

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)
Complementary CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Product:	DC-DC Power Module
Model:	PH50A280-5, PH50A280-12, PH50A280-24, PH50A280-48 PH75A280-3.3, PH75A280-5, PH75A280-12, PH75A280-15, PH75A280-24, PH75A280-28, PH75A280-48 PH100A280-3.3, PH100A280-5, PH100A280-12, PH100A280-24, PH100A280-48 PH150A280-5, PH150A280-12, PH150A280-15, PH150A280-24, PH150A280-28, PH150A280-48 All models maybe followed by no safety relevant suffix "abcdef" (a is /, b is H, c is T, d is V, e is 2 or 3, f is CO, and "a", "b", "c", "d", "e", "f" may be blank)
Rating:	Input Voltage: 200-425 Vdc Input Current: 0.33A (PH50A280 series) 0.5A (PH75A280 series) 0.66A (PH100A280 series) 1.0A (PH150A280 series) Output: Refer to General Product Information.
Applicant Name and Address:	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.

Issue Date: 2013-09-13
2018-12-11

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Report Reference #

E122103-A146-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: Tetsuo Iwasaki

Reviewed by: Ikuro Kinno

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 in this Test Report is building-in component type DC-DC Power Module which is intended to be used in information communication technology equipment. All components are mounted on PCB and housed in plastic enclosure.

Supply circuit to this unit is assumed to be a rectified d.c. circuit of AC Mains voltage at 140~300V.

Model Differences

See enclosure Miscellaneous 7-04 for variations of component and construction between models.

Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : Not directly connected
- Operating condition : continuous
- Access location : operator accessible
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : N/A
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : NA
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 40 A (declared by the manufacture)
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : Up to 3000
- Altitude of test laboratory (m) : Up to 2000
- Mass of equipment (kg) : Max. 0.056
- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of: 85°C with 100°C of baseplate
- The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual

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 end-product enclosures are required: Electrical
- See enclosure 7-03 for test condition
- Tests were conducted with external R/C fuse, Model DCP20, manufactured by DAITO COMMUNICATION APPARATUS CO LTD, rated 450Vdc, 2A ,
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 506 Vrms, 780 Vpk
- The following secondary output circuits are SELV: All output
- The following secondary output circuits are at non-hazardous energy levels: All output
- The power supply terminals and/or connectors are: Not investigated for field wiring
- The investigated Pollution Degree is: 2
- 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): T101: Class 155(F)
- The following output circuits are at ES1 energy levels : Output of all models
- The following output circuits are at PS3 energy levels : Output of all models
- The plastic enclosure (Frame and Cover) have been evaluated to Reinforced insulation (solid insulation) and fire barriers.
- Humidity conditioning has been conducted by tropical condition.
- Classification of PIS has not been conducted. However, the plastic enclosure (Frame and Cover) have been evaluated as fire barriers to any PIS parts and/or components inside the unit.
- This component has been evaluated in "control of fire spread" method, and the plastic enclosure (Frame and Cover) have been evaluated as fire barriers.

Additional Information

The following are the output voltage rating and output voltage ranges considered during the evaluation:

PH50A280 series;

Model PH50A280-5: 5Vdc (4.0 - 6Vdc), maximum 10A and 50W
Model PH50A280-12: 12Vdc (9.6 - 13.2Vdc), maximum 4.2A and 50.4W
Model PH50A280-24: 24Vdc (19.2 - 26.4Vdc), maximum 2.1A and 50.4W
Model PH50A280-48: 48Vdc (38.4 - 52.8Vdc), maximum 1.1A and 52.8W

PH75A280 series;

Model PH75A280-3.3: 3.3Vdc (2.97 - 3.96Vdc), maximum 15A and 49.5W
Model PH75A280-5: 5Vdc (4.0 - 6Vdc), maximum 15A and 75W
Model PH75A280-12: 12Vdc (9.6 - 13.2Vdc), maximum 6.3A and 75.6W
Model PH75A280-15: 15Vdc (12.0 - 16.5Vdc), maximum 5A and 75W
Model PH75A280-24: 24Vdc (19.2 - 26.4Vdc), maximum 3.2A and 76.8W
Model PH75A280-28: 28Vdc (22.4 - 30.8Vdc), maximum 2.7A and 75.6W
Model PH75A280-48: 48Vdc (38.4 - 52.8Vdc), maximum 1.6A and 76.8W

PH100A280 series;

Model PH100A280-3.3: 3.3Vdc (2.97 - 3.96Vdc), maximum 20A and 66W
Model PH100A280-5: 5Vdc (4.0 - 6Vdc), maximum 20A and 100W
Model PH100A280-12: 12Vdc (9.6 - 13.2Vdc), maximum 8.4A and 100.8W
Model PH100A280-24: 24Vdc (19.2 - 26.4Vdc), maximum 4.2A and 100.8W

Model PH100A280-48: 48Vdc (38.4 - 52.8Vdc), maximum 2.1A and 100.8W

PH150A280 series;

Model PH150A280-5: 5Vdc (4.0 - 6Vdc), maximum 20A and 100W

Model PH150A280-12: 12Vdc (9.6 - 13.2Vdc), maximum 12.5A and 150W

Model PH150A280-15: 15Vdc (12.0 - 16.5Vdc), maximum 10A and 150W

Model PH150A280-24: 24Vdc (19.2 - 26.4Vdc), maximum 6.3A and 151.2W

Model PH150A280-28: 28Vdc (22.4 - 30.8Vdc), maximum 5.4A and 151.2W

Model PH150A280-48: 48Vdc (38.4 - 52.8Vdc), maximum 3.2A and 153.6W

During the tests, external fuse, rated 2A / 450Vdc, type DCP20 by Daito Communication Apparatus Co., Ltd., was provided upstream the unit.

Additional Standards

The product fulfills the requirements of: 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
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