



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** ..... : CB 156788-80023774  
 Date of issue ..... : 2019-11-29  
 Total number of pages..... : 87


**Applicant's name**..... : SL POWER ELECTRONICS CORP  
 Address..... : BLDG A, 6050 KING DR, VENTURA, CA 93003 USA



**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 .....	Power Supply
Trade Mark.....	
Manufacturer .....	Same as Applicant
Model/Type reference.....	TF1500A12K, TF1500A15K, TF1500A24K, TF1500A30K, TF1500A36K, TF1500A48K, TF1500A60K
Rating.....	Input: 100-240Vac, 50/60 Hz, 18-9 A Output: See page 9 for detail

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	CSA Group - Taiwan Canadian Standards Association (Far East Operations) Ltd.
Testing location/ address .....		No.26, Fuxing 3rd Road, Guishan District, Taoyuan City 333, Taiwan Chinese Taipei.
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address .....		
Tested by (name + signature).....:		Allen Huang/Certifier 
Approved by (name + signature) .....		Cay Hsieh /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).....:		
Approved by (name + signature) .....		
Supervised by (name + signature).....:		

<b>List of Attachments (including a total number of pages in each attachment):</b>	
<b>Att. 1 National Differences</b>	<b>( 32 pages )</b>
<b>Att. 2 Photographs</b>	<b>( 14 pages )</b>
<b>Att. 3 Drawings</b>	<b>( 12 pages )</b>
<b>Att. 4 Additional Test</b>	<b>( 18 pages )</b>
<b>Summary of testing:</b>	
<p><b>Tests performed (name of test and test clause):</b> All applicable data had been carried out under CB Report mentioned in below, the information and test data is copying from the following CBTB/TR:</p> <p>CBTC number: JPTUV-100700, dated 2019-09-23; CBTR number: 50273211 001, dated 2019-09-19;</p> <p>Test List: 5.2 – Classification of electrical energy sources 5.4.1.4, 6.3.2, 9.0, B.2.6 – Temperature measurements 5.4.1.10.3 – Ball pressure test of thermoplastics 5.4.2.2, 5.4.2.4, 5.4.3 – Minimum clearances/ creepage distances 5.4.8 – Humidity conditioning 5.4.9 – Electric strength test 5.6.6.2 – Resistance of protective conductors and terminations 5.7 – Prospective touch voltage, touch current and protective conductor current 5.7.2.2, 5.7.4 - Earthed accessible conductive part 6.2.2 – Electrical power sources (PS) measurement for classification B.2.5 – Input test B.3 – Abnormal operating condition tests B.4 – Fault condition tests T – Mechanical and Stress Relief test</p> <p>Based on review of previous test data recorded in CB test report and all necessary documents including circuit schematic, photographs, and review of test sample, the above CBTC/TR is considered accepted without additional tests, exclude below test: 5.5.2.2 – Capacitor Discharge</p> <p><b>Additional test at CSA:</b> 5.5.2.2 – Capacitor Discharge</p>	<p><b>Testing location:</b> See Page 2.</p>

**Summary of compliance with National Differences:****List of countries addressed**

**CENELEC member countries (EU group differences): Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Cyprus (CY), the Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), Former Yugoslav Republic of Macedonia (MK), France (FR), Germany (DE), Greece (GR), Hungary (HU), Iceland (IS), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), the Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), Turkey (TR) and the United Kingdom (GB).**

**Australia (AU), Canada (CA), New Zealand (NZ), United States (US)**

**The product fulfils the requirements of national and group differences according to EN 62368-1:2014+A11:2017**

**The product fulfils the requirements of national differences according to CSA C22.2 No. 62368-1-14, UL 62368-1, 2<sup>nd</sup> edition**

