

UL TEST REPORT AND PROCEDURE

Standard:	UL 62368-1, 2nd Ed, 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CAN/CSA C22.2 No. 62368-1-14, 2nd Ed, Issued: 2014-12-01 (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:	CCG1R5-xx-yySa#, CCG3-xx-yySa#, CCG1R5-xx-zzDa# and CCG3-xx-zzDa# (where xx: 12, 24, or 48, where yy: 03, 05, 12, or 15, where zz: 12 or 15, where a: F or R, where #: 1 or 2 digit, A to Z or blank)
Rating:	<p>Input:</p> <p>4.5 - 18V dc, 0.414 A (for Model CCG1R5-12-03S) 4.5 - 18V dc, 0.433 A (for Model CCG1R5-12-05S) 4.5 - 18V dc, 0.469 A (for Model CCG1R5-12-12S) 4.5 - 18V dc, 0.445 A (for Model CCG1R5-12-15S) 9 - 36V dc, 0.207 A (for Model CCG1R5-24-03S) 9 - 36V dc, 0.217 A (for Model CCG1R5-24-05S) 9 - 36V dc, 0.214 A (for Model CCG1R5-24-12S) 9 - 36V dc, 0.209 A (for Model CCG1R5-24-15S) 18 - 76V dc, 0.104 A (for Model CCG1R5-48-03S) 18 - 76V dc, 0.110 A (for Model CCG1R5-48-05S and CCG1R5-48-15S) 18 - 76V dc, 0.112 A (for Model CCG1R5-48-12S)</p> <p>4.5 - 18V dc, 0.793 A (for Model CCG3-12-03S) 4.5 - 18V dc, 0.866 A (for Model CCG3-12-05S and CCG3-12-12S) 4.5 - 18V dc, 0.855 A (for Model CCG3-12-15S) 9 - 36V dc, 0.397 A (for Model CCG3-24-03S) 9 - 36V dc, 0.422 A (for Model CCG3-24-05S and CCG3-24-12S) 9 - 36V dc, 0.412 A (for Model CCG3-24-15S) 18 - 76V dc, 0.199 A (for Model CCG3-48-03S) 18 - 76V dc, 0.214 A (for Model CCG3-48-05S) 18 - 76V dc, 0.209 A (for Model CCG3-48-12S) 18 - 76V dc, 0.211 A (for Model CCG3-48-15S)</p> <p>4.5 - 18V dc, 0.463 A (for Model CCG1R5-12-12D) 4.5 - 18V dc, 0.445 A (for Model CCG1R5-12-15D) 9 - 36V dc, 0.220 A (for Model CCG1R5-24-12D) 9 - 36V dc, 0.214 A (for Model CCG1R5-24-15D)</p>

18 - 76V dc, 0.115 A (for Model CCG1R5-48-12D and CCG1R5-48-15D)

4.5 - 18V dc, 0.889 A (for Model CCG3-12-12D)

4.5 - 18V dc, 0.855 A (for Model CCG3-12-15D)

9 - 36V dc, 0.439 A (for Model CCG3-24-12D and CCG3-24-15D)

18 - 76V dc, 0.217 A (for Model CCG3-48-12D)

18 - 76V dc, 0.209 A (for Model CCG3-48-15D)

Output: See Additional Information.

Applicant Name and Address:

TDK-LAMBDA CORP
NAGAOKA TECHNICAL CENTER
2704-1 SETTAYA-MACHI
NAGAOKA-SHI
NIIGATA-KEN 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 / Project
Handler

Reviewed By: Atsushi Saito / Reviewer

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

These units are component "DC/DC Converter" with single or dual outputs.

