

SPECIFIC TECHNICAL CRITERIA

UL 60950-1:2005 (2nd Edition)	
Information technology equipment - Safety - Part 1: General requirements	
Report Reference No	E186249-A51-UL-3
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Standards	UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (Information Technology Equipment - Safety - Part 1: General Requirements)
Test procedure	Component Recognition
Non-standard test method	N/A
Test item description	Power Supply, Built-In DC/DC
Trademark	None
Model and/or type reference	LQD40A483V3-1V8XXXXX, LQD40A483V3-1V5XXXXX, LQD40A483V3-1V2XXXXX, LQD40A483V3-2V5XXXXX, LQD30A483V3-1V8XXXXX or LQD30A-48D3V3-1V8XXXXX, LQD30A483V3-1V5XXXXX, LQD30A483V3-1V2XXXXX, LQD30A483V3-2V5XXXXX, LQD25A48-5V0-3V3XXXXX, LES50A48-1V2XXXXX, LES50A48-1V0XXXX, LES40A48-1V8XXXXX, LES40A48-1V5XXXXX, LES40A48-1V2XXXXX, LES40A48-2V5XXXXX, LES30A48-3V3XXXXX, LES25A48-3V3XXXXX, LES25A48-2V5XXXXX, LES25A48-1V8XXXXX, LES25A48-1V5XXXXX, LES25A48-1V2XXXXX, LES20A48-5V0XXXXX, LES20A48-2V5XXXXX, LES20A48-3V3XXXXX, LES15A48-5V0RE05, LES15A48-5V0XXXXX, LES10A48-5V0XXXXX, LES20A24-3V3XXXXX,

LES20A24-2V5XXXXX,
 LES20A24-1V8XXXXX,
 LES20A24-1V5XXXXX,
 LES20A24-1V2XXXXX,
 LQ30A-48D3V3-1V8XXXXX,
 LQS30A48-5V0XXXXX,
 LQS30A24-3V3XXXXX,
 LQS30A24-2V5XXXXX,
 LQS30A24-1V8XXXXX,
 LQS30A24-1V5XXXXX,
 LQS30A24-1V2XXXXX,
 LQS40A48-5V0XXXXX,
 LQS50A48-3V3XXXXX,
 LQS50A48-2V5XXXXX,
 LQS50A48-1V8XXXXX,
 LQS50A48-1V5XXXXX,
 LQS50A48-1V2XXXXX,
 LQS60A48-3V3XXXXX,
 LQS80A48-1V8XXXXX,
 LQS80A48-1V5XXXXX,
 LQS80A48-2V5XXXXX,
 LQS100A48-1V2XXXXX,
 LQS100A48-1V0XXXXX,
 LQS100A48-1V5XXXXX,
 LQS100A48-1V8XXXXX,

where X represents 1 to 2 any alphanumeric characters.

Rating(s) : Input: 36 - 75 VDC, 3.7 A (Series LQD, LQ), or 2.1 A (LES15, LES10), or 2.3 A or 2.6 A (Series LES25) or 2.3 A (LES20), or 3.1 A (LES30), or 3.1 A or 2.3 A (Series LES40, LES20), or 6.2 A (LQS40, LQS60), or 5.6 A (Series LQS50), or 6.2 A or 4.5 A (LQS80, LQS100).

Input 18 - 36 VDC, 6.5 A (Series LQS30), or 4.5 A (Series LES20).

Input 41 - 75 VDC, 2.3 A (LES15A48-5V0RE05)

Output:

LQD40A48-3V3-2V5XXXXX:
 3.3 Vdc, 20 A (a) or 12.5 A (c); 2.5 Vdc, 20 A (a) or 12.5 A (c)

LQD40A48-3V3-1V8XXXXX:
 3.3 Vdc, 20 A (a) or 15 A (b); 1.8 Vdc, 20 A (a) or 15 A (b)

LQD40A48-3V3-1V5XXXXX:
 3.3 Vdc, 20 A (a) or 15 A (b); 1.5 Vdc, 20 A (a) or 15 A (b)

LQD40A48-3V3-1V2XXXXX:
 3.3 Vdc, 20 A (a) or 15 A (b); 1.2 Vdc, 20 A (a) or 15 A (b)

LQD30A48-3V3-2V5XXXXX:
 3.3 Vdc, 15 A (a) or 12.5 A (c); 2.5 Vdc, 15 A (a) or 12.5 A (c)

LQD30A48-3V3-1V8XXXXX or LQD30A-48D3V3-1V8XXXXX:
 3.3 Vdc, 15 A (a); 1.8 Vdc, 15 A (a)

LQD30A48-3V3-1V5XXXXX:
3.3 Vdc, 15 A (a); 1.5 Vdc, 15 A (a)

LQD30A48-3V3-1V2XXXXX:
3.3 Vdc, 15 A (a); 1.2 Vdc, 15 A (a)

LQD25A48-5V0-3V3XXXXX:
3.3 V @ 15 A (a)(b), 5 V @ 10 A (a)(b)

LES50A48-1V2XXXXX:
1.2 Vdc, 50 A (a) or 35 A (b)

