

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	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)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
<b>Complementary CCN:</b>	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
<b>Product:</b>	Switching Power Supply
<b>Model:</b>	RWS300B-5, RWS300B-12, RWS300B-15, RWS300B-24, RWS300B-28, RWS300B-36, and RWS300B-48
<b>Rating:</b>	Maybe followed by suffix "abcdef" ("a" is "/", "b" is "R", "c" is "CO2", "d" is "FG", "e" is "DIN"; "f" is "H" (for RWS300B-24); and "a", "b", "c", "d", "e" and "f" may be blank) Input: 100-240 Vac, 50-60 Hz, 3.3 A (for Model RWS300B-5) and 3.8 A (for Models RWS300B-12, RWS300B-15, RWS300B-24, RWS300B-28, RWS300B-36, and RWS300B-48)
<b>Applicant Name and Address:</b>	TDK-LAMBDA CORP NAGAOKA TECHNICAL CENTER R&D DIV 2704-1 SETTAYA-MACHI NAGAOKA-SHI NIIGATA 940-1195 JAPAN

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.

Prepared by: Toshiyuki Suzuki

Reviewed by: Tetsuo Iwasaki

### 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

The product covered in this Test Report is building-in type switching power supply with a single output circuit.

Output:

5 Vdc (4.5 Vdc - 5.75 Vdc), maximum 50 A (maximum 250 W) (for Model RWS300B-5)  
12 Vdc (10.8 Vdc - 13.8 Vdc), maximum 25 A (maximum 300 W) (for Model RWS300B-12)  
15 Vdc (13.5 Vdc - 17.2 Vdc), maximum 20 A (maximum 300 W) (for Model RWS300B-15)  
24 Vdc (21.6 Vdc - 27.6 Vdc), maximum 12.5 A (maximum 300 W) (for Model RWS300B-24)  
24 Vdc (21.6 Vdc - 25.0 Vdc), maximum 12.5 A (maximum 300 W) (for Model RWS300B-24/H)  
28 Vdc (25.2 Vdc - 32.2 Vdc), maximum 11 A (maximum 308 W) (for Model RWS300B-28)  
36 Vdc (32.4 Vdc - 41.4 Vdc), maximum 8.4 A (maximum 302.4 W) (for Model RWS300B-36)  
48 Vdc (43.2 Vdc - 52.8 Vdc), maximum 6.3 A (maximum 302.4 W) (for Model RWS300B-48)

### Model Differences

All models are identical, except for model designation, output rating, secondary winding and internal construction of Transformer (T1), and secondary components.

RWS300B Series maybe followed by suffix "abcdef". ("a" is "/", "b" is "R", "c" is "CO2", "d" is "FG", "e" is "DIN", "f" is "H" (for RWS300B-24); and "a", "b", "c", "d", "e" and "f" may be blank)

1. R: Model provided with optional ON/OFF control function. Photo Coupler (PC103) and related circuit provided.
2. CO2: Model provided with optional thin coating (QMJU2) on both component and solder side of PWB
3. FG: Model with Low Leakage (the capacitances between Primary - FG reduced).
4. DIN: Model provided with Din Rail Mounting Bracket.
5. H: Model of long hold-up time.

### Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : N/A
- Operating condition : continuous
- Access location : N/A (for building-in)
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- 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) : 20 A

- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : less than 3000 m
- Altitude of test laboratory (m) : approximately 10 to 20 m
- Mass of equipment (kg) : approximately 0.9 kg
- The product is intended for use on the following power systems: TN
- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: See Enclosure Id. 7-01 and 7-04.

### **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:

- Line to Line Capacitor C1 have maximum 0.68uF for capacitance. C1: 0.68uF was used in test. Therefore, consideration shall be given in conducting Capacitance Discharge Test in the end product application with respect to the variation in C1.
- Line to ground Capacitors C2, C3 has maximum 2200 pF for capacitance. Primary to ground Capacitor C8 have maximum 2200 pF for capacitance. C2, C3 and C8: 2200pF were used in test. Therefore, consideration shall be given to conducting Touch Current Test in the end-product with respect to the variation in C2, C3 and C8.
- Earth terminal provided on Terminal Block (TB1) has not been evaluated as protective earthing terminal. This component is intended to be connected to a protective earth via earthed parts of end-product. If protective earthing conductor is connected to the earth terminal on Terminal Block (TB1) in the end product, Limited Short-Circuit Test per CSA C22.2 No.04 shall be conducted.
- Model RWS300B-5 was tested with Output Voltage Range of 4.5 - 5.75 Vdc (maximum 250 W)  
Model RWS300B-12 was tested with Output Voltage Range of 10.8 - 13.8 Vdc (maximum 300 W)  
Model RWS300B-15 was tested with Output Voltage Range 13.5 - 17.2 Vdc (maximum 300 W)  
Model RWS300B-24 was tested with Output Voltage Range of 21.6 - 27.6 Vdc (maximum 300 W)  
Model RWS300B-24/H was tested with Output Voltage Range of 21.6 - 25.0 Vdc (maximum 300W)  
Model RWS300B-28 was tested with Output Voltage Range of 25.2 - 32.2 Vdc (maximum 308 W)  
Model RWS300B-36 was tested with Output Voltage Range of 32.4 - 41.4 Vdc (maximum 302.4 W)  
Model RWS300B-48 was tested with Output Voltage Range of 43.2 - 52.8 Vdc (maximum 302.4 W).
- The end-product Electric Strength Test shall take into account the maximum working voltage of:  
[Model RWS300B-5] Primary - Secondary: 472 Vrms and 848 Vpk / Primary - Ground: 431 Vrms and 840 Vpk [Model RWS300B-12] Primary - Secondary: 413 Vrms and 784 Vpk / Primary - Ground: 411 Vrms and 776 Vpk [Model RWS300B-15] Primary - Secondary: 431 Vrms and 652 Vpk / Primary - Ground: 383 Vrms and 648 Vpk [Model RWS300B-24] Primary - Secondary: 454 Vrms and 672 Vpk / Primary - Ground: 390 Vrms and 616 Vpk [Model RWS300B-24/H] Primary - Secondary: 421 Vrms and 656 Vpk / Primary - Ground: 381 Vrms and 660 Vpk [Model RWS300B-28 and Model RWS300B-36] Primary - Secondary: 448 Vrms and 672 Vpk / Primary - Ground: 391 Vrms and 632 Vpk [Model RWS300B-48] Primary - Secondary: 456 Vrms and 664 Vpk / Primary - Ground: 388 Vrms and 612 Vpk
- The following secondary output circuits are SELV: Output of Models RWS300B-5, RWS300B-12, RWS300B-15, RWS300B-24, RWS300B-28, RWS300B-36, and RWS300B-48
- The following secondary output circuits are at hazardous energy levels: Output of Models RWS300B-5, RWS300B-12, RWS300B-15, RWS300B-24, RWS300B-28, RWS300B-36, and RWS300B-48
- 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
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): Transformer (T1) (Class 155(F))

- The following end-product enclosures are required: Electrical, Fire.
- The following secondary output circuits are ES1: Output of all models.
- The following secondary output circuits are at PS3 energy level: Output of all models.

**Additional Information**

The Clearances and Creepage Distances have additionally been assessed for suitability up to 3000 m elevation.

**Additional Standards**

The product fulfills the requirements of: UL 62368-1, 2nd Edition, 2014-12-01, CAN/CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12.

**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.