Ref. Certif. No.

JP-20631-M1-UL

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

CB TEST CERTIFICATE

Product	DC-DC Converter
Name and address of the applicant	COSEL CO LTD 1-6-43 KAMIAKAE-MACHI TOYAMA-SHI TOYAMA 930-0816 JAPAN
Name and address of the manufacturer	COSEL CO LTD 1-6-43 KAMIAKAE-MACHI TOYAMA-SHI TOYAMA 930-0816 JAPAN
Name and address of the factory Note: *When more than one factory, please report on page 2*	COSEL CO LTD TATEYAMA FACTORY 78 DOGENJI TATEYAMAMACHI NAKANIIKAWA-GUN TOYAMA 930-0241 JAPAN ☒ Additional Information on page 2
Ratings and principal characteristics	See Page 2
Trademark (if any)	COSEL
Type of Customer's Testing Facility (CTF) Stage used	
Model / Type Ref.	See Page 2
Additional information (if necessary may also be reported on page 2)	Additionally evaluated to EN 62368-1:2014/ A11:2017. National Differences specified in the CB Test Report. ☒ Additional Information on page 2
A sample of the product was tested and found to be in conformity with	IEC 62368-1:2014
As shown in the Test Report Ref. No. which forms part of this Certificate	E132067-A6009-CB-1 issued on 2019-04-11

This CB Test Certificate is issued by the National Certification Body

☐ UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA
☐ UL (Demko), Borupvang 5A DK-2750 Ballerup, DENMARK
☒ UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN
☐ UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA

For full legal entity names see www.ul.com/ncbnames

Date: 2019-04-12
Original Issue Date: 2019-01-18

Signature:

Masamichi Takagi

Model Details:
MGFwxyz
("w" = S or W, "x" = 40 or 80, "y" = 05 (when "x" = 40 only), 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W))
Maybe provided with suffix "-$#####".
("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)

Factories:
WUXI COSEL ELECTRONICS CO LTD
5TH FL, BLD A3, NO.866 LIYUAN DEVELOMPENT ZONE WUXI JIANGSU 214072
CHINA

Ratings:
4.5 - 9 Vdc/ 7.09 A (Model MGFS40053R3), 7.87 A (Model MGFS400512, MGFS400515), 7.96 A (Model MGFS400505, MGFW400515), 8.47 A (Model MGFW400512)

9 - 36 Vdc/ 4.38 A (Model MGFS40243R3), 5.13 A (Model MGFS402405), 5.20 A (Model MGFS402415), 5.24 A (Model MGFS402412), 5.60 A (Model MGFW402412), 5.64 A (Model MGFW402415), 7.5 A (Model MGFS80243R3), 10.0 A (Model MGFS802412), 10.1 A (Model MGFS802405, MGFS802415, MGFW802412, MGFW802415)

18 - 76 Vdc/ 2.17 A (Model MGFS40483R3), 2.57 A (Model MGFS404805, MGFS404815), 2.62 A (Model MGFS404812), 2.77 A (Model MGFW404812), 2.79 A (Model MGFW404815), 3.8 A (Model MGFS80483R3), 5.0 A (Model MGFS804812, MGFS804815, MGFW804815), 5.1 A (Model MGFS804805, MGFW804812)

Additional Information:
(Technical Modification)
The original report was modified to include the following changes/additions:
- Addirion of Model MGFwxyz ("w" = S or W, "x" = 80, "y" = 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W)).
Maybe provided with suffix "-$#####". ("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)
- Added LIMITED POWER SOURCE (ANNEX Q.1) evaluation of Model MGFw40yz.

Additional information (if necessary)

☐ UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA
☐ UL (Demko), Borupvang 5A DK-2750 Ballerup, DENMARK
☒ UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN
☐ UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA

For full legal entity names see www.ul.com/ncbnames

Date: 2019-04-12
Original Issue Date: 2019-01-18

Signature:
Masamichi Takagi

Test Report issued under the responsibility of:

TEST REPORT
IEC 62368-1
Audio/video, information and communication technology equipment
Part 1: Safety requirements

Report Number .....:	E132067-A6009-CB-1
Date of issue.....:	2019-01-17 ; Amendment 1 : 2019-04-11
Total number of pages .....:	82
Applicant's name.....:	**COSEL CO LTD**
Address .....:	**1-6-43 KAMIAKAE-MACHI** **TOYAMA-SHI** **TOYAMA 930-0816 JAPAN**
Name of Test Laboratory preparing the Report .....:	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
Test specification:	
Standard .....:	IEC 62368-1:2014 (Second Edition)
Test procedure .....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC62368_1B
Test Report Form(s) Originator .....:	UL(US)
Master TRF.....:	2014-03

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory.
The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test Item description :	DC-DC Converter
Trade Mark .....:	COSEL
Manufacturer .....:	COSEL CO LTD 1-6-43 KAMIAKAE-MACHI TOYAMA-SHI TOYAMA 930-0816 JAPAN
Model/Type reference .....:	MGFwxyz ("w" = S or W, "x" = 40 or 80, "y" = 05 (when "x" = 40 only), 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W)) Maybe provided with suffix "-$#####". ("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)
Ratings .....:	4.5 - 9 Vdc/ 7.09 A (Model MGFS40053R3), 7.87 A (Model MGFS400512, MGFS400515), 7.96 A (Model MGFS400505, MGFW400515), 8.47 A (Model MGFW400512) 9 - 36 Vdc/ 4.38 A (Model MGFS40243R3), 5.13 A (Model MGFS402405), 5.20 A (Model MGFS402415), 5.24 A (Model MGFS402412), 5.60 A (Model MGFW402412), 5.64 A (Model MGFW402415), 7.5 A (Model MGFS80243R3), 10.0 A (Model MGFS802412), 10.1 A (Model MGFS802405, MGFS802415, MGFW802412, MGFW802415) 18 - 76 Vdc/ 2.17 A (Model MGFS40483R3), 2.57 A (Model MGFS404805, MGFS404815), 2.62 A (Model MGFS404812), 2.77 A (Model MGFW404812), 2.79 A (Model MGFW404815), 3.8 A (Model MGFS80483R3), 5.0 A (Model MGFS804812, MGFS804815, MGFW804815), 5.1 A (Model MGFS804805, MGFW804812)
Testing procedure and testing location:	
☒ CB Testing Laboratory:	
Testing location/ address ..... :	UL Japan, Inc., 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
Tested by (name + signature).....:	Hirokatsu Kubota / Project Handler — H. Kubota
Approved by (name + signature) .....:	Ikuro Kinno / Reviewer
☐ Testing procedure: CTF Stage 1	
Testing location/ address..... :	
Tested by (name + signature).....:	

Approved by (name + signature) .....:		
☐ Testing procedure: CTF Stage 2		
Testing location/ address..... :		
Tested by (name + signature).....:		
Witnessed by (name + signature).....:		
Approved by (name + signature) .....:		
☐ Testing procedure: CTF Stage 3		
☐ Testing procedure: CTF Stage 4		
Testing location/ address..... :		
Tested by (name + signature).....:		
Witnessed by (name + signature).....:		
Approved by (name + signature) .....:		
Supervised by (name + signature) .....:		

List of Attachments (including a total number of pages in each attachment):

National Differences (0 pages)
Enclosures (12 pages)

Summary of testing:

Tests performed (name of test and test clause):	**Testing Location:**
	CBTL: UL Japan, Inc., 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
CLASSIFICATION OF ELECTRICAL ENERGY SOURCES (5.2, 5.7)	
MAXIMUM OPERATING TEMPERATURE FOR MATERIALS, COMPONENTS AND SYSTEMS (5.4.1.4, Annex B.2)	
POWER MEASUREMENTS (6.2.2.2, 6.2.2.3)	
INPUT TEST: SINGLE PHASE (B.2.5)	
SIMULATED ABNORMAL OPERATING CONDITIONS (B.3)	
SIMULATED SINGLE FAULT CONDITIONS (B.4)	
LIMITED POWER SOURCE (ANNEX Q.1)	

Summary of compliance with National Differences:

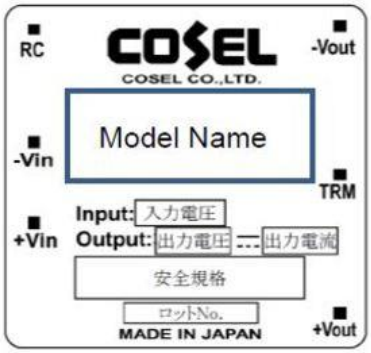
List of countries addressed: EU Group Differences, US,CA

☒ **The product fulfils the requirements of:** EN 62368-1:2014 + A11:2017, UL 62368-1 2ND Ed, Issued December 1, 2014, CSA CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

MGFw40yz



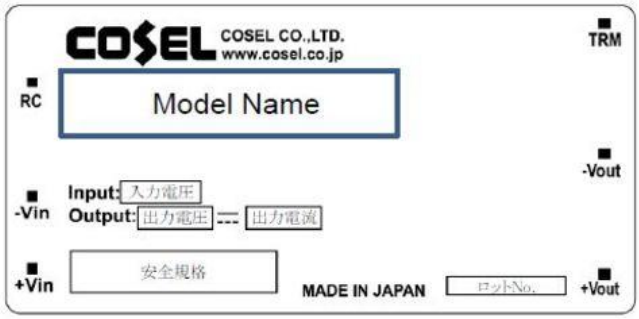
*Model Name

("w" = S or W, "y" = 05, 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W)

Maybe provided with suffix "-$#####".

("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)

MGFw80yz



*Model Name

("w" = S or W, "y" = 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W)

Maybe provided with suffix "-$#####".

("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)

Note: The above markings are the minimum requirements required by the safety lab. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

TEST ITEM PARTICULARS:	
Classification of use by	Ordinary person, Skilled person
Supply Connection	External Circuit - not Mains connected ES1 or ES2
Supply % Tolerance	None
Supply Connection – Type	for building in
Considered current rating of protective device as part of building or equipment installation	N/A
Equipment mobility	for building-in
Over voltage category (OVC)	other: not directly connected to the mains
Class of equipment	Not classified
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient	85 °C
IP protection class	IPX0
Power Systems	N/A
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	0.03 or less kg
POSSIBLE TEST CASE VERDICTS:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
TESTING:	
Date of receipt of test item..... :	2018-09-03, 2018-09-06, 2019-01-31, 2019-02-04, 2019-02-07, 2019-02-13
Date (s) of performance of tests..... :	2019-03-05 TO 2019-04-04
GENERAL REMARKS:	
"(See Enclosure #)" refers to additional information appended to the report. **"(See appended table)" refers to a table appended to the report.** **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☒ **Yes** ☐ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) ..... :	COSEL CO LTD TATEYAMA FACTORY 78 DOGENJI TATEYAMAMACHI NAKANIIKAWA-GUN TOYAMA 930-0241 JAPAN WUXI COSEL ELECTRONICS CO LTD 5TH FL, BLD A3, NO.866 LIYUAN DEVELOMPENT ZONE WUXI JIANGSU 214072 CHINA

GENERAL PRODUCT INFORMATION:

Report Summary

The original report was modified on 2019-04-11 to include the following changes/additions:
This report is only valid in conjunction with CB Test Report Ref. No. E132067-A6009-CB-1.
Amendment 1 is Technical Amendment to cover modifications as follows.
- Addirion of Model MGFwxyz ("w" = S or W, "x" = 80, "y" = 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W)).
Maybe provided with suffix "-$#####". ("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)
- Added LIMITED POWER SOURCE (ANNEX Q.1) evaluation of Model MGFw40yz.

Product Description

The products covered in this report are components DC-DC Converter for building, providing functional insulation.
See Model Differences for details.

Output Ratings;
<MGF40 series>
MGFS40053R3: 2.97 - 3.63 Vdc, maximum 8 A, maximum 26.4 W
MGFS400505: 4.5 - 5.5 Vdc, maximum 6 A, maximum 30 W
MGFS400512: 10.8 - 13.2 Vdc, maximum 2.5 A, maximum 30 W
MGFS400515: 13.5 - 16.5 Vdc, maximum 2 A, maximum 30 W
MGFW400512: +12 Vdc/ 1.3 A, -12 Vdc/ 1.3 A, maximum 31.2 W
MGFW400515: +15 Vdc/ 1 A, -15 Vdc/ 1 A, maximum 30 W
MGFS40243R3: 2.97 - 3.63 Vdc, maximum 10 A, maximum 33 W
MGFS402405: 4.5 - 5.5 Vdc, maximum 8 A, maximum 40 W
MGFS402412: 10.8 - 13.2 Vdc, maximum 3.4 A, maximum 40.8 W
MGFS402415: 13.5 - 16.5 Vdc, maximum 2.7 A, maximum 40.5 W
MGFW402412: +12 Vdc/ 1.7 A, -12 Vdc/ 1.7 A, maximum 40.8 W
MGFW402415: +15 Vdc/ 1.4 A, -15 Vdc/ 1.4 A, maximum 42 W
MGFS40483R3: 2.97 - 3.63 Vdc, maximum 10 A, maximum 33 W

MGFS404805: 4.5 - 5.5 Vdc, maximum 8 A, maximum 40 W
MGFS404812: 10.8 - 13.2 Vdc, maximum 3.4 A, maximum 40.8 W
MGFS404815: 13.5 - 16.5 Vdc, maximum 2.7 A, maximum 40.5 W
MGFW404812: +12 Vdc/ 1.7 A, -12 Vdc/ 1.7 A, maximum 40.8 W
MGFW404815: +15 Vdc/ 1.4 A, -15 Vdc/ 1.4 A, maximum 42 W
<MGF80 series>
MGFS80243R3: 2.97 - 3.63 Vdc, maximum 18 A, maximum 59.4 W
MGFS802405: 4.5 - 5.5 Vdc, maximum 16 A, maximum 80 W
MGFS802412: 10.8 - 13.2 Vdc, maximum 6.7 A, maximum 80.4 W
MGFS802415: 13.5 - 16.5 Vdc, maximum 5.4 A, maximum 81 W
MGFW802412: +12 Vdc/ 3.4 A, -12 Vdc/ 3.4 A, maximum 81.6 W
MGFW802415: +15 Vdc/ 2.7 A, -15 Vdc/ 2.7 A, maximum 81 W
MGFS80483R3: 2.97 - 3.63 Vdc, maximum 18 A, maximum 59.4 W
MGFS804805: 4.5 - 5.5 Vdc, maximum 16 A, maximum 80 W
MGFS804812: 10.8 - 13.2 Vdc, maximum 6.7 A, maximum 80.4 W
MGFS804815: 13.5 - 16.5 Vdc, maximum 5.4 A, maximum 81 W
MGFW804812: +12 Vdc/ 3.4 A, -12 Vdc/ 3.4 A, maximum 81.6 W
MGFW804815: +15 Vdc/ 2.7 A, -15 Vdc/ 2.7 A, maximum 81 W
Adjustment of output voltage range was made via external control circuit.
Condition of output derating: Depends on model, input voltage and 100% of rated output is allowed within the specified temperature at the measurement points specified as “Point A”. See Enclosure Id. 7-01 for details.

Model Differences

Each models are identical except as follows:
- The input/output rating.
- Major components described in "Table 4.1.2"
- Minor components.

Nomenclature:
MGF w x y z -$#####
I II III IV V VI
I. Series name
MGF
II. Output specification
S: Single output
W: Dual output
III. Output wattege
40: 40 W
80: 80 W
IV. Input voltage
05: 4.5 - 13 Vdc
24: 9 - 36 Vdc
48: 18 - 76 Vdc
V. Output voltage
3R3: 3.3 Vdc (when "w" = S only)
05: 5 Vdc (when "w" = S only)
12: 12 Vdc (when "w" = S), +12/ -12 Vdc (when "w" = W)

15: 15 Vdc (when "w" = S), +15/ -15 Vdc (when "w" = W)
VI. Optional suffix
"$" is G, R or blank.
G: Capacitor (C901) between Input and Output is removed.
R: Reverses the logic of remote control function. (Positive)
"#####" signify marketing purpose or minor modification and does not affect safety.

Additional application considerations – (Considerations used to test a component or sub-assembly) -
The Clearances and Creepage Distances have additionally been assessed for suitability up to 5000 m elevation.
The circuit diagrams may be required at the discretion of the accepting NCB.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 85 °C (See Enclosure Id. 7-01)

Engineering Conditions of Acceptability
When installed in an end-product, consideration must be given to the following:

- The following output circuits are at ES2 energy levels : Output of all models
- The following output circuits are at PS2 energy levels : Output of all models
- The following end-product enclosures are required : Electrical, Fire
- This component has been evaluated in 'control of fire spread' method assuming appropriate fire enclosure is provided in end product. Unless the fire enclosure is made of non-combustible or V-0 material, the separation from the PIS (all electrical components) shall be considered.
- Insulation between Input Terminal and Output Terminal of the DC-DC Converter complies with Functional Insulation.
- The product is intended for use on the following power systems: The equipment is for building-in, and intended to be supplied by secondary dc power source which is isolated from mains by double or reinforced insulation, highest transient voltage in secondary circuit is up to 1500 V and ES2 electrical energy source.
- This DC-DC Converter has no internal fuse, therefore Input circuit must provide external fuse in +Vin line. Test was performed at input circuit provided external fuse. (Littelfuse, Inc., Type 324, Model MGFw4005z and MGFw8024z: Rated 250V, 15A, Model MGFw4024z and MGFw8048z: Rated 250V, 10A, Model MGFw4048z: Rated 250V, 5A,) (These fuses are not certified by IEC.)
- The following secondary output circuits are Limited Power Source: Output of all models except for Model MGFS40053R3, MGFS40243R3, MGFS402405, MGFS40483R3, MGFS404805, MGFS80243R3, MGFS802405, MGFS80483R3, MGFS804805.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.5.2	Cross-sectional area (mm^2) ..... :		—
Q	**CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING**		Pass
Q.1	Limited power sources	Outputs of all models were evaluated as Limited Power Source except for Model MGFS40053R3, MGFS40243R3, MGFS402405, MGFS40483R3, MGFS404805, MGFS80243R3, MGFS802405, MGFS80483R3, MGFS804805.	Pass
Q.1.1 a)	Inherently limited output		Pass
Q.1.2	Compliance and test method	(See appended table Annex Q)	Pass

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.1.2	TABLE: list of critical components and materials	Pass

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Case for MGFw40yz	Interchangeable	Interchangeable	Brass, Overall 25.1 by 25.1 mm, 0.3 mm thick.	--	--
Case for MGFw80yz	Interchangeable	Interchangeable	Brass, Overall 25.1 by 50.5 mm, 0.3 mm thick.	--	--
Potting Compound	Interchangeable	Interchangeable	Silicone, Minimum V-2, Minimum 150 °C	UL 94	UL
Printed Wiring Board (P1, P2 board)	Interchangeable	Interchangeable	Minimum V-1, minimum 130 °C	UL 796	UL
Transformer (T1) for MGFS40053R3, MGFS400505	Cosel Co., Ltd.	17M041	Designed with PWB Traces. (Winding: In 2T, Out 2T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS400512	Cosel Co., Ltd.	17M051	Designed with PWB Traces. (Winding: In 2T, Out 5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS400515	Cosel Co., Ltd.	17M061	Designed with PWB Traces. (Winding: In 2T, Out 6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW400512	Cosel Co., Ltd.	17M151	Designed with PWB Traces. (Winding: In 2T, Out 5/5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW400515	Cosel Co., Ltd.	17M161	Designed with PWB Traces. (Winding: In 2T, Out 6/6T)	IEC 62368-1:2004	-- , Tested in unit.
Transformer (T1) for MGFS40243R3, MGFS402405	Cosel Co., Ltd.	17M081	Designed with PWB Traces. (Winding: In 4T, Out 2T)	IEC 62368-1:2004	-- , Tested in unit.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Transformer (T1) for MGFS402412	Cosel Co., Ltd.	17M091	Designed with PWB Traces. (Winding: In 4T, Out 5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS402415	Cosel Co., Ltd.	17M101	Designed with PWB Traces. (Winding: In 4T, Out 6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW402412	Cosel Co., Ltd.	17M171	Designed with PWB Traces. (Winding: In 4T, Out 5/5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW402415	Cosel Co., Ltd.	17M181	Designed with PWB Traces. (Winding: In 4T, Out 6/6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS40483R3, MGFS404805	Cosel Co., Ltd.	17M121	Designed with PWB Traces. (Winding: In 8T, Out 2T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS404812	Cosel Co., Ltd.	17M131	Designed with PWB Traces. (Winding: In 8T, Out 5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS404815	Cosel Co., Ltd.	17M141	Designed with PWB Traces. (Winding: In 8T, Out 6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW404812	Cosel Co., Ltd.	17M191	Designed with PWB Traces. (Winding: In 8T, Out 5/5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW404815	Cosel Co., Ltd.	17M201	Designed with PWB Traces. (Winding: In 8T, Out 6/6T)	IEC 62368-1:2004	Tested in unit.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Transformer (T1) for MGFS80243R3, MGFS802405	Cosel Co., Ltd.	17M221	Designed with PWB Traces. (Winding: In 2T, Out 1T)	IEC 62368-1:2004	-- , Tested in unit.
Transformer (T1) for MGFS802412	Cosel Co., Ltd.	17M231	Designed with PWB Traces. (Winding: In 2T, Out 2T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS802415	Cosel Co., Ltd.	17M241	Designed with PWB Traces. (Winding: In 2T, Out 3T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW802412	Cosel Co., Ltd.	17M291	Designed with PWB Traces. (Winding: In 2T, Out 2/2T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW802415	Cosel Co., Ltd.	17M301	Designed with PWB Traces. (Winding: In 2T, Out 3/3T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS80483R3, MGFS804805	Cosel Co., Ltd.	17M261	Designed with PWB Traces. (Winding: In 4T, Out 1T)	IEC 62368-1:2004	-- , Tested in unit.
Transformer (T1) for MGFS804812	Cosel Co., Ltd.	17M271	Designed with PWB Traces. (Winding: In 4T, Out 2T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS804815	Cosel Co., Ltd.	17M281	Designed with PWB Traces. (Winding: In 4T, Out 3T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW804812	Cosel Co., Ltd.	17M311	Designed with PWB Traces. (Winding: In 4T, Out 2/2T)	IEC 62368-1:2004	Tested in unit.

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Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Transformer (T1) for MGFW804815	Cosel Co., Ltd.	17M321	Designed with PWB Traces. (Winding: In 4T, Out 3/3T)	IEC 62368-1:2004	Tested in unit.
FET (TR101) for MGFw4005z	Interchangeable	Interchangeable	Minimum 40 V, Minimum 100 A	--	--
FET (TR101) for MGFw4024z	Interchangeable	Interchangeable	Minimum 80 V, Minimum 44 A	--	--
FET (TR101) for MGFw4048z	Interchangeable	Interchangeable	Minimum 150 V, Minimum 29 A	--	--
FET (TR101) for MGFw8024z	Interchangeable	Interchangeable	Minimum 80 V, Minimum 95 A	--	--
FET (TR101) for MGFw8048z	Interchangeable	Interchangeable	Minimum 150 V, Minimum 56 A	--	--
FET (TR141) for MGFwx24z	Interchangeable	Interchangeable	Minimum 60 V, Minimum 6 A	--	--
FET (TR141) for MGFwx48z	Interchangeable	Interchangeable	Minimum 100 V, Minimum 3.3 A	--	--
Thermistor (TH101)	Mitsubishi Materials Corporation	TD05-3H103	10 kohm at 25 °C	IEC 62368-1:2004	Tested in unit.
- Description:					
--	--	--	--	--	-- , --

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.

2) Description line content is optional. Main line description needs to clearly detail the component used for testing

3) The CBTL has verified the component information

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	Table: Classification of electrical energy sources						Pass
5.2.2.2 – Steady State Voltage and Current conditions							
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				U (Vrms or Vpk)	I (Apk or Arms)	Hz	
1	76 Vdc	Output (+Vout) of model MGFS404815 (*1) (*2)	Normal	16.5 Vdc	--	--	ES1
			Abnormal - External Variable Resistor maximum	17.3 Vdc	--	--	
			Abnormal - Output overload	15.0 Vdc	--	--	
			Single fault – TR101 D to S, SC	6.0 Vdc	--	--	
			Single fault – TR101 D to G, SC (*4)	8.0 Vdc	--	--	
			Single fault – T1 Pin 1 to 2, SC (*4)	19.2 Vpk	--	--	
			Single fault – T1 Pin 1 to 3, SC (*4)	5.6 Vdc	--	--	
			Single fault – T1 Pin 1 to 4, SC (*4)	8.0 Vdc	--	--	
			Single fault – T1 Pin 2 to 3, SC (*4)	5.6 Vdc	--	--	
			Single fault – T1 Pin 2 to 4, SC (*4)	10.0 Vdc	--	--	
			Single fault – T1 Pin 3 to 4, SC (*4)	16.5 Vdc	--	--	
			Single fault – PC201 Input side, SC	4.5 Vdc	--	--	
			Single fault – PC201 Output side, SC	21.9 Vpk	--	--	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	Table: Classification of electrical energy sources						Pass
			Single fault – L501, SC (*4)	16.5 Vdc	--	--	
			Single fault – TR501 D to S, SC (*4)	6.0 Vpk	--	--	
2	76 Vdc	Output (+Vout) of model MGFW404815 (*3)	Normal	15.0 Vdc	--	--	ES1
			Abnormal	15.0 Vdc	--	--	
			Single fault – T1 Pin 1 to 5, SC	26.0 Vpk	--	--	
			Single fault – T1 Pin 1 to 6, SC	26.4 Vpk	--	--	
			Single fault – T1 Pin 2 to 5, SC	32.0 Vpk	--	--	
			Single fault – T1 Pin 2 to 6, SC	27.0 Vpk	--	--	
			Single fault – T1 Pin 5 to 6, SC	22.6 Vpk	--	--	
			Single fault – TR511 D to S, SC	7.0 Vdc	--	--	
			Single fault – PC201 Input side, SC	10.0 Vdc	--	--	
			Single fault – PC201 Output side, SC	26.0 Vpk	--	--	
			Single fault – TR101 D to S, SC	11.0 Vdc	--	--	
3	76 Vdc	Output (-Vout) of model MGFW404815 (*3)	Normal	15.0 Vdc	--	--	ES1
			Abnormal	14.7 Vdc	--	--	
			Single fault – T1 Pin 1 to 5, SC	29.0 Vpk	--	--	
			Single fault – T1 Pin 5 to 6, SC	19.6 Vpk	--	--	
			Single fault – L511, SC	15.0 Vdc	--	--	
			Single fault – TR511 D to S, SC	14.0 Vpk	--	--	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	**Table: Classification of electrical energy sources**						Pass
			Single fault – PC201 Input side, SC	3.0 Vdc	--	--	
			Single fault – PC201 Output side, SC	25.0 Vpk	--	--	
			Single fault – TR101 D to S, SC	2.0 Vdc	--	--	
4	76 Vdc	T1 Pin1 to - Vin of model MGFS404815 (*5)	Normal	76.8 Vdc	--	--	
			Abnormal	--	--	--	
			Single fault – TR141 D to S, SC	76.6 Vdc	--	--	ES2
			Single fault – TR141 D to G, SC	84.8 Vdc	--	--	
5	76 Vdc	T1 Pin2 to - Vin of model MGFS404815 (*5)	Normal	113 Vpk	--	386.8 KHz	
			Abnormal	--	--	--	
			Single fault – TR101 D to S, SC	0 Vdc	--	--	ES2
			Single fault – TR101 D to G, SC	1.0 Vdc	--	--	
6	76 Vdc	Output (+Vout) of model MGFS804815 (*1) (*6)	Normal	16.5 Vdc	--	--	
			Abnormal - External Variable Resistor maximum	17.3 Vdc	--	--	
			Abnormal - Output overload	15.0 Vdc	--	--	ES1
			Single fault - TR141 D to S, SC (*7)	18.4 Vpk	--	--	
			Single fault - TR141 D to G, SC (*7)	20.8 Vpk	--	--	
			Single fault - T1 Pin 1 to 2, SC (*7)	20.4 Vpk	--	--	

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Clause	Requirement + Test	Result - Remark	Verdict

5.2	**Table: Classification of electrical energy sources**						Pass
			Single fault - T1 Pin 1 to 4, SC (*7)	18.4 Vdc	--	--	
			Single fault - T1 Pin 2 to 4, SC (*7)	18.4 Vdc	--	--	
			Single fault - T1 Pin 3 to 4, SC (*7)	18.8 Vdc	--	--	
			Single fault – L501, SC (*7)	16.5 Vdc	--	--	
			Single fault – L501, SC (*7)	16.5 Vdc	--	--	
			Single fault - PC201 Input side, SC (*7)	17.8 Vdc	--	--	
			Single fault - PC291 Output side, SC (*7)	16.5 Vdc	--	--	
			Single fault - PC291 Input side, SC (*7)	17.8 Vdc	--	--	
7	76 Vdc	T1 Pin 1 to - Vin of Model MGFS804815 (*8)	Normal	76.2 Vdc	--	--	
			Abnormal	--	--	--	
			Single fault - TR141 D to S, SC	79.6 Vdc	--	--	ES2
			Single fault - TR141 D to G, SC	78.8 Vdc	--	--	
8	76 Vdc	T1 Pin 2 to - Vin of Model MGFS804815 (*8)	Normal	125 Vpk	--	227.3 KHz	
			Abnormal	--	--	--	
			Single fault - TR101 D to S, SC	8.8 Vpk	--	--	ES2
			Single fault - TR101 D to G, SC	8.8 Vpk	--	--	
9	76 Vdc	T1 Pin 4 to Pin 3 of Model MGFS804815 (*8)	Normal	102 Vpk	--	227.2 KHz	
			Abnormal	--	--	--	ES2
			Single fault – SC/OC	--	--	--	

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Clause	Requirement + Test	Result - Remark	Verdict

5.2	**Table: Classification of electrical energy sources**						Pass
10	76 Vdc	Output (+Vout) of model MGFW804815 (*9)	Normal	15.0 Vdc	--	--	ES2
			Abnormal	--	--	--	
			Single fault – T1 Pin 1 to 6, SC	16.8 Vdc	--	--	
			Single fault – T1 Pin 2 to 5, SC	70.4 Vpk	--	--	
11	76 Vdc	Output (-Vout) of model MGFW804815 (*9)	Normal	15.0 Vdc	--	--	ES1
			Abnormal	--	--	--	
			Single fault – T1 Pin 1 to 6, SC	16.4 Vdc	--	--	
			Single fault – T1 Pin 2 to 5, SC	16.4 Vdc	--	--	

5.2.2.3 - Capacitance Limits

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters		ES Class
				Capacitance, nF	Upk (V)	
--	--	--	Normal	--	--	--
			Abnormal	--	--	
			Single fault – SC/OC	--	--	

5.2.2.4 - Single Pulses

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Duration (ms)	Upk (V)	Ipk (mA)	
1	76 Vdc	Output (-Vout) of model MGFW404815 (*3)	Normal	--	--	--	ES2
			Abnormal	--	--	--	
			Single fault – T1 Pin 1 to 6, SC	Less than 200ms	75.2 Vpk	--	
			Single fault – T1 Pin 2 to 5, SC	Less than 200ms	55.0 Vpk	--	
			Single fault – T1 Pin 2 to 6, SC	Less than 100ms	74.0 Vpk	--	
2	76 Vdc	Output (+Vout) of model MGFS804815 (*1) (*6)	Normal	--	--	--	ES1
			Abnormal	--	--	--	
			Single fault – PC201 Output side, SC (*7)	22.0 Vpk	--	--	
3	76 Vdc		Normal	--	--	--	ES1

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Clause	Requirement + Test	Result - Remark	Verdict

5.2	**Table: Classification of electrical energy sources**						Pass
		Output (+Vout) of model MGFW804815 (*1) (*6)	Abnormal	--	--	--	
			Single fault – PC201 Output side, SC (*7)	21.6 Vpk	--	--	
4	76 Vdc	Output (-Vout) of model MGFW804815 (*1) (*6)	Normal	--	--	--	ES1
			Abnormal	--	--	--	
			Single fault – PC201 Output side, SC (*7)	22.6 Vpk	--	--	
5.2.2.5 - Repetitive Pulses							
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Off time (ms)	Upk (V)	Ipk (mA)	
1	76 Vdc	Output (+Vout) of model MGFS804815 (*1) (*6)	Normal	--	--	--	ES1
			Abnormal	--	--	--	
			Single fault – TR501 D to S, SC (*7)	Less than 3 second	7.8 Vpk	--	
2	76 Vdc	Output (+Vout) of model MGFW804815 (*9)	Normal	--	--	--	ES1
			Abnormal	--	--	--	
			Single fault – T1 Pin 5 to 6, SC	Less than 3 second	6.4 Vpk	--	
3	76 Vdc	Output (-Vout) of model MGFW804815 (*9)	Normal	--	--	--	ES1
			Abnormal	--	--	--	
			Single fault – TR501 D to S, SC (*7)	Less than 3 second	6.4 Vpk	--	
Test Conditions: Normal – Abnormal - Supplementary information: SC=Short Circuit, OC=Short Circuit							

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Clause	Requirement + Test	Result - Remark	Verdict

5.2	**Table: Classification of electrical energy sources**	Pass

(*1) Maximum voltage within output voltage range.

(*2) Model MGFS404815 is representative of MGFS40yz because the circuit configuration is the same all other models of MGFS40yz.

(*3) Model MGFW404815 is representative of MGFW40yz because the circuit configuration is the same all other models of MGFW40yz.

(*4) This test was representative of +Vout of Model MGFW40yz because the circuit configuration is the same.

(*5) Model MGFS404815 is representative of MGFw40yz because the input side circuit configuration is the same all other models of MGFw40yz.

(*6) Model MGFS804815 is representative of MGFS80yz because the circuit configuration is the same all other models of MGFS80yz.

(*7) This test was representative of +Vout of Model MGFW80yz because the circuit configuration is the same.

(*8) Model MGFS804815 is representative of MGFw40yz because the input side circuit configuration is the same all other models of MGFw80yz.

(*9) This test was representative of +Vout of Model MGFW80yz because the circuit configuration is the same.

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Clause	Requirement + Test	Result - Remark	Verdict

5.4.1.4, 6.3.2, 9.0, B.2.6	**TABLE: Temperature measurements**					Pass
	Supply voltage (V) ..... :	See below	See below	See below	See below	—
	Ambient T_{min} (°C) ..... :	See below	See below	See below	See below	—
	Ambient T_{max} (°C) ..... :	See below	See below	See below	See below	—
	Tma (°C) ..... :	See below	See below	See below	See below	—
Maximum measured temperature T of part/at:		T (°C)				Allowed T_{max} (°C)
Maximum operating temperatures for materials, components and systems		---	---	---	---	---
Model MGFS40053R3		--	--	--	--	--
Input voltage (Vdc)		4.5	4.5	13	13	--
Output load		100% (3.3V/ 8A)	100% (3.3V/ 8A)	100% (3.3V/ 8A)	100% (3.3V/ 8A)	--
Ambient (C)		23	Calculated at 110	23	Calculated at 110	--
Center of the Case (Reference point)		85	110	62	110	--
PWB near TR101 (P2 board)		105	130	73	121	130 (PWB)
PWB near TR501 (P2 board)		98	123	70	118	130 (PWB)
PWB T1 Input side (P2 board)		98	123	68	116	130 (PWB)
PWB T1 Output side (P2 board)		98	123	69	117	130 (PWB)
PWB near R227 (P1 board)		93	118	67	115	130 (PWB)
PWB near C901 (P1 board)		84	109	61	115	130 (PWB)
Test Duration		2 hours	--	2 hours	--	--
Model MGFS400515		--	--	--	--	--
Input voltage (Vdc)		4.5	4.5	13	13	--
Output load		100% (15V/ 2A)	100% (15V/ 2A)	100% (15V/ 2A)	100% (15V/ 2A)	--
Ambient (C)		23	Calculated at 110	23	Calculated at 110	--

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Clause	Requirement + Test	Result - Remark			Verdict
Center of the Case (Reference point)	78	110	62	110	--
PWB near TR101 (P2 board)	92	124	72	120	130 (PWB)
PWB near TR501 (P2 board)	89	121	70	118	130 (PWB)
PWB T1 Input side (P2 board)	87	119	67	115	130 (PWB)
PWB T1 Output side (P2 board)	86	118	67	115	130 (PWB)
PWB near R227 (P1 board)	86	118	69	117	130 (PWB)
PWB near C901 (P1 board)	75	107	60	108	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Model MGFW400512	--	--	--	--	--
Input voltage (Vdc)	4.5	4.5	13	13	--
Output load	100% (+12V/ 1.3A, -12V/ 1.3A)	100% (+12V/ 1.3A, -12V/ 1.3A)	100% (+12V/ 1.3A, -12V/ 1.3A)	100% (+12V/ 1.3A, -12V/ 1.3A)	--
Ambient (C)	24	Calculated at 110	24	Calculated at 110	--
Center of the Case (Reference point)	90	110	69	110	--
PWB near TR101 (P2 board)	107	127	80	121	130 (PWB)
PWB near TR501 (P2 board)	106	126	80	121	130 (PWB)
PWB T1 Input side (P2 board)	104	124	76	117	130 (PWB)
PWB T1 Output side (P2 board)	103	124	77	118	130 (PWB)
PWB near R227 (P1 board)	98	118	75	116	130 (PWB)
PWB near C901 (P1 board)	94	114	72	113	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Model MGFS40243R3	--	--	--	--	--
Input voltage (Vdc)	9	9	18	18	--
Output load	70% (5V/ 5.6A)	70% (5V/ 5.6A)	100% (5V/ 8A)	100% (5V/ 8A)	--

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Clause	Requirement + Test	Result - Remark	Verdict

Ambient (C)	21	Calculated at 110	21	Calculated at 110	--
Center of the Case (Reference point)	54	110	66	110	--
PWB near TR101 (P2 board)	63	119	78	122	130 (PWB)
PWB near TR501 (P2 board)	64	120	80	124	130 (PWB)
PWB T1 Input side (P2 board)	62	118	76	120	130 (PWB)
PWB T1 Output side (P2 board)	62	118	78	122	130 (PWB)
PWB near R227 (P1 board)	60	116	73	117	130 (PWB)
PWB near C901 (P1 board)	57	113	72	116	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (5V/ 8A)	100% (5V/ 8A)	--	--	--
Ambient (C)	21	Calculated at 110	--	--	--
Center of the Case (Reference point)	62	110	--	--	--
PWB near TR101 (P2 board)	74	122	--	--	130 (PWB)
PWB near TR501 (P2 board)	75	123	--	--	130 (PWB)
PWB T1 Input side (P2 board)	71	119	--	--	130 (PWB)
PWB T1 Output side (P2 board)	73	121	--	--	130 (PWB)
PWB near R227 (P1 board)	69	117	--	--	130 (PWB)
PWB near C901 (P1 board)	68	116	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFS402412	--	--	--	--	--
Input voltage (Vdc)	9	9	18	18	--
Output load	70% (12V/ 3.38A)	70% (12V/ 3.38A)	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--

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Clause	Requirement + Test	Result - Remark	Verdict

Ambient (C)	20	Calculated at 110	23	Calculated at 110	--
Center of the Case (Reference point)	61	110	69	110	--
PWB near TR101 (P2 board)	72	121	82	123	130 (PWB)
PWB near TR501 (P2 board)	71	120	82	123	130 (PWB)
PWB T1 Input side (P2 board)	70	119	79	120	130 (PWB)
PWB T1 Output side (P2 board)	69	118	79	120	130 (PWB)
PWB near R227 (P1 board)	69	118	79	120	130 (PWB)
PWB near C901 (P1 board)	63	112	73	114	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	65	110	--	--	--
PWB near TR101 (P2 board)	77	122	--	--	130 (PWB)
PWB near TR501 (P2 board)	76	121	--	--	130 (PWB)
PWB T1 Input side (P2 board)	74	119	--	--	130 (PWB)
PWB T1 Output side (P2 board)	74	119	--	--	130 (PWB)
PWB near R227 (P1 board)	74	119	--	--	130 (PWB)
PWB near C901 (P1 board)	68	113	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFW402415	--	--	--	--	--
Input voltage (Vdc)	9	9	18	18	--

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Clause	Requirement + Test	Result - Remark			Verdict
Output load	70% (+15V/ 0.98A, -15V/ 0.98A)	70% (+15V/ 0.98A, -15V/ 0.98A)	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--
Ambient (C)	21	Calculated at 110	22	Calculated at 110	--
Center of the Case (Reference point)	61	110	68	110	--
PWB near TR101 (P2 board)	69	118	78	120	130 (PWB)
PWB near TR501 (P2 board)	68	117	78	120	130 (PWB)
PWB T1 Input side (P2 board)	66	115	75	117	130 (PWB)
PWB T1 Output side (P2 board)	65	114	75	117	130 (PWB)
PWB near R227 (P1 board)	64	113	72	114	130 (PWB)
PWB near C901 (P1 board)	60	109	69	111	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	63	110	--	--	--
PWB near TR101 (P2 board)	72	119	--	--	130 (PWB)
PWB near TR501 (P2 board)	72	119	--	--	130 (PWB)
PWB T1 Input side (P2 board)	69	116	--	--	130 (PWB)
PWB T1 Output side (P2 board)	69	116	--	--	130 (PWB)
PWB near R227 (P1 board)	67	114	--	--	130 (PWB)
PWB near C901 (P1 board)	63	110	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

Model MGFS40483R3	--	--	--	--	--
Input voltage (Vdc)	18	18	36	36	--
Output load	70% (3.3V/ 7A)	70% (3.3V/ 7A)	100% (3.3V/ 10A)	100% (3.3V/ 10A)	--
Ambient (C)	20	Calculated at 110	20	Calculated at 110	--
Center of the Case (Reference point)	54	110	67	110	--
PWB near TR101 (P2 board)	59	115	74	117	130 (PWB)
PWB near TR501 (P2 board)	59	115	78	121	130 (PWB)
PWB T1 Input side (P2 board)	56	112	70	113	130 (PWB)
PWB T1 Output side (P2 board)	56	112	72	115	130 (PWB)
PWB near R227 (P1 board)	53	109	66	109	130 (PWB)
PWB near C901 (P1 board)	56	112	72	115	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	76	76	--	--	--
Output load	100% (3.3V/ 10A)	100% (3.3V/ 10A)	--	--	--
Ambient (C)	20	Calculated at 110	--	--	--
Center of the Case (Reference point)	66	110	--	--	--
PWB near TR101 (P2 board)	74	118	--	--	130 (PWB)
PWB near TR501 (P2 board)	54	98	--	--	130 (PWB)
PWB T1 Input side (P2 board)	69	113	--	--	130 (PWB)
PWB T1 Output side (P2 board)	71	115	--	--	130 (PWB)
PWB near R227 (P1 board)	66	110	--	--	130 (PWB)
PWB near C901 (P1 board)	71	115	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

Model MGFS404812	--	--	--	--	--
Input voltage (Vdc)	18	18	36	36	--
Output load	70% (12V/ 3.38A)	70% (12V/ 3.38A)	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--
Ambient (C)	20	Calculated at 110	21	Calculated at 110	--
Center of the Case (Reference point)	62	110	74	110	--
PWB near TR101 (P2 board)	71	119	85	121	130 (PWB)
PWB near TR501 (P2 board)	68	116	83	119	130 (PWB)
PWB T1 Input side (P2 board)	66	114	79	115	130 (PWB)
PWB T1 Output side (P2 board)	67	115	80	116	130 (PWB)
PWB near R227 (P1 board)	62	110	74	110	130 (PWB)
PWB near C901 (P1 board)	61	109	74	110	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	76	76	--	--	--
Output load	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	73	110	--	--	--
PWB near TR101 (P2 board)	84	121	--	--	130 (PWB)
PWB near TR501 (P2 board)	82	119	--	--	130 (PWB)
PWB T1 Input side (P2 board)	78	115	--	--	130 (PWB)
PWB T1 Output side (P2 board)	79	116	--	--	130 (PWB)
PWB near R227 (P1 board)	74	111	--	--	130 (PWB)
PWB near C901 (P1 board)	73	110	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Model MGFW404815	--	--	--	--	--
Input voltage (Vdc)	18	18	36	36	--
Output load	70% (+15V/ 0.98A, -15V/ 0.98A)	70% (+15V/ 0.98A, -15V/ 0.98A)	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--
Ambient (C)	20	Calculated at 110	21	Calculated at 110	--
Center of the Case (Reference point)	54	110	65	110	--
PWB near TR101 (P2 board)	61	117	75	120	130 (PWB)
PWB near TR501 (P2 board)	59	115	73	118	130 (PWB)
PWB T1 Input side (P2 board)	59	115	72	117	130 (PWB)
PWB T1 Output side (P2 board)	57	113	71	116	130 (PWB)
PWB near R227 (P1 board)	55	111	67	112	130 (PWB)
PWB near C901 (P1 board)	54	110	66	111	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	76	76	--	--	--
Output load	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	67	110	--	--	--
PWB near TR101 (P2 board)	77	120	--	--	130 (PWB)
PWB near TR501 (P2 board)	74	117	--	--	130 (PWB)
PWB T1 Input side (P2 board)	74	117	--	--	130 (PWB)
PWB T1 Output side (P2 board)	72	115	--	--	130 (PWB)
PWB near R227 (P1 board)	70	113	--	--	130 (PWB)

IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
PWB near C901 (P1 board)	67	110	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFS80243R3	--	--	--	--	--
Input voltage (Vdc)	18	18	--	--	--
Output load	100% (3.3V/ 18A)	100% (3.3V/ 18A)	--	--	--
Ambient (C)	23	Calculated at 110	--	--	--
PWB T1 Input side (near L101)	66	108	--	--	130 (PWB)
PWB T1 Output side (near TR501)	74	116	--	--	130 (PWB)
PWB near TR101	75	117	--	--	130 (PWB)
PWB near L501	68	110	--	--	130 (PWB)
Center of the Case (Reference point)	68	110	--	--	130 (PWB)
PWB near TR502	74	116	--	--	130 (PWB)
PWB near TR141	69	111	--	--	130 (PWB)
Test Duration	5 hours	--	--	--	--
Model MGFS802415	--	--	--	--	--
Input voltage (Vdc)	18	18	--	--	--
Output load	100% (15V/ 5.4A)	100% (15V/ 5.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
PWB T1 Input side (near L101)	68	107	--	--	130 (PWB)
PWB T1 Output side (near TR501)	76	115	--	--	130 (PWB)
PWB near TR101	79	118	--	--	130 (PWB)
PWB near L501	68	107	--	--	130 (PWB)

IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
Center of the Case (Reference point)	71	110	--	--	130 (PWB)
PWB near TR502	78	117	--	--	130 (PWB)
PWB near TR141	73	112	--	--	130 (PWB)
Test Duration	4 hours	--	--	--	--
Model MGFW802412	--	--	--	--	--
Input voltage (Vdc)	18	18	--	--	--
Output load	100% (+12V/ 3.4A, -12V/ 3.4A)	100% (+12V/ 3.4A, -12V/ 3.4A)	--	--	--
Ambient (C)	23	Calculated at 110	--	--	--
PWB T1 Input side (near L101)	71	108	--	--	130 (PWB)
PWB T1 Output side (near TR501)	78	115	--	--	130 (PWB)
PWB near TR101	80	117	--	--	130 (PWB)
PWB near L511	71	108	--	--	130 (PWB)
Center of the Case (Reference point)	73	110	--	--	130 (PWB)
PWB near TR511	80	117	--	--	130 (PWB)
PWB near TR141	75	112	--	--	130 (PWB)
PWB near L501	71	108	--	--	130 (PWB)
Test Duration	4 hours	--	--	--	--
Model MGFS80483R3	--	--	--	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (3.3V/ 18A)	100% (3.3V/ 18A)	--	--	--
Ambient (C)	23	Calculated at 110	--	--	--
PWB T1 Input side (near L101)	66	110	--	--	130 (PWB)

IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
PWB T1 Output side (near TR501)	75	119	--	--	130 (PWB)
PWB near TR101	73	117	--	--	130 (PWB)
PWB near L501	70	114	--	--	130 (PWB)
Center of the Case (Reference point)	66	110	--	--	130 (PWB)
PWB near TR502	75	119	--	--	130 (PWB)
PWB near TR141	68	112	--	--	130 (PWB)
Test Duration	4 hours	--	--	--	--
Model MGFS804815	--	--	--	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (15V/ 5.4A)	100% (15V/ 5.4A)	--	--	--
Ambient (C)	23	Calculated at 110	--	--	--
PWB T1 Input side (near L101)	64	108	--	--	130 (PWB)
PWB T1 Output side (near TR501)	72	116	--	--	130 (PWB)
PWB near TR101	73	117	--	--	130 (PWB)
PWB near L501	65	109	--	--	130 (PWB)
Center of the Case (Reference point)	66	110	--	--	130 (PWB)
PWB near TR502	75	119	--	--	130 (PWB)
PWB near TR141	66	110	--	--	130 (PWB)
Test Duration	3 hours	--	--	--	--
Model MGFW804812	--	--	--	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (+12V/ 3.4A, -12V/ 3.4A)	100% (+12V/ 3.4A, -12V/ 3.4A)	--	--	--

IEC 62368-1					
Clause	Requirement + Test	Result - Remark			Verdict
Ambient (C)	23	Calculated at 110	--	--	--
PWB T1 Input side (near L101)	64	108	--	--	130 (PWB)
PWB T1 Output side (near TR501)	72	116	--	--	130 (PWB)
PWB near TR101	70	114	--	--	130 (PWB)
PWB near L511	65	109	--	--	130 (PWB)
Center of the Case (Reference point)	66	110	--	--	130 (PWB)
PWB near TR511	74	118	--	--	130 (PWB)
PWB near TR141	66	110	--	--	130 (PWB)
PWB near L501	65	109	--	--	130 (PWB)
Test Duration	4 hours	--	--	--	--
Abnormal Operating Conditions: Output overload	---	---	---	---	---
Model (Output terminal)	Model MGFS40053R3 (+Vout)	Model MGFS40053R3 (+Vout)	Model MGFS40515 (+Vout)	Model MGFS40515 (+Vout)	--
Input voltage (Vdc)	4.5	4.5	4.5	4.5	--
Ambient (C)	20	Tma = 85	18	Tma = 85	--
PWB near TR101 (P2 board)	125	190	119	186	300
PWB T1 Input side (P2 board)	124	189	114	181	300
PWB T1 Output side (P2 board)	123	188	111	178	300
Model (Output terminal)	Model MGFW400515 (+Vout)	Model MGFW400515 (+Vout)	Model MGFW400515 (-Vout)	Model MGFW40515 (-Vout)	--
Input voltage (Vdc)	4.5	4.5	4.5	4.5	--
Ambient (C)	20	Tma = 85	21	Tma = 85	--
PWB near TR101 (P2 board)	133	198	133	197	300
PWB T1 Input side (P2 board)	126	191	126	190	300
PWB T1 Output side (P2 board)	122	187	123	187	300

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Clause	Requirement + Test	Result - Remark	Verdict

Model (Output terminal)	Model MGFS40483R3 (+Vout)	Model MGFS40483R3 (+Vout)	Model MGFS40481 5 (+Vout)	Model MGFS40481 5 (+Vout)	--
Input voltage (Vdc)	36 Vdc	36 Vdc	36 Vdc	36 Vdc	--
Ambient (C)	18	Tma = 85	18	Tma = 85	--
PWB near TR101 (P2 board)	97	134	134	201	300
PWB T1 Input side (P2 board)	92	159	127	194	300
PWB T1 Output side (P2 board)	95	162	126	193	300
Model (Output terminal)	Model MGFS80483R3 (+Vout)	Model MGFS80483R3 (+Vout)	Model MGFS80481 5 (+Vout)	Model MGFS80481 5 (+Vout)	--
Input voltage (Vdc)	36	36	36	36	--
Ambient (C)	22	Tma = 85	22	Tma = 85	--
PWB T1 Input side (P1 board)	78	141	72	135	300
PWB T1 Output side (P1 board)	90	153	81	144	300
Model (Output terminal)	Model MGFW804812 (+Vout)	Model MGFW804812 (+Vout)	Model MGFW804812 (-Vout)	Model MGFW80481 2 (-Vout)	--
Input voltage (Vdc)	36	36	36	36	--
Ambient (C)	22	Tma = 85	22	Tma = 85	--
PWB T1 Input side (P1 board)	71	134	70	133	300
PWB T1 Output side (P1 board)	81	144	79	142	300
Model (Output terminal)	Model MGFW804815 (+Vout)	Model MGFW804815 (+Vout)	Model MGFW804815 (-Vout)	Model MGFW80481 5 (-Vout)	--
Input voltage (Vdc)	36	36	36	36	--
Ambient (C)	23	Tma = 85	25	Tma = 85	--
PWB T1 Input side (P1 board)	71	132	86	146	300
PWB T1 Output side (P1 board)	85	147	97	157	300
Supplementary information:					
The models tested were considered representative of the entire series because the construction is the same all other models. The representative models were considered based on specifications of maximum VA and/or maximum output current.					

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class

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Clause	Requirement + Test	Result - Remark	Verdict

N/A	--	--	--	--	--	--	--
Supplementary information:							
Note 1: Tma should be considered as directed by applicable requirement Note 2: Tma is not included in assessment of Touch Temperatures (Clause 9)							

6.2.2	**Table: Electrical power sources (PS) measurements for classification**					Pass
Source	Description	Measurement		Max Power after 3 s	Max Power after 5 s*)	PS Classification
A	Output (+Vout) of model MGFS40243R3 (*1) (*2)	Power (W)	:	--	41.652	PS2
		V_A (V)	:	--	3.56	
		I_A (A)	:	--	11.70	
B	Output (+Vout) of model MGFS402412 (*1) (*2)	Power (W)	:	--	54.12	PS2
		V_A (V)	:	--	13.2	
		I_A (A)	:	--	4.1	
C	Output (+Vout) of model MGFS402415 (*1) (*2)	Power (W)	:	--	51.15	PS2
		V_A (V)	:	--	16.5	
		I_A (A)	:	--	3.1	
D	Output (+Vout) of model MGFW402415 (*3)	Power (W)	:	--	45.856	PS2
		V_A (V)	:	--	14.33	
		I_A (A)	:	--	3.2	
E	Output (-Vout) of model MGFW402415 (*3)	Power (W)	:	--	46.016	PS2
		V_A (V)	:	--	14.38	
		I_A (A)	:	--	3.2	
F	Output (+Vout) of model MGFS80483R3 (*1) (*4)	Power (W)	:	--	75.50	PS2
		V_A (V)	:	--	3.63	
		I_A (A)	:	--	20.8	
G	Output (+Vout) of model MGFS804815 (*1) (*4)	Power (W)	:	--	97.35	PS2
		V_A (V)	:	--	16.5	
		I_A (A)	:	--	5.9	
H	Output (+Vout) of model MGFW804812 (*5)	Power (W)	:	--	63.08	PS2
		V_A (V)	:	--	11.88	
		I_A (A)	:	--	5.31	
I	Output (-Vout) of model MGFW804812 (*5)	Power (W)	:	--	64.44	PS2
		V_A (V)	:	--	12.0	
		I_A (A)	:	--	5.37	
Supplementary Information:						

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

(*) Measurement taken only when limits at 3 seconds exceed PS1 limits

(*1) Maximum voltage within output voltage range.

(*2) Models MGFS40243R3, MGFS402412 and MGFS402415 are representative of MGFS40yz because the circuit configuration is the same all other models of MGFS40yz.

(*3) Model MGFW402415 is representative of MGFW40yz because the circuit configuration is the same all other models of MGFW40yz.

(*4) Models MGFS80483R3 and MGFS804812 are representative of MGFS80yz because the circuit configuration is the same all other models of MGFS80yz.

(*5) Model MGFW802412 is representative of MGFW40yz because the circuit configuration is the same all other models of MGFW40yz.

The representative models were considered based on specifications of maximum VA and/or maximum output current.

