

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:	PH300A280-z/abcde (where z can be 5, 12, 24, 28 and 48, To denote different output voltage, 5 for 5Vdc, 12 for 12Vdc, 24 for 24Vdc, 28 for 28Vdc and 48 for 48Vdc; / can optional, when a, b, c, d, e are blank, then "/" is no need; a, b, c, d, e can be any alphanumeric character with "/" or blank, non safety relevant information, When all of "a, b, c, d, e" are blank, then "/" is no need.)
Rating:	See additional information (Page 5) for the details. Input Voltage: 200-425 Vdc Input Current : 1.8A Output: See additional information (Page 5) or enclosure 7-01 for details
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.

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: 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 DC-DC Power Module is building-in equipment which can be used in information technology equipment, all components mounted on minimum V-1 PCB and housed in plastic enclosure.

Model Differences

Output voltages with 12Vdc, 24Vdc 28Vdc and 48Vdc models are identical with each other except for output ratings, transformer secondary windings and minor secondary components.
Output voltages with 12Vdc and 5Vdc models are identical with each other except for output ratings, main transformer and minor secondary components.

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 & OVCIII
- 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 3048 for OVCII only and up to 2000 for OVCIII
- Altitude of test laboratory (m) : Up to 2000
- Mass of equipment (kg) : Max. 0.09
- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of: with 100 degree C at the center of baseplate
- The means of connection to the mains supply is: No direct connection

- The product is intended for use on the following power systems: Earthed DC mains supply or would be considered & evaluated in the end system.
- The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual
- The product was investigated to OVC III category when the input voltage is 200-424Vdc. .

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-SELV: 571 Vrms, 880 Vpk
- The following secondary output circuits are SELV: All output
- The following secondary output circuits are at hazardous energy levels: All output
- The power supply terminals and/or connectors are: Not investigated for field wiring
- The maximum investigated branch circuit rating is: 40 A (declared by the manufacture)
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: 40 A
- An investigation of the protective bonding terminals has: Been conducted
- 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): T101: Class H, T1: Class F
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The equipment is suitable for direct connection to: Earthed DC mains supply or would be considered & evaluated in the end system
- See enclosure 7-03 for test condition request.
- Test conducted with external R/C fuse, Model BDH50, manufactured by DAITO COMMUNICATION APPARATUS CO LTD, rated 450Vdc, 5A ,
- The following secondary output circuits are ES1: All output
- The following secondary output circuits are assumed to be PS3 energy levels : All output
- Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing PIS and resistive PIS.
- This component has been evaluated in "control of fire spread" method assuming appropriate fire enclosure is provided in end product. Unless the fire enclosure is made of non-combustible or V-0 material, the separation from the PIS shall be considered.

Additional Information

Output Information:

Model PH300A280-z/abcde series;

5Vdc (2.0 - 6Vdc), maximum 60A, maximum 300W

12Vdc (4.8 - 14.4Vdc), maximum 25.2A, maximum 302.4W

24Vdc (9.6 - 28.8Vdc), maximum 12.5A, maximum 300W

28Vdc (11.2 - 33.6Vdc), maximum 10.8A, maximum 302.4W

48Vdc (19.2 - 57.6Vdc), maximum 6.3A, maximum 302.4W

The following output voltage ranges were considered: +20%, -60% (for All Output).

suffix options for "a, b, c, d, e" would be used "2, 3, T, H, V, CO or other alphanumeric character, symbol" & may be used together; (e.g. /TV, /HTV3) See Enclosure Id: 7-04 for details.

Transformer(T101) Information:

CA83601x is for 5Vdc output model.
CA83602x is for 12Vdc output model.
CA83603x is for 24Vdc output model.
CA83604x is for 28Vdc output model.
CA83605x is for 48Vdc output model.

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