

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: 40°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/10⁶ hours

No.	Part Type	λ_g	π_Q	π_L	N	λ_{eq}
1	Capacitor (Aluminum Dry) , CE	0.0012	15	1.0	25	0.45
2	Capacitor (Ceramic, Gen. Purpose) , CK	0.0037	5.5	1.0	22	0.4477
3	Metallized plastic/plasticn ,CH	0.00051	10	1.0	4	0.0204
4	Resistor (Chip), RN	0.0037	5	1.0	101	1.8685
5	Diode (General Purpose Analog)	0.0036	5.5	1.0	25	0.495
6	Diode (Voltage Reg. ; Zener)	0.0033	5.5	1.0	6	0.1089
7	Diode (Power Rectifier/Schottky Pwr.)	0.0028	10	1.0	10	0.28
8	Diode (fast Recovery Pwr. Rectifier)	0.0230	10	1.0	9	2.07
9	FUSES	0.01	1	1.0	1	0.01
10	Thermistor , RTH	0.0014	10	1.0	1	0.014
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	5	1.0	9	0.00144
16	Transformer, Switching	0.00220	5	1.0	5	0.055
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 ⁶ hours)						7.32781

PCB Name:IS-PPC-2

Unit : Failures/10⁶ hours

No.	Part Type	λ_g	π_Q	π_L	N	λ_{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 ⁶ hours)						1.588244

PCB Name:TC-735i-LS

Unit : Failures/10⁶ hours

No.	Part Type	λ_g	π_Q	π_L	N	λ_{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 ⁶ hours)						1.134862

Total Failure rate= 10.050916

MTBF(hours)= 99493.419

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 .

$$\text{Total Failure Rate (F)} = M \lambda / (3 / 2) + B \lambda = 10.05092 / (3 / 2) + 0.766620 = 7.467231$$

$$\text{TC-550RVN2 (MTBF)} = F / 10^6 \text{Hrs} = 7.467231 / 10^6 \text{Hrs} = 133918.46$$

$M\lambda$ = Main power failure rate , $B\lambda$ = Back plane failure rate