B.2.5	**TABLE: Input test**							Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
Model MGFS40053R3	--	--	--	--	--	--	--	--
4.5 Vdc	--	7.21	7.09	32.4	--	(*1)	--	Rated Load (Load factor: 100%, 3.3V/ 8A)
4.5 Vdc	--	7.09	7.09	31.9	--	(*1)	--	+10% output voltage (Load factor: 100%, 3.63V/ 7.28A)
4.5 Vdc	--	6.48	7.09	29.2	--	(*1)	--	-10% output voltage (Load factor: 100%, 2.97V/ 8A)
13 Vdc	--	2.33	7.09	30.3	--	(*1)	--	Rated Load (Load factor: 100%, 3.3V/ 8A)
13 Vdc	--	2.31	7.09	30.0	--	(*1)	--	+10% output voltage (Load factor: 100%, 3.63V/ 7.28A)
13 Vdc	--	2.11	7.09	27.4	--	(*1)	--	-10% output voltage (Load factor: 100%, 2.97V/ 8A)
Model MGFS400505	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test							Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
4.5 Vdc	--	8.02	7.96	36.1	--	(*1)	--	Rated Load (Load factor: 100%, 5V/ 6A)
13 Vdc	--	2.87	7.96	37.3	--	(*1)	--	Rated Load (Load factor: 100%, 5V/ 6A)
Model MGFS400512	--	--	--	--	--	--	--	--
4.5 Vdc	--	7.81	7.87	35.2	--	(*1)	--	Rated Load (Load factor: 100%, 12V/ 2.5A)
13 Vdc	--	2.59	7.87	33.7	--	(*1)	--	Rated Load (Load factor: 100%, 12V/ 2.5A)
Model MGFS400515	--	--	--	--	--	--	--	--
4.5 Vdc	--	7.76	7.87	34.9	--	(*1)	--	Rated Load (Load factor: 100%, 15V/ 2A)
13 Vdc	--	2.57	7.87	33.4	--	(*1)	--	Rated Load (Load factor: 100%, 15V/ 2A)
Model MGFS40243R3	--	--	--	--	--	--	--	--
9 Vdc	--	2.96	4.38	26.6	--	(*1)	--	Rated Load (Load factor: 70%: 3.3V/ 7A)
18 Vdc	--	2.10	4.38	37.8	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
36 Vdc	--	1.04	4.38	37.4	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
Model MGFS402405	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test							Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
9 Vdc	--	3.54	5.13	31.9	--	(*1)	--	Rated Load (Load factor: 70%: 5V/ 5.6A)
18 Vdc	--	2.49	5.13	44.8	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
36 Vdc	--	1.24	5.13	44.6	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
Model MGFS402412	--	--	--	--	--	--	--	--
9 Vdc	--	3.63	5.24	32.7	--	(*1)	--	Rated Load (Load factor: 70%: 12V/ 2.38A
18 Vdc	--	2.53	5.24	45.5	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
36 Vdc	--	1.25	5.24	45.0	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
Model MGFS402415	--	--	--	--	--	--	--	--
9 Vdc	--	3.62	5.20	32.6	--	(*1)	--	Rated Load (Load factor: 70%: 15V/ 1.89A)
18 Vdc	--	2.51	5.20	45.2	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)
36 Vdc	--	1.24	5.20	44.6	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)
Model MGFS40483R3	--	--	--	--	--	--	--	--
18 Vdc	--	1.45	2.17	26.1	--	(*1)	--	Rated Load (Load factor: 70%: 3.3V/ 7A)

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test							Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
36 Vdc	--	1.04	2.17	37.4	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
76 Vdc	--	0.49	2.17	37.2	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
Model MGFS4 04805	--	--	--	--	--	--	--	--
18 Vdc	--	1.79	2.57	32.2	--	(*1)	--	Rated Load (Load factor: 70%: 5V/ 5.6A)
36 Vdc	--	1.26	2.57	45.4	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
76 Vdc	--	0.59	2.57	44.8	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
Model MGFS4 04812	--	--	--	--	--	--	--	--
18 Vdc	--	1.81	2.62	32.6	--	(*1)	--	Rated Load (Load factor: 70%: 12V/ 2.38A)
36 Vdc	--	1.27	2.62	45.7	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
76 Vdc	--	0.60	2.62	45.6	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
Model MGFS4 04815	--	--	--	--	--	--	--	--
18 Vdc	--	1.82	2.57	32.8	--	(*1)	--	Rated Load (Load factor: 70%: 15V/ 1.89A)
36 Vdc	--	1.27	2.57	45.7	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test							Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
76 Vdc	--	0.60	2.57	45.6	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)
Model MGFW 400512	--	--	--	--	--	--	--	--
4.5 Vdc	--	8.24	8.47	37.1	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.3A, -12V/ 1.3A)
13 Vdc	--	2.72	8.47	35.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.3A, -12V/ 1.3A)
Model MGFW 400515	--	--	--	--	--	--	--	--
4.5 Vdc	--	7.79	7.96	35.1	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1A, -15V/ 1A)
13 Vdc	--	2.58	7.96	33.5	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1A, -15V/ 1A)
Model MGFW 402412	--	--	--	--	--	--	--	--
9 Vdc	--	3.60	5.60	32.4	--	(*1)	--	Rated Load (Load factor: 70%, +12V/ 1.19A, -12V/ 1.19A)
18 Vdc	--	2.52	5.60	45.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
36 Vdc	--	1.26	5.60	45.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
Model MGFW 402415	--	--	--	--	--	--	--	--
9 Vdc	--	3.67	5.64	33.0	--	(*1)	--	Rated Load (Load factor: 70%, +15V/ 0.98A, -15V/ 0.98A)
18 Vdc	--	2.57	5.64	46.3	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test							Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
36 Vdc	--	1.28	5.64	46.1	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
Model MGFW 404812	--	--	--	--	--	--	--	--
18 Vdc	--	1.79	2.77	32.2	--	(*1)	--	Rated Load (Load factor: 70%, +12V/ 1.19A, -12V/ 1.19A)
36 Vdc	--	1.26	2.77	45.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
76 Vdc	--	0.60	2.77	45.6	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
Model MGFW 404815	--	--	--	--	--	--	--	--
18 Vdc	--	1.81	2.79	32.6	--	(*1)	--	Rated Load (Load factor: 70%, +15V/ 0.98A, -15V/ 0.98A)
36 Vdc	--	1.28	2.79	46.1	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
76 Vdc	--	0.61	2.79	46.4	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
Model MGFS8 0243R3	--	--	--	--	--	--	--	--
9 Vdc	--	5.09	7.5	45.81	--	(*1)	--	Rated Load (Load factor: 70%: 3.3V/ 12.6A)
18 Vdc	--	3.67	7.5	66.06	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 18A)
36 Vdc	--	1.81	7.5	65.16	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 18A)
Model MGFS8 02405	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test							Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
9 Vdc	--	6.82	10.1	61.38	--	(*1)	--	Rated Load (Load factor: 70%: 5V/ 11.2A)
18 Vdc	--	4.84	10.1	87.12	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 16A)
36 Vdc	--	2.40	10.1	86.40	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 16A)
Model MGFS802412	--	--	--	--	--	--	--	--
9 Vdc	--	6.80	10.0	61.2	--	(*1)	--	Rated Load (Load factor: 70%: 12V/ 4.69A)
18 Vdc	--	4.77	10.0	85.86	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 6.7A)
36 Vdc	--	2.38	10.0	82.8	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 6.7A)
Model MGFS802415	--	--	--	--	--	--	--	--
9 Vdc	--	6.93	10.1	62.37	--	(*1)	--	Rated Load (Load factor: 70%: 15V/ 3.78A)
18 Vdc	--	4.87	10.1	87.66	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 5.4A)
36 Vdc	--	2.42	10.1	87.12	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 5.4A)
Model MGFS80483R3	--	--	--	--	--	--	--	--
18 Vdc	--	2.54	3.8	45.72	--	(*1)	--	Rated Load (Load factor: 70%: 3.3V/ 12.6A)

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Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test							Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
36 Vdc	--	1.81	3.8	65.16	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 18A)
76 Vdc	--	0.861	3.8	65.44	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 18A)
Model MGFS8 04805	--	--	--	--	--	--	--	--
18 Vdc	--	3.38	5.1	60.84	--	(*1)	--	Rated Load (Load factor: 70%: 5V/ 11.2A)
36 Vdc	--	2.42	5.1	87.12	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 16A)
76 Vdc	--	1.15	5.1	87.40	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 16A)
Model MGFS8 04812	--	--	--	--	--	--	--	--
18 Vdc	--	3.35	5.0	60.3	--	(*1)	--	Rated Load (Load factor: 70%: 12V/ 4.69A)
36 Vdc	--	2.37	5.0	85.32	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 6.7A)
76 Vdc	--	1.13	5.0	85.88	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 6.7A)
Model MGFS8 04815	--	--	--	--	--	--	--	--
18 Vdc	--	3.38	5.0	60.84	--	(*1)	--	Rated Load (Load factor: 70%: 15V/ 3.78A)
36 Vdc	--	2.39	5.0	86.04	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 5.4A)

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Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test							Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
76 Vdc	--	1.14	5.0	86.64	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 5.4A)
Model MGFW 802412	--	--	--	--	--	--	--	--
9 Vdc	--	6.95	10.1	62.55	--	(*1)	--	Rated Load (Load factor: 70%, +12V/ 2.38A, -12V/ 2.38A)
18 Vdc	--	4.92	10.1	88.56	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 3.4A, -12V/ 3.4A)
36 Vdc	--	2.45	10.1	88.20	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 3.4A, -12V/ 3.4A)
Model MGFW 802415	--	--	--	--	--	--	--	--
9 Vdc	--	6.84	10.1	61.56	--	(*1)	--	Rated Load (Load factor: 70%, +15V/ 1.89A, -15V/ 1.89A)
18 Vdc	--	4.80	10.1	86.40	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 2.7A, -15V/ 2.7A)
36 Vdc	--	2.40	10.1	86.40	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 2.7A, -15V/ 2.7A)
Model MGFW 804812	--	--	--	--	--	--	--	--
18 Vdc	--	3.44	5.1	61.92	--	(*1)	--	Rated Load (Load factor: 70%, +12V/ 2.38A, -12V/ 2.38A)
36 Vdc	--	2.43	5.1	87.48	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 3.4A, -12V/ 3.4A)
76 Vdc	--	1.16	5.1	88.16	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 3.4A, -12V/ 3.4A)
Model MGFW 804815	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test							Pass
U (V)	Hz	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
18 Vdc	--	3.21	5.0	57.78	--	(*1)	--	Rated Load (Load factor: 70%, +15V/ 1.89A, -15V/ 1.89A)
36 Vdc	--	2.40	5.0	86.40	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 2.7A, -15V/ 2.7A)
76 Vdc	--	1.14	5.0	86.64	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 2.7A, -15V/ 2.7A)
Supplementary information:								
(*1): External Fuse was used while testing. See Engineering Conditions of Acceptability.								

B.3	TABLE: Abnormal operating condition tests							Pass
Ambient temperature (°C) .....:					See below			—
Power source for EUT: Manufacturer, model/type, output rating ..:					Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W			—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFS40053R3	--	--	--	--	--	--	--	--
Output (+Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately The temperature did not rise more than the heating test. No components damaged. Input current: 1.2A <-> 0.005A NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests							Pass
Ambient temperature (°C) .....:				See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:				Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W				—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	4.5 Vdc	3 hours 25 minutes	(*1)	--	See Observation	See Observation	CT at 8.7A, 3.30Vdc Load adjusted to 9.0A, outputs stopped after 1min. PWB near TR101 (P2 board): 125°C PWB T1 Input side (P2 board): 124°C PWB T1 Output side (P2 board): 123°C TH101 body: 119°C Center of the Case: 110°C Ambient: 20°C NC, NT (*2)
Model MGFS400515	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. The temperature did not rise more than the heating test. No components damaged. Input current: 116mA <-> 135mA NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests								Pass
Ambient temperature (°C) .....:					See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:					Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W				—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation	
Output (+Vout)	Overload	4.5 Vdc	5 hours 32 minutes	(*1)	--	See Observation	See Observation	CT at 2.28A, 15.0Vdc Input current: 9.31A Load adjusted to 2.30A, input current and output voltage intermittent oscillation immediately. Finally shorted. No component damaged. Input current: 0.38A <-> 0.005A PWB near TR101 (P2 board): 119°C PWB T1 Input side (P2 board): 114°C PWB T1 Output side (P2 board): 111°C TH101 body: 110°C Center of the Case: 102°C Ambient: 18°C NC, NT	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	**TABLE: Abnormal operating condition tests**	Pass
Ambient temperature (°C) .....:	See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:	Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFW400515	--	--	--	--	--	--	--	--
Output (+Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No components damaged. NC, NT
Output (+Vout)	Overload	4.5 Vdc	2 hours 29 minutes	(*1)	--	See Observation	See Observation	CT at 1.20A, 15.2Vdc Load adjusted to 1.30A, output stopped after 7miin. PWB near TR101 (P2 board): 133°C PWB T1 Input side (P2 board): 126°C PWB T1 Output side (P2 board): 122°C TH101 body: 122°C Center of the Case: 111°C Ambient: 20°C No components damaged. NC, NT (*2)

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No components damaged. Input current: 0.581A NC, NT
Output (-Vout)	Overload	4.5 Vdc	2 hours	(*1)	--	See Observation	See Observation	CT at 1.25A, 14.7Vdc Load adjusted to 1.30A, output stopped after 2min. PWB near TR101 (P2 board): 133°C PWB T1 Input side (P2 board): 126°C PWB T1 Output side (P2 board): 123°C TH101 body: 122°C Center of the Case: 111°C Ambient: 21°C No components damaged. NC, NT (*2)

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFS40483R3	--	--	--	--	--	--	--	--
Output (+Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. The temperature did not rise more than the heating test. No components damaged. NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	36 Vdc	9 hours 32 minutes	(*1)	--	See Observation	See Observation	CT at 11.5A, 3.3Vdc Input current: 1.22A Load adjusted to 12.5A, output voltage intermittent oscillation immediately. Finally shorted. PWB near TR101 (P2 board): 97°C PWB T1 Input side (P2 board): 92°C PWB T1 Output side (P2 board): 95°C TH101 body: 90°C Center of the case: 89°C Ambient: 18°C No components damaged. NC, NT
Model MGFS404815	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No components damaged. NC, NT
Output (+Vout)	Overload	36 Vdc	11 hours 17 minutes	(*1)	--	See Observation	See Observation	CT at 3.55A, 15.0Vdc Load adjusted to 3.65A, output stopped after 8mintes. PWB near TR101 (P2 board): 134°C PWB T1 Input side (P2 board): 127°C PWB T1 Output side (P2 board): 126°C TH101 body: 121°C Center of the case: 112°C Ambient: 20°C NC, NT (*2)
Model MGFW404815	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	**TABLE: Abnormal operating condition tests**		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No component damaged. Input current: 0.240A <-> 0.003A NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	36 Vdc	8 hours 58 minutes	(*1)	--	See Observation	See Observation	CT at 2.1A, 15.0Vdc Input current: 1.64A Load adjusted to 2.25A, Input current intermittent oscillation immediately. Finally shorted. Any component damaged. Input current: 0.303A <-> 0.003A PWB near TR101 (P2 board): 105°C PWB T1 Input side (P2 board): 102°C PWB T1 Output side (P2 board): 99°C TH101 body: 97°C Center of the case: 92°C Ambient: 19°C NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	**TABLE: Abnormal operating condition tests**							Pass
Ambient temperature (°C) .....:				See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:				Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W				—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No component damaged. Input current: 0.172A <-> 0.003A NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Overload	36 Vdc	12 hours 15 minutes	(*1)	--	See Observation	See Observation	CT at 1.95A, 14.7Vdc Input current: 1.59A Load adjusted to 1.97A, Input current intermittent oscillation immediately. Finally shorted. Any component damaged. Input current: 0.120A <-> 0.003A PWB near TR101 (P2 board): 109°C PWB T1 Input side (P2 board): 103°C PWB T1 Output side (P2 board): 104°C TH101 body: 99°C Center of the Case: 94°C Ambient : 20°C NC, NT
Model MGFS80483R3	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	**TABLE: Abnormal operating condition tests**							Pass
Ambient temperature (°C) .....:				See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:				Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W				—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	36 Vdc	45 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No component damaged. Input current: 0.11A <-> 0.004A No hazard.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	36 Vdc	12 hours 15 minutes	(*1)	--	See Observation	See Observation	CT at 20.0A, 3.30Vdc Input current: 2.03A Load adjusted to 20.6A, Input current and output voltage intermittent oscillation immediately. No component damaged. PWB T1 Input side: 78°C PWB T1 Output side: 90°C TH231 body: 84°C Center of the Case: 80°C Ambient : 22°C No hazard.
Model MGFS804815	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No component damaged. Input current: 0.07A <-> 0.004A No hazard.

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	36 Vdc	10 hours	(*1)	--	See Observation	See Observation	CT at 6.3A, 15Vdc Input current: 2.81A Load adjusted to 6.4A, Input current and output voltage intermittent oscillation immediately. No component damaged. PWB T1 Input side: 72°C PWB T1 Output side: 81°C TH231 body: 76°C Center of the Case: 74°C Ambient : 22°C No hazard.
Model MGFW804812	--	--	--	--	--	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	36 Vdc	54 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No component damaged. Input current: 0.106A <-> 0.004A No hazard.

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests							Pass
Ambient temperature (°C) .....:			See below					—
Power source for EUT: Manufacturer, model/type, output rating ..:			Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W					—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	36 Vdc	3 hours 03 minutes	(*1)	--	See Observation	See Observation	CT at 4.4A, 12.02Vdc Input current: 2.83A Load adjusted to 4.4A, Input current and all output voltage intermittent oscillation immediately. After 10 minutes sample damaged. PWB T1 Input side: 71°C PWB T1 Output side: 81°C TH231 body: 76°C Center of the Case: 73°C Ambient : 22°C No hazard.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Short	36 Vdc	1 hours 27 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No component damaged. Input current: 0.07A <-> 0.129A No hazard.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Overload	36 Vdc	10 hours 23 minutes	(*1)	--	See Observation	See Observation	CT at 4.4A, 11.99Vdc Input current: 2.80A Load adjusted to 4.4A, Input current and all output voltage intermittent oscillation immediately. After 35 minutes sample damaged. PWB T1 Input side: 70°C PWB T1 Output side: 79°C TH231 body: 75°C Center of the Case: 72°C Ambient : 23°C No hazard.
Model MGFW804815	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	36 Vdc	1 hours	(*1)	--	--	--	Input current intermittent oscillation immediately. No component damaged. Input current: 0.0.8A <-> 0.004A No hazard. PWB T1 Input side: 35°C PWB T1 Output side: 40°C TH231 body: 36°C Center of the Case: 35°C Ambient : 23°C No hazard.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests							Pass
Ambient temperature (°C) .....:			See below					—
Power source for EUT: Manufacturer, model/type, output rating ..:			Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W					—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	36 Vdc	6 hours 27 minutes	(*1)	--	See Observation	See Observation	CT at 3.5A, 14.93Vdc Input current: 2.75A Load adjusted to 3.67A, Input current and all output voltage intermittent oscillation immediately. After 1 hour 31 minutes sample damaged. PWB T1 Input side: 71°C PWB T1 Output side: 85°C TH231 body: 77°C Center of the Case: 73°C Ambient : 23°C No hazard.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	**TABLE: Abnormal operating condition tests**		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No component damaged. Input current: 0.0.8A <-> 0.004A No hazard. PWB T1 Input side: 34°C PWB T1 Output side: 36°C TH231 body: 35°C Center of the Case: 34°C Ambient : 23°C No hazard.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests							Pass
Ambient temperature (°C) .....:				See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:				Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W				—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Overload	36 Vdc	11 hours 4 minutes	(*1)	--	See Observation	See Observation	CT at 3.67A, 14.93Vdc Input current: 2.90A Load adjusted to 3.72A, Input current and all output voltage intermittent oscillation immediately. Finally shorted. Any components damaged. PWB T1 Input side: 86°C PWB T1 Output side: 97°C TH231 body: 93°C Center of the Case: 89°C Ambient : 25°C No hazard.
Supplementary information:								

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests								Pass
Ambient temperature (°C) .....:					See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:					Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W				—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation	
Test table is provided to record abnormal and fault conditions for all applicable energy sources including Thermal burn injury. Column “Abnormal/Fault.” Specify if test condition by indicating “Abnormal” then the condition for a Clause B.3 test or “Single Fault” then the condition for Clause B.4. CT - Constant temperatures were obtained NC - Cheesecloth remained intact NT - Tissue paper remained intact (*1): External Fuse was used while testing. See Engineering Conditions of Acceptability. (*2): Test was conducted three times due to TH101 was operated. The models tested were considered representative of the entire series because the construction is the same all other models. The representative models were considered based on specifications of maximum VA, maximum output current and/or Transformer winding number/structure.									

B.4	TABLE: Fault condition tests								Pass
Ambient temperature (°C) .....:					See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:					Manufacturer: TAKASAGO, Model: HX060-100M2, Ratings: 0-60V, 0-100A, Two series connected.				—
Component No.	Fault Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation	
Model MGFS400505	--	--	--	--	--	--	--	--	
TR101 D to S	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.104A -> 0.015A NC, NT.	

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
TR101 D to G	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.076A -> 0.016A NC, NT.
T1 Pin 1 to 2	Short	13 Vdc	15 minutes	(*1)	--	--	--	Input and output started intermittent oscillation immediately. Temperature stabilized at 92°C (Core) No components damaged. Input current: 3.47A <-> 0A NC, NT.
T1 Pin 1 to 3	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.104A -> 0.015A NC, NT.
T1 Pin 1 to 4	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.104A -> 0.015A NC, NT

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
T1 Pin 2 to 3	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.075A -> 0.015A NC, NT
T1 Pin 2 to 4	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.075A -> 0.015A NC, NT
T1 Pin 3 to 4	Short	13 Vdc	15 minutes	(*1)	--	--	--	Input current decreased immediately. Output operated normally. No abnormal heat rise. No components damaged. Input current: 0.076A -> 0.026A NC, NT
PC201 Output side	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. Input current: 0.104A -> 0.018A NC, NT

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
PC201 Input side	Short	13 Vdc	15 minutes	(*1)	--	--	--	Intermittent oscillation of output started immediately. No components damaged. Input current: 0.104A -> 0.033A NC, NT
Model MGFW400512	--	--	--	--	--	--	--	--
T1 Pin 1 to 5	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.093A -> 0.014A NC, NT
T1 Pin 1 to 6	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.090A -> 0.015A NC, NT
T1 Pin 2 to 5	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.093A-> 0.014A NC, NT

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
T1 Pin 2 to 6	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.090A -> 0.015A NC, NT
T1 Pin 5 to 6	Short	13 Vdc	15 minutes	(*1)	--	--	--	Input current increased immediately. Output operated normally. No abnormal heat rise. No components damaged. Input current: 0.090A -> 0.183A NC, NT
Model MGFS404815	--	--	--	--	--	--	--	--
TR141 D to S	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased immediately. Input current: 0.031A-> 0.038A Temperature stabilized at 59°C (Core) NC, NT
TR141 D to G	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased immediately. Input current: 0.031A-> 0.043A Temperature stabilized at 66°C (Core) NC, NT

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
TR101 D to S	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
TR101 D to G	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 1 to 2	Short	76 Vdc	1 hour	(*1)	--	--	--	Input current increased immediately and components damaged. Input current: 0.018A-> 0.061A Temperature stabilized at 78°C (Core) NC, NT
T1 Pin 1 to 3	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 1 to 4	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. NC, NT (*2)
T1 Pin 2 to 3	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. NC, NT (*2)
T1 Pin 2 to 4	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. NC, NT (*2)

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
T1 Pin 3 to 4	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current decreased immediately. Input current:0.0324 -> 0.0228A No component damaged. NC, NT
PC201 Input side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT
PC201 Output side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT
L501	Short	76 Vdc	15 minutes	(*1)	--	--	--	Operated normally. No components damaged. NC, NT
TR501 D to S	Short	76 Vdc	15 minutes	(*1)	--	--	--	Input current and output voltage intermittaon oscillation immediately. Input current: 0.255 <-> 0.03 No components damaged. NC, NT
Model MGFW404815	--	--	--	--	--	--	--	--

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
T1 Pin 1 to 5	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 1 to 6	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 2 to 5	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 2 to 6	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 5 to 6	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased immediately. Input current: 0.035A Temperature stabilized at 59°C (Core) NC, NT
L511	Short	76 Vdc	15 minutes	(*1)	--	--	--	Operated normally. No components damaged. NC, NT

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
TR511 D to S	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased and intermittent oscillation immediately. Input current: 0.10A <-> 0.6A Temperature stabilized at 58°C (Core) NC, NT
PC201 Input side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT
PC201 Output side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT
TR101 D to S	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
Model MGFS804815	--	--	--	--	--	--	--	--
TR141 D to S	Short	76 Vdc	15 minutes	(*1)	--	--	--	Operated normmaly. No hazard.
TR 141 D to G	Short	76 Vdc	15 minutes	(*1)	--	--	--	Operated normmaly. No hazard.
TR101 D to S	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. No hazard. (*2)

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
TR101 D to G	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. No hazard. (*2)
T1 Pin 1 to 2	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	Input current decreased immediately. No hazard.
T1 Pin 1 to 4	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. No hazard. (*2)
T1 Pin 2 to 4	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. No hazard. (*2)
T1 Pin 3 to 4	Short	76 Vdc	15 minutes	(*1)	--	--	--	Input current decreased immediately. No hazard.
TR501 D to S	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output voltage intermittent oscillation immediately. No hazard.
L501	Short	76 Vdc	15 minutes	(*1)	--	--	--	Operated normmaly. No hazard.
PC201 Output side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No hazard.
PC201 Input side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No hazard.

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
PC291 Output side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Operated normmaly. No hazard.
PC291 Input side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No hazard.
Model MGFW804815	--	--	--	--	--	--	--	--
T1 Pin 1 to 6	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. No hazard. (*2)
T1 Pin 2 to 5	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. No hazard. (*2)
T1 Pin 5 to 6	Short	76 Vdc	15 minutes	(*1)	--	--	--	All output voltage intermittent oscillation immediately. No hazard.
PC201 Output sid	Short	76 Vdc	15 minutes	(*1)	--	--	--	All output stopped immediately. No hazard.

Supplementary information:

NC - Cheesecloth remained intact

NT - Tissue paper remained intact

(*1): External Fuse was used while testing. See Engineering Conditions of Acceptability.

(*2): Test was conducted three times.

The models tested were considered representative of the entire series because the construction is the same all other models.

The representative models were considered based on specifications of input voltage, circuit configuration and/or Transformer winding number/structure.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Annex Q.1	**TABLE: Circuits intended for interconnection with building wiring (LPS)**					Pass
Note: Measured UOC (V) with all load circuits disconnected:						
Output Circuit	Components	U_{oc} (V)	I_{sc} (A)		S (VA)	
			Meas.	Limit	Meas.	Limit
Model MGFS400505	--	--	--	--	--	--
+Vout	Normal	5.50	6.65	8.0	35.91	100
+Vout	TR501 D to S, SC	0 (*3)	--	8.0	--	100
Model MGFW400512	--	--	--	--	--	--
+Vout	Normal	12.06	3.12	8.0	35.91	100
+Vout	TR501 D to S, SC	1.86 (*1)	0	8.0	--	100
-Vout	Normal	12.02	3.12	8.0	36.00	100
-Vout	TR511 D to S, SC	0.26 (*1)	0	8.0	--	100
Model MGFS402412	--	--	--	--	--	--
+Vout	Normal	13.2	4.1	8.0	54.12	100
+Vout	TR501 D to S, SC	0 (+3)	--	8.0	--	100
Model MGFW400512	--	--	--	--	--	--
+Vout	Normal	14.33	3.2	8.0	45.856	100
+Vout	TR501 D to S, SC	0 (+3)	--	8.0	--	100
-Vout	Normal	14.38	3.2	8.0	46.016	100
-Vout	TR511 D to S, SC	0 (+3)	--	8.0	--	100
Model MGFS804815	--	--	--	--	--	--
+Vout	Normal	16.5	5.9	8.0	97.35	100
+Vout	TR501 D to S, SC	7.80 (*1)	0	8.0	--	100
Model MGFW804812	--	--	--	--	--	--
+Vout	Normal	11.88	5.31	8.0	63.08	100
+Vout	TR501 D to S, SC	0 (*2)	--	8.0	--	100
-Vout	Normal	12.0	5.37	8.0	64.44	100

IEC 62368-1						
Clause	Requirement + Test			Result - Remark		Verdict
-Vout	TR511 D to S, SC	2.10 (*1)	0	8.0	--	100
Supplementary Information:						
SC=Short circuit, OC=Open circuit (*1): Output voltage intermittent oscillation immediately. (*2): Fuse open. Component damaged. (*3): Output shutdown immediately.						

Enclosures

Type	Supplement Id	Description
Photographs	03-01	Overall view: Top side (Model MGFw40yz)
Photographs	03-02	Overall view: Bottom side (Model MGFw40yz)
Photographs	03-03	Overall view: Top side without Case (Model MGFw40yz)
Photographs	03-04	P1 Borard: Top side (Model MGFw40yz)
Photographs	03-05	P1 Board: Bottom side (Model MGFw40yz)
Photographs	03-06	P2 Board (Model MGFS40yz): Top side
Photographs	03-07	P2 Board (Model MGFS40yz): Bottom side
Photographs	03-08	P2 Board (Model MGFW40yz): Top side
Photographs	03-09	P2 Board (Model MGFW40yz): Bottom side
Photographs	03-10	Overall view: Top side (Model MGFw80yz)
Photographs	03-11	Overall view: Bottom side (Model MGFw80yz)
Photographs	03-12	P1 Borard: Top side (Model MGFS80yz)
Photographs	03-13	P1 Board: Bottom side (Model MGFS80yz)
Photographs	03-14	P1 Borard: Top side (Model MGFW80yz)
Photographs	03-15	P1 Board: Bottom side (Model MGFW80yz)
Schematics + PWB	05-01	Pattern Layout: P1 Borad (Model MGFw40yz)
Schematics + PWB	05-02	Pattern Layout: P2 Borad (Model MGFS40yz, Model MGFW40yz)
Schematics + PWB	05-03	Pattern Layout: P1 Borad (Model MGFS80yz, Model MGFW80yz)
Miscellaneous	07-01	Output/ Input derating
Miscellaneous	07-02	Declaration of Conformity on RoHS (Model MGFw40yz)
Miscellaneous	07-03	Manufacturer’s Declaration under IECEE CB Scheme
Miscellaneous	07-04	Declaration of Conformity on RoHS (Model MGFw80yz)

Miscellaneous ID 07-01

Output derating curve
Ventilation must keep the temperature of point A below 110℃.
Refer to Fig.7.2 for the location of point A.
Ambient temperature must keep below 85℃.

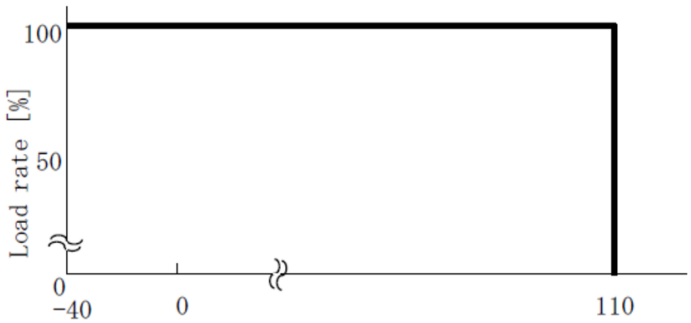


Fig. 7.1 Derating curve

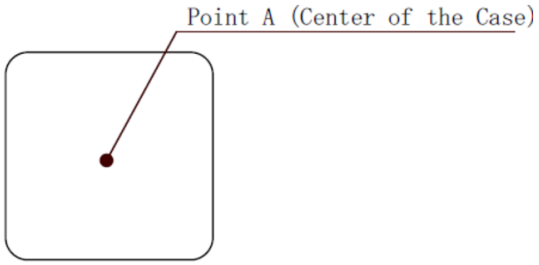
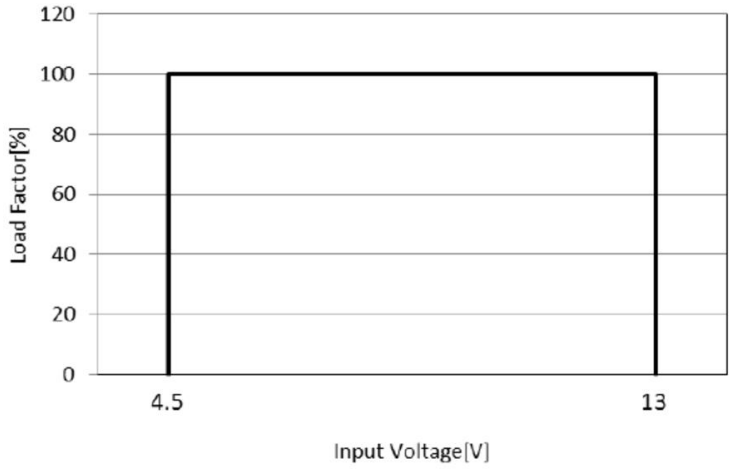


Fig. 7.2 Temperature measurement point

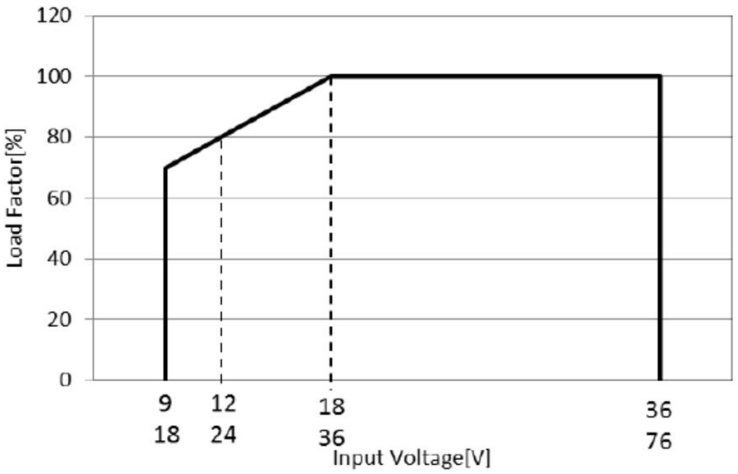
Miscellaneous ID 07-01

Input voltage derating curve

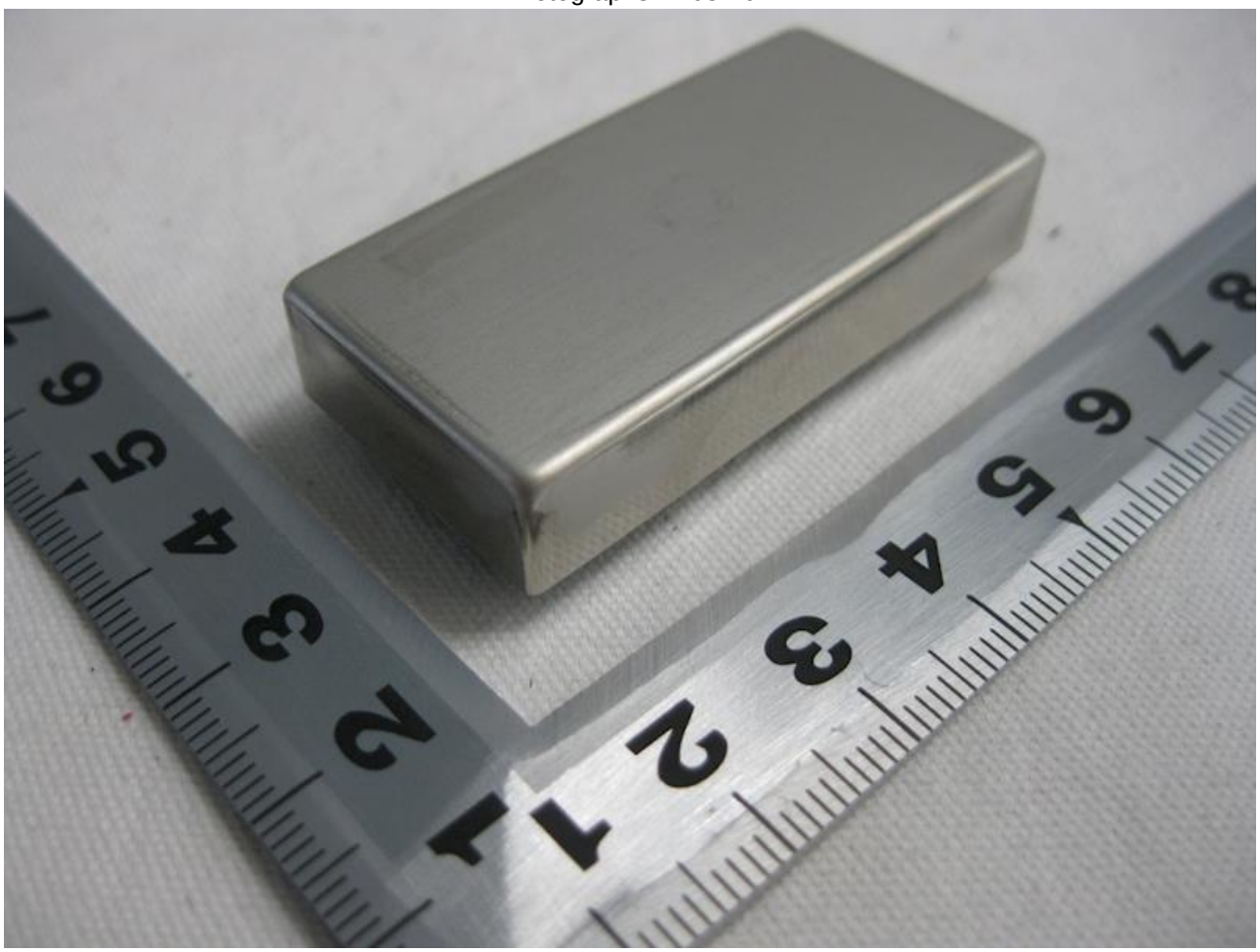
For Model MGFw4005z



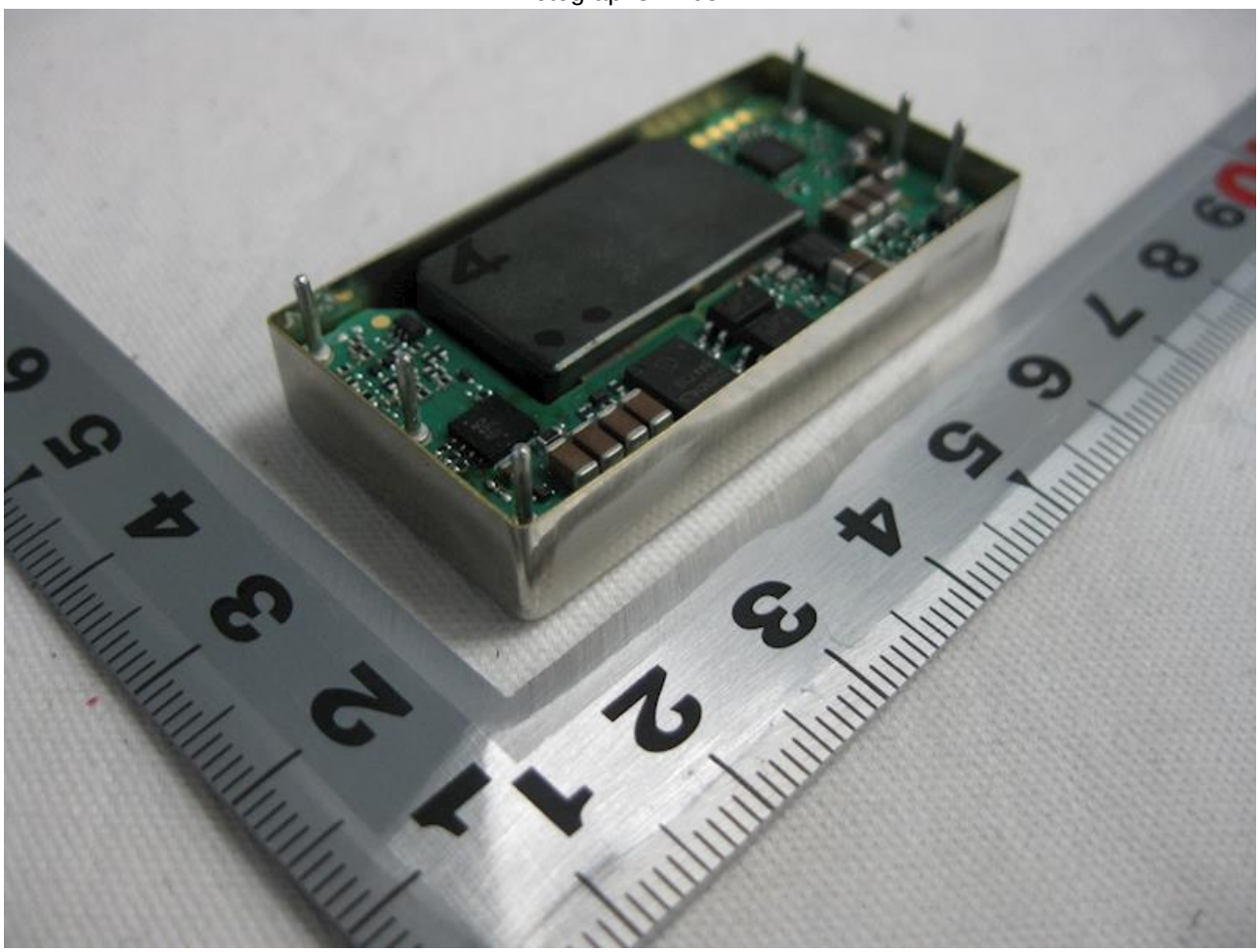
For Model MGFw4024z, MGFw4048z, MGFw8024z, MGFw8048z



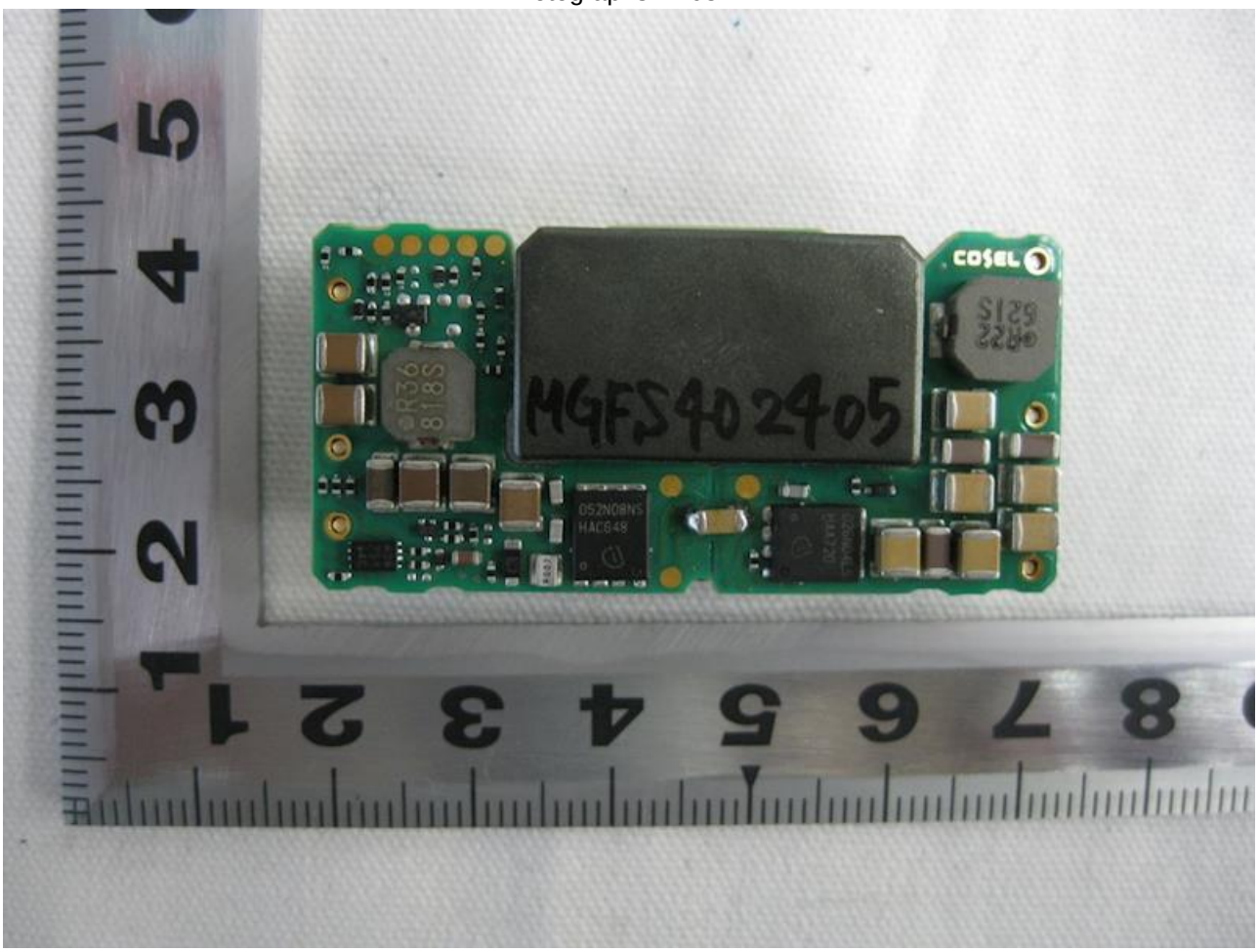
Photographs ID 03-10



Photographs ID 03-11



Photographs ID 03-12



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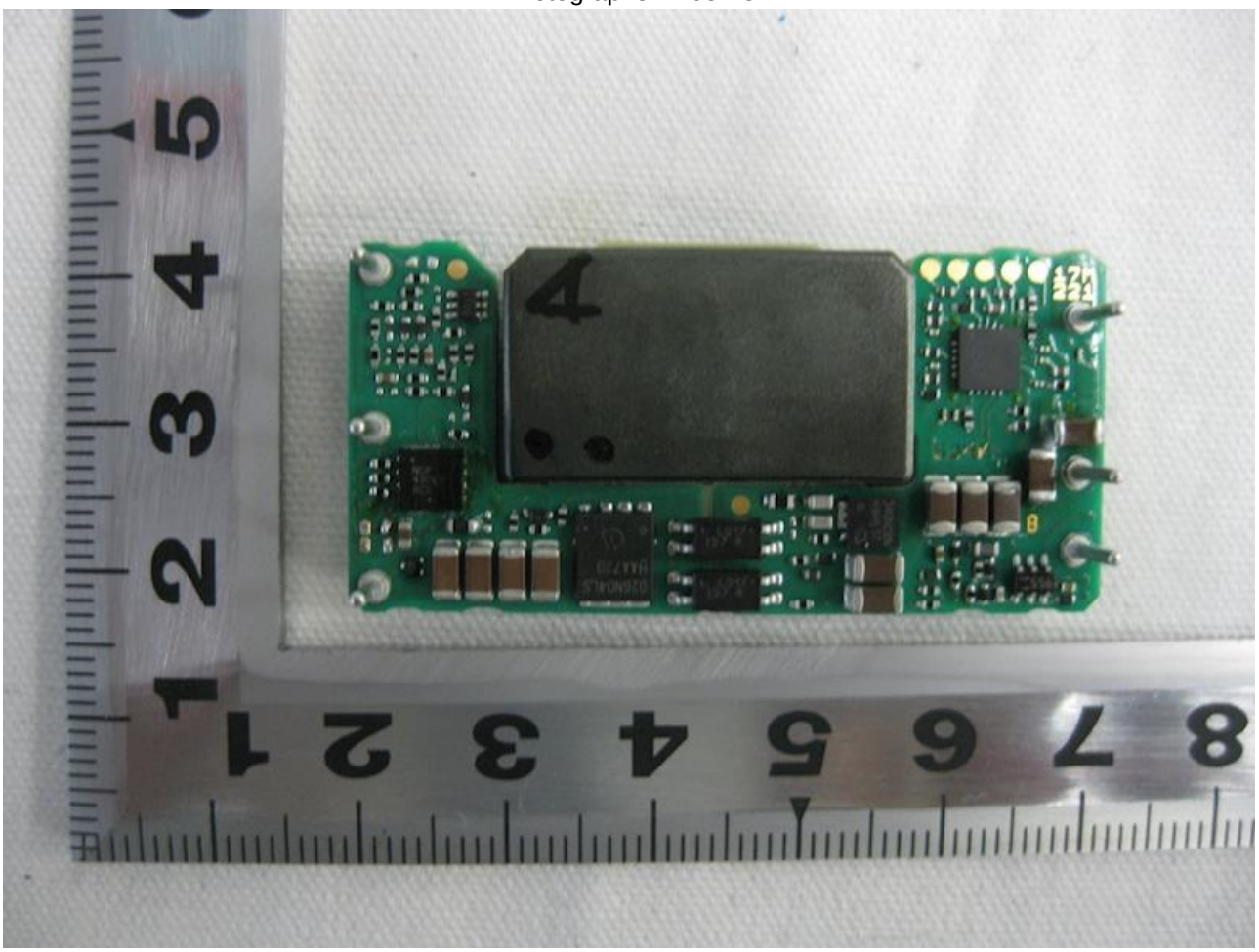
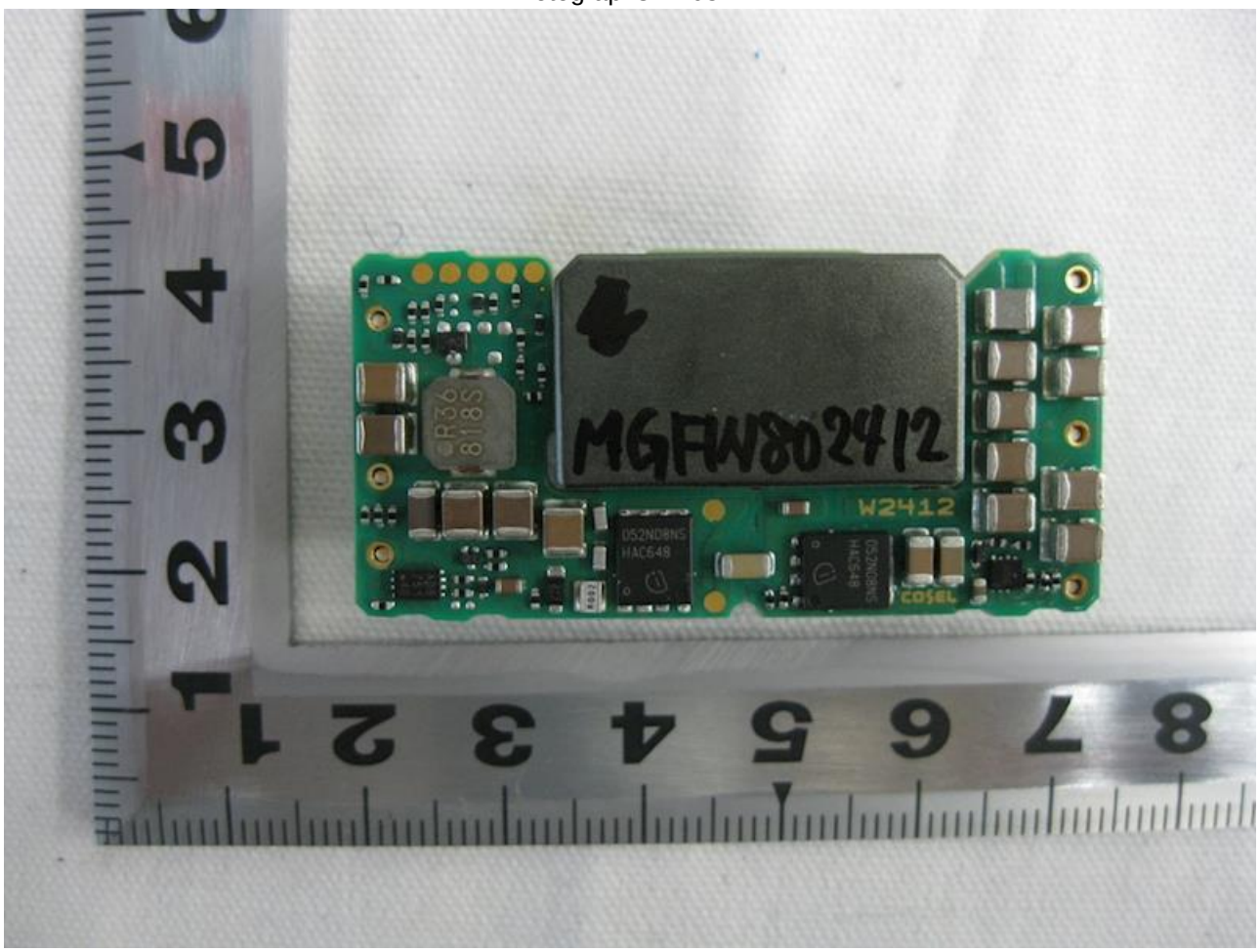
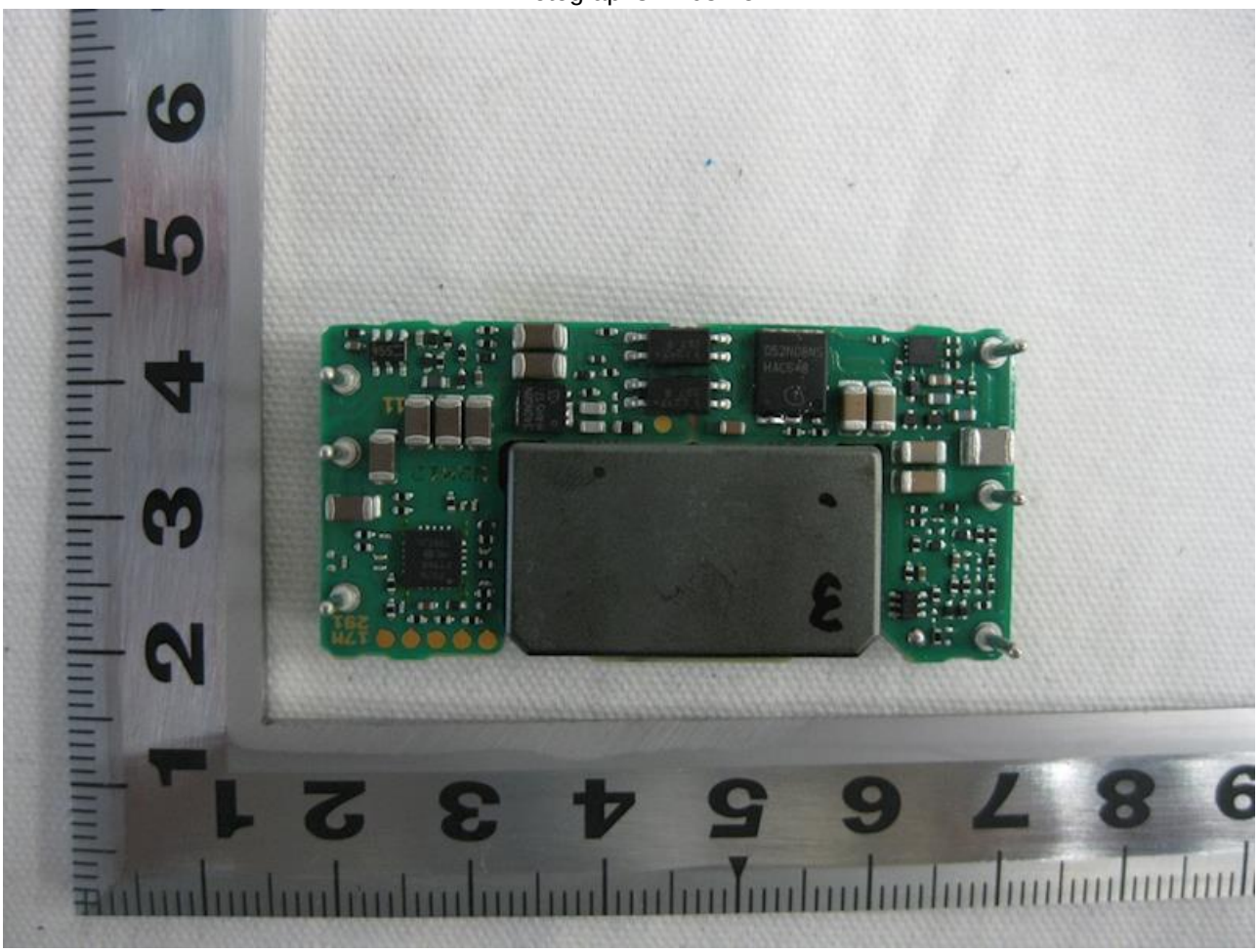


Photographs ID 03-14



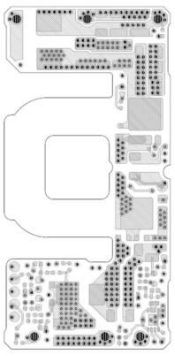
Photographs ID 03-15



Schematics + PWB ID 05-03

For Model MGFS80yz

Top



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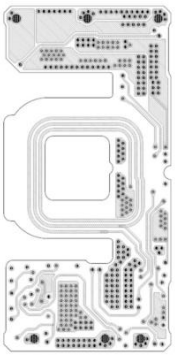

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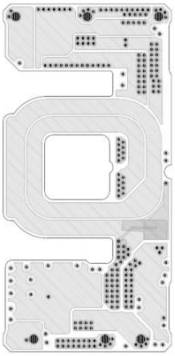

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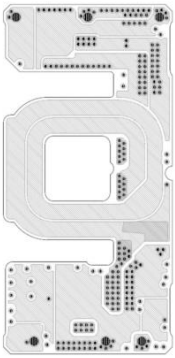

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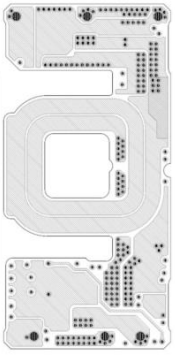

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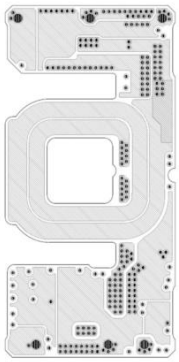

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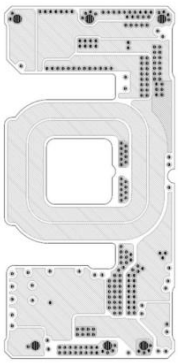

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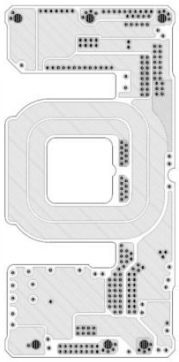

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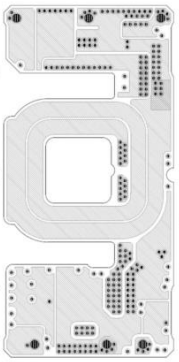

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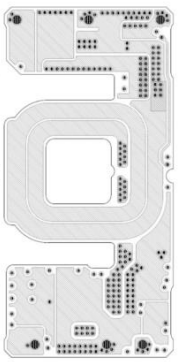

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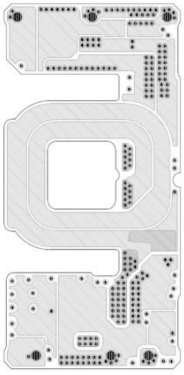

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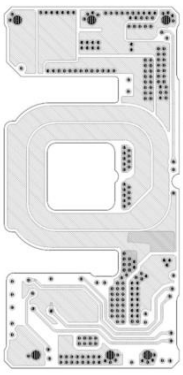

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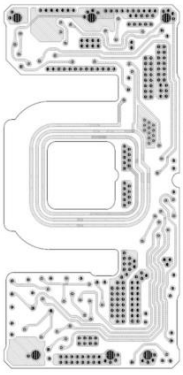

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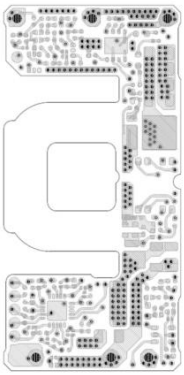
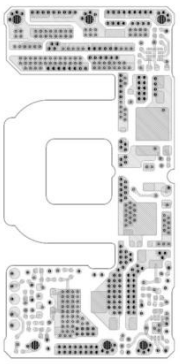


Schematics + PWB ID 05-03

For Model MGFW80yz

Top



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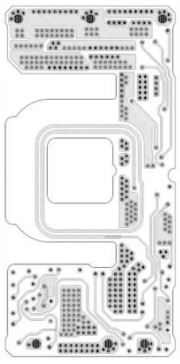

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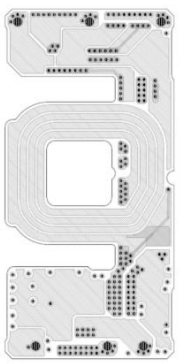

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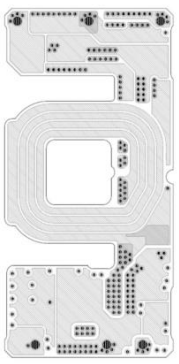

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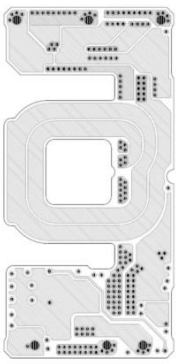

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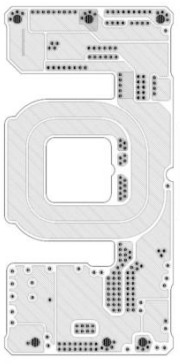

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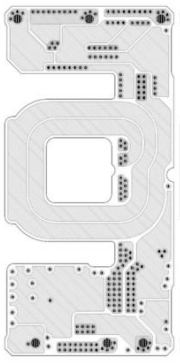

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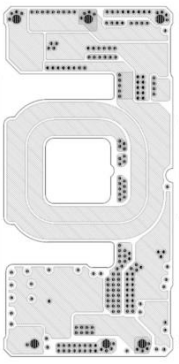

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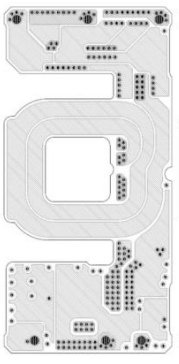

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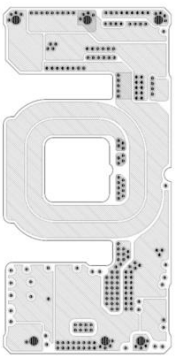

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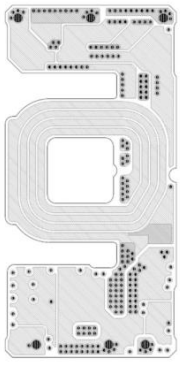

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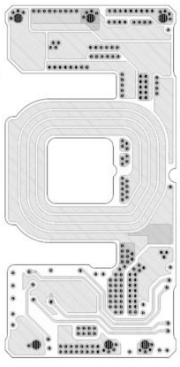

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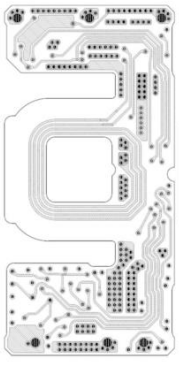

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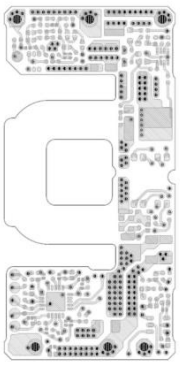


Miscellaneous ID 07-04

COSEL

COSEL Co., Ltd.
1-6-43 Kamiakae-machi,Toyama-city
Toyama 930-0816 JAPAN
Tel : +81-76-471-8592

DATE : Apr.5.2019

Subject: Declaration of Conformity on RoHS

Dear UL Japan, Inc.,

We, COSEL, declare, under our solo responsibility, that the product(s) noted below are in conformity with the requirements of Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS).

