

UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2011-12 (Information Technology Equipment - Safety - Part 1: General Requirements)
Certification Type:	Listing
CCN:	QQGQ, QQGQ7 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
Product:	AC ADAPTER
Model:	ZWCX251-WXXXXYYYYO (XXX=050-240, indicating output voltage from 5.0 to 24.0 Vdc; YYYY=0010-2600, indicating output current from 0.01 to 2.6 A) (See Supplement ID 7-01 for detail)
Rating:	ZWCX251-WXXYYYYO (XX=05-24, indicating output voltage from 5.0 to 24.0 Vdc; YYYY=0010-2600, indicating output current from 0.01 to 2.6 A) Input: 100-120 Vac, 50/60 Hz, 0.8 A Output: 5-24 Vdc, 0.01-2.6 A (See Supplement ID 7-01 for detail)
Applicant Name and Address:	DONGGUAN SONICWAY ELECTRIC CO LTD RIVER BANK INDUSTRIAL ESTATE HENGLIZHEN DONGGUAN GUANGDONG 523077 CHINA

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.

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Reviewed by: William R Carney

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

Unit is a direct plug-in switching power supply for ITE, suitable for outdoor use, all electrical components are mounted on one PWB and housed by plastic enclosure.

Model Differences

All models in ZWCX251-WXXXYYYYO series are identical to each other except for the following items:

1) Model designation and output rating;

2) Transformer type:

EF25T01 (For models output 5.0-8.0Vdc); EF25T02 (For models output 8.5-14.5Vdc); EF25T03 (For models output 15.0-24.0Vdc).

Model ZWCX251-WXXXYYYYO series are identical to model ZWCX251-WXXXYYYYO series except for model designation.

Technical Considerations

- Equipment mobility : direct plug-in
- Connection to the mains : pluggable A
- Operating condition : continuous
- Access location : operator accessible
- Over voltage category (OVC) : OVC III
- Mains supply tolerance (%) or absolute mains supply values : +10%, -10% (declared by manufacturer)
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : Class II (double insulated)
- Considered current rating of protective device as part of the building installation (A) : 20
- Pollution degree (PD) : PD 3
- IP protection class : IP X0
- Altitude of operation (m) : Up to 2000
- Altitude of test laboratory (m) : Less than 2000
- Mass of equipment (kg) : 0.12

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: 40 degree C
- The means of connection to the mains supply is: Pluggable A (DPIU)
- The product is intended for use on the following power systems: TN
- The equipment disconnect device is considered to be: Plug
- The product was investigated to the following additional standards: (1) The blade dimension was evaluated to be complied with NEMA configurations in accordance with Wiring Devices - Dimensional Specifications, ANSI/NEMA WD6. (2) UL 60950-22 INFORMATION TECHNOLOGY EQUIPMENT - SAFETY - PART 22: EQUIPMENT TO BE INSTALLED OUTDOORS. (3) CSA C22.2 NO. 60950-22-07-CAN/CSA INFORMATION TECHNOLOGY EQUIPMENT - SAFETY - PART 22: EQUIPMENT TO BE INSTALLED OUTDOORS.
- The following accessible locations (with circuit/schematic designation) are within a limited current circuit: Bridging Capacitor (CY1) secondary pin
- The following circuit locations (with circuit/schematic designation) were investigated as a limited power source (LPS): Output terminals on PWB.
- The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual
- The outdoor equipment/enclosure was evaluated for use in an ambient range of: -33 degree C to 40 degree C

Additional Information

Project 4786617743:

Added an alternate Transformer, details refer to table 1.5.1 and enclosure.


