





Test Report issued under the responsibility of:



TEST REPORT IEC 60950-1 Information technology equipment – Safety – Part 1: General requirements		
Report Number	207721-AS3-1	CB/DE1-55140
Date of issue	2015-01-22	
Total number of pages	226	
Applicant's name	TDK-Lambda Americas Inc.	
Address	3320 Matrix Drive, Richardson, TX, 75082	
Test specification:		
Standard	DIN EN 60950-1 (VDE 0805-1):2014-08 EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2014 IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013	
Test procedure	VDE ÜG, 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:		
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Test item description :	Component DC DC Converter for use with IT Equipment
Trade Mark :	 and/or  and/or TDK-Lambda
Manufacturer	TDK-Lambda Americas Inc. 3320 Matrix Drive, Richardson, TX, 75082
Model/Type reference :	i6A series, (See model matrix)
10004095 Structure of type name.....:	See Model matrix, appendix 3
10004560 Type differences.....:	See model Matrix, appendix 3
Ratings :	
10003893 Rated voltage.....:	DC 9 – 55 V Input (SELV)
10004017 Rated current.....:	Max. 16,5 A
10004112 Rated power.....:	Max. Output Power 250 W
10004029 Rated frequency.....:	DC
10003951 Output voltages and currents.....:	max. DC 3,3V - 28 or -3.3 - -30V max. 20 A, 250 W (SELV) See model Matrix, appendix 3
Max. baseplate temperature..:	130C at Q5 tab
Supplementary information: The above listing was introduced only for internal VDE administration process.	

Testing procedure and testing location:		
<input type="checkbox"/>	CB Testing Laboratory:	VDE Prüf- und Zertifizierungsinstitut GmbH VDE Testing and Certification Institute
Testing location/ address.....:		Section AS3 Merianstrasse 28, D-63069 Offenbach, Germany
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address.....:		
Tested by (name + signature).....:		(authorization of test report)
Approved by (name + signature).....:		
<hr/>		
<input type="checkbox"/>	Testing procedure: TMP/CTF Stage 1:	
Testing location/ address.....:		
Tested by (name + signature).....:		
Approved by (name + signature).....:		
<hr/>		
<input checked="" type="checkbox"/>	Testing procedure: WMT/CTF Stage 2:	
Testing location/ address.....:		TDK-Lambda Americas Inc. 3320 Matrix Drive, Suite 100, Richardson, Texas 75082, USA WMT (TDAP, VDE File No. 2520400-9501-0001)
Tested by (name + signature).....:		Steve McKitrick <i>Steve McKitrick</i>
Witnessed by (name + signature).....:		Günter Straube <i>G. Straube</i>
Approved by (name + signature).....:		Patrick Möbs <i>Patrick Möbs</i>
<hr/>		
<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).....:		
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List of Attachments (including a total number of pages in each attachment):		
Appendix No.	Description	Page(s)
1	Picture	122
2	Schematics and Layout	123 - 133
3	Model Matrix	134 -135
4	Test Results	136 -226
Summary of testing:		
Tests performed (name of test and test clause):		Testing location:
<ul style="list-style-type: none"> 1.5 Components 1.6 Power interface 1.7 Marking and instructions 2.2 SELV circuits 2.9 Electrical insulation 2.10 Clearances, creepage distances and distances through insulation 3.1 General 4.3 Design and construction 4.4 Protection against hazardous moving parts 4.5 Thermal requirements 4.7 Resistance to fire 5.2 Electric strength 5.3 Abnormal operating and fault conditions 		<p>TDK-Lambda Americas Inc. 3320 Matrix Drive, Suite 100, Richardson, Texas 75082, USA WMT (TDAP under File No. 2520400-9501-0001)</p>

Summary of compliance with National Differences:				
List of countries addressed				
The product has been tested according to standard IEC 60950-1:2005 (2 nd Edition); am1:2009 / EN 60950-1:2006/A11:2009/A1:2010/A12:2011 and those deviations taken into account of				
<input type="checkbox"/> CENELEC common modifications	<input checked="" type="checkbox"/> United Kingdom		<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Finland	<input checked="" type="checkbox"/> Denmark	<input checked="" type="checkbox"/> Ireland	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Sweden	<input checked="" type="checkbox"/> Germany	<input checked="" type="checkbox"/> Spain	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Norway	<input checked="" type="checkbox"/> Switzerland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> CB Bull. NATIONAL DIFFERENCES IEC 60950-1:2005 (2nd Edition)				
<input checked="" type="checkbox"/> Switzerland	<input checked="" type="checkbox"/> Finland	<input checked="" type="checkbox"/> Norway	<input checked="" type="checkbox"/> USA	<input type="checkbox"/>
<input checked="" type="checkbox"/> Germany	<input checked="" type="checkbox"/> United Kingdom	<input checked="" type="checkbox"/> Sweden	<input type="checkbox"/> Israel	<input type="checkbox"/>
<input checked="" type="checkbox"/> Denmark	<input checked="" type="checkbox"/> Ireland	<input checked="" type="checkbox"/> Group Differences	<input type="checkbox"/> Australia	<input type="checkbox"/>
<input checked="" type="checkbox"/> Spain	<input type="checkbox"/> Korea	<input checked="" type="checkbox"/> Canada	<input type="checkbox"/> New Zealand	<input type="checkbox"/>
For national and cenelec differences refer to main test report				
<input checked="" type="checkbox"/> The product fulfils the requirements of				
DIN EN 60950-1 (VDE 0805-1):2014-08				
EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2014				
IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013				