Description of equipment:

Product description:	DC-DC Converter
Model:	MG80 Series

Sincerely yours,

SIGNATURE (script or attach) Junichi Hatagishi
NAME : Junichi Hatagishi
TITLE : Manager

Test Report issued under the responsibility of:

TEST REPORT
IEC 62368-1
Audio/video, information and communication technology equipment
Part 1: Safety requirements

Report Number .....:	E132067-A6009-CB-1
Date of issue.....:	2019-01-17
Total number of pages .....:	89
Applicant's name.....:	**COSEL CO LTD**
Address .....:	**1-6-43 KAMIAKAE-MACHI** **TOYAMA-SHI** **TOYAMA 930-0816 JAPAN**
Name of Test Laboratory preparing the Report .....:	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
Test specification:	
Standard.....:	IEC 62368-1:2014 (Second Edition)
Test procedure .....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC62368_1B
Test Report Form(s) Originator .....:	UL(US)
Master TRF.....:	2014-03

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory.
The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test Item description :	DC-DC Converter	
Trade Mark .....:	COSEL	
Manufacturer .....:	COSEL CO LTD 1-6-43 KAMIAKAE-MACHI TOYAMA-SHI TOYAMA 930-0816 JAPAN	
Model/Type reference .....:	MGFwxyz ("w" = S or W, "x" = 40, "y" = 05, 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W)) Maybe provided with suffix "-$#####". ("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)	
Ratings .....:	4.5 - 9 Vdc/ 7.09 A (Model MGFS40053R3), 7.87 A (MGFS400512, MGFS400515), 7.96 A (MGFS400505, MGFW400515), 8.47 A (MGFW400512) 9 - 36 Vdc/ 4.38 A (MGFS40243R3), 5.13 A (MGFS402405), 5.20 A (MGFS402415), 5.24 A (MGFS402412), 5.60 A (MGFW402412), 5.64 A (MGFW402415) 18 - 76 Vdc/ 2.17 A (MGFS40483R3), 2.57 A (MGFS404805, MGFS404815), 2.62 A (MGFS404812), 2.77 A (MGFW404812), 2.79 A (MGFW404815)	
Testing procedure and testing location:		
☒ CB Testing Laboratory:		
Testing location/ address ..... :	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan	
☐ Associated CB Testing Laboratory:		
Testing location/ address..... :		
Tested by (name + signature).....:	Hirokatsu Kubota / Project Handler	H. Kubota
Approved by (name + signature) .....:	Ikuro Kinno / Reviewer	
☐ Testing procedure: TMP/CTF Stage 1		
Testing location/ address..... :		
Tested by (name + signature).....:		
Approved by (name + signature) .....:		
☐ Testing procedure: WMT/CTF Stage 2		

Testing location/ address..... :		
Tested by (name + signature).....:		
Witnessed by (name + signature).....:		
Approved by (name + signature) .....:		
☐ Testing procedure: SMT/CTF Stage 3 or 4		
Testing location/ address..... :		
Tested by (name + signature).....:		
Approved by (name + signature) .....:		
Supervised by (name + signature) .....:		

List of Attachments (including a total number of pages in each attachment):

National Differences (14 pages)
Enclosures (17 pages)

Summary of testing:

Unless otherwise indicated, all tests were conducted at UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan.

Tests performed (name of test and test clause):	**Testing location:**
CLASSIFICATION OF ELECTRICAL ENERGY SOURCES (5.2, 5.7) MAXIMUM OPERATING TEMPERATURE FOR MATERIALS, COMPONENTS AND SYSTEMS (5.4.1.4, Annex B.2) POWER MEASUREMENTS (6.2.2.2, 6.2.2.3) INPUT TEST: SINGLE PHASE (B.2.5) SIMULATED ABNORMAL OPERATING CONDITIONS (B.3) SIMULATED SINGLE FAULT CONDITIONS (B.4)	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan

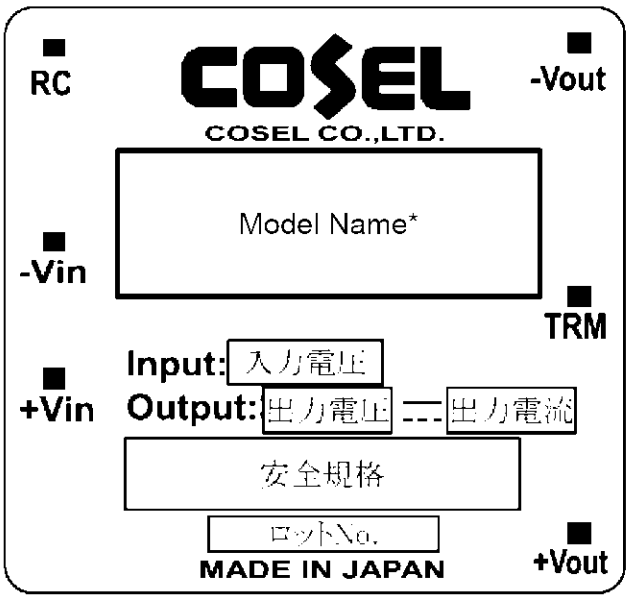
Summary of compliance with National Differences:

List of countries addressed: EU Group Differences, US,CA

☒ **The product fulfils the requirements of:** EN 62368-1:2014 + A11:2017, UL 62368-1 2ND Ed, Issued December 1, 2014, CSA CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



* Model Name
MGFwxyz
("w" = S or W, "x" = 40, "y" = 05, 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W))
Maybe provided with suffix "-$#####".
("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)

Note: The above markings are the minimum requirements required by the safety lab. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

TEST ITEM PARTICULARS:	
Classification of use by	Ordinary person, Skilled person
Supply Connection	External Circuit - not Mains connected ES1 or ES2
Supply % Tolerance	None
Supply Connection – Type	for building in
Considered current rating of protective device as part of building or equipment installation	N/A
Equipment mobility	for building-in
Over voltage category (OVC)	other: not directly connected to the mains
Class of equipment	Not Classified
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient	85 °C
IP protection class	IPX0
Power Systems	N/A
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	0.03 or less kg
POSSIBLE TEST CASE VERDICTS:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
TESTING:	
Date of receipt of test item..... :	2018-09-03, 2018-09-06, 2018-10-22, 2018-11-26, 2018-12-13, 2018-12-19
Date (s) of performance of tests..... :	2018-11-01 to 2019-01-09
GENERAL REMARKS:	
"(See Enclosure #)" refers to additional information appended to the report. **"(See appended table)" refers to a table appended to the report.** **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☒ **Yes** ☐ **Not applicable**

When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) ..... :	COSEL CO LTD TATEYAMA FACTORY 78 DOGENJI TATEYAMAMACHI NAKANIIKAWA-GUN TOYAMA 930-0241 JAPAN WUXI COSEL ELECTRONICS CO LTD 5TH FL, BLD A3, NO.866 LIYUAN DEVELOMPENT ZONE WUXI JIANGSU 214072 CHINA

GENERAL PRODUCT INFORMATION:

Report Summary

All applicable tests according to the referenced standard(S) have been carried out.

Product Description

The products covered in this report are components DC-DC Converter for building, providing functional insulation.

See Model Differences for details.

Output Ratings;

MGFS40053R3: 2.97 - 3.63 Vdc, maximum 8 A, maximum 26.4 W

MGFS400505: 4.5 - 5.5 Vdc, maximum 6 A, maximum 30 W

MGFS400512: 10.8 - 13.2 Vdc, maximum 2.5 A, maximum 30 W

MGFS400515: 13.5 - 16.5 Vdc, maximum 2 A, maximum 30 W

MGFW400512: +12 Vdc/ 1.3 A, -12 Vdc/ 1.3 A, maximum 31.2 W

MGFW400515: +15 Vdc/ 1 A, -15 Vdc/ 1 A, maximum 30 W

MGFS40243R3: 2.97 - 3.63 Vdc, maximum 10 A, maximum 33 W

MGFS402405: 4.5 - 5.5 Vdc, maximum 8 A, maximum 40 W

MGFS402412: 10.8 - 13.2 Vdc, maximum 3.4 A, maximum 40.8 W

MGFS402415: 13.5 - 16.5 Vdc, maximum 2.7 A, maximum 40.5 W

MGFW402412: +12 Vdc/ 1.7 A, -12 Vdc/ 1.7 A, maximum 40.8 W

MGFW402415: +15 Vdc/ 1.4 A, -15 Vdc/ 1.4 A, maximum 42 W

MGFS40483R3: 2.97 - 3.63 Vdc, maximum 10 A, maximum 33 W

MGFS404805: 4.5 - 5.5 Vdc, maximum 8 A, maximum 40 W

MGFS404812: 10.8 - 13.2 Vdc, maximum 3.4 A, maximum 40.8 W

MGFS404815: 13.5 - 16.5 Vdc, maximum 2.7 A, maximum 40.5 W

MGFW404812: +12 Vdc/ 1.7 A, -12 Vdc/ 1.7 A, maximum 40.8 W

MGFW404815: +15 Vdc/ 1.4 A, -15 Vdc/ 1.4 A, maximum 42 W

Adjustment of output voltage range was made via external control circuit.

Condition of output derating: Depends on model, input voltage and 100% of rated output is allowed within the specified temperature at the measurement points specified as “Point A”. See Enclosure Id. 7-01 for details.

Model Differences

Each models are identical except as follows:

- The input/output rating.
- Major components described in "Table 4.1.2"
- Minor components.

Nomenclature:
MGF w x y z -$#####
I II III IV V VI
I. Series name
MGF
II. Output specification
S: Single output
W: Dual output
III. Output wattege
40
IV. Input voltage
05: 4.5 - 13 Vdc
24: 9 - 36 Vdc
48: 18 - 76 Vdc
V. Output voltage
3R3: 3.3 Vdc (when "w" = S only)
05: 5 Vdc (when "w" = S only)
12: 12 Vdc (when "w" = S), +12/ -12 Vdc (when "w" = W)
15: 15 Vdc (when "w" = S), +15/ -15 Vdc (when "w" = W)
VI. Optional suffix
"$" is G, R or blank.
G: Capacitor (C901) between Input and Output is removed.
R: Reverses the logic of remote control function. (Positive)
"#####" signify marketing purpose or minor modification and does not affect safety.

Additional application considerations – (Considerations used to test a component or sub-assembly) -
The Clearances and Creepage Distances have additionally been assessed for suitability up to 5000 m elevation.
The circuit diagrams may be required at the discretion of the accepting NCB.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 85 °C (See Enclosure Id. 7-01)

Engineering Conditions of Acceptability
When installed in an end-product, consideration must be given to the following:

- The following output circuits are at ES2 energy levels : Output of all models
- The following output circuits are at PS2 energy levels : Output of all models
- The following end-product enclosures are required : Electrical, Fire
- This component has been evaluated in 'control of fire spread' method assuming appropriate fire enclosure is provided in end product. Unless the fire enclosure is made of non-combustible or V-0 material, the separation from the PIS (all electrical components) shall be considered.

- Insulation between Input Terminal and Output Terminal of the DC-DC Converter complies with Functional Insulation.
- The product is intended for use on the following power systems: The equipment is for building-in, and intended to be supplied by secondary dc power source which is isolated from mains by double or reinforced insulation, highest transient voltage in secondary circuit is up to 1500 V and ES2 electrical energy source.
- This DC-DC Converter has no internal fuse, therefore Input circuit must provide external fuse in +Vin line. Test was performed at input circuit provided external fuse. (Littelfuse, Inc., Type 324, Model MGFw4005z: Rated 250V, 15A, Model MGFw4024z: Rated 250V, 10A, Model MGFw4048z: Rated 250V, 5A,) (These fuses are not certified by IEC.)

ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:	
(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.) (Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3.	
Electrically-caused injury (Clause 5): (Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification) Example: +5 V dc input ES1	
Source of electrical energy	**Corresponding classification (ES)**
All input circuits	ES2
Output of all models	ES2
Electrically-caused fire (Clause 6): (Note: List sub-assembly or circuit designation and corresponding energy source classification) Example: Battery pack (maximum 85 watts): PS2	
Source of power or PIS	**Corresponding classification (PS)**
All input circuits	PS3 (Declared)
Output of all models	PS2
Injury caused by hazardous substances (Clause 7) (Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.) Example: Liquid in filled component Glycol	
Source of hazardous substances	**Corresponding chemical**
N/A	N/A
Mechanically-caused injury (Clause 8) (Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.) Example: Wall mount unit MS2	
Source of kinetic/mechanical energy	**Corresponding classification (MS)**
N/A	N/A
Thermal burn injury (Clause 9) (Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.) Example: Hand-held scanner – thermoplastic enclosure TS1	
Source of thermal energy	**Corresponding classification (TS)**
N/A	N/A
Radiation (Clause 10) (Note: List the types of radiation present in the product and the corresponding energy source classification.) Example: DVD – Class 1 Laser Product RS1	
Type of radiation	**Corresponding classification (RS)**
N/A	N/A

ENERGY SOURCE DIAGRAM
Indicate which energy sources are included in the energy source diagram. Insert diagram below
☐ ES ☐ PS ☐ MS ☐ TS ☐ RS

OVERVIEW OF EMPLOYED SAFEGUARDS				
Clause	**Possible Hazard**			
5.1	Electrically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (ES3: Primary Filter circuit)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
Ordinary (assumed to be accessing end use product)	ES2: All input circuits and output of all model	Enclosure to be provided in end-product. See C of A.	N/A	N/A
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementary	Reinforced
All electrical components	PS3: Declared	Temperature in "N" and "A"	Mounted on PWB rated V-0, and fire enclosure to be provided in end-product. See C of A.	N/A
Printed wiring board	PS3: Declared	Temperature in "N" and "A"	V-0 and fire enclosure to be provided in end-product. See C of A.	N/A
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	N/A	N/A	N/A	N/A
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3:High Pressure Lamp)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
N/A	N/A	N/A	N/A	N/A
9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	N/A	N/A	N/A	N/A
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	N/A	N/A	N/A	N/A

Supplementary Information:
(1) See attached energy source diagram for additional details. (2) “N” – Normal Condition; “A” – Abnormal Condition; “S” Single Fault

4	**GENERAL REQUIREMENTS**		Pass
4.1.1	Acceptance of materials, components and subassemblies		Pass
4.1.2	Use of components		Pass
4.1.3	Equipment design and construction		Pass
4.1.15	Markings and instructions ..... :	(See Annex F)	Pass
4.4.4	Safeguard robustness	Building-in component.	N/A
4.4.4.2	Steady force tests ..... :		N/A
4.4.4.3	Drop tests..... :		N/A
4.4.4.4	Impact tests..... :		N/A
4.4.4.5	Internal accessible safeguard enclosure and barrier tests ..... :		N/A
4.4.4.6	Glass Impact tests..... :		N/A
4.4.4.7	Thermoplastic material tests ..... :		N/A
4.4.4.8	Air comprising a safeguard ..... :		N/A
4.4.4.9	Accessibility and safeguard effectiveness		N/A
4.5	Explosion	No explosion under normal, abnormal and single fault condition.	Pass
4.6	Fixing of conductors		N/A
4.6.1	Fix conductors not to defeat a safeguard		N/A
4.6.2	10 N force test applied to ..... :		N/A
4.7	Equipment for direct insertion into mains socket - outlets		N/A
4.7.2	Mains plug part complies with the relevant standard ..... :		N/A
4.7.3	Torque (Nm)..... :		N/A
4.8	Products containing coin/button cell batteries		N/A
4.8.2	Instructional safeguard		N/A
4.8.3	Battery Compartment Construction		N/A
	Means to reduce the possibility of children removing the battery ..... :		—
4.8.4	Battery Compartment Mechanical Tests..... :		N/A
4.8.5	Battery Accessibility		N/A
4.9	Likelihood of fire or shock due to entry of conductive object ..... :	Building-in component.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5	**ELECTRICALLY-CAUSED INJURY**		Pass
5.2.1	Electrical energy source classifications .....:	(See appended table 5.2)	Pass
5.2.2	ES1, ES2 and ES3 limits		Pass
5.2.2.2	Steady-state voltage and current .....:	(See appended table 5.2)	Pass
5.2.2.3	Capacitance limits .....:		N/A
5.2.2.4	Single pulse limits .....:	(See appended table 5.2)	Pass
5.2.2.5	Limits for repetitive pulses .....:		N/A
5.2.2.6	Ringing signals .....:		N/A
5.2.2.7	Audio signals .....:		N/A
5.3	Protection against electrical energy sources		Pass
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons	Building-in component. Final compliance to be evaluated in end-product.	Pass
5.3.2.1	Accessibility to electrical energy sources and safeguards		N/A
5.3.2.2	Contact requirements		N/A
	a) Test with test probe from Annex V .....:		N/A
	b) Electric strength test potential (V) .....:		N/A
	c) Air gap (mm) .....:		N/A
5.3.2.4	Terminals for connecting stripped wire		N/A
5.4	Insulation materials and requirements		N/A
5.4.1.2	Properties of insulating material	Functional insulation only.	N/A
5.4.1.3	Humidity conditioning ..... :		N/A
5.4.1.4	Maximum operating temperature for insulating materials .....:		N/A
5.4.1.5	Pollution degree .....:		—
5.4.1.5.2	Test for pollution degree 1 environment and for an insulating compound		N/A
5.4.1.5.3	Thermal cycling		N/A
5.4.1.6	Insulation in transformers with varying dimensions		N/A
5.4.1.7	Insulation in circuits generating starting pulses		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.1.8	Determination of working voltage		N/A
5.4.1.9	Insulating surfaces		N/A
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted		N/A
5.4.1.10.2	Vicat softening temperature .....:		N/A
5.4.1.10.3	Ball pressure .....:		N/A
5.4.2	Clearances	Functional insulation only.	N/A
5.4.2.2	Determining clearance using peak working voltage	(See appended table 5.4.2.2)	N/A
5.4.2.3	Determining clearance using required withstand voltage .....:	(See appended table 5.4.2.3)	N/A
	a) a.c. mains transient voltage .....:		—
	b) d.c. mains transient voltage .....:		—
	c) external circuit transient voltage .....:		—
	d) transient voltage determined by measurement ..... :		—
5.4.2.4	Determining the adequacy of a clearance using an electric strength test		N/A
5.4.2.5	Multiplication factors for clearances and test voltages.....:		N/A
5.4.3	Creepage distances .....:	Functional insulation only.	N/A
5.4.3.1	General		N/A
5.4.3.3	Material Group .....:		—
5.4.4	Solid insulation		N/A
5.4.4.2	Minimum distance through insulation .....:		N/A
5.4.4.3	Insulation compound forming solid insulation		N/A
5.4.4.4	Solid insulation in semiconductor devices		N/A
5.4.4.5	Cemented joints		N/A
5.4.4.6	Thin sheet material		N/A
5.4.4.6.1	General requirements		N/A
5.4.4.6.2	Separable thin sheet material		N/A
	Number of layers (pcs) .....:		N/A
5.4.4.6.3	Non-separable thin sheet material		N/A
5.4.4.6.4	Standard test procedure for non-separable thin sheet material..... :		N/A
5.4.4.6.5	Mandrel test		N/A
5.4.4.7	Solid insulation in wound components		N/A
5.4.4.9	Solid insulation at frequencies >30 kHz..... :		N/A
5.4.5	Antenna terminal insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.5.1	General		N/A
5.4.5.2	Voltage surge test		N/A
	Insulation resistance (MΩ) ..... :		—
5.4.6	Insulation of internal wire as part of supplementary safeguard ..... :		N/A
5.4.7	Tests for semiconductor components and for cemented joints		N/A
5.4.8	Humidity conditioning	Functional insulation only.	N/A
	Relative humidity (%) ..... :		—
	Temperature (°C) .....:		—
	Duration (h) ..... :		—
5.4.9	Electric strength test..... :		N/A
5.4.9.1	Test procedure for a solid insulation type test		N/A
5.4.9.2	Test procedure for routine tests		N/A
5.4.10	Protection against transient voltages between external circuit		N/A
5.4.10.1	Parts and circuits separated from external circuits		N/A
5.4.10.2	Test methods		N/A
5.4.10.2.1	General		N/A
5.4.10.2.2	Impulse test..... :		N/A
5.4.10.2.3	Steady-state test ..... :		N/A
5.4.11	Insulation between external circuits and earthed circuitry..... :		N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A
5.4.11.2	Requirements		N/A
	Rated operating voltage U_{op} (V) ..... :		—
	Nominal voltage U_{peak} (V) ..... :		—
	Max increase due to variation U_{sp} ..... :		—
	Max increase due to ageing δU_{sa} ..... :		—
	$U_{op} = U_{peak} + \delta U_{sp} + \delta U_{sa}$ ..... :		—
5.5	Components as safeguards		N/A
5.5.1	General		N/A
5.5.2	Capacitors and RC units		N/A
5.5.2.1	General requirement		N/A
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.5.3	Transformers		N/A
5.5.4	Optocouplers		N/A
5.5.5	Relays		N/A
5.5.6	Resistors		N/A
5.5.7	SPD's		N/A
5.5.7.1	Use of an SPD connected to reliable earthing		N/A
5.5.7.2	Use of an SPD between mains and protective earth		N/A
5.5.8	Insulation between the mains and external circuit consisting of a coaxial cable ..... :		N/A
5.6	Protective conductor		N/A
5.6.2	Requirement for protective conductors		N/A
5.6.2.1	General requirements		N/A
5.6.2.2	Colour of insulation		N/A
5.6.3	Requirement for protective earthing conductors		N/A
	Protective earthing conductor size (mm^2) .....:		—
5.6.4	Requirement for protective bonding conductors		N/A
5.6.4.1	Protective bonding conductors		N/A
	Protective bonding conductor size (mm^2).....:		—
	Protective current rating (A) ..... :		—
5.6.4.3	Current limiting and overcurrent protective devices		N/A
5.6.5	Terminals for protective conductors		N/A
5.6.5.1	Requirement		N/A
	Conductor size (mm^2), nominal thread diameter (mm).....:		N/A
5.6.5.2	Corrosion		N/A
5.6.6	Resistance of the protective system		N/A
5.6.6.1	Requirements		N/A
5.6.6.2	Test Method Resistance (Ω).....:		N/A
5.6.7	Reliable earthing		N/A
5.7	Prospective touch voltage, touch current and protective conductor current		N/A
5.7.2	Measuring devices and networks		N/A
5.7.2.1	Measurement of touch current.....:		N/A
5.7.2.2	Measurement of prospective touch voltage		N/A
5.7.3	Equipment set-up, supply connections and earth connections		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	System of interconnected equipment (separate connections/single connection) ..... :		—
	Multiple connections to mains (one connection at a time/simultaneous connections) ..... :		—
5.7.4	Earthed conductive accessible parts ..... :		N/A
5.7.5	Protective conductor current		N/A
	Supply Voltage (V) ..... :		—
	Measured current (mA) ..... :		—
	Instructional Safeguard ..... :		N/A
5.7.6	Prospective touch voltage and touch current due to external circuits		N/A
5.7.6.1	Touch current from coaxial cables		N/A
5.7.6.2	Prospective touch voltage and touch current from external circuits		N/A
5.7.7	Summation of touch currents from external circuits		N/A
	a) Equipment with earthed external circuits Measured current (mA) ..... :		N/A
	b) Equipment whose external circuits are not referenced to earth. Measured current (mA) ..... :		N/A
6	**ELECTRICALLY- CAUSED FIRE**		Pass
6.2	Classification of power sources (PS) and potential ignition sources (PIS)		Pass
6.2.2	Power source circuit classifications		Pass
6.2.2.1	General	(See clause 6.2.2.2)	Pass
6.2.2.2	Power measurement for worst-case load fault .... :	(See appended table 6.2.2)	Pass
6.2.2.3	Power measurement for worst-case power source fault ..... :		N/A
6.2.2.4	PS1 ..... :	No PS1 Circuits.	N/A
6.2.2.5	PS2 ..... :	(See appended table 6.2.2)	Pass
6.2.2.6	PS3 ..... :	(See appended table 6.2.2)	Pass
6.2.3	Classification of potential ignition sources		Pass
6.2.3.1	Arcing PIS ..... :	Input circuits to be assumed arcing PIS.	Pass
6.2.3.2	Resistive PIS ..... :	All components are considered resistive PIS.	Pass
6.3	Safeguards against fire under normal operating and abnormal operating conditions		Pass
6.3.1 (a)	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials ..... :	(See appended table 5.4.1.5, 6.3.2, 9.0, B.2.6)	Pass

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Clause	Requirement + Test	Result - Remark	Verdict
6.3.1 (b)	Combustible materials outside fire enclosure		N/A
6.4	Safeguards against fire under single fault conditions		Pass
6.4.1	Safeguard Method	Applied with “control fire spread”.	Pass
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits		N/A
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits		N/A
6.4.3.1	General		N/A
6.4.3.2	Supplementary Safeguards		N/A
	Special conditions if conductors on printed boards are opened or peeled		N/A
6.4.3.3	Single Fault Conditions ..... :	(See appended table 6.4.3)	N/A
	Special conditions for temperature limited by fuse		N/A
6.4.4	Control of fire spread in PS1 circuits		N/A
6.4.5	Control of fire spread in PS2 circuits		Pass
6.4.5.2	Supplementary safeguards ..... :	All electrical components are mounted on minimum V-1 printed wiring board.	Pass
6.4.6	Control of fire spread in PS3 circuit	Building-in component. Fire enclosure shall be provided in end-product.	Pass
6.4.7	Separation of combustible materials from a PIS	Applied with “control fire spread”.	N/A
6.4.7.1	General ..... :		N/A
6.4.7.2	Separation by distance		N/A
6.4.7.3	Separation by a fire barrier		N/A
6.4.8	Fire enclosures and fire barriers	Building-in component. Fire enclosure shall be provided in end-product.	N/A
6.4.8.1	Fire enclosure and fire barrier material properties		N/A
6.4.8.2.1	Requirements for a fire barrier		N/A
6.4.8.2.2	Requirements for a fire enclosure		N/A
6.4.8.3	Constructional requirements for a fire enclosure and a fire barrier		N/A
6.4.8.3.1	Fire enclosure and fire barrier openings		N/A
6.4.8.3.2	Fire barrier dimensions		N/A
6.4.8.3.3	Top Openings in Fire Enclosure: dimensions (mm) ..... :		N/A
	Needle Flame test		N/A
6.4.8.3.4	Bottom Openings in Fire Enclosure, condition met a), b) and/or c) dimensions (mm) ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Flammability tests for the bottom of a fire enclosure ..... :		N/A
6.4.8.3.5	Integrity of the fire enclosure, condition met: a), b) or c) ..... :		N/A
6.4.8.4	Separation of PIS from fire enclosure and fire barrier distance (mm) or flammability rating .....:		N/A
6.5	Internal and external wiring		N/A
6.5.1	Requirements		N/A
6.5.2	Cross-sectional area (mm^2) ..... :		—
6.5.3	Requirements for interconnection to building wiring ..... :		N/A
6.6	Safeguards against fire due to connection to additional equipment		N/A
	External port limited to PS2 or complies with Clause Q.1		N/A
7	**INJURY CAUSED BY HAZARDOUS SUBSTANCES**		N/A
7.2	Reduction of exposure to hazardous substances	No such hazardous substances involved.	N/A
7.3	Ozone exposure		N/A
7.4	Use of personal safeguards (PPE)		N/A
	Personal safeguards and instructions.....:		—
7.5	Use of instructional safeguards and instructions		N/A
	Instructional safeguard (ISO 7010) .....:		—
7.6	Batteries ..... :	No batteries provided.	N/A
8	**MECHANICALLY-CAUSED INJURY**		N/A
8.1	General	No mechanical energy sources.	N/A
8.2	Mechanical energy source classifications		N/A
8.3	Safeguards against mechanical energy sources		N/A
8.4	Safeguards against parts with sharp edges and corners		N/A
8.4.1	Safeguards		N/A
8.5	Safeguards against moving parts		N/A
8.5.1	MS2 or MS3 part required to be accessible for the function of the equipment		N/A
8.5.2	Instructional Safeguard ..... :		—
8.5.4	Special categories of equipment comprising moving parts		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.5.4.1	Large data storage equipment		N/A
8.5.4.2	Equipment having electromechanical device for destruction of media		N/A
8.5.4.2.1	Safeguards and Safety Interlocks..... :		N/A
8.5.4.2.2	Instructional safeguards against moving parts		N/A
	Instructional Safeguard ..... :		—
8.5.4.2.3	Disconnection from the supply		N/A
8.5.4.2.4	Probe type and force (N)..... :		N/A
8.5.5	High Pressure Lamps		N/A
8.5.5.1	Energy Source Classification		N/A
8.5.5.2	High Pressure Lamp Explosion Test ..... :		N/A
8.6	Stability		N/A
8.6.1	Product classification		N/A
	Instructional Safeguard ..... :		—
8.6.2	Static stability		N/A
8.6.2.2	Static stability test		N/A
	Applied Force..... :		—
8.6.2.3	Downward Force Test		N/A
8.6.3	Relocation stability test		N/A
	Unit configuration during 10° tilt..... :		—
8.6.4	Glass slide test		N/A
8.6.5	Horizontal force test (Applied Force) ..... :		N/A
	Position of feet or movable parts ..... :		—
8.7	Equipment mounted to wall or ceiling		N/A
8.7.1	Mounting Means (Length of screws (mm) and mounting surface) ..... :		N/A
8.7.2	Direction and applied force ..... :		N/A
8.8	Handles strength		N/A
8.8.1	Classification		N/A
8.8.2	Applied Force ..... :		N/A
8.9	Wheels or casters attachment requirements		N/A
8.9.1	Classification		N/A
8.9.2	Applied force..... :		—
8.10	Carts, stands and similar carriers		N/A
8.10.1	General		N/A
8.10.2	Marking and instructions		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Instructional Safeguard ..... :		—
8.10.3	Cart, stand or carrier loading test and compliance		N/A
	Applied force..... :		—
8.10.4	Cart, stand or carrier impact test		N/A
8.10.5	Mechanical stability		N/A
	Applied horizontal force (N)..... :		—
8.10.6	Thermoplastic temperature stability (°C) ..... :		N/A
8.11	Mounting means for rack mounted equipment		N/A
8.11.1	General		N/A
8.11.2	Product Classification		N/A
8.11.3	Mechanical strength test, variable *N* ..... :		N/A
8.11.4	Mechanical strength test 250N, including end stops		N/A
8.12	Telescoping or rod antennas		N/A
	Button/Ball diameter (mm) ..... :		—
9	**THERMAL BURN INJURY**		N/A
9.2	Thermal energy source classifications	Building-in component. Fire enclosure shall be provided in end-product.	N/A
9.3	Safeguard against thermal energy sources		N/A
9.4	Requirements for safeguards		N/A
9.4.1	Equipment safeguard		N/A
9.4.2	Instructional safeguard ..... :		N/A
10	**RADIATION**		N/A
10.2	Radiation energy source classification	No radiation energy sources.	N/A
10.2.1	General classification		N/A
10.3	Protection against laser radiation		N/A
	Laser radiation that exists equipment:		—
	Normal, abnormal, single-fault ..... :		N/A
	Instructional safeguard..... :		—
	Tool ..... :		—
10.4	Protection against visible, infrared, and UV radiation		N/A
10.4.1	General		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
10.4.1.a)	RS3 for Ordinary and instructed persons ..... :		N/A
10.4.1.b)	RS3 accessible to a skilled person ..... :		N/A
	Personal safeguard (PPE) instructional safeguard ..... :		—
10.4.1.c)	Equipment visible, IR, UV does not exceed RS1 ..... :		N/A
10.4.1.d)	Normal, abnormal, single-fault conditions .....:		N/A
10.4.1.e)	Enclosure material employed as safeguard is opaque ..... :		N/A
10.4.1.f)	UV attenuation ..... :		N/A
10.4.1.g)	Materials resistant to degradation UV..... :		N/A
10.4.1.h)	Enclosure containment of optical radiation ..... :		N/A
10.4.1.i)	Exempt Group under normal operating conditions ..... :		N/A
10.4.2	Instructional safeguard ..... :		N/A
10.5	Protection against x-radiation		N/A
10.5.1	X- radiation energy source that exists equipment :		N/A
	Normal, abnormal, single fault conditions		N/A
	Equipment safeguards ..... :		N/A
	Instructional safeguard for skilled person .....:		N/A
10.5.3	Most unfavourable supply voltage to give maximum radiation..... :		—
	Abnormal and single-fault condition.....:		N/A
	Maximum radiation (pA/kg) .....:		N/A
10.6	Protection against acoustic energy sources		N/A
10.6.1	General		N/A
10.6.2	Classification		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Acoustic output, dB(A) .....:		N/A
	Output voltage, unweighted r.m.s. .....:		N/A
10.6.4	Protection of persons		N/A
	Instructional safeguards.....:		N/A
	Equipment safeguard prevent ordinary person to RS2 .....:		—
	Means to actively inform user of increase sound pressure .....:		—
10.6.4.	Equipment safeguard prevent ordinary person to RS2.....:		—
10.6.5	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.5.1	Corded passive listening devices with analog input		N/A
	Input voltage with 94 dB(A) L_{Aeq} acoustic pressure output .....:		—
10.6.5.2	Corded listening devices with digital input		N/A
	Maximum dB(A) .....:		—
10.6.5.3	Cordless listening device		N/A
	Maximum dB(A) .....:		—

B	**NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS**		Pass
B.2	Normal Operating Conditions		Pass
B.2.1	General requirements .....:	(See Test Item Particulars and appended test tables)	Pass
	Audio Amplifiers and equipment with audio amplifiers.....:		N/A
B.2.3	Supply voltage and tolerances	Extremes of rated voltage ranges were considered.	Pass
B.2.5	Input test .....:	(See appended table B.2.5)	Pass
B.3	Simulated abnormal operating conditions		Pass
B.3.1	General requirements .....:	(See appended table B.3)	Pass
B.3.2	Covering of ventilation openings		N/A
B.3.3	D.C. mains polarity test		N/A
B.3.4	Setting of voltage selector.....:		N/A
B.3.5	Maximum load at output terminals.....:	(See appended table B.3)	Pass
B.3.6	Reverse battery polarity		N/A
B.3.7	Abnormal operating conditions as specified in Clause E.2.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
B.3.8	Safeguards functional during and after abnormal operating conditions	(See appended table B.4)	Pass
B.4	Simulated single fault conditions		Pass
B.4.2	Temperature controlling device open or short-circuited.....:		N/A
B.4.3	Motor tests		N/A
B.4.3.1	Motor blocked or rotor locked increasing the internal ambient temperature .....:		N/A
B.4.4	Short circuit of functional insulation		Pass
B.4.4.1	Short circuit of clearances for functional insulation	(See appended table B.4)	Pass
B.4.4.2	Short circuit of creepage distances for functional insulation	(See appended table B.4)	Pass
B.4.4.3	Short circuit of functional insulation on coated printed boards	No coated printed boards provided.	N/A
B.4.5	Short circuit and interruption of electrodes in tubes and semiconductors	(See appended table B.4)	Pass
B.4.6	Short circuit or disconnect of passive components	(See appended table B.4)	Pass
B.4.7	Continuous operation of components	No applicable component.	N/A
B.4.8	Class 1 and Class 2 energy sources within limits during and after single fault conditions		Pass
B.4.9	Battery charging under single fault conditions....:		N/A
C	**UV RADIATION**		N/A
C.1	Protection of materials in equipment from UV radiation	No UV radiations involved.	N/A
C.1.2	Requirements		N/A
C.1.3	Test method		N/A
C.2	UV light conditioning test		N/A
C.2.1	Test apparatus		N/A
C.2.2	Mounting of test samples		N/A
C.2.3	Carbon-arc light-exposure apparatus		N/A
C.2.4	Xenon-arc light exposure apparatus		N/A
D	**TEST GENERATORS**		N/A
D.1	Impulse test generators		N/A
D.2	Antenna interface test generator		N/A
D.3	Electronic pulse generator		N/A
E	**TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS**		N/A
E.1	Audio amplifier normal operating conditions	No audio amplifiers provided.	N/A
	Audio signal voltage (V) ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated load impedance (Ω) ..... :		
E.2	Audio amplifier abnormal operating conditions		N/A
F	**EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS**		Pass
F.1	General requirements		Pass
	Instructions – Language ..... :	English only evaluated.	—
F.2	Letter symbols and graphical symbols	No graphic symbols used.	N/A
F.2.1	Letter symbols according to IEC60027-1		N/A
F.2.2	Graphic symbols IEC, ISO or manufacturer specific		N/A
F.3	Equipment markings		Pass
F.3.1	Equipment marking locations	Located on Case.	Pass
F.3.2	Equipment identification markings		Pass
F.3.2.1	Manufacturer identification ..... :	Trademark "COSEL" marked on Nameplate label.	—
F.3.2.2	Model identification ..... :	Marked on Nameplate label.	—
F.3.3	Equipment rating markings	Building-in component. No means for direct connection to mains supply, no marking of electrical rating required.	N/A
F.3.3.1	Equipment with direct connection to mains		N/A
F.3.3.2	Equipment without direct connection to mains		N/A
F.3.3.3	Nature of supply voltage ..... :		—
F.3.3.4	Rated voltage ..... :		—
F.3.3.4	Rated frequency ..... :		—
F.3.3.6	Rated current or rated power ..... :		—
F.3.3.7	Equipment with multiple supply connections		N/A
F.3.4	Voltage setting device		N/A
F.3.5	Terminals and operating devices		N/A
F.3.5.1	Mains appliance outlet and socket-outlet markings..... :		N/A
F.3.5.2	Switch position identification marking ..... :		N/A
F.3.5.3	Replacement fuse identification and rating markings..... :		N/A
F.3.5.4	Replacement battery identification marking..... :		N/A
F.3.5.5	Terminal marking location		N/A
F.3.6	Equipment markings related to equipment classification		N/A
F.3.6.1	Class I Equipment		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
F.3.6.1.1	Protective earthing conductor terminal		N/A
F.3.6.1.2	Neutral conductor terminal		N/A
F.3.6.1.3	Protective bonding conductor terminals		N/A
F.3.6.2	Class II equipment (IEC60417-5172)		N/A
F.3.6.2.1	Class II equipment with or without functional earth		N/A
F.3.6.2.2	Class II equipment with functional earth terminal marking		N/A
F.3.7	Equipment IP rating marking ..... :		—
F.3.8	External power supply output marking		N/A
F.3.9	Durability, legibility and permanence of marking	Building-in component. No marking considered to be exposed to outside.	N/A
F.3.10	Test for permanence of markings		N/A
F.4	Instructions		N/A
	a) Equipment for use in locations where children not likely to be present - marking	Building-in component. Shall be evaluated in end-product.	N/A
	b) Instructions given for installation or initial use		N/A
	c) Equipment intended to be fastened in place		N/A
	d) Equipment intended for use only in restricted access area		N/A
	e) Audio equipment terminals classified as ES3 and other equipment with terminals marked in accordance F.3.6.1		N/A
	f) Protective earthing employed as safeguard		N/A
	g) Protective earthing conductor current exceeding ES 2 limits		N/A
	h) Symbols used on equipment		N/A
	i) Permanently connected equipment not provided with all-pole mains switch		N/A
	j) Replaceable components or modules providing safeguard function		N/A
F.5	Instructional safeguards		N/A
	Where “instructional safeguard” is referenced in the test report it specifies the required elements, location of marking and/or instruction		N/A
G	**COMPONENTS**		Pass
G.1	**Switches**		N/A
G.1.1	General requirements	Not used.	N/A
G.1.2	Ratings, endurance, spacing, maximum load		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.2	**Relays**		N/A
G.2.1	General requirements	Not used.	N/A
G.2.2	Overload test		N/A
G.2.3	Relay controlling connectors supply power		N/A
G.2.4	Mains relay, modified as stated in G.2		N/A
G.3	**Protection Devices**		Pass
G.3.1	Thermal cut-offs	Not used.	N/A
G.3.1.1a) &b)	Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b)		N/A
G.3.1.1c)	Thermal cut-outs tested as part of the equipment as indicated in c)		N/A
G.3.1.2	Thermal cut-off connections maintained and secure		N/A
G.3.2	Thermal links		N/A
G.3.2.1a)	Thermal links separately tested with IEC 60691	Not used.	N/A
G.3.2.1b)	Thermal links tested as part of the equipment		N/A
	Aging hours (H) .....:		—
	Single Fault Condition .....:		—
	Test Voltage (V) and Insulation Resistance (Ω) .:		—
G.3.3	PTC Thermistors	Not used.	N/A
G.3.4	Overcurrent protection devices		N/A
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.5		Pass
G.3.5.1	Non-resettable devices suitably rated and marking provided		N/A
G.3.5.2	Single faults conditions .....:	NTC Thermistor (TH101) and External Fuses are not certified by IEC. The related tests were carried out three times.(See appended Table B.4)	Pass
G.4	**Connectors**		N/A
G.4.1	Spacings	Not used.	N/A
G.4.2	Mains connector configuration .....:		N/A
G.4.3	Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely		N/A
G.5	**Wound Components**		N/A
G.5.1	Wire insulation in wound components	Not used.	N/A
G.5.1.2 a)	Two wires in contact inside wound component, angle between 45° and 90°		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.5.1.2 b)	Construction subject to routine testing		N/A
G.5.2	Endurance test on wound components		N/A
G.5.2.1	General test requirements		N/A
G.5.2.2	Heat run test		N/A
	Time (s) ..... :		—
	Temperature (°C) ..... :		—
G.5.2.3	Wound Components supplied by mains		N/A
G.5.3	**Transformers**		N/A
G.5.3.1	Requirements applied (IEC61204-7, IEC61558-1/-2, and/or IEC62368-1) ..... :	Planer transformer, winding is multi-layer PWB used. Functional Insulation	N/A
	Position ..... :		—
	Method of protection ..... :		—
G.5.3.2	Insulation		N/A
	Protection from displacement of windings ..... :		—
G.5.3.3	Overload test..... :		N/A
G.5.3.3.1	Test conditions		N/A
G.5.3.3.2	Winding Temperatures testing in the unit		N/A
G.5.3.3.3	Winding Temperatures - Alternative test method		N/A
G.5.4	**Motors**		N/A
G.5.4.1	General requirements	Not used.	N/A
	Position ..... :		—
G.5.4.2	Test conditions		N/A
G.5.4.3	Running overload test		N/A
G.5.4.4	Locked-rotor overload test		N/A
	Test duration (days) ..... :		—
G.5.4.5	Running overload test for d.c. motors in secondary circuits		N/A
G.5.4.5.2	Tested in the unit		N/A
	Electric strength test (V)..... :		—
G.5.4.5.3	Tested on the Bench - Alternative test method; test time (h) ..... :		N/A
	Electric strength test (V)..... :		—
G.5.4.6	Locked-rotor overload test for d.c. motors in secondary circuits		N/A
G.5.4.6.2	Tested in the unit		N/A
	Maximum Temperature ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Electric strength test (V) ..... :		N/A
G.5.4.6.3	Tested on the bench - Alternative test method; test time (h) ..... :		N/A
	Electric strength test (V)..... :		N/A
G.5.4.7	Motors with capacitors		N/A
G.5.4.8	Three-phase motors		N/A
G.5.4.9	Series motors		N/A
	Operating voltage ..... :		—
G.6	**Wire Insulation**		N/A
G.6.1	General	Not used.	N/A
G.6.2	Solvent-based enamel wiring insulation		N/A
G.7	**Mains supply cords**		N/A
G.7.1	General requirements	Not used.	N/A
	Type ..... :		—
	Rated current (A) ..... :		—
	Cross-sectional area (mm^2), (AWG) ..... :		—
G.7.2	Compliance and test method		N/A
G.7.3	Cord anchorages and strain relief for non-detachable power supply cords		N/A
G.7.3.2	Cord strain relief		N/A
G.7.3.2.1	Requirements		N/A
	Strain relief test force (N) ..... :		—
G.7.3.2.2	Strain relief mechanism failure		N/A
G.7.3.2.3	Cord sheath or jacket position, distance (mm) ... :		—
G.7.3.2.4	Strain relief comprised of polymeric material		N/A
G.7.4	Cord Entry ..... :		N/A
G.7.5	Non-detachable cord bend protection		N/A
G.7.5.1	Requirements		N/A
G.7.5.2	Mass (g) ..... :		—
	Diameter (m) ..... :		—
	Temperature (°C) ..... :		—
G.7.6	Supply wiring space		N/A
G.7.6.2	Stranded wire		N/A
G.7.6.2.1	Test with 8 mm strand		N/A
G.8	**Varistors**		N/A
G.8.1	General requirements	Not used.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.8.2	Safeguard against shock		N/A
G.8.3	Safeguard against fire		N/A
G.8.3.2	Varistor overload test ..... :		N/A
G.8.3.3	Temporary overvoltage ..... :		N/A
G.9	**Integrated Circuit (IC) Current Limiters**		N/A
G.9.1 a)	Manufacturer defines limit at max. 5A.	Not used.	N/A
G.9.1 b)	Limiters do not have manual operator or reset		N/A
G.9.1 c)	Supply source does not exceed 250 VA ..... :		—
G.9.1 d)	IC limiter output current (max. 5A) ..... :		—
G.9.1 e)	Manufacturers' defined drift ..... :		—
G.9.2	Test Program 1		N/A
G.9.3	Test Program 2		N/A
G.9.4	Test Program 3		N/A
G.10	**Resistors**		N/A
G.10.1	General requirements	Not used.	N/A
G.10.2	Resistor test		N/A
G.10.3	Test for resistors serving as safeguards between the mains and an external circuit consisting of a coaxial cable		N/A
G.10.3.1	General requirements		N/A
G.10.3.2	Voltage surge test		N/A
G.10.3.3	Impulse test		N/A
G.11	**Capacitor and RC units**		N/A
G.11.1	General requirements	Not used.	N/A
G.11.2	Conditioning of capacitors and RC units		N/A
G.11.3	Rules for selecting capacitors		N/A
G.12	**Optocouplers**		N/A
	Optocouplers comply with IEC 60747-5-5:2007 Spacing or Electric Strength Test (specify option and test results) ..... :	Not used as a safeguard.	N/A
	Type test voltage Vini ..... :		—
	Routine test voltage, Vini,b ..... :		—
G.13	**Printed boards**		N/A
G.13.1	General requirements	Functional insulation only.	N/A
G.13.2	Uncoated printed boards		N/A
G.13.3	Coated printed boards		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.13.4	Insulation between conductors on the same inner surface		N/A
	Compliance with cemented joint requirements (Specify construction) ..... :		—
G.13.5	Insulation between conductors on different surfaces		N/A
	Distance through insulation..... :		N/A
	Number of insulation layers (pcs) ..... :		—
G.13.6	Tests on coated printed boards		N/A
G.13.6.1	Sample preparation and preliminary inspection		N/A
G.13.6.2a)	Thermal conditioning		N/A
G.13.6.2b)	Electric strength test		N/A
G.13.6.2c)	Abrasion resistance test		N/A
G.14	**Coating on components terminals**		N/A
G.14.1	Requirements .....:	Not used.	N/A
G.15	**Liquid filled components**		N/A
G.15.1	General requirements	Not used.	N/A
G.15.2	Requirements		N/A
G.15.3	Compliance and test methods		N/A
G.15.3.1	Hydrostatic pressure test		N/A
G.15.3.2	Creep resistance test		N/A
G.15.3.3	Tubing and fittings compatibility test		N/A
G.15.3.4	Vibration test		N/A
G.15.3.5	Thermal cycling test		N/A
G.15.3.6	Force test		N/A
G.15.4	Compliance		N/A
G.16	**IC including capacitor discharge function (ICX)**		N/A
G.16 a)	Humidity treatment in accordance with sc5.4.8 – 120 hours	Not used.	N/A
G.16 b)	Impulse test using circuit 2 with Uc = to transient voltage ..... :		N/A
G.16 C1)	Application of ac voltage at 110% of rated voltage for 2.5 minutes		N/A
G.16 C2)	Test voltage ..... :		—
G.16 D1)	10,000 cycles on and off using capacitor with smallest capacitance resistor with largest resistance specified by manufacturer		N/A
G.16 D2)	Capacitance ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
G.16 D3)	Resistance ..... :		—
H	**CRITERIA FOR TELEPHONE RINGING SIGNALS**		N/A
H.1	General		N/A
H.2	Method A		N/A
H.3	Method B		N/A
H.3.1	Ringing signal		N/A
H.3.1.1	Frequency (Hz) ..... :		—
H.3.1.2	Voltage (V) ..... :		—
H.3.1.3	Cadence; time (s) and voltage (V) ..... :		—
H.3.1.4	Single fault current (mA): ..... :		—
H.3.2	Tripping device and monitoring voltage ..... :		N/A
H.3.2.1	Conditions for use of a tripping device or a monitoring voltage complied with		N/A
H.3.2.2	Tripping device		N/A
H.3.2.3	Monitoring voltage (V) ..... :		—
J	**INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION**		N/A
	General requirements		N/A
K	**SAFETY INTERLOCKS**		N/A
K.1	General requirements	Not used.	N/A
K.2	Components of safety interlock safeguard mechanism		N/A
K.3	Inadvertent change of operating mode		N/A
K.4	Interlock safeguard override		N/A
K.5	Fail-safe		N/A
	Compliance ..... :		N/A
K.6	Mechanically operated safety interlocks		N/A
K.6.1	Endurance requirement		N/A
K.6.2	Compliance and Test method ..... :		N/A
K.7	Interlock circuit isolation		N/A
K.7.1	Separation distance for contact gaps & interlock circuit elements (type and circuit location) ..... :		N/A
K.7.2	Overload test, Current (A) ..... :		N/A
K.7.3	Endurance test		N/A
K.7.4	Electric strength test ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
L	**DISCONNECT DEVICES**		N/A
L.1	General requirements	Building-in component. Shall be evaluated in end-product.	N/A
L.2	Permanently connected equipment		N/A
L.3	Parts that remain energized		N/A
L.4	Single phase equipment		N/A
L.5	Three-phase equipment		N/A
L.6	Switches as disconnect devices		N/A
L.7	Plugs as disconnect devices		N/A
L.8	Multiple power sources		N/A
M	**EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS**		N/A
M.1	General requirements	No batteries provided.	N/A
M.2	Safety of batteries and their cells		N/A
M.2.1	Requirements		N/A
M.2.2	Compliance and test method (identify method) .. :		N/A
M.3	Protection circuits		N/A
M.3.1	Requirements		N/A
M.3.2	Tests		N/A
	- Overcharging of a rechargeable battery		N/A
	- Unintentional charging of a non-rechargeable battery		N/A
	- Reverse charging of a rechargeable battery		N/A
	- Excessive discharging rate for any battery		N/A
M.3.3	Compliance ..... :		N/A
M.4	Additional safeguards for equipment containing secondary lithium battery		N/A
M.4.1	General		N/A
M.4.2	Charging safeguards		N/A
M.4.2.1	Charging operating limits		N/A
M.4.2.2a)	Charging voltage, current and temperature ..... :		—
M.4.2.2 b)	Single faults in charging circuitry ..... :		—
M.4.3	Fire Enclosure		N/A
M.4.4	Endurance of equipment containing a secondary lithium battery		N/A
M.4.4.2	Preparation		N/A
M.4.4.3	Drop and charge/discharge function tests		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Drop		N/A
	Charge		N/A
	Discharge		N/A
M.4.4.4	Charge-discharge cycle test		N/A
M.4.4.5	Result of charge-discharge cycle test		N/A
M.5	Risk of burn due to short circuit during carrying		N/A
M.5.1	Requirement		N/A
M.5.2	Compliance and Test Method (Test of P.2.3)		N/A
M.6	Prevention of short circuits and protection from other effects of electric current		N/A
M.6.1	Short circuits		N/A
M.6.1.1	General requirements		N/A
M.6.1.2	Test method to simulate an internal fault		N/A
M.6.1.3	Compliance (Specify M.6.1.2 or alternative method) ..... :		N/A
M.6.2	Leakage current (mA) ..... :		N/A
M.7	Risk of explosion from lead acid and NiCd batteries		N/A
M.7.1	Ventilation preventing explosive gas concentration		N/A
M.7.2	Compliance and test method		N/A
M.8	Protection against internal ignition from external spark sources of lead acid batteries		N/A
M.8.1	General requirements		N/A
M.8.2	Test method		N/A
M.8.2.1	General requirements		N/A
M.8.2.2	Estimation of hypothetical volume *Vz* (m^3/s) ..... :		—
M.8.2.3	Correction factors ..... :		—
M.8.2.4	Calculation of distance *d* (mm) ..... :		—
M.9	Preventing electrolyte spillage		N/A
M.9.1	Protection from electrolyte spillage		N/A
M.9.2	Tray for preventing electrolyte spillage		N/A
M.10	Instructions to prevent reasonably foreseeable misuse (Determination of compliance: inspection, data review; or abnormal testing) ..... :		N/A
N	**ELECTROCHEMICAL POTENTIALS**		N/A
	Metal(s) used ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
O	**MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES**		N/A
	Figures O.1 to O.20 of this Annex applied..... :	Functional insulation only.	—
P	**SAFEGUARDS AGAINST ENTRY OF FOREIGN OBJECTS AND SPILLAGE OF INTERNAL LIQUIDS**		N/A
P.1	General requirements	Building-in component. Shall be evaluated in end-product.	N/A
P.2.2	Safeguards against entry of foreign object		N/A
	Location and Dimensions (mm) ..... :		—
P.2.3	Safeguard against the consequences of entry of foreign object		N/A
P.2.3.1	Safeguards against the entry of a foreign object		N/A
	Openings in transportable equipment		N/A
	Transportable equipment with metalized plastic parts ..... :		N/A
P.2.3.2	Openings in transportable equipment in relation to metallized parts of a barrier or enclosure (identification of supplementary safeguard) ..... :		N/A
P.3	Safeguards against spillage of internal liquids		N/A
P.3.1	General requirements		N/A
P.3.2	Determination of spillage consequences		N/A
P.3.3	Spillage safeguards		N/A
P.3.4	Safeguards effectiveness		N/A
P.4	Metallized coatings and adhesive securing parts		N/A
P.4.2 a)	Conditioning testing		N/A
	Tc (°C)..... :		—
	Tr (°C) ..... :		—
	Ta (°C) ..... :		—
P.4.2 b)	Abrasion testing ..... :		N/A
P.4.2 c)	Mechanical strength testing ..... :		N/A
Q	**CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING**		N/A
Q.1	Limited power sources	Not considered.	N/A
Q.1.1 a)	Inherently limited output		N/A
Q.1.1 b)	Impedance limited output		N/A
	- Regulating network limited output under normal operating and simulated single fault condition		N/A
Q.1.1 c)	Overcurrent protective device limited output		N/A
Q.1.1 d)	IC current limiter complying with G.9		N/A
Q.1.2	Compliance and test method		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
Q.2	Test for external circuits – paired conductor cable		N/A
	Maximum output current (A) ..... :		—
	Current limiting method..... :		—
R	**LIMITED SHORT CIRCUIT TEST**		N/A
R.1	General requirements		N/A
R.2	Determination of the overcurrent protective device and circuit		N/A
R.3	Test method Supply voltage (V) and short-circuit current (A)). ..... :		N/A
S	**TESTS FOR RESISTANCE TO HEAT AND FIRE**		N/A
S.1	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material ..... :		—
	Wall thickness (mm) ..... :		—
	Conditioning (°C) ..... :		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	- Material not consumed completely		N/A
	- Material extinguishes within 30s		N/A
	- No burning of layer or wrapping tissue		N/A
S.2	Flammability test for fire enclosure and fire barrier integrity		N/A
	Samples, material ..... :		—
	Wall thickness (mm) ..... :		—
	Conditioning (°C) ..... :		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	Test specimen does not show any additional hole		N/A
S.3	Flammability test for the bottom of a fire enclosure		N/A
	Samples, material ..... :		—
	Wall thickness (mm) ..... :		—
	Cheesecloth did not ignite		N/A
S.4	Flammability classification of materials		N/A
S.5	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material ..... :		—

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Wall thickness (mm) ..... :		—
	Conditioning (test condition), (°C)..... :		—
	Test flame according to IEC 60695-11-20 with conditions as set out		N/A
	After every test specimen was not consumed completely		N/A
	After fifth flame application, flame extinguished within 1 min		N/A
T	**MECHANICAL STRENGTH TESTS**		N/A
T.1	General requirements		N/A
T.2	Steady force test, 10 N ..... :	Functional Insulation only.	N/A
T.3	Steady force test, 30 N ..... :		N/A
T.4	Steady force test, 100 N ..... :		N/A
T.5	Steady force test, 250 N ..... :		N/A
T.6	Enclosure impact test		N/A
	Fall test		N/A
	Swing test		N/A
T.7	Drop test ..... :		N/A
T.8	Stress relief test ..... :		N/A
T.9	Impact Test (glass)		N/A
T.9.1	General requirements		N/A
T.9.2	Impact test and compliance		N/A
	Impact energy (J) ..... :		—
	Height (m)..... :		—
T.10	Glass fragmentation test..... :		N/A
T.11	Test for telescoping or rod antennas		N/A
	Torque value (Nm) ..... :		—
U	**MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFECTS OF IMPLOSION**		N/A
U.1	General requirements		N/A
U.2	Compliance and test method for non-intrinsically protected CRTs		N/A
U.3	Protective Screen ..... :		N/A
V	**DETERMINATION OF ACCESSIBLE PARTS (FINGERS, PROBES AND WEDGES)**		N/A
V.1	Accessible parts of equipment		N/A
V.2	Accessible part criterion		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.1.2	TABLE: list of critical components and materials	Pass

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Case	Interchangeable	Interchangeable	Brass, Overall 25.1 by 25.1 mm, 0.3 mm thick.	--	--
Potting Compound	Interchangeable	Interchangeable	Silicone, Minimum V-2, Minimum 150 °C	UL 94	UL
Printed Wiring Board (P1, P2 board)	Interchangeable	Interchangeable	Minimum V-1, minimum 130 °C	UL 796	UL
Transformer (T1) for MGFS40053R3, MGFS400505	Cosel Co., Ltd.	17M041	Designed with PWB Traces. (Winding: In 2T, Out 2T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS400512	Cosel Co., Ltd.	17M051	Designed with PWB Traces. (Winding: In 2T, Out 5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS400515	Cosel Co., Ltd.	17M061	Designed with PWB Traces. (Winding: In 2T, Out 6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW400512	Cosel Co., Ltd.	17M151	Designed with PWB Traces. (Winding: In 2T, Out 5/5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW400515	Cosel Co., Ltd.	17M161	Designed with PWB Traces. (Winding: In 2T, Out 6/6T)	IEC 62368-1:2004	-- , Tested in unit.
Transformer (T1) for MGFS40243R3, MGFS402405	Cosel Co., Ltd.	17M081	Designed with PWB Traces. (Winding: In 4T, Out 2T)	IEC 62368-1:2004	-- , Tested in unit.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Transformer (T1) for MGFS402412	Cosel Co., Ltd.	17M091	Designed with PWB Traces. (Winding: In 4T, Out 5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS402415	Cosel Co., Ltd.	17M101	Designed with PWB Traces. (Winding: In 4T, Out 6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW402412	Cosel Co., Ltd.	17M171	Designed with PWB Traces. (Winding: In 4T, Out 5/5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW402415	Cosel Co., Ltd.	17M181	Designed with PWB Traces. (Winding: In 4T, Out 6/6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS40483R3, MGFS404805	Cosel Co., Ltd.	17M121	Designed with PWB Traces. (Winding: In 8T, Out 2T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS404812	Cosel Co., Ltd.	17M131	Designed with PWB Traces. (Winding: In 8T, Out 5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS404815	Cosel Co., Ltd.	17M141	Designed with PWB Traces. (Winding: In 8T, Out 6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW404812	Cosel Co., Ltd.	17M191	Designed with PWB Traces. (Winding: In 8T, Out 5/5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW404815	Cosel Co., Ltd.	17M201	Designed with PWB Traces. (Winding: In 8T, Out 6/6T)	IEC 62368-1:2004	Tested in unit.
FET (TR101) for MGFw4005z	Interchangeable	Interchangeable	Minimum 40 V, Minimum 100 A	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
FET (TR101) for MGFw4024z	Interchangeable	Interchangeable	Minimum 80 V, Minimum 44 A	--	--
FET (TR101) for MGFw4048z	Interchangeable	Interchangeable	Minimum 150 V, Minimum 29 A	--	--
FET (TR141) for MGFw4024z	Interchangeable	Interchangeable	Minimum 60 V, Minimum 6 A	--	--
FET (TR141) for MGFw4048z	Interchangeable	Interchangeable	Minimum 100 V, Minimum 3.3 A	--	--
Thermistor (TH101)	Mitsubishi Materials Corporation	TD05-3H103	10 kohm at 25 °C	IEC 62368-1:2004	Tested in unit.
- Description:					
--	--	--	--	--	-- , --

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.