Project 4787581713:

- add model ZWCX251-WXXYYYYO

Additional Standards

The product fulfills the requirements of: UL 60950-22 1st Ed Revised 2011-12-19, CSA C22.2 No. 60950-22-07 1st Ed Revised 2011-12-19

Markings and instructions

Clause Title	Marking or Instruction Details
Power rating - Ratings	Ratings (voltage, frequency/dc, current)
Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
Power rating - Model	Model Number
Power rating - Class II symbol	Symbol for Class II construction  (60417-2-IEC-5172)

Fuses - Rating	Rated current and voltage and type located on or adjacent to fuse or fuseholder.
LPS Marking (Optional)	"LPS" or "Limited Power Source." may be marked on unit.
Outdoor Use Marking	"WARNING: Risk of Electric Shock. Install only to a covered Class A GFCI receptacle that has an enclosure that is weatherproof with the attachment plug cap inserted or removed." "WARNING: Not for use with receptacles that are weatherproof only when the receptacle is covered (attachment plug cap not inserted and receptacle cover closed)."
Outdoor use - Product enclosure	"Raintight" shall be marked on outdoor unit.
Special Instructions to UL Representative Inspect the transformer(s) listed in Production-Line Testing Requirements (Electric Strength Test Special Constructions) per AA1.1- (C). When the tests are conducted at other location, Inspect test record and specification sheet provided by the component manufacturer. Verify the specification sheet indicates 100% routine test specified in Production-Line Testing Requirements (Electric Strength Test Special Constructions) be conducted at the component manufacturer.	

Production-Line Testing Requirements						
<u>Electric Strength Test Special Constructions - Refer to Generic Inspection Instructions, Part AC for further information.</u>						
Model	Component	Removable Parts	Test probe location	V rms	V dc	Test Time, s
All models	Transformer T1	--	Primary pins to Secondary pins	380 0	5374	Minimum 1
<u>Earthing Continuity Test Exemptions - This test is not required for the following models:</u>						
All models						
<u>Electric Strength Test Exemptions - This test is not required for the following models:</u>						
None						
<u>Electric Strength Test Component Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test:</u>						
N/A						
<u>Sample and Test Specifics for Follow-Up Tests at UL</u>						
Model	Component	Material	Test	Sample(s)	Test Specifics	
N/A	--	--	--	--	--	

1.5.1	TABLE: list of critical components					Pass
Object/part or Description	Manufacturer/ trademark	type/model	technical data	Product Category CCN(s)	Required Marks of Conformity	Supplement ID
01. Label	Various	Various	Suitable for outdoor use. Minimum range 80 degree C to minus 33 degree C. Suitable for application for plastic surface. All marking should be provided by authorized suppliers.	PGDQ2 or PGJ12	UL	
02. Plastic enclosure	SABIC INNOVATIVE PLASTICS JAPAN L L C	SE1X(GG)(f1)	PPE+PS, V-1, minimum thickness 1.5 mm, 105 degree C. Suitable for outdoor use with respect to exposure to Ultraviolet Light. Two pieces construction, secured together by ultrasonic welding. See supplement ID 7-02 for dimension details.	QMFZ2	UL E45587	7-02
03. Plug holder	SABIC INNOVATIVE PLASTICS JAPAN L L C	SE100P	PPE+PS, V-1, minimum thickness 1.5 mm, 80 degree C.	QMFZ2	UL E45587	
04. Input blades	--	--	Non-polarized, solid copper or copper alloy, NEMA plug type 1-15P, integrally molded on plug holder, from any point of either blade to the plug face section of the edge is spaced minimum 5.1 mm perimeter. See supplement ID 7-03 for dimension detail.	--	--	7-03
05. Secondary wirings	Various	Various	Minimum 30 V, minimum 24 AWG, minimum 80 degree C, insulated with PVC, TFE, PTFE, FEP, polychloroprene or polyimide, marked VW-1 or FT-	AVLV2	UL	

			1. One end soldered to PWB and adhered to PWB by glue, each maximum 40 mm inside enclosure.			
06. Strain relief	SABIC INNOVATIVE PLASTICS JAPAN L L C	SE1X(GG)(f1)	Integrally molded with Secondary wirings, rated minimum V-1. Physically secured into the cutout of plastic enclosure. See supplement ID 7-04 for detail.	QMFZ2	UL E45587	7-04
06a. Strain relief (Alternate)	SABIC INNOVATIVE PLASTICS B V	940(f1)	Integrally molded with Secondary wirings, rated minimum V-1. Physically secured into the cutout of plastic enclosure. See supplement ID 7-04 for detail.	QMFZ2	UL E45329	7-04
06b. Strain relief (Alternate)	SABIC INNOVATIVE PLASTICS US L L C	940(f1)	Integrally molded with Secondary wirings, rated minimum V-1. Physically secured into the cutout of plastic enclosure. See supplement ID 7-04 for detail.	QMFZ2	UL E121562	7-04
07. Primary wirings	Various	Various	Minimum 300 V, minimum 80 degree C, minimum 22 AWG, insulated with PVC, TFE, PTFE, FEP, polychloroprene or polyimide, marked VW-1 or FT-1. Each maximum 70 mm long. One terminal was hooked and soldered to input blades, the other terminal was soldered to PWB and adhered to PWB by glue.	AVLV2	UL	
08. Plastic sheet between PWB and input blades	Various	Various	Minimum V-2.	QMFZ2	UL	
09. Printed Wiring Board	Various	Various	Minimum V-1, minimum 130	ZPMV2	UL	

