

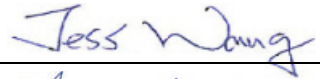



Test Report issued under the responsibility of:



TEST REPORT IEC 60950-1 Information technology equipment – Safety – Part 1: General requirements	
Report Number	U1610168-096
Date of issue	2016-10-27
Total number of pages	81
Applicant's name	TDK-LAMBDA CORP. NAGAOKA TECHNICAL CENTER
Address	2704-1 SETTAYA-MACHI, NAGAOKA-SHI, NIIGATA 940-1195, JAPAN
Test specification:	
Standard	IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013
Test procedure	CB Scheme
Non-standard test method	N/A
Test Report Form No.	IEC60950_1F
Test Report Form(s) Originator	SGS Fimko Ltd
Master TRF	Dated 2014-02
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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 Power Module
Trade Mark :	<i>TDK-Lambda</i> or TDK-Lambda
Manufacturer	TDK-LAMBDA CORP. NAGAOKA TECHNICAL CENTER 2704-1 SETTAYA-MACHI, NAGAOKA-SHI, NIIGATA 940-1195, JAPAN
Model/Type reference	PH300A280-z/abcde (where “z, /, a, b, c, d, e”, refer to general product information)
Ratings	Refer to general product information

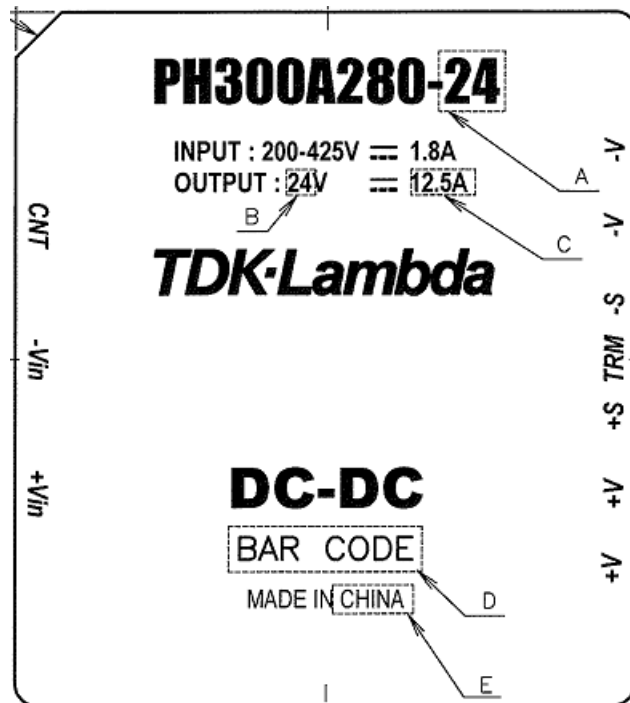
Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	Cerpass Technology Corporation
Testing location/ address.....:		No.10, Lane 2, Lianfu Street, Luzhu Dist., Taoyuan City 33848 Chinese Taipei
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address.....:		
Tested by (name + signature).....:		Jess Wang / Project Handler 
Approved by (name + signature).....:		Miller Chang / Reviewer 
<input type="checkbox"/>	Testing procedure: TMP/CTF Stage 1:	
Testing location/ address.....:		
Tested by (name + signature).....:		
Approved by (name + signature).....:		
<input type="checkbox"/>	Testing procedure: WMT/CTF Stage 2:	
Testing location/ address.....:		
Tested by (name + signature).....:		
Witnessed by (name + signature).....:		
Approved by (name + signature).....:		
<input type="checkbox"/>	Testing procedure: SMT/CTF Stage 3 or 4:	
Testing location/ address.....:		
Tested by (name + signature).....:		
Witnessed by (name + signature).....:		
Approved by (name + signature).....:		
Supervised by (name + signature).....:		