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 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 type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other:
Mains supply tolerance (%) or absolute mains supply values	
Tested for IT power systems	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
IT testing, phase-phase voltage (V)	
Class of equipment	<input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III <input checked="" type="checkbox"/> Not classified
Considered current rating of protective device as part of the building installation (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)	≤ 2000 m
Altitude of test laboratory (m)	app. 180m
Mass of equipment (kg)	<18kg

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	2015-01-06
Date (s) of performance of tests	2015-01-16 to 2015-01-22
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 IEC60950-1:	
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 see VDE construction form 131	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> Not applicable (one factory)
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)	30014661 TDK-Lambda Americas Inc. 3320 Matrix Drive, Suite 100, Richardson, Texas 75082, USA 30017287 TDK-Lambda Malaysia Sdn. Bhd. PLO 33 Kawasan Perindustrian Senai; Locked Bag No. 110; SENAI, JOHOR 81400; Johor; Malaysia
General product information:	
<p>The label includes: Optional "-R" appended to product code to indicate ROHS compliance. eg. iCGXXXXXXXXXX-### -R Series</p> <p>The i6A product family consists of high density, non-isolated DC-DC power modules intended to be purchased and used as a component in an end-user's power system. The modules will be offered in multiple input voltage and output voltage ranges. The input ranges from 9 – 55Vdc input. The output voltage will be adjustable between -30 V to 30V. The rated output power will be 250W or less.</p> <p>i6A Product Family Similarities:</p> <p>The design intention is that the modules within a platform consist of a family of units with similar form, fit and function with the exception of the output voltage and current. The major differences between the modules will be as follows.</p> <p>The PWB may be changed though the difference in the layout is minimal. The power output inductor is the same structure, but the number of turns will be modified depending upon the output voltage or current of the specific power module.</p> <p>The semiconductors such as power switches may be different devices depending upon the specific voltage and current stresses in the various power module designs. The power devices may have heat sink applied or omitted.</p> <p>The input and output filter capacitors may be different values depending upon the specific voltage and current stresses in the various power module designs.</p> <p>Control circuits will have value changes to scale the typical circuit parameters such as output voltage and output current limit set point as required for the different designs.</p> <p>Other control circuits such as the feedback compensation may have value changes as required for each specific design.</p>	

Testing Plan:

Our intention is to obtain approve for the power module series by testing highest output voltage and highest power module i6A24014A033V-0xx samples.

We would like to obtain approval to the following standards: UL60950 (US & Canada), VDE0805, CB scheme (IEC950), CE mark (EN60950).

Manufacturing:

The i6A product family will be manufactured by TDK-Lambda (M) Sdn. Bhd. PLO 33, Kawasan Perindustrian Senai, Locked Bag No. 110, 81400 Senai, Johor, Malaysia and/or TDK Lambda Americas – Dallas Technical Center, 3320 Matrix Drive, Suite 100, Richardson, TX 75082.

The facilities are **UL, CSA and VDE** approved manufacturing facility with **ISO9002** certified.



Unit was tested with a 30 A external fuse.

The DC-DC Converters are not internally fused. An external input line fuse is required

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

Indicate used abbreviations (if any)

Information to test report reference No. :	
VDE Test- and Certification Institute GmbH Merianstrasse 28 D - 63069 Offenbach	DIN EN 60950-1 (VDE 0805-1):2014-08 EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2014 IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013
Test item description:	Component DC-DC Converters for building-in in IT-equipment
Made by :	TDK-Lambda Americas Inc. 3320 Matrix Drive, Richardson, TX, 75082
Trade mark :	 and/or  and/or
Model/type ref. :	I6A series, (See model matrix)
Rated :	Input: DC 9-55V, max 16,5 A, Output: 3.3 – 30V, 20 A, max 250W (See model matrix) Appendix 3
Commission received from	Steve.Mc Kitrick
Date:	2015-01-16
Modification on the appliance:	
1.	Testing to: DIN EN 60950-1 (VDE 0805-1):2014-08 EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2014 IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013

Test Report History:			
This report may consist of more than one report and is valid only with additional or previous issued reports:			
Date: (jjjj-mm-dd)	VDE-Certificate: CB-Ref. No.:	Test Report Number	Modifications:
2015-01-16	CB/DE1-55140	2520400-3336-0049/207721	Original Test Report
			Testing to: DIN EN 60950-1 (VDE 0805-1):2014-08 EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2014 IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013