**The product fulfils the requirements of national differences according to AS/NZS 62368.1:2018**

**The product fulfils the requirements of national differences according to J62368-1 (H30)**

**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.



**SL**  
POWER ELECTRONICS  
www.slpower.com

**TF1500A24K**

INPUT: 100-240 VAC  
50/60Hz 18-9A  
OUTPUT: +24V = 62.5A

**CE** **UL** **CCC** **RoHS** **Made in Taiwan**

**DC OUTPUT** **AC INPUT**

**SL**  
POWER ELECTRONICS  
www.slpower.com

**TF1500A30K**

INPUT: 100-240 VAC  
50/60Hz 18-9A  
OUTPUT: +30V = 50A

**CE** **UL** **CCC** **RoHS** **M001**

**DC OUTPUT** **AC INPUT**

**SL**  
POWER ELECTRONICS  
www.slpower.com

**TF1500A30K**

INPUT: 100-240 VAC  
50/60Hz 18-9A  
OUTPUT: +30V = 50A

**CE** **UL** **CCC** **RoHS** **Made in Taiwan**

**DC OUTPUT** **AC INPUT**

**SL**  
POWER ELECTRONICS  
www.slpower.com

**TF1500A36K**

INPUT: 100-240 VAC  
50/60Hz 18-9A  
OUTPUT: +36V = 41.7A

**CE** **UL** **CCC** **RoHS** **M001**

**DC OUTPUT** **AC INPUT**

**SL**  
POWER ELECTRONICS  
www.slpower.com

**TF1500A36K**

INPUT: 100-240 VAC  
50/60Hz 18-9A  
OUTPUT: +36V = 41.7A

**CE** **UL** **CCC** **RoHS** **Made in Taiwan**





**DC OUTPUT** **AC INPUT**



**SL**  
POWER ELECTRONICS  
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**TF1500A48K**

INPUT: 100-240 VAC  
50/60Hz 18-9A  
OUTPUT: +48V = 31.3A

    M001

DC OUTPUT AC INPUT

**SL**  
POWER ELECTRONICS  
www.slpower.com

**TF1500A48K**

INPUT: 100-240 VAC  
50/60Hz 18-9A  
OUTPUT: +48V = 31.3A





    Made in Taiwan

DC OUTPUT AC INPUT

**SL**  
POWER ELECTRONICS  
www.slpower.com

**TF1500A60K**

INPUT: 100-240 VAC  
50/60Hz 18-9A  
OUTPUT: +60V = 25A

    M001

DC OUTPUT AC INPUT

**SL**  
POWER ELECTRONICS  
www.slpower.com

**TF1500A60K**

INPUT: 100-240 VAC  
50/60Hz 18-9A  
OUTPUT: +60V = 25A

    Made in Taiwan

DC OUTPUT AC INPUT

<b>TEST ITEM PARTICULARS:</b>	
Classification of use by.....:	<input checked="" type="checkbox"/> Ordinary person <input type="checkbox"/> Instructed person <input type="checkbox"/> Skilled person <input type="checkbox"/> Children likely to be present
Supply Connection.....:	<input checked="" type="checkbox"/> AC Mains <input type="checkbox"/> DC Mains <input type="checkbox"/> External Circuit - not Mains connected - <input type="checkbox"/> ES1 <input type="checkbox"/> ES2 <input checked="" type="checkbox"/> ES3
Supply % Tolerance .....	<input checked="" type="checkbox"/> +10%/-10% <input type="checkbox"/> +20%/-15% <input type="checkbox"/> ___%/ ___% <input type="checkbox"/> None
Supply Connection – Type .....	<input checked="" type="checkbox"/> pluggable equipment type A - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> direct plug-in <input type="checkbox"/> mating connector <input type="checkbox"/> pluggable equipment type B - <input type="checkbox"/> non-detachable supply cord <input type="checkbox"/> appliance coupler <input type="checkbox"/> permanent connection <input type="checkbox"/> mating connector <input checked="" type="checkbox"/> other: Terminal block.
Considered current rating of protective device as part of building or equipment installation .....	16 A, 13 A (GB) or 20 A (US and Canada) for building; 20 A (for equipment) Installation location: <input checked="" type="checkbox"/> building; <input checked="" type="checkbox"/> equipment
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 <input type="checkbox"/> rack-mounting <input type="checkbox"/> wall-mounted
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: _____
Class of equipment .....	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III
Access location .....	<input type="checkbox"/> restricted access location <input checked="" type="checkbox"/> N/A
Pollution degree (PD) .....	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
Manufacturer's specified maximum operating ambient:	+50°C (output at full load) and +60°C (for output at 60% load)
IP protection class .....	<input checked="" type="checkbox"/> IPX0 <input type="checkbox"/> IP__
Power Systems .....	<input checked="" type="checkbox"/> TN <input type="checkbox"/> TT <input checked="" type="checkbox"/> IT - 230V <sub>L-L</sub>
Altitude during operation (m) .....	<input type="checkbox"/> 2000 m or less <input checked="" type="checkbox"/> 3000 m
Altitude of test laboratory (m) .....	<input checked="" type="checkbox"/> 2000 m or less <input type="checkbox"/> _____ m
Mass of equipment (kg) .....	<input checked="" type="checkbox"/> 2.6 kg
<b>POSSIBLE TEST CASE VERDICTS:</b>	
- 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)
<b>TESTING:</b>	
Date of receipt of test item..... :	2019-11-05
Date (s) of performance of tests..... :	2018-11-06
<b>GENERAL REMARKS:</b>	
<p>"(See Enclosure #)" refers to additional information appended to the report.                  "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IECCE 02:</b>	
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..... :	<input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>Not applicable</b>
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies)..... :</b>	1. Cotek Electronic Industrial Co Ltd No. 33, Sec. 2, Renhe Rd., Daxi Township, Taoyuan County 33548 Taiwan  2. DONG GUAN TEKVERT POWER CO., LTD Building 121, Arising Sun Industrial City, No.13, Xinan Road, Lin Village, Tangxia Town, Dongguan City, Guangdong Province 523710, P. R. China
<b>GENERAL PRODUCT INFORMATION:</b>	
<p><b>Product Description –</b></p> <ol style="list-style-type: none"> <li>The equipment is a Power Supply, intended for use with Audio/video, information and communication technology Equipment.</li> <li>The equipment were submitted and tested for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: +50°C (output at full load) and +60°C (for output at 60% load).</li> <li>The equipment was evaluated for a maximum operating altitude of 3000 m. Therefore the requirements of IEC 60664-1:1992+A1+A2 for clearances were considered and the required clearance was multiplied with an altitude correction factor of 1.14.</li> <li>The following output circuits are ES1: Output.</li> <li>The test samples were a pre-production without serial number.</li> <li>The equipment consists of electronic components mounted on PCB.</li> <li>The enclosures secured together by screws.</li> <li>Earthing terminal shall be reliably connected to protective earth in final system assembly.</li> <li>This CB test report is based on the previous IEC 62368-1:2014 (Second Edition) test report 50273211 001 with the certificate no.: JPTUV-100700 issued by TUV Rheinland Japan Ltd. No technical changes have been found by construction review at the provided samples and/or other administrative modifications.</li> </ol> <p><b>Model Differences –</b></p> <p>All models are similar to each other except for model designation, output rating, transformer and secondary components/circuits.</p>	

