

UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements)
Certification Type:	Component Recognition
CCN:	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Product:	Switching Power Supply for building-in
Model:	LS25-X /YYYYYY, where X can be 3.3, 5, 7, 12, 15, 18, 24, 28, 36, 40, 48, or 56. And /YYYYYY can be /B, /BCO, /BCO2, /BCOL, /BCO2L, /BL, /BM, /BMCO, /BMCO2, /BMCOL, /BMCO2L, /BML, /CO, /COL, /CO2, /CO2L, /L, or blank.
Rating:	Input: AC 100-240V, 0.7A, 50/60Hz; Output: LS25-3.3, 3.3Vdc (2.85 - 3.6 Vdc), 6A max.; LS25-5, 5Vdc (4.5 - 5.5 Vdc), 5A max.; LS25-7, 7Vdc, 3.6A; LS25-12, 12Vdc (10.8 - 13.2 Vdc), 2.1A max.; LS25-15, 15Vdc (13.5 - 16.5 Vdc), 1.7A max.; LS25-18, 18Vdc, 1.4A; LS25-24, 24Vdc (22 - 27.6 Vdc), 1.1A max.; LS25-28, 28Vdc, 0.9A; LS25-36, 36Vdc (32 - 40 Vdc), 0.75A max.; LS25-40, 40Vdc, 0.7A; LS25-48, 48Vdc (42 - 54 Vdc), 0.57A max.; LS25-56, 56Vdc, 0.5A.
Applicant Name and Address:	TDK-LAMBDA SINGAPORE PTE LTD #06-01/08 1008 TOA PAYOH NORTH SINGAPORE 318996 SINGAPORE

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

Issue Date: 2009-07-01
2015-12-21

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Report Reference #

E252373-A18-UL

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Prepared by: Maelyn Shi

Reviewed by: CheeBeng Wai

Supporting Documentation

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

- A. Authorization - The Authorization page may include additional Factory Identification Code markings.
- B. Generic Inspection Instructions -
 - i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.
 - ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.
 - iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

Product Description

Electronic components mounted on PWB and housed within metal enclosure.

Model Differences

All Models are similar to each other, except the following:-

- a) Output rating;
- b) Layout;
- c) Transformer (T1) primary and secondary windings;
- d) Model designation (refer to below for more designation information);

LS25-X /YYYYYY, where X can be 3.3, 5, 7, 12, 15, 18, 24, 28, 36, 40, 48, or 56. And /YYYYYY can be /B, /BCO, /BCO2, /BCOL, /BCO2L, /BM, /BMCO, /BMCO2, /BMCOL, /BMCO2L, /BL, /BML, /CO, /COL, /CO2, /CO2L, /L, or blank.

- 1) B => Input Connector (CN1) and Output connector (CN2) are from JST;
- 2) BM => Input Connector (CN1) and Output connector (CN2) are from Molex;
- 3) CO => PCB with one (1) side coating;
- 4) CO2 => PCB with two (2) sides coating;
- 5) L => Open frame (Cover removed);
- 6) blank => Input connector and output connector using terminal block TB1

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : N/A
- Operating condition : continuous
- Access location : N/A
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10% (manufacturer declared)
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : Class I (earthed)

- Considered current rating of protective device as part of the building installation (A) : 20A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : less than 2000 meters
- Altitude of test laboratory (m) : less than 2000 meters
- Mass of equipment (kg) : 0.17kg
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: Full load: 40°C for LS25-3.3, mounting B & C for model LS25-5, LS25-12, LS25-15, LS25-24, LS25-36, LS25-48; 50°C for LS25-7, LS25-18, LS25-28, LS25-56; Mounting A & D for model LS25-5, LS25-12, LS25-15, LS25-24, LS25-36, LS25-48; Derating: 50% load at Tma 65°C with mounting (B & C); 60% load at Tma 70°C with mounting (A & D) for models LS25-3.3, LS25-5, LS25-12, LS25-15, LS25-24, LS25-36 and LS25-48)., For mounting position and derating condition, refer to enclosure 4-09 for details.
- The product is intended for use on the following power systems: TN
- 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).
- LEDs provided in the product are considered low power devices: Yes

