

# RELIABILITY PREDICTION STANDARD REPORT

Applicant: *SURE STAR* Computer. CO., LTD

Address: No. 2-1, Da'an Rd., Shulin Dist., New Taipei City 238 Taiwan

Date: Dct -09-2012

Commodity: Power Supply

End Item Part Number: TC-550R

Power Unit Module: TC-550RVN2

Testing Item:

Environmental Condition: GB

Ambient Temperature: 25°C

Referring to MIL-HDBK-217F, Notice2, APPENDIX A: PARTS

COUNT RELIABILITY PREDICTION , PREDICT THE VALUE OF MTBF

## TC-550R

PCB Name: TC-735I (Excluded: FAN):

Unit : Failures/10<sup>6</sup> hours

No.	Part Type	$\lambda_g$	$\pi_Q$	$\pi_L$	N	$\lambda_{eq}$
1	Capacitor (Aluminum Dry) , CE	0.0012	10	1.0	25	0.3
2	Capacitor (Ceramic, Gen. Purpose) , CK	0.0037	5	1.0	22	0.407
3	Metallized plastic/plasticn , CH	0.00051	5	1.0	4	0.0102
4	Resistor (Chip), RN	0.0037	5	1.0	101	1.8685
5	Diode (General Purpose Analog)	0.0036	5	1.0	25	0.45
6	Diode (Voltage Reg. ; Zener)	0.0033	5	1.0	6	0.099
7	Diode (Power Rectifier/Schottky Pwr.)	0.0028	5	1.0	10	0.14
8	Diode (fast Recovery Pwr. Rectifier)	0.0230	5	1.0	9	1.035
9	FUSES	0.01	1	1.0	1	0.01
10	Thermistor , RTH	0.0014	5	1.0	1	0.007
11	OPTO- Isolator	0.027	5.5	1.0	3	0.4455
12	Microcircuit (Bipolar technology, , Linear, 1-100 Transistors)	0.0095	10	1.0	3	0.285
13	Transistor ( NPN/PNP)	0.00015	5.5	1.0	12	0.0099
14	Transistor ( SIFET, $f \leq 400$ MHz)	0.014	5.5	1.0	5	0.385
15	Inductive Device ( Coil, Fixed Inductor	0.000032	3	1.0	9	0.000864
16	Transformer, Switching	0.00220	3	1.0	5	0.033
17	Connector (Rectangular)	0.050	2	1.0	3	0.3
18	Plated Through Hole Circuit Boards	0.022	2	1.0	1	0.044
19	Single Connection (Hand Solder W/Wrapping)	0.00007	1	1.0	7	0.00049
20	OPTO- Emitter	0.00047	5.5	1.0	1	0.002585
21	Single Connection (Reflow Solder)	0.000069	1	1.0	495	0.034155
22	Single Connection (Clip Termination)	0.00012	1	1.0	2	0.00024
Total Failure rate (Failures/10 <sup>6</sup> hours)						5.867434

PCB Name:IS-PPC-2

Unit : Failures/10<sup>6</sup> hours

No.	Part Type	$\lambda_g$	$\pi_Q$	$\pi_L$	N	$\lambda_{eq}$
1	Resistor (Film), RN	0.0037	10	1.0	27	0.999
2	Diode (General Purpose Analog)	0.0036	5.5	1.0	6	0.1188
3	Single Connection (Reflow Solder)	0.000069	1	1.0	126	0.008694
4	Capacitor (Ceramic, Gen. Purpose) , CK	0.0017	10	1.0	13	0.221
5	Metallized plastic/plastic CH	0.00051	10	1.0	1	0.0051
6	Transistor ( NPN/PNP, f < 200MHz)	0.00015	5.5	1.0	2	0.00165
7	Microcircuit (Bipolar technology, 1-100 Transistors)	0.0095	10	1.0	2	0.19
8	Plated Through Hole Circuit Boards	0.022	2	1.0	1	0.044
Total Failure rate (Failures/10 <sup>6</sup> hours)						1.588244

PCB Name:TC-735i-LS

Unit : Failures/10<sup>6</sup> hours

No.	Part Type	$\lambda_g$	$\pi_Q$	$\pi_L$	N	$\lambda_{eq}$
1	Resistor (Film), RN	0.0037	10	1.0	16	0.592
2	Diode (Voltage Reg. ; Zener)	0.0033	5.5	1.0	3	0.05445
3	Diode (General Purpose Analog)	0.0036	5.5	1.0	4	0.0792
4	Diode (Power Rectifier/Schottky Pwr.)	0.0028	5.5	1.0	1	0.0154
5	Plated Through Hole Circuit Boards	0.022	2	1.0	1	0.044
6	Capacitor (Aluminum Dry) , CE	0.0013	10	1.0	3	0.039
7	Capacitor (Ceramic, Gen. Purpose) , CK	0.0017	10	1.0	2	0.034
8	Metallized plastic/plastic CH	0.00051	10	1.0	2	0.0102
9	Inductive Device ( Coil, Fixed Inductor	0.000032	3	1.0	2	0.000192
10	Transistor ( SIFET, f ≤ 400MHz)	0.014	5.5	1.0	2	0.154
11	Connector (Rectangular)	0.050	2	1.0	1	0.1
12	Single Connection (Reflow Solder)	0.000069	1	1.0	180	0.01242
Total Failure rate (Failures/10 <sup>6</sup> hours)						1.134862

**Total Failure rate= 8.59054**

**MTBF(hours)= 116407.12**

### Two Redundant Units Module:

Two identical units Module may be connected in parallel, each capable of supplying the total required output. If one unit Module fails and can be removed from the system ( does not interfere with the operation of the other unit Module ) , then the other unit Module supplies the required output. Using a constant failure rate, the following relations apply .

$$\text{Total Failure Rate ( F )} = M \lambda / ( 3 / 2 ) + B \lambda = 8.59054 / ( 3 / 2 ) + 0.766620 = 6.493647$$

$$\text{TC-550RVN2 (MTBF)} = F / 10^6 \text{Hrs} = 6.808113 / 10^6 \text{Hrs} = 153996.68$$

**Mλ= Main power failure rate , Bλ= Back plane failure rate**