



### TEST REPORT IEC 62368-1

# Audio/video, information and communication technology equipment Part 1: Safety requirements

**Report Number .....: 50391186 001**Date of issue .....: 2020-08-10

Total number of pages .....: 77 (excluding attachments, refer to page 3)

Applicant's name.....: TDK-Lambda (China) Electronics Co., Ltd.

Address ...... No. 95, Zhujiang Road, Xinwu District, Wuxi 214028 Jiangsu, P.R. China

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

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Test Item description:	Switching Power Supply
Trade Mark::	TDK-Lambda
Manufacturer:	Same as applicant
Model/Type reference:	CUS250x-yzz1 (x = blank or LD; y = 3, 4, 5, 12 or 24; z = /CO2, /A or blank; z1 = alphanumeric character, symbol or blank)
Ratings:	See the model list on page 10

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Testi	ng procedure and testing location:			
$\boxtimes$	CB Testing Laboratory:	TÜV Rheinland Shanghai	Co., Ltd.	
Testi	ng location/ address:	No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China		
	Associated CB Testing Laboratory:			
Testi	ng location/ address:			
-	Tested by (name + signature):	Tim Song / Technical Expert	7hm Suf.	
,	Approved by (name + signature)::	Sunny Sun / Technical Reviewer	7hm Suf.	
	Testing procedure: TMP/CTF Stage 1			
Testi	ng location/ address:			
-	Tested by (name + signature):			
Approved by (name + signature):				
	Testing procedure: WMT/CTF Stage 2			
Testi	ng location/ address:			
-	Tested by (name + signature):			
,	Witnessed by (name + signature):			
	Approved by (name + signature):			
	Testing procedure: SMT/CTF Stage 3 or 4			
Testi	ng 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):

- ATTACHMENT Measurement Section (4 pages)
- ATTACHMENT National Differences (35 pages)
- ATTACHMENT Photo documentation (5 pages)

Note: Total number of pages in each attachment is indicated in individual attachment.

### Summary of testing:

### Tests performed (name of test and test clause):

This report is based on original CB report 50178634 001 with certificate ref. no. JPTUV-090645 with following changes:

- Change Applicant and Manufacturer from TDK-Lambda Corp. Nagaoka Technical Center to TDK-Lambda (China) Electronics Co., Ltd.
- Add additional new factory TDK-Lambda (China) Electronics Co., Ltd.
- 3. Update test standard from IEC 60950-1 to IEC 62368-1.

All applicable tests as described in Test Case and Tables were performed.

The maximum specified operation ambient temperature is 70°C. Specified ambient temperature for operation is according to manufacturer's specification. (see chart of convection cooling on following)

Unless otherwise indicated, all tests were conducted on Models CUS250x-4zz1, CUS250x-12zz1 and CUS250x-24zz1 to represent other similar models.

The load conditions used during testing: Maximum normal load according to clause B.2.5 for this equipment is the operation with the maximum specified DC-load with maximum power condition according to the manufacturer specified.

The equipment is operated up to 3000m above sea level as declared by manufacturer. Clearances have been evaluated according to IEC 60664-1 table A.2 with a multiplication factor of 1.14 throughout this report.

The test samples are pre-production without serial numbers.

### **Testing location:**

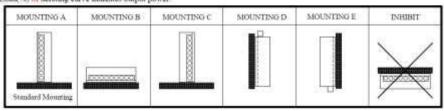
TÜV Rheinland Shanghai Co. Ltd. No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China

#### Mouting position:

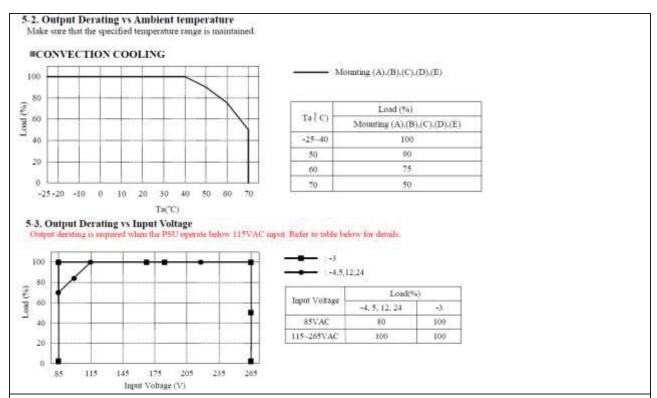
### 5. Mounting Directions

5-1. Output Derating according to the Mounting Directions.
Recommended standard mounting method is (A). Method (B)-(E) are also possible. Refer to the output denting below.