**Output rating**

Model	Output Rating
TF1500A12K	12Vdc / 125A
TF1500A15K	15Vdc / 100A
TF1500A24K	24Vdc / 62.5A
TF1500A30K	30Vdc / 50A
TF1500A36K	36Vdc / 41.7A
TF1500A48K	48Vdc / 31.3A
TF1500A60K	60Vdc / 25A

Unless otherwise specified, the tests were performed on the most representational models TF1500A12K, TF1500A15K and TF1500A60K under this certification.

Layout B is minor change to layout A, not influence safety.

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

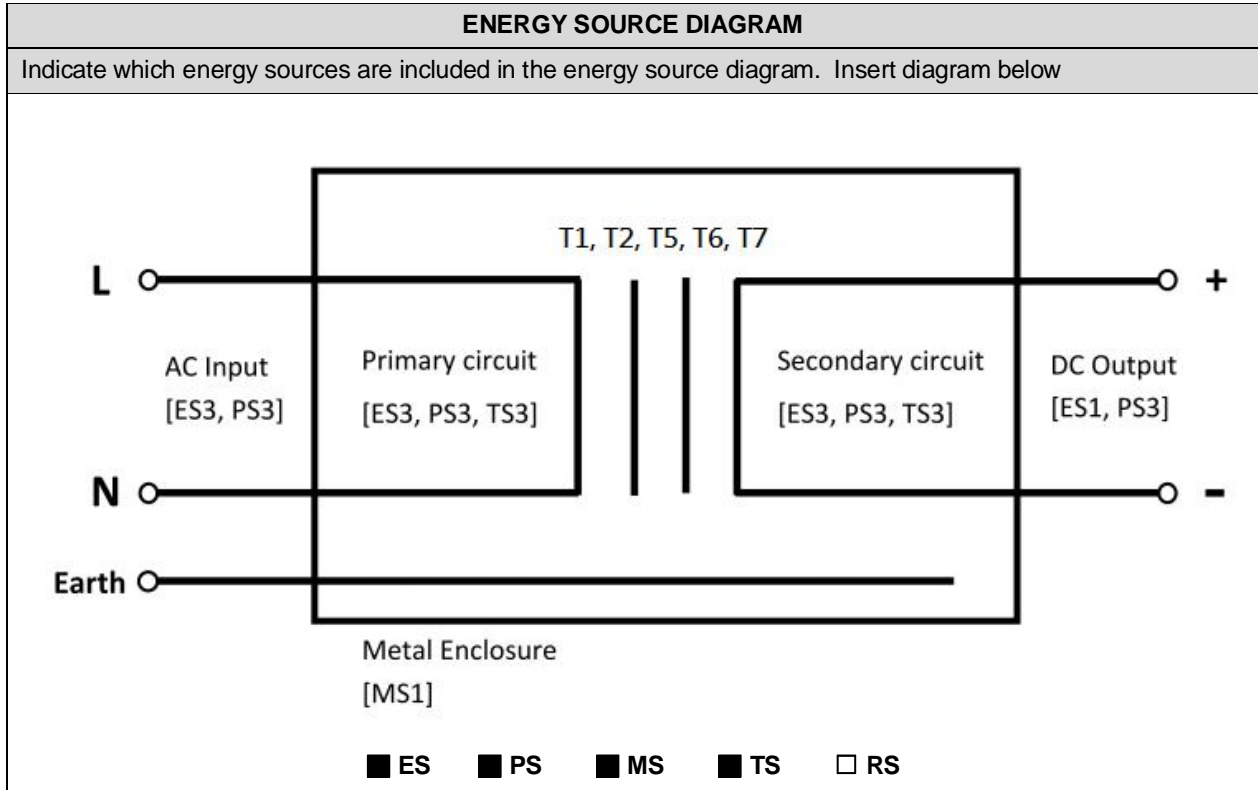
Where the components or subassemblies are used in circuits is compliance with the relevant IEC component standards and/or tested under the conditions occurring in the equipment, and that checked for correct application and use in accordance with its rating.

