DESCRIPTION

PRODUCT COVERED:

USR, CNR Component - Switching Power Supply, Model LPQ142 for use in Information Technology Equipment, Including Electrical Business Equipment.

ELECTRICAL RATINGS:

MODEL	INPUT	OUTPUT			
LPQ142	100 - 250 V ac	FORCED AIR			
	3 A	V1:	DC + 3.3	to + 5.7 V,	25 A MAX
	50 / 60 Hz	V2:	DC + 12	to + 12.7 V,	6 A MAX
	OR	V3:	DC - 12	to - 15.0 V,	1.5 A MAX
	DC 120 Vmin - 370 Vmax	V4:	DC + 3.3	to + 25.0 V,	4.5 A MAX
	3 A	CONVECTION COOLING			
		V1:	DC + 3.3	to + 5.7 V,	12 A MAX
		V2:	DC + 12	to + 12.7 V,	5 A MAX
		V3:	DC - 12	to - 15 V,	1 A MAX
		V4:	DC + 3.3	to + 25 V,	1.5 A MAX

Maximum continuous output powers are 145 W with or without cover at min. 30 CFM forced air and 80 W without cover at convection cooling.

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

General - The unit is for use in product where the acceptability of the combination is determined by Underwriters Laboratories Inc.

Both USR and CNR indicate investigation to the Standard for Safety of Information Technology Equipment, Including Electrical Business Equipment, UL 60950 and CAN/CSA C22.2 No. 60950-00, Third Edition.

Conditions of Acceptability - When installed in the end-use equipment, the following are the considerations to be made:

1. This component has been judged on the basis of the required creepages and clearances in the Third Edition of the Standard for Safety of Information Technology Equipment Including Electrical Business Equipment, UL 60950 and CAN/CSA C22.2 No. 60950-00, Sub-clause 2.10, which covers the end-use product for which the component was designed. The operational insulation have been evaluated by conducting Component Failure Tests per sub-clause 5.3.4 (c) of UL 60950 and CAN/CSA C22.2 No. 60950-00, Third Edition.

2. This power supply has only been evaluated for use in Pollution Degree 2 environment.

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3. This power supply was evaluated with the assumption that the power source is a TN-S system as defined by UL 60950 and CAN/CSA C22.2 No. 60950-00, Third Edition.

4. A suitable enclosure shall be provided by end use equipment.

5. The secondary outputs of the power supply are unearthed non-energy hazard SELV. Sub-clause 2.2.3.1 per UL 60950 and CAN/CSA C22.2 No. 60950-00, Third Edition were used to maintain the insulation of SELV from primary circuits.

6. This power supply has been evaluated for use in Class I equipment as defined in UL 60950 and CAN/CSA C22.2 No. 60950-00, Third Edition and shall be properly earthed or bonded to earth in the end-use. An additional evaluation shall be made if the power supply is intended for use in other than Class I equipment.

7. This power supply has been evaluated for use in 25°C and 50°C ambient.

8. Transformer T4 employs Class F electrical insulation system.

9. The secondary DC output connector has not been evaluated for field connections.

10. This power supply is classified as Level 3 as defined by CAN/CSA C22.2 No. 60950-00, Third Edition.

11. This power supply has not been evaluated for end system mounting. Creepage and clearance requirements between primary parts of power supply and system chassis shall be considered in the end system.

12. This power supply has only been evaluated under a specific ventilation set-up. See ILL. 3 for details.

13. The reliability of protective bonding conductor in U-Base shall be evaluated per clause 2.6 of UL 60950 Third Edition in the end system.

CONSTRUCTION DETAILS:

Spacing - the following spacings are maintained in the power supply, Model LPQ142.

1. Minimum 2.5 mm creepage and 2.0 mm clearance between Live and Neutral phase before the fuse.

2. Minimum 2.5 mm creepage and 2.0 mm clearance between primary traces and Protective Earth traces.

3. Minimum 2.6 mm creepage and 2.1 mm clearance between primary traces and Protective Earth traces other than Item 2.

4. Minimum 5.0 mm creepage distance and minimum 4.0 mm clearance between primary and secondary traces under optocouplers.

5. Minimum 6.0 mm creepage distance and minimum 4.8 mm clearance between primary and secondary traces under T4 other than Item 4.

See ILL. 1 and 2 for details.

Section General - The following construction items are described in the Section general.