2) Description line content is optional. Main line description needs to clearly detail the component used for testing

3) The CBTL has verified the component information

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.8.4, 4.8.5	**TABLE: Lithium coin/button cell batteries mechanical tests**		N/A
(The following mechanical tests are conducted in the sequence noted.)			
4.8.4.2	**TABLE: Stress Relief test**		—
Part	**Material**	**Oven Temperature (°C)**	**Comments**
4.8.4.3	**TABLE: Battery replacement test**		—
Battery part no. ..... :			—
Battery Installation/withdrawal		Battery Installation/Removal Cycle	Comments
		1	
		2	
		3	
		4	
		5	
		6	
		8	
		9	
		10	
4.8.4.4	**TABLE: Drop test**		—
Impact Area	Drop Distance	Drop No.	Observations
		1	
		2	
		3	
4.8.4.5	**TABLE: Impact**		—
Impacts per surface	**Surface tested**	**Impact energy (Nm)**	**Comments**
4.8.4.6	**TABLE: Crush test**		—
Test position	**Surface tested**	**Crushing Force (N)**	**Duration force applied (s)**
Supplementary information:			

4.8.5	**TABLE: Lithium coin/button cell batteries mechanical test result**	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Test position	Surface tested	Force (N)	Duration force applied (s)
Supplementary information:			

5.2	Table: Classification of electrical energy sources						Pass
5.2.2.2 – Steady State Voltage and Current conditions							
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				U (Vrms or Vpk)	I (Apk or Arms)	Hz	
1	76 Vdc	Output (+Vout) of model MGFS404815 (*1) (*2)	Normal	16.5 Vdc	--	--	ES1
			Abnormal - External Variable Resistor maximum	17.3 Vdc	--	--	
			Abnormal - Output overload	15.0 Vdc	--	--	
			Single fault – TR101 D to S, SC	6.0 Vdc	--	--	
			Single fault – TR101 D to G, SC (*4)	8.0 Vdc	--	--	
			Single fault – T1 Pin 1 to 2, SC (*4)	19.2 Vpk	--	--	
			Single fault – T1 Pin 1 to 3, SC (*4)	5.6 Vdc	--	--	
			Single fault – T1 Pin 1 to 4, SC (*4)	8.0 Vdc	--	--	
			Single fault – T1 Pin 2 to 3, SC (*4)	5.6 Vdc	--	--	
			Single fault – T1 Pin 2 to 4, SC (*4)	10.0 Vdc	--	--	
			Single fault – T1 Pin 3 to 4, SC (*4)	16.5 Vdc	--	--	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	Table: Classification of electrical energy sources						Pass
			Single fault – PC201 Input side, SC	4.5 Vdc	--	--	
			Single fault – PC201 Output side, SC	21.9 Vpk	--	--	
			Single fault – L501, SC (*4)	16.5 Vdc	--	--	
			Single fault – TR501 D to S, SC (*4)	6.0 Vpk	--	--	
2	76 Vdc	Output (+Vout) of model MGFW404815 (*3)	Normal	15.0 Vdc	--	--	ES1
			Abnormal	15.0 Vdc	--	--	
			Single fault – T1 Pin 1 to 5, SC	26.0 Vpk	--	--	
			Single fault – T1 Pin 1 to 6, SC	26.4 Vpk	--	--	
			Single fault – T1 Pin 2 to 5, SC	32.0 Vpk	--	--	
			Single fault – T1 Pin 2 to 6, SC	27.0 Vpk	--	--	
			Single fault – T1 Pin 5 to 6, SC	22.6 Vpk	--	--	
			Single fault – TR511 D to S, SC	7.0 Vdc	--	--	
			Single fault – PC201 Input side, SC	10.0 Vdc	--	--	
			Single fault – PC201 Output side, SC	26.0 Vpk	--	--	
			Single fault – TR101 D to S, SC	11.0 Vdc	--	--	
3	76 Vdc	Output (-Vout) of model MGFW404815 (*3)	Normal	15.0 Vdc	--	--	ES1
			Abnormal	14.7 Vdc	--	--	
			Single fault – T1 Pin 1 to 5, SC	29.0 Vpk	--	--	
			Single fault – T1 Pin 5 to 6, SC	19.6 Vpk	--	--	
			Single fault – L511, SC	15.0 Vdc	--	--	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	Table: Classification of electrical energy sources						Pass
			Single fault – TR511 D to S, SC	14.0 Vpk	--	--	
			Single fault – PC201 Input side, SC	3.0 Vdc	--	--	
			Single fault – PC201 Output side, SC	25.0 Vpk	--	--	
			Single fault – TR101 D to S, SC	2.0 Vdc	--	--	
4	76 Vdc	T1 Pin1 to - Vin of model MGFS404815 (*5)	Normal	76.8 Vdc	--	--	
			Abnormal	--	--	--	
			Single fault – TR141 D to S, SC	76.6 Vdc	--	--	ES2
			Single fault – TR141 D to G, SC	84.8 Vdc	--	--	
5	76 Vdc	T1 Pin2 to - Vin of model MGFS404815 (*5)	Normal	113 Vpk	--	386.8 KHz	
			Abnormal	--	--	--	
			Single fault – TR101 D to S, SC	0 Vdc	--	--	ES2
			Single fault – TR101 D to G, SC	1.0 Vdc	--	--	

5.2.2.3 - Capacitance Limits

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters		ES Class
				Capacitance, nF	Upk (V)	
--	--	--	Normal	--	--	--
			Abnormal	--	--	
			Single fault – SC/OC	--	--	

5.2.2.4 - Single Pulses

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Duration (ms)	Upk (V)	Ipk (mA)	
1	76 Vdc	Output (-Vout) of model	Normal	--	--	--	ES2
			Abnormal	--	--	--	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	Table: Classification of electrical energy sources						Pass
		MGFW404815 (*3)	Single fault – T1 Pin 1 to 6, SC	Less than 200ms	75.2 Vpk	--	
			Single fault – T1 Pin 2 to 5, SC	Less than 200ms	55.0 Vpk	--	
			Single fault – T1 Pin 2 to 6, SC	Less than 100ms	74.0 Vpk	--	

5.2.2.5 - Repetitive Pulses

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Off time (ms)	Upk (V)	Ipk (mA)	
--	--	--	Normal	--	--	--	--
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	

Test Conditions:

Normal –

Abnormal -

Supplementary information: SC=Short Circuit, OC=Short Circuit

(*1) Maximum voltage within output voltage range.

(*2) Model MGFS404815 is representative of MGFS40yz because the circuit configuration is the same all other models of MGFS40yz.

(*3) Model MGFW404815 is representative of MGFW40yz because the circuit configuration is the same all other models of MGFW40yz.

(*4) This test was representative of +Vout of Model MGFW40yz because the circuit configuration is the same.

(*5) Model MGFS404815 is representative of MGFw40yz because the input side circuit configuration is the same all other models of MGFw40yz.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.4.1.4, 6.3.2, 9.0, B.2.6	**TABLE: Temperature measurements**					N/A
	Supply voltage (V) ..... :	See below	See below	See below	See below	—
	Ambient T_{min} (°C) ..... :	See below	See below	See below	See below	—
	Ambient T_{max} (°C) ..... :	See below	See below	See below	See below	—
	Tma (°C) ..... :	See below	See below	See below	See below	—
Maximum measured temperature T of part/at:		T (°C)				Allowed T_{max} (°C)
Maximum operating temperatures for materials, components and systems		---	---	---	---	---
Model MGFS40053R3		--	--	--	--	--
Input voltage (Vdc)		4.5	4.5	13	13	--
Output load		100% (3.3V/ 8A)	100% (3.3V/ 8A)	100% (3.3V/ 8A)	100% (3.3V/ 8A)	--
Ambient (C)		23	Calculated at 110	23	Calculated at 110	--
Center of the Case (Reference point)		85	110	62	110	--
PWB near TR101 (P2 board)		105	130	73	121	130 (PWB)
PWB near TR501 (P2 board)		98	123	70	118	130 (PWB)
PWB T1 Input side (P2 board)		98	123	68	116	130 (PWB)
PWB T1 Output side (P2 board)		98	123	69	117	130 (PWB)
PWB near R227 (P1 board)		93	118	67	115	130 (PWB)
PWB near C901 (P1 board)		84	109	61	115	130 (PWB)
Test Duration		2 hours	--	2 hours	--	--
Model MGFS400515		--	--	--	--	--
Input voltage (Vdc)		4.5	4.5	13	13	--
Output load		100% (15V/ 2A)	100% (15V/ 2A)	100% (15V/ 2A)	100% (15V/ 2A)	--
Ambient (C)		23	Calculated at 110	23	Calculated at 110	--
Center of the Case (Reference point)		78	110	62	110	--

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Clause	Requirement + Test	Result - Remark	Verdict

PWB near TR101 (P2 board)	92	124	72	120	130 (PWB)
PWB near TR501 (P2 board)	89	121	70	118	130 (PWB)
PWB T1 Input side (P2 board)	87	119	67	115	130 (PWB)
PWB T1 Output side (P2 board)	86	118	67	115	130 (PWB)
PWB near R227 (P1 board)	86	118	69	117	130 (PWB)
PWB near C901 (P1 board)	75	107	60	108	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Model MGFW400512	--	--	--	--	--
Input voltage (Vdc)	4.5	4.5	13	13	--
Output load	100% (+12V/ 1.3A, -12V/ 1.3A)	100% (+12V/ 1.3A, -12V/ 1.3A)	100% (+12V/ 1.3A, -12V/ 1.3A)	100% (+12V/ 1.3A, -12V/ 1.3A)	--
Ambient (C)	24	Calculated at 110	24	Calculated at 110	--
Center of the Case (Reference point)	90	110	69	110	--
PWB near TR101 (P2 board)	107	127	80	121	130 (PWB)
PWB near TR501 (P2 board)	106	126	80	121	130 (PWB)
PWB T1 Input side (P2 board)	104	124	76	117	130 (PWB)
PWB T1 Output side (P2 board)	103	124	77	118	130 (PWB)
PWB near R227 (P1 board)	98	118	75	116	130 (PWB)
PWB near C901 (P1 board)	94	114	72	113	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Model MGFS40243R3	--	--	--	--	--
Input voltage (Vdc)	9	9	18	18	--
Output load	70% (5V/ 5.6A)	70% (5V/ 5.6A)	100% (5V/ 8A)	100% (5V/ 8A)	--
Ambient (C)	21	Calculated at 110	21	Calculated at 110	--
Center of the Case (Reference point)	54	110	66	110	--

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Clause	Requirement + Test	Result - Remark	Verdict

PWB near TR101 (P2 board)	63	119	78	122	130 (PWB)
PWB near TR501 (P2 board)	64	120	80	124	130 (PWB)
PWB T1 Input side (P2 board)	62	118	76	120	130 (PWB)
PWB T1 Output side (P2 board)	62	118	78	122	130 (PWB)
PWB near R227 (P1 board)	60	116	73	117	130 (PWB)
PWB near C901 (P1 board)	57	113	72	116	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (5V/ 8A)	100% (5V/ 8A)	--	--	--
Ambient (C)	21	Calculated at 110	--	--	--
Center of the Case (Reference point)	62	110	--	--	--
PWB near TR101 (P2 board)	74	122	--	--	130 (PWB)
PWB near TR501 (P2 board)	75	123	--	--	130 (PWB)
PWB T1 Input side (P2 board)	71	119	--	--	130 (PWB)
PWB T1 Output side (P2 board)	73	121	--	--	130 (PWB)
PWB near R227 (P1 board)	69	117	--	--	130 (PWB)
PWB near C901 (P1 board)	68	116	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFS402412	--	--	--	--	--
Input voltage (Vdc)	9	9	18	18	--
Output load	70% (12V/ 3.38A)	70% (12V/ 3.38A)	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--
Ambient (C)	20	Calculated at 110	23	Calculated at 110	--
Center of the Case (Reference point)	61	110	69	110	--
PWB near TR101 (P2 board)	72	121	82	123	130 (PWB)

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Clause	Requirement + Test	Result - Remark	Verdict

PWB near TR501 (P2 board)	71	120	82	123	130 (PWB)
PWB T1 Input side (P2 board)	70	119	79	120	130 (PWB)
PWB T1 Output side (P2 board)	69	118	79	120	130 (PWB)
PWB near R227 (P1 board)	69	118	79	120	130 (PWB)
PWB near C901 (P1 board)	63	112	73	114	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	65	110	--	--	--
PWB near TR101 (P2 board)	77	122	--	--	130 (PWB)
PWB near TR501 (P2 board)	76	121	--	--	130 (PWB)
PWB T1 Input side (P2 board)	74	119	--	--	130 (PWB)
PWB T1 Output side (P2 board)	74	119	--	--	130 (PWB)
PWB near R227 (P1 board)	74	119	--	--	130 (PWB)
PWB near C901 (P1 board)	68	113	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFW402415	--	--	--	--	--
Input voltage (Vdc)	9	9	18	18	--
Output load	70% (+15V/ 0.98A, -15V/ 0.98A)	70% (+15V/ 0.98A, -15V/ 0.98A)	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--
Ambient (C)	21	Calculated at 110	22	Calculated at 110	--
Center of the Case (Reference point)	61	110	68	110	--
PWB near TR101 (P2 board)	69	118	78	120	130 (PWB)

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Clause	Requirement + Test	Result - Remark	Verdict

PWB near TR501 (P2 board)	68	117	78	120	130 (PWB)
PWB T1 Input side (P2 board)	66	115	75	117	130 (PWB)
PWB T1 Output side (P2 board)	65	114	75	117	130 (PWB)
PWB near R227 (P1 board)	64	113	72	114	130 (PWB)
PWB near C901 (P1 board)	60	109	69	111	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	63	110	--	--	--
PWB near TR101 (P2 board)	72	119	--	--	130 (PWB)
PWB near TR501 (P2 board)	72	119	--	--	130 (PWB)
PWB T1 Input side (P2 board)	69	116	--	--	130 (PWB)
PWB T1 Output side (P2 board)	69	116	--	--	130 (PWB)
PWB near R227 (P1 board)	67	114	--	--	130 (PWB)
PWB near C901 (P1 board)	63	110	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFS40483R3	--	--	--	--	--
Input voltage (Vdc)	18	18	36	36	--
Output load	70% (3.3V/ 7A)	70% (3.3V/ 7A)	100% (3.3V/ 10A)	100% (3.3V/ 10A)	--
Ambient (C)	20	Calculated at 110	20	Calculated at 110	--
Center of the Case (Reference point)	54	110	67	110	--
PWB near TR101 (P2 board)	59	115	74	117	130 (PWB)

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Clause	Requirement + Test	Result - Remark	Verdict

PWB near TR501 (P2 board)	59	115	78	121	130 (PWB)
PWB T1 Input side (P2 board)	56	112	70	113	130 (PWB)
PWB T1 Output side (P2 board)	56	112	72	115	130 (PWB)
PWB near R227 (P1 board)	53	109	66	109	130 (PWB)
PWB near C901 (P1 board)	56	112	72	115	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	76	76	--	--	--
Output load	100% (3.3V/ 10A)	100% (3.3V/ 10A)	--	--	--
Ambient (C)	20	Calculated at 110	--	--	--
Center of the Case (Reference point)	66	110	--	--	--
PWB near TR101 (P2 board)	74	118	--	--	130 (PWB)
PWB near TR501 (P2 board)	54	98	--	--	130 (PWB)
PWB T1 Input side (P2 board)	69	113	--	--	130 (PWB)
PWB T1 Output side (P2 board)	71	115	--	--	130 (PWB)
PWB near R227 (P1 board)	66	110	--	--	130 (PWB)
PWB near C901 (P1 board)	71	115	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFS404812	--	--	--	--	--
Input voltage (Vdc)	18	18	36	36	--
Output load	70% (12V/ 3.38A)	70% (12V/ 3.38A)	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--
Ambient (C)	20	Calculated at 110	21	Calculated at 110	--
Center of the Case (Reference point)	62	110	74	110	--
PWB near TR101 (P2 board)	71	119	85	121	130 (PWB)
PWB near TR501 (P2 board)	68	116	83	119	130 (PWB)

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Clause	Requirement + Test	Result - Remark	Verdict

PWB T1 Input side (P2 board)	66	114	79	115	130 (PWB)
PWB T1 Output side (P2 board)	67	115	80	116	130 (PWB)
PWB near R227 (P1 board)	62	110	74	110	130 (PWB)
PWB near C901 (P1 board)	61	109	74	110	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	76	76	--	--	--
Output load	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	73	110	--	--	--
PWB near TR101 (P2 board)	84	121	--	--	130 (PWB)
PWB near TR501 (P2 board)	82	119	--	--	130 (PWB)
PWB T1 Input side (P2 board)	78	115	--	--	130 (PWB)
PWB T1 Output side (P2 board)	79	116	--	--	130 (PWB)
PWB near R227 (P1 board)	74	111	--	--	130 (PWB)
PWB near C901 (P1 board)	73	110	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFW404815	--	--	--	--	--
Input voltage (Vdc)	18	18	36	36	--
Output load	70% (+15V/ 0.98A, -15V/ 0.98A)	70% (+15V/ 0.98A, -15V/ 0.98A)	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--
Ambient (C)	20	Calculated at 110	21	Calculated at 110	--
Center of the Case (Reference point)	54	110	65	110	--
PWB near TR101 (P2 board)	61	117	75	120	130 (PWB)
PWB near TR501 (P2 board)	59	115	73	118	130 (PWB)

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Clause	Requirement + Test	Result - Remark	Verdict

PWB T1 Input side (P2 board)	59	115	72	117	130 (PWB)
PWB T1 Output side (P2 board)	57	113	71	116	130 (PWB)
PWB near R227 (P1 board)	55	111	67	112	130 (PWB)
PWB near C901 (P1 board)	54	110	66	111	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	76	76	--	--	--
Output load	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	67	110	--	--	--
PWB near TR101 (P2 board)	77	120	--	--	130 (PWB)
PWB near TR501 (P2 board)	74	117	--	--	130 (PWB)
PWB T1 Input side (P2 board)	74	117	--	--	130 (PWB)
PWB T1 Output side (P2 board)	72	115	--	--	130 (PWB)
PWB near R227 (P1 board)	70	113	--	--	130 (PWB)
PWB near C901 (P1 board)	67	110	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Abnormal Operating Conditions: Output overload	---	---	---	---	---
Model (Output terminal)	Model MGFS40053R3 (+Vout)	Model MGFS40053R3 (+Vout)	Model MGFS400515 (+Vout)	Model MGFS400515 (+Vout)	--
Input voltage (Vdc)	4.5	4.5	4.5	4.5	--
Ambient (C)	20	Tma = 85	18	Tma = 85	--
PWB near TR101 (P2 board)	125	190	119	186	300
PWB T1 Input side (P2 board)	124	189	114	181	300
PWB T1 Output side (P2 board)	123	188	111	178	300

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Clause	Requirement + Test	Result - Remark	Verdict

Model (Output terminal)	Model MGFW40 0515 (+Vout)	Model MGFW40 0515 (+Vout)	Model MGFW40 0515 (-Vout)	Model MGFW400 515 (-Vout)	--
Input voltage (Vdc)	4.5	4.5	4.5	4.5	--
Ambient (C)	20	Tma = 85	21	Tma = 85	--
PWB near TR101 (P2 board)	133	198	133	197	300
PWB T1 Input side (P2 board)	126	191	126	190	300
PWB T1 Output side (P2 board)	122	187	123	187	300
Model (Output terminal)	Model MGFS404 83R3 (+Vout)	Model MGFS404 83R3 (+Vout)	Model MGFS404 815 (+Vout)	Model MGFS404 815 (+Vout)	--
Input voltage (Vdc)	36 Vdc	36 Vdc	36 Vdc	36 Vdc	--
Ambient (C)	18	Tma = 85	18	Tma = 85	--
PWB near TR101 (P2 board)	97	134	134	201	300
PWB T1 Input side (P2 board)	92	159	127	194	300
PWB T1 Output side (P2 board)	95	162	126	193	300
Model (Output terminal)	Model MGFW40 4815 (+Vout)	Model MGFW40 4815 (+Vout)	Model MGFW40 4815 (-Vout)	Model MGFW404 815 (-Vout)	--
Input voltage (Vdc)	36	36	36	36	--
Ambient (C)	19	Tma = 85	20	Tma = 85	--
PWB near TR101 (P2 board)	105	171	109	174	300
PWB T1 Input side (P2 board)	102	168	103	168	300
PWB T1 Output side (P2 board)	99	165	104	169	300

Supplementary information:

The models tested were considered representative of the entire series because the construction is the same all other models.

The representative models were considered based on specifications of maximum VA and/or maximum output current.

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
N/A	--	--	--	--	--	--	--

Supplementary information:

Note 1: Tma should be considered as directed by applicable requirement

Note 2: Tma is not included in assessment of Touch Temperatures (Clause 9)

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Clause	Requirement + Test	Result - Remark	Verdict

5.4.1.10.2	TABLE: Vicat softening temperature of thermoplastics		N/A
Penetration (mm)....:			—
Object/ Part No./Material	Manufacturer/trademark	T softening (°C)	
supplementary information:			

5.4.1.10.3	TABLE: Ball pressure test of thermoplastics		N/A
Allowed impression diameter (mm) ....:	≤ 2 mm		—
Object/Part No./Material	Manufacturer/trademark	Test temperature (°C)	Impression diameter (mm)
Supplementary information:			

5.4.2.2, 5.4.2.4 and 5.4.3	TABLE: Minimum Clearances/Creepage distance						N/A
Clearance (cl) and creepage distance (cr) at/of/between:	Up (V)	U r.m.s. (V)	Frequency (kHz)[1]	Required cl (mm)	cl (mm) [2]	Required[3] cr (mm)	cr (mm)
Supplementary information:							
Note 1: Only for frequency above 30 kHz Note 2: See table 5.4.2.4 if this is based on electric strength test Note 3: Provide Material Group							

5.4.2.3	TABLE: Minimum Clearances distances using required withstand voltage			N/A
	Overvoltage Category (OV):			
	Pollution Degree:			
Clearance distanced between:	Required withstand voltage	Required cl (mm)	Measured cl (mm)	
Supplementary information:				

5.4.2.4	TABLE: Clearances based on electric strength test			N/A
Test voltage applied between:	Required cl (mm)	Test voltage (kV) peak/ r.m.s. / d.c.	Breakdown Yes / No	

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:			

5.4.4.2, 5.4.4.5 c) 5.4.4.9	**TABLE: Distance through insulation measurements**				N/A
Distance through insulation di at/of:	Peak voltage (V)	Frequency (kHz)	Material	Required DTI (mm)	DTI (mm)
Supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict

5.4.9	TABLE: Electric strength tests			N/A
Test voltage applied between:		Voltage shape (AC, DC)	Test voltage (V)	Breakdown Yes / No
Functional:				
Basic/supplementary:				
Reinforced:				
Routine Tests:				
Supplementary information:				

5.5.2.2	TABLE: Stored discharge on capacitors				N/A
Supply Voltage (V), Hz	Test Location	Operating Condition (N, S)	Switch position On or off	Measured Voltage (after 2 seconds)	ES Classification
Supplementary information:					

X-capacitors installed for testing are:

☐ bleeding resistor rating:

☐ ICX:

Notes:

A. Test Location:

Phase to Neutral; Phase to Phase; Phase to Earth; and/or Neutral to Earth

B. Operating condition abbreviations:

N – Normal operating condition (e.g., normal operation, or open fuse); S –Single fault condition

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Clause	Requirement + Test	Result - Remark	Verdict

5.6.6.2	TABLE: Resistance of protective conductors and terminations				N/A
Accessible part		Test current (A)	Duration (min)	Voltage drop (V)	Resistance (Ω)
Supplementary information:					

5.7.2.2, 5.7.4	TABLE: Earthed accessible conductive part		N/A
Supply voltage .....:			—
Location		Test conditions specified in 6.1 of IEC 60990 or Fault Condition No in IEC 60990 clause 6.2.2.1 through 6.2.2.8, except for 6.2.2.7	Touch current (mA)
		1	
		2*	
		3	
		4	
		5	
		6	
		8	
Supplementary Information:			
Notes:[1] Supply voltage is the anticipated maximum Touch Voltage [2] Earthed neutral conductor [Voltage differences less than 1% or more] [3] Specify method used for measurement as described in IEC 60990 sub-clause 4.3 [4] IEC60990, sub-clause 6.2.2.7, Fault 7 not applicable. [5] (*) IEC60990, sub-clause 6.2.2.2 is not applicable if switch or disconnect device (e.g., appliance coupler) provided.			

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Clause	Requirement + Test	Result - Remark	Verdict

6.2.2	Table: Electrical power sources (PS) measurements for classification				Pass
Source	Description	Measurement	Max Power after 3 s	Max Power after 5 s*)	PS Classification
A	Output (+Vout) of model MGFS40243R3 (*1) (*2)	Power (W) :	--	41.652	PS2
		V_A (V) :	--	3.56	
		I_A (A) :	--	11.70	
B	Output (+Vout) of model MGFS402412 (*1) (*2)	Power (W) :	--	54.12	PS2
		V_A (V) :	--	13.2	
		I_A (A) :	--	4.1	
C	Output (+Vout) of model MGFS402415 (*1) (*2)	Power (W) :	--	51.15	PS2
		V_A (V) :	--	16.5	
		I_A (A) :	--	3.1	
D	Output (+Vout) of model MGFW402415 (*3)	Power (W) :	--	45.856	PS2
		V_A (V) :	--	14.33	
		I_A (A) :	--	3.2	
E	Output (-Vout) of model MGFW402415 (*3)	Power (W) :	--	46.016	PS2
		V_A (V) :	--	14.38	
		I_A (A) :	--	3.2	

Supplementary Information:

(*) Measurement taken only when limits at 3 seconds exceed PS1 limits

(*1) Maximum voltage within output voltage range.

(*2) Models MGFS40243R3, MGFS402412 and MGFS402415 are representative of MGFS40yz because the circuit configuration is the same all other models of MGFS40yz.

(*3) Model MGFW402415 is representative of MGFW40yz because the circuit configuration is the same all other models of MGFW40yz.

The representative models were considered based on specifications of maximum VA and/or maximum output current.

6.2.3.1	Table: Determination of Potential Ignition Sources (Arcing PIS)			N/A
Location	Open circuit voltage After 3 s (Vp)	Measured r.m.s current (Irms)	Calculated value (V_p x I_{rms})	Arcing PIS? Yes / No

Supplementary information:

An Arcing PIS requires a minimum of 50 V (peak) a.c. or d.c. An Arcing PIS is established when the product of the open circuit voltage (Vp) and normal operating condition rms current (Irms) is greater than 15.

6.2.3.2	Table: Determination of Potential Ignition Sources (Resistive PIS)	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Circuit Location (x-y)	Operating Condition (Normal / Describe Single Fault)	Measured wattage or VA During first 30 s (W / VA)	Measured wattage or VA After 30 s (W / VA)	Protective Circuit, Regulator, or PTC Operated? Yes / No (Comment)	Resistive PIS? Yes/No

Supplementary Information:

A combination of voltmeter, VA and ammeter IA may be used instead of a wattmeter.

If a separate voltmeter and ammeter are used, the product of (VA x IA) is used to determine Resistive PIS classification.

A Resistive PIS: (a) dissipates more than 15 W, measured after 30 s of normal operation,

or (b) under single fault conditions has either a power exceeding 100 W measured immediately after the introduction of the fault if electronic circuits,

regulators or PTC devices are used, or has an available power exceeding 15 W measured 30 s after introduction of the fault.

8.5.5	TABLE: High Pressure Lamp	N/A
Description	Values	Energy Source Classification
Lamp type .....:		—
Manufacturer.....:		—
Cat no.....:		—
Pressure (cold) (MPa) .....:		MS_
Pressure (operating) (MPa).....:		MS_
Operating time (minutes).....:		—
Explosion method .....:		—
Max particle length escaping enclosure (mm) .:		MS_
Max particle length beyond 1 m (mm).....:		MS_
Overall result .....:		
Supplementary information:		

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
Model MGFS40053 R3	--	--	--	--	--	--	--
4.5 Vdc	7.21	7.09	32.4	--	(*1)	--	Rated Load (Load factor: 100%, 3.3V/ 8A)
4.5 Vdc	7.09	7.09	31.9	--	(*1)	--	+10% output voltage (Load factor: 100%, 3.63V/ 7.28A)

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
4.5 Vdc	6.48	7.09	29.2	--	(*1)	--	-10% output voltage (Load factor: 100%, 2.97V/ 8A)
13 Vdc	2.33	7.09	30.3	--	(*1)	--	Rated Load (Load factor: 100%, 3.3V/ 8A)
13 Vdc	2.31	7.09	30.0	--	(*1)	--	+10% output voltage (Load factor: 100%, 3.63V/ 7.28A)
13 Vdc	2.11	7.09	27.4	--	(*1)	--	-10% output voltage (Load factor: 100%, 2.97V/ 8A)
Model MGFS400505	--	--	--	--	--	--	--
4.5 Vdc	8.02	7.96	36.1	--	(*1)	--	Rated Load (Load factor: 100%, 5V/ 6A)
13 Vdc	2.87	7.96	37.3	--	(*1)	--	Rated Load (Load factor: 100%, 5V/ 6A)
Model MGFS400512	--	--	--	--	--	--	--
4.5 Vdc	7.81	7.87	35.2	--	(*1)	--	Rated Load (Load factor: 100%, 12V/ 2.5A)
13 Vdc	2.59	7.87	33.7	--	(*1)	--	Rated Load (Load factor: 100%, 12V/ 2.5A)
Model MGFS400515	--	--	--	--	--	--	--
4.5 Vdc	7.76	7.87	34.9	--	(*1)	--	Rated Load (Load factor: 100%, 15V/ 2A)
13 Vdc	2.57	7.87	33.4	--	(*1)	--	Rated Load (Load factor: 100%, 15V/ 2A)
Model MGFS40243R3	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
9 Vdc	2.96	4.38	26.6	--	(*1)	--	Rated Load (Load factor: 70%: 3.3V/ 7A)
18 Vdc	2.10	4.38	37.8	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
36 Vdc	1.04	4.38	37.4	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
Model MGFS402405	--	--	--	--	--	--	--
9 Vdc	3.54	5.13	31.9	--	(*1)	--	Rated Load (Load factor: 70%: 5V/ 5.6A)
18 Vdc	2.49	5.13	44.8	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
36 Vdc	1.24	5.13	44.6	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
Model MGFS402412	--	--	--	--	--	--	--
9 Vdc	3.63	5.24	32.7	--	(*1)	--	Rated Load (Load factor: 70%: 12V/ 2.38A
18 Vdc	2.53	5.24	45.5	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
36 Vdc	1.25	5.24	45.0	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
Model MGFS402415	--	--	--	--	--	--	--
9 Vdc	3.62	5.20	32.6	--	(*1)	--	Rated Load (Load factor: 70%: 15V/ 1.89A)
18 Vdc	2.51	5.20	45.2	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)

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Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
36 Vdc	1.24	5.20	44.6	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)
Model MGFS40483 R3	--	--	--	--	--	--	--
18 Vdc	1.45	2.17	26.1	--	(*1)	--	Rated Load (Load factor: 70%: 3.3V/ 7A)
36 Vdc	1.04	2.17	37.4	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
76 Vdc	0.49	2.17	37.2	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
Model MGFS404805	--	--	--	--	--	--	--
18 Vdc	1.79	2.57	32.2	--	(*1)	--	Rated Load (Load factor: 70%: 5V/ 5.6A)
36 Vdc	1.26	2.57	45.4	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
76 Vdc	0.59	2.57	44.8	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
Model MGFS404812	--	--	--	--	--	--	--
18 Vdc	1.81	2.62	32.6	--	(*1)	--	Rated Load (Load factor: 70%: 12V/ 2.38A)
36 Vdc	1.27	2.62	45.7	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
76 Vdc	0.60	2.62	45.6	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
Model MGFS404815	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
18 Vdc	1.82	2.57	32.8	--	(*1)	--	Rated Load (Load factor: 70%: 15V/ 1.89A)
36 Vdc	1.27	2.57	45.7	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)
76 Vdc	0.60	2.57	45.6	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)
Model MGFW400512	--	--	--	--	--	--	--
4.5 Vdc	8.24	8.47	37.1	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.3A, -12V/ 1.3A)
13 Vdc	2.72	8.47	35.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.3A, -12V/ 1.3A)
Model MGFW400515	--	--	--	--	--	--	--
4.5 Vdc	7.79	7.96	35.1	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1A, -15V/ 1A)
13 Vdc	2.58	7.96	33.5	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1A, -15V/ 1A)
Model MGFW402412	--	--	--	--	--	--	--
9 Vdc	3.60	5.60	32.4	--	(*1)	--	Rated Load (Load factor: 70%, +12V/ 1.19A, -12V/ 1.19A)
18 Vdc	2.52	5.60	45.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
36 Vdc	1.26	5.60	45.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
Model MGFW402415	--	--	--	--	--	--	--
9 Vdc	3.67	5.64	33.0	--	(*1)	--	Rated Load (Load factor: 70%, +15V/ 0.98A, -15V/ 0.98A)

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Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
18 Vdc	2.57	5.64	46.3	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
36 Vdc	1.28	5.64	46.1	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
Model MGFW404812	--	--	--	--	--	--	--
18 Vdc	1.79	2.77	32.2	--	(*1)	--	Rated Load (Load factor: 70%, +12V/ 1.19A, -12V/ 1.19A)
36 Vdc	1.26	2.77	45.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
76 Vdc	0.60	2.77	45.6	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
Model MGFW404815	--	--	--	--	--	--	--
18 Vdc	1.81	2.79	32.6	--	(*1)	--	Rated Load (Load factor: 70%, +15V/ 0.98A, -15V/ 0.98A)
36 Vdc	1.28	2.79	46.1	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
76 Vdc	0.61	2.79	46.4	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
Supplementary information:							
(*1): External Fuse was used while testing. See Engineering Conditions of Acceptability.							

B.3	TABLE: Abnormal operating condition tests							Pass
Ambient temperature (°C) .....:					See below			—
Power source for EUT: Manufacturer, model/type, output rating ..:					Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W			—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFS40053R3	--	--	--	--	--	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately The temperature did not rise more than the heating test. No components damaged. Input current: 1.2A <-> 0.005A NC, NT
Output (+Vout)	Overload	4.5 Vdc	3 hours 25 minutes	(*1)	--	See Observation	See Observation	CT at 8.7A, 3.30Vdc Load adjusted to 9.0A, outputs stopped after 1min. PWB near TR101 (P2 board): 125°C PWB T1 Input side (P2 board): 124°C PWB T1 Output side (P2 board): 123°C TH101 body: 119°C Center of the Case: 110°C Ambient: 20°C NC, NT (*2)

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	**TABLE: Abnormal operating condition tests**							Pass
Ambient temperature (°C) .....:				See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:				Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W				—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFS400515	--	--	--	--	--	--	--	--
Output (+Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. The temperature did not rise more than the heating test. No components damaged. Input current: 116mA <-> 135mA NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	4.5 Vdc	5 hours 32 minutes	(*1)	--	See Observation	See Observation	CT at 2.28A, 15.0Vdc Input current: 9.31A Load adjusted to 2.30A, input current and output voltage intermittent oscillation immediately. Finally shorted. No component damaged. Input current: 0.38A <-> 0.005A PWB near TR101 (P2 board): 119°C PWB T1 Input side (P2 board): 114°C PWB T1 Output side (P2 board): 111°C TH101 body: 110°C Center of the Case: 102°C Ambient: 18°C NC, NT
Model MGFW400515	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No components damaged. NC, NT
Output (+Vout)	Overload	4.5 Vdc	2 hours 29 minutes	(*1)	--	See Observation	See Observation	CT at 1.20A, 15.2Vdc Load adjusted to 1.30A, output stopped after 7miin. PWB near TR101 (P2 board): 133°C PWB T1 Input side (P2 board): 126°C PWB T1 Output side (P2 board): 122°C TH101 body: 122°C Center of the Case: 111°C Ambient: 20°C No components damaged. NC, NT (*2)

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	**TABLE: Abnormal operating condition tests**		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No components damaged. Input current: 0.581A NC, NT
Output (-Vout)	Overload	4.5 Vdc	2 hours	(*1)	--	See Observation	See Observation	CT at 1.25A, 14.7Vdc Load adjusted to 1.30A, output stopped after 2min. PWB near TR101 (P2 board): 133°C PWB T1 Input side (P2 board): 126°C PWB T1 Output side (P2 board): 123°C TH101 body: 122°C Center of the Case: 111°C Ambient: 21°C No components damaged. NC, NT (*2)

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFS40483R3	--	--	--	--	--	--	--	--
Output (+Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. The temperature did not rise more than the heating test. No components damaged. NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	36 Vdc	9 hours 32 minutes	(*1)	--	See Observation	See Observation	CT at 11.5A, 3.3Vdc Input current: 1.22A Load adjusted to 12.5A, output voltage intermittent oscillation immediately. Finally shorted. PWB near TR101 (P2 board): 97°C PWB T1 Input side (P2 board): 92°C PWB T1 Output side (P2 board): 95°C TH101 body: 90°C Center of the case: 89°C Ambient: 18°C No components damaged. NC, NT
Model MGFS404815	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No components damaged. NC, NT
Output (+Vout)	Overload	36 Vdc	11 hours 17 minutes	(*1)	--	See Observation	See Observation	CT at 3.55A, 15.0Vdc Load adjusted to 3.65A, output stopped after 8mintes. PWB near TR101 (P2 board): 134°C PWB T1 Input side (P2 board): 127°C PWB T1 Output side (P2 board): 126°C TH101 body: 121°C Center of the case: 112°C Ambient: 20°C NC, NT (*2)
Model MGFW404815	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No component damaged. Input current: 0.240A <-> 0.003A NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	36 Vdc	8 hours 58 minutes	(*1)	--	See Observation	See Observation	CT at 2.1A, 15.0Vdc Input current: 1.64A Load adjusted to 2.25A, Input current intermittent oscillation immediately. Finally shorted. Any component damaged. Input current: 0.303A <-> 0.003A PWB near TR101 (P2 board): 105°C PWB T1 Input side (P2 board): 102°C PWB T1 Output side (P2 board): 99°C TH101 body: 97°C Center of the case: 92°C Ambient: 19°C NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No component damaged. Input current: 0.172A <-> 0.003A NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Overload	36 Vdc	12 hours 15 minutes	(*1)	--	See Observation	See Observation	CT at 1.95A, 14.7Vdc Input current: 1.59A Load adjusted to 1.97A, Input current intermittent oscillation immediately. Finally shorted. Any component damaged. Input current: 0.120A <-> 0.003A PWB near TR101 (P2 board): 109°C PWB T1 Input side (P2 board): 103°C PWB T1 Output side (P2 board): 104°C TH101 body: 99°C Center of the Case: 94°C Ambient : 20°C NC, NT
Supplementary information:								

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests								Pass
Ambient temperature (°C) .....:					See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:					Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W				—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation	
Test table is provided to record abnormal and fault conditions for all applicable energy sources including Thermal burn injury. Column “Abnormal/Fault.” Specify if test condition by indicating “Abnormal” then the condition for a Clause B.3 test or “Single Fault” then the condition for Clause B.4. CT - Constant temperatures were obtained NC - Cheesecloth remained intact NT - Tissue paper remained intact (*1): External Fuse was used while testing. See Engineering Conditions of Acceptability. (*2): Test was conducted three times due to TH101 was operated. The models tested were considered representative of the entire series because the construction is the same all other models. The representative models were considered based on specifications of maximum VA, maximum output current and/or Transformer winding number/structure.									

B.4	TABLE: Fault condition tests							Pass
Ambient temperature (°C) .....:					See below			—
Power source for EUT: Manufacturer, model/type, output rating ..:					Manufacturer: TAKASAGO, Model: HX060-100M2, Ratings: 0-60V, 0-100A, Two series connected.			—
Component No.	Fault Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFS400505	--	--	--	--	--	--	--	--
TR101 D to S	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.104A -> 0.015A NC, NT.

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Clause	Requirement + Test				Result - Remark			Verdict
TR101 D to G	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.076A -> 0.016A NC, NT.
T1 Pin 1 to 2	Short	13 Vdc	15 minutes	(*1)	--	--	--	Input and output started intermittent oscillation immediately. Temperature stabilized at 92°C (Core) No components damaged. Input current: 3.47A <-> 0A NC, NT.
T1 Pin 1 to 3	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.104A -> 0.015A NC, NT.
T1 Pin 1 to 4	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.104A -> 0.015A NC, NT
T1 Pin 2 to 3	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.075A -> 0.015A NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

T1 Pin 2 to 4	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.075A -> 0.015A NC, NT
T1 Pin 3 to 4	Short	13 Vdc	15 minutes	(*1)	--	--	--	Input current decreased immediately. Output operated normally. No abnormal heat rise. No components damaged. Input current: 0.076A -> 0.026A NC, NT
PC201 Output side	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. Input current: 0.104A -> 0.018A NC, NT
PC201 Input side	Short	13 Vdc	15 minutes	(*1)	--	--	--	Intermittent oscillation of output started immediately. No components damaged. Input current: 0.104A -> 0.033A NC, NT
Model MGFW400512	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

T1 Pin 1 to 5	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.093A -> 0.014A NC, NT
T1 Pin 1 to 6	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.090A -> 0.015A NC, NT
T1 Pin 2 to 5	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.093A-> 0.014A NC, NT
T1 Pin 2 to 6	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.090A -> 0.015A NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

T1 Pin 5 to 6	Short	13 Vdc	15 minutes	(*1)	--	--	--	Input current increased immediately. Output operated normally. No abnormal heat rise. No components damaged. Input current: 0.090A -> 0.183A NC, NT
Model MGFS404815	--	--	--	--	--	--	--	--
TR141 D to S	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased immediately. Input current: 0.031A-> 0.038A Temperature stabilized at 59°C (Core) NC, NT
TR141 D to G	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased immediately. Input current: 0.031A-> 0.043A Temperature stabilized at 66°C (Core) NC, NT
TR101 D to S	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
TR101 D to G	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)

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Clause	Requirement + Test				Result - Remark			Verdict
T1 Pin 1 to 2	Short	76 Vdc	1 hour	(*1)	--	--	--	Input current increased immediately and components damaged. Input current: 0.018A-> 0.061A Temperature stabilized at 78°C (Core) NC, NT
T1 Pin 1 to 3	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 1 to 4	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. NC, NT (*2)
T1 Pin 2 to 3	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. NC, NT (*2)
T1 Pin 2 to 4	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. NC, NT (*2)
T1 Pin 3 to 4	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current decreased immediately. Input current:0.0324 -> 0.0228A No component damaged. NC, NT
PC201 Input side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

PC201 Output side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT
L501	Short	76 Vdc	15 minutes	(*1)	--	--	--	Operated normally. No components damaged. NC, NT
TR501 D to S	Short	76 Vdc	15 minutes	(*1)	--	--	--	Input current and output voltage intermittaon oscillation immediately. Input current: 0.255 <-> 0.03 No components damaged. NC, NT
Model MGFW404815	--	--	--	--	--	--	--	--
T1 Pin 1 to 5	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 1 to 6	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 2 to 5	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)

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Clause	Requirement + Test	Result - Remark	Verdict

T1 Pin 2 to 6	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 5 to 6	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased immediately. Input current: 0.035A Temperature stabilized at 59°C (Core) NC, NT
L511	Short	76 Vdc	15 minutes	(*1)	--	--	--	Operated normally. No components damaged. NC, NT
TR511 D to S	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased and intermittent oscillation immediately. Input current: 0.10A <-> 0.6A Temperature stabilized at 58°C (Core) NC, NT
PC201 Input side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT
PC201 Output side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

TR101 D to S	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)

Supplementary information:

NC - Cheesecloth remained intact

NT - Tissue paper remained intact

(*1): External Fuse was used while testing. See Engineering Conditions of Acceptability.

(*2): Test was conducted three times.

The models tested were considered representative of the entire series because the construction is the same all other models.

The representative models were considered based on specifications of input voltage, circuit configuration and/or Transformer winding number/structure.

Annex M	**TABLE: Batteries**									N/A
The tests of Annex M are applicable only when appropriate battery data is not available										
Is it possible to install the battery in a reverse polarity position? .....:										
	Non-rechargeable batteries			Rechargeable batteries						
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging		
	Meas. current	Manuf. Specs.		Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	
Max. current during normal condition										
Max. current during fault condition										
Test results:										Verdict
- Chemical leaks										
- Explosion of the battery										
- Emission of flame or expulsion of molten metal										
- Electric strength tests of equipment after completion of tests										
Supplementary information:										

Annex M.4	**Table: Additional safeguards for equipment containing secondary lithium batteries**				N/A
Battery/Cell No.	Test conditions	Measurements			Observation
		U	I (A)	Temp (°C)	

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Clause	Requirement + Test	Result - Remark	Verdict

	Normal				
	Abnormal				
	Single fault –SC/OC				
Supplementary Information:					

Battery identification	Charging at T_{lowest} (°C)	Observation	Charging at $T_{highest}$ (°C)	Observation
Supplementary Information:				

Annex Q.1	**TABLE: Circuits intended for interconnection with building wiring (LPS)**					N/A
Note: Measured UOC (V) with all load circuits disconnected:						
Output Circuit	Components	U_{oc} (V)	I_{sc} (A)		S (VA)	
			Meas.	Limit	Meas.	Limit
Supplementary Information:						
SC=Short circuit, OC=Open circuit						

T.2, T.3, T.4, T.5	**TABLE: Steady force test**				N/A
Part/Location	Material	Thickness (mm)	Force (N)	Test Duration (sec)	Observation
Supplementary information:					

T.6, T.9	**TABLE: Impact tests**				N/A
Part/Location	Material	Thickness (mm)	Vertical distance (mm)	Observation	
Supplementary information:					

T.7	**TABLE: Drop tests**				N/A
Part/Location	Material	Thickness (mm)	Drop Height (mm)	Observation	

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:				

T.8	TABLE: Stress relief test				N/A
Part/Location	Material	Thickness (mm)	Oven Temperature (°C)	Duration (h)	Observation
Supplementary information:					

Enclosure
National Differences

EU Group Differences
USA / Canada

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62368-1 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES (Audio/video, information and communication technology equipment - Part 1: Safety requirements)	
Differences according to	EN 62368-1:2014+A11:2017
Attachment Form No.	EU_GD_IEC62368_1B_II
Attachment Originator	Nemko AS
Master Attachment	9/22/2017

	CENELEC COMMON MODIFICATIONS (EN)		Pass
	Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2014 are prefixed “Z”.		Pass
CONTENTS	**Add** the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions Annex ZC (informative) A-deviations Annex ZD (informative) IEC and CENELEC code designations for flexible cords		Pass
	Delete all the “country” notes in the reference document (IEC 62368-1:2014) according to the following list:		Pass
	For special national conditions, see Annex ZB.		Pass
1	Add the following note: NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.	See Enclosure Id. 7-02.	Pass
4.Z1	Protective devices included as integral parts of the equipment or as parts of the building installation:	Building-in component. No direct connection to mains. Final compliance to be evaluated in end-product.	N/A
	a) Included as parts of the equipment		N/A
	b) For components in series with the mains; by devices in the building installation		N/A
	c) For pluggable type B or permanently connected; by devices in the building installation		N/A

0.2.1	Note	1	Note 3	4.1.15	Note
4.7.3	Note 1 and 2	5.2.2.2	Note	5.4.2.3.2.2 Table 13	Note c
5.4.2.3.2.4	Note 1 and 3	5.4.2.5	Note 2	5.4.5.1	Note
5.5.2.1	Note	5.5.6	Note	5.6.4.2.1	Note 2 and 3
5.7.5	Note	5.7.6.1	Note 1 and 2	10.2.1 Table 39	Note 2, 3 and 4
10.5.3	Note 2	10.6.2.1	Note 3	F.3.3.6	Note 3

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5.4.2.3.2.4	**Add** the following to the end of this subclause: The requirement for interconnection with **external circuit** is in addition given in EN 50491-3:2009.		N/A
10.2.1	**Add** the following to c) and d) in table 39: For additional requirements, see 10.5.1.		N/A
10.5.1	**Add** the following after the first paragraph: For RS 1 compliance is checked by measurement under the following conditions: In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any object such as a tool or a coin, and those internal adjustments or presets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made. NOTE Z1 Soldered joints and paint lockings are examples of adequate locking. The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm^2, at any point 10 cm from the outer surface of the apparatus. Moreover, the measurement shall be made under fault conditions causing an increase of the high-voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made. For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level. NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.		N/A
10.6.1	**Add** the following paragraph to the end of the subclause: EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.		N/A
10.Z1	**Add** the following new subclause after 10.6.5. **10.Z1 Non-ionizing radiation from radio frequencies in the range 0 to 300 GHz** The amount of non-ionizing radiation is regulated by European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz). For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body-mounted devices, attention is drawn to EN 50360 and EN 50566		N/A
G.7.1	**Add** the following note: NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.		N/A
Bibliography	**Add** the following standards: **Add** the following notes for the standards indicated: IEC 60130-9 NOTE Harmonized as EN 60130-9. IEC 60269-2 NOTE Harmonized as HD 60269-2. IEC 60309-1 NOTE Harmonized as EN 60309-1. IEC 60364 NOTE some parts harmonized in HD 384/HD 60364 series.		Pass

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	IEC 60601-2-4 NOTE Harmonized as EN 60601-2-4. IEC 60664-5 NOTE Harmonized as EN 60664-5. IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (not modified). IEC 61508-1 NOTE Harmonized as EN 61508-1. IEC 61558-2-1 NOTE Harmonized as EN 61558-2-1. IEC 61558-2-4 NOTE Harmonized as EN 61558-2-4. IEC 61558-2-6 NOTE Harmonized as EN 61558-2-6. IEC 61643-1 NOTE Harmonized as EN 61643-1. IEC 61643-21 NOTE Harmonized as EN 61643-21. IEC 61643-311 NOTE Harmonized as EN 61643-311. IEC 61643-321 NOTE Harmonized as EN 61643-321. IEC 61643-331 NOTE Harmonized as EN 61643-331.		
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		Pass
4.1.15	**Denmark, Finland, Norway and Sweden** To the end of the subclause the following is added: **Class I pluggable equipment type A** intended for connection to other equipment or a network shall, if safety relies on connection to reliable earthing or if surge suppressors are connected between the network terminals and **accessible** parts, have a marking stating that the equipment shall be connected to an earthed **mains** socket-outlet. The marking text in the applicable countries shall be as follows: In **Denmark**: “Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord.” In **Finland**: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan" In **Norway**: “Apparatet må tilkoples jordet stikkontakt” In **Sweden**: “Apparaten skall anslutas till jordat uttag”		N/A
4.7.3	**United Kingdom** To the end of the subclause the following is added: The torque test is performed using a socket-outlet complying with BS 1363, and the plug part shall be assessed to the relevant clauses of BS 1363. Also see Annex G.4.2 of this annex		N/A
5.2.2.2	**Denmark** After the 2nd paragraph add the following: A warning (marking **safeguard**) for high **touch current** is required if the **touch current** exceeds the limits of 3,5 mA a.c. or 10 mA d.c.		N/A
5.4.11.1 and Annex G	**Finland and Sweden** To the end of the subclause the following is added: For separation of the telecommunication network from earth the following is applicable: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either • two layers of thin sheet material, each of which		N/A

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	shall pass the electric strength test below, or • one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that clearances and creepage distances do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition • passes the tests and inspection criteria of 5.4.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 5.4.9 shall be performed using 1,5 kV), and • is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5kV. It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2. A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions: • the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in 5.4.11; • the additional testing shall be performed on all the test specimens as described in EN 60384-14; the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14.		
5.5.2.1	**Norway** After the 3rd paragraph the following is added: Due to the IT power system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V).		N/A
5.5.6	**Finland, Norway and Sweden** To the end of the subclause the following is added: Resistors used as **basic safeguard** or bridging **basic insulation** in **class I pluggable equipment type A** shall comply with G.10.1 and the test of G.10.2.		N/A

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5.6.1	**Denmark** **Add** to the end of the subclause Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. *Justification:* In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.		N/A
5.6.4.2.1	**Ireland and United Kingdom** After the indent for **pluggable equipment type A**, the following is added: – the **protective current rating** is taken to be 13 A, this being the largest rating of fuse used in the **mains** plug.		N/A
5.6.5.1	**Ireland and United Kingdom** To the second paragraph the following is added: The range of conductor sizes of flexible cords to be accepted by terminals for equipment with a rated current over 10 A and up to and including 13 A is: 1,25 mm^2 to 1,5 mm^2 in cross-sectional area.		N/A
5.7.5	**Denmark** To the end of the subclause the following is added: The installation instruction shall be affixed to the equipment if the **protective conductor current** exceeds the limits of 3,5 mA a.c. or 10 mA d.c.		N/A
5.7.6.1	**Norway and Sweden** To the end of the subclause the following is added: The screen of the television distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation needs to be isolated from the screen of a cable distribution system. It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example. The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in: “Apparatus connected to the protective earthing of the building installation through the mains connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system therefore has to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN		N/A

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	60728-11)" NOTE In Norway, due to regulation for CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min. Translation to Norwegian (the Swedish text will also be accepted in Norway): "Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et koaksialbasert kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av apparater til kabel-TV nett installeres en galvanisk isolator mellom apparatet og kabel-TV nettet." Translation to Swedish: "Apparater som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av apparaten till kabel-TV nät galvanisk isolator finnas mellan apparaten och kabel-TV nätet.".		
5.7.6.2	**Denmark** To the end of the subclause the following is added: The warning (marking safeguard) for high touch current is required if the touch current or the protective current exceed the limits of 3,5 mA .		N/A
B.3.1 and B.4	**Ireland and United Kingdom** The following is applicable: To protect against excessive currents and short-circuits in the primary circuit of **direct plug-in equipment**, tests according to Annexes B.3.1 and B.4 shall be conducted using an external miniature circuit breaker complying with EN 60898-1, Type B, rated 32A. If the equipment does not pass these tests, suitable protective devices shall be included as an integral part of the **direct plug-in equipment**, until the requirements of Annexes B.3.1 and B.4 are met		N/A
G.4.2	**Denmark:** Appliances rated ≤13 A provided with a plug according to DS 60884-2-D1:2011. Class I equipment provided with socket-outlets provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a. If a single-phase equipment having rated >13 A or poly-phase equipment provided with a supply cord with a plug, plug in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2. Mains socket outlets intended for providing power to Class II apparatus rated 2,5 A in accordance with DS 60884-2-D1:2011 standard sheet DKA 1-4a.		N/A