**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)

<b>ENERGY SOURCE IDENTIFICATION AND CLASSIFICATION TABLE:</b>	
(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.)	
<b>Electrically-caused injury (Clause 5):</b> (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)
X-capacitors connected between L and N	ES3
All circuits except for output circuits	ES3
Output circuit (connector)	ES1
<b>Electrically-caused fire (Clause 6):</b> (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 circuits	PS3
<b>Injury caused by hazardous substances (Clause 7)</b> (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
<b>Mechanically-caused injury (Clause 8)</b> (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
Moving parts (DC fan, plastic fan blade)	MS3
Equipment mass – mass < 7 kg	MS1
<b>Thermal burn injury (Clause 9)</b> (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)
Metal chassis (the accessible surfaces of side near terminal block)	TS1
Metal chassis	The evaluation shall be made during the final system approval
<b>Radiation (Clause 10)</b> (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)
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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, instructed	ES3: X-capacitors connected between L and N	N/A	N/A	A safeguard provided by bleeder resistors
Ordinary, instructed	ES3: Primary circuits	Clearance/Cree page distance	Protective earth conductor	Transformers, opto-couplers, isolation IC
6.1	Electrically-caused fire			
Material part (e.g. mouse enclosure)	Energy Source (PS2: 100 Watt circuit)	Safeguards		
		Basic	Supplementary	Reinforced
Combustible materials within equipment fire barrier	PS3: > 100 Watt circuit (Primary and secondary circuits)	Equipment safeguards (no ignition occurs and no such temp. attained specified in 6.3 (a))	Equipment safeguards (e.g. min rated V-1 PWB, combustible material rated V-2 min., metal fire enclosure; see 6.4.5 and 6.4.6)	N/A
Metal chassis	PS3: > 100 Watt circuit (primary and secondary circuits)	Not combustible materials	Equipment safeguards (control of fire spread)	N/A
Internal wiring material	PS3: > 100 Watt circuit (primary and secondary circuits)	See above and subclause 6.3.1 (a)	Equipment safeguards (rated VW-1, see 6.5 for details)	N/A
Component material	PS1: < 15 Watt circuit	N/A	N/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)
Ordinary Person	MS1: Sharp edges and corners (none)	N/A	N/A	N/A
Ordinary Person	MS1: Equipment mass – mass < 7 kg	N/A	N/A	N/A
Ordinary Person	Moving parts (DC fan),	N/A	N/A	N/A

	shall be made the evaluation during the final system approval			
9.1	Thermal Burn			
Body Part (e.g., Ordinary)	Energy Source (TS2)	Safeguards		
		Basic	Supplementary	Reinforced
Ordinary Person	TS1: Metal chassis (the accessible surfaces of side near terminal block) (< 70 °C)	N/A	N/A	N/A
Ordinary Person	Metal chassis shall be made the evaluation during the final system approval	N/A	N/A	N/A
10.1	Radiation			
Body Part (e.g., Ordinary)	Energy Source (Output from audio port)	Safeguards		
		Basic	Supplementary	Reinforced
--	--	--	--	--
Supplementary Information:				
(1) See attached energy source diagram for additional details.				
(2) "N" – Normal Condition; "A" – Abnormal Condition; "S" Single Fault				