Test Report issued under the responsibility of:

TEST REPORT
IEC 60950-1
Information technology equipment - Safety - Part 1: General requirements

Report Reference No ..... :	4786910627-3
Date of issue ..... :	2015-10-13
Total number of pages ..... :	84
CB Testing Laboratory ..... :	UL Japan, Inc.
Address ..... :	4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
Applicant's name ..... :	TDK-LAMBDA CORP
Address ..... :	NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN
Test specification:	
Standard ..... :	IEC 60950-1:2005 (Second Edition); Am1:2009 + Am2:2013
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60950_1F
Test Report Form originator ..... :	SGS Fimko Ltd
Master TRF ..... :	Dated 2014-02

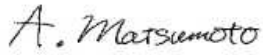
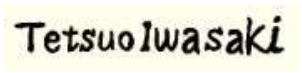
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

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 ..... :	Switching Power Supply
Trade Mark ..... :	TDK·Lambda
Manufacturer ..... :	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN
Model/Type reference ..... :	PAQ50S48 Series: Models PAQ50S48-x/y, PAQ50S48-3R3/15A, PAQ50S48-8/z PAQ100S48 Series: Models PAQ100S48-x/y x = 1R2, 1R8, 2R5, 3R3, or 5 /y = /B, /BP, /BV, /BPV, /P, /V, /PV, /C, /CP, /CV, /CPV, /L, /LP, /LV, /LPV, /TV (for only PAQ100S48 Series) or blank /z = /B, /BP, /BV, /BPV or blank
Ratings ..... :	Input: DC 36 – 76V 1.7A for PAQ50S48 Series, 3.3A for PAQ100S48 Series Output:

Model	Output Voltage [Vdc]	Output Current [A]
PAQ50S48-1R2/y	1.2	12
PAQ50S48-1R8/y	1.8	12
PAQ50S48-2R5/y	2.5	12
PAQ50S48-3R3/y	3.3	12
PAQ50S48-3R3/15A	3.3	15
PAQ50S48-5/y	5.0	10
PAQ50S48-8/z	8.0	6.3
PAQ100S48-1R2/y	1.2	25
PAQ100S48-1R8/y	1.8	25
PAQ100S48-2R5/y	2.5	25
PAQ100S48-3R3/y	3.3	25
PAQ100S48-5/y	5.0	20

Testing procedure and testing location:		
[x]	**CB Testing Laboratory**	
	Testing location / address ..... :	UL Japan, Inc. 4383-326 Asama-cho, Ise-shi, Mie, 516-0021, Japan
[ ]	**Associated CB Test Laboratory**	
	Testing location / address ..... :	
	Tested by (name + signature) ..... :	Ayano Matsumoto 
	Approved by (name + signature)... :	Tetsuo Iwasaki 
[ ]	**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). :	
[ ]	**Testing Procedure: RMT**	
	Testing location / address ..... :	
	Tested by (name + signature) ..... :	
	Approved by (name + signature)... :	
	Supervised by (name + signature). :	

List of Attachments

National Differences (24 pages)
Enclosures (13 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 / Comments
	Input: Single-Phase (1.6.2)	
	Determination of Working Voltage; Working Voltage Measurement (2.10.2)	
	Heating (4.5.1, 1.4.12, 1.4.13)	
	Electric Strength (5.2.2)	
	Component Failure (5.3.1, 5.3.4, 5.3.7)	
	Abnormal Operation (5.3.1 - 5.3.9)	
	Transformer Abnormal Operation (5.3.3, 5.3.7b, Annex C.1)	

Summary of Compliance with National Differences:

Countries outside the CB Scheme membership may also accept this report.

List of countries addressed: CA, DE, DK, EU, FI, GB, KR, SE, SI, US

The product fulfills the requirements of: EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011 + A2:2013

Copy of Marking Plate - Refer to Enclosure titled Marking Plate for copy.

Test item particulars :	
Equipment mobility .....:	for building-in
Connection to the mains .....:	not directly connected to the mains
Operating condition .....:	continuous
Access location .....:	restricted access location
Over voltage category (OVC) .....:	OVC I
Mains supply tolerance (%) or absolute mains supply values .....:	N/A
Tested for IT power systems .....:	No
IT testing, phase-phase voltage (V) .....:	N/A
Class of equipment .....:	Not classified
Considered current rating of protective device as part of the building installation (A) .....:	N/A (not connected to primary)
Pollution degree (PD) .....:	PD 2
IP protection class .....:	IPX0
Altitude of operation (m) .....:	Up to 2000
Altitude of test laboratory (m) .....:	< 1000 m
Mass of equipment (kg) .....:	< 0.1kg
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(s) of receipt of test item .....:	2001-04, 2002-10-07
Date(s) of Performance of tests .....:	2001-04, 2001-08, 2002-09, 2002-10-07

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 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 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

When differences exist, they shall be identified in the General Product Information section.