Factory Location and Identification
Abbreviations
C-UL Requirements
Corrosion Protection
Internal Wiring
Segregation
Wire Positioning Devices
Marking Methods
Markings
Internal Polymeric Materials
Printed Wiring Board
Wire Connections
Connectors and Receptacles
Earthing/Bonding
Mechanical Assembly
Insulating Tubing/Sleeving
Earthing Symbol
Tolerances
Capacitors
Optocouplers
Voltage Surge Suppressors

ILLUSTRATIONS:

ILL. 1 - Main PWB Trace Layout (Component Side)
ILL. 2 - Main PWB Trace Layout (Solder Side)
ILL. 3 - Ventilation Condition for LPQ142

General - The general design, shape and arrangement shall be as illustrated, in the following figures, except where variations are specifically described.

MODEL LPQ142 - FIG. 1

1. U-Base - Metal. Overall 177.8 by 102 by 38 mm, 2 mm thick. Provided with 17 oval-shaped ventilation slots on one side, 11 of them, each measures 33 by 3 mm and the other 6, each measures 25 by 3 mm. Provided on the other side with 19 oval-shaped ventilation slots 13 of them, each measures 33 by 3 and the other 6, each measures 25 by 3 mm.

2. Main Printed Wiring Board (PWB) - (ZPMV2), Refer to Section General for details. Measure 175 by 94.6 mm, 1.6 mm thick. Secured to metal studs of U-Base, by four screws.

3. Cover - Not Shown. Optional. Aluminum, Overall 177.8 by 101 mm, 0.95 mm thick. Provided with 368 circular-shaped ventilation slots, each measures 3 mm diameter.

4. Input Connector (SK1) - (ECBT2), Cvilux Corp., Type CI51, rated 7 A, 250 V ac. Secured to Main PWB by soldering.

5. Fuse (F1) - (JDYX2), Cooper Industries Inc., Bussmann Div., Type GDA-V/S501, rated 4 A, 250 V ac. Wrapped with heat-shrinkable tube and a Teflon tube on longer lead-out use to isolate both ends of the fuse. Soldered to Main PWB. Fuse rating is permanently marked on the Main PWB, Item 2, adjacent to the fuse.

6. Capacitor (C1) - (Across-the-Line). See Section General for manufacturer and catalog number. Rated maximum 0.47 µF, minimum 250 V ac.

7. Discharge Resistors (R1, R2, R95, R96) - Each rated maximum 220 K ohms, minimum 1/8 watts.

8. Capacitors (C2, C3, C2A, C3A) - (Line-to-Protective Earth). See Section General for manufacturer and catalog number. Each rated maximum 2200 pF, minimum 250 V ac.

9. Capacitor (C4) - (Across-the-Line). See Section General for manufacturer and catalog number. Rated maximum 0.1 µF, minimum 250 V ac.

10. Common Mode Choke (L1) - Astec P/N: 852-66007560.

11. Differential Chokes (L2, L3) - Astec P/N: 852-66007230.

12. Bridge Rectifier (D2) - (QQIJ2), General Semiconductor Inc., Type GBU, rated min. 6 A, min. 600 V. Secured to D2 Heatsink (earthed), by screw and nut. Provided with D2 Insulator, used to isolate D2 pins from D2 Heatsink.

13. PFC Choke (L8) - Astec P/N: 852-66007070.

14. PFC Transistor (Q103) - Rated minimum 20 A, minimum 500 V. Secured to Primary Heatsink by screw and nut.

15. Bulk Capacitor (C105) - With integral pressure relief, rated minimum 150 µF, minimum 400 V.

16. Bridging Capacitor (C14) - (Primary-to-Secondary). See Section General for manufacturer and catalog number. Rated maximum 1 nF, minimum 250 V ac.

17. Gate Drive Transformer (T3) - Astec P/N: 852-66007080.

18. Power Transistors (Q3, Q4) - Each rated minimum 8 A, minimum 500 V. Secured to Q3 Heatsink by screw and nut.

19. Snubber Choke (L6) - Minimum 0.23 mm diameter, maximum 60.5 turns, wound on ferrite toroidal core.

20. Power Transformer (T4) - Astec P/N: 852-66007020. Provided with (OBJY2), Astec International Ltd., Class 155 (F), insulation system, designated 155-10B.

21. Optocouplers (OPTO2, OPTO3, OPTO4) - See Section General for manufacturer and catalog number. Each rated minimum 3000 V ac isolation test voltage.

