

PRELIMINARY RELIABILITY PREDICTION ANALYSIS FOR POWER SUPPLY MODEL: SCS403

1) INTRODUCTION

This report is a summary presentation of the results of reliability analysis of power supply model SCS403.

The power supply is rated as follows:

INPUT

85Vac-265Vac
47Hz-63Hz

OUTPUT

+3.3V @ 8A

This analysis and prediction is based on Part Count Reliability Prediction method as specified in MIL – HDBK – 217F. The component list is based on the schematic diagram of the power supply unit. It must be understood that reliability prediction is an estimation and statistical nature and much dependent on the quality factory of the components being used. In addition, the ambient temp for the MTBF prediction is based on 30°C.

2) RELIABILITY PREDICTION RESULT

A summary of the reliability prediction is given in Table 1.

And the predicted mean time between failure (MTBF): 291,912hrs.

3) COMMENTS

It must be noted that however, the loading is assumed to be a t worst case and 100% duty cycle for all components, together with fact that the quality factors for most of the components are estimated rather conservatively. In practice, therefore, the MTBF (hrs) can be expected to be higher than this calculated figures.

MTBF CALCULATION

TABLE 1.

ITEM	COMPONENT TYPE	λG	πQ	Ni	λ_{EQUIP}
RESISTOR:					
1.	Fixed Film	0.0037	10	28	1.036
2.	Film Power	0.01	10	5	0.5
3.	Thermistor	0.0014	10	1	0.014
4.	Non-Wirewound Variable	0.0029	8	1	0.0232
CAPACITOR:					
1.	Electrolytic	0.0013	10	9	0.117
2.	Ceramic	0.0017	10	9	0.153
3.	Metallized Paper / Plastic	0.0007	10	8	0.056
SEMICONDUCTOR:					
1.	Diode, General Purpose	0.0036	8	7	0.2016
2.	Diode, Fast Recovery Pwr. Rectifier	0.023	8	2	0.368
3.	Diode, Power Rectifier Schottky Pwr.	0.0028	8	1	0.0224
4.	Zener Diode, General Purpose	0.0033	8	1	0.0264
5.	Si Power MOSFET	0.014	8	1	0.112
6.	SCR	0.0025	8	2	0.04
7.	Transistors	0.00015	8	2	0.0024
INDUCTIVE PARTS:					
1.	Transformer, Flyback	0.0058	3	1	0.0174
2.	Coil, Fixed Inductor or Choke	0.000032	3	3	0.000288
INTEGRATED CIRCUIT:					
1.	Linear	0.0095	10	2	0.19
2.	Opto Isolator	0.027	8	1	0.216
OTHERS:					
1.	Fuse	0.010	N/A	1	0.01
2.	Printed Wire Board	0.022	2	1	0.044
3.	I/P Connector	0.050	2	1	0.1
4.	PCB Connector	0.044	2	2	0.176

TOTAL EQUIP. FAILURE RATE = 3.425688

$$\text{MTBF (hrs)} = \frac{1 \times 10^6 \text{ hrs}}{\text{Total } \lambda \text{ EQUIP}} = 291,912 \text{ hrs}$$