LES50A48-1V0XXXXX:
1.0 Vdc, 50 A (a) or 35 A (b)

LES40A48-2V5XXXXX:
2.5 Vdc, 40 A (a) or 28 A (b)

LES40A48-1V8XXXXX:
1.8 Vdc, 40 A (a) or 35 A (b)

LES40A48-1V5XXXXX:
1.5 Vdc, 40 A (a) or 35 A (b)

LES40A48-1V2XXXXX:
1.2 Vdc, 40 A (a) or 35 A (b)

LES30A48-3V3XXXXX:
3.3 V @ 30 A (a) or 21 A (b)

LES25A48-3V3XXXXX:
3.3 V @ 25 A (a) or 18 A (b)

LES25A48-2V5XXXXX:
2.5 V @ 25 A (a) or 18 A (b)

LES25A48-1V8XXXXX:
1.8 V @ 25 A (a)(b)

LES25A48-1V5XXXXX:
1.5 V @ 25 A (a)(b)

LES25A48-1V2XXXXX:
1.2 V @ 25 A (a)(b)

LES20A48-5V0XXXXX:
5.0 V @ 20 A (a) or 14 A (b)

LES20A48-3V3XXXXX:
3.3 V @ 20 A (a) or 18 A (b)

LES20A48-2V5XXXXX:
2.5 V @ 20 A (a)(b)

LES20A24-3V3XXXXX:
3.3 V @ 20 A (a) or 18 A (b)

LES20A24-2V5XXXXX:
2.5 V @ 20 A(a) (b)

LES20A24-1V8XXXXX:
1.8 V @ 20 A (a) or 18 A (b)

LES20A24-1V5XXXXX:
1.5 V @ 20 A (a) (b)

LES20A24-1V2XXXXX:
1.2 V @ 20 A (a) (b)

LES15A48-5V0XXXXX:
5.0 V @ 15 A (a) or 10 A (b)

LES15A48-5V0RE05:
5.0 V @ 15 A (a) or 10 A (b)

LES10A48-5V0XXXXX:
5.0 V @ 10 A (a)(b)

LQ30A-48-D3V3-1V8XXXXX:
3.3 V @ 15 A (a), 1.8 V @ 15 A (a)

LQS100A48-1V8XXXXX:
1.8V @ 100A (a) or 50 A (b)

LQS100A48-1V5XXXXX:
1.5V @ 100A (a) or 55 A (b)

LQS100A48-1V2XXXXX:
1.2 V @ 100 A (a) or 55 A (b)

LQS100A48-1V0XXXXX:
1.0 V @ 100 A (a) or 55 A (b)

LQS80A48-2V5XXXXX:
2.5 V @ 80 A (a) or 47 A (b)

LQS80A48-1V8XXXXX:
1.8 V @ 80 A (a) or 55 A (b)

LQS80A48-1V5XXXXX:
1.5 V @ 80 A (a) or 55 A (b)

LQS60A48-3V3XXXXX:
3.3 V @ 60 A (a) or 35.5 A (b)

LQS50A48-3V3XXXXX:
3.3 V @ 50 A (a) or 27.5 A (b)

LQS50A48-2V5XXXXX:
2.5 V @ 50 A (a) or 27.5 A (b)

LQS50A48-1V8XXXXX:
1.8 V @ 50 A (a)(b)

LQS50A48-1V5XXXXX:
1.5 V @ 50 A (a)(b)

LQS50A48-1V2XXXXX:
1.2 V @ 50 A (a)(b)

LQS40A48-5V0XXXXX:
5.0 V @ 40 A (a) or 23.5 A (b)

LQS30A48-5V0XXXXX:
5.0V @ 30A (a) or 23.5 A (b)

LQS30A24-3V3XXXXX:
3.3 V @ 30 A (a) or 23.5 A (b)

LQS30A24-2V5XXXXX:
2.5 V @ 30 A (a)(b)

LQS30A24-1V8XXXXX:
1.8 V @ 30 A (a) (b)

LQS30 A24-1V5XXXXX:
1.5 V @ 30 A (a) (b)

LQS30A24-1V2XXXXX:
1.2 V @ 30 A (a) (b)

Particulars: test item vs. test requirements

Equipment mobility	: for building-in
Connection to the mains	: not directly connected to the mains
Operating condition	: continuous
Over voltage category	: OVC II
Mains supply tolerance (%)	: N/A
Tested for IT power systems	: No
IT testing, phase-phase voltage (V)	: N/A
Class of equipment	: Class I (earthed)
Mass of equipment (kg)	: <18 kg
Pollution degree	: PD 2
IP protection class	: IP X0

Possible test case verdicts:

- test case does not apply to the test object: N / A
- test object does meet the requirement: Pass
- test object does not meet the requirement: Fail (acceptable only if a corresponding, less stringent national requirement is "Pass")

General remarks:

- "(see Enclosure #)" refers to additional information appended to the Test Report
- "(see appended table)" refers to a table appended to the Test Report
- Throughout the Test Report a point is used as the decimal separator