Reconnected standard mounting method is (A). Method (B)-(E) are also possible. Refer to the output defining below Load(%) of derating curve indicates output power.



#### **Derating Curve:**



### **Summary of compliance with National Differences:**

#### List of countries addressed

EU Group Differences, EU Special National Conditions, AU, CA, DK, JP, NZ, US

### Explanation of used codes:

AU = Australia; CA = Canada; DK = Denmark; JP = Japan; NZ = New Zealand; US = United States of America

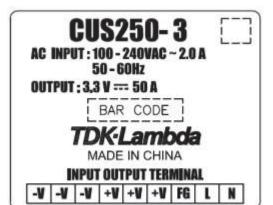
### ☐ The product fulfils the requirements of

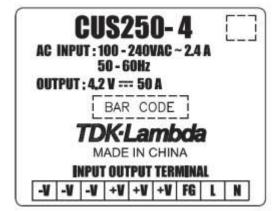
IEC 62368-1:2014 (Second Edition), EN 62368-1:2014+A11:2017 and CSA/UL 62368-1:2014 Page 5 of 77 Report No.: 50391186 001

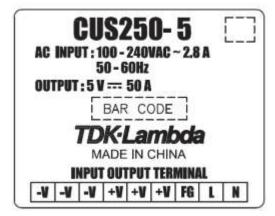
### Copy of marking plate

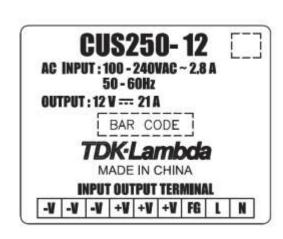
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

