

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (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>Product:</b>	Switching Power Supplies
<b>Model:</b>	ZWS150BAF-3, -5, -12, -15, -24 or -48 may be followed by /xyz (x is R or blank, y is A or L or blank, z is CO2 or FG or FV or FGM or blank)
<b>Rating:</b>	Input: Model ZWS150BAF-3: 100-240 Vac, 50/60 Hz, 1.4A  Models ZWS150BAF-5, -12, -15, -24, -48 100-240 Vac, 50/60 Hz, 2.0A  Output: 3.3 Vdc, 30A: ZWS150BAF-3 (DC 2.64 - 3.63 V, max 30A, max 99.0W) 5 Vdc, 30A: ZWS150BAF-5 (DC 4.0 - 5.5 V, max 30A, max 150W) 12 Vdc, 12.5A: ZWS150BAF-12 (DC 9.6 - 13.2 V, max 12.5A, max 150W) 15 Vdc, 10A: ZWS150BAF-15 (DC 12.0 - 16.5 V, max 10A, max 150W) 24 Vdc, 6.3A: ZWS150BAF-24 (DC 19.2 - 26.4 V, max 6.3A, max 151.2W) 48 Vdc, 3.2A: ZWS150BAF-48 (DC 38.4 - 52.8 V, max 3.2A, max 153.6W)
<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

Issue Date: 2010-08-27  
2011-11-29

Page 2 of 11

Report Reference #

E122103-A86-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 Underwriters Laboratories Inc. ('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.

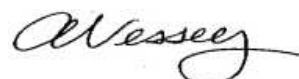
UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

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

Prepared by: Junko Minami  
Underwriters Laboratories Inc.



Reviewed by: AnnaMarie Vessey  
Underwriters Laboratories Inc.



### **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 is a switching power supply intended for building in to an ITE end product.

### Model Differences

All models are identical except for input rating of Model ZWS150BAF-3, output ratings, and the following suffixes:

Models may be followed by suffix /CO2, /FG, /FV, /R, /A, /L, /FGM

/CO2: Coating on both sides of PWB, (not relied upon to reduce spacings)

/FG: Low Leakage option

/FV: Fixed output voltage without adjustment

/R: with remote ON/OFF control function

/A: with L shaped metal chassis and cover

/L: with L shaped metal chassis on solder side

/FGM: Lowered Capacity of Y-capacitors

### Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : not directly connected to mains
- Operating condition : continuous
- Access location : 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) : -
- Class of equipment : Not classified
- Considered current rating (A) : 20 A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0

- Altitude of operation (m) : Up to 2000 m
- Altitude of test laboratory (m) : < 1000 m
- Mass of equipment (kg) : 0.4 kg approx., 0.6 kg approx. for models with suffix /A, 0.56 kg approx. for models with suffix /L
- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of: For Model Series ZWS150BAF with all suffixes except /A:; 100% load @ 30°C ambient for Mounting position A, B with convection cooling; , 100% load @ 40°C ambient for Mounting positions C, E with convection cooling; 100% load @ 50°C ambient for Mounting positions D with convection cooling; , See Enclosure Miscellaneous ID 7-01 for complete Output Derating Curves. , Repeat of Heating test should be performed in the end product application. , , For Model Series ZWS150BAFwith suffix /A, 100% load @ 20°C ambient for Mounting position A, B with convection cooling; , 100% load @ 30°C ambient for Mounting positions C, E with convection cooling; , 100% load @ 40°C ambient for Mounting positions D with convection cooling; , See Enclosure Miscellaneous ID 7-03 for complete Output Derating Curves. , Repeat of Heating test should be performed in the end product application.
- Secondary Circuits (SELV) are separated from primary by double/ reinforced insulation.
- Primary circuits are separated from Bonding/Grounding points by at least Basic insulation.

#### **Engineering Conditions of Acceptability**

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

- The following secondary output circuits are SELV: All
- The following secondary output circuits are at non-hazardous energy levels: All
- The power supply terminals and/or connectors are: Not investigated for field wiring
- 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 fully conducted. Resistance of Earthing Test of 2.6.3.4 (40A / 2 min) and Limited Short Circuit Test (US/CAN difference of 2.6.3.4) performed with acceptable results.

- 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): T2 (Class F Insulation System - Reinforced Insulation); L1, L2, L3, T1 (130°C materials, Functional Insulation), PWB (130°C)
- The following end-product enclosures are required: Electrical, Fire, Mechanical
- Heating Tests shall be repeated in the end product evaluation.

**Additional Information**

N/A

**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	Model Number
Fuses - Rating	Rated current and voltage and type located on or adjacent to fuse or fuseholder.

**Special Instructions to UL Representative**

N/A