(PWB)			degree C.			
10. Fuse (F1)	Various	Various	Rated 2 A, 250 Vac.	JDYX	UL	
10a. Fuse (F1) (Alternate)	SHENZHEN LANSON ELECTRONICS CO LTD	3N	Rated 2 A, 250 Vac.	JDYX2	UL E221465	
10b. Fuse (F1) (Alternate)	SHENZHEN LANSON ELECTRONICS CO LTD	3K	Rated 2 A, 250 Vac.	JDYX2	UL E221465	
11. X-Capacitor (CX1) (Optional)	SHENZHEN SURONG CAPACITORS CO LTD	MPX/MKP	Rated maximum 0.22 uF, 250 V ac. Minimum 100 degree C, X1 or X2 type, comply with IEC60384-14 damp heat test requirement.	FOWX2	UL E246678, VDE	
11a. X-Capacitor (CX1) (Optional) (Alternate)	SHANTOU HIGH- NEW TECHNOLOGY DEVELOPMNT ZONE SONGTIAN ENTERPRISE CO LTD	MPX	Rated maximum 0.22 uF, 250 V ac. Minimum 110 degree C, X1 or X2 type, comply with IEC60384-14 damp heat test requirement.	FOWX2	UL E208107, TUV	
11b. X-Capacitor (CX1) (Optional) (Alternate)	ULTRA TECH XIPHI ENTERPRISE CO LTD	HQX	Rated maximum 0.22 uF, 250 V ac. Minimum 100 degree C, X1 or X2 type, comply with IEC60384-14 damp heat test requirement.	FOWX2	UL E183780, VDE	
11c. X-Capacitor (CX1) (Optional) (Alternate)	STRONG CAPACITOR CO LTD	MPX	Rated maximum 0.22 uF, 250 V ac. Minimum 100 degree C, X1 or X2 type, comply with IEC60384-14 damp heat test requirement.	FOKY2	UL E327073, VDE	
11d. X-Capacitor (CX1) (Optional) (Alternate)	CARLI ELECTRONICS CO LTD	MPX	Rated maximum 0.22 uF, 275 V ac. Minimum 100 degree C, X1 or X2 type, comply with IEC60384-14 damp heat test requirement.	FOKY2	UL E242149, VDE	
11e. X-Capacitor (CX1)	SHENZHEN JING	CBBX2	Rated maximum 0.22 uF, 250	FOWX2	UL E230035,	