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	Other current rating socket outlets in compliance with Standard Sheet DKA 1-3a or DKA 1-1c. Mains socket-outlets with earth in compliance with DS 60884-2-D1:2011 Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a		
G.4.2	**United Kingdom** To the end of the subclause the following is added: The plug part of direct plug-in equipment shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16, and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.		N/A
G.7.1	**United Kingdom** To the first paragraph the following is added: Equipment which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord shall be fitted with a 'standard plug' in accordance with the Plugs and Sockets etc (Safety) Regulations 1994, Statutory Instrument 1994 No. 1768, unless exempted by those regulations. NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.		N/A
G.7.1	**Ireland** To the first paragraph the following is added: Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, "13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. S.I. 525 provides for the recognition of a standard of another Member State which is equivalent to the relevant Irish Standard		N/A
G.7.2	**Ireland and United Kingdom** To the first paragraph the following is added: A power supply cord with a conductor of 1,25 mm^2 is allowed for equipment which is rated over 10 A and up to and including 13 A.		N/A
ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		Pass

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10.5.2	**Germany** The following requirement applies: For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking. *Justification:* German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM. **NOTE** Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int +49-531-592-6320, Internet: http://www.ptb.de		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62368-1 2th Ed. U.S.A. NATIONAL DIFFERENCES Audio/video, information and communication technology equipment – Part 1: Safety requirements	
Differences according to	CSA/UL 62368-1:2014
Attachment Form No.	US&CA_ND_IEC623681B
Attachment Originator	UL(US)
Master Attachment	Date 2015-06

IEC 62368-1 - US and Canadian National Differences Special National Conditions based on Regulations and Other National Differences			
1.1	All equipment is to be designed to allow installation according to the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part I, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2. Also, for such equipment marked or otherwise identified, installation is allowed per the Standard for the Protection of Information Technology Equipment, ANSI/NFPA 75.		Pass
1.4	Additional requirements apply to some forms of power distribution equipment, including sub-assemblies.		N/A
4.1.17	For lengths exceeding 3.05 m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type (e.g., DP, CL2) specified in the NEC.		N/A
	For lengths 3.05 m or less, external interconnecting flexible cord and cable assemblies that are not types specified in the NEC generally are required to have special construction features and identification markings.		N/A
4.8	Lithium coin / button cell batteries have modified special construction and performance requirements.		N/A
5.6.3	Protective earthing conductors comply with the minimum conductor sizes in Table G.5, except as required by Table G.7ADV.1 for cord connected equipment, or Annex DVH for permanently connected equipment		N/A
5.7.7	Equipment intended to receive telecommunication ringing signals complies with a special touch current measurement tests.		N/A
6.5.1	PS3 wiring outside a fire enclosure complies with single fault testing in B.4, or be current limited per one of the permitted methods.		N/A

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Annex F (F.3.3.8)	Output terminals provided for supply of other equipment, except mains, supply are marked with a maximum rating or references to which equipment it is permitted to be connected.		N/A
Annex G (G.7.1)	Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs.		N/A
Annex G (G.7.3)	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.		N/A
	Flexible power supply cords are required to be compatible with Article 400 of the NEC, and Tables 11 and 12 of the CEC.		N/A
Annex G (G.7.5)	Minimum cord length is required to be 1.5 m, with certain constructions such as external power supplies allowed to consider both input and output cord lengths into the requirement. Power supply cords are required to be no longer than 4.5 m in length if used in ITE Rooms.		N/A
Annex H.2	Continuous ringing signals under normal operating conditions up to 16 mA only are permitted if the equipment is subjected to special installation and performance restrictions.		N/A
Annex H.4	For circuits with other than ringing signals and with voltages exceeding 42.4 Vpeak or 60 V d.c., the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 mA d.c. under normal operating conditions.		N/A
Annex M	Battery packs for stationary applications comply with special component requirements.		N/A
Annex DVA (1)	Equipment intended for use in spaces used for environmental air are subjected to special flammability requirements for heat and visible smoke release.		N/A
	For ITE room applications, automated information storage systems with combustible media greater than 0.76 m3 (27 cu ft) have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.		N/A
	Consumer products designed or intended primarily for children 12 years of age or younger are subject to additional requirements in accordance with U.S. & Canadian Regulations.		N/A
	Baby monitors additionally comply with ASTM F2951, Consumer Safety Specification for Baby Monitors.		N/A

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Annex DVA (5.6.3)	For Pluggable Equipment Type A, the protection in the installation is assumed to be 20A.		N/A
Annex DVA (6.3)	The maximum quantity of flammable liquid stored in equipment complies with NFPA 30.		N/A
Annex DVA (6.4.8)	For ITE room applications, enclosures with combustible material measuring greater than 0.9 m2 (10 sq ft) or a single dimension greater than 1.8 m (6 ft) have a flame spread rating of 50 or less. For equipment with the same dimensions for other applications, an external surface that is not a fire enclosure requires a min. flammability classification of V-1.		N/A
Annex DVA (10.3.1)	Equipment with lasers meets the U.S. Code of Federal Regulations 21 CFR 1040 (and the Canadian Radiation Emitting Devices Act, REDR C1370).		N/A
Annex DVA (10.5.1)	Equipment that produces ionizing radiation complies with the U.S. Code of Federal Regulations, 21 CFR 1020 (and the Canadian Radiation Emitting Devices Act, REDR C1370).		N/A
Annex DVA (F.3.3.3)	Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings. Additional considerations apply for voltage ratings that exceed the attachment cap rating or are lower than the “Normal Operating Condition” in Table 2 of CAN/CSA C22.2 No. 235.”		N/A
Annex DVA (F.3.3.5)	Equipment identified for ITE (computer) room installation is marked with the rated current		N/A
Annex DVA (G.1)	Vertically-mounted disconnect switches and circuit breakers have the "on" position indicated by the handle in the up position		N/A
Annex DVA (G.3.4)	Suitable NEC/CEC branch circuit protection rated at the maximum circuit rating is required for all standard supply outlets and receptacles (such as supplied in power distribution units) if the supply branch circuit protection is not suitable.		N/A
Annex DVA (G.4.2)	Equipment with isolated ground (earthing) receptacles complies with NEC 250.146(D) and CEC 10-112 and 10-906(8).		N/A
Annex DVA (G.4.3)	Where a fuse is used to provide Class 2 or Class 3 current limiting, it is not operator-accessible unless it is non- interchangeable.		N/A
Annex DVA (G.5.3)	Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, require special transformer overcurrent protection.		N/A

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Annex DVA (G.5.4)	Motor control devices are required for cord-connected equipment with a mains-connected motor if the equipment is rated more than 12 A, or if the equipment has a nominal voltage rating greater than 120 V, or if the motor is rated more than 1/3 hp (locked rotor current over 43 A).		N/A
Annex DVA (Annex M)	For ITE room applications, equipment with battery systems capable of supplying 750 VA for five minutes have a battery disconnect means that may be connected to the ITE room remote power-off circuit.		N/A
Annex DVA (Q)	Wiring terminals intended to supply Class 2 outputs according to the NEC or CEC Part 1are marked with the voltage rating and “Class 2” or equivalent; marking is located adjacent to the terminals and visible during wiring.		N/A
Annex DVB (1)	Additional requirements apply for equipment used for entertainment purposes intended for installation in general patient care areas of health care facilities.		N/A
Annex DVC (1)	Additional requirements apply for equipment intended for mounting under kitchen cabinets.		N/A
Annex DVE (4.1.1)	Some equipment, components, sub-assemblies and materials associated with the risk of fire, electric shock, or personal injury have component or material ratings in accordance with the applicable national (U.S. and Canadian) component or material requirements. Components required to comply include: appliance couplers, attachment plugs, battery back-up systems, battery packs, circuit breakers, communication circuit accessories, connectors (used for current interruption of non-LPS circuits), power supply cords, direct plug-in equipment, electrochemical capacitor modules (energy storage modules with ultra-capacitors), enclosures (outdoor), flexible cords and cables, fuses (branch circuit), ground-fault current interrupters, interconnecting cables, data storage equipment, printed wiring, protectors for communications circuits, receptacles, surge protective devices, vehicle battery adapters, wire connectors, and wire and cables.	Considered.	Pass
Annex DVH	Equipment for permanent connection to the mains supply is subjected to additional requirements.		N/A
Annex DVH (DVH.1)	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains are in accordance with the NEC/CEC.		N/A

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Annex DVH (DVH.3.2)	Terminals for permanent wiring, including protective earthing terminals, are suitable for U.S./Canadian wire gauge sizes, rated 125 percent of the equipment rating, and are specially marked when specified.		N/A
Annex DVH (DVH.3.2)	Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 mm2).		N/A
Annex DVH (DVH.4)	Permanently connected equipment is required to have a suitable wiring compartment and wire bending space.		N/A
Annex DVH (DVH 5.5)	Equipment connected to a centralized d.c. power system, and having one pole of the DC mains input terminal connected to the main protective earthing terminal in the equipment, complies with special earthing, wiring, marking and installation instruction requirements.		N/A
Annex DVI (6.7)	Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage from power line crosses.		N/A
Annex DVJ (10.6.1)	Equipment connected to a telecommunication and cable distribution networks and supplied with an earphone intended to be held against, or in the ear is required to comply with special acoustic pressure requirements.		N/A

Enclosures

Type	Supplement Id	Description
Photographs	03-01	Overall view: Top side
Photographs	03-02	Overall view: Bottom side
Photographs	03-03	Overall view: Top side without Case
Photographs	03-04	P1 Borard: Top side
Photographs	03-05	P1 Board: Bottom side
Photographs	03-06	P2 Board (Model MGFS40yz): Top side
Photographs	03-07	P2 Board (Model MGFS40yz): Bottom side
Photographs	03-08	P2 Board (Model MGFW40yz): Top side
Photographs	03-09	P2 Board (Model MGFW40yz): Bottom side
Schematics + PWB	05-01	Pattern Layout: P1 Borad
Schematics + PWB	05-02	Pattern Layout: P2 Borad
Miscellaneous	07-01	Output/ Input derating
Miscellaneous	07-02	Declaration of Conformity on RoHS
Miscellaneous	07-03	Manufacturer’s Declaration under IECEE CB Scheme

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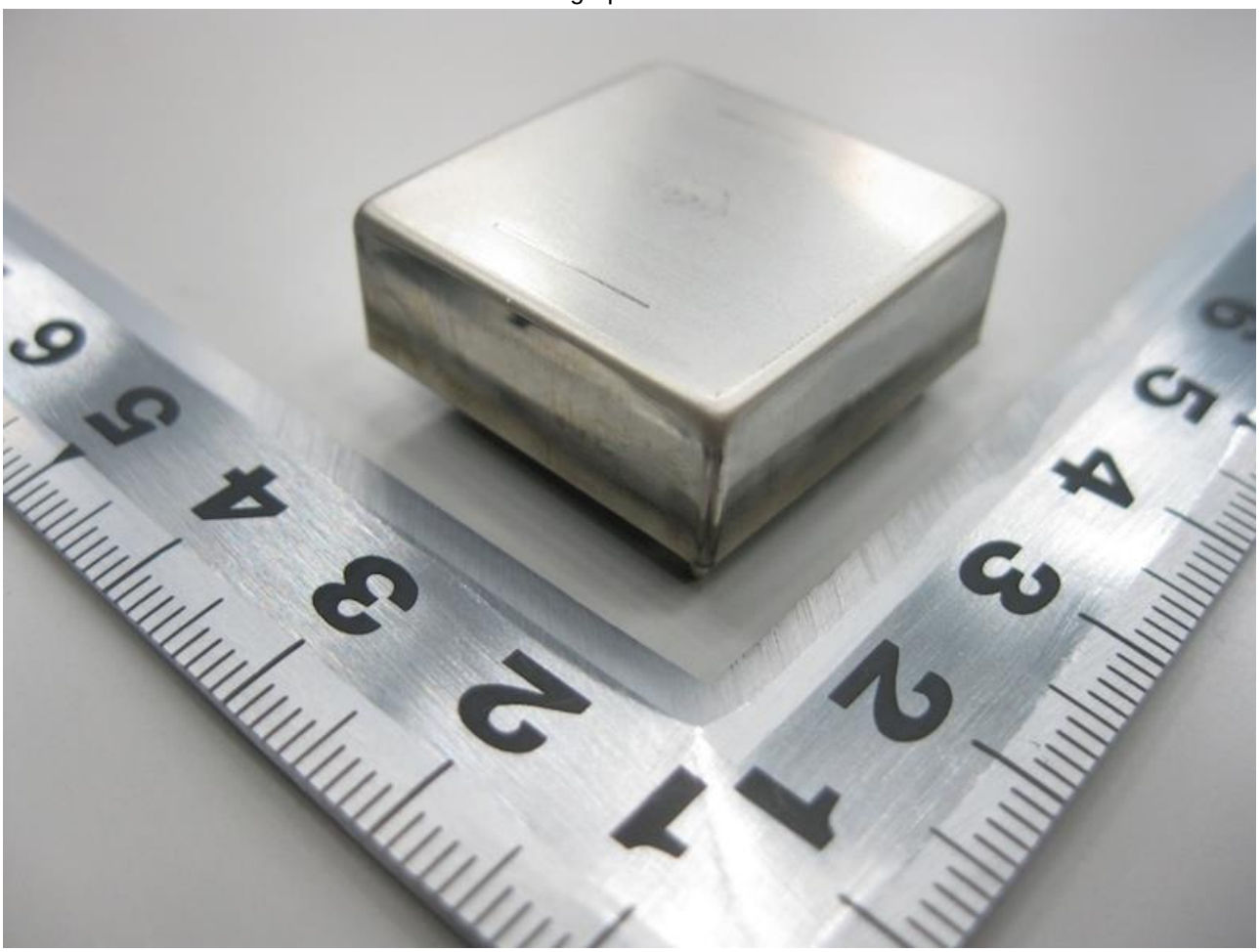
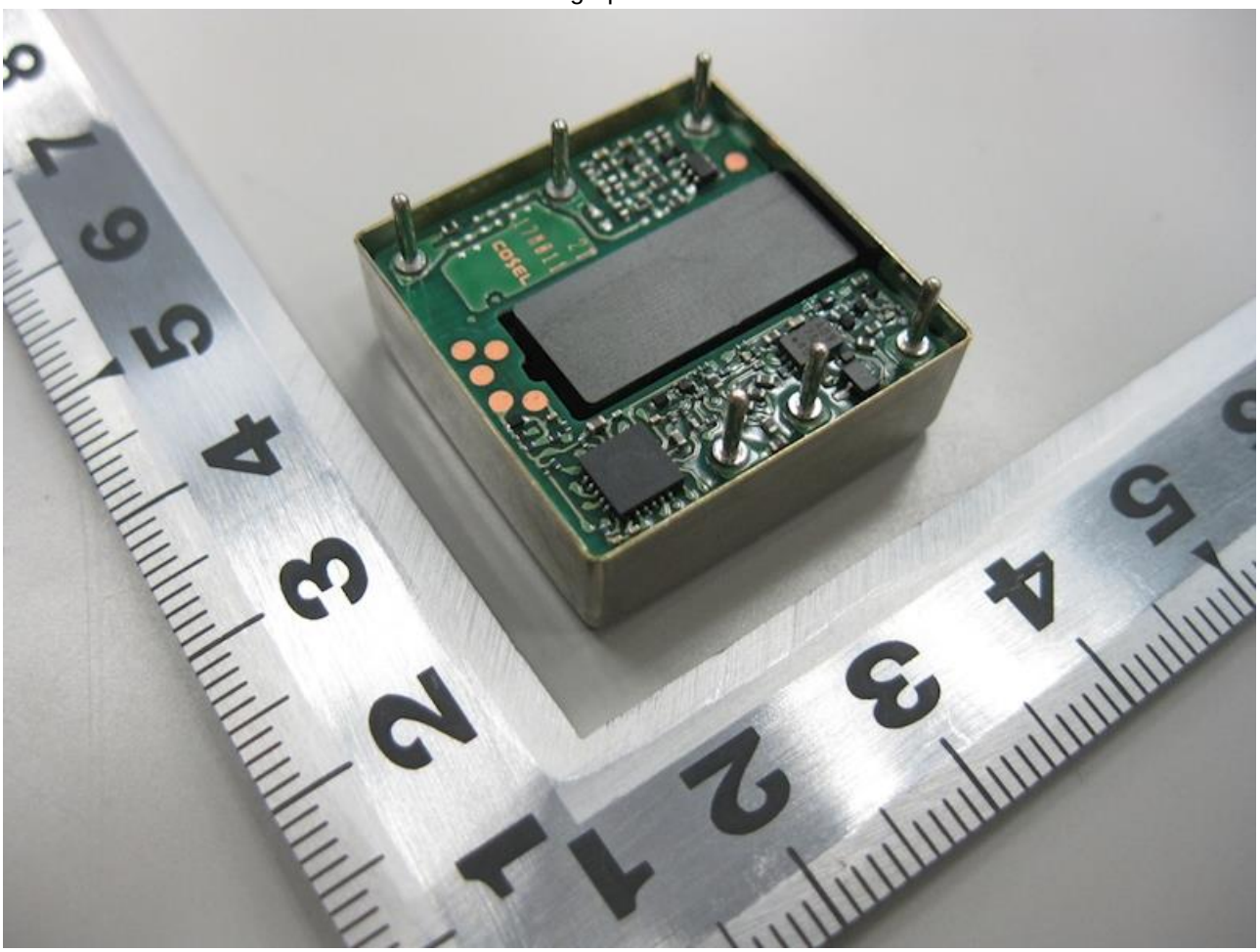
Photographs ID 03-01



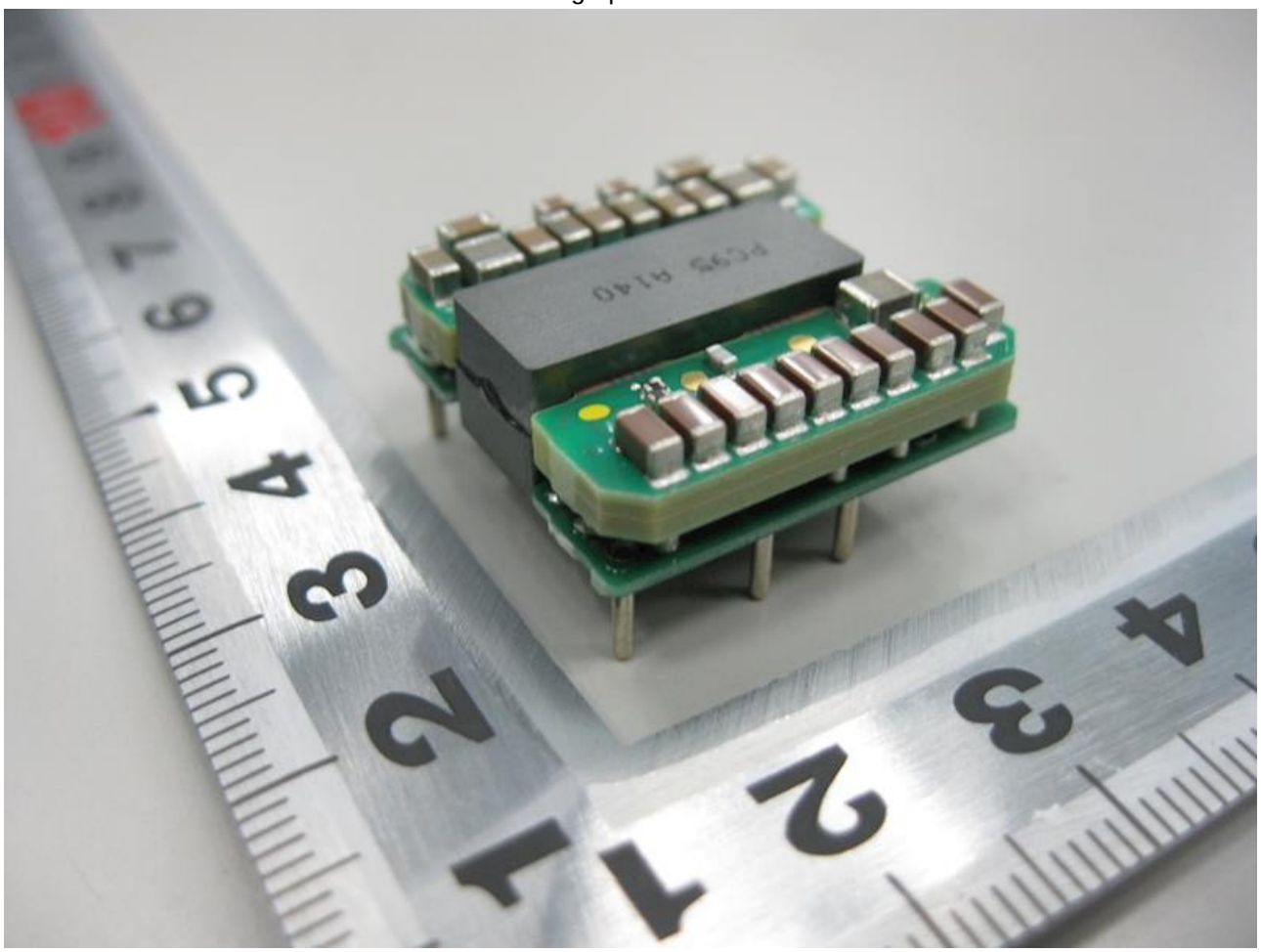
Enclosures

Photographs ID 03-02



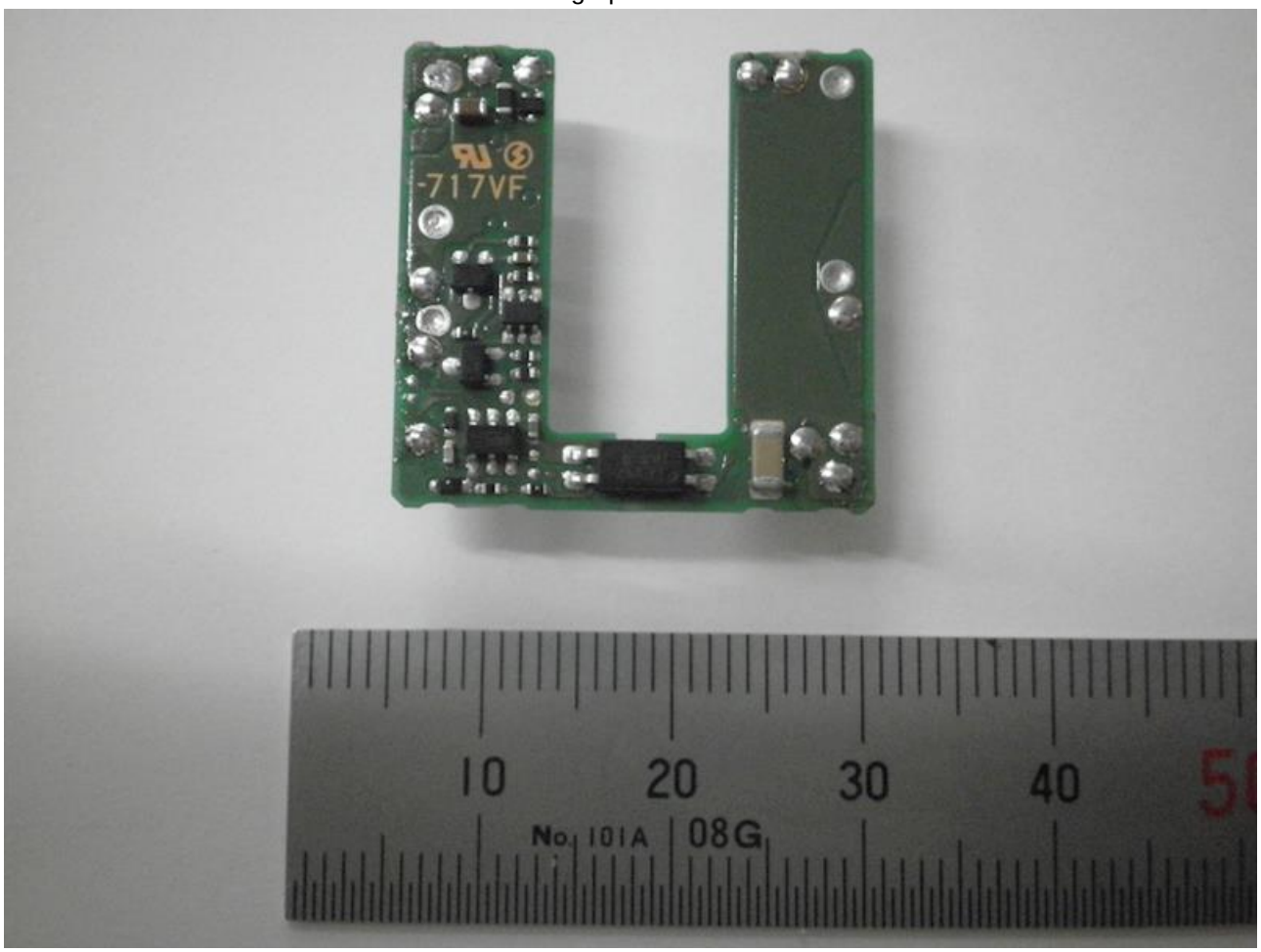
Enclosures

Photographs ID 03-03



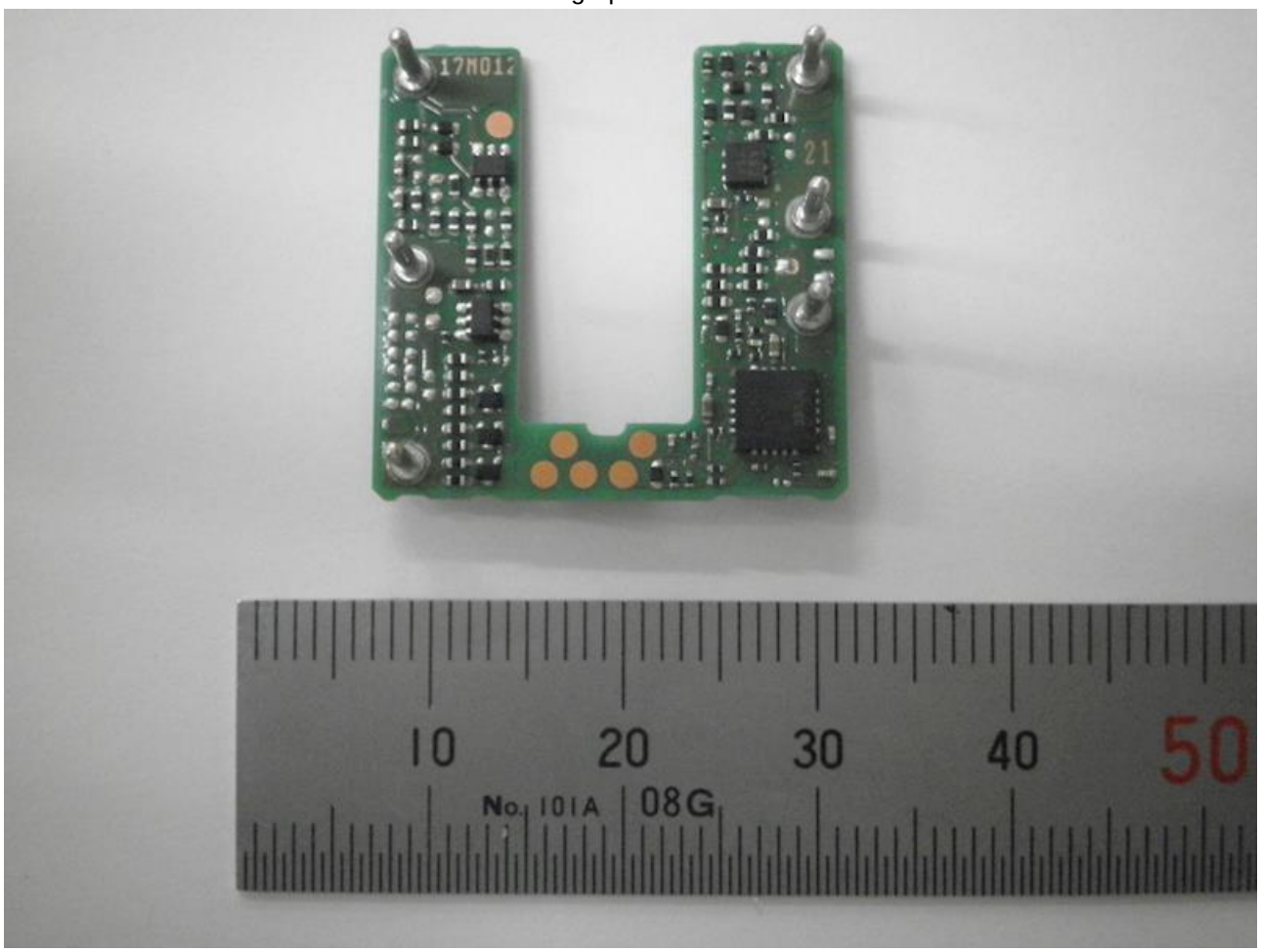
Enclosures

Photographs ID 03-04



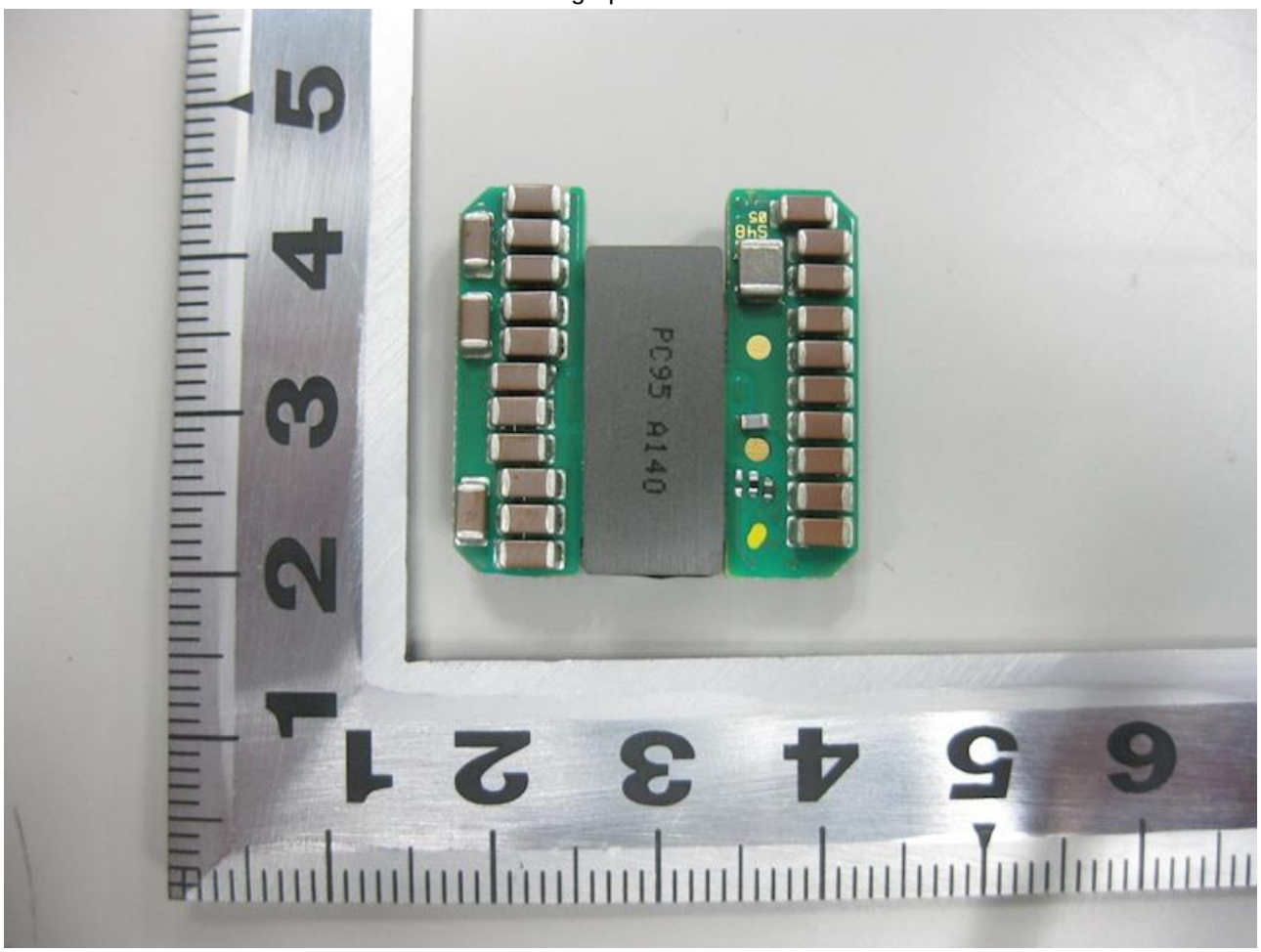
Enclosures

Photographs ID 03-05



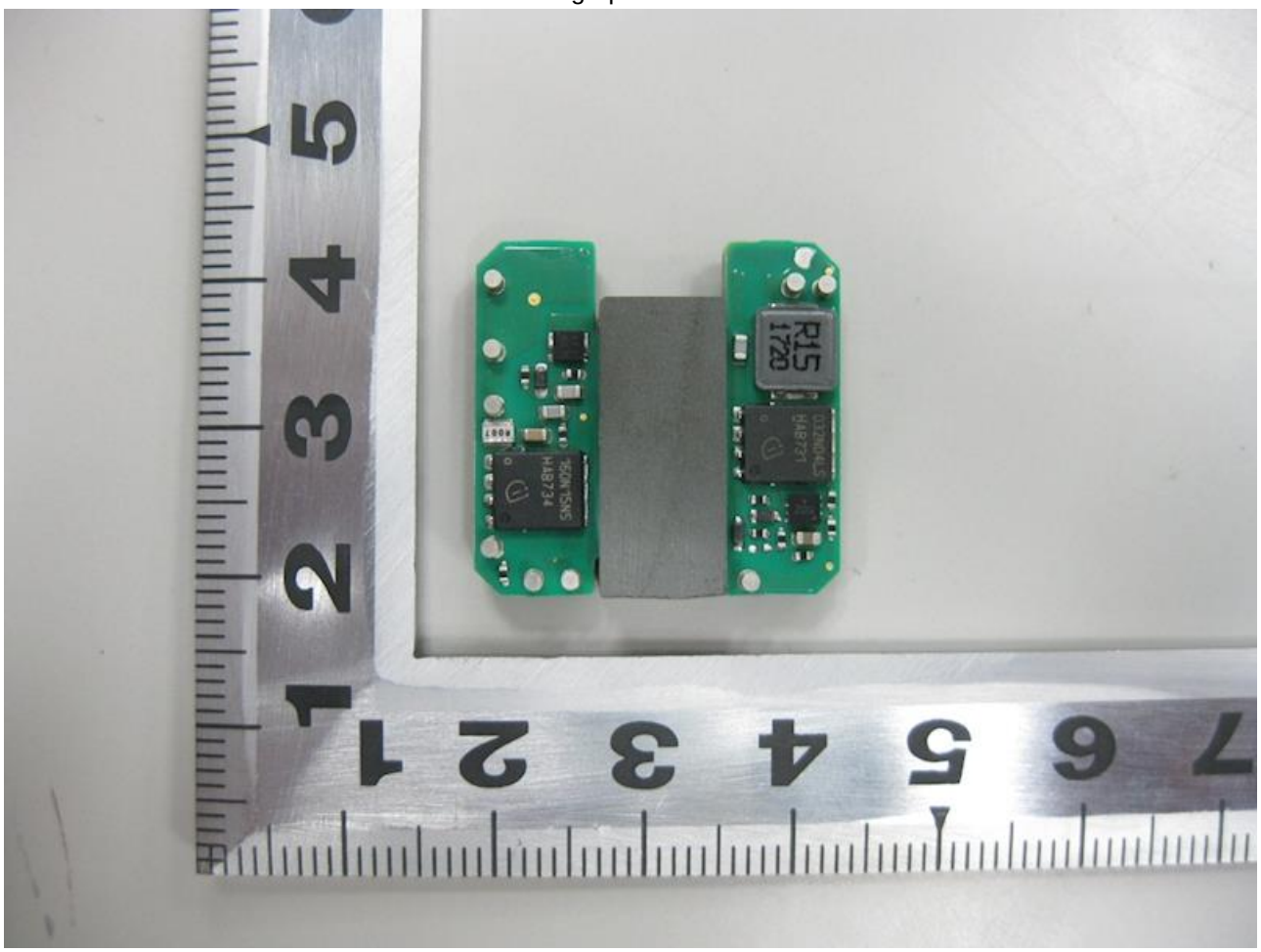
Enclosures

Photographs ID 03-06



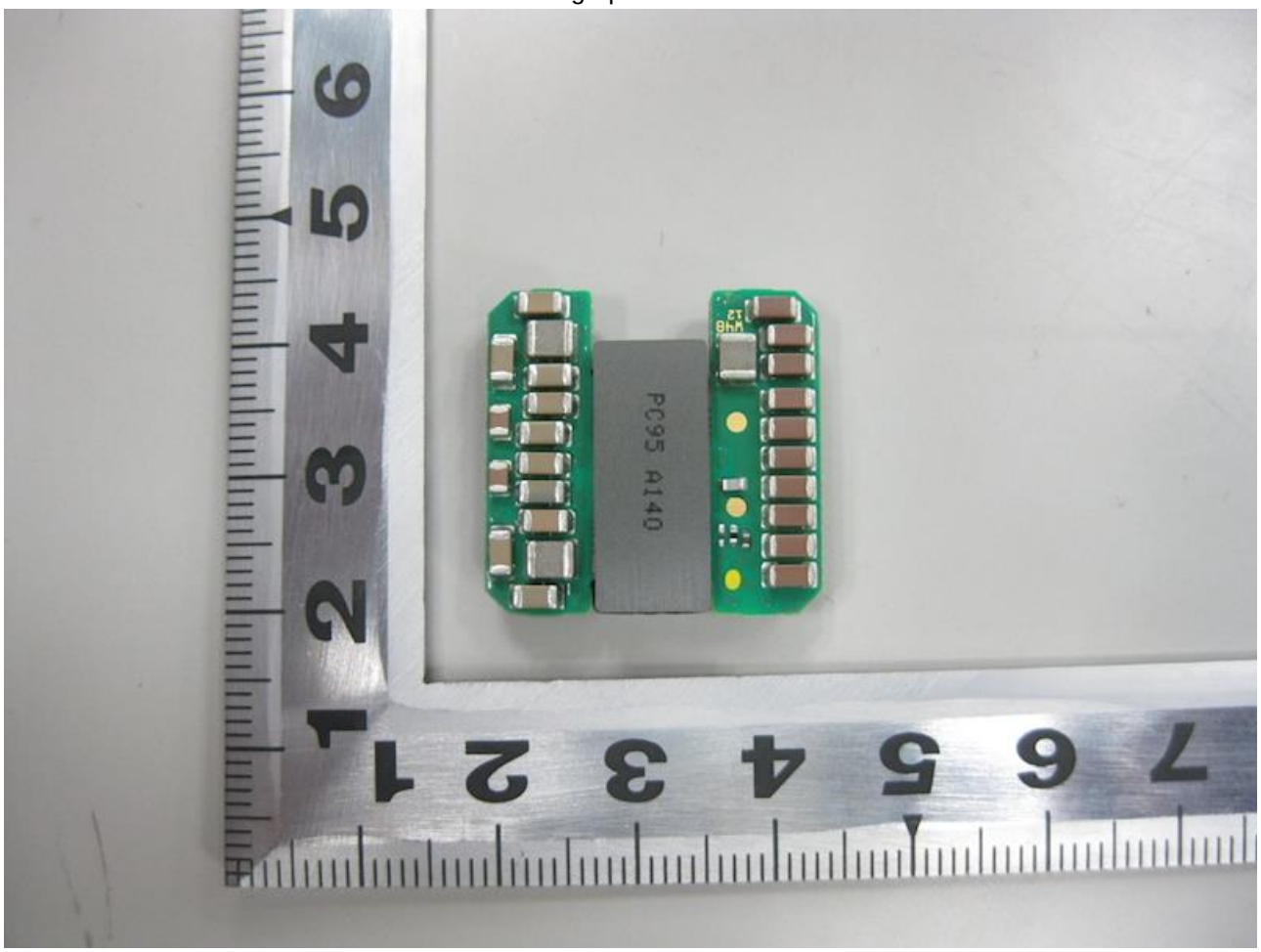
Enclosures

Photographs ID 03-07



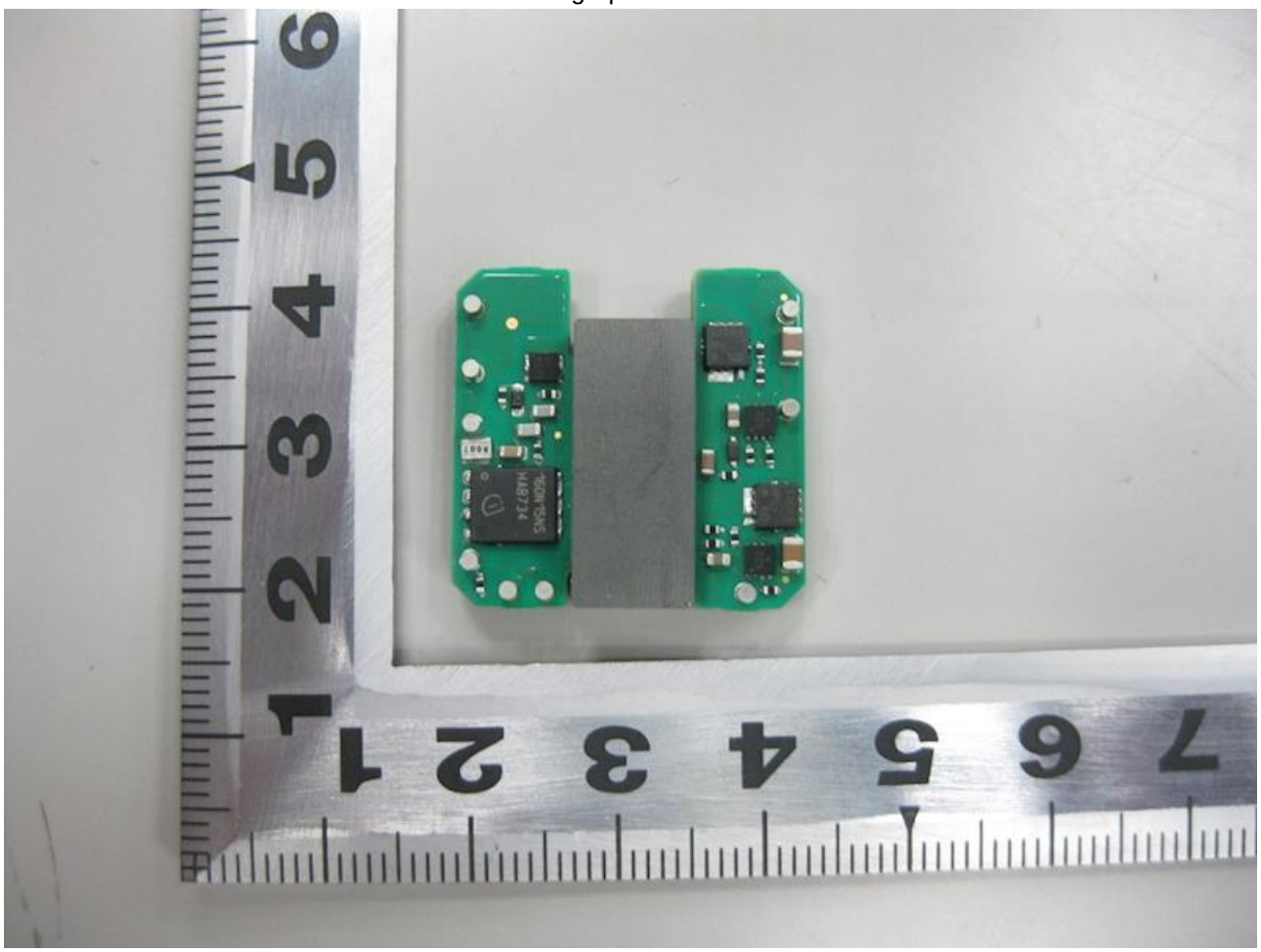
Enclosures

Photographs ID 03-08



Enclosures

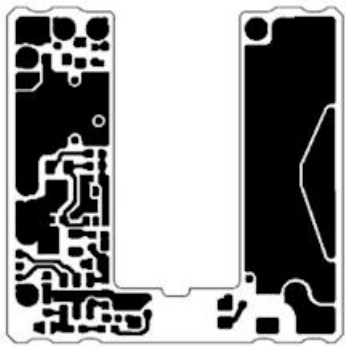
Photographs ID 03-09



Enclosures

Schematics + PWB ID 05-01

Top



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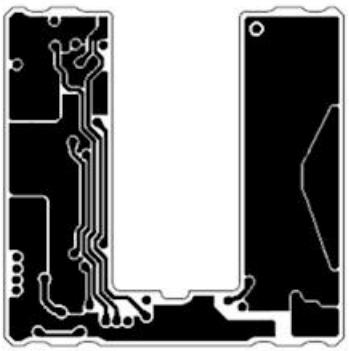

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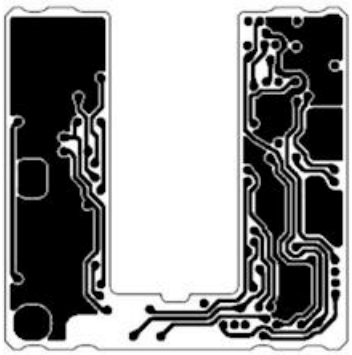

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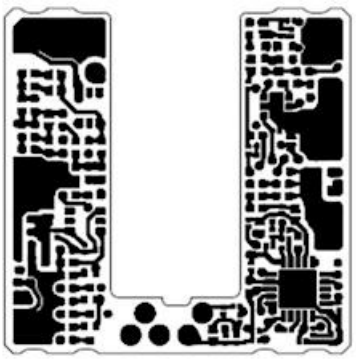
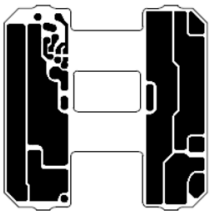


Enclosures

Schematics + PWB ID 05-02

For Model MGFS40yz

Top



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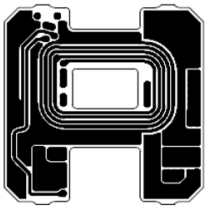

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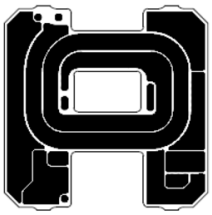

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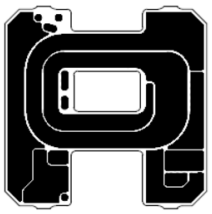
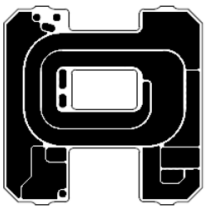
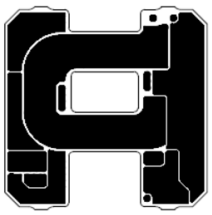


Inner layer 4

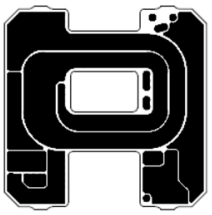


Inner layer 5

Inner layer 6

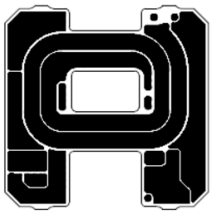


Inner layer 7



Inner layer 8

Inner layer 9



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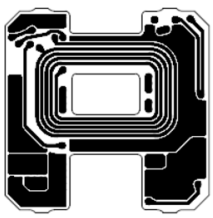

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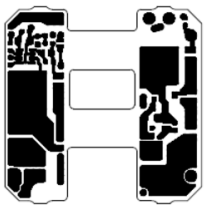
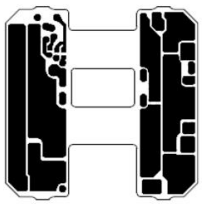


Enclosures

Schematics + PWB ID 05-02

For Model MGFW40yz

Top



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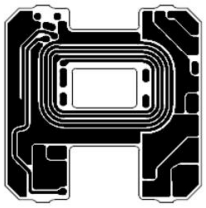

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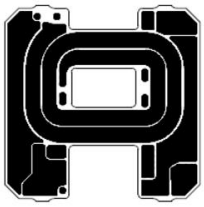

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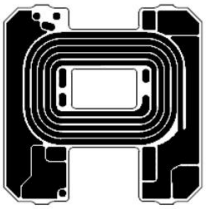

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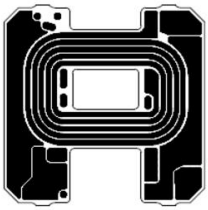

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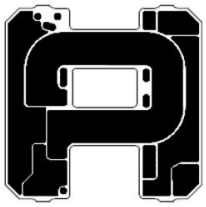

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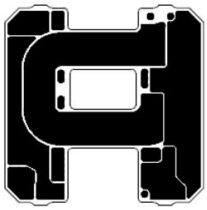

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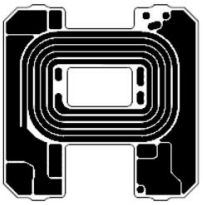

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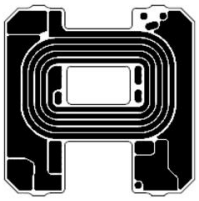
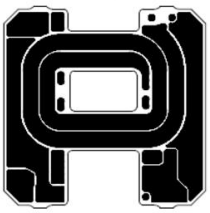


Inner layer 9



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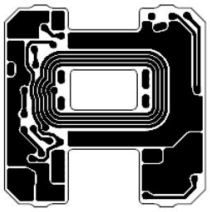
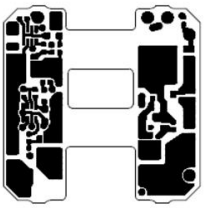


Bottom



Enclosures

Miscellaneous ID 07-01

Output derating curve
Ventilation must keep the temperature of point A below 110℃.
Refer to Fig.7.2 for the location of point A.
Ambient temperature must keep below 85℃.

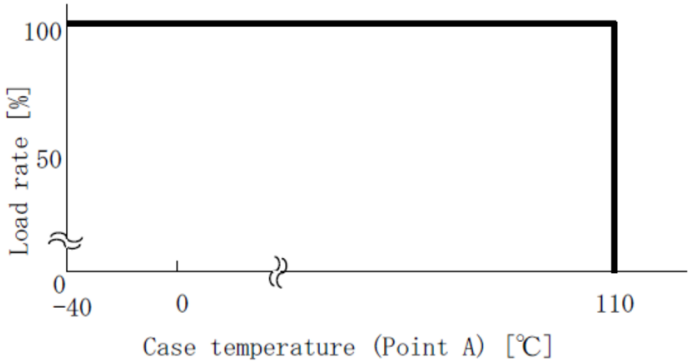


Fig. 7.1 Derating curve

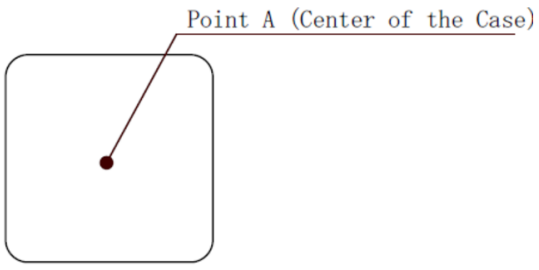


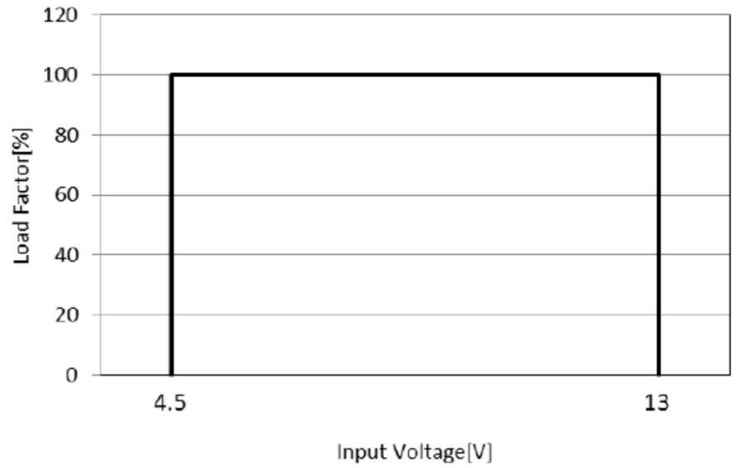
Fig. 7.2 Temperature measurement point

Enclosures

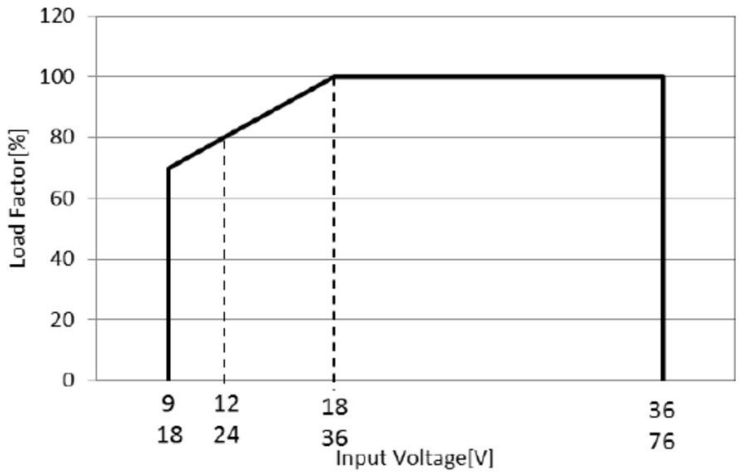
Miscellaneous ID 07-01

Input voltage derating curve

For Model MGFw4005z



For Model MGFw4024z, MGFw4048z



Enclosures

Miscellaneous ID 07-02

COSEL

COSEL Co., Ltd.
1-5-1 Kamiakae-machi,Toyama-city
Toyama 930-0816 JAPAN
Tel : +81-76-471-8592

DATE : Dec.10.2018

Subject: Declaration of Conformity on RoHS

Dear UL Japan, Inc.,

We, COMPANY, declare, under our solo responsibility, that the product(s) noted below are in conformity with the requirements of Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS).

Description of equipment:

Product description:	DC-DC Converter
Model:	MG40 Series

Sincerely yours,

SIGNATURE (script or attach) Junichi Katagishi

NAME : Junichi Hatagishi

TITLE : Manager

Enclosures

Miscellaneous ID 07-03

Manufacturer's Declaration under IECEE CB Scheme

（IECEE CB スキームに於ける製造者宣言書）

We as a manufacturer and/or a manufacturer of the original model declare that the submitted sample(s) descrived in Test Report for evaluation is/are representative of the products from the each factory in Test Report.

（製造者/オリジナルモデルの製造者として、評価のために提出したテストレポート中のサンプルは、テストレポートに記載される各工場を代表するサンプルであることを宣言します。）

Date of issue（発行日）	Jan.11.2019
Manufacturer name（製造者名）	COSEL Co., Ltd.
Manufacturer Address（製造者住所）	1-6-43 Kamiakae-machi,Toyama-city Toyama 930-0816 JAPAN
Name of person in charge（責任者名）	Junichi Hatagishi
Title（役職）	Manager
Signature（署名）	Junichi Hatagishi

Ref. Certif. No.

JP-20631-UL

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

CB TEST CERTIFICATE

Product	DC-DC Converter
Name and address of the applicant	COSEL CO LTD 1-6-43 KAMIAKAE-MACHI TOYAMA-SHI TOYAMA 930-0816 JAPAN
Name and address of the manufacturer	COSEL CO LTD 1-6-43 KAMIAKAE-MACHI TOYAMA-SHI TOYAMA 930-0816 JAPAN
Name and address of the factory Note: *When more than one factory, please report on page 2*	COSEL CO LTD TATEYAMA FACTORY 78 DOGENJI TATEYAMAMACHI NAKANIIKAWA-GUN TOYAMA 930-0241 JAPAN ☒ Additional Information on page 2
Ratings and principal characteristics	See Page 2
Trademark (if any)	COSEL
Type of Customer's Testing Facility (CTF) Stage used	
Model / Type Ref.	See Page 2
Additional information (if necessary may also be reported on page 2)	Additionally evaluated to EN 62368-1:2014/ A11:2017. National Differences specified in the CB Test Report. ☐ Additional Information on page 2
A sample of the product was tested and found to be in conformity with	IEC 62368-1:2014
As shown in the Test Report Ref. No. which forms part of this Certificate	E132067-A6009-CB-1 issued on 2019-01-17

This CB Test Certificate is issued by the National Certification Body

☐ UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA
☐ UL (Demko), Borupvang 5A DK-2750 Ballerup, DENMARK
☒ UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN
☐ UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA

For full legal entity names see www.ul.com/ncbnames

Date: 2019-01-18

Signature: M. Takagi

Masamichi Takagi

Model Details:
MGFwxyz
("w" = S or W, "x" = 40, "y" = 05, 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W))
Maybe provided with suffix "-$#####".
("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)

Factories:
WUXI COSEL ELECTRONICS CO LTD
5TH FL, BLD A3, NO.866 LIYUAN DEVELOMPENT ZONE WUXI JIANGSU 214072
CHINA

Ratings:
4.5 - 9 Vdc/ 7.09 A (Model MGFS40053R3), 7.87 A (MGFS400512, MGFS400515), 7.96 A (MGFS400505, MGFW400515), 8.47 A (MGFW400512)
9 - 36 Vdc/ 4.38 A (MGFS40243R3), 5.13 A (MGFS402405), 5.20 A (MGFS402415), 5.24 A (MGFS402412), 5.60 A (MGFW402412), 5.64 A (MGFW402415)
18 - 76 Vdc/ 2.17 A (MGFS40483R3), 2.57 A (MGFS404805, MGFS404815), 2.62 A (MGFS404812), 2.77 A (MGFW404812), 2.79 A (MGFW404815)

Additional information (if necessary)

☐ UL (US), 333 Pfingsten Rd IL 60062, Northbrook, USA
☐ UL (Demko), Borupvang 5A DK-2750 Ballerup, DENMARK
☒ UL (JP), Marunouchi Trust Tower Main Building 6F, 1-8-3 Marunouchi, Chiyoda-ku, Tokyo 100-0005, JAPAN
☐ UL (CA), 7 Underwriters Road, Toronto, M1R 3B4 Ontario, CANADA

For full legal entity names see www.ul.com/ncbnames

Date: 2019-01-18

Signature:
Masamichi Takagi

Test Report issued under the responsibility of:

TEST REPORT
IEC 62368-1
Audio/video, information and communication technology equipment
Part 1: Safety requirements

Report Number .....:	E132067-A6009-CB-1
Date of issue.....:	2019-01-17
Total number of pages .....:	89
Applicant's name.....:	**COSEL CO LTD**
Address .....:	**1-6-43 KAMIAKAE-MACHI** **TOYAMA-SHI** **TOYAMA 930-0816 JAPAN**
Name of Test Laboratory preparing the Report .....:	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
Test specification:	
Standard.....:	IEC 62368-1:2014 (Second Edition)
Test procedure .....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC62368_1B
Test Report Form(s) Originator .....:	UL(US)
Master TRF.....:	2014-03

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory.
The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test Item description :	DC-DC Converter	
Trade Mark .....:	COSEL	
Manufacturer .....:	COSEL CO LTD 1-6-43 KAMIAKAE-MACHI TOYAMA-SHI TOYAMA 930-0816 JAPAN	
Model/Type reference .....:	MGFwxyz ("w" = S or W, "x" = 40, "y" = 05, 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W)) Maybe provided with suffix "-$#####". ("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)	
Ratings .....:	4.5 - 9 Vdc/ 7.09 A (Model MGFS40053R3), 7.87 A (MGFS400512, MGFS400515), 7.96 A (MGFS400505, MGFW400515), 8.47 A (MGFW400512) 9 - 36 Vdc/ 4.38 A (MGFS40243R3), 5.13 A (MGFS402405), 5.20 A (MGFS402415), 5.24 A (MGFS402412), 5.60 A (MGFW402412), 5.64 A (MGFW402415) 18 - 76 Vdc/ 2.17 A (MGFS40483R3), 2.57 A (MGFS404805, MGFS404815), 2.62 A (MGFS404812), 2.77 A (MGFW404812), 2.79 A (MGFW404815)	
Testing procedure and testing location:		
☒ CB Testing Laboratory:		
Testing location/ address ..... :	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan	
☐ Associated CB Testing Laboratory:		
Testing location/ address..... :		
Tested by (name + signature).....:	Hirokatsu Kubota / Project Handler	H. Kubota
Approved by (name + signature) .....:	Ikuro Kinno / Reviewer	
☐ Testing procedure: TMP/CTF Stage 1		
Testing location/ address..... :		
Tested by (name + signature).....:		
Approved by (name + signature) .....:		
☐ Testing procedure: WMT/CTF Stage 2		

Testing location/ address..... :		
Tested by (name + signature).....:		
Witnessed by (name + signature).....:		
Approved by (name + signature) .....:		
☐ Testing procedure: SMT/CTF Stage 3 or 4		
Testing location/ address..... :		
Tested by (name + signature).....:		
Approved by (name + signature) .....:		
Supervised by (name + signature) .....:		

List of Attachments (including a total number of pages in each attachment):

National Differences (14 pages)
Enclosures (17 pages)

Summary of testing:

Unless otherwise indicated, all tests were conducted at UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan.