Name and address of Factory(ies): TDK-LAMBDA MALAYSIA SDN BHD
PLO33 KAWASAN PERINDUSTRIAN SENAI

81400 SENAI MALAYSIA

TDK-LAMBDA MALAYSIA SDN BHD
LOT 2 & 3, BATU 9 3/4
KAWASAN PERINDUSTRIAN
BANDAR BARU JAYA GADING
26070 KUANTAN MALAYSIA

ALPS LOGISTICS FACILITIES CO LTD
593-1 NISHIOOHASHI
TSUKUBA-SHI
IBARAKI-KEN 305-0831 JAPAN

Wuxi TDK-Lambda Electronics Co Ltd
NO 6
XING CHUANG ER LU
WUXI
JIANGSU 214028 CHINA

SENDAN ELECTRONICS MFG CO LTD
1010 HABUSHIN
NANTO-SHI
TOYAMA-KEN 939-1756 JAPAN

TDK-LAMBDA CORP
2704-1 SETTAYA-MACHI
NAGAOKA-SHI
NIIGATA-KEN 940-1195 JAPAN

ZHANGJIAGANG HUA YANG ELECTRONICS CO LTD
TONGXIN RD
ZHAOFENG ECONOMIC DEVELOPMENT ZONE
LEYU TOWN
ZHANGJIAGANG CHINA

GENERAL PRODUCT INFORMATION:

Report Summary

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

Product Description

The equipment tested is built-in type DC-DC-converter for general use in office equipment. The equipment is tested under the condition that input circuit is secondary.

A classification of the equipment is not applicable since the equipment under test is component-type equipment and the supply voltage range is covering SELV and non SELV-areas. The maximum input voltage of the equipment is DC 76V.

At an input voltage level over SELV, the host-equipment has to provide the required means of protection from electrical hazards.

The transformer contained within the equipment is built up by using a multi-layer-PCB. The traces of this multi-layer PCB build the windings of the transformer T1 and L51. The core of the transformer T1 and L51 is integrated into the PCB. Both creepage distance and clearance between pri - sec and between pri - heatsink are kept by 1.5mm minimum.

Model Differences

The models are essentially the same except for some components provided not affecting safety and layout of multi-layer PCB in area of T1. The models of the PAQ-series are identical from the outer enclosure, the installation instructions and the circuitry affecting safety. Components not affecting safety differ slightly in their ratings.

All models have the same rated input voltages of DC 36-76 V. The models of PAQ50S48 Series have the rated input current of 1.7 A, while the models of PAQ100S48 Series have the rated input current of 3.3 A.

The models of PAQ50S48 Series have the rated output voltages from DC 1.2 V to DC 8.0 V, while the models of PAQ100S48 Series have the rated output voltages from DC 1.2 V to DC 5.0 V, with higher rated output currents.

Models with suffix B denote an aluminum heatsink provided.

Models with suffix C denote height of Input/Output pin terminal supports are 10.2mm.

Models with suffix L denote height of Input/Output pin terminals are 5.1mm.

"/TV" stand for no screw threads provided on enclosure, no effecting safety.

Model PAQ50S48-3R3/15V is identical to Model PAQ50S48-3R3 except for output rated current.

Definition of variable /x: x means output voltage (for example 1R2: 1.2V, 3R3: 3.3V, 5: 5V)

Definition of variable /y and /z:

OPTION	ON/OFF LOGIC	Over Voltage Protection	Over Current Protection
Nothing or "/B", "/C", "/L" (Standard model)	Negative (H:OFF/L:ON)	Shut down. (ON/OFF Cont. Reset or Manual Reset)	Shut down. (ON/OFF Cont. Reset or Manual Reset)
"/P", "/BP" , "/CP" , "/LP"	Positive (H:ON/L:OFF)	Shut down. (ON/OFF Cont. Reset or Manual Reset)	Shut down. (ON/OFF Cont. Reset or Manual Reset)
"/V", "/BV" , "/CV" , "/LV"	Negative (H:OFF/L:ON)	Auto Restart	Auto Restart
"/PV", "/BPV" , "/CPV" , "/LPV"	Positive (H:ON/L:OFF)	Auto Restart	Auto Restart

Maximum ambient temperature
- For Models without suffix /B: Max. PCB temperature were specified
90°C at 100% load, 100°C at 50% load.

- For Models with suffix /B: Max. Heatsink temperature were specified

I. For 1.2V, 1.8V output models
100°C at 100% load
II. For 2.5V, 3.3V or 5V output models
90°C at 100% load
100°C at 50% load
III. For 8V output models
100°C at 100% load

Additional Information

This report is a reissue of CBTR Ref. No.: 12027293 001, CB Test Certificate Ref. No.JPTUV-047085. Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, has been determined that the product continues to comply with the standard.

Abbreviations used in the report.
- built-in application: B/I

In this Test Report, CENELEC mark license indicating compliance to EN standard was used to verify component compliance to IEC standard because the standards are technically equivalent.

It was considered that UL Standard has requirements that meet or exceed the relevant IEC requirements.

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: See "Model Differences".

- The product was investigated to the following additional standards: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013 (which includes all European national differences, including those specified in this test report).

Engineering Conditions of Acceptability

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

- The end-product Electric Strength Test is to be based upon a maximum working voltage of: max working voltage: 84 Vrms, 116 Vpk

- The following secondary output circuits are SELV: All output

- The power supply terminals and/or connectors are: Suitable for factory wiring only

- The investigated Pollution Degree is: 2

- Proper bonding to the end-product main protective earthing termination is: Required

- An investigation of the protective bonding terminals has: Not been conducted

- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation

system with the indicated rating greater than Class A (105°C): T1 (Class B)

- The following end-product enclosures are required: Fire, Electrical

Abbreviations used in the report:			
- normal condition	N.C.	- single fault condition	S.F.C
- operational insulation	OP	- basic insulation	BI
- basic insulation between parts of opposite polarity:	BOP	- supplementary insulation	SI
- double insulation	DI	- reinforced insulation	RI

Indicate used abbreviations (if any)