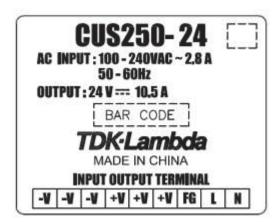
<Representative>











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## **CUS250LD-3**

AC INPUT: 100 - 240VAC ~ 2.0 A 50 - 60Hz

OUTPUT: 3.3 V == 50 A

BAR CODE

### TDK-Lambda

MADE IN CHINA

INPUT OUTPUT TERMINAL

-V |-V |-V |+V |+V | FG | L | N

## **CUS250LD-4**

AC INPUT : 100 - 240VAC ~ 2.4 A 50 - 60Hz

OUTPUT : 4.2 V === 50 A

BAR CODE

### TDK-Lambda

MADE IN CHINA

**INPUT OUTPUT TERMINAL** 

-V -V -V +V +V +V FG L N

## **CUS250LD-5**

AC INPUT: 100 - 240VAC ~ 2.8 A 50 - 60Hz

OUTPUT : 5 V === 50 A

BAR CODE

### TDK-Lambda

MADE IN CHINA

INPUT OUTPUT TERMINAL

-V -V -V +V +V +FG L N

## **CUS250LD-12**

AC INPUT: 100 - 240VAC ~ 2.8 A

50 - 60Hz

OUTPUT: 12 V === 21 A

BAR CODE

### TDK·Lambda

MADE IN CHINA

**INPUT OUTPUT TERMINAL** 

-V |-V |-V |+V |+V | FG | L | N

## **CUS250LD-24**

AC INPUT: 100 - 240VAC ~ 2.8 A 50 - 60Hz

OUTPUT: 24 V === 10.5 A

BAR CODE

### TDK-Lambda

MADE IN CHINA

**INPUT OUTPUT TERMINAL** 

-V |-V |-V |+V |+V | FG | L | N

## CUS250-3/CO2 []]

AC INPUT: 100 - 240VAC ~ 2.0 A 50 - 60Hz

OUTPUT: 3.3 V === 50 A

BAR CODE

### TDK-Lambda

MADE IN CHINA

INPUT OUTPUT TERMINAL

-V -V -V +V +V +V FG L N

## CUS250-4/CO2

AC INPUT: 100 - 240VAC ~ 2.4 A

50 - 60Hz

OUTPUT: 4.2 V === 50 A

BAR CODE

### TDK·Lambda

MADE IN CHINA

INPUT OUTPUT TERMINAL

-V -V -V +V +V +V FG L N

## CUS250-5/CO2

AC INPUT: 100 - 240VAC ~ 2.8 A

50 - 60Hz

OUTPUT: 5 V == 50 A

BAR CODE

### TDK-Lambda

MADE IN CHINA

INPUT OUTPUT TERMINAL

-V -V -V +V +V FG L N

## CUS250-12/CO2

AC INPUT: 100 - 240VAC ~ 2.8 A

50 - 60Hz

OUTPUT: 12 V === 21 A

BAR CODE

### TDK-Lambda

MADE IN CHINA

**INPUT OUTPUT TERMINAL** 

-V -V -V +V +V +V FG L N

## CUS250-24/CO2

AC INPUT: 100 - 240VAC ~ 2.8 A

50 - 60Hz

OUTPUT: 24 V === 10.5 A

BAR CODE

### TDK-Lambda

MADE IN CHINA

INPUT OUTPUT TERMINAL

-V |-V |-V |+V |+V | FG | L | N

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TEST ITEM PARTICULARS:			
Classification of use by:	<ul> <li>☑ Ordinary person</li> <li>☑ Instructed person</li> <li>☑ Skilled person</li> <li>☐ Children likely to be present</li> </ul>		
Supply Connection:	<ul><li>☑ AC Mains ☐ DC Mains</li><li>☐ External Circuit - not Mains connected</li><li>- ☐ ES1 ☐ ES2 ☐ ES3</li></ul>		
Supply % Tolerance:	<ul><li></li></ul>		
Supply Connection – Type:	<ul> <li>□ pluggable equipment type A -</li> <li>□ non-detachable supply cord</li> <li>□ appliance coupler</li> <li>□ direct plug-in</li> <li>□ mating connector</li> <li>□ pluggable equipment type B -</li> <li>□ non-detachable supply cord</li> <li>□ appliance coupler</li> <li>□ permanent connection</li> <li>□ mating connector □ other:Terminal block</li> </ul>		
Considered current rating of protective device as part of building or equipment installation	16 A or 20 A (for US/CSA) Installation location: ⊠ building; □ equipment		
Equipment mobility:	<ul> <li>☐ movable</li> <li>☐ hand-held</li> <li>☐ stationary</li> <li>☐ for building-in</li> <li>☐ direct plug-in</li> <li>☐ rack-mounting</li> <li>☐ wall-mounted</li> </ul>		
Over voltage category (OVC):	□ OVC I         □ OVC II         □ OVC III           □ OVC IV         □ other:		
Class of equipment			
Access location			
Pollution degree (PD)	☐ PD 1		
Manufacturer's specified maxium operating ambient	70 °C		
IP protection class:	☑ IPX0 ☐ IP		
Power Systems:			
Altitude during operation (m):	☐ 2000 m or less ⊠ up to 3000 m		
Altitude of test laboratory (m)			
Mass of equipment (kg)	≅0.68kg (with chassis and cover)		