Tests performed (name of test and test clause):	**Testing location:**
CLASSIFICATION OF ELECTRICAL ENERGY SOURCES (5.2, 5.7) MAXIMUM OPERATING TEMPERATURE FOR MATERIALS, COMPONENTS AND SYSTEMS (5.4.1.4, Annex B.2) POWER MEASUREMENTS (6.2.2.2, 6.2.2.3) INPUT TEST: SINGLE PHASE (B.2.5) SIMULATED ABNORMAL OPERATING CONDITIONS (B.3) SIMULATED SINGLE FAULT CONDITIONS (B.4)	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan

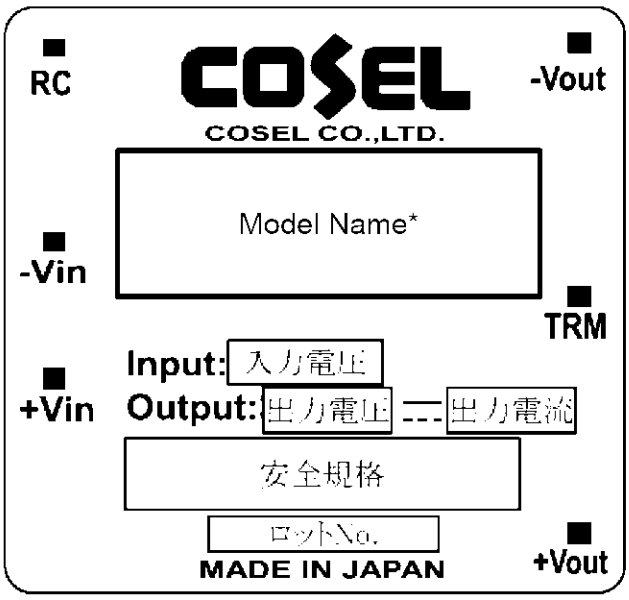
Summary of compliance with National Differences:

List of countries addressed: EU Group Differences, US,CA

☒ **The product fulfils the requirements of:** EN 62368-1:2014 + A11:2017, UL 62368-1 2ND Ed, Issued December 1, 2014, CSA CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



* Model Name
MGFwxyz
("w" = S or W, "x" = 40, "y" = 05, 24 or 48, "z" = 3R3 or 05 (when "w" = S only), 12 or 15 (when "w" = S or W))
Maybe provided with suffix "-$#####".
("$" is G, R or blank, "#####" is any number 0 to 9 or any letter A to Z except G and R or blank.)

Note: The above markings are the minimum requirements required by the safety lab. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

TEST ITEM PARTICULARS:	
Classification of use by	Ordinary person, Skilled person
Supply Connection	External Circuit - not Mains connected ES1 or ES2
Supply % Tolerance	None
Supply Connection – Type	for building in
Considered current rating of protective device as part of building or equipment installation	N/A
Equipment mobility	for building-in
Over voltage category (OVC)	other: not directly connected to the mains
Class of equipment	Not Classified
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient	85 °C
IP protection class	IPX0
Power Systems	N/A
Altitude during operation (m)	5000 m
Altitude of test laboratory (m)	2000 m or less
Mass of equipment (kg)	0.03 or less kg
POSSIBLE TEST CASE VERDICTS:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
TESTING:	
Date of receipt of test item..... :	2018-09-03, 2018-09-06, 2018-10-22, 2018-11-26, 2018-12-13, 2018-12-19
Date (s) of performance of tests..... :	2018-11-01 to 2019-01-09
GENERAL REMARKS:	
"(See Enclosure #)" refers to additional information appended to the report. **"(See appended table)" refers to a table appended to the report.** **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☒ **Yes** ☐ **Not applicable**

When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) ..... :	COSEL CO LTD TATEYAMA FACTORY 78 DOGENJI TATEYAMAMACHI NAKANIIKAWA-GUN TOYAMA 930-0241 JAPAN WUXI COSEL ELECTRONICS CO LTD 5TH FL, BLD A3, NO.866 LIYUAN DEVELOMPENT ZONE WUXI JIANGSU 214072 CHINA

GENERAL PRODUCT INFORMATION:

Report Summary

All applicable tests according to the referenced standard(S) have been carried out.

Product Description

The products covered in this report are components DC-DC Converter for building, providing functional insulation.

See Model Differences for details.

Output Ratings;

MGFS40053R3: 2.97 - 3.63 Vdc, maximum 8 A, maximum 26.4 W

MGFS400505: 4.5 - 5.5 Vdc, maximum 6 A, maximum 30 W

MGFS400512: 10.8 - 13.2 Vdc, maximum 2.5 A, maximum 30 W

MGFS400515: 13.5 - 16.5 Vdc, maximum 2 A, maximum 30 W

MGFW400512: +12 Vdc/ 1.3 A, -12 Vdc/ 1.3 A, maximum 31.2 W

MGFW400515: +15 Vdc/ 1 A, -15 Vdc/ 1 A, maximum 30 W

MGFS40243R3: 2.97 - 3.63 Vdc, maximum 10 A, maximum 33 W

MGFS402405: 4.5 - 5.5 Vdc, maximum 8 A, maximum 40 W

MGFS402412: 10.8 - 13.2 Vdc, maximum 3.4 A, maximum 40.8 W

MGFS402415: 13.5 - 16.5 Vdc, maximum 2.7 A, maximum 40.5 W

MGFW402412: +12 Vdc/ 1.7 A, -12 Vdc/ 1.7 A, maximum 40.8 W

MGFW402415: +15 Vdc/ 1.4 A, -15 Vdc/ 1.4 A, maximum 42 W

MGFS40483R3: 2.97 - 3.63 Vdc, maximum 10 A, maximum 33 W

MGFS404805: 4.5 - 5.5 Vdc, maximum 8 A, maximum 40 W

MGFS404812: 10.8 - 13.2 Vdc, maximum 3.4 A, maximum 40.8 W

MGFS404815: 13.5 - 16.5 Vdc, maximum 2.7 A, maximum 40.5 W

MGFW404812: +12 Vdc/ 1.7 A, -12 Vdc/ 1.7 A, maximum 40.8 W

MGFW404815: +15 Vdc/ 1.4 A, -15 Vdc/ 1.4 A, maximum 42 W

Adjustment of output voltage range was made via external control circuit.

Condition of output derating: Depends on model, input voltage and 100% of rated output is allowed within the specified temperature at the measurement points specified as “Point A”. See Enclosure Id. 7-01 for details.

Model Differences

Each models are identical except as follows:

- The input/output rating.
- Major components described in "Table 4.1.2"
- Minor components.

Nomenclature:
MGF w x y z -$#####
I II III IV V VI
I. Series name
MGF
II. Output specification
S: Single output
W: Dual output
III. Output wattege
40
IV. Input voltage
05: 4.5 - 13 Vdc
24: 9 - 36 Vdc
48: 18 - 76 Vdc
V. Output voltage
3R3: 3.3 Vdc (when "w" = S only)
05: 5 Vdc (when "w" = S only)
12: 12 Vdc (when "w" = S), +12/ -12 Vdc (when "w" = W)
15: 15 Vdc (when "w" = S), +15/ -15 Vdc (when "w" = W)
VI. Optional suffix
"$" is G, R or blank.
G: Capacitor (C901) between Input and Output is removed.
R: Reverses the logic of remote control function. (Positive)
"#####" signify marketing purpose or minor modification and does not affect safety.

Additional application considerations – (Considerations used to test a component or sub-assembly) -
The Clearances and Creepage Distances have additionally been assessed for suitability up to 5000 m elevation.
The circuit diagrams may be required at the discretion of the accepting NCB.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 85 °C (See Enclosure Id. 7-01)

Engineering Conditions of Acceptability
When installed in an end-product, consideration must be given to the following:

- The following output circuits are at ES2 energy levels : Output of all models
- The following output circuits are at PS2 energy levels : Output of all models
- The following end-product enclosures are required : Electrical, Fire
- This component has been evaluated in 'control of fire spread' method assuming appropriate fire enclosure is provided in end product. Unless the fire enclosure is made of non-combustible or V-0 material, the separation from the PIS (all electrical components) shall be considered.

- Insulation between Input Terminal and Output Terminal of the DC-DC Converter complies with Functional Insulation.
- The product is intended for use on the following power systems: The equipment is for building-in, and intended to be supplied by secondary dc power source which is isolated from mains by double or reinforced insulation, highest transient voltage in secondary circuit is up to 1500 V and ES2 electrical energy source.
- This DC-DC Converter has no internal fuse, therefore Input circuit must provide external fuse in +Vin line. Test was performed at input circuit provided external fuse. (Littelfuse, Inc., Type 324, Model MGFw4005z: Rated 250V, 15A, Model MGFw4024z: Rated 250V, 10A, Model MGFw4048z: Rated 250V, 5A,) (These fuses are not certified by IEC.)

ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:	
(Note 1: Identify the following six (6) energy source forms based on the origin of the energy.) (Note 2: The identified classification e.g., ES2, TS1, should be with respect to its ability to cause pain or injury on the body or its ability to ignite a combustible material. Any energy source can be declared Class 3 as a worse case classification e.g. PS3, ES3.	
Electrically-caused injury (Clause 5): (Note: Identify type of source, list sub-assembly or circuit designation and corresponding energy source classification) Example: +5 V dc input ES1	
Source of electrical energy	**Corresponding classification (ES)**
All input circuits	ES2
Output of all models	ES2
Electrically-caused fire (Clause 6): (Note: List sub-assembly or circuit designation and corresponding energy source classification) Example: Battery pack (maximum 85 watts): PS2	
Source of power or PIS	**Corresponding classification (PS)**
All input circuits	PS3 (Declared)
Output of all models	PS2
Injury caused by hazardous substances (Clause 7) (Note: Specify hazardous chemicals, whether produces ozone or other chemical construction not addressed as part of the component evaluation.) Example: Liquid in filled component Glycol	
Source of hazardous substances	**Corresponding chemical**
N/A	N/A
Mechanically-caused injury (Clause 8) (Note: List moving part(s), fan, special installations, etc. & corresponding MS classification based on Table 35.) Example: Wall mount unit MS2	
Source of kinetic/mechanical energy	**Corresponding classification (MS)**
N/A	N/A
Thermal burn injury (Clause 9) (Note: Identify the surface or support, and corresponding energy source classification based on type of part, location, operating temperature and contact time in Table 38.) Example: Hand-held scanner – thermoplastic enclosure TS1	
Source of thermal energy	**Corresponding classification (TS)**
N/A	N/A
Radiation (Clause 10) (Note: List the types of radiation present in the product and the corresponding energy source classification.) Example: DVD – Class 1 Laser Product RS1	
Type of radiation	**Corresponding classification (RS)**
N/A	N/A

ENERGY SOURCE DIAGRAM
Indicate which energy sources are included in the energy source diagram. Insert diagram below
☐ ES ☐ PS ☐ MS ☐ TS ☐ RS

OVERVIEW OF EMPLOYED SAFEGUARDS				
Clause	**Possible Hazard**			
5.1	Electrically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (ES3: Primary Filter circuit)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
Ordinary (assumed to be accessing end use product)	ES2: All input circuits and output of all model	Enclosure to be provided in end-product. See C of A.	N/A	N/A
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementary	Reinforced
All electrical components	PS3: Declared	Temperature in "N" and "A"	Mounted on PWB rated V-0, and fire enclosure to be provided in end-product. See C of A.	N/A
Printed wiring board	PS3: Declared	Temperature in "N" and "A"	V-0 and fire enclosure to be provided in end-product. See C of A.	N/A
7.1	Injury caused by hazardous substances			
Body Part (e.g., skilled)	Energy Source (hazardous material)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	N/A	N/A	N/A	N/A
8.1	Mechanically-caused injury			
Body Part (e.g. Ordinary)	Energy Source (MS3:High Pressure Lamp)	Safeguards		
		Basic	Supplementary	Reinforced (Enclosure)
N/A	N/A	N/A	N/A	N/A
9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	N/A	N/A	N/A	N/A
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced
N/A	N/A	N/A	N/A	N/A

Supplementary Information:
(1) See attached energy source diagram for additional details. (2) “N” – Normal Condition; “A” – Abnormal Condition; “S” Single Fault

4	**GENERAL REQUIREMENTS**		Pass
4.1.1	Acceptance of materials, components and subassemblies		Pass
4.1.2	Use of components		Pass
4.1.3	Equipment design and construction		Pass
4.1.15	Markings and instructions ..... :	(See Annex F)	Pass
4.4.4	Safeguard robustness	Building-in component.	N/A
4.4.4.2	Steady force tests ..... :		N/A
4.4.4.3	Drop tests..... :		N/A
4.4.4.4	Impact tests..... :		N/A
4.4.4.5	Internal accessible safeguard enclosure and barrier tests ..... :		N/A
4.4.4.6	Glass Impact tests..... :		N/A
4.4.4.7	Thermoplastic material tests ..... :		N/A
4.4.4.8	Air comprising a safeguard ..... :		N/A
4.4.4.9	Accessibility and safeguard effectiveness		N/A
4.5	Explosion	No explosion under normal, abnormal and single fault condition.	Pass
4.6	Fixing of conductors		N/A
4.6.1	Fix conductors not to defeat a safeguard		N/A
4.6.2	10 N force test applied to ..... :		N/A
4.7	Equipment for direct insertion into mains socket - outlets		N/A
4.7.2	Mains plug part complies with the relevant standard ..... :		N/A
4.7.3	Torque (Nm)..... :		N/A
4.8	Products containing coin/button cell batteries		N/A
4.8.2	Instructional safeguard		N/A
4.8.3	Battery Compartment Construction		N/A
	Means to reduce the possibility of children removing the battery ..... :		—
4.8.4	Battery Compartment Mechanical Tests..... :		N/A
4.8.5	Battery Accessibility		N/A
4.9	Likelihood of fire or shock due to entry of conductive object ..... :	Building-in component.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5	**ELECTRICALLY-CAUSED INJURY**		Pass
5.2.1	Electrical energy source classifications .....:	(See appended table 5.2)	Pass
5.2.2	ES1, ES2 and ES3 limits		Pass
5.2.2.2	Steady-state voltage and current .....:	(See appended table 5.2)	Pass
5.2.2.3	Capacitance limits .....:		N/A
5.2.2.4	Single pulse limits .....:	(See appended table 5.2)	Pass
5.2.2.5	Limits for repetitive pulses .....:		N/A
5.2.2.6	Ringing signals .....:		N/A
5.2.2.7	Audio signals .....:		N/A
5.3	Protection against electrical energy sources		Pass
5.3.1	General Requirements for accessible parts to ordinary, instructed and skilled persons	Building-in component. Final compliance to be evaluated in end-product.	Pass
5.3.2.1	Accessibility to electrical energy sources and safeguards		N/A
5.3.2.2	Contact requirements		N/A
	a) Test with test probe from Annex V .....:		N/A
	b) Electric strength test potential (V) .....:		N/A
	c) Air gap (mm) .....:		N/A
5.3.2.4	Terminals for connecting stripped wire		N/A
5.4	Insulation materials and requirements		N/A
5.4.1.2	Properties of insulating material	Functional insulation only.	N/A
5.4.1.3	Humidity conditioning ..... :		N/A
5.4.1.4	Maximum operating temperature for insulating materials .....:		N/A
5.4.1.5	Pollution degree .....:		—
5.4.1.5.2	Test for pollution degree 1 environment and for an insulating compound		N/A
5.4.1.5.3	Thermal cycling		N/A
5.4.1.6	Insulation in transformers with varying dimensions		N/A
5.4.1.7	Insulation in circuits generating starting pulses		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.1.8	Determination of working voltage		N/A
5.4.1.9	Insulating surfaces		N/A
5.4.1.10	Thermoplastic parts on which conductive metallic parts are directly mounted		N/A
5.4.1.10.2	Vicat softening temperature .....:		N/A
5.4.1.10.3	Ball pressure .....:		N/A
5.4.2	Clearances	Functional insulation only.	N/A
5.4.2.2	Determining clearance using peak working voltage	(See appended table 5.4.2.2)	N/A
5.4.2.3	Determining clearance using required withstand voltage .....:	(See appended table 5.4.2.3)	N/A
	a) a.c. mains transient voltage .....:		—
	b) d.c. mains transient voltage .....:		—
	c) external circuit transient voltage .....:		—
	d) transient voltage determined by measurement ..... :		—
5.4.2.4	Determining the adequacy of a clearance using an electric strength test		N/A
5.4.2.5	Multiplication factors for clearances and test voltages.....:		N/A
5.4.3	Creepage distances .....:	Functional insulation only.	N/A
5.4.3.1	General		N/A
5.4.3.3	Material Group .....:		—
5.4.4	Solid insulation		N/A
5.4.4.2	Minimum distance through insulation .....:		N/A
5.4.4.3	Insulation compound forming solid insulation		N/A
5.4.4.4	Solid insulation in semiconductor devices		N/A
5.4.4.5	Cemented joints		N/A
5.4.4.6	Thin sheet material		N/A
5.4.4.6.1	General requirements		N/A
5.4.4.6.2	Separable thin sheet material		N/A
	Number of layers (pcs) .....:		N/A
5.4.4.6.3	Non-separable thin sheet material		N/A
5.4.4.6.4	Standard test procedure for non-separable thin sheet material..... :		N/A
5.4.4.6.5	Mandrel test		N/A
5.4.4.7	Solid insulation in wound components		N/A
5.4.4.9	Solid insulation at frequencies >30 kHz..... :		N/A
5.4.5	Antenna terminal insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.4.5.1	General		N/A
5.4.5.2	Voltage surge test		N/A
	Insulation resistance (MΩ) ..... :		—
5.4.6	Insulation of internal wire as part of supplementary safeguard ..... :		N/A
5.4.7	Tests for semiconductor components and for cemented joints		N/A
5.4.8	Humidity conditioning	Functional insulation only.	N/A
	Relative humidity (%) ..... :		—
	Temperature (°C) .....:		—
	Duration (h) ..... :		—
5.4.9	Electric strength test..... :		N/A
5.4.9.1	Test procedure for a solid insulation type test		N/A
5.4.9.2	Test procedure for routine tests		N/A
5.4.10	Protection against transient voltages between external circuit		N/A
5.4.10.1	Parts and circuits separated from external circuits		N/A
5.4.10.2	Test methods		N/A
5.4.10.2.1	General		N/A
5.4.10.2.2	Impulse test..... :		N/A
5.4.10.2.3	Steady-state test ..... :		N/A
5.4.11	Insulation between external circuits and earthed circuitry..... :		N/A
5.4.11.1	Exceptions to separation between external circuits and earth		N/A
5.4.11.2	Requirements		N/A
	Rated operating voltage U_{op} (V) ..... :		—
	Nominal voltage U_{peak} (V) ..... :		—
	Max increase due to variation U_{sp} ..... :		—
	Max increase due to ageing δU_{sa} ..... :		—
	$U_{op} = U_{peak} + \delta U_{sp} + \delta U_{sa}$ ..... :		—
5.5	Components as safeguards		N/A
5.5.1	General		N/A
5.5.2	Capacitors and RC units		N/A
5.5.2.1	General requirement		N/A
5.5.2.2	Safeguards against capacitor discharge after disconnection of a connector ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
5.5.3	Transformers		N/A
5.5.4	Optocouplers		N/A
5.5.5	Relays		N/A
5.5.6	Resistors		N/A
5.5.7	SPD's		N/A
5.5.7.1	Use of an SPD connected to reliable earthing		N/A
5.5.7.2	Use of an SPD between mains and protective earth		N/A
5.5.8	Insulation between the mains and external circuit consisting of a coaxial cable ..... :		N/A
5.6	Protective conductor		N/A
5.6.2	Requirement for protective conductors		N/A
5.6.2.1	General requirements		N/A
5.6.2.2	Colour of insulation		N/A
5.6.3	Requirement for protective earthing conductors		N/A
	Protective earthing conductor size (mm^2) .....:		—
5.6.4	Requirement for protective bonding conductors		N/A
5.6.4.1	Protective bonding conductors		N/A
	Protective bonding conductor size (mm^2).....:		—
	Protective current rating (A) ..... :		—
5.6.4.3	Current limiting and overcurrent protective devices		N/A
5.6.5	Terminals for protective conductors		N/A
5.6.5.1	Requirement		N/A
	Conductor size (mm^2), nominal thread diameter (mm).....:		N/A
5.6.5.2	Corrosion		N/A
5.6.6	Resistance of the protective system		N/A
5.6.6.1	Requirements		N/A
5.6.6.2	Test Method Resistance (Ω).....:		N/A
5.6.7	Reliable earthing		N/A
5.7	Prospective touch voltage, touch current and protective conductor current		N/A
5.7.2	Measuring devices and networks		N/A
5.7.2.1	Measurement of touch current.....:		N/A
5.7.2.2	Measurement of prospective touch voltage		N/A
5.7.3	Equipment set-up, supply connections and earth connections		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	System of interconnected equipment (separate connections/single connection) ..... :		—
	Multiple connections to mains (one connection at a time/simultaneous connections) ..... :		—
5.7.4	Earthed conductive accessible parts ..... :		N/A
5.7.5	Protective conductor current		N/A
	Supply Voltage (V) ..... :		—
	Measured current (mA) ..... :		—
	Instructional Safeguard ..... :		N/A
5.7.6	Prospective touch voltage and touch current due to external circuits		N/A
5.7.6.1	Touch current from coaxial cables		N/A
5.7.6.2	Prospective touch voltage and touch current from external circuits		N/A
5.7.7	Summation of touch currents from external circuits		N/A
	a) Equipment with earthed external circuits Measured current (mA) ..... :		N/A
	b) Equipment whose external circuits are not referenced to earth. Measured current (mA) ..... :		N/A
6	**ELECTRICALLY- CAUSED FIRE**		Pass
6.2	Classification of power sources (PS) and potential ignition sources (PIS)		Pass
6.2.2	Power source circuit classifications		Pass
6.2.2.1	General	(See clause 6.2.2.2)	Pass
6.2.2.2	Power measurement for worst-case load fault .... :	(See appended table 6.2.2)	Pass
6.2.2.3	Power measurement for worst-case power source fault ..... :		N/A
6.2.2.4	PS1 ..... :	No PS1 Circuits.	N/A
6.2.2.5	PS2 ..... :	(See appended table 6.2.2)	Pass
6.2.2.6	PS3 ..... :	(See appended table 6.2.2)	Pass
6.2.3	Classification of potential ignition sources		Pass
6.2.3.1	Arcing PIS ..... :	Input circuits to be assumed arcing PIS.	Pass
6.2.3.2	Resistive PIS ..... :	All components are considered resistive PIS.	Pass
6.3	Safeguards against fire under normal operating and abnormal operating conditions		Pass
6.3.1 (a)	No ignition and attainable temperature value less than 90 % defined by ISO 871 or less than 300 °C for unknown materials ..... :	(See appended table 5.4.1.5, 6.3.2, 9.0, B.2.6)	Pass

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.3.1 (b)	Combustible materials outside fire enclosure		N/A
6.4	Safeguards against fire under single fault conditions		Pass
6.4.1	Safeguard Method	Applied with “control fire spread”.	Pass
6.4.2	Reduction of the likelihood of ignition under single fault conditions in PS1 circuits		N/A
6.4.3	Reduction of the likelihood of ignition under single fault conditions in PS2 and PS3 circuits		N/A
6.4.3.1	General		N/A
6.4.3.2	Supplementary Safeguards		N/A
	Special conditions if conductors on printed boards are opened or peeled		N/A
6.4.3.3	Single Fault Conditions ..... :	(See appended table 6.4.3)	N/A
	Special conditions for temperature limited by fuse		N/A
6.4.4	Control of fire spread in PS1 circuits		N/A
6.4.5	Control of fire spread in PS2 circuits		Pass
6.4.5.2	Supplementary safeguards ..... :	All electrical components are mounted on minimum V-1 printed wiring board.	Pass
6.4.6	Control of fire spread in PS3 circuit	Building-in component. Fire enclosure shall be provided in end-product.	Pass
6.4.7	Separation of combustible materials from a PIS	Applied with “control fire spread”.	N/A
6.4.7.1	General ..... :		N/A
6.4.7.2	Separation by distance		N/A
6.4.7.3	Separation by a fire barrier		N/A
6.4.8	Fire enclosures and fire barriers	Building-in component. Fire enclosure shall be provided in end-product.	N/A
6.4.8.1	Fire enclosure and fire barrier material properties		N/A
6.4.8.2.1	Requirements for a fire barrier		N/A
6.4.8.2.2	Requirements for a fire enclosure		N/A
6.4.8.3	Constructional requirements for a fire enclosure and a fire barrier		N/A
6.4.8.3.1	Fire enclosure and fire barrier openings		N/A
6.4.8.3.2	Fire barrier dimensions		N/A
6.4.8.3.3	Top Openings in Fire Enclosure: dimensions (mm) ..... :		N/A
	Needle Flame test		N/A
6.4.8.3.4	Bottom Openings in Fire Enclosure, condition met a), b) and/or c) dimensions (mm) ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Flammability tests for the bottom of a fire enclosure ..... :		N/A
6.4.8.3.5	Integrity of the fire enclosure, condition met: a), b) or c) ..... :		N/A
6.4.8.4	Separation of PIS from fire enclosure and fire barrier distance (mm) or flammability rating .....:		N/A
6.5	Internal and external wiring		N/A
6.5.1	Requirements		N/A
6.5.2	Cross-sectional area (mm^2) ..... :		—
6.5.3	Requirements for interconnection to building wiring ..... :		N/A
6.6	Safeguards against fire due to connection to additional equipment		N/A
	External port limited to PS2 or complies with Clause Q.1		N/A
7	**INJURY CAUSED BY HAZARDOUS SUBSTANCES**		N/A
7.2	Reduction of exposure to hazardous substances	No such hazardous substances involved.	N/A
7.3	Ozone exposure		N/A
7.4	Use of personal safeguards (PPE)		N/A
	Personal safeguards and instructions.....:		—
7.5	Use of instructional safeguards and instructions		N/A
	Instructional safeguard (ISO 7010) .....:		—
7.6	Batteries ..... :	No batteries provided.	N/A
8	**MECHANICALLY-CAUSED INJURY**		N/A
8.1	General	No mechanical energy sources.	N/A
8.2	Mechanical energy source classifications		N/A
8.3	Safeguards against mechanical energy sources		N/A
8.4	Safeguards against parts with sharp edges and corners		N/A
8.4.1	Safeguards		N/A
8.5	Safeguards against moving parts		N/A
8.5.1	MS2 or MS3 part required to be accessible for the function of the equipment		N/A
8.5.2	Instructional Safeguard ..... :		—
8.5.4	Special categories of equipment comprising moving parts		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.5.4.1	Large data storage equipment		N/A
8.5.4.2	Equipment having electromechanical device for destruction of media		N/A
8.5.4.2.1	Safeguards and Safety Interlocks..... :		N/A
8.5.4.2.2	Instructional safeguards against moving parts		N/A
	Instructional Safeguard ..... :		—
8.5.4.2.3	Disconnection from the supply		N/A
8.5.4.2.4	Probe type and force (N)..... :		N/A
8.5.5	High Pressure Lamps		N/A
8.5.5.1	Energy Source Classification		N/A
8.5.5.2	High Pressure Lamp Explosion Test ..... :		N/A
8.6	Stability		N/A
8.6.1	Product classification		N/A
	Instructional Safeguard ..... :		—
8.6.2	Static stability		N/A
8.6.2.2	Static stability test		N/A
	Applied Force..... :		—
8.6.2.3	Downward Force Test		N/A
8.6.3	Relocation stability test		N/A
	Unit configuration during 10° tilt..... :		—
8.6.4	Glass slide test		N/A
8.6.5	Horizontal force test (Applied Force) ..... :		N/A
	Position of feet or movable parts ..... :		—
8.7	Equipment mounted to wall or ceiling		N/A
8.7.1	Mounting Means (Length of screws (mm) and mounting surface) ..... :		N/A
8.7.2	Direction and applied force ..... :		N/A
8.8	Handles strength		N/A
8.8.1	Classification		N/A
8.8.2	Applied Force ..... :		N/A
8.9	Wheels or casters attachment requirements		N/A
8.9.1	Classification		N/A
8.9.2	Applied force..... :		—
8.10	Carts, stands and similar carriers		N/A
8.10.1	General		N/A
8.10.2	Marking and instructions		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Instructional Safeguard ..... :		—
8.10.3	Cart, stand or carrier loading test and compliance		N/A
	Applied force..... :		—
8.10.4	Cart, stand or carrier impact test		N/A
8.10.5	Mechanical stability		N/A
	Applied horizontal force (N)..... :		—
8.10.6	Thermoplastic temperature stability (°C) ..... :		N/A
8.11	Mounting means for rack mounted equipment		N/A
8.11.1	General		N/A
8.11.2	Product Classification		N/A
8.11.3	Mechanical strength test, variable *N* ..... :		N/A
8.11.4	Mechanical strength test 250N, including end stops		N/A
8.12	Telescoping or rod antennas		N/A
	Button/Ball diameter (mm) ..... :		—
9	**THERMAL BURN INJURY**		N/A
9.2	Thermal energy source classifications	Building-in component. Fire enclosure shall be provided in end-product.	N/A
9.3	Safeguard against thermal energy sources		N/A
9.4	Requirements for safeguards		N/A
9.4.1	Equipment safeguard		N/A
9.4.2	Instructional safeguard ..... :		N/A
10	**RADIATION**		N/A
10.2	Radiation energy source classification	No radiation energy sources.	N/A
10.2.1	General classification		N/A
10.3	Protection against laser radiation		N/A
	Laser radiation that exists equipment:		—
	Normal, abnormal, single-fault ..... :		N/A
	Instructional safeguard..... :		—
	Tool ..... :		—
10.4	Protection against visible, infrared, and UV radiation		N/A
10.4.1	General		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
10.4.1.a)	RS3 for Ordinary and instructed persons ..... :		N/A
10.4.1.b)	RS3 accessible to a skilled person ..... :		N/A
	Personal safeguard (PPE) instructional safeguard ..... :		—
10.4.1.c)	Equipment visible, IR, UV does not exceed RS1 ..... :		N/A
10.4.1.d)	Normal, abnormal, single-fault conditions .....:		N/A
10.4.1.e)	Enclosure material employed as safeguard is opaque ..... :		N/A
10.4.1.f)	UV attenuation ..... :		N/A
10.4.1.g)	Materials resistant to degradation UV..... :		N/A
10.4.1.h)	Enclosure containment of optical radiation ..... :		N/A
10.4.1.i)	Exempt Group under normal operating conditions ..... :		N/A
10.4.2	Instructional safeguard ..... :		N/A
10.5	Protection against x-radiation		N/A
10.5.1	X- radiation energy source that exists equipment :		N/A
	Normal, abnormal, single fault conditions		N/A
	Equipment safeguards ..... :		N/A
	Instructional safeguard for skilled person .....:		N/A
10.5.3	Most unfavourable supply voltage to give maximum radiation..... :		—
	Abnormal and single-fault condition.....:		N/A
	Maximum radiation (pA/kg) .....:		N/A
10.6	Protection against acoustic energy sources		N/A
10.6.1	General		N/A
10.6.2	Classification		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Acoustic output, dB(A) .....:		N/A
	Output voltage, unweighted r.m.s. .....:		N/A
10.6.4	Protection of persons		N/A
	Instructional safeguards.....:		N/A
	Equipment safeguard prevent ordinary person to RS2 .....:		—
	Means to actively inform user of increase sound pressure .....:		—
10.6.4.	Equipment safeguard prevent ordinary person to RS2.....:		—
10.6.5	Requirements for listening devices (headphones, earphones, etc.)		N/A
10.6.5.1	Corded passive listening devices with analog input		N/A
	Input voltage with 94 dB(A) L_{Aeq} acoustic pressure output .....:		—
10.6.5.2	Corded listening devices with digital input		N/A
	Maximum dB(A) .....:		—
10.6.5.3	Cordless listening device		N/A
	Maximum dB(A) .....:		—

B	**NORMAL OPERATING CONDITION TESTS, ABNORMAL OPERATING CONDITION TESTS AND SINGLE FAULT CONDITION TESTS**		Pass
B.2	Normal Operating Conditions		Pass
B.2.1	General requirements .....:	(See Test Item Particulars and appended test tables)	Pass
	Audio Amplifiers and equipment with audio amplifiers.....:		N/A
B.2.3	Supply voltage and tolerances	Extremes of rated voltage ranges were considered.	Pass
B.2.5	Input test .....:	(See appended table B.2.5)	Pass
B.3	Simulated abnormal operating conditions		Pass
B.3.1	General requirements .....:	(See appended table B.3)	Pass
B.3.2	Covering of ventilation openings		N/A
B.3.3	D.C. mains polarity test		N/A
B.3.4	Setting of voltage selector.....:		N/A
B.3.5	Maximum load at output terminals.....:	(See appended table B.3)	Pass
B.3.6	Reverse battery polarity		N/A
B.3.7	Abnormal operating conditions as specified in Clause E.2.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
B.3.8	Safeguards functional during and after abnormal operating conditions	(See appended table B.4)	Pass
B.4	Simulated single fault conditions		Pass
B.4.2	Temperature controlling device open or short-circuited.....:		N/A
B.4.3	Motor tests		N/A
B.4.3.1	Motor blocked or rotor locked increasing the internal ambient temperature .....:		N/A
B.4.4	Short circuit of functional insulation		Pass
B.4.4.1	Short circuit of clearances for functional insulation	(See appended table B.4)	Pass
B.4.4.2	Short circuit of creepage distances for functional insulation	(See appended table B.4)	Pass
B.4.4.3	Short circuit of functional insulation on coated printed boards	No coated printed boards provided.	N/A
B.4.5	Short circuit and interruption of electrodes in tubes and semiconductors	(See appended table B.4)	Pass
B.4.6	Short circuit or disconnect of passive components	(See appended table B.4)	Pass
B.4.7	Continuous operation of components	No applicable component.	N/A
B.4.8	Class 1 and Class 2 energy sources within limits during and after single fault conditions		Pass
B.4.9	Battery charging under single fault conditions....:		N/A
C	**UV RADIATION**		N/A
C.1	Protection of materials in equipment from UV radiation	No UV radiations involved.	N/A
C.1.2	Requirements		N/A
C.1.3	Test method		N/A
C.2	UV light conditioning test		N/A
C.2.1	Test apparatus		N/A
C.2.2	Mounting of test samples		N/A
C.2.3	Carbon-arc light-exposure apparatus		N/A
C.2.4	Xenon-arc light exposure apparatus		N/A
D	**TEST GENERATORS**		N/A
D.1	Impulse test generators		N/A
D.2	Antenna interface test generator		N/A
D.3	Electronic pulse generator		N/A
E	**TEST CONDITIONS FOR EQUIPMENT CONTAINING AUDIO AMPLIFIERS**		N/A
E.1	Audio amplifier normal operating conditions	No audio amplifiers provided.	N/A
	Audio signal voltage (V) ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated load impedance (Ω) ..... :		
E.2	Audio amplifier abnormal operating conditions		N/A
F	**EQUIPMENT MARKINGS, INSTRUCTIONS, AND INSTRUCTIONAL SAFEGUARDS**		Pass
F.1	General requirements		Pass
	Instructions – Language ..... :	English only evaluated.	—
F.2	Letter symbols and graphical symbols	No graphic symbols used.	N/A
F.2.1	Letter symbols according to IEC60027-1		N/A
F.2.2	Graphic symbols IEC, ISO or manufacturer specific		N/A
F.3	Equipment markings		Pass
F.3.1	Equipment marking locations	Located on Case.	Pass
F.3.2	Equipment identification markings		Pass
F.3.2.1	Manufacturer identification ..... :	Trademark "COSEL" marked on Nameplate label.	—
F.3.2.2	Model identification ..... :	Marked on Nameplate label.	—
F.3.3	Equipment rating markings	Building-in component. No means for direct connection to mains supply, no marking of electrical rating required.	N/A
F.3.3.1	Equipment with direct connection to mains		N/A
F.3.3.2	Equipment without direct connection to mains		N/A
F.3.3.3	Nature of supply voltage ..... :		—
F.3.3.4	Rated voltage ..... :		—
F.3.3.4	Rated frequency ..... :		—
F.3.3.6	Rated current or rated power ..... :		—
F.3.3.7	Equipment with multiple supply connections		N/A
F.3.4	Voltage setting device		N/A
F.3.5	Terminals and operating devices		N/A
F.3.5.1	Mains appliance outlet and socket-outlet markings..... :		N/A
F.3.5.2	Switch position identification marking ..... :		N/A
F.3.5.3	Replacement fuse identification and rating markings..... :		N/A
F.3.5.4	Replacement battery identification marking..... :		N/A
F.3.5.5	Terminal marking location		N/A
F.3.6	Equipment markings related to equipment classification		N/A
F.3.6.1	Class I Equipment		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
F.3.6.1.1	Protective earthing conductor terminal		N/A
F.3.6.1.2	Neutral conductor terminal		N/A
F.3.6.1.3	Protective bonding conductor terminals		N/A
F.3.6.2	Class II equipment (IEC60417-5172)		N/A
F.3.6.2.1	Class II equipment with or without functional earth		N/A
F.3.6.2.2	Class II equipment with functional earth terminal marking		N/A
F.3.7	Equipment IP rating marking ..... :		—
F.3.8	External power supply output marking		N/A
F.3.9	Durability, legibility and permanence of marking	Building-in component. No marking considered to be exposed to outside.	N/A
F.3.10	Test for permanence of markings		N/A
F.4	Instructions		N/A
	a) Equipment for use in locations where children not likely to be present - marking	Building-in component. Shall be evaluated in end-product.	N/A
	b) Instructions given for installation or initial use		N/A
	c) Equipment intended to be fastened in place		N/A
	d) Equipment intended for use only in restricted access area		N/A
	e) Audio equipment terminals classified as ES3 and other equipment with terminals marked in accordance F.3.6.1		N/A
	f) Protective earthing employed as safeguard		N/A
	g) Protective earthing conductor current exceeding ES 2 limits		N/A
	h) Symbols used on equipment		N/A
	i) Permanently connected equipment not provided with all-pole mains switch		N/A
	j) Replaceable components or modules providing safeguard function		N/A
F.5	Instructional safeguards		N/A
	Where “instructional safeguard” is referenced in the test report it specifies the required elements, location of marking and/or instruction		N/A
G	**COMPONENTS**		Pass
G.1	**Switches**		N/A
G.1.1	General requirements	Not used.	N/A
G.1.2	Ratings, endurance, spacing, maximum load		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.2	**Relays**		N/A
G.2.1	General requirements	Not used.	N/A
G.2.2	Overload test		N/A
G.2.3	Relay controlling connectors supply power		N/A
G.2.4	Mains relay, modified as stated in G.2		N/A
G.3	**Protection Devices**		Pass
G.3.1	Thermal cut-offs	Not used.	N/A
G.3.1.1a) &b)	Thermal cut-outs separately approved according to IEC 60730 with conditions indicated in a) & b)		N/A
G.3.1.1c)	Thermal cut-outs tested as part of the equipment as indicated in c)		N/A
G.3.1.2	Thermal cut-off connections maintained and secure		N/A
G.3.2	Thermal links		N/A
G.3.2.1a)	Thermal links separately tested with IEC 60691	Not used.	N/A
G.3.2.1b)	Thermal links tested as part of the equipment		N/A
	Aging hours (H) .....:		—
	Single Fault Condition .....:		—
	Test Voltage (V) and Insulation Resistance (Ω) .:		—
G.3.3	PTC Thermistors	Not used.	N/A
G.3.4	Overcurrent protection devices		N/A
G.3.5	Safeguards components not mentioned in G.3.1 to G.3.5		Pass
G.3.5.1	Non-resettable devices suitably rated and marking provided		N/A
G.3.5.2	Single faults conditions .....:	NTC Thermistor (TH101) and External Fuses are not certified by IEC. The related tests were carried out three times.(See appended Table B.4)	Pass
G.4	**Connectors**		N/A
G.4.1	Spacings	Not used.	N/A
G.4.2	Mains connector configuration .....:		N/A
G.4.3	Plug is shaped that insertion into mains socket-outlets or appliance coupler is unlikely		N/A
G.5	**Wound Components**		N/A
G.5.1	Wire insulation in wound components	Not used.	N/A
G.5.1.2 a)	Two wires in contact inside wound component, angle between 45° and 90°		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.5.1.2 b)	Construction subject to routine testing		N/A
G.5.2	Endurance test on wound components		N/A
G.5.2.1	General test requirements		N/A
G.5.2.2	Heat run test		N/A
	Time (s) ..... :		—
	Temperature (°C) ..... :		—
G.5.2.3	Wound Components supplied by mains		N/A
G.5.3	**Transformers**		N/A
G.5.3.1	Requirements applied (IEC61204-7, IEC61558-1/-2, and/or IEC62368-1) ..... :	Planer transformer, winding is multi-layer PWB used. Functional Insulation	N/A
	Position ..... :		—
	Method of protection ..... :		—
G.5.3.2	Insulation		N/A
	Protection from displacement of windings ..... :		—
G.5.3.3	Overload test..... :		N/A
G.5.3.3.1	Test conditions		N/A
G.5.3.3.2	Winding Temperatures testing in the unit		N/A
G.5.3.3.3	Winding Temperatures - Alternative test method		N/A
G.5.4	**Motors**		N/A
G.5.4.1	General requirements	Not used.	N/A
	Position ..... :		—
G.5.4.2	Test conditions		N/A
G.5.4.3	Running overload test		N/A
G.5.4.4	Locked-rotor overload test		N/A
	Test duration (days) ..... :		—
G.5.4.5	Running overload test for d.c. motors in secondary circuits		N/A
G.5.4.5.2	Tested in the unit		N/A
	Electric strength test (V)..... :		—
G.5.4.5.3	Tested on the Bench - Alternative test method; test time (h) ..... :		N/A
	Electric strength test (V)..... :		—
G.5.4.6	Locked-rotor overload test for d.c. motors in secondary circuits		N/A
G.5.4.6.2	Tested in the unit		N/A
	Maximum Temperature ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Electric strength test (V) ..... :		N/A
G.5.4.6.3	Tested on the bench - Alternative test method; test time (h) ..... :		N/A
	Electric strength test (V)..... :		N/A
G.5.4.7	Motors with capacitors		N/A
G.5.4.8	Three-phase motors		N/A
G.5.4.9	Series motors		N/A
	Operating voltage ..... :		—
G.6	**Wire Insulation**		N/A
G.6.1	General	Not used.	N/A
G.6.2	Solvent-based enamel wiring insulation		N/A
G.7	**Mains supply cords**		N/A
G.7.1	General requirements	Not used.	N/A
	Type ..... :		—
	Rated current (A) ..... :		—
	Cross-sectional area (mm^2), (AWG) ..... :		—
G.7.2	Compliance and test method		N/A
G.7.3	Cord anchorages and strain relief for non-detachable power supply cords		N/A
G.7.3.2	Cord strain relief		N/A
G.7.3.2.1	Requirements		N/A
	Strain relief test force (N) ..... :		—
G.7.3.2.2	Strain relief mechanism failure		N/A
G.7.3.2.3	Cord sheath or jacket position, distance (mm) ... :		—
G.7.3.2.4	Strain relief comprised of polymeric material		N/A
G.7.4	Cord Entry ..... :		N/A
G.7.5	Non-detachable cord bend protection		N/A
G.7.5.1	Requirements		N/A
G.7.5.2	Mass (g) ..... :		—
	Diameter (m) ..... :		—
	Temperature (°C) ..... :		—
G.7.6	Supply wiring space		N/A
G.7.6.2	Stranded wire		N/A
G.7.6.2.1	Test with 8 mm strand		N/A
G.8	**Varistors**		N/A
G.8.1	General requirements	Not used.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.8.2	Safeguard against shock		N/A
G.8.3	Safeguard against fire		N/A
G.8.3.2	Varistor overload test ..... :		N/A
G.8.3.3	Temporary overvoltage ..... :		N/A
G.9	**Integrated Circuit (IC) Current Limiters**		N/A
G.9.1 a)	Manufacturer defines limit at max. 5A.	Not used.	N/A
G.9.1 b)	Limiters do not have manual operator or reset		N/A
G.9.1 c)	Supply source does not exceed 250 VA ..... :		—
G.9.1 d)	IC limiter output current (max. 5A) ..... :		—
G.9.1 e)	Manufacturers' defined drift ..... :		—
G.9.2	Test Program 1		N/A
G.9.3	Test Program 2		N/A
G.9.4	Test Program 3		N/A
G.10	**Resistors**		N/A
G.10.1	General requirements	Not used.	N/A
G.10.2	Resistor test		N/A
G.10.3	Test for resistors serving as safeguards between the mains and an external circuit consisting of a coaxial cable		N/A
G.10.3.1	General requirements		N/A
G.10.3.2	Voltage surge test		N/A
G.10.3.3	Impulse test		N/A
G.11	**Capacitor and RC units**		N/A
G.11.1	General requirements	Not used.	N/A
G.11.2	Conditioning of capacitors and RC units		N/A
G.11.3	Rules for selecting capacitors		N/A
G.12	**Optocouplers**		N/A
	Optocouplers comply with IEC 60747-5-5:2007 Spacing or Electric Strength Test (specify option and test results) ..... :	Not used as a safeguard.	N/A
	Type test voltage Vini ..... :		—
	Routine test voltage, Vini,b ..... :		—
G.13	**Printed boards**		N/A
G.13.1	General requirements	Functional insulation only.	N/A
G.13.2	Uncoated printed boards		N/A
G.13.3	Coated printed boards		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
G.13.4	Insulation between conductors on the same inner surface		N/A
	Compliance with cemented joint requirements (Specify construction) ..... :		—
G.13.5	Insulation between conductors on different surfaces		N/A
	Distance through insulation..... :		N/A
	Number of insulation layers (pcs) ..... :		—
G.13.6	Tests on coated printed boards		N/A
G.13.6.1	Sample preparation and preliminary inspection		N/A
G.13.6.2a)	Thermal conditioning		N/A
G.13.6.2b)	Electric strength test		N/A
G.13.6.2c)	Abrasion resistance test		N/A
G.14	**Coating on components terminals**		N/A
G.14.1	Requirements .....:	Not used.	N/A
G.15	**Liquid filled components**		N/A
G.15.1	General requirements	Not used.	N/A
G.15.2	Requirements		N/A
G.15.3	Compliance and test methods		N/A
G.15.3.1	Hydrostatic pressure test		N/A
G.15.3.2	Creep resistance test		N/A
G.15.3.3	Tubing and fittings compatibility test		N/A
G.15.3.4	Vibration test		N/A
G.15.3.5	Thermal cycling test		N/A
G.15.3.6	Force test		N/A
G.15.4	Compliance		N/A
G.16	**IC including capacitor discharge function (ICX)**		N/A
G.16 a)	Humidity treatment in accordance with sc5.4.8 – 120 hours	Not used.	N/A
G.16 b)	Impulse test using circuit 2 with Uc = to transient voltage ..... :		N/A
G.16 C1)	Application of ac voltage at 110% of rated voltage for 2.5 minutes		N/A
G.16 C2)	Test voltage ..... :		—
G.16 D1)	10,000 cycles on and off using capacitor with smallest capacitance resistor with largest resistance specified by manufacturer		N/A
G.16 D2)	Capacitance ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
G.16 D3)	Resistance ..... :		—
H	**CRITERIA FOR TELEPHONE RINGING SIGNALS**		N/A
H.1	General		N/A
H.2	Method A		N/A
H.3	Method B		N/A
H.3.1	Ringing signal		N/A
H.3.1.1	Frequency (Hz) ..... :		—
H.3.1.2	Voltage (V) ..... :		—
H.3.1.3	Cadence; time (s) and voltage (V) ..... :		—
H.3.1.4	Single fault current (mA): ..... :		—
H.3.2	Tripping device and monitoring voltage ..... :		N/A
H.3.2.1	Conditions for use of a tripping device or a monitoring voltage complied with		N/A
H.3.2.2	Tripping device		N/A
H.3.2.3	Monitoring voltage (V) ..... :		—
J	**INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION**		N/A
	General requirements		N/A
K	**SAFETY INTERLOCKS**		N/A
K.1	General requirements	Not used.	N/A
K.2	Components of safety interlock safeguard mechanism		N/A
K.3	Inadvertent change of operating mode		N/A
K.4	Interlock safeguard override		N/A
K.5	Fail-safe		N/A
	Compliance ..... :		N/A
K.6	Mechanically operated safety interlocks		N/A
K.6.1	Endurance requirement		N/A
K.6.2	Compliance and Test method ..... :		N/A
K.7	Interlock circuit isolation		N/A
K.7.1	Separation distance for contact gaps & interlock circuit elements (type and circuit location) ..... :		N/A
K.7.2	Overload test, Current (A) ..... :		N/A
K.7.3	Endurance test		N/A
K.7.4	Electric strength test ..... :		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
L	**DISCONNECT DEVICES**		N/A
L.1	General requirements	Building-in component. Shall be evaluated in end-product.	N/A
L.2	Permanently connected equipment		N/A
L.3	Parts that remain energized		N/A
L.4	Single phase equipment		N/A
L.5	Three-phase equipment		N/A
L.6	Switches as disconnect devices		N/A
L.7	Plugs as disconnect devices		N/A
L.8	Multiple power sources		N/A
M	**EQUIPMENT CONTAINING BATTERIES AND THEIR PROTECTION CIRCUITS**		N/A
M.1	General requirements	No batteries provided.	N/A
M.2	Safety of batteries and their cells		N/A
M.2.1	Requirements		N/A
M.2.2	Compliance and test method (identify method) .. :		N/A
M.3	Protection circuits		N/A
M.3.1	Requirements		N/A
M.3.2	Tests		N/A
	- Overcharging of a rechargeable battery		N/A
	- Unintentional charging of a non-rechargeable battery		N/A
	- Reverse charging of a rechargeable battery		N/A
	- Excessive discharging rate for any battery		N/A
M.3.3	Compliance ..... :		N/A
M.4	Additional safeguards for equipment containing secondary lithium battery		N/A
M.4.1	General		N/A
M.4.2	Charging safeguards		N/A
M.4.2.1	Charging operating limits		N/A
M.4.2.2a)	Charging voltage, current and temperature ..... :		—
M.4.2.2 b)	Single faults in charging circuitry ..... :		—
M.4.3	Fire Enclosure		N/A
M.4.4	Endurance of equipment containing a secondary lithium battery		N/A
M.4.4.2	Preparation		N/A
M.4.4.3	Drop and charge/discharge function tests		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Drop		N/A
	Charge		N/A
	Discharge		N/A
M.4.4.4	Charge-discharge cycle test		N/A
M.4.4.5	Result of charge-discharge cycle test		N/A
M.5	Risk of burn due to short circuit during carrying		N/A
M.5.1	Requirement		N/A
M.5.2	Compliance and Test Method (Test of P.2.3)		N/A
M.6	Prevention of short circuits and protection from other effects of electric current		N/A
M.6.1	Short circuits		N/A
M.6.1.1	General requirements		N/A
M.6.1.2	Test method to simulate an internal fault		N/A
M.6.1.3	Compliance (Specify M.6.1.2 or alternative method) ..... :		N/A
M.6.2	Leakage current (mA) ..... :		N/A
M.7	Risk of explosion from lead acid and NiCd batteries		N/A
M.7.1	Ventilation preventing explosive gas concentration		N/A
M.7.2	Compliance and test method		N/A
M.8	Protection against internal ignition from external spark sources of lead acid batteries		N/A
M.8.1	General requirements		N/A
M.8.2	Test method		N/A
M.8.2.1	General requirements		N/A
M.8.2.2	Estimation of hypothetical volume *Vz* (m^3/s) ..... :		—
M.8.2.3	Correction factors ..... :		—
M.8.2.4	Calculation of distance *d* (mm) ..... :		—
M.9	Preventing electrolyte spillage		N/A
M.9.1	Protection from electrolyte spillage		N/A
M.9.2	Tray for preventing electrolyte spillage		N/A
M.10	Instructions to prevent reasonably foreseeable misuse (Determination of compliance: inspection, data review; or abnormal testing) ..... :		N/A
N	**ELECTROCHEMICAL POTENTIALS**		N/A
	Metal(s) used ..... :		—

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
O	**MEASUREMENT OF CREEPAGE DISTANCES AND CLEARANCES**		N/A
	Figures O.1 to O.20 of this Annex applied..... :	Functional insulation only.	—
P	**SAFEGUARDS AGAINST ENTRY OF FOREIGN OBJECTS AND SPILLAGE OF INTERNAL LIQUIDS**		N/A
P.1	General requirements	Building-in component. Shall be evaluated in end-product.	N/A
P.2.2	Safeguards against entry of foreign object		N/A
	Location and Dimensions (mm) ..... :		—
P.2.3	Safeguard against the consequences of entry of foreign object		N/A
P.2.3.1	Safeguards against the entry of a foreign object		N/A
	Openings in transportable equipment		N/A
	Transportable equipment with metalized plastic parts ..... :		N/A
P.2.3.2	Openings in transportable equipment in relation to metallized parts of a barrier or enclosure (identification of supplementary safeguard) ..... :		N/A
P.3	Safeguards against spillage of internal liquids		N/A
P.3.1	General requirements		N/A
P.3.2	Determination of spillage consequences		N/A
P.3.3	Spillage safeguards		N/A
P.3.4	Safeguards effectiveness		N/A
P.4	Metallized coatings and adhesive securing parts		N/A
P.4.2 a)	Conditioning testing		N/A
	Tc (°C)..... :		—
	Tr (°C) ..... :		—
	Ta (°C) ..... :		—
P.4.2 b)	Abrasion testing ..... :		N/A
P.4.2 c)	Mechanical strength testing ..... :		N/A
Q	**CIRCUITS INTENDED FOR INTERCONNECTION WITH BUILDING WIRING**		N/A
Q.1	Limited power sources	Not considered.	N/A
Q.1.1 a)	Inherently limited output		N/A
Q.1.1 b)	Impedance limited output		N/A
	- Regulating network limited output under normal operating and simulated single fault condition		N/A
Q.1.1 c)	Overcurrent protective device limited output		N/A
Q.1.1 d)	IC current limiter complying with G.9		N/A
Q.1.2	Compliance and test method		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
Q.2	Test for external circuits – paired conductor cable		N/A
	Maximum output current (A) ..... :		—
	Current limiting method..... :		—
R	**LIMITED SHORT CIRCUIT TEST**		N/A
R.1	General requirements		N/A
R.2	Determination of the overcurrent protective device and circuit		N/A
R.3	Test method Supply voltage (V) and short-circuit current (A)). ..... :		N/A
S	**TESTS FOR RESISTANCE TO HEAT AND FIRE**		N/A
S.1	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material ..... :		—
	Wall thickness (mm) ..... :		—
	Conditioning (°C) ..... :		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	- Material not consumed completely		N/A
	- Material extinguishes within 30s		N/A
	- No burning of layer or wrapping tissue		N/A
S.2	Flammability test for fire enclosure and fire barrier integrity		N/A
	Samples, material ..... :		—
	Wall thickness (mm) ..... :		—
	Conditioning (°C) ..... :		—
	Test flame according to IEC 60695-11-5 with conditions as set out		N/A
	Test specimen does not show any additional hole		N/A
S.3	Flammability test for the bottom of a fire enclosure		N/A
	Samples, material ..... :		—
	Wall thickness (mm) ..... :		—
	Cheesecloth did not ignite		N/A
S.4	Flammability classification of materials		N/A
S.5	Flammability test for fire enclosures and fire barrier materials of equipment where the steady state power does not exceed 4 000 W		N/A
	Samples, material ..... :		—

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Wall thickness (mm) ..... :		—
	Conditioning (test condition), (°C)..... :		—
	Test flame according to IEC 60695-11-20 with conditions as set out		N/A
	After every test specimen was not consumed completely		N/A
	After fifth flame application, flame extinguished within 1 min		N/A
T	**MECHANICAL STRENGTH TESTS**		N/A
T.1	General requirements		N/A
T.2	Steady force test, 10 N ..... :	Functional Insulation only.	N/A
T.3	Steady force test, 30 N ..... :		N/A
T.4	Steady force test, 100 N ..... :		N/A
T.5	Steady force test, 250 N ..... :		N/A
T.6	Enclosure impact test		N/A
	Fall test		N/A
	Swing test		N/A
T.7	Drop test ..... :		N/A
T.8	Stress relief test ..... :		N/A
T.9	Impact Test (glass)		N/A
T.9.1	General requirements		N/A
T.9.2	Impact test and compliance		N/A
	Impact energy (J) ..... :		—
	Height (m)..... :		—
T.10	Glass fragmentation test..... :		N/A
T.11	Test for telescoping or rod antennas		N/A
	Torque value (Nm) ..... :		—
U	**MECHANICAL STRENGTH OF CATHODE RAY TUBES (CRT) AND PROTECTION AGAINST THE EFECTS OF IMPLOSION**		N/A
U.1	General requirements		N/A
U.2	Compliance and test method for non-intrinsically protected CRTs		N/A
U.3	Protective Screen ..... :		N/A
V	**DETERMINATION OF ACCESSIBLE PARTS (FINGERS, PROBES AND WEDGES)**		N/A
V.1	Accessible parts of equipment		N/A
V.2	Accessible part criterion		N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.1.2	TABLE: list of critical components and materials	Pass

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Case	Interchangeable	Interchangeable	Brass, Overall 25.1 by 25.1 mm, 0.3 mm thick.	--	--
Potting Compound	Interchangeable	Interchangeable	Silicone, Minimum V-2, Minimum 150 °C	UL 94	UL
Printed Wiring Board (P1, P2 board)	Interchangeable	Interchangeable	Minimum V-1, minimum 130 °C	UL 796	UL
Transformer (T1) for MGFS40053R3, MGFS400505	Cosel Co., Ltd.	17M041	Designed with PWB Traces. (Winding: In 2T, Out 2T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS400512	Cosel Co., Ltd.	17M051	Designed with PWB Traces. (Winding: In 2T, Out 5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS400515	Cosel Co., Ltd.	17M061	Designed with PWB Traces. (Winding: In 2T, Out 6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW400512	Cosel Co., Ltd.	17M151	Designed with PWB Traces. (Winding: In 2T, Out 5/5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW400515	Cosel Co., Ltd.	17M161	Designed with PWB Traces. (Winding: In 2T, Out 6/6T)	IEC 62368-1:2004	-- , Tested in unit.
Transformer (T1) for MGFS40243R3, MGFS402405	Cosel Co., Ltd.	17M081	Designed with PWB Traces. (Winding: In 4T, Out 2T)	IEC 62368-1:2004	-- , Tested in unit.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Transformer (T1) for MGFS402412	Cosel Co., Ltd.	17M091	Designed with PWB Traces. (Winding: In 4T, Out 5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS402415	Cosel Co., Ltd.	17M101	Designed with PWB Traces. (Winding: In 4T, Out 6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW402412	Cosel Co., Ltd.	17M171	Designed with PWB Traces. (Winding: In 4T, Out 5/5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW402415	Cosel Co., Ltd.	17M181	Designed with PWB Traces. (Winding: In 4T, Out 6/6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS40483R3, MGFS404805	Cosel Co., Ltd.	17M121	Designed with PWB Traces. (Winding: In 8T, Out 2T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS404812	Cosel Co., Ltd.	17M131	Designed with PWB Traces. (Winding: In 8T, Out 5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFS404815	Cosel Co., Ltd.	17M141	Designed with PWB Traces. (Winding: In 8T, Out 6T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW404812	Cosel Co., Ltd.	17M191	Designed with PWB Traces. (Winding: In 8T, Out 5/5T)	IEC 62368-1:2004	Tested in unit.
Transformer (T1) for MGFW404815	Cosel Co., Ltd.	17M201	Designed with PWB Traces. (Winding: In 8T, Out 6/6T)	IEC 62368-1:2004	Tested in unit.
FET (TR101) for MGFw4005z	Interchangeable	Interchangeable	Minimum 40 V, Minimum 100 A	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
FET (TR101) for MGFw4024z	Interchangeable	Interchangeable	Minimum 80 V, Minimum 44 A	--	--
FET (TR101) for MGFw4048z	Interchangeable	Interchangeable	Minimum 150 V, Minimum 29 A	--	--
FET (TR141) for MGFw4024z	Interchangeable	Interchangeable	Minimum 60 V, Minimum 6 A	--	--
FET (TR141) for MGFw4048z	Interchangeable	Interchangeable	Minimum 100 V, Minimum 3.3 A	--	--
Thermistor (TH101)	Mitsubishi Materials Corporation	TD05-3H103	10 kohm at 25 °C	IEC 62368-1:2004	Tested in unit.
- Description:					
--	--	--	--	--	-- , --

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.