<p>List of Attachments (including a total number of pages in each attachment):</p> <ul style="list-style-type: none"> - National Differences (97 pages) - Photo documentation (5 pages) - Miscellanea (1 page) - Measurement Section (1 page) 	
<p>Summary of testing:</p>	
<p>Tests performed (name of test and test clause):</p> <ul style="list-style-type: none"> - Input Test (1.6.2) - Durability of marking test (1.7.11) - SELV Reliability Test (2.2) - Protective Bonding Test (2.6.3.4) - Humidity Test (2.9.2) - Working Voltage (2.10.2) - Heating Test (4.5.2) - Ball pressure test (4.5.5) - Electric Strength (5.2) - Abnormal operating and fault condition (5.3) <p>The maximum ambient temperature is specified as 100°C at Center of baseplate.</p>	<p>Testing location:</p> <p>Cerpass Technology Corporation No.10, Lane 2, Lianfu Street, Luzhu Dist., Taoyuan City 33848 Chinese Taipei</p>
<p>Summary of compliance with National Differences:</p> <p>List of countries addressed</p> <p><u>Summary of compliance with National Differences to IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013 (for explanation of codes see below):</u></p> <p>EU Group Differences, EU Special National Conditions, AT, DK, IT, SE, US, CA</p> <p><input checked="" type="checkbox"/> The product fulfils the requirements of EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013</p> <p><u>Additional National Differences to IEC 60950-1:2005 (2nd Edition)+Am 1:2009 and EN 60950-1:2006+A11:2009+A1:2010+A12:2011 (for client's requirement):</u></p> <p>EU Group Differences, EU Special National Conditions, CA, DE, DK, FI, GB, IL, KR, SE, SI, US</p> <p><u>Additional National Differences to IEC 60950-1:2005 (2nd Edition) and EN 60950-1:2006+A11:2009 (for client's requirement):</u></p> <p>AU, CH, CN, DK, ES, GB, IE, NO, SE.</p> <p>Explanation of used codes: AT=Austria, AU=Australia, CA=Canada, CH=Switzerland, CN=China, DE=Germany, DK=Denmark, ES=Spain, FI=Finland, GB=United Kingdom, IE=Ireland, IL=Israel, IT=Italy, KR=Republic of Korea, NO=Norway, SE=Sweden, SI=Slovenia, US=United States of America.</p> <p>For National Differences see corresponding Attachment.</p>	

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.

(Representative)



Test item particulars.....:	
Equipment mobility.....:	<input type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input checked="" type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in
Connection to the mains.....:	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> type A <input type="checkbox"/> type B <input type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input checked="" type="checkbox"/> not directly connected to the mains
Operating condition.....:	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
Access location	<input checked="" type="checkbox"/> operator accessible <input type="checkbox"/> restricted access location
Over voltage category (OVC)	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input checked="" type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other:
Mains supply tolerance (%) or absolute mains supply values	N/A
Tested for IT power systems	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
IT testing, phase-phase voltage (V)	N/A
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified:
Considered current rating of protective device as part of the building installation (A)	N/A
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class	IPX0
Altitude during operation (m)	Up to 3048m for OVC II, 2000m for OVC III
Altitude of test laboratory (m)	Up to 2000
Mass of equipment (kg)	Approx. 84g

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	2016-10-21
Date (s) of performance of tests.....:	2016-10-21 to 2016-10-25
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 <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	

Manufacturer’s Declaration per sub-clause 4.2.5 of IECCE 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)..... :

1. WUXI TDK-LAMBDA ELECTRONICS CO., LTD.
NO. 6 XING CHUANG ER LU WUXI JIANGSU
214028, P.R. CHINA.
2. TDK-LAMBDA CORP. NAGAOKA TECHNICAL
CENTER
2704-1 SETTAYA-MACHI, NAGAOKA-SHI,
NIIGATA 940-1195, JAPAN.
3. TDK-LAMBDA MALAYSIA SDN. BHD.
LOT 2 & 3, BATU 9 3/4, KAWASAN
PERINDUSTRIAN, BANDAR BARU JAYA
GADING, KUANTAN PAHANG 26070,
MALAYSIA.
4. SENDAN ELECTRONICS MFG. CO., LTD.
1010 HABUSHIN NANTO-SHI, TOYAMA 939-
1756 JAPAN.
5. TDK-LAMBDA MALAYSIA SDN BHD
PLO33 KAWASAN PERINDUSTRIAN SENAI
81400 SENAI MALAYSIA

General product information:
 The DC-DC Power Module is building-in equipment which can be used in information technology equipment, all components mounted on minimum V-1 PCB and housed in plastic enclosure.