Engineering Conditions of Acceptability

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- The following Production-Line tests are conducted for this product: Electric Strength, Earthing Continuity
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 250.3 Vrms, 504.9 Vpk, Primary-Earthed Dead Metal: 241.9 Vrms, 403.01 Vpk, ,
- The following secondary output circuits are SELV: All outputs
- The following secondary output circuits are at non-hazardous energy levels: All outputs
- The following output terminals were referenced to earth during performance testing: T1 pin 6, 7,
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The maximum investigated branch circuit rating is: 20 A
- 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: Been conducted
- The following input terminals/connectors must be connected to the end-product supply neutral: For model LS25-x, where input is terminal block TB1 (pin 2); For model LS25-x, where input is connector CN1 (pin 2).
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJ2 insulation system with the indicated rating greater than Class A (105°C): T1 (Class B)
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The following LEDs operate within the exempt group per IEC 62471: Indicator LED

Additional Information

For CB report only, reissued no. 4:

This report is reissued from E252373-A18-CB-3 due to the following:

- 1) Upgrade standard to IEC 60950-1 (2nd edition including amendment 1 and amendment 2): Information Technology Equipment - Safety - Part 1: General Requirements - Edition 2 - Revision Date: 2013/05/01;
- 2) Add mounting methods (B), (C), (D) as shown in enclosure 4-09;
- 3) Add Tma of 40°C for mounting B & C at 100% load for model LS25-5, LS25-12, LS25-15, LS25-24, LS25-36 and LS25-48;
- 4) Add output derating for models LS25-3.3, LS25-5, LS25-12, LS25-15, LS25-24, LS25-36 and LS25-48 (50% load at Tma 65°C with mounting (B & C); 60% load at Tma 70°C with mounting (A & D));
- 5) Evaluate output voltage tolerance for LS25-3.3 (-13.6%, +9%), LS25-5 (+/-10%), LS25-12 (+/-10%), LS25-15 (+/-10%), LS25-24 (-8.3%, +15%), LS25-36 (+/-11.1%) and LS25-48 (+/-12.5%);
- 6) Add alternate components (Terminal block (TB1), Photocoupler (PC1), X-Capacitor (C1), Y-Capacitor (C2, C3), Insulation sleeving at A1);
- 7) Remove tape No. 530F for transformer T1, remove insulation sleeving type TC-A with 0.15mm thickness;
- 8) Factory name and address changed from

TRIO ENGINEERING CO LTD
SHIJI INDUSTRIAL ESTATE
DONGYONG
PANYU
GUANGZHOU GUANGDONG CHINA

to

PANYU TRIO MICROTRONICS CO LTD
SHIJI INDUSTRIAL ESTATE
DONGYONG
NANSHA
GUANGZHOU
GUANGDONG 511453 CHINA

This report is reissued from CBTR Ref. No. E252373-A18-CB-3-Reissue, issued date 2013-02-18 with CB Test Certificate Ref. No. DK-31080-UL, issued date 2013-02-18.

Based on previously conducted testing and the review of product construction, only limited tests were deemed necessary.

Additional Standards

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

Markings and instructions

Clause Title	Marking or Instruction Details
Power rating - Ratings	Ratings (voltage, frequency/dc, current)
Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
Power rating -	Model Number

Model	
Fuses - Rating	Rated current and voltage and type located on or adjacent to fuse or fuseholder.
Special Instructions to UL Representative	
N/A	

Production-Line Testing Requirements						
<u>Electric Strength Test Special Constructions - Refer to Generic Inspection Instructions, Part AC for further information.</u>						
Model	Component	Removable Parts	Test probe location	V rms	V dc	Test Time, s
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<u>Earthing Continuity Test Exemptions - This test is not required for the following models:</u>						
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<u>Electric Strength Test Exemptions - This test is not required for the following models:</u>						
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<u>Electric Strength Test Component Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test:</u>						
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<u>Sample and Test Specifics for Follow-Up Tests at UL</u>						
Model	Component	Material	Test	Sample(s)	Test Specifics	
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