2) Description line content is optional. Main line description needs to clearly detail the component used for testing

3) The CBTL has verified the component information

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.8.4, 4.8.5	**TABLE: Lithium coin/button cell batteries mechanical tests**		N/A
(The following mechanical tests are conducted in the sequence noted.)			
4.8.4.2	**TABLE: Stress Relief test**		—
Part	**Material**	**Oven Temperature (°C)**	**Comments**
4.8.4.3	**TABLE: Battery replacement test**		—
Battery part no. ..... :			—
Battery Installation/withdrawal		Battery Installation/Removal Cycle	Comments
		1	
		2	
		3	
		4	
		5	
		6	
		8	
		9	
		10	
4.8.4.4	**TABLE: Drop test**		—
Impact Area	Drop Distance	Drop No.	Observations
		1	
		2	
		3	
4.8.4.5	**TABLE: Impact**		—
Impacts per surface	**Surface tested**	**Impact energy (Nm)**	**Comments**
4.8.4.6	**TABLE: Crush test**		—
Test position	**Surface tested**	**Crushing Force (N)**	**Duration force applied (s)**
Supplementary information:			

4.8.5	**TABLE: Lithium coin/button cell batteries mechanical test result**	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Test position	Surface tested	Force (N)	Duration force applied (s)
Supplementary information:			

5.2	Table: Classification of electrical energy sources						Pass
5.2.2.2 – Steady State Voltage and Current conditions							
No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				U (Vrms or Vpk)	I (Apk or Arms)	Hz	
1	76 Vdc	Output (+Vout) of model MGFS404815 (*1) (*2)	Normal	16.5 Vdc	--	--	ES1
			Abnormal - External Variable Resistor maximum	17.3 Vdc	--	--	
			Abnormal - Output overload	15.0 Vdc	--	--	
			Single fault – TR101 D to S, SC	6.0 Vdc	--	--	
			Single fault – TR101 D to G, SC (*4)	8.0 Vdc	--	--	
			Single fault – T1 Pin 1 to 2, SC (*4)	19.2 Vpk	--	--	
			Single fault – T1 Pin 1 to 3, SC (*4)	5.6 Vdc	--	--	
			Single fault – T1 Pin 1 to 4, SC (*4)	8.0 Vdc	--	--	
			Single fault – T1 Pin 2 to 3, SC (*4)	5.6 Vdc	--	--	
			Single fault – T1 Pin 2 to 4, SC (*4)	10.0 Vdc	--	--	
			Single fault – T1 Pin 3 to 4, SC (*4)	16.5 Vdc	--	--	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	Table: Classification of electrical energy sources						Pass
			Single fault – PC201 Input side, SC	4.5 Vdc	--	--	
			Single fault – PC201 Output side, SC	21.9 Vpk	--	--	
			Single fault – L501, SC (*4)	16.5 Vdc	--	--	
			Single fault – TR501 D to S, SC (*4)	6.0 Vpk	--	--	
2	76 Vdc	Output (+Vout) of model MGFW404815 (*3)	Normal	15.0 Vdc	--	--	ES1
			Abnormal	15.0 Vdc	--	--	
			Single fault – T1 Pin 1 to 5, SC	26.0 Vpk	--	--	
			Single fault – T1 Pin 1 to 6, SC	26.4 Vpk	--	--	
			Single fault – T1 Pin 2 to 5, SC	32.0 Vpk	--	--	
			Single fault – T1 Pin 2 to 6, SC	27.0 Vpk	--	--	
			Single fault – T1 Pin 5 to 6, SC	22.6 Vpk	--	--	
			Single fault – TR511 D to S, SC	7.0 Vdc	--	--	
			Single fault – PC201 Input side, SC	10.0 Vdc	--	--	
			Single fault – PC201 Output side, SC	26.0 Vpk	--	--	
			Single fault – TR101 D to S, SC	11.0 Vdc	--	--	
3	76 Vdc	Output (-Vout) of model MGFW404815 (*3)	Normal	15.0 Vdc	--	--	ES1
			Abnormal	14.7 Vdc	--	--	
			Single fault – T1 Pin 1 to 5, SC	29.0 Vpk	--	--	
			Single fault – T1 Pin 5 to 6, SC	19.6 Vpk	--	--	
			Single fault – L511, SC	15.0 Vdc	--	--	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	Table: Classification of electrical energy sources						Pass
			Single fault – TR511 D to S, SC	14.0 Vpk	--	--	
			Single fault – PC201 Input side, SC	3.0 Vdc	--	--	
			Single fault – PC201 Output side, SC	25.0 Vpk	--	--	
			Single fault – TR101 D to S, SC	2.0 Vdc	--	--	
4	76 Vdc	T1 Pin1 to - Vin of model MGFS404815 (*5)	Normal	76.8 Vdc	--	--	
			Abnormal	--	--	--	
			Single fault – TR141 D to S, SC	76.6 Vdc	--	--	ES2
			Single fault – TR141 D to G, SC	84.8 Vdc	--	--	
5	76 Vdc	T1 Pin2 to - Vin of model MGFS404815 (*5)	Normal	113 Vpk	--	386.8 KHz	
			Abnormal	--	--	--	
			Single fault – TR101 D to S, SC	0 Vdc	--	--	ES2
			Single fault – TR101 D to G, SC	1.0 Vdc	--	--	

5.2.2.3 - Capacitance Limits

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters		ES Class
				Capacitance, nF	Upk (V)	
--	--	--	Normal	--	--	--
			Abnormal	--	--	
			Single fault – SC/OC	--	--	

5.2.2.4 - Single Pulses

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Duration (ms)	Upk (V)	Ipk (mA)	
1	76 Vdc	Output (-Vout) of model	Normal	--	--	--	ES2
			Abnormal	--	--	--	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.2	Table: Classification of electrical energy sources						Pass
		MGFW404815 (*3)	Single fault – T1 Pin 1 to 6, SC	Less than 200ms	75.2 Vpk	--	
			Single fault – T1 Pin 2 to 5, SC	Less than 200ms	55.0 Vpk	--	
			Single fault – T1 Pin 2 to 6, SC	Less than 100ms	74.0 Vpk	--	

5.2.2.5 - Repetitive Pulses

No.	Supply Voltage	Location (e.g. circuit designation)	Test conditions	Parameters			ES Class
				Off time (ms)	Upk (V)	Ipk (mA)	
--	--	--	Normal	--	--	--	--
			Abnormal	--	--	--	
			Single fault – SC/OC	--	--	--	

Test Conditions:

Normal –

Abnormal -

Supplementary information: SC=Short Circuit, OC=Short Circuit

(*1) Maximum voltage within output voltage range.

(*2) Model MGFS404815 is representative of MGFS40yz because the circuit configuration is the same all other models of MGFS40yz.

(*3) Model MGFW404815 is representative of MGFW40yz because the circuit configuration is the same all other models of MGFW40yz.

(*4) This test was representative of +Vout of Model MGFW40yz because the circuit configuration is the same.

(*5) Model MGFS404815 is representative of MGFw40yz because the input side circuit configuration is the same all other models of MGFw40yz.

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.4.1.4, 6.3.2, 9.0, B.2.6	**TABLE: Temperature measurements**					N/A
	Supply voltage (V) ..... :	See below	See below	See below	See below	—
	Ambient T_{min} (°C) ..... :	See below	See below	See below	See below	—
	Ambient T_{max} (°C) ..... :	See below	See below	See below	See below	—
	Tma (°C) ..... :	See below	See below	See below	See below	—
Maximum measured temperature T of part/at:		T (°C)				Allowed T_{max} (°C)
Maximum operating temperatures for materials, components and systems		---	---	---	---	---
Model MGFS40053R3		--	--	--	--	--
Input voltage (Vdc)		4.5	4.5	13	13	--
Output load		100% (3.3V/ 8A)	100% (3.3V/ 8A)	100% (3.3V/ 8A)	100% (3.3V/ 8A)	--
Ambient (C)		23	Calculated at 110	23	Calculated at 110	--
Center of the Case (Reference point)		85	110	62	110	--
PWB near TR101 (P2 board)		105	130	73	121	130 (PWB)
PWB near TR501 (P2 board)		98	123	70	118	130 (PWB)
PWB T1 Input side (P2 board)		98	123	68	116	130 (PWB)
PWB T1 Output side (P2 board)		98	123	69	117	130 (PWB)
PWB near R227 (P1 board)		93	118	67	115	130 (PWB)
PWB near C901 (P1 board)		84	109	61	115	130 (PWB)
Test Duration		2 hours	--	2 hours	--	--
Model MGFS400515		--	--	--	--	--
Input voltage (Vdc)		4.5	4.5	13	13	--
Output load		100% (15V/ 2A)	100% (15V/ 2A)	100% (15V/ 2A)	100% (15V/ 2A)	--
Ambient (C)		23	Calculated at 110	23	Calculated at 110	--
Center of the Case (Reference point)		78	110	62	110	--

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Clause	Requirement + Test	Result - Remark	Verdict

PWB near TR101 (P2 board)	92	124	72	120	130 (PWB)
PWB near TR501 (P2 board)	89	121	70	118	130 (PWB)
PWB T1 Input side (P2 board)	87	119	67	115	130 (PWB)
PWB T1 Output side (P2 board)	86	118	67	115	130 (PWB)
PWB near R227 (P1 board)	86	118	69	117	130 (PWB)
PWB near C901 (P1 board)	75	107	60	108	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Model MGFW400512	--	--	--	--	--
Input voltage (Vdc)	4.5	4.5	13	13	--
Output load	100% (+12V/ 1.3A, -12V/ 1.3A)	100% (+12V/ 1.3A, -12V/ 1.3A)	100% (+12V/ 1.3A, -12V/ 1.3A)	100% (+12V/ 1.3A, -12V/ 1.3A)	--
Ambient (C)	24	Calculated at 110	24	Calculated at 110	--
Center of the Case (Reference point)	90	110	69	110	--
PWB near TR101 (P2 board)	107	127	80	121	130 (PWB)
PWB near TR501 (P2 board)	106	126	80	121	130 (PWB)
PWB T1 Input side (P2 board)	104	124	76	117	130 (PWB)
PWB T1 Output side (P2 board)	103	124	77	118	130 (PWB)
PWB near R227 (P1 board)	98	118	75	116	130 (PWB)
PWB near C901 (P1 board)	94	114	72	113	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Model MGFS40243R3	--	--	--	--	--
Input voltage (Vdc)	9	9	18	18	--
Output load	70% (5V/ 5.6A)	70% (5V/ 5.6A)	100% (5V/ 8A)	100% (5V/ 8A)	--
Ambient (C)	21	Calculated at 110	21	Calculated at 110	--
Center of the Case (Reference point)	54	110	66	110	--

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Clause	Requirement + Test	Result - Remark	Verdict

PWB near TR101 (P2 board)	63	119	78	122	130 (PWB)
PWB near TR501 (P2 board)	64	120	80	124	130 (PWB)
PWB T1 Input side (P2 board)	62	118	76	120	130 (PWB)
PWB T1 Output side (P2 board)	62	118	78	122	130 (PWB)
PWB near R227 (P1 board)	60	116	73	117	130 (PWB)
PWB near C901 (P1 board)	57	113	72	116	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (5V/ 8A)	100% (5V/ 8A)	--	--	--
Ambient (C)	21	Calculated at 110	--	--	--
Center of the Case (Reference point)	62	110	--	--	--
PWB near TR101 (P2 board)	74	122	--	--	130 (PWB)
PWB near TR501 (P2 board)	75	123	--	--	130 (PWB)
PWB T1 Input side (P2 board)	71	119	--	--	130 (PWB)
PWB T1 Output side (P2 board)	73	121	--	--	130 (PWB)
PWB near R227 (P1 board)	69	117	--	--	130 (PWB)
PWB near C901 (P1 board)	68	116	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFS402412	--	--	--	--	--
Input voltage (Vdc)	9	9	18	18	--
Output load	70% (12V/ 3.38A)	70% (12V/ 3.38A)	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--
Ambient (C)	20	Calculated at 110	23	Calculated at 110	--
Center of the Case (Reference point)	61	110	69	110	--
PWB near TR101 (P2 board)	72	121	82	123	130 (PWB)

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Clause	Requirement + Test	Result - Remark	Verdict

PWB near TR501 (P2 board)	71	120	82	123	130 (PWB)
PWB T1 Input side (P2 board)	70	119	79	120	130 (PWB)
PWB T1 Output side (P2 board)	69	118	79	120	130 (PWB)
PWB near R227 (P1 board)	69	118	79	120	130 (PWB)
PWB near C901 (P1 board)	63	112	73	114	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	65	110	--	--	--
PWB near TR101 (P2 board)	77	122	--	--	130 (PWB)
PWB near TR501 (P2 board)	76	121	--	--	130 (PWB)
PWB T1 Input side (P2 board)	74	119	--	--	130 (PWB)
PWB T1 Output side (P2 board)	74	119	--	--	130 (PWB)
PWB near R227 (P1 board)	74	119	--	--	130 (PWB)
PWB near C901 (P1 board)	68	113	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFW402415	--	--	--	--	--
Input voltage (Vdc)	9	9	18	18	--
Output load	70% (+15V/ 0.98A, -15V/ 0.98A)	70% (+15V/ 0.98A, -15V/ 0.98A)	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--
Ambient (C)	21	Calculated at 110	22	Calculated at 110	--
Center of the Case (Reference point)	61	110	68	110	--
PWB near TR101 (P2 board)	69	118	78	120	130 (PWB)

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Clause	Requirement + Test	Result - Remark	Verdict

PWB near TR501 (P2 board)	68	117	78	120	130 (PWB)
PWB T1 Input side (P2 board)	66	115	75	117	130 (PWB)
PWB T1 Output side (P2 board)	65	114	75	117	130 (PWB)
PWB near R227 (P1 board)	64	113	72	114	130 (PWB)
PWB near C901 (P1 board)	60	109	69	111	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	36	36	--	--	--
Output load	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	63	110	--	--	--
PWB near TR101 (P2 board)	72	119	--	--	130 (PWB)
PWB near TR501 (P2 board)	72	119	--	--	130 (PWB)
PWB T1 Input side (P2 board)	69	116	--	--	130 (PWB)
PWB T1 Output side (P2 board)	69	116	--	--	130 (PWB)
PWB near R227 (P1 board)	67	114	--	--	130 (PWB)
PWB near C901 (P1 board)	63	110	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFS40483R3	--	--	--	--	--
Input voltage (Vdc)	18	18	36	36	--
Output load	70% (3.3V/ 7A)	70% (3.3V/ 7A)	100% (3.3V/ 10A)	100% (3.3V/ 10A)	--
Ambient (C)	20	Calculated at 110	20	Calculated at 110	--
Center of the Case (Reference point)	54	110	67	110	--
PWB near TR101 (P2 board)	59	115	74	117	130 (PWB)

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Clause	Requirement + Test	Result - Remark	Verdict

PWB near TR501 (P2 board)	59	115	78	121	130 (PWB)
PWB T1 Input side (P2 board)	56	112	70	113	130 (PWB)
PWB T1 Output side (P2 board)	56	112	72	115	130 (PWB)
PWB near R227 (P1 board)	53	109	66	109	130 (PWB)
PWB near C901 (P1 board)	56	112	72	115	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	76	76	--	--	--
Output load	100% (3.3V/ 10A)	100% (3.3V/ 10A)	--	--	--
Ambient (C)	20	Calculated at 110	--	--	--
Center of the Case (Reference point)	66	110	--	--	--
PWB near TR101 (P2 board)	74	118	--	--	130 (PWB)
PWB near TR501 (P2 board)	54	98	--	--	130 (PWB)
PWB T1 Input side (P2 board)	69	113	--	--	130 (PWB)
PWB T1 Output side (P2 board)	71	115	--	--	130 (PWB)
PWB near R227 (P1 board)	66	110	--	--	130 (PWB)
PWB near C901 (P1 board)	71	115	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFS404812	--	--	--	--	--
Input voltage (Vdc)	18	18	36	36	--
Output load	70% (12V/ 3.38A)	70% (12V/ 3.38A)	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--
Ambient (C)	20	Calculated at 110	21	Calculated at 110	--
Center of the Case (Reference point)	62	110	74	110	--
PWB near TR101 (P2 board)	71	119	85	121	130 (PWB)
PWB near TR501 (P2 board)	68	116	83	119	130 (PWB)

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Clause	Requirement + Test	Result - Remark	Verdict

PWB T1 Input side (P2 board)	66	114	79	115	130 (PWB)
PWB T1 Output side (P2 board)	67	115	80	116	130 (PWB)
PWB near R227 (P1 board)	62	110	74	110	130 (PWB)
PWB near C901 (P1 board)	61	109	74	110	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	76	76	--	--	--
Output load	100% (12V/ 3.4A)	100% (12V/ 3.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	73	110	--	--	--
PWB near TR101 (P2 board)	84	121	--	--	130 (PWB)
PWB near TR501 (P2 board)	82	119	--	--	130 (PWB)
PWB T1 Input side (P2 board)	78	115	--	--	130 (PWB)
PWB T1 Output side (P2 board)	79	116	--	--	130 (PWB)
PWB near R227 (P1 board)	74	111	--	--	130 (PWB)
PWB near C901 (P1 board)	73	110	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Model MGFW404815	--	--	--	--	--
Input voltage (Vdc)	18	18	36	36	--
Output load	70% (+15V/ 0.98A, -15V/ 0.98A)	70% (+15V/ 0.98A, -15V/ 0.98A)	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--
Ambient (C)	20	Calculated at 110	21	Calculated at 110	--
Center of the Case (Reference point)	54	110	65	110	--
PWB near TR101 (P2 board)	61	117	75	120	130 (PWB)
PWB near TR501 (P2 board)	59	115	73	118	130 (PWB)

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Clause	Requirement + Test	Result - Remark	Verdict

PWB T1 Input side (P2 board)	59	115	72	117	130 (PWB)
PWB T1 Output side (P2 board)	57	113	71	116	130 (PWB)
PWB near R227 (P1 board)	55	111	67	112	130 (PWB)
PWB near C901 (P1 board)	54	110	66	111	130 (PWB)
Test Duration	2 hours	--	2 hours	--	--
Input voltage (Vdc)	76	76	--	--	--
Output load	100% (+15V/ 1.4A, -15V/ 1.4A)	100% (+15V/ 1.4A, -15V/ 1.4A)	--	--	--
Ambient (C)	22	Calculated at 110	--	--	--
Center of the Case (Reference point)	67	110	--	--	--
PWB near TR101 (P2 board)	77	120	--	--	130 (PWB)
PWB near TR501 (P2 board)	74	117	--	--	130 (PWB)
PWB T1 Input side (P2 board)	74	117	--	--	130 (PWB)
PWB T1 Output side (P2 board)	72	115	--	--	130 (PWB)
PWB near R227 (P1 board)	70	113	--	--	130 (PWB)
PWB near C901 (P1 board)	67	110	--	--	130 (PWB)
Test Duration	2 hours	--	--	--	--
Abnormal Operating Conditions: Output overload	---	---	---	---	---
Model (Output terminal)	Model MGFS40053R3 (+Vout)	Model MGFS40053R3 (+Vout)	Model MGFS400515 (+Vout)	Model MGFS400515 (+Vout)	--
Input voltage (Vdc)	4.5	4.5	4.5	4.5	--
Ambient (C)	20	Tma = 85	18	Tma = 85	--
PWB near TR101 (P2 board)	125	190	119	186	300
PWB T1 Input side (P2 board)	124	189	114	181	300
PWB T1 Output side (P2 board)	123	188	111	178	300

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Clause	Requirement + Test	Result - Remark	Verdict

Model (Output terminal)	Model MGFW40 0515 (+Vout)	Model MGFW40 0515 (+Vout)	Model MGFW40 0515 (-Vout)	Model MGFW400 515 (-Vout)	--
Input voltage (Vdc)	4.5	4.5	4.5	4.5	--
Ambient (C)	20	Tma = 85	21	Tma = 85	--
PWB near TR101 (P2 board)	133	198	133	197	300
PWB T1 Input side (P2 board)	126	191	126	190	300
PWB T1 Output side (P2 board)	122	187	123	187	300
Model (Output terminal)	Model MGFS404 83R3 (+Vout)	Model MGFS404 83R3 (+Vout)	Model MGFS404 815 (+Vout)	Model MGFS404 815 (+Vout)	--
Input voltage (Vdc)	36 Vdc	36 Vdc	36 Vdc	36 Vdc	--
Ambient (C)	18	Tma = 85	18	Tma = 85	--
PWB near TR101 (P2 board)	97	134	134	201	300
PWB T1 Input side (P2 board)	92	159	127	194	300
PWB T1 Output side (P2 board)	95	162	126	193	300
Model (Output terminal)	Model MGFW40 4815 (+Vout)	Model MGFW40 4815 (+Vout)	Model MGFW40 4815 (-Vout)	Model MGFW404 815 (-Vout)	--
Input voltage (Vdc)	36	36	36	36	--
Ambient (C)	19	Tma = 85	20	Tma = 85	--
PWB near TR101 (P2 board)	105	171	109	174	300
PWB T1 Input side (P2 board)	102	168	103	168	300
PWB T1 Output side (P2 board)	99	165	104	169	300

Supplementary information:

The models tested were considered representative of the entire series because the construction is the same all other models.

The representative models were considered based on specifications of maximum VA and/or maximum output current.

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 (Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class
N/A	--	--	--	--	--	--	--

Supplementary information:

Note 1: Tma should be considered as directed by applicable requirement

Note 2: Tma is not included in assessment of Touch Temperatures (Clause 9)

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Clause	Requirement + Test	Result - Remark	Verdict

5.4.1.10.2	TABLE: Vicat softening temperature of thermoplastics		N/A
Penetration (mm)....:			—
Object/ Part No./Material	Manufacturer/trademark	T softening (°C)	
supplementary information:			

5.4.1.10.3	TABLE: Ball pressure test of thermoplastics		N/A
Allowed impression diameter (mm) ....:	≤ 2 mm		—
Object/Part No./Material	Manufacturer/trademark	Test temperature (°C)	Impression diameter (mm)
Supplementary information:			

5.4.2.2, 5.4.2.4 and 5.4.3	TABLE: Minimum Clearances/Creepage distance						N/A
Clearance (cl) and creepage distance (cr) at/of/between:	Up (V)	U r.m.s. (V)	Frequency (kHz)[1]	Required cl (mm)	cl (mm) [2]	Required[3] cr (mm)	cr (mm)
Supplementary information:							
Note 1: Only for frequency above 30 kHz Note 2: See table 5.4.2.4 if this is based on electric strength test Note 3: Provide Material Group							

5.4.2.3	TABLE: Minimum Clearances distances using required withstand voltage			N/A
	Overvoltage Category (OV):			
	Pollution Degree:			
Clearance distanced between:	Required withstand voltage	Required cl (mm)	Measured cl (mm)	
Supplementary information:				

5.4.2.4	TABLE: Clearances based on electric strength test			N/A
Test voltage applied between:	Required cl (mm)	Test voltage (kV) peak/ r.m.s. / d.c.	Breakdown Yes / No	

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:			

5.4.4.2, 5.4.4.5 c) 5.4.4.9	**TABLE: Distance through insulation measurements**				N/A
Distance through insulation di at/of:	Peak voltage (V)	Frequency (kHz)	Material	Required DTI (mm)	DTI (mm)
Supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict

5.4.9	TABLE: Electric strength tests			N/A
Test voltage applied between:		Voltage shape (AC, DC)	Test voltage (V)	Breakdown Yes / No
Functional:				
Basic/supplementary:				
Reinforced:				
Routine Tests:				
Supplementary information:				

5.5.2.2	TABLE: Stored discharge on capacitors				N/A
Supply Voltage (V), Hz	Test Location	Operating Condition (N, S)	Switch position On or off	Measured Voltage (after 2 seconds)	ES Classification
Supplementary information:					

X-capacitors installed for testing are:

☐ bleeding resistor rating:

☐ ICX:

Notes:

A. Test Location:

Phase to Neutral; Phase to Phase; Phase to Earth; and/or Neutral to Earth

B. Operating condition abbreviations:

N – Normal operating condition (e.g., normal operation, or open fuse); S –Single fault condition

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

5.6.6.2	TABLE: Resistance of protective conductors and terminations				N/A
Accessible part		Test current (A)	Duration (min)	Voltage drop (V)	Resistance (Ω)
Supplementary information:					

5.7.2.2, 5.7.4	TABLE: Earthed accessible conductive part		N/A
Supply voltage .....:			—
Location		Test conditions specified in 6.1 of IEC 60990 or Fault Condition No in IEC 60990 clause 6.2.2.1 through 6.2.2.8, except for 6.2.2.7	Touch current (mA)
		1	
		2*	
		3	
		4	
		5	
		6	
		8	
Supplementary Information:			
Notes:[1] Supply voltage is the anticipated maximum Touch Voltage [2] Earthed neutral conductor [Voltage differences less than 1% or more] [3] Specify method used for measurement as described in IEC 60990 sub-clause 4.3 [4] IEC60990, sub-clause 6.2.2.7, Fault 7 not applicable. [5] (*) IEC60990, sub-clause 6.2.2.2 is not applicable if switch or disconnect device (e.g., appliance coupler) provided.			

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Clause	Requirement + Test	Result - Remark	Verdict

6.2.2	Table: Electrical power sources (PS) measurements for classification				Pass
Source	Description	Measurement	Max Power after 3 s	Max Power after 5 s*)	PS Classification
A	Output (+Vout) of model MGFS40243R3 (*1) (*2)	Power (W) :	--	41.652	PS2
		V_A (V) :	--	3.56	
		I_A (A) :	--	11.70	
B	Output (+Vout) of model MGFS402412 (*1) (*2)	Power (W) :	--	54.12	PS2
		V_A (V) :	--	13.2	
		I_A (A) :	--	4.1	
C	Output (+Vout) of model MGFS402415 (*1) (*2)	Power (W) :	--	51.15	PS2
		V_A (V) :	--	16.5	
		I_A (A) :	--	3.1	
D	Output (+Vout) of model MGFW402415 (*3)	Power (W) :	--	45.856	PS2
		V_A (V) :	--	14.33	
		I_A (A) :	--	3.2	
E	Output (-Vout) of model MGFW402415 (*3)	Power (W) :	--	46.016	PS2
		V_A (V) :	--	14.38	
		I_A (A) :	--	3.2	

Supplementary Information:

(*) Measurement taken only when limits at 3 seconds exceed PS1 limits

(*1) Maximum voltage within output voltage range.

(*2) Models MGFS40243R3, MGFS402412 and MGFS402415 are representative of MGFS40yz because the circuit configuration is the same all other models of MGFS40yz.

(*3) Model MGFW402415 is representative of MGFW40yz because the circuit configuration is the same all other models of MGFW40yz.

The representative models were considered based on specifications of maximum VA and/or maximum output current.

6.2.3.1	Table: Determination of Potential Ignition Sources (Arcing PIS)			N/A
Location	Open circuit voltage After 3 s (Vp)	Measured r.m.s current (Irms)	Calculated value (V_p x I_{rms})	Arcing PIS? Yes / No

Supplementary information:

An Arcing PIS requires a minimum of 50 V (peak) a.c. or d.c. An Arcing PIS is established when the product of the open circuit voltage (Vp) and normal operating condition rms current (Irms) is greater than 15.

6.2.3.2	Table: Determination of Potential Ignition Sources (Resistive PIS)	N/A

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Circuit Location (x-y)	Operating Condition (Normal / Describe Single Fault)	Measured wattage or VA During first 30 s (W / VA)	Measured wattage or VA After 30 s (W / VA)	Protective Circuit, Regulator, or PTC Operated? Yes / No (Comment)	Resistive PIS? Yes/No

Supplementary Information:

A combination of voltmeter, VA and ammeter IA may be used instead of a wattmeter.

If a separate voltmeter and ammeter are used, the product of (VA x IA) is used to determine Resistive PIS classification.

A Resistive PIS: (a) dissipates more than 15 W, measured after 30 s of normal operation,

or (b) under single fault conditions has either a power exceeding 100 W measured immediately after the introduction of the fault if electronic circuits,

regulators or PTC devices are used, or has an available power exceeding 15 W measured 30 s after introduction of the fault.

8.5.5	TABLE: High Pressure Lamp	N/A
Description	Values	Energy Source Classification
Lamp type .....:		—
Manufacturer.....:		—
Cat no.....:		—
Pressure (cold) (MPa) .....:		MS_
Pressure (operating) (MPa).....:		MS_
Operating time (minutes).....:		—
Explosion method .....:		—
Max particle length escaping enclosure (mm) .:		MS_
Max particle length beyond 1 m (mm).....:		MS_
Overall result .....:		
Supplementary information:		

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
Model MGFS40053 R3	--	--	--	--	--	--	--
4.5 Vdc	7.21	7.09	32.4	--	(*1)	--	Rated Load (Load factor: 100%, 3.3V/ 8A)
4.5 Vdc	7.09	7.09	31.9	--	(*1)	--	+10% output voltage (Load factor: 100%, 3.63V/ 7.28A)

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Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
4.5 Vdc	6.48	7.09	29.2	--	(*1)	--	-10% output voltage (Load factor: 100%, 2.97V/ 8A)
13 Vdc	2.33	7.09	30.3	--	(*1)	--	Rated Load (Load factor: 100%, 3.3V/ 8A)
13 Vdc	2.31	7.09	30.0	--	(*1)	--	+10% output voltage (Load factor: 100%, 3.63V/ 7.28A)
13 Vdc	2.11	7.09	27.4	--	(*1)	--	-10% output voltage (Load factor: 100%, 2.97V/ 8A)
Model MGFS400505	--	--	--	--	--	--	--
4.5 Vdc	8.02	7.96	36.1	--	(*1)	--	Rated Load (Load factor: 100%, 5V/ 6A)
13 Vdc	2.87	7.96	37.3	--	(*1)	--	Rated Load (Load factor: 100%, 5V/ 6A)
Model MGFS400512	--	--	--	--	--	--	--
4.5 Vdc	7.81	7.87	35.2	--	(*1)	--	Rated Load (Load factor: 100%, 12V/ 2.5A)
13 Vdc	2.59	7.87	33.7	--	(*1)	--	Rated Load (Load factor: 100%, 12V/ 2.5A)
Model MGFS400515	--	--	--	--	--	--	--
4.5 Vdc	7.76	7.87	34.9	--	(*1)	--	Rated Load (Load factor: 100%, 15V/ 2A)
13 Vdc	2.57	7.87	33.4	--	(*1)	--	Rated Load (Load factor: 100%, 15V/ 2A)
Model MGFS40243R3	--	--	--	--	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
9 Vdc	2.96	4.38	26.6	--	(*1)	--	Rated Load (Load factor: 70%: 3.3V/ 7A)
18 Vdc	2.10	4.38	37.8	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
36 Vdc	1.04	4.38	37.4	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
Model MGFS402405	--	--	--	--	--	--	--
9 Vdc	3.54	5.13	31.9	--	(*1)	--	Rated Load (Load factor: 70%: 5V/ 5.6A)
18 Vdc	2.49	5.13	44.8	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
36 Vdc	1.24	5.13	44.6	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
Model MGFS402412	--	--	--	--	--	--	--
9 Vdc	3.63	5.24	32.7	--	(*1)	--	Rated Load (Load factor: 70%: 12V/ 2.38A
18 Vdc	2.53	5.24	45.5	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
36 Vdc	1.25	5.24	45.0	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
Model MGFS402415	--	--	--	--	--	--	--
9 Vdc	3.62	5.20	32.6	--	(*1)	--	Rated Load (Load factor: 70%: 15V/ 1.89A)
18 Vdc	2.51	5.20	45.2	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)

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Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
36 Vdc	1.24	5.20	44.6	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)
Model MGFS40483 R3	--	--	--	--	--	--	--
18 Vdc	1.45	2.17	26.1	--	(*1)	--	Rated Load (Load factor: 70%: 3.3V/ 7A)
36 Vdc	1.04	2.17	37.4	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
76 Vdc	0.49	2.17	37.2	--	(*1)	--	Rated Load (Load factor: 100%: 3.3V/ 10A)
Model MGFS404805	--	--	--	--	--	--	--
18 Vdc	1.79	2.57	32.2	--	(*1)	--	Rated Load (Load factor: 70%: 5V/ 5.6A)
36 Vdc	1.26	2.57	45.4	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
76 Vdc	0.59	2.57	44.8	--	(*1)	--	Rated Load (Load factor: 100%: 5V/ 8A)
Model MGFS404812	--	--	--	--	--	--	--
18 Vdc	1.81	2.62	32.6	--	(*1)	--	Rated Load (Load factor: 70%: 12V/ 2.38A)
36 Vdc	1.27	2.62	45.7	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
76 Vdc	0.60	2.62	45.6	--	(*1)	--	Rated Load (Load factor: 100%: 12V/ 3.4A)
Model MGFS404815	--	--	--	--	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
18 Vdc	1.82	2.57	32.8	--	(*1)	--	Rated Load (Load factor: 70%: 15V/ 1.89A)
36 Vdc	1.27	2.57	45.7	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)
76 Vdc	0.60	2.57	45.6	--	(*1)	--	Rated Load (Load factor: 100%: 15V/ 2.7A)
Model MGFW400512	--	--	--	--	--	--	--
4.5 Vdc	8.24	8.47	37.1	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.3A, -12V/ 1.3A)
13 Vdc	2.72	8.47	35.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.3A, -12V/ 1.3A)
Model MGFW400515	--	--	--	--	--	--	--
4.5 Vdc	7.79	7.96	35.1	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1A, -15V/ 1A)
13 Vdc	2.58	7.96	33.5	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1A, -15V/ 1A)
Model MGFW402412	--	--	--	--	--	--	--
9 Vdc	3.60	5.60	32.4	--	(*1)	--	Rated Load (Load factor: 70%, +12V/ 1.19A, -12V/ 1.19A)
18 Vdc	2.52	5.60	45.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
36 Vdc	1.26	5.60	45.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
Model MGFW402415	--	--	--	--	--	--	--
9 Vdc	3.67	5.64	33.0	--	(*1)	--	Rated Load (Load factor: 70%, +15V/ 0.98A, -15V/ 0.98A)

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Clause	Requirement + Test	Result - Remark	Verdict

B.2.5	TABLE: Input test						Pass
U (V)	I (A)	I rated (A)	P (W)	P rated (W)	Fuse No	I fuse (A)	Condition/status
18 Vdc	2.57	5.64	46.3	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
36 Vdc	1.28	5.64	46.1	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
Model MGFW404812	--	--	--	--	--	--	--
18 Vdc	1.79	2.77	32.2	--	(*1)	--	Rated Load (Load factor: 70%, +12V/ 1.19A, -12V/ 1.19A)
36 Vdc	1.26	2.77	45.4	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
76 Vdc	0.60	2.77	45.6	--	(*1)	--	Rated Load (Load factor: 100%, +12V/ 1.7A, -12V/ 1.7A)
Model MGFW404815	--	--	--	--	--	--	--
18 Vdc	1.81	2.79	32.6	--	(*1)	--	Rated Load (Load factor: 70%, +15V/ 0.98A, -15V/ 0.98A)
36 Vdc	1.28	2.79	46.1	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
76 Vdc	0.61	2.79	46.4	--	(*1)	--	Rated Load (Load factor: 100%, +15V/ 1.4A, -15V/ 1.4A)
Supplementary information:							
(*1): External Fuse was used while testing. See Engineering Conditions of Acceptability.							

B.3	TABLE: Abnormal operating condition tests							Pass
Ambient temperature (°C) .....:					See below			—
Power source for EUT: Manufacturer, model/type, output rating ..:					Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W			—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFS40053R3	--	--	--	--	--	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately The temperature did not rise more than the heating test. No components damaged. Input current: 1.2A <-> 0.005A NC, NT
Output (+Vout)	Overload	4.5 Vdc	3 hours 25 minutes	(*1)	--	See Observation	See Observation	CT at 8.7A, 3.30Vdc Load adjusted to 9.0A, outputs stopped after 1min. PWB near TR101 (P2 board): 125°C PWB T1 Input side (P2 board): 124°C PWB T1 Output side (P2 board): 123°C TH101 body: 119°C Center of the Case: 110°C Ambient: 20°C NC, NT (*2)

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	**TABLE: Abnormal operating condition tests**							Pass
Ambient temperature (°C) .....:				See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:				Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W				—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFS400515	--	--	--	--	--	--	--	--
Output (+Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. The temperature did not rise more than the heating test. No components damaged. Input current: 116mA <-> 135mA NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	4.5 Vdc	5 hours 32 minutes	(*1)	--	See Observation	See Observation	CT at 2.28A, 15.0Vdc Input current: 9.31A Load adjusted to 2.30A, input current and output voltage intermittent oscillation immediately. Finally shorted. No component damaged. Input current: 0.38A <-> 0.005A PWB near TR101 (P2 board): 119°C PWB T1 Input side (P2 board): 114°C PWB T1 Output side (P2 board): 111°C TH101 body: 110°C Center of the Case: 102°C Ambient: 18°C NC, NT
Model MGFW400515	--	--	--	--	--	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No components damaged. NC, NT
Output (+Vout)	Overload	4.5 Vdc	2 hours 29 minutes	(*1)	--	See Observation	See Observation	CT at 1.20A, 15.2Vdc Load adjusted to 1.30A, output stopped after 7miin. PWB near TR101 (P2 board): 133°C PWB T1 Input side (P2 board): 126°C PWB T1 Output side (P2 board): 122°C TH101 body: 122°C Center of the Case: 111°C Ambient: 20°C No components damaged. NC, NT (*2)

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	**TABLE: Abnormal operating condition tests**		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Short	4.5 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No components damaged. Input current: 0.581A NC, NT
Output (-Vout)	Overload	4.5 Vdc	2 hours	(*1)	--	See Observation	See Observation	CT at 1.25A, 14.7Vdc Load adjusted to 1.30A, output stopped after 2min. PWB near TR101 (P2 board): 133°C PWB T1 Input side (P2 board): 126°C PWB T1 Output side (P2 board): 123°C TH101 body: 122°C Center of the Case: 111°C Ambient: 21°C No components damaged. NC, NT (*2)

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFS40483R3	--	--	--	--	--	--	--	--
Output (+Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. The temperature did not rise more than the heating test. No components damaged. NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	36 Vdc	9 hours 32 minutes	(*1)	--	See Observation	See Observation	CT at 11.5A, 3.3Vdc Input current: 1.22A Load adjusted to 12.5A, output voltage intermittent oscillation immediately. Finally shorted. PWB near TR101 (P2 board): 97°C PWB T1 Input side (P2 board): 92°C PWB T1 Output side (P2 board): 95°C TH101 body: 90°C Center of the case: 89°C Ambient: 18°C No components damaged. NC, NT
Model MGFS404815	--	--	--	--	--	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No components damaged. NC, NT
Output (+Vout)	Overload	36 Vdc	11 hours 17 minutes	(*1)	--	See Observation	See Observation	CT at 3.55A, 15.0Vdc Load adjusted to 3.65A, output stopped after 8mintes. PWB near TR101 (P2 board): 134°C PWB T1 Input side (P2 board): 127°C PWB T1 Output side (P2 board): 126°C TH101 body: 121°C Center of the case: 112°C Ambient: 20°C NC, NT (*2)
Model MGFW404815	--	--	--	--	--	--	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No component damaged. Input current: 0.240A <-> 0.003A NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (+Vout)	Overload	36 Vdc	8 hours 58 minutes	(*1)	--	See Observation	See Observation	CT at 2.1A, 15.0Vdc Input current: 1.64A Load adjusted to 2.25A, Input current intermittent oscillation immediately. Finally shorted. Any component damaged. Input current: 0.303A <-> 0.003A PWB near TR101 (P2 board): 105°C PWB T1 Input side (P2 board): 102°C PWB T1 Output side (P2 board): 99°C TH101 body: 97°C Center of the case: 92°C Ambient: 19°C NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Short	36 Vdc	30 minutes	(*1)	--	--	--	Input current intermittent oscillation immediately. No abnormal heat rise. No component damaged. Input current: 0.172A <-> 0.003A NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests		Pass
Ambient temperature (°C) .....:		See below	—
Power source for EUT: Manufacturer, model/type, output rating ..:		Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W	—

Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Output (-Vout)	Overload	36 Vdc	12 hours 15 minutes	(*1)	--	See Observation	See Observation	CT at 1.95A, 14.7Vdc Input current: 1.59A Load adjusted to 1.97A, Input current intermittent oscillation immediately. Finally shorted. Any component damaged. Input current: 0.120A <-> 0.003A PWB near TR101 (P2 board): 109°C PWB T1 Input side (P2 board): 103°C PWB T1 Output side (P2 board): 104°C TH101 body: 99°C Center of the Case: 94°C Ambient : 20°C NC, NT
Supplementary information:								

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Clause	Requirement + Test	Result - Remark	Verdict

B.3	TABLE: Abnormal operating condition tests								Pass
Ambient temperature (°C) .....:					See below				—
Power source for EUT: Manufacturer, model/type, output rating ..:					Manufacturer: KIKUSUI, Model: PWR400L, Ratings: 0-80Vdc, 24A, 400W				—
Component No.	Abnormal Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation	
Test table is provided to record abnormal and fault conditions for all applicable energy sources including Thermal burn injury. Column “Abnormal/Fault.” Specify if test condition by indicating “Abnormal” then the condition for a Clause B.3 test or “Single Fault” then the condition for Clause B.4. CT - Constant temperatures were obtained NC - Cheesecloth remained intact NT - Tissue paper remained intact (*1): External Fuse was used while testing. See Engineering Conditions of Acceptability. (*2): Test was conducted three times due to TH101 was operated. The models tested were considered representative of the entire series because the construction is the same all other models. The representative models were considered based on specifications of maximum VA, maximum output current and/or Transformer winding number/structure.									

B.4	TABLE: Fault condition tests							Pass
Ambient temperature (°C) .....:					See below			—
Power source for EUT: Manufacturer, model/type, output rating ..:					Manufacturer: TAKASAGO, Model: HX060-100M2, Ratings: 0-60V, 0-100A, Two series connected.			—
Component No.	Fault Condition	Supply voltage, (V)	Test time (ms)	Fuse no.	Fuse current, (A)	T-couple	Temp. (°C)	Observation
Model MGFS400505	--	--	--	--	--	--	--	--
TR101 D to S	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.104A -> 0.015A NC, NT.

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Clause	Requirement + Test				Result - Remark			Verdict
TR101 D to G	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.076A -> 0.016A NC, NT.
T1 Pin 1 to 2	Short	13 Vdc	15 minutes	(*1)	--	--	--	Input and output started intermittent oscillation immediately. Temperature stabilized at 92°C (Core) No components damaged. Input current: 3.47A <-> 0A NC, NT.
T1 Pin 1 to 3	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.104A -> 0.015A NC, NT.
T1 Pin 1 to 4	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.104A -> 0.015A NC, NT
T1 Pin 2 to 3	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.075A -> 0.015A NC, NT

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Clause	Requirement + Test	Result - Remark	Verdict

T1 Pin 2 to 4	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.075A -> 0.015A NC, NT
T1 Pin 3 to 4	Short	13 Vdc	15 minutes	(*1)	--	--	--	Input current decreased immediately. Output operated normally. No abnormal heat rise. No components damaged. Input current: 0.076A -> 0.026A NC, NT
PC201 Output side	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. Input current: 0.104A -> 0.018A NC, NT
PC201 Input side	Short	13 Vdc	15 minutes	(*1)	--	--	--	Intermittent oscillation of output started immediately. No components damaged. Input current: 0.104A -> 0.033A NC, NT
Model MGFW400512	--	--	--	--	--	--	--	--

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

T1 Pin 1 to 5	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.093A -> 0.014A NC, NT
T1 Pin 1 to 6	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.090A -> 0.015A NC, NT
T1 Pin 2 to 5	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.093A-> 0.014A NC, NT
T1 Pin 2 to 6	Short	13 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. Unit damaged. Input current: 0.090A -> 0.015A NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

T1 Pin 5 to 6	Short	13 Vdc	15 minutes	(*1)	--	--	--	Input current increased immediately. Output operated normally. No abnormal heat rise. No components damaged. Input current: 0.090A -> 0.183A NC, NT
Model MGFS404815	--	--	--	--	--	--	--	--
TR141 D to S	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased immediately. Input current: 0.031A-> 0.038A Temperature stabilized at 59°C (Core) NC, NT
TR141 D to G	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased immediately. Input current: 0.031A-> 0.043A Temperature stabilized at 66°C (Core) NC, NT
TR101 D to S	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
TR101 D to G	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)

IEC 62368-1								
Clause	Requirement + Test				Result - Remark			Verdict
T1 Pin 1 to 2	Short	76 Vdc	1 hour	(*1)	--	--	--	Input current increased immediately and components damaged. Input current: 0.018A-> 0.061A Temperature stabilized at 78°C (Core) NC, NT
T1 Pin 1 to 3	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 1 to 4	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. NC, NT (*2)
T1 Pin 2 to 3	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. NC, NT (*2)
T1 Pin 2 to 4	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened immediately. NC, NT (*2)
T1 Pin 3 to 4	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current decreased immediately. Input current:0.0324 -> 0.0228A No component damaged. NC, NT
PC201 Input side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

PC201 Output side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT
L501	Short	76 Vdc	15 minutes	(*1)	--	--	--	Operated normally. No components damaged. NC, NT
TR501 D to S	Short	76 Vdc	15 minutes	(*1)	--	--	--	Input current and output voltage intermittaon oscillation immediately. Input current: 0.255 <-> 0.03 No components damaged. NC, NT
Model MGFW404815	--	--	--	--	--	--	--	--
T1 Pin 1 to 5	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 1 to 6	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 2 to 5	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

T1 Pin 2 to 6	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)
T1 Pin 5 to 6	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased immediately. Input current: 0.035A Temperature stabilized at 59°C (Core) NC, NT
L511	Short	76 Vdc	15 minutes	(*1)	--	--	--	Operated normally. No components damaged. NC, NT
TR511 D to S	Short	76 Vdc	30 minutes	(*1)	--	--	--	Input current increased and intermittent oscillation immediately. Input current: 0.10A <-> 0.6A Temperature stabilized at 58°C (Core) NC, NT
PC201 Input side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT
PC201 Output side	Short	76 Vdc	15 minutes	(*1)	--	--	--	Output stopped immediately. No components damaged. NC, NT

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

TR101 D to S	Short	76 Vdc	Less than 1 second	(*1)	--	--	--	External Fuse opened and components damaged immediately. NC, NT (*2)

Supplementary information:

NC - Cheesecloth remained intact

NT - Tissue paper remained intact

(*1): External Fuse was used while testing. See Engineering Conditions of Acceptability.

(*2): Test was conducted three times.

The models tested were considered representative of the entire series because the construction is the same all other models.

The representative models were considered based on specifications of input voltage, circuit configuration and/or Transformer winding number/structure.