Output Ratings:

3.3V dc, 0.4 A for CCG1R5-12-03S

5V dc, 0.3 A for CCG1R5-12-05S

12V dc, 0.13 A for CCG1R5-12-12S

15V dc, 0.1 A for CCG1R5-12-15S

3.3V dc, 0.4 A for CCG1R5-24-03S

5V dc, 0.3 A for CCG1R5-24-05S

12V dc, 0.13 A for CCG1R5-24-12S

15V dc, 0.1 A for CCG1R5-24-15S

3.3V dc, 0.4 A for CCG1R5-48-03S

5V dc, 0.3 A for CCG1R5-48-05S

12V dc, 0.13 A for CCG1R5-48-12S

15V dc, 0.1 A for CCG1R5-48-15S

3.3V dc, 0.8 A for CCG3-12-03S

5V dc, 0.6 A for CCG3-12-05S

12V dc, 0.25 A for CCG3-12-12S

15V dc, 0.2 A for CCG3-12-15S

3.3V dc, 0.8 A for CCG3-24-03S

5V dc, 0.6 A for CCG3-24-05S

12V dc, 0.25 A for CCG3-24-12S

15V dc, 0.2 A for CCG3-24-15S

3.3V dc, 0.8 A for CCG3-48-03S

5V dc, 0.6 A for CCG3-48-05S

12V dc, 0.25 A for CCG3-48-12S

15V dc, 0.2 A for CCG3-48-15S

+12 V dc/ -12 V dc, +0.065 A/ -0.065 A for CCG1R5-12-12D

+15 V dc/ -15 V dc, +0.05 A/ -0.05 A for CCG1R5-12-15D

+12 V dc/ -12 V dc, +0.065 A/ -0.065 A for CCG1R5-24-12D

+15 V dc/ -15 V dc, +0.05 A/ -0.05 A for CCG1R5-24-15D

+12 V dc/ -12 V dc, +0.065 A/ -0.065 A for CCG1R5-48-12D
 +15 V dc/ -15 V dc, +0.05 A/ -0.05 A for CCG1R5-48-15D

+12 V dc/ -12 V dc, +0.13 A/ -0.13 A for CCG3-12-12D
 +15 V dc/ -15 V dc, +0.1 A/ -0.1 A for CCG3-12-15D
 +12 V dc/ -12 V dc, +0.13 A/ -0.13 A for CCG3-24-12D
 +15 V dc/ -15 V dc, +0.1 A/ -0.1 A for CCG3-24-15D
 +12 V dc/ -12 V dc, +0.13 A/ -0.13 A for CCG3-48-12D
 +15 V dc/ -15 V dc, +0.1 A/ -0.1 A for CCG3-48-15D

See Enclosure id.7-01 for Output Derating Specification.

Model Differences

The differences between Models CCG1R5-xx-yySa#, CCG3-xx-yySa#, CCG1R5-xx-zzDa# and CCG3-xx-zzDa# are as follow.

Each model is identical, except for model designation, input/output rating, Transformer (T1), PWB, and some minor secondary side components.

Models CCG1R5-xx-yySa#, CCG3-xx-yySa#: single output model.

Models CCG1R5-xx-zzDa# and CCG3-xx-zzDa#: dual output model

PWB for models CCG1R5-xx-yySa# or CCG3-xx-yySa#: PZC-221

PWB for models CCG1R5-xx-zzDa# or CCG3-xx-zzDa#: PZC-222

xx: input voltage (See Ratings for detail).

yy, zz: output voltage (See Production Description for detail).

a: structural of terminal (F: DIP type terminal, R: SMD type terminal)

#: optional code which is not related to safety such as customer code

Test Item Particulars

Classification of use by	Ordinary person
Supply Connection	External Circuit - not Mains connected ES2
Supply % Tolerance	None
Supply Connection – Type	Soldering to PCB
Considered current rating of protective device as part of building or equipment installation	-- A;
Equipment mobility	for building-in
Over voltage category (OVC)	OVC II
Class of equipment	Not classified
Access location	N/A
Pollution degree (PD)	PD 2
Manufacturer's specified maximum operating ambient (°C)	80°C, 85°C or 100°C (Refer to Enclosure id. 7-01.)
IP protection class	IPX0
Power Systems	N/A
Altitude during operation (m)	Up to 5000 m
Altitude of test laboratory (m)	Approximately 10 to 20 m
Mass of equipment (kg)	Approximately 0.003

