UL TEST REPORT AND PROCEDURE

Standard:	UL 62368-1, 3rd Ed, 2021-10-22 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CAN/CSA C22.2 No. 62368-1:19, 3rd Ed, 2021-10-22 (Audio/video, information and communication technology equipment Part 1: Safety requirements)
Certification Type:	Component Recognition
CCN:	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
Complementary CCN:	N/A
Product:	DC-DC Converter
Model:	i6A series, (See model matrix) Models i6A24***A%%%V-0xx(-R) where 24 represents nominal input voltage, with a 9-40Vdc input *** represents rated output current between 0A - 14A, %%% represents rated output voltage between 0.6Vdc – 28Vdc and 0xx indicates a number or alphanumeric character which affects non safety related features Optional –R indicated RoHS compliance i6A24***A%%%V-Nxx(-R) where 24 represents nominal input voltage, with a 9-40Vdc input where *** represents rated output current between 0A - 8A, %%% represents rated output voltage between -0.6Vdc – -30Vdc and Nxx indicates a number or alphanumeric character which affects non safety related features. The “N” indicates the output voltage polarity is inverted with respect to the input voltage polarity. Optional –R indicated RoHS compliance i6A4W***A%%%V-0xx(-R) where 4W represents input voltage between 9-55Vdc input *** represents rated output current between 0A - 20A, 4W represents input voltage between 9-55Vdc input %%% represents rated output voltage between 0.6Vdc – 15Vdc

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	and 0xx indicates a number or alphanumeric character which affects non safety related features. Optional –R indicated RoHS compliance
Rating:	Optional: Model i6A24***A%%%V-0xx(-R), Input: 9-40Vdc, 15 A Output: 0.6 VDC to 28 VDC, 14 A max, 250W Model i6A24***A%%%V-Nxx(-R) Input: 9-40Vdc, 15 A Output: 0.6 VDC to -30 VDC, 8 A max, 75W Model i6A4W***A%%%V-0xx(-R) Input: 9-55Vdc, 16.5 A Output: 0.6 VDC to 15 VDC, 20 A max, 250W
Applicant Name and Address:	TDK-LAMBDA AMERICAS INC 3000 TECHNOLOGY DR, SUITE 100 PLANO TX 75074 UNITED STATES

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: Oliver Trinh/Mengis Tesfay / Project Handler

Reviewed By: Michael Lockhart / Reviewer

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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 i6A product family consists of high density, non-isolated DC-DC power modules intended to be used as a component in an end-user's power system. The modules will be offered in multiple input voltage and output voltage ranges. The input ranges from 9 – 55Vdc input. The output

voltage will be adjustable between -30 V to 30V. The rated output power will be 250W or less.

Model Differences

All models are identical except for minor changes to the components based upon the output voltage rating of the unit.

Test Item Particulars

Product group	built-in component
Classification of use by	Instructed person
Supply Connection	not mains connected: ES1
Supply tolerance	None
Supply connection – type	To be considered in end system
Considered current rating of protective device	N/A
Equipment mobility	for building-in
Over voltage category (OVC)	OVC I
Class of equipment	Not Classified
Special installation location	N/A 0
Pollution degree (PD)	PD 2
Manufacturer's specified Tma (°C)	25
IP protection class	IPX0
Power systems	not AC mains
Altitude during operation (m)	2000 m or less
Altitude of test laboratory (m)	Approximately 105m m
Mass of equipment (kg)	0.02

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 25 °C
- The product is intended for use on the following power systems : No direct connection
- Considered current rating of protective device as part of the building installation (A) : N/A
- Mains supply tolerance (%) or absolute mains supply : No direct connection
- The equipment disconnect device is considered to be : To be considered in end system
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The product was investigated to the following additional standard : EN IEC 62368-1:2020+A11:2020

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 output circuits are at ES1 energy levels : All output
- The following output circuits are at PS3 energy levels : All
- The investigated Pollution Degree is : 2
- The following end-product enclosures are required : Fire, Electrical
- The power supply was evaluated to be used at altitudes up to : "2,000 m"
- The terminals and/or connectors are: Suitable for factory wiring only
- The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing: The PWB is rated 130°C. ,
- The Normal Temperature Test for the Model i6A4W***A%%%V-0xx was performed with 500 LFM external cooling. The manufacture's datasheet should be consulted regarding de-rating when less external airflow is provided.

Additional Information

This report is based on CB report references E220248-A6006-CB-1 and CB Test Certificate Ref. US-34430-UL, respectively which was previously evaluated to UL 62368-1, 2nd Edition, 2014-12-01, CSA C22.2 No. 62368-1- 14, 2nd Edition, 2014-12, and IEC 62368-1:2014. Testing conducted in accordance with IEC UL 62368-1, 2nd Edition, 2014-12-01, CSA C22.2 No. 62368-1-14, 2nd Edition, 2014-12, and IEC 62368-1:2014, was deemed equivalent to the test required per UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed.

The original test report was generated from VDE CB report references 207721-AS3-1, and amendment CB report references 237556-CI3-1 and CB Test Certificate Ref. DE1-55140, and DE1-55140/A1 respectively which was previously evaluated to UL/CSA/IEC 60950-1, 2nd edition, + Amendment 1 + Amendment 2.

Testing conducted in accordance with IEC 60950-1:2005 (Second Edition), Am1:2009 + Am2:2013; UL 60950-1, 2nd Edition, 2014-10-14; and CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10, and was deemed equivalent to the test required by IEC62368-1, 2nd Edition, CAN/CSA-C22.2 NO. 62368-1 2nd Ed, Issued December 1, 2014, and UL 62368-1 2nd Ed, Issued December 1, 2014; and UL62368-1, 3rd Ed December 13, 2019; CAN/CSA-C22.2 No. 62368-1, 3rd Ed December 13, 2019; and IEC62368-1:2018, 3rd Ed. All original sample and test dates are noted in the testing portion of this report. Only Electric Strength test (5.4.9) was conducted at UL RTP, 12 Laboratory Dr. RTP NC 27709.

Marking label provided represents all models in series. The label also may include an optional "-R" as a suffix to denote ROHS compliance.

Additional Standards

The product fulfills the requirements of: EN IEC 62368-1:2020+A11:2020

Markings and Instructions	
Clause Title	Marking or Instruction Details
Equipment identification marking – Manufacturer identification	Listee's or Recognized Company's name, Trade Name, Trademark or File Number
Equipment identification marking – model identification	Model Number

Special Instructions to UL Representative

Units can be fully manufactured in either the Malaysia or Plano, TX location; however, it is also possible that completed units can go back to either factory for rework where a new product label can be applied based on the location that completed the rework.

The Field Inspector should verify that the reworked units came from the original manufacturer (the Factory ID (if any) should be verified). The Field Inspector should verify that the new product label includes all required markings as shown in the Markings and Instructions section.