

Switching Power Supply/Adaptor MTBF Report

Part No. : CSS150 SERIES

Description : 12Vdc/12.5Amp(Sample)

Date : 2009.09.21

MTBF Model

The calculation is based on MIL-HDBK-217F, Notice 1, Appendix A: Parts Count Reliability. The prediction were performed with the power supply operating in a Ground Benign (Gb) controlled environment

MIL-HDBK-217F

$$MTBF = \frac{1}{\lambda_{\text{equip}}} = \frac{1}{\sum_{i=1}^n N_i (\lambda_G) I(\pi_Q) i} \times 10^6$$

Where :

λ_G : Generic Failure Rate for the 'ith (Failures / 10⁶ Hours)
 λ_{equip} : Total Equipment Failure Rate (Failures / 10⁶ Hours)
 N_i : Quantity of the 'ith Generic Part

π_Q : Quality Factor
 π_L : Learning Factor
 n : Number of different Generic Part categories

No. Part Type	λ_G	π_Q	π_L	N_i	λ_{equip}	Remark
1. Resistor (Film), RN	0.0014	10	—	46	0.644	
2. Capacitor (Aluminum Dry),CE	0.029	10	—	5	1.45	
3. Capacitor (Ceramic,General Purpose),CK	0.0036	10	—	26	0.936	Including of EMI Y Cap.
4. Capacitor (Metalized plastic/plastic)	0.0029	10	—	4	0.116	Including of EMI X Cap.
5. Transient Suppressor/Varistor	0.0029	10	—	0	0	
6. Thermistor	0.065	10	—	1	0.65	
7. Diode (Fast Recovery Power Rectifier)	0.065	5.5	—	1	0.3575	Including of Bridge Diode
8. Diode (General Purpose Analog)	0.0036	5.5	—	4	0.0792	
9. Diode (Power Rectifier/Power Schottky)	0.0028	5.5	—	3	0.0462	Output Rectifiers
10. Diode (Voltage Reference/Regulator; Avalanche and Zener)	0.0033	5.5	—	3	0.05445	TL431/Zener Diode
11. Transistor (NPN/PNP, Frequency<200MHz)	0.00015	5.5	—	3	0.002475	
12. Transistor (Power MOSFET, Frequency<200MHz)	0.0057	5.5	—	5	0.15675	
13. Diode (Thyristor/SCR)	0.0025	5.5	—	0	0	
14. Microcircuit (Bipolar technology, Gate/logic Arrays, Linear,1-100 Transistors)	0.0095	10	—	5	0.475	PWM IC AND OPTOCOUPLERS
15. Inductive Device (Low power Pulse Transformer)	0.0035	10	—	6	0.21	Transformer & Line Filter
16. Electronic Filter (Ceramic-Ferrite)	0.022	2.9	—	4	0.2552	Ferrite Bead core
17. FUSE	0.01	1	—	2	0.02	
18. Rotating Device (Motor)	1.6	1	—	0	0	
19. Switch (Toggle or Push-button)	0.001	20	—	0	0	
20. Connector (General)	0.011	2	—	3	0.066	Input & Output Connector
21. Hand Solder (Wrapping)	0.00014	1	—	0	0	Output Wireharness/Cable
22. Single Connections (Clip Termination)	0.00012	1	—	0	0	
23. Single Connections (Reflow Solder)	0.000069	1	—	215	0.014835	
Total Equipment Failure Rate (Failures / 10⁶ Hours)					5.53361	

MTBF = 180,714 Hours