

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:	GWS250-XX/YYYYYYYYYYYYYY, where XX can be 12, 24, 36, 48 and Y options can be any combination of P,F,L,RL,CO,CO2,ME,T,BAT or blank.
Rating:	<p>For Model GWS250-XX/YYYYYYYYYYYYYY (except : Models GWS250-XX/PYYYYYYYYYYYYYY, GWS250-XX/BATYYYYYYYYYYYYYY, GWS250-XX/PBATYYYYYYYYYYYYYY)</p> <p>Input: 100-240 V ac, 3.3 A, 50/60 Hz</p> <p>Output:</p> <p>GWS250-12: 12 V dc (+10.8 - +13.2 V dc), 21 A max; GWS250-24: 24 V dc (+22 - +28.8 V dc), 10.5 A max; GWS250-36: 36 V dc (+32 - +40 V dc), 7 A max; GWS250-48: 48 V dc (+42 - +57.6 V dc), 5.3 A max.</p> <p>For Model GWS250-XX/PYYYYYYYYYYYYYY only:</p> <p>Input: 100-240 V ac, 4.8 A, 50/60 Hz</p> <p>Output:</p> <p>GWS250-12/P: 12 V dc (+10.8 - +13.2 V dc), 29.2 A max; GWS250-24/P: 24 V dc (+22 - +28.8 V dc), 14.6 A max; GWS250-36/P: 36 V dc (+32 - +40 V dc), 9.7 A max; GWS250-48/P: 48 V dc (+42 - +57.6 V dc), 7.3 A max.</p> <p>For Model GWS250-XX/BATYYYYYYYYYYYYYY only:</p> <p>Input: 100-240 V ac, 3.3 A, 50/60 Hz</p> <p>Output:</p> <p>GWS250-24/BAT: 21-29 V dc, 8.8 A GWS250-48/BAT: 42-58 V dc, 4.4 A</p> <p>For Model GWS250-XX/PBATYYYYYYYYYYYYYY only:</p> <p>Input: 100-240 V ac, 4.8 A, 50/60 Hz</p> <p>Output:</p> <p>GWS250-24/PBAT: 21-29 V dc, 12.2 A GWS250-48/PBAT: 42-58 V dc, 6.1 A</p>
Applicant Name and Address:	TDK-LAMBDA SINGAPORE PTE LTD #06-01/08 1008 TOA PAYOH NORTH SINGAPORE 318996 SINGAPORE

Issue Date: 2010-12-01
2016-04-11

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Report Reference #

E252373-A31-UL

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.

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.

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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 with metal enclosure.

Model Differences

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

- Ratings
- Transformer (T1) Secondary winding
- Model designation

Models GWS250-XX/PYYYYYYYYYYYYY is similar to Models GWS250-XX/YYYYYYYYYYYYYYY except for the following:

- i) ratings and higher power
- ii) external Forced Air Cooling required
- iii) alternate non-perforated Top cover
- iv) alternate control board with minor modifications to R117 from 62 ohms to 24 ohms and VR101/VR201 increased Over-Current Protection

Models GWS250-XX/BATYYYYYYYYYYY is similar to Models GWS250-XX/YYYYYYYYYYYYYYY except for output ratings.

Options:

- /F full cover
- /L no cover
- /P power up (350W)
- /RL reverse logic
- /CO lacquer coating on single side
- /CO2 lacquer coating on double side
- /ME low leakage current
- /T OTP auto-restart
- /BAT Battery Charger

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : not directly connected to the mains
- Operating condition : continuous
- Access location : operator accessible
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : Yes
- IT testing, phase-phase voltage (V) : 230V (For Norway only)
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : Up to 2000
- Altitude of test laboratory (m) : less than 2000 meters
- Mass of equipment (kg) : Open frame: 0.6 kg, With Metal enclosure: 0.82kg
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma)

permitted by the manufacturer's specification of: Models GWS250-XX:, 40 °C for 100 % load (Condition A and B), Mounting Position B, C and D; 50 °C for 100 % load (Condition A and B), Mounting Position A; 60 °C for 50 % load (Condition C and D), Mounting Position B, C and D; 70 °C for 50 % load (Condition C and D), Mounting Position A., , Models GWS250-XX/P:, 50 °C for 100 % load (Condition A and B), Mounting Position A and B; 70 °C for 70 % load (Condition C and D), Mounting Position A and B.

- The product is intended for use on the following power systems: TT, TN, IT (For Norway only)
- 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).
- The following accessible locations (with circuit/schematic designation) are within a limited current circuit: Bridging capacitor C311
- 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: Earthing Continuity, Electric Strength
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-Earthed Dead Metal: 328 Vrms, 542 Vpk
- The following secondary output circuits are SELV: All secondary outputs
- The following secondary output circuits are at hazardous energy levels: All secondary outputs
- The following secondary output circuits are Limited Current Circuits: Secondary side of C311
- The following output terminals were referenced to earth during performance testing: T1 pin 17, T301 pin 8
- The power supply terminals and/or connectors are: All models 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: TB1 Neutral (pin 4)
- 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 F), T301 (Class F)
- The following end-product enclosures are required: Electrical, Mechanical, Fire
- The maximum continuous power supply output (Watts) relied on forced air cooling from: For Models GWS250-XX/PYYYYYYYYYYYY only, Two fans at 10 cfm each placed 7cm from unit applied to Bulk capacitor C14 side (Opposite terminal block) blowing inwards.
- The following LEDs operate within the exempt group per IEC 62471: All LEDs
- Additional temperature consideration at end-product is required for bridging components such as transformers and photocouplers at applicable Tma.

Additional Information

For CB report, reissued no. 3:

This report is reissued from E252373-A32-CB-2 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) Adding of alternate Relay RL1;
- 3) Evaluate voltage range as identified by manufacturer for GWS250-12 (+/- 10%), GWS250-24 (+20%, - 8.3%), GWS-36 (+/- 11.1%) and GWS250-48 (+20%, -12.5%);
- 4) Add mounting methods (B), (C) and (D);
- 5) Add output de-rating as follow:
For Models GWS250-XX:
60 °C for 50 % load (Condition C and D), Mounting Position B, C and D;
70 °C for 50 % load (Condition C and D), Mounting Position A;
For Models GWS250-XX/P:
70 °C for 70 % load (Condition C and D), Mounting Position A and B;
- 6) Minor PCB changes to improve clearance creepage distances;
- 7) Change of factory name from TRIO ENGINEERING CO LTD to PANYU TRIO MICROTRONICS CO LTD and factory address from SHIJI INDUSTRIAL ESTATE, DONGYONG, PANYU, GUANGZHOU GUANGDONG CHINA to SHIJI INDUSTRIAL ESTATE DONGYONG NANSHA GUANGZHOU GUANGDONG 511453 CHINA.

This report is a reissue of CBTR Ref. No. E252373-A31-CB-2-Reissue, issued date 2013-03-27 with CB Test Certificate Ref. No. DK-31833, issued date 2013-03-27.

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
1.7.1 Power rating - Ratings	Ratings (voltage, frequency/dc, current)
1.7.1 Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
1.7.1 Power rating - Model	Model Number
1.7.6 Fuses - Rating	Rated current and voltage and type located on or adjacent to fuse or fuseholder.
1.7.7.2 Terminals for external primary power supply conductors	Capital letter "N" located adjacent to a terminal intended exclusively for connection of the primary power neutral conductor