(Optional) (Alternate)	YU ELECTRONICS CO LTD		V ac. Minimum 100 degree C, X1 or X2 type, comply with IEC60384-14 damp heat test requirement.		VDE	
12. Bleeder resistor (R2, R3)	--	--	Each rated 1M ohm, 1/4 W.	--	--	
13. Line Choke (LF1)	--	--	See supplement ID 4-04 for detail.	--	--	4-04
13-1. LF1 - Core	--	--	Ferrite, see supplement ID 4-04 for detail.	--	--	4-04
13-2. LF1 - Bobbin	CHANG CHUN PLASTICS CO LTD	T375J	Phenolic, V-0, minimum thickness 0.45 mm, 150 degree C.	QMFZ2	UL E59481	
13-3. LF1 - Coil	Various	Various	Copper magnet wire, minimum 130 degree C.	OBMW2	UL	
14. Bridge diode (D1, D2, D4, D5)	--	--	Each rated minimum 1 A, minimum 1000 V.	--	--	
15. Electrolytic Capacitor (C18)	--	--	Rated maximum 68 uF, minimum 400 V, minimum 105 degree C, provided with integral pressure relief.	--	--	
16. Switching MOSFET (Q1)	--	--	Rated 4 A, 600 V minimum.	--	--	
17. Limiting current resistor (R5, R7, R9)	--	--	Each rated minimum 2 ohm, 1/2 W.	--	--	
18. Bridging capacitor (CY1) (Optional)	JYA-NAY CO LTD	JN	Rated maximum 1000 pF, 250 Vac, minimum 125 degree C, Y1 type, comply with minimum 21 days of IEC60384-14 Damp Heat Test requirement.	FOWX2	UL E201384, VDE	
18a. Bridging capacitor (CY1) (Optional) (Alternate)	GUANGDONG SOUTH HONGMING ELECTRONIC SCIENCE & TECHNOLOGY CO LTD	F	Rated maximum 1000 pF, 250 Vac, minimum 125 degree C, Y1 type, comply with minimum 21 days of IEC60384-14 Damp Heat Test requirement.	FOWX2	UL E154899, VDE	
18b. Bridging capacitor	HSUAN TAI	CY	Rated maximum 1000 pF, 250	FOWX2	UL	

(CY1) (Optional) (Alternate)	ELECTRONICS CO LTD		Vac, minimum 125 degree C, Y1 type, comply with minimum 21 days of IEC60384-14 Damp Heat Test requirement.		E199069, VDE	
18c. Bridging capacitor (CY1) (Optional) (Alternate)	DONGGUAN EASY-GATHER ELECTRONIC CO LTD	DCF	Rated maximum 1000 pF, 250 Vac, minimum 125 degree C, Y1 type, comply with minimum 21 days of IEC60384-14 Damp Heat Test requirement.	FOWX2	UL E252221, VDE	
19. Optical Isolator (U1)	BRIGHT LED ELECTRONICS CORP	BPC-817XXXXXX, BPC-817MXXXXXX, BPC-817SXXXXXX (where XXXXXX can be any alphanumeric character or blank)	Isolation voltage minimum 5000 V ac, 100 degree C.	FPQU2	UL E236324	
19a. Optical Isolator (U1) (Alternate)	COSMO ELECTRONICS CORP	KPC817	Isolation voltage minimum 5000 V ac, 100 degree C.	FPQU2	UL E169586	
19b. Optical Isolator (U1) (Alternate)	EVERLIGHT ELECTRONICS CO LTD	EL817	Isolation voltage minimum 5000 V ac, 110 degree C.	FPQU2	UL E214129	
19c. Optical Isolator (U1) (Alternate)	LITE-ON TECHNOLOGY CORP	LTV-817	Isolation voltage minimum 5000 V ac, 115 degree C.	FPQU2	UL E113898	
20. Transformer (T1)	BOLUO COUNTY ZONEFULL TECHNOLOGY ELECTRONICS CO LTD	1) EF25T01 (For models output 5.0-8.0Vdc); 2) EF25T02 (For models output 8.5-14.5Vdc); 3) EF25T03 (For models output	Class B. See supplement ID 4-01, 4-02, 4-03 for details.	--	--	4-01

		15.0-24.0Vdc).				
20-1. T1 - Insulation system	BOLUO COUNTY ZONEFULL TECHNOLOGY ELECTRONICS CO LTD	RF-B1	Class B	OBJY2	UL E324351	
20-2. T1 - Core	--	--	Ferrite, overall size approx. 27.15 by 25.61 by 7.2 mm.	--	--	
20-3. T1 - Bobbin	CHANG CHUN PLASTICS CO LTD	T375J	Phenolic, V-0, minimum thickness 0.45 mm, 150 degree C.	QMFZ2	UL E59481	
20-4. T1 - Primary winding	Various	Various	Copper magnet wire, Type MW-28 or MW-75, minimum 130 degree C.	OBMW2	UL	
20-5. T1 - Secondary winding	COSMOLINK CO LTD	TIW-M	Triple insulated wire, rated 130 degree C.	OBJT2	UL E213764	
20-6. T1 - Insulation tape	SYMBIO INC	35660	Minimum two layers, rated 130 degree C.	OANZ2	UL E50292	
20-6a. T1 - Insulation tape (Alternate)	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PZ	Minimum two layers, rated 130 degree C.	OANZ2	UL E165111	
20-7. Sleeving	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	CB-TT-T	Rated 200 degree C.	YDPU2	UL E180908	
20-8. Varnish	WU JIANG TAIHU INSULATING MATERIAL CO LTD	ET-90(a), T-4260(a)	Rated minimum 130 degree C.	OBOR2	UL E228349	
20a. Transformer (T1)(Alternate)	BOLUO LICHUANG ELECTRIC CO LTD	1) EF25T01 (For models output 5.0-8.0Vdc); 2) EF25T02 (For models output 8.5-14.5Vdc); 3) EF25T03 (For models output	Class B. See supplement ID 4-05, 4-06, 4-07 for details.	--	--	