Annex M	**TABLE: Batteries**									N/A
The tests of Annex M are applicable only when appropriate battery data is not available										
Is it possible to install the battery in a reverse polarity position? .....:										
	Non-rechargeable batteries			Rechargeable batteries						
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging		
	Meas. current	Manuf. Specs.		Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	
Max. current during normal condition										
Max. current during fault condition										
Test results:										Verdict
- Chemical leaks										
- Explosion of the battery										
- Emission of flame or expulsion of molten metal										
- Electric strength tests of equipment after completion of tests										
Supplementary information:										

Annex M.4	**Table: Additional safeguards for equipment containing secondary lithium batteries**				N/A
Battery/Cell No.	Test conditions	Measurements			Observation
		U	I (A)	Temp (°C)	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Normal				
	Abnormal				
	Single fault –SC/OC				
Supplementary Information:					

Battery identification	Charging at T_{lowest} (°C)	Observation	Charging at $T_{highest}$ (°C)	Observation
Supplementary Information:				

Annex Q.1	**TABLE: Circuits intended for interconnection with building wiring (LPS)**					N/A
Note: Measured UOC (V) with all load circuits disconnected:						
Output Circuit	Components	U_{oc} (V)	I_{sc} (A)		S (VA)	
			Meas.	Limit	Meas.	Limit
Supplementary Information:						
SC=Short circuit, OC=Open circuit						

T.2, T.3, T.4, T.5	**TABLE: Steady force test**				N/A
Part/Location	Material	Thickness (mm)	Force (N)	Test Duration (sec)	Observation
Supplementary information:					

T.6, T.9	**TABLE: Impact tests**				N/A
Part/Location	Material	Thickness (mm)	Vertical distance (mm)	Observation	
Supplementary information:					

T.7	**TABLE: Drop tests**				N/A
Part/Location	Material	Thickness (mm)	Drop Height (mm)	Observation	

IEC 62368-1			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:				

T.8	TABLE: Stress relief test				N/A
Part/Location	Material	Thickness (mm)	Oven Temperature (°C)	Duration (h)	Observation
Supplementary information:					

Enclosure
National Differences

EU Group Differences
USA / Canada

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62368-1 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES (Audio/video, information and communication technology equipment - Part 1: Safety requirements)	
Differences according to	EN 62368-1:2014+A11:2017
Attachment Form No.	EU_GD_IEC62368_1B_II
Attachment Originator	Nemko AS
Master Attachment	9/22/2017

	CENELEC COMMON MODIFICATIONS (EN)		Pass
	Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62368-1:2014 are prefixed “Z”.		Pass
CONTENTS	**Add** the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions Annex ZC (informative) A-deviations Annex ZD (informative) IEC and CENELEC code designations for flexible cords		Pass
	Delete all the “country” notes in the reference document (IEC 62368-1:2014) according to the following list:		Pass
	For special national conditions, see Annex ZB.		Pass
1	Add the following note: NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2011/65/EU.	See Enclosure Id. 7-02.	Pass
4.Z1	Protective devices included as integral parts of the equipment or as parts of the building installation:	Building-in component. No direct connection to mains. Final compliance to be evaluated in end-product.	N/A
	a) Included as parts of the equipment		N/A
	b) For components in series with the mains; by devices in the building installation		N/A
	c) For pluggable type B or permanently connected; by devices in the building installation		N/A

0.2.1	Note	1	Note 3	4.1.15	Note
4.7.3	Note 1 and 2	5.2.2.2	Note	5.4.2.3.2.2 Table 13	Note c
5.4.2.3.2.4	Note 1 and 3	5.4.2.5	Note 2	5.4.5.1	Note
5.5.2.1	Note	5.5.6	Note	5.6.4.2.1	Note 2 and 3
5.7.5	Note	5.7.6.1	Note 1 and 2	10.2.1 Table 39	Note 2, 3 and 4
10.5.3	Note 2	10.6.2.1	Note 3	F.3.3.6	Note 3

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.2.3.2.4	**Add** the following to the end of this subclause: The requirement for interconnection with **external circuit** is in addition given in EN 50491-3:2009.		N/A
10.2.1	**Add** the following to c) and d) in table 39: For additional requirements, see 10.5.1.		N/A
10.5.1	**Add** the following after the first paragraph: For RS 1 compliance is checked by measurement under the following conditions: In addition to the normal operating conditions, all controls adjustable from the outside by hand, by any object such as a tool or a coin, and those internal adjustments or presets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made. NOTE Z1 Soldered joints and paint lockings are examples of adequate locking. The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm^2, at any point 10 cm from the outer surface of the apparatus. Moreover, the measurement shall be made under fault conditions causing an increase of the high-voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made. For RS1, the dose-rate shall not exceed 1 µSv/h taking account of the background level. NOTE Z2 These values appear in Directive 96/29/Euratom of 13 May 1996.		N/A
10.6.1	**Add** the following paragraph to the end of the subclause: EN 71-1:2011, 4.20 and the related tests methods and measurement distances apply.		N/A
10.Z1	**Add** the following new subclause after 10.6.5. **10.Z1 Non-ionizing radiation from radio frequencies in the range 0 to 300 GHz** The amount of non-ionizing radiation is regulated by European Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz). For intentional radiators, ICNIRP guidelines should be taken into account for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). For hand-held and body-mounted devices, attention is drawn to EN 50360 and EN 50566		N/A
G.7.1	**Add** the following note: NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD.		N/A
Bibliography	**Add** the following standards: **Add** the following notes for the standards indicated: IEC 60130-9 NOTE Harmonized as EN 60130-9. IEC 60269-2 NOTE Harmonized as HD 60269-2. IEC 60309-1 NOTE Harmonized as EN 60309-1. IEC 60364 NOTE some parts harmonized in HD 384/HD 60364 series.		Pass

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	IEC 60601-2-4 NOTE Harmonized as EN 60601-2-4. IEC 60664-5 NOTE Harmonized as EN 60664-5. IEC 61032:1997 NOTE Harmonized as EN 61032:1998 (not modified). IEC 61508-1 NOTE Harmonized as EN 61508-1. IEC 61558-2-1 NOTE Harmonized as EN 61558-2-1. IEC 61558-2-4 NOTE Harmonized as EN 61558-2-4. IEC 61558-2-6 NOTE Harmonized as EN 61558-2-6. IEC 61643-1 NOTE Harmonized as EN 61643-1. IEC 61643-21 NOTE Harmonized as EN 61643-21. IEC 61643-311 NOTE Harmonized as EN 61643-311. IEC 61643-321 NOTE Harmonized as EN 61643-321. IEC 61643-331 NOTE Harmonized as EN 61643-331.		
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		Pass
4.1.15	**Denmark, Finland, Norway and Sweden** To the end of the subclause the following is added: **Class I pluggable equipment type A** intended for connection to other equipment or a network shall, if safety relies on connection to reliable earthing or if surge suppressors are connected between the network terminals and **accessible** parts, have a marking stating that the equipment shall be connected to an earthed **mains** socket-outlet. The marking text in the applicable countries shall be as follows: In **Denmark**: “Apparatets stikprop skal tilsluttes en stikkontakt med jord som giver forbindelse til stikproppens jord.” In **Finland**: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan" In **Norway**: “Apparatet må tilkoples jordet stikkontakt” In **Sweden**: “Apparaten skall anslutas till jordat uttag”		N/A
4.7.3	**United Kingdom** To the end of the subclause the following is added: The torque test is performed using a socket-outlet complying with BS 1363, and the plug part shall be assessed to the relevant clauses of BS 1363. Also see Annex G.4.2 of this annex		N/A
5.2.2.2	**Denmark** After the 2nd paragraph add the following: A warning (marking **safeguard**) for high **touch current** is required if the **touch current** exceeds the limits of 3,5 mA a.c. or 10 mA d.c.		N/A
5.4.11.1 and Annex G	**Finland and Sweden** To the end of the subclause the following is added: For separation of the telecommunication network from earth the following is applicable: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either • two layers of thin sheet material, each of which		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	shall pass the electric strength test below, or • one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that clearances and creepage distances do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition • passes the tests and inspection criteria of 5.4.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 5.4.9 shall be performed using 1,5 kV), and • is subject to routine testing for electric strength during manufacturing, using a test voltage of 1,5kV. It is permitted to bridge this insulation with a capacitor complying with EN 60384-14:2005, subclass Y2. A capacitor classified Y3 according to EN 60384-14:2005, may bridge this insulation under the following conditions: • the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 60384-14, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in 5.4.11; • the additional testing shall be performed on all the test specimens as described in EN 60384-14; the impulse test of 2,5 kV is to be performed before the endurance test in EN 60384-14, in the sequence of tests as described in EN 60384-14.		
5.5.2.1	**Norway** After the 3rd paragraph the following is added: Due to the IT power system used, capacitors are required to be rated for the applicable line-to-line voltage (230 V).		N/A
5.5.6	**Finland, Norway and Sweden** To the end of the subclause the following is added: Resistors used as **basic safeguard** or bridging **basic insulation** in **class I pluggable equipment type A** shall comply with G.10.1 and the test of G.10.2.		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
5.6.1	**Denmark** **Add** to the end of the subclause Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. *Justification:* In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.		N/A
5.6.4.2.1	**Ireland and United Kingdom** After the indent for **pluggable equipment type A**, the following is added: – the **protective current rating** is taken to be 13 A, this being the largest rating of fuse used in the **mains** plug.		N/A
5.6.5.1	**Ireland and United Kingdom** To the second paragraph the following is added: The range of conductor sizes of flexible cords to be accepted by terminals for equipment with a rated current over 10 A and up to and including 13 A is: 1,25 mm^2 to 1,5 mm^2 in cross-sectional area.		N/A
5.7.5	**Denmark** To the end of the subclause the following is added: The installation instruction shall be affixed to the equipment if the **protective conductor current** exceeds the limits of 3,5 mA a.c. or 10 mA d.c.		N/A
5.7.6.1	**Norway and Sweden** To the end of the subclause the following is added: The screen of the television distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation needs to be isolated from the screen of a cable distribution system. It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by a retailer, for example. The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in: “Apparatus connected to the protective earthing of the building installation through the mains connection or through other apparatus with a connection to protective earthing – and to a television distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a television distribution system therefore has to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	60728-11)" NOTE In Norway, due to regulation for CATV-installations, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min. Translation to Norwegian (the Swedish text will also be accepted in Norway): "Apparater som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et koaksialbasert kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av apparater til kabel-TV nett installeres en galvanisk isolator mellom apparatet og kabel-TV nettet." Translation to Swedish: "Apparater som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av apparaten till kabel-TV nät galvanisk isolator finnas mellan apparaten och kabel-TV nätet.".		
5.7.6.2	**Denmark** To the end of the subclause the following is added: The warning (marking safeguard) for high touch current is required if the touch current or the protective current exceed the limits of 3,5 mA .		N/A
B.3.1 and B.4	**Ireland and United Kingdom** The following is applicable: To protect against excessive currents and short-circuits in the primary circuit of **direct plug-in equipment**, tests according to Annexes B.3.1 and B.4 shall be conducted using an external miniature circuit breaker complying with EN 60898-1, Type B, rated 32A. If the equipment does not pass these tests, suitable protective devices shall be included as an integral part of the **direct plug-in equipment**, until the requirements of Annexes B.3.1 and B.4 are met		N/A
G.4.2	**Denmark:** Appliances rated ≤13 A provided with a plug according to DS 60884-2-D1:2011. Class I equipment provided with socket-outlets provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a. If a single-phase equipment having rated >13 A or poly-phase equipment provided with a supply cord with a plug, plug in accordance with the standard sheets DK 6-1a in DS 60884-2-D1 or EN 60309-2. Mains socket outlets intended for providing power to Class II apparatus rated 2,5 A in accordance with DS 60884-2-D1:2011 standard sheet DKA 1-4a.		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	Other current rating socket outlets in compliance with Standard Sheet DKA 1-3a or DKA 1-1c. Mains socket-outlets with earth in compliance with DS 60884-2-D1:2011 Standard Sheet DK 1-3a, DK 1-1c, DK1-1d, DK 1-5a or DK 1-7a		
G.4.2	**United Kingdom** To the end of the subclause the following is added: The plug part of direct plug-in equipment shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16, and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.		N/A
G.7.1	**United Kingdom** To the first paragraph the following is added: Equipment which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord shall be fitted with a 'standard plug' in accordance with the Plugs and Sockets etc (Safety) Regulations 1994, Statutory Instrument 1994 No. 1768, unless exempted by those regulations. NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.		N/A
G.7.1	**Ireland** To the first paragraph the following is added: Apparatus which is fitted with a flexible cable or cord shall be provided with a plug in accordance with Statutory Instrument 525: 1997, "13 A Plugs and Conversion Adapters for Domestic Use Regulations: 1997. S.I. 525 provides for the recognition of a standard of another Member State which is equivalent to the relevant Irish Standard		N/A
G.7.2	**Ireland and United Kingdom** To the first paragraph the following is added: A power supply cord with a conductor of 1,25 mm^2 is allowed for equipment which is rated over 10 A and up to and including 13 A.		N/A
ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		Pass

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
10.5.2	**Germany** The following requirement applies: For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking. *Justification:* German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM. **NOTE** Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int +49-531-592-6320, Internet: http://www.ptb.de		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62368-1 2th Ed. U.S.A. NATIONAL DIFFERENCES Audio/video, information and communication technology equipment – Part 1: Safety requirements	
Differences according to	CSA/UL 62368-1:2014
Attachment Form No.	US&CA_ND_IEC623681B
Attachment Originator	UL(US)
Master Attachment	Date 2015-06

IEC 62368-1 - US and Canadian National Differences Special National Conditions based on Regulations and Other National Differences			
1.1	All equipment is to be designed to allow installation according to the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part I, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2. Also, for such equipment marked or otherwise identified, installation is allowed per the Standard for the Protection of Information Technology Equipment, ANSI/NFPA 75.		Pass
1.4	Additional requirements apply to some forms of power distribution equipment, including sub-assemblies.		N/A
4.1.17	For lengths exceeding 3.05 m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type (e.g., DP, CL2) specified in the NEC.		N/A
	For lengths 3.05 m or less, external interconnecting flexible cord and cable assemblies that are not types specified in the NEC generally are required to have special construction features and identification markings.		N/A
4.8	Lithium coin / button cell batteries have modified special construction and performance requirements.		N/A
5.6.3	Protective earthing conductors comply with the minimum conductor sizes in Table G.5, except as required by Table G.7ADV.1 for cord connected equipment, or Annex DVH for permanently connected equipment		N/A
5.7.7	Equipment intended to receive telecommunication ringing signals complies with a special touch current measurement tests.		N/A
6.5.1	PS3 wiring outside a fire enclosure complies with single fault testing in B.4, or be current limited per one of the permitted methods.		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex F (F.3.3.8)	Output terminals provided for supply of other equipment, except mains, supply are marked with a maximum rating or references to which equipment it is permitted to be connected.		N/A
Annex G (G.7.1)	Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs.		N/A
Annex G (G.7.3)	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.		N/A
	Flexible power supply cords are required to be compatible with Article 400 of the NEC, and Tables 11 and 12 of the CEC.		N/A
Annex G (G.7.5)	Minimum cord length is required to be 1.5 m, with certain constructions such as external power supplies allowed to consider both input and output cord lengths into the requirement. Power supply cords are required to be no longer than 4.5 m in length if used in ITE Rooms.		N/A
Annex H.2	Continuous ringing signals under normal operating conditions up to 16 mA only are permitted if the equipment is subjected to special installation and performance restrictions.		N/A
Annex H.4	For circuits with other than ringing signals and with voltages exceeding 42.4 Vpeak or 60 V d.c., the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 mA d.c. under normal operating conditions.		N/A
Annex M	Battery packs for stationary applications comply with special component requirements.		N/A
Annex DVA (1)	Equipment intended for use in spaces used for environmental air are subjected to special flammability requirements for heat and visible smoke release.		N/A
	For ITE room applications, automated information storage systems with combustible media greater than 0.76 m3 (27 cu ft) have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.		N/A
	Consumer products designed or intended primarily for children 12 years of age or younger are subject to additional requirements in accordance with U.S. & Canadian Regulations.		N/A
	Baby monitors additionally comply with ASTM F2951, Consumer Safety Specification for Baby Monitors.		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVA (5.6.3)	For Pluggable Equipment Type A, the protection in the installation is assumed to be 20A.		N/A
Annex DVA (6.3)	The maximum quantity of flammable liquid stored in equipment complies with NFPA 30.		N/A
Annex DVA (6.4.8)	For ITE room applications, enclosures with combustible material measuring greater than 0.9 m2 (10 sq ft) or a single dimension greater than 1.8 m (6 ft) have a flame spread rating of 50 or less. For equipment with the same dimensions for other applications, an external surface that is not a fire enclosure requires a min. flammability classification of V-1.		N/A
Annex DVA (10.3.1)	Equipment with lasers meets the U.S. Code of Federal Regulations 21 CFR 1040 (and the Canadian Radiation Emitting Devices Act, REDR C1370).		N/A
Annex DVA (10.5.1)	Equipment that produces ionizing radiation complies with the U.S. Code of Federal Regulations, 21 CFR 1020 (and the Canadian Radiation Emitting Devices Act, REDR C1370).		N/A
Annex DVA (F.3.3.3)	Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings. Additional considerations apply for voltage ratings that exceed the attachment cap rating or are lower than the “Normal Operating Condition” in Table 2 of CAN/CSA C22.2 No. 235.”		N/A
Annex DVA (F.3.3.5)	Equipment identified for ITE (computer) room installation is marked with the rated current		N/A
Annex DVA (G.1)	Vertically-mounted disconnect switches and circuit breakers have the "on" position indicated by the handle in the up position		N/A
Annex DVA (G.3.4)	Suitable NEC/CEC branch circuit protection rated at the maximum circuit rating is required for all standard supply outlets and receptacles (such as supplied in power distribution units) if the supply branch circuit protection is not suitable.		N/A
Annex DVA (G.4.2)	Equipment with isolated ground (earthing) receptacles complies with NEC 250.146(D) and CEC 10-112 and 10-906(8).		N/A
Annex DVA (G.4.3)	Where a fuse is used to provide Class 2 or Class 3 current limiting, it is not operator-accessible unless it is non- interchangeable.		N/A
Annex DVA (G.5.3)	Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, require special transformer overcurrent protection.		N/A

IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVA (G.5.4)	Motor control devices are required for cord-connected equipment with a mains-connected motor if the equipment is rated more than 12 A, or if the equipment has a nominal voltage rating greater than 120 V, or if the motor is rated more than 1/3 hp (locked rotor current over 43 A).		N/A
Annex DVA (Annex M)	For ITE room applications, equipment with battery systems capable of supplying 750 VA for five minutes have a battery disconnect means that may be connected to the ITE room remote power-off circuit.		N/A
Annex DVA (Q)	Wiring terminals intended to supply Class 2 outputs according to the NEC or CEC Part 1are marked with the voltage rating and “Class 2” or equivalent; marking is located adjacent to the terminals and visible during wiring.		N/A
Annex DVB (1)	Additional requirements apply for equipment used for entertainment purposes intended for installation in general patient care areas of health care facilities.		N/A
Annex DVC (1)	Additional requirements apply for equipment intended for mounting under kitchen cabinets.		N/A
Annex DVE (4.1.1)	Some equipment, components, sub-assemblies and materials associated with the risk of fire, electric shock, or personal injury have component or material ratings in accordance with the applicable national (U.S. and Canadian) component or material requirements. Components required to comply include: appliance couplers, attachment plugs, battery back-up systems, battery packs, circuit breakers, communication circuit accessories, connectors (used for current interruption of non-LPS circuits), power supply cords, direct plug-in equipment, electrochemical capacitor modules (energy storage modules with ultra-capacitors), enclosures (outdoor), flexible cords and cables, fuses (branch circuit), ground-fault current interrupters, interconnecting cables, data storage equipment, printed wiring, protectors for communications circuits, receptacles, surge protective devices, vehicle battery adapters, wire connectors, and wire and cables.	Considered.	Pass
Annex DVH	Equipment for permanent connection to the mains supply is subjected to additional requirements.		N/A
Annex DVH (DVH.1)	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains are in accordance with the NEC/CEC.		N/A

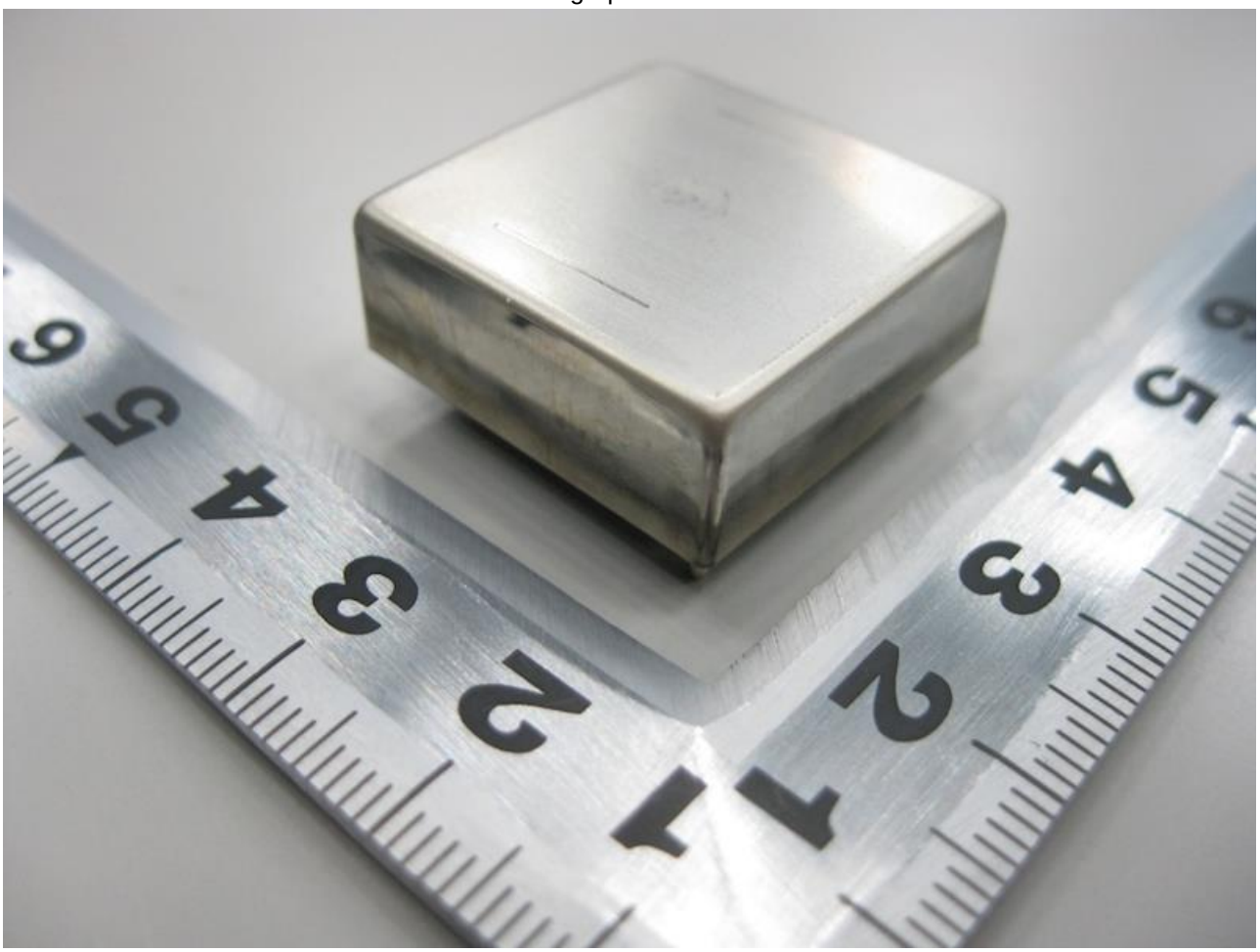
IEC62368_1B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
Annex DVH (DVH.3.2)	Terminals for permanent wiring, including protective earthing terminals, are suitable for U.S./Canadian wire gauge sizes, rated 125 percent of the equipment rating, and are specially marked when specified.		N/A
Annex DVH (DVH.3.2)	Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 mm2).		N/A
Annex DVH (DVH.4)	Permanently connected equipment is required to have a suitable wiring compartment and wire bending space.		N/A
Annex DVH (DVH 5.5)	Equipment connected to a centralized d.c. power system, and having one pole of the DC mains input terminal connected to the main protective earthing terminal in the equipment, complies with special earthing, wiring, marking and installation instruction requirements.		N/A
Annex DVI (6.7)	Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage from power line crosses.		N/A
Annex DVJ (10.6.1)	Equipment connected to a telecommunication and cable distribution networks and supplied with an earphone intended to be held against, or in the ear is required to comply with special acoustic pressure requirements.		N/A

Enclosures

Type	Supplement Id	Description
Photographs	03-01	Overall view: Top side
Photographs	03-02	Overall view: Bottom side
Photographs	03-03	Overall view: Top side without Case
Photographs	03-04	P1 Borard: Top side
Photographs	03-05	P1 Board: Bottom side
Photographs	03-06	P2 Board (Model MGFS40yz): Top side
Photographs	03-07	P2 Board (Model MGFS40yz): Bottom side
Photographs	03-08	P2 Board (Model MGFW40yz): Top side
Photographs	03-09	P2 Board (Model MGFW40yz): Bottom side
Schematics + PWB	05-01	Pattern Layout: P1 Borad
Schematics + PWB	05-02	Pattern Layout: P2 Borad
Miscellaneous	07-01	Output/ Input derating
Miscellaneous	07-02	Declaration of Conformity on RoHS
Miscellaneous	07-03	Manufacturer’s Declaration under IECEE CB Scheme

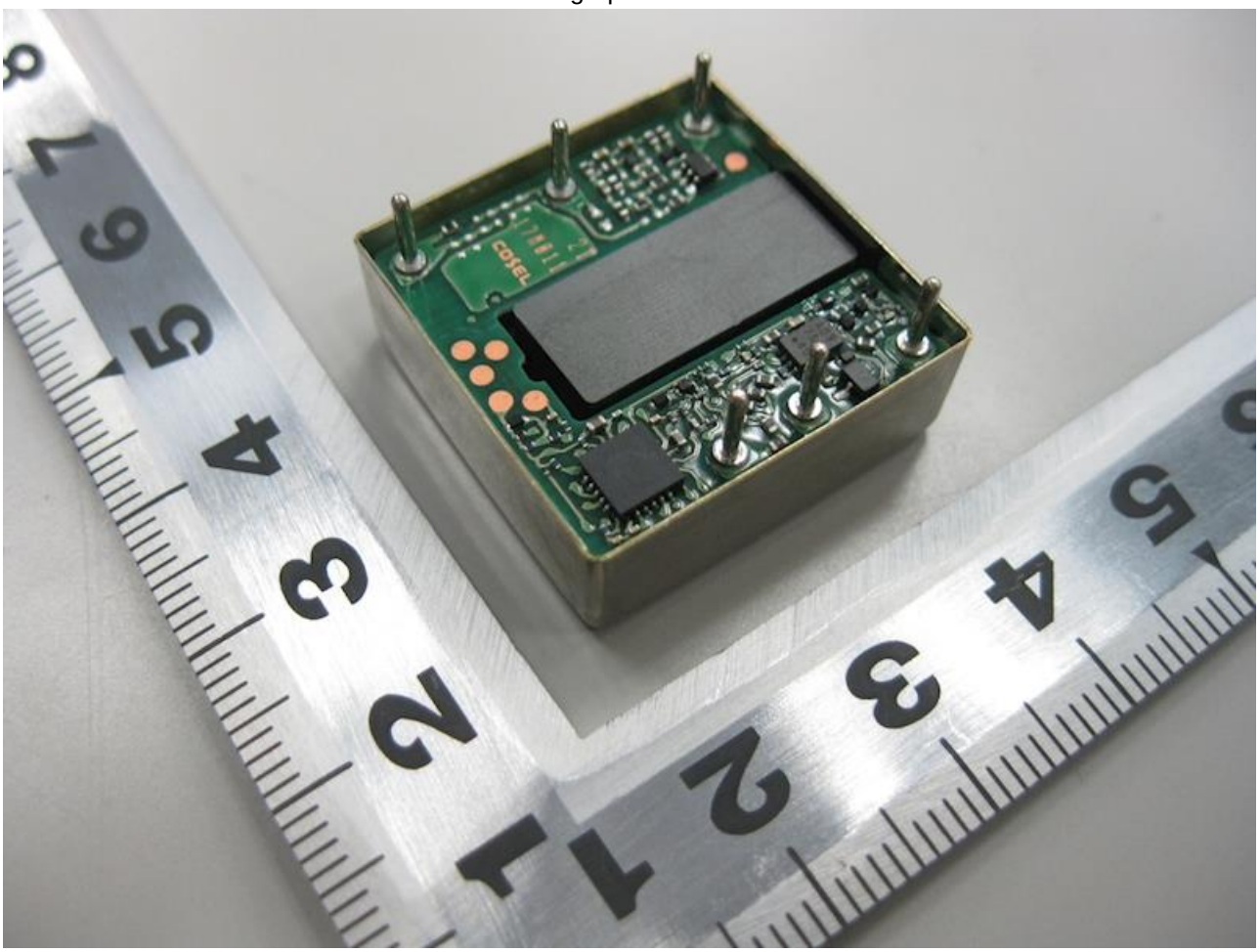
Enclosures

Photographs ID 03-01



Enclosures

Photographs ID 03-02



Enclosures

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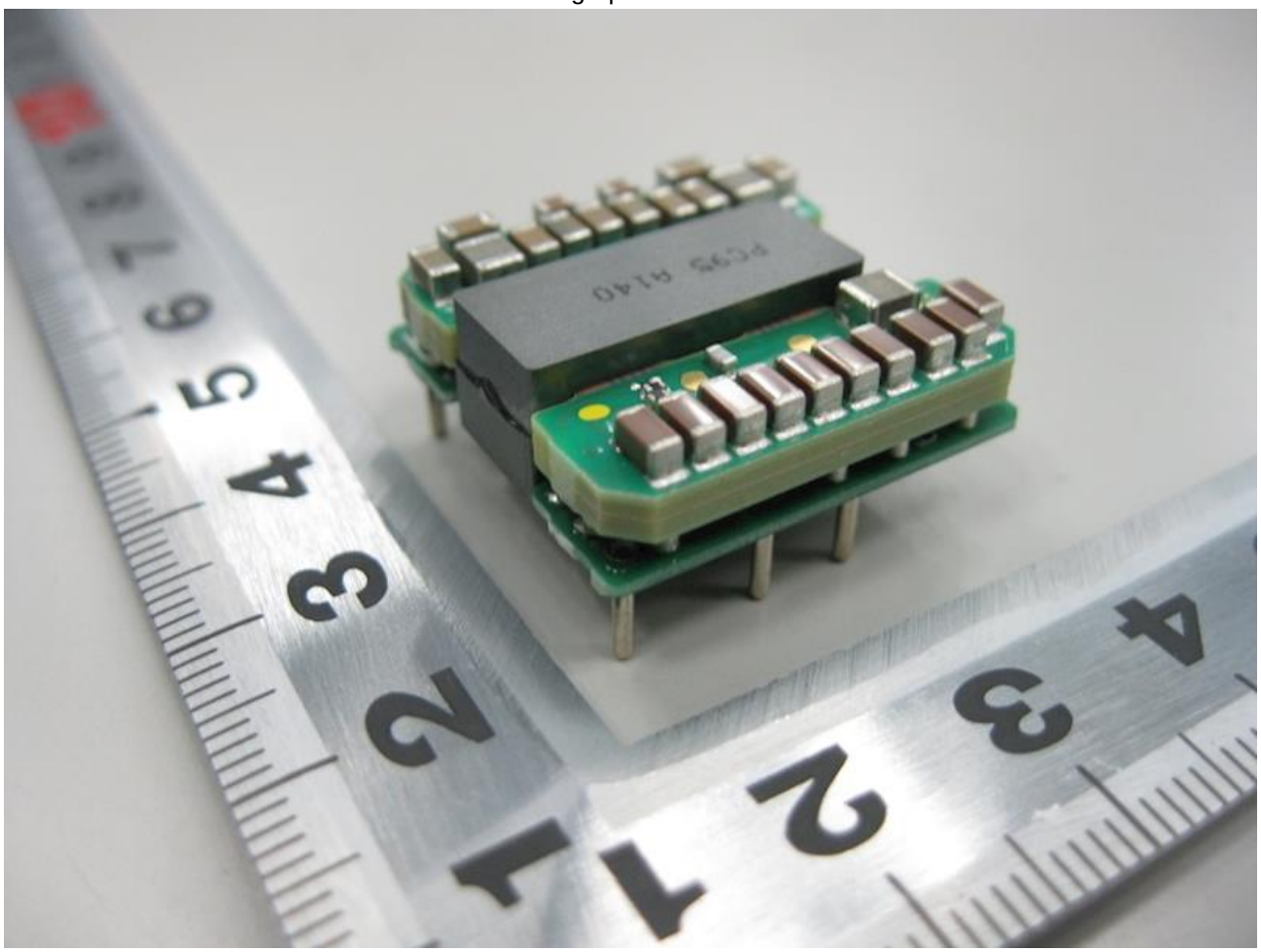

Enclosures

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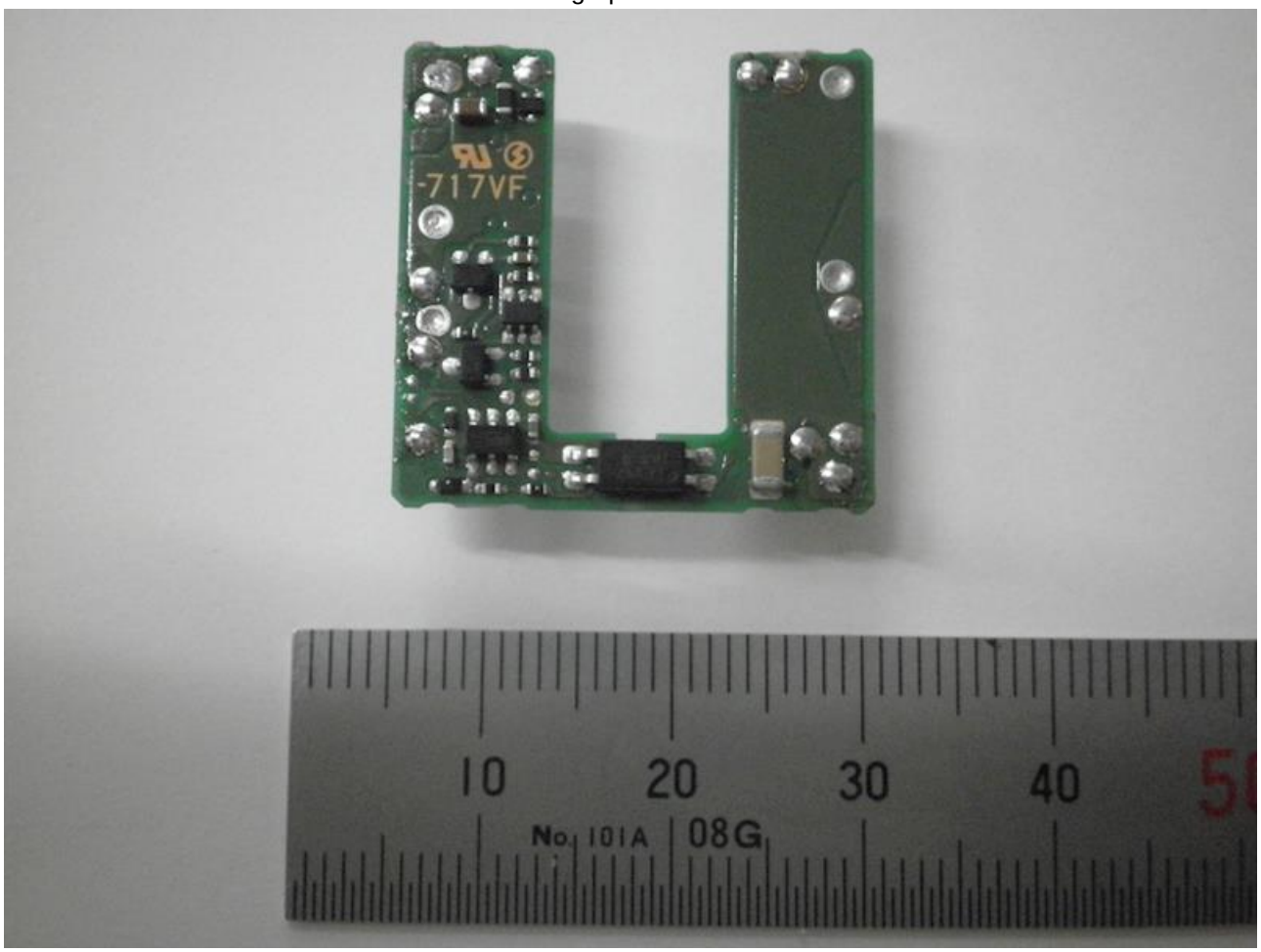

Enclosures

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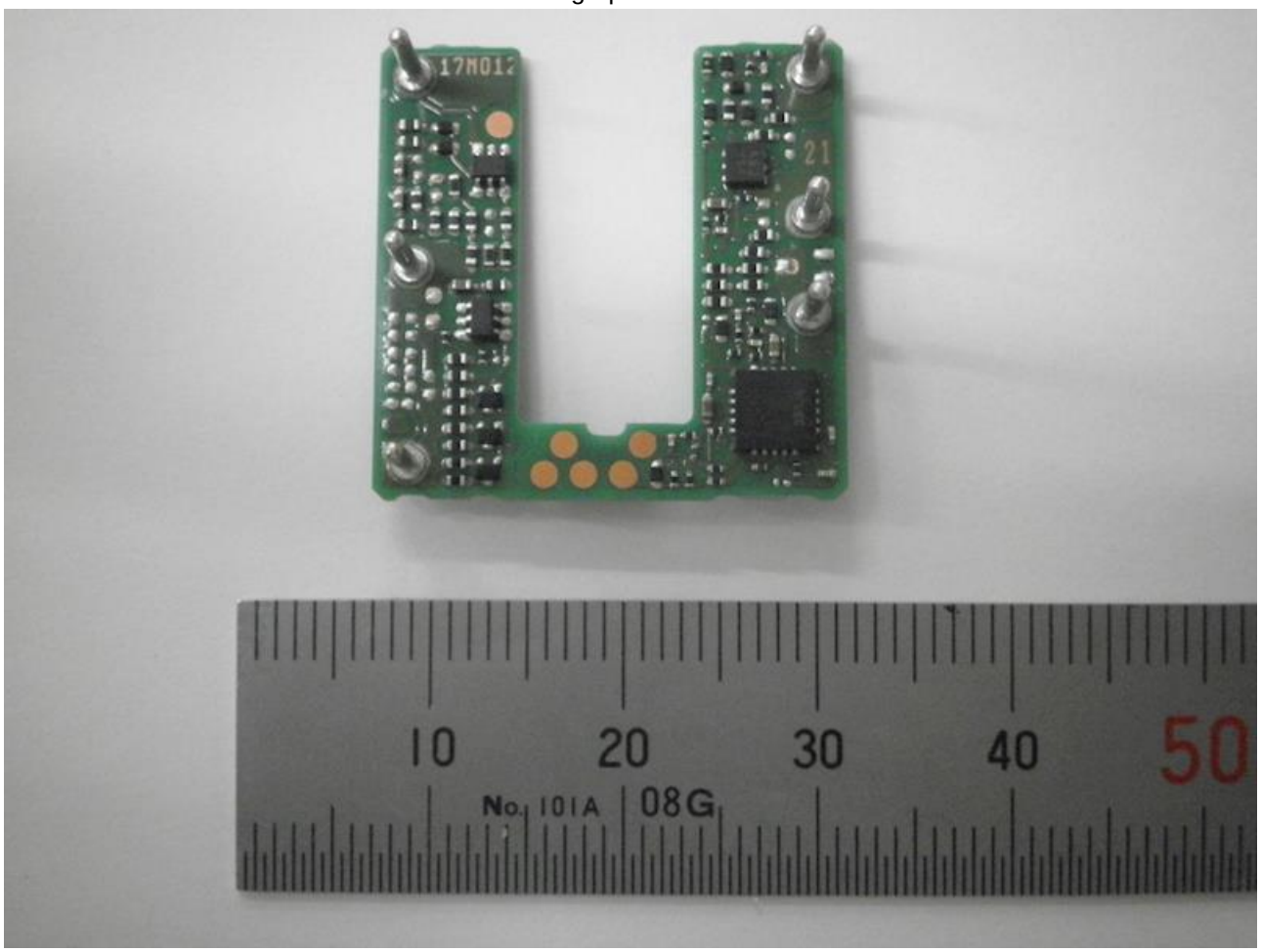

Enclosures

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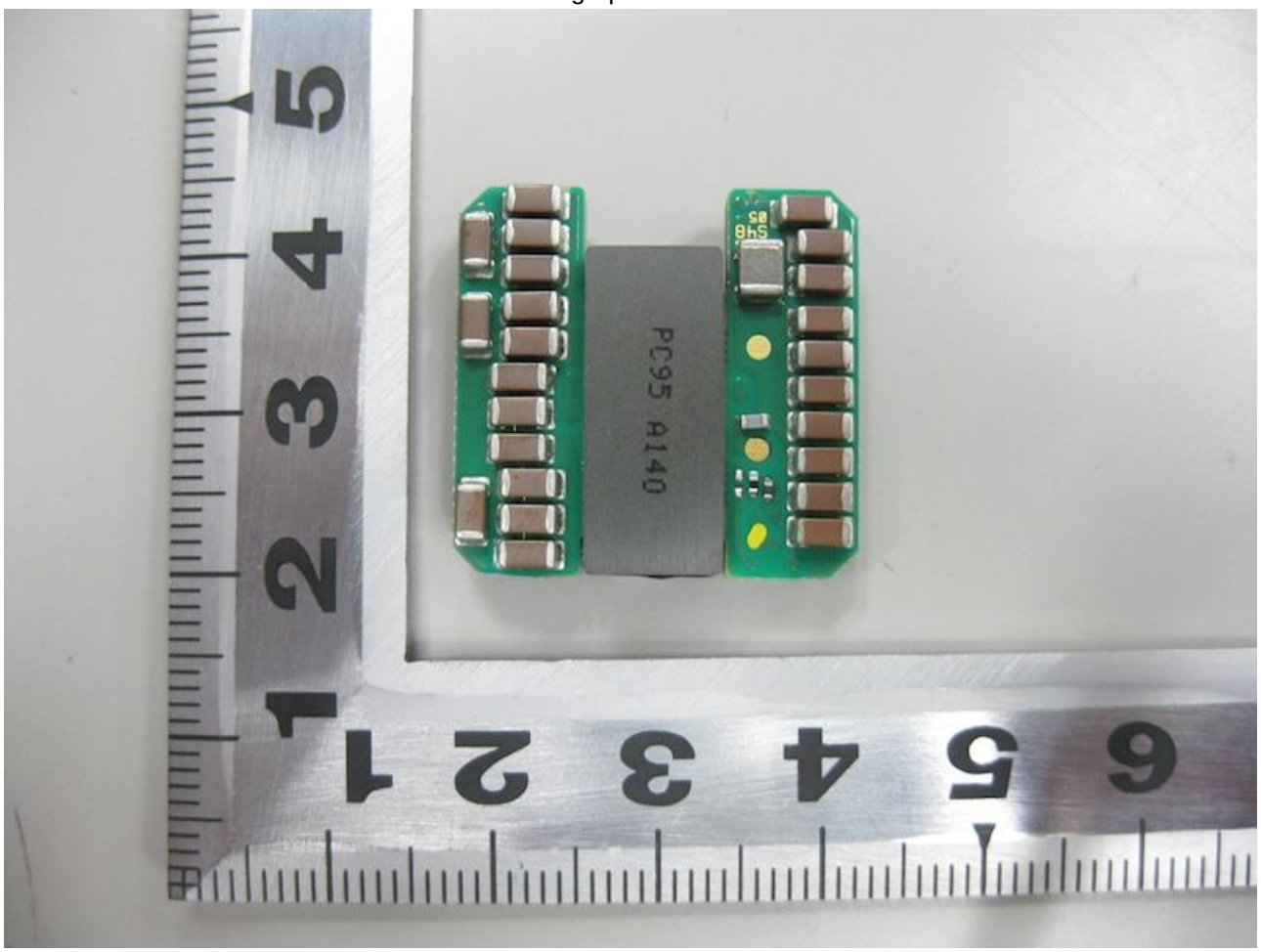

Enclosures

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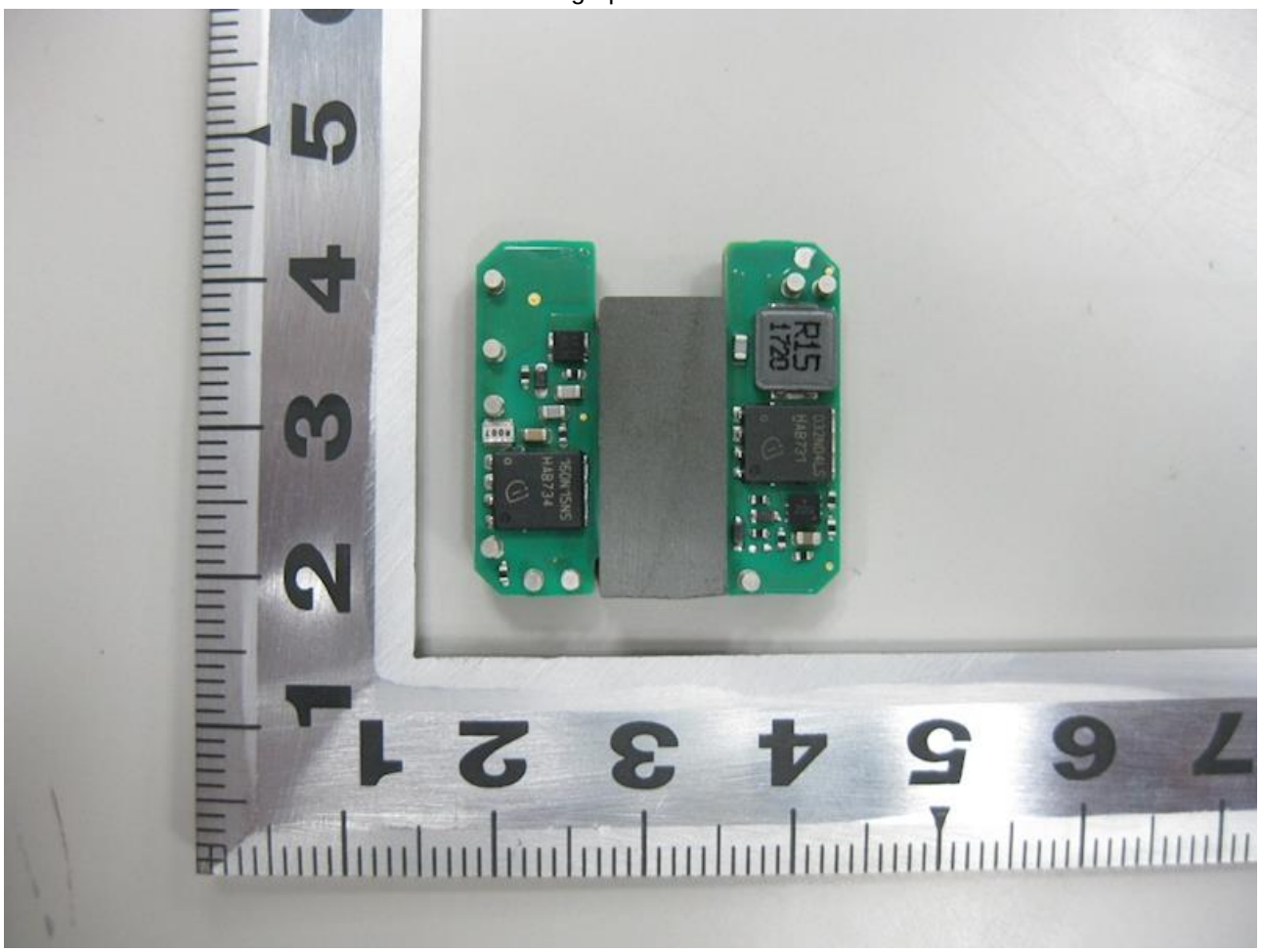

Enclosures

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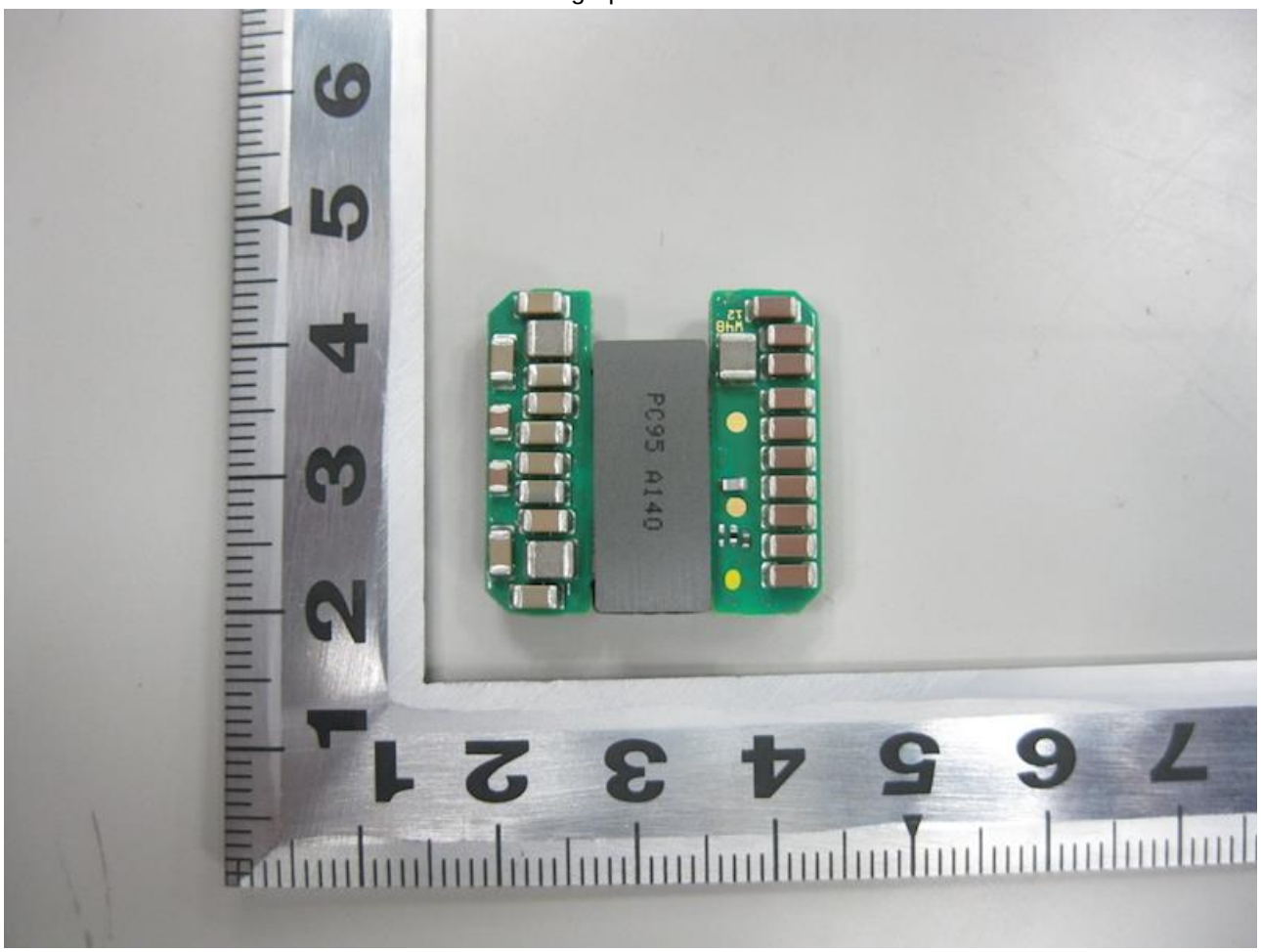

Enclosures

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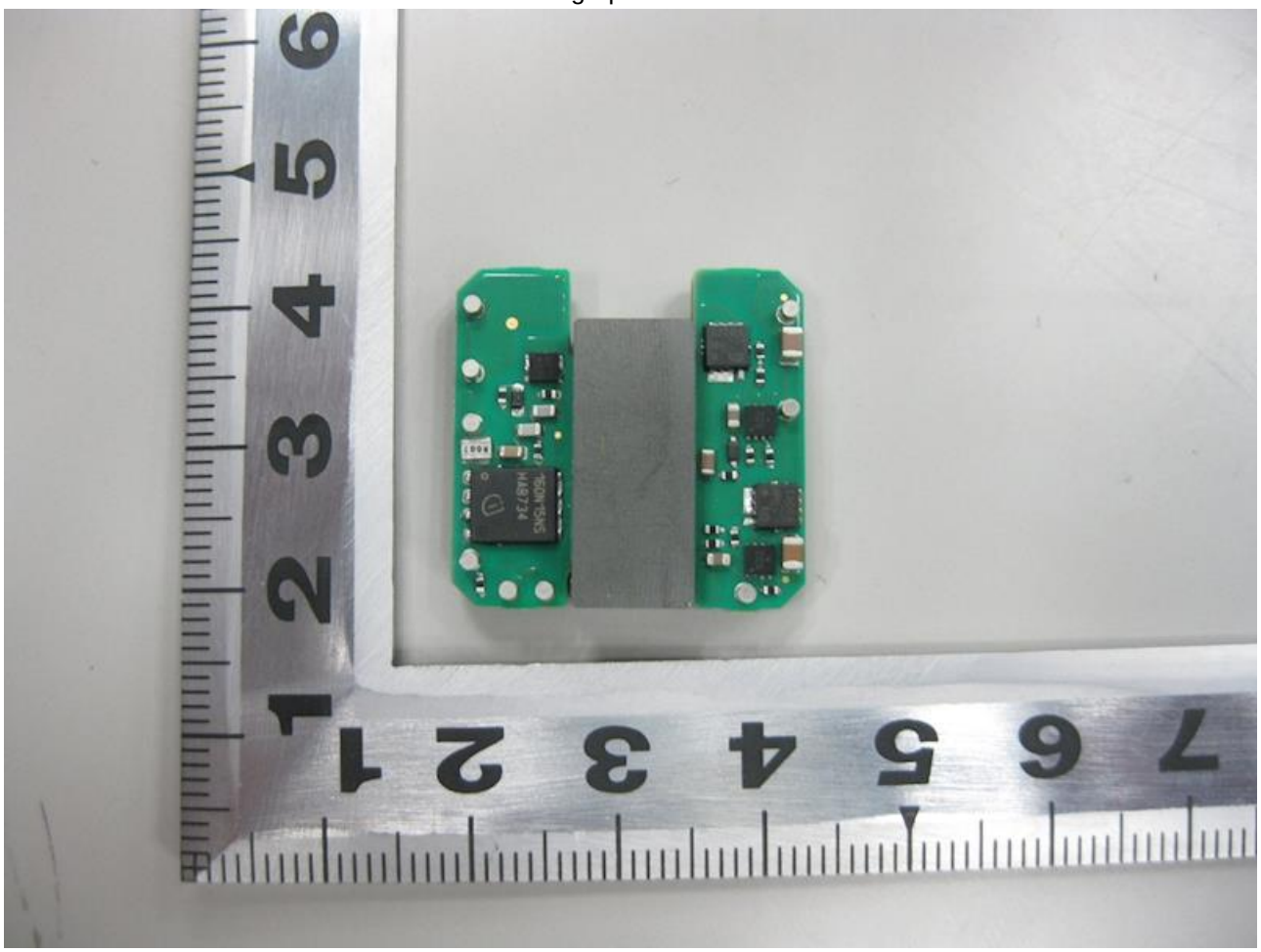

Enclosures

Schematics + PWB ID 05-01

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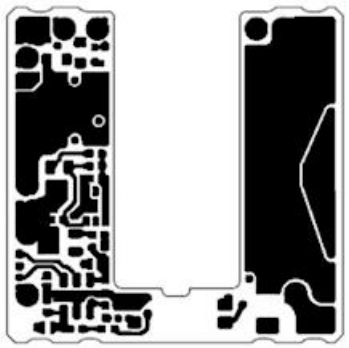

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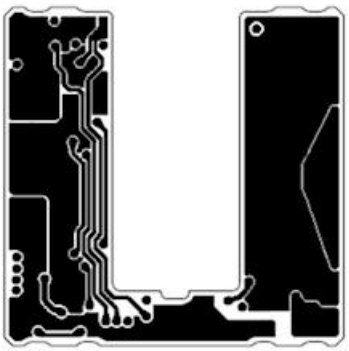

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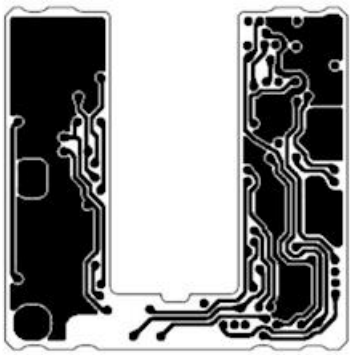

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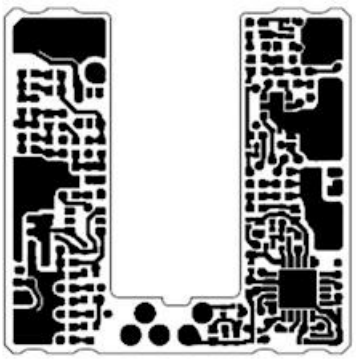
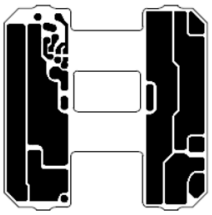


Enclosures

Schematics + PWB ID 05-02

For Model MGFS40yz

Top



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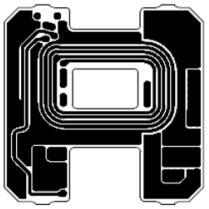

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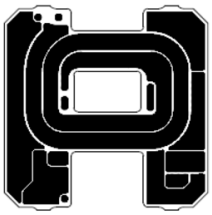

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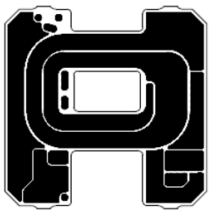

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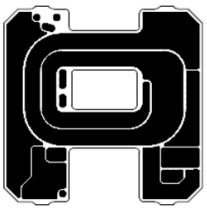

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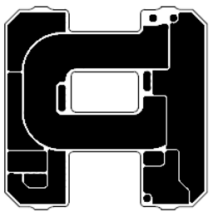

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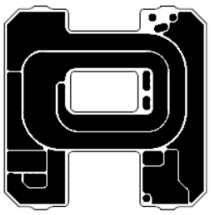

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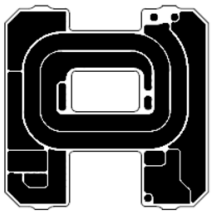

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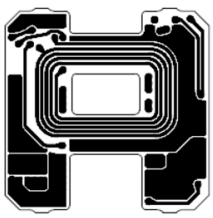

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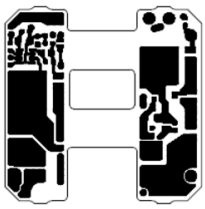
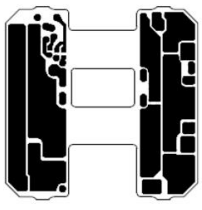


Enclosures

Schematics + PWB ID 05-02

For Model MGFW40yz

Top



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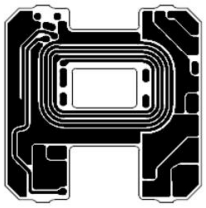

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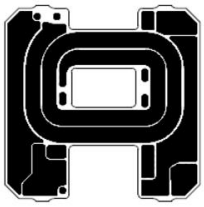

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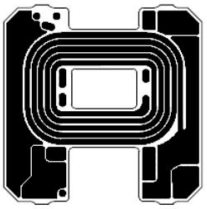

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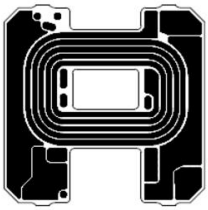

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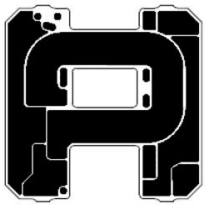

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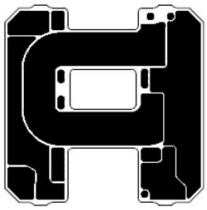

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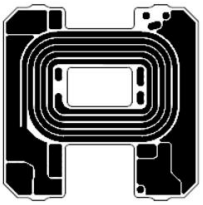

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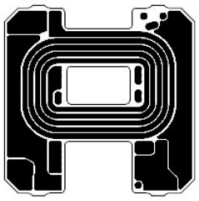

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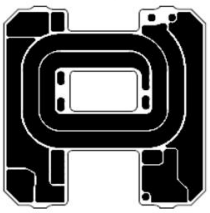

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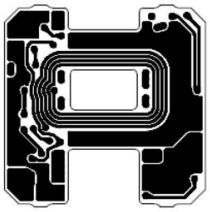

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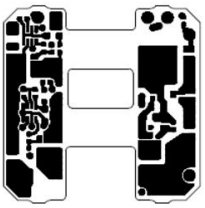


Enclosures

Miscellaneous ID 07-01

Output derating curve
Ventilation must keep the temperature of point A below 110℃.
Refer to Fig.7.2 for the location of point A.
Ambient temperature must keep below 85℃.

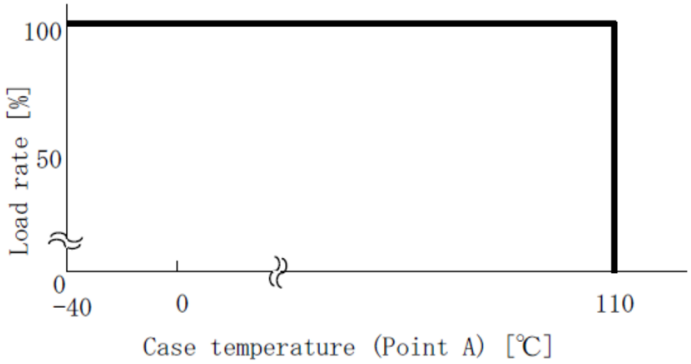


Fig. 7.1 Derating curve

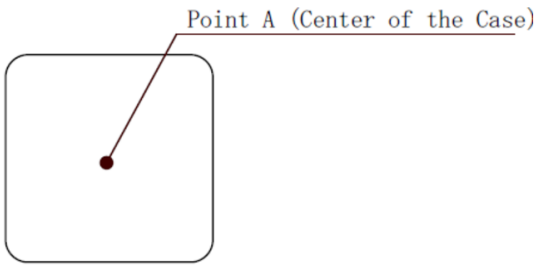


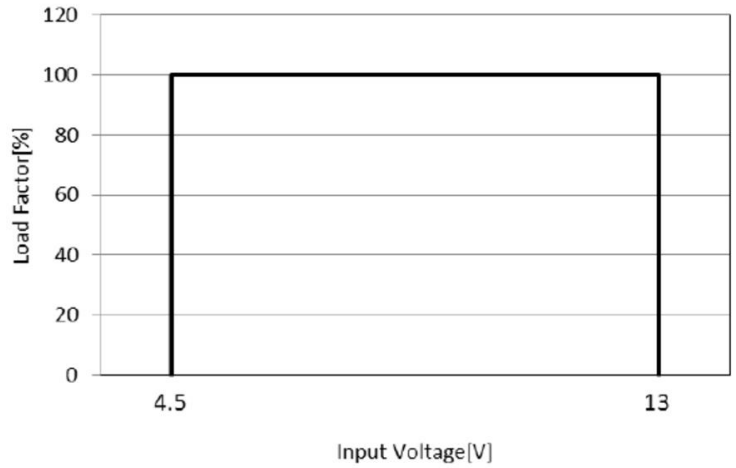
Fig. 7.2 Temperature measurement point

Enclosures

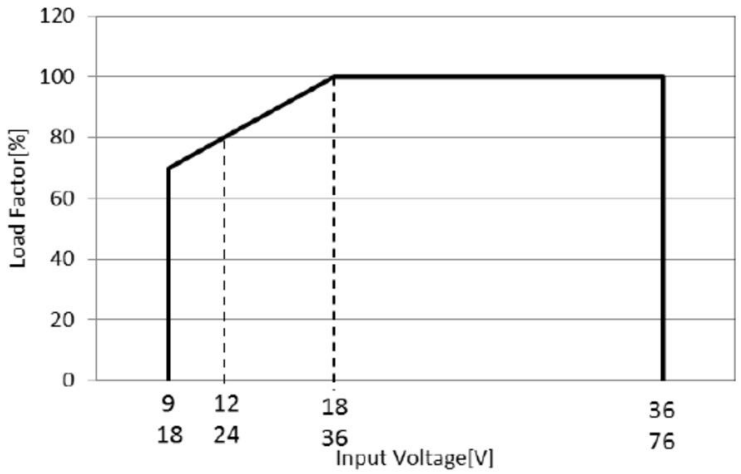
Miscellaneous ID 07-01

Input voltage derating curve

For Model MGFw4005z



For Model MGFw4024z, MGFw4048z



Enclosures

Miscellaneous ID 07-02

COSEL

COSEL Co., Ltd.
1-5-1 Kamiakae-machi,Toyama-city
Toyama 930-0816 JAPAN
Tel : +81-76-471-8592

DATE : Dec.10.2018

Subject: Declaration of Conformity on RoHS

Dear UL Japan, Inc.,

We, COMPANY, declare, under our solo responsibility, that the product(s) noted below are in conformity with the requirements of Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS).

Description of equipment:

Product description:	DC-DC Converter
Model:	MG40 Series

Sincerely yours,

SIGNATURE (script or attach) Junichi Katagishi

NAME : Junichi Hatagishi

TITLE : Manager

Enclosures

Miscellaneous ID 07-03

Manufacturer's Declaration under IECEE CB Scheme

（IECEE CB スキームに於ける製造者宣言書）

We as a manufacturer and/or a manufacturer of the original model declare that the submitted sample(s) descrived in Test Report for evaluation is/are representative of the products from the each factory in Test Report.

（製造者/オリジナルモデルの製造者として、評価のために提出したテストレポート中のサンプルは、テストレポートに記載される各工場を代表するサンプルであることを宣言します。）

Date of issue（発行日）	Jan.11.2019
Manufacturer name（製造者名）	COSEL Co., Ltd.
Manufacturer Address（製造者住所）	1-6-43 Kamiakae-machi,Toyama-city Toyama 930-0816 JAPAN
Name of person in charge（責任者名）	Junichi Hatagishi
Title（役職）	Manager
Signature（署名）	Junichi Hatagishi