22. Output Chokes (L7, L235) - Astec P/N: 852-20101240.

23. Output Chokes (L251, L252) - Astec P/N: 852-66006050.

24. Output Choke (L613) - Astec P/N: 852-66007650.

25. Output Choke (L603) - Astec P/N: 852-66006020.

26. Output Choke (L604) - Astec P/N: 852-20101260.

27. Output Choke (U225) - Astec P/N: 852-66006710.

28. Output Choke (T201) - Astec P/N: 852-66006770.

29. Output Choke (T601) - Astec P/N: 852-66006780.

30. U-Base Insulator - (QMFZ2), General Electric Co., Lexan, Type FR700, rated V-0. Measures 177 by 95.6 mm, minimum 0.25 mm thick.

31. C105 Insulator - (QMFZ2), General Electric Co., Valox, Type FR1, rated VTM-0. Measures 65 by 65 mm, minimum 0.25 mm thick.

32. D2 Insulator - (QMFZ2), Bergquist Co., Sil-Pad, Type 1000L, rated V-0. Measures 29 by 24 mm, minimum 0.15 mm thick.

    Alternate - Same as above except Parker-Hannifin Corp., Chomerics Div., Cho-Therm, Type T441.

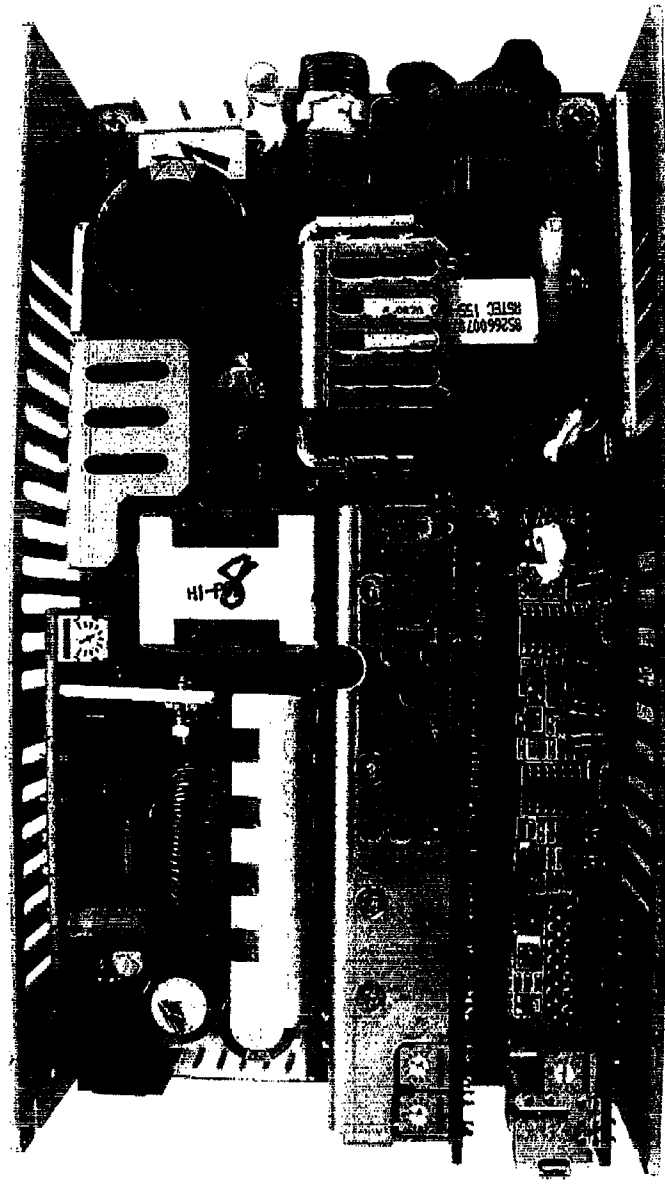
    Alternate - Same as above except Shin-Etsu Chemical Co. Ltd., SI, Type TC-20CG.