GENERAL PRODUCT INFORMATION:	
CA1.0	Report Summary
CA1.1	N/A
CB1.0	Product Description
CB1.1	Product is a DC/DC power supply for building in. All outputs are SELV outputs.
CC1.0	Model Differences
CC1.1	All models in the LQD Series are identical except for number of turns in transformer windings and output ratings. All models in the LES Series are identical except for number of turns in transformer windings and output ratings. Model LES series is similar to Model LQD series except for the number of outputs and minor circuit changes. Model LQ series is similar to Model LQD series except for the model designation and ratings. Model LQS series are similar except for the model designation and ratings. X represents an alphanumeric character that is for customer specific options that do not effect safety.
CD1.0	Additional Information
CD1.1	<p>Notes:</p> <p>(a) Maximum output current at 45°C ambient in still air or 55°C ambient with a minimum of 100 LFM airflow or 85°C ambient with a minimum of 200 LFM airflow. For Models LQD40A48-3V3-2V5XXXXX, LQS30A24-1V8XXXXX, LQS30A24-1V5XXXXX, LQS30A24-1V2XXXXX, LES40A48-2V5XXXXX, LES30A48-3V3XXXXX, LES20A24-3V3XXXXX, LQS30A24-3V3XXXXX, LQS30A24-2V5XXXXX, LES20A24-1V8XXXXX, LES20A24-1V5XXXXX, LES20A24-1V2XXXXX, maximum current at 45°C with 200 LFM airflow. For models LQS50A48-3V3XXXXX, LQS50A48-2V5XXXXX and LQS100A48-1V2XXXXX, maximum current at 45°C with 400 LFM airflow.</p> <p>(b) Maximum output current at 85°C ambient with a minimum of 100 LFM airflow.</p> <p>(c) Maximum output current at 75°C ambient with a minimum 100 LFM airflow.</p> <p>2-Amendment 3 (04CA22516) - Revised current input rating for Model Series LES20, LES15, LES10 from 2.1A to 2.3 A; Series LES25 from 2.6 A to 2.3 A; Series LQS50 from 5.2 A to 5.6 A at 36-75 V dc.</p> <p>3 - Final Re-issue - Added new Models LQS40A48-5V0XXXXX, LQS60A48-3V3XXXXX, LQS80A48-2V5XXXXX, LQS100A48-1V0XXXXX, LQS30A24-1V8XXXXX, LQS30A24-1V5XXXXX, LQS30A24-1V2XXXXX, LES20A48-5V0XXXXX, LES15A48-5V0RE05, LES20A24-2V5XXXXX, LES20A24-1V5XXXXX, and LES20A24-1V2XXXXX.</p> <p>4 - Amendment - Added new Models LQS100A48-1V8XXXXX and LQS100A481V5XXXXX.</p> <p>5 - Amendment - Added new Model LES50A48-1V0XXXX</p> <p>6 - Amendment 2: Employing alternate insulated wire for Transformer (T101), Type S-AA-X-XX-</p>

	T-X-L by Rubadue Wire Co Inc. 7 - Re-issue 2: Upgraded standard to UL60950-1, 2nd Edition, Dated March 27, 2007 and CAN/CSA C22.2 No. 60950-1-07
CE1.0	Technical Considerations
CE2.0	The product was submitted and tested for use at the manufacturer's recommended ambient temperature (Tmra) of: 45 °C, 55 °C, or 85 °C depending on the output ratings and the air flow cooling provided. See Model ratings for details. --
CE2.1	The product is intended for use on the following systems: TN --
CF1.0	Engineering Conditions of Acceptability
CF1.1	For use only in or with complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc. When installed in an end-product, consideration must be given to the following:
CF2.0	The maximum working voltage present is 75 V rms; 75 V pk. The electric strength tests in the end-product shall be based on this value.,
CF2.1	Abnormal/Component Failure Tests were conducted with the power supply input protected by a maximum 10 A Listed external fuse for Model LQ, LQD and LQS series, and maximum 5 A Listed external fuse for Model LES series. The need for repeating these tests in the end-use product shall be considered if installed in a circuit having higher rated protective devices.
CF2.2	Final determination of thermal limitations may be required at the system level safety evaluation. In this case the maximum temperature of 130°C at any location on the Printed Wiring Board.
CF2.3	Input and output insulation: DC input of the unit to DC output of the unit has basic insulation. An additional evaluation may be necessary if Reinforced insulation is necessary in the end use product.
CF2.4	The DC input of the unit is considered already isolated from AC Mains with reinforced insulation. If this power supply is connected to Centralized DC (TNV-2), the end-product should be for use in a Restricted Access Location only.
CF2.5	The following Production-Line tests are conducted for this product: Electric Strength,
CF2.6	The power supply terminals and/or connectors are: Suitable for factory wiring only
CF2.7	The investigated Pollution Degree is: 2
CF2.8	The following end-product enclosures are required: Mechanical, Fire, Electrical
CF2.9	The following secondary output circuits are SELV: all outputs.
CF3	The end-product Electric Strength Test is to be based upon a maximum working voltage of: 75 Vrms, 75 Vpk