The model rating list as below:

Character Model	Input Rated Voltage (Vdc)	Input Rated current (A)	Min. Output	Rated output	Max. Output	Max. Output Power (W)	Transformer (T101)
PH300A280-5	200-230	1.8	2.00	5.00	5.25	300	CA83601x
			60.00	60.00	57.14		
	231-425	1.8	2.00	5.00	6.00		
			60.00	60.00	50.00		
PH300A280-12	200-230	1.8	4.80	12.00	12.60	302.4	CA83602x
			25.20	25.20	24.00		
	231-425	1.8	4.80	12.00	14.40		
			25.20	25.20	21.00		
PH300A280-24	200-425	1.8	9.60	24.00	28.80	300	CA83603x
			12.50	12.50	10.42		
PH300A280-28	200-425	1.8	11.20	28.00	33.60	302.4	CA83604x

			10.80	10.80	9.00		
PH300A280-48	200-425	1.8	19.20	48.00	57.60	302.4	CA83605x
			6.30	6.30	5.25		
Note:							

All models are similar expect for model description, output rating, transformer (T101) secondary winding and secondary components

The equipment was additionally evaluated by OVC III with 200-424Vdc by declare of manufacturer.

Other comments:

The maximum operational ambient temperature as specified by the manufacturer is 100°C at center of baseplate.

This equipment did not have fuse that shall be considered or evaluated in final system if it's necessary. The product was tested with manufacturer specified fuse, 5A / 450Vdc, Model: BDH50, Manufactured: Daito Communication Apparatus Co Ltd.

Unless otherwise indicated, all tests were conducted on Models: PH300A280-5, PH300A280-12 and PH300A280-48 to represent the other models.

Definition of variable(s):

Variable	Range of variable:	Content:																																																								
z	5, 12, 24, 28, 48	To denote different output voltage (V dc).																																																								
/	When "a, b, c, d, or e" to denote "/2, /3, /T, /H, /V, /CO, /other alphanumeric character, symbol or -", then "/" is no need.	Marketing purpose, no safety relevant information																																																								
a, b, c, d, e	- , /2, /3, /T, /H, /V or /CO (1)These suffixes may be used together (e.g. /TV, /HTV3) (2) When character "-" occurs in model name, it does mean blank.	Marketing purpose, no safety relevant information. <table border="1"> <thead> <tr> <th>Variable</th> <th>Pin Length</th> <th>OVP</th> <th>OCP</th> <th>OTP</th> <th>Stud</th> <th>Coating</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>5.08</td> <td>Manual</td> <td>Constant current model</td> <td>Manual</td> <td>with Treads</td> <td>No coating</td> </tr> <tr> <td>/2</td> <td>2.79</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>/3</td> <td>3.68</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>/T</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>without Threads</td> <td>N/A</td> </tr> <tr> <td>/H</td> <td>N/A</td> <td>N/A</td> <td>Hiccup model</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>/V</td> <td>N/A</td> <td>Auto Reset</td> <td>N/A</td> <td>Auto Reset</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>/CO</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> <td>Coating model</td> </tr> </tbody> </table>	Variable	Pin Length	OVP	OCP	OTP	Stud	Coating	-	5.08	Manual	Constant current model	Manual	with Treads	No coating	/2	2.79	N/A	N/A	N/A	N/A	N/A	/3	3.68	N/A	N/A	N/A	N/A	N/A	/T	N/A	N/A	N/A	N/A	without Threads	N/A	/H	N/A	N/A	Hiccup model	N/A	N/A	N/A	/V	N/A	Auto Reset	N/A	Auto Reset	N/A	N/A	/CO	N/A	N/A	N/A	N/A	N/A	Coating model
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/CO	N/A	N/A	N/A	N/A	N/A	Coating model																																																				

Abbreviations used in the report:

- normal conditions	N.C.	- single fault conditions	S.F.C
- functional insulation	OP	- basic insulation	BI
- double insulation	DI	- supplementary insulation	SI
- between parts of opposite polarity	BOP	- reinforced insulation	RI
- short-circuited	s-c	- open-circuited	o-c
- over-loaded	o-l	- input	I/P
- output	O/P	- internal protection operated	IP
- no indication of dielectric breakdown	NB	- Cheesecloth remain intact	NC
- tissue paper remains intact	NT	- components damage	CD