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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:	2015-03-06 (15077109 001) 2018-06-29 (50178634 001) 2020-05-19 (this report)
Date (s) of performance of tests:	2015-03-21 to 2015-04-02 (15077109 001) 2018-08-22 (50178634 001) 2020-06-19 (this report)
GENERAL REMARKS:	
"(See Enclosure #)" refers to additional information (See ATTACHMENT #)" refers to additional information (See appended table)" refers to a table appended Throughout this report a □ comma / ⋈ point is under the comma of the c	mation appended to the report. to the report.
Manufacturer's Declaration per sub-clause 4.2.5 of	FIECEE 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	<ul><li>✓ Yes</li><li>☐ Not applicable</li></ul>
When differences exist; they shall be identified in	the General product information section.
Name and address of factory (ies):	<ol> <li>TDK-Lambda (China) Electronics Co., Ltd.         No. 95, Zhujiang Road, Xinwu District, Wuxi 214028 Jiangsu, P.R. China     </li> <li>Zhangjiagang Hua Yang Electronics Co., Ltd. Zhao Feng Industrial Zone, Leyu Town Zhangjiagang, 215622 Jiangsu, P.R. China</li> </ol>

### **GENERAL PRODUCT INFORMATION:**

#### General product information:

The EUT is a component type switching mode power supplies intended for the class I construction of information technology equipment.

The equipment employs PCB: CCB156 (primary, PB and secondary circuits)

All models are identical, except of the turns of Transformer and the rating of some components which results in different output ratings. See Model List below for details.

For rating differences between the models see below tables:

Model	I/p voltage (Vac)	Fre. (Hz)	I/p current (A)	Minimal output	Rated output (typical)	Maximum output	Max. O/P Power
CUS250x-3zz1	100-240	50-60	2.0	2.97Vd.c.	3.3Vd.c.	3.63Vd.c.	~165
C03230X-3221	100-240	50-60	2.0	50A	50A	45.45A	≅165
CUS250x-4zz1	100-240	50-60	2.4	3.78Vd.c.	4.2Vd.c.	4.62Vd.c.	~040
CUS250X-4221	100-240	50-60	2.4	50A	50A	45.45A	≅210
CUS250x-5zz1	100-240	50-60	2.8	4.5Vd.c.	5Vd.c.	5.5Vd.c.	~050
CU3230x-3221	100-240	50-60	2.0	50A	50A	45.45A	≅250
CUS250x-12zz1	100-240	50-60	2.8	10.8Vd.c.	12Vd.c.	13.2Vd.c.	~050
CU3230X-12221	100-240	50-60	2.0	21A	21A	19.1A	≅252
CUS250x-24zz1	100-240	E0 60	2.8	21.6Vd.c.	24Vd.c.	26.4Vd.c.	~050
CU3230X-24221	100-240	50-60	∠.8	10.5A	10.5A	9.55A	≅252

#### Remark:

Operating temp.: up to +70°C (operating temperature depending on equipment's load, mounting position, for details refer to instruction manual).

### **Additional Information:**

- The product is a component type switching power supply, the overall compliance shall be investigated in the complete end system/equipment, in particular as:
  - Fire enclosure
  - Mechanical enclosure
  - Electrical enclosure
- Some components are **pre-certified**, which have been evaluated according to the relevant requirements of IEC 62368-1, are employed in this product. Their suitability of use has been checked according to clauses 4.1.1 and 4.1.2.
- The product is to be operated up to 3000 m above sea level, the minimum clearances were multiplied by the factor given in Table A.2 of IEC 60664-1: 1.14.
- The label is draft of artwork for marking plates pending approval by National Certification Bodies and it shall not be affixed to products prior to such an approval.

### **Markings and Instructions**

- The installation instruction contains instructions for connection to an IT power distribution system.
- Fuse Identification: F1: AC 250V T6.3AH

The product also marked with:

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE.

#### **Definition of variable(s):**

CUS250x-yzz1 (x = blank or LD; y = 3, 4, 5, 12 or 24; z = /CO2, /A or blank; z1 = alphanumeric character, symbol or blank)

Note: Suffix options would be used shown below or used together.				
Variable:	Range of variable:	Content:		
Х	LD or blank	blank: Standard type of model name; LD: Special type of model name base on the customer requirement.		
У	3, 4, 5, 12 or 24	Denotes for different output voltage.		
Z	/CO2, /A or blank	/CO2 = with coating; /A = with plastic cover blank = not coating		
z1	alphanumeric character, symbol or blank	For market purposes, no construction differences and no safety impact.		

