

## UL TEST REPORT AND PROCEDURE

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| <b>Standard:</b>                   | UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements)<br>CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements)                           |
| <b>Certification Type:</b>         | Component Recognition   |
| <b>CCN:</b>                        | QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)  |
| <b>Product:</b>                    | Switching Power Supply  |
| <b>Model:</b>                      | DS1050-3, DS1050-3-001-FF   |
| <b>Rating:</b>                     | AC input:<br>100-240V, 14.5A Max, 50/60Hz<br><br>For Model DS1050-3:<br>DC outputs:<br>+12.0V, 87.0A Max<br>+3.3Vsb, 3.0A Max / +5.0Vsb, 2.0 A Max<br>1050 Watts<br><br>For Model DS1050-3-001-FF:<br>DC outputs:<br>+12.0V, 82.0A Max<br>+3.3Vsb, 6.0A Max<br>1000 Watts |
| <b>Applicant Name and Address:</b> | ASTECH INTERNATIONAL LTD<br>16TH FL, LU PLAZA, KWUN TONG<br>2 WING YIP ST<br>KOWLOON, HONG KONG   |

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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### **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 equipment is a switching power supply, intended for building in as a component used in information technology equipment which employs isolating transformers. Reinforced insulation is provided between primary and secondary. Basic insulation is provided between primary and PE (Protective Earth).

### Model Differences

Model DS1050-3-001-FF is identical to Model DS1050-3 except for model designation, output rating, the airflow with only one direction (handle to output connector with fan filter), the EMI circuitry layout of Mainboard, additional Surge PWB assembly and output power derating features.

### Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : pluggable A
- Operating condition : continuous
- Access location : To be considered in end system
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10%
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : --
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : See cover page
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : < 3963 m
- Altitude of test laboratory (m) : < 500 m
- Mass of equipment (kg) : <18
- The creepage and clearance distances have additionally been assessed for suitability up to 3963 m (13000 ft).
- The equipment is a component level power supply intended for use in Class I applications
- For Model DS1050-3, the equipment was additionally evaluated at the following conditions: Reverse Airflow (Handle to Output fan airflow) at 25 degC 1050W(full load), 50 degC 900W, 55degC 825W and 61 degC 525W (half load); Reverse airflow with fan filter at 25 degC 1000W, 50 degC 750W, 55 degC 700W and 61 deg C 500W load.
- For Model DS1050-3-001-FF, the equipment was additionally evaluated at the following conditions: Reverse Airflow (Handle to Output fan airflow with fan filter) at 25 degC 1000W(full load), 40 degC 850W (85% load), 50degC 750W (75% load), 55 degC 700W (70% load), 60 degC 600W (60% load) and 70 degC 450W (45% load).
- The product was investigated to the following additional standards: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2: 2013 (which includes all European national differences, including those specified in this test report).
- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of: below. For Model DS1050-3, 50 °C at full load and 70 °C at half load conditions for forward fan airflow (Output to handle airflow); 25 °C at full load and up to 61 °C at derating load conditions for reverse fan airflow (handle to output airflow) conditions. For Model DS1050-3-001-FF, 25 degree C at 1000W (full load) and 55 degree C at 700 W; Output power derates 10W per °C from 26°C to 50°C ambient; and Output power derates 15W per °C from

51°C to 70°C ambient.

- The means of connection to the mains supply is: Pluggable A
- The product is intended for use on the following power systems: TN
- The equipment disconnect device is considered to be: Appliance inlet
- The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual
- The class of laser product is: Class 1 (I) for indication only

#### **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 secondary output connector has not been evaluated for field connections.
- The power supply has been evaluated for use in Class 1 equipment as defined in UL 60950-1 Second edition and CAN/CSA C22.2 No. 60950-1-07. An additional evaluation shall be made if the power supply is intended for use in other than Class 1 equipment.
- Connection to the supply: Pluggable equipment type A with detachable input cord in end system.
- The disconnection from the line should be considered in the end system.
- The equipment was not evaluated for system mounting. When installed in the end system, proper evaluation should be considered.
- The following Production-Line tests are conducted for this product: Electric Strength, Earthing Continuity
- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 374.7 Vrms, 716 Vpk Primary-Earthed Dead Metal: 374.2 Vrms, 716 Vpk
- The following secondary output circuits are SELV: +12V, +3.3Vsb/+5.0Vsb
- The following secondary output circuits are at hazardous energy levels: +12V
- The following secondary output circuits are at non-hazardous energy levels: +3.3Vsb / 5.0Vsb
- The power supply terminals and/or connectors are: Not investigated for field wiring
- The maximum investigated branch circuit rating is: 20 A
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Required
- An investigation of the protective bonding terminals has: Been conducted
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY2 insulation system with the indicated rating greater than Class A (105°C): T1, T2 (Class F)
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The equipment is suitable for direct connection to: AC mains supply