

Switching Power Supply MTBF Report

Part No. : CSS65A 5-19V

Description : Output 5V,12V,15V,19V

Date : 2015/1/21

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

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

Where : λ_G : Generic Failure Rate for the 'ith (Failures / 10^9 Hours)

π_Q : Quality Factor

π_L : Learning Factor

N_i : Quantity of the 'ith Generic Part

λ_{equip} : Total Equipment Failure Rate (Failures / 10^6 Hours)

n : Number of different Generic Part categories

No.	Part Type	λ_G	π_Q	π_L	Ni					λ_{equip}
1.	Resistor (Film), RN	0.0014	10	--	29					0.406
2	Capacitor (Aluminum Dry),CE	0.029	10	--	6					1.74
3	Capacitor (Ceramic,Gen. Purpose),CK	0.0036	10	--	17					0.612
4	Capacitor (Metalized plastic/plastic)	0.0029	10	--	1					0.029
5	Transient Suppressor/Varistor	0.0029	10	--	0					0
6	Thermistor	0.065	10	--	1					0.65
7	Diode (Fast Recovery Pwr. Rectifier)	0.065	5.5	--	2					0.715
8	Diode (General Purpose analog)	0.0036	5.5	--	4					0.0792
9	Diode (Power Rectifier/Schottky Pwr.)	0.0028	5.5	--	1					0.0154
10	Diode (Voltage Ref./Reg ; Avalanche and Zener)	0.0033	5.5	--	2					0.0363
11	Transistor (NPN/PNP,f<200MHz)	0.00015	5.5	--	1					0.000825
12	Transistor (Power ,MOSFET,f<200MHz)	0.0057	5.5	--	2					0.0627
13	Diode (Thyristor/SCR)	0.0025	5.5	--	0					0
14	Microcircuit (Bipolar technology, Gate /logic Arrays, Linear,1-100 Transistors	0.0095	10	--	3					0.285
15	Inductive Device (Low power Pulse XFMR)	0.0035	10	--	5					0.175
16	Electronic Filter (Ceramic-Ferrite)	0.022	2.9	--	0					0
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	--	8					0.176
21	Hand Solder(Wrapping)	0.00014	1	--	2					0.00028
22	Single Connections (Clip Termination)	0.00012	1	--	4					0.00048
23	Single Connections (Reflow Solder)	0.000069	1	--	190					0.01311
Total Equipment Failure rate (Failures/ 10^6 hours)										5.016295

MTBF 199,350 HOURS