33. D2 Heatsink - Metal. (Earthed), overall 54 by 30 mm, minimum 2 mm thick.

34. Q103 Heatsink - Metal. (Live), overall 39 by 30 by 23 mm, minimum 2 mm thick.

35. Q3 Heatsink - Metal. (Live), overall 54.5 by 30 by 20 mm, minimum 2 mm thick.

36. Daughter Board Heatsink - Metal. Overall 97.5 by 19 by 16 mm, minimum 2 mm thick.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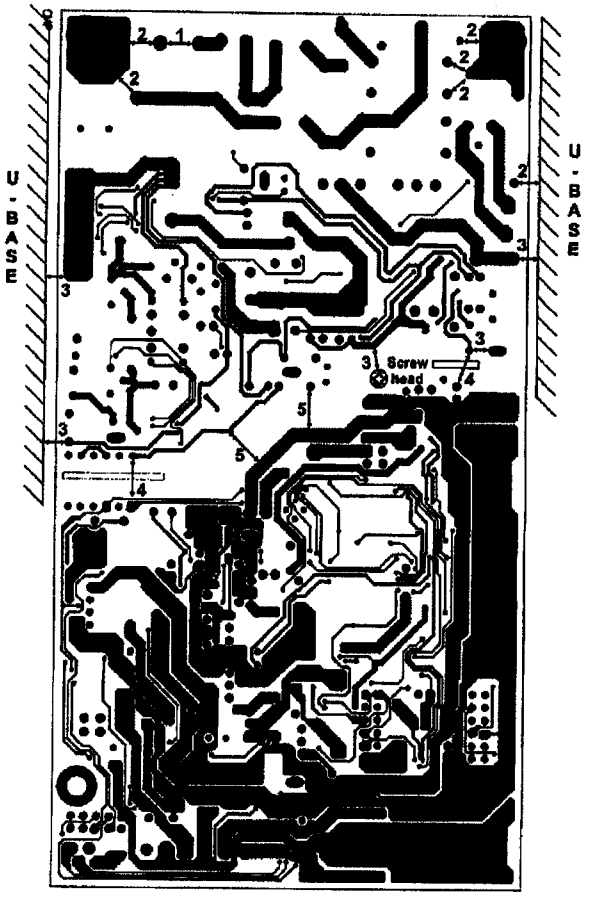
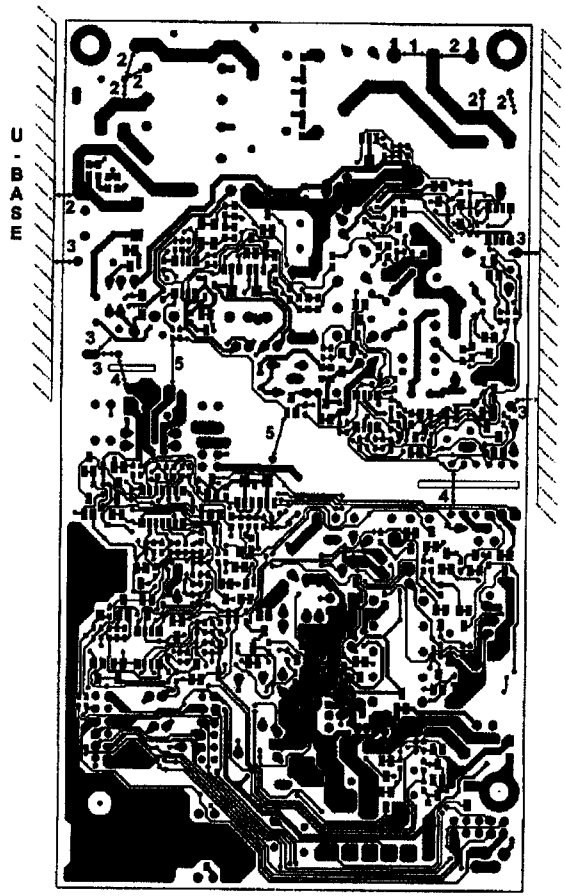
ILL.1 - MAIN PWB TRACE LAYOUT (Component Side)



Location:

1. Minimum 2.5 mm creepage and 2.0 mm clearance distance.
2. Minimum 2.5 mm creepage and 2.0 mm clearance distance.
3. Minimum 2.6 mm creepage and 2.1 mm clearance distance.
4. Minimum 5.0 mm creepage and 4.0 mm clearance distance.
5. Minimum 6.0 mm creepage and 4.8 mm clearance distance.

ILL.2 - MAIN PWB TRACE LAYOUT (Solder Side)



Location:

1. Minimum 2.5 mm creepage and 2.0 mm clearance distance.
2. Minimum 2.5 mm creepage and 2.0 mm clearance distance.
3. Minimum 2.6 mm creepage and 2.1 mm clearance distance.
4. Minimum 5.0 mm creepage and 4.0 mm clearance distance.
5. Minimum 6.0 mm creepage and 4.8 mm clearance distance.

ILL.3 - VENTILATION SET-UP FOR LPQ142