Technical Considerations

- N/A

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 ES3 energy levels : All models' output circuits
- The following output circuits are at PS1 energy levels : All models' output circuits
- The investigated Pollution Degree is : 2
- The following end-product enclosures are required : Electrical, Fire
- The following output circuits' energy levels are depending on its' input circuit ES class : Output circuits of Models CCG1R5-48-xxS series, CCG1R5-48-xxS series, CCG3-48-xxS series, and CCG3-48-xxD series.
- Unit intended for building-in and supplied ES1 or ES2 power from secondary circuit which is isolated from primary mains circuit by double or reinforced insulation.
- Only functional insulation provided between input and output circuits, which complies with electric strength test at 1500Vdc.
- During the tests, external fuse: UL Listed, SOC Corp., Type DC86V11CT was provided at input side of the unit. For model CCG1R5-12-xx and CCG3-12-xx: Rated 86Vdc, 3.15 A. For model CCG1R5-24-xx and CCG3-24-xx: Rated 86Vdc, 1.6 A. For model CCG1R5-48-xx and CCG3-48-xx: Rated 86Vdc, 1.25 A.
- Classification of PIS has not been conducted. Therefore, all electrical components and conductors including printed wirings were assumed to be arcing/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

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

CCG1R5-12-03S: 3.135 – 3.63VDC, maximum 0.4 A and 1.32W

CCG1R5-12-05S: 4.75 – 5.5VDC, maximum 0.3 A and 1.5W

CCG1R5-12-12S: 11.4 – 13.2VDC, maximum 0.13 A and 1.56W

CCG1R5-12-15S: 14.25 – 16.5VDC, maximum 0.1 A and 1.5W

CCG1R5-24-03S: 3.135 – 3.63VDC, maximum 0.4 A and 1.32W

CCG1R5-24-05S: 4.75 – 5.5VDC, maximum 0.3 A and 1.5W

CCG1R5-24-12S: 11.4 – 13.2VDC, maximum 0.13 A and 1.56W

CCG1R5-24-15S: 14.25 – 16.5VDC, maximum 0.1 A and 1.5W

CCG1R5-48-03S: 3.135 – 3.63VDC, maximum 0.4 A and 1.32W

CCG1R5-48-05S: 4.75 – 5.5VDC, maximum 0.3 A and 1.5W

CCG1R5-48-12S: 11.4 – 13.2VDC, maximum 0.13 A and 1.56W

CCG1R5-48-15S: 14.25 – 16.5VDC, maximum 0.1 A and 1.5W

CCG3-12-03S: 3.135 – 3.63VDC, maximum 0.8 A and 2.64W

CCG3-12-05S: 4.75 – 5.5VDC, maximum 0.6 A and 3W

CCG3-12-12S: 11.4 – 13.2VDC, maximum 0.25 A and 3W

CCG3-12-15S: 14.25 – 16.5VDC, maximum 0.2 A and 3W

CCG3-24-03S: 3.135 – 3.63VDC, maximum 0.8 A and 2.64W

CCG3-24-05S: 4.75 – 5.5VDC, maximum 0.6 A and 3W

CCG3-24-12S: 11.4 – 13.2VDC, maximum 0.25 A and 3W

CCG3-24-15S: 14.25 – 16.5VDC, maximum 0.2 A and 3W

CCG3-48-03S: 3.135 – 3.63VDC, maximum 0.8 A and 2.64W

CCG3-48-05S: 4.75 – 5.5VDC, maximum 0.6 A and 3W

CCG3-48-12S: 11.4 – 13.2VDC, maximum 0.25 A and 3W

CCG3-48-15S: 14.25 – 16.5VDC, maximum 0.2 A and 3W

Additional Standards

The product fulfills the requirements of:

Markings and Instructions

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