

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	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)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQJQ2, QQJQ8 (Power Supplies for Use in Audio/Video, Information and Communication Technology Equipment)
<b>Complementary CCN:</b>	N/A
<b>Product:</b>	DC-DC Converter
<b>Model:</b>	CCG6-xx-yySa#, CCG10-xx-yySa#, CCG6-xx-zzDa# and CCG10-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)
<b>Rating:</b>	<p>Input:</p> <p>4.5 - 18V dc, 1.503 A (for Model CCG6-12-03Sa#)  4.5 - 18V dc, 1.675 A (for Model CCG6-12-05Sa#)  4.5 - 18V dc, 1.616 A (for Model CCG6-12-12Sa#)  4.5 - 18V dc, 1.621 A (for Model CCG6-12-15Sa#)  9 - 36V dc, 0.736 A (for Model CCG6-24-03Sa#)  9 - 36V dc, 0.823 A (for Model CCG6-24-05Sa#)  9 - 36V dc, 0.784 A (for Model CCG6-24-12Sa#)  9 - 36V dc, 0.790 A (for Model CCG6-24-15Sa#)  18 - 76V dc, 0.369 A (for Model CCG6-48-03Sa#)  18 - 76V dc, 0.411 A (for Model CCG6-48-05Sa#)  18 - 76V dc, 0.396 A (for Model CCG6-48-12Sa#)  18 - 76V dc, 0.400 A (for Model CCG6-48-15Sa#)</p> <p>4.5 - 18V dc, 2.331 A (for Model CCG10-12-03Sa#)  4.5 - 18V dc, 2.736 A (for Model CCG10-12-05Sa#)  4.5 - 18V dc, 2.867 A (for Model CCG10-12-12Sa#)  4.5 - 18V dc, 2.776 A (for Model CCG10-12-15Sa#)  9 - 36V dc, 1.134 A (for Model CCG10-24-03Sa#)  9 - 36V dc, 1.325 A (for Model CCG10-24-05Sa#)  9 - 36V dc, 1.407 A (for Model CCG10-24-12Sa#)  9 - 36V dc, 1.368 A (for Model CCG10-24-15Sa#)  18 - 76V dc, 0.579 A (for Model CCG10-48-03Sa#)</p>

18 - 76V dc, 0.657 A (for Model CCG10-48-05Sa#)  
18 - 76V dc, 0.695 A (for Model CCG10-48-12Sa#)  
18 - 76V dc, 0.676 A (for Model CCG10-48-15Sa#)

4.5 - 18V dc, 1.620 A (for Model CCG6-12-12Da#)  
4.5 - 18V dc, 1.632 A (for Model CCG6-12-15Da#)  
9 - 36V dc, 0.805 A (for Model CCG6-24-12Da#)  
9 - 36V dc, 0.805 A (for Model CCG6-24-15Da#)  
18 - 76V dc, 0.400 A (for Model CCG6-48-12Da#)  
18 - 76V dc, 0.398 A (for Model CCG6-48-15Da#)

4.5 - 18V dc, 2.813 A (for Model CCG10-12-12Da#)  
4.5 - 18V dc, 2.850 A (for Model CCG10-12-15Da#)  
9 - 36V dc, 1.358 A (for Model CCG10-24-12Da#)  
9 - 36V dc, 1.366 A (for Model CCG10-24-15Da#)  
18 - 76V dc, 0.672 A (for Model CCG10-48-12Da#)  
18 - 76V dc, 0.679 A (for Model CCG10-48-15Da#)

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, 1.6 A for CCG6-12-03Sa#

5V dc, 1.2 A for CCG6-12-05Sa#

12V dc, 0.5 A for CCG6-12-12Sa#

15V dc, 0.4 A for CCG6-12-15Sa#

3.3V dc, 1.6 A for CCG6-24-03Sa#

5V dc, 1.2 A for CCG6-24-05Sa#

12V dc, 0.5 A for CCG6-24-12Sa#

15V dc, 0.4 A for CCG6-24-15Sa#

3.3V dc, 1.6 A for CCG6-48-03Sa#

5V dc, 1.2 A for CCG6-48-05Sa#

12V dc, 0.5 A for CCG6-48-12Sa#

15V dc, 0.4 A for CCG6-48-15Sa#

3.3V dc, 2.6 A for CCG10-12-03Sa#

5V dc, 2 A for CCG10-12-05Sa#

12V dc, 0.9 A for CCG10-12-12Sa#

15V dc, 0.7 A for CCG10-12-15Sa#

3.3V dc, 2.6 A for CCG10-24-03Sa#

5V dc, 2 A for CCG10-24-05Sa#

12V dc, 0.9 A for CCG10-24-12Sa#

15V dc, 0.7 A for CCG10-24-15Sa#

3.3V dc, 2.6 A for CCG10-48-03Sa#

5V dc, 2 A for CCG10-48-05Sa#

12V dc, 0.9 A for CCG10-48-12Sa#

15V dc, 0.7 A for CCG10-48-15Sa#

+12 V dc/ -12 V dc, +0.25 A/ -0.25 A for CCG6-12-12Da#  
 +15 V dc/ -15 V dc, +0.2 A/ -0.2 A for CCG6-12-15Da#  
 +12 V dc/ -12 V dc, +0.25 A/ -0.25 A for CCG6-24-12Da#  
 +15 V dc/ -15 V dc, +0.2 A/ -0.2 A for CCG6-24-15Da#  
 +12 V dc/ -12 V dc, +0.25 A/ -0.25 A for CCG6-48-12Da#  
 +15 V dc/ -15 V dc, +0.2 A/ -0.2 A for CCG6-48-15Da#