#### Additional application considerations – (Considerations used to test a component or sub-assembly) –

The equipment is a component intended for incorporation in IT equipment, the overall compliance shall be investigated in the complete end system.

The power supply cord set was not evaluated together with the equipment. The suitable certified power supply cord set has to be provided in the country where the equipment is sold.

#### **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)	
Primary circuits	ES3	
DC output terminal	ES1	

#### 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)			
Primary circuits	PS3			
DC output	PS3			

### 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)	
Sharp edges and corners	MS1	

ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:						
Equipment mass – mass < 7 kg MS1						
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	1	Corresponding	classification (TS)			
Metal chassis		The evaluation s system approval	hall be made during	the final		
Radiation (Clause 10) (Note: List the types of radi Example: DVD – Class 1 L	ation present in the product	and the correspon	ding energy source RS1	classification.)		
Type of radiation		Corresponding	classification (RS)			
N/A		N/A				
	ENERGY SOUR	RCE DIAGRAM				
Indicate which energy sou	rces are included in the ener	gy source diagran	n. Insert diagram be	low		
See "ENEF	RGY SOURCE IDENTIFICAT			<u>.</u> "		
OVERVIEW OF EMPLOY	ED SAFEGUARDS					
Clause	Possible Hazard					
5.1	Electrically-caused injury					
Body Part (e.g. Ordinary)	Energy Source (ES3: Primary Filter circuit)	Basic	Safeguards Supplementary	Reinforced		
Ordinary (output circuit assumed to be accessible by ordinary person in end product)	ES3: Primary circuits			Isolating Transformers, Optocouplers		
Ordinary (metal chassis assumed to be direct or indirect accessible by ordinary person in end product)	ES3: Primary circuits	Certified Y- Capacitor	Protectively bonding chassis	N/A		
Ordinary	ES1: Output	N/A	N/A	N/A		
6.1	Electrically-caused fire					
Material part	Energy Source Safeguards					
(e.g. mouse enclosure)	(PS2: 100 Watt circuit)	Basic	Supplementary	Reinforced		
Combustible materials	PS3: > 100 Watt circuit (Primary circuits and Secondary circuits)	Equipment safeguards (no ignition occurs and no such temp. attained specified in 6.3.1 a)	Equipment safeguards (e.g. rated V-0 PCB, combustible material rated V- 2 min., metal fire barrier or	N/A		

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ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:						
		enclosure; see 6.4.5 and 6.4.6)				
7.1	Injury caused by hazardou	Injury caused by hazardous substances				
Body Part	Energy Source	Safeguards				
(e.g., skilled)	(hazardous material)	Basic	Supplementary	Reinforced		
N/A	N/A	N/A	N/A	N/A		
8.1	Mechanically-caused injur	у				
Body Part	Energy Source		Safeguards	Safeguards		
(e.g. Ordinary)	(MS3:High Pressure Lamp)	Basic	Supplementary	Reinforced		
Ordinary	MS1: Sharp edge and corners	Rounded edge and corners	N/A	N/A		
Ordinary	MS1: Equipment mass – mass < 7 kg	≅0.68kg	N/A	N/A		
9.1	Thermal Burn					
Body Part	Energy Source		Safeguards			
(e.g., Ordinary)	Ordinary) (TS2)		Supplementary	Reinforced		
N/A	N/A	N/A	N/A	N/A		
10.1	Radiation	Radiation				
Body Part	Energy Source		Safeguards			
(e.g., Ordinary) (Output from	(Output from audio port)	Basic	Supplementary	Reinforced		
N/A	N/A	N/A	N/A	N/A		
Supplementary Inforr	mation:	•				

### Supplementary Information:

- (1) See attached energy source diagram for additional details.
- (2) "N" Normal Condition; "A" Abnormal Condition; "S" Single Fault