		15.0-24.0Vdc).				
20a-1. T1 - Insulation system	BOLUO LICHUANG ELECTRIC CO LTD	LC-01	Class B	OBJY2	UL E362656	
20a-2. T1 - Core	--	--	Ferrite, overall size approx. 27.15 by 25.61 by 7.2 mm.	--	--	
20a-3. T1 - Bobbin	CHANG CHUN PLASTICS CO LTD	T375J	Phenolic, V-0, minimum thickness 0.45 mm, 150 degree C.	QMFZ2	UL E59481	
20a-4. T1 - Primary winding	Various	Various	Copper magnet wire, Type MW-28 or MW-75, minimum 130 degree C.	OBMW2	UL	
20a-5. T1 - Secondary winding	YOUNG CHANG SILICONE CO LTD	STW-B	Triple insulated wire, rated 130 degree C.	OBJT2	UL E242198	
20a-6. T1 - Insulation tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PZ	Minimum two layers, rated 130 degree C.	OANZ2	UL E165111	
20a-7. Sleeving	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	CB-TT-T	Rated 200 degree C.	YDPU2	UL E180908	
20a-8. Varnish	ELANTAS ELECTRICAL INSULATION ELANTAS PDG INC	V1630	Rated minimum 130 degree C.	OBOR2	UL E75225	
21. Heat sink for Q1	--	--	Aluminum, primary, secured to PWB by soldering. See supplement ID 7-05 for detail.	--	--	7-05
22. Glue	Various	Various	Minimum V-2.	QMFZ2	UL	
23. Heat shrinkable tube (Optional)	Various	Various	Minimum VW-1. Wrapped on F1.	YDPU2	UL	
24. Detachable output cord (Optional)	Various	Various	Maximum 3.05 m long, minimum 30 V, minimum 24 AWG, minimum 80 degree C, insulated with PVC, TFE, PTFE, FEP, polychloroprene or	AVLV2	UL	

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Report Reference #

E356605-A2-UL

			polyimide, marked VW-1 or FT-1.			
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Enclosures

<u>Type</u>	<u>Supplement Id</u>	<u>Description</u>
Photographs	3-01	Overall view 1
Photographs	3-02	Overall view 2
Photographs	3-03	Overall view 3 with detachable output cord removed
Photographs	3-04	Internal view 1
Photographs	3-05	Internal view 2
Photographs	3-06	Component side
Photographs	3-07	Trace side
Diagrams	4-01	T1 spec for type EF25T01
Diagrams	4-02	T1 spec for type EF25T02
Diagrams	4-03	T1 spec for type EF25T03
Diagrams	4-04	LF1 spec
Diagrams	4-05	T1 spec for type EF25T01(E362656)
Diagrams	4-06	T1 spec for type EF25T02(E362656)
Diagrams	4-07	T1 spec for type EF25T03(E362656)
Schematics + PWB	5-01	PWB layout
Manuals	6-01	Instruction Manual
Miscellaneous	7-01	Model list
Miscellaneous	7-02	Dimension of plastic enclosure
Miscellaneous	7-03	Dimension of input blades
Miscellaneous	7-04	Dimension of strain relief of output cord
Miscellaneous	7-05	Dimension of heat sink for Q1
Miscellaneous	7-06	UL 60950-22 Report