+12 V dc/ -12 V dc, +0.42 A/ -0.42 A for CCG10-12-12Da#  
 +15 V dc/ -15 V dc, +0.34 A/ -0.34 A for CCG10-12-15Da#  
 +12 V dc/ -12 V dc, +0.42 A/ -0.42 A for CCG10-24-12Da#  
 +15 V dc/ -15 V dc, +0.34 A/ -0.34 A for CCG10-24-15Da#  
 +12 V dc/ -12 V dc, +0.42 A/ -0.42 A for CCG10-48-12Da#  
 +15 V dc/ -15 V dc, +0.34 A/ -0.34 A for CCG10-48-15Da#

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

**Model Differences**

The differences between Models CCG6-xx-yySa#, CCG10-xx-yySa#, CCG6-xx-zzDa# and CCG10-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 CCG6-xx-yySa#, CCG10-xx-yySa#: single output model.

Models CCG6-xx-zzDa# and CCG10-xx-zzDa#: dual output model

PWB for models CCG6-xx-yySa#, CCG10-xx-12Sa# or CCG10-xx-15Sa#: PZC-272, PZC-284, PZC-287

PWB for models CCG10-xx-03Sa# or CCG10-xx-05Sa#: PZC-275, PZC-286, PZC-289

PWB for models CCG6-xx-zzDa# or CCG10-xx-zzDa#: PZC-273, PZC-285, PZC-288

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)	50°C, 60°C, 65°C, 70°C, 75°C, 80°C, 90°C or 95°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 0.004

### 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 : Output of all models.
- The following output circuits are at PS2 energy levels : Output of all models.
- The following end-product enclosures are required : Electrical, Fire
- 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.
- 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.
- During the tests, external fuse: UL Listed, SOC Corp., Type DC86V11CT was provided at input side of the unit. For models CCG6-12-yySa#, CCG6-12-zzDa#, CCG10-12-yySa# and CCG10-12-zzDa#: Rated 86 Vdc, 8.0 A.
- During the tests, external fuse: UL Listed, SOC Corp., Type DC86V11CT was provided at input side of the unit. For models CCG6-24-yySa#, CCG6-24-zzDa#, CCG10-24-yySa# and CCG10-24-zzDa#: Rated 86 Vdc, 4.0 A.
- During the tests, external fuse: UL Listed, SOC Corp., Type DC86V11CT was provided at input side of the unit. For models CCG6-48-yySa#, CCG6-48-zzDa#, CCG10-48-yySa# and CCG10-48-zzDa#: Rated 86 Vdc, 2.5 A.

### Additional Information

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

CCG6-12-03Sa#: 3.135 – 3.63VDC, maximum 1.6 A and 5.28W  
 CCG6-12-05Sa#: 4.75 – 5.5VDC, maximum 1.2 A and 6W  
 CCG6-12-12Sa#: 11.4 – 13.2VDC, maximum 0.5 A and 6W  
 CCG6-12-15Sa#: 14.25 – 16.5VDC, maximum 0.4 A and 6W  
 CCG6-24-03Sa#: 3.135 – 3.63VDC, maximum 1.6 A and 5.28W  
 CCG6-24-05Sa#: 4.75 – 5.5VDC, maximum 1.2 A and 6W  
 CCG6-24-12S:a# 11.4 – 13.2VDC, maximum 0.5 A and 6W  
 CCG6-24-15Sa#: 14.25 – 16.5VDC, maximum 0.4 A and 6W  
 CCG6-48-03Sa#: 3.135 – 3.63VDC, maximum 1.6 A and 5.28W

CCG6-48-05Sa#: 4.75 – 5.5VDC, maximum 1.2 A and 6W  
 CCG6-48-12Sa#: 11.4 – 13.2VDC, maximum 0.5 A and 6W  
 CCG6-48-15Sa#: 14.25 – 16.5VDC, maximum 0.4 A and 6W

CCG10-12-03Sa#: 3.135 – 3.63VDC, maximum 2.6 A and 8.58W  
 CCG10-12-05Sa#: 4.75 – 5.5VDC, maximum 2 A and 10W  
 CCG10-12-12Sa#: 11.4 – 13.2VDC, maximum 0.9 A and 10.8W  
 CCG10-12-15Sa#: 14.25 – 16.5VDC, maximum 0.7 A and 10.5W  
 CCG10-24-03Sa#: 3.135 – 3.63VDC, maximum 2.6 A and 8.58W  
 CCG10-24-05Sa#: 4.75 – 5.5VDC, maximum 2 A and 10W  
 CCG10-24-12Sa#: 11.4 – 13.2VDC, maximum 0.9 A and 10.8W  
 CCG10-24-15Sa#: 14.25 – 16.5VDC, maximum 0.7 A and 10.5W  
 CCG10-48-03Sa#: 3.135 – 3.63VDC, maximum 2.6 A and 8.58W  
 CCG10-48-05Sa#: 4.75 – 5.5VDC, maximum 2 A and 10W  
 CCG10-48-12Sa#: 11.4 – 13.2VDC, maximum 0.9 A and 10.8W  
 CCG10-48-15Sa#: 14.25 – 16.5VDC, maximum 0.7 A and 10.5W

Coating for PWB (Option) is used for functional performance purposes only.

**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