

GlobTek Inc.

MTBF REPORT

FOR

GT-81081-6012

Test Type:	Parts Prediction		Standard:	MIL-HDBK-217F	Test Date:	Aug 31th 2004
Product:	SMPS		Model:	GT-81081-6012	Revision :	A
1. Test Condition :						
	AC Line Voltage :	115 Vac		Line Frequency :	50 Hz	
	Temperature:	25°C		LOAD:	5A	
2. Summary :						
2.1 Microelectronic Devices		(Section 5)				
	$\lambda p = \langle C1 \cdot \pi T + C2 \cdot \pi E \rangle \cdot \pi Q \cdot \pi L$					
	= 0.1889229	Failures / 1000000	Hours			
2.2 Discrete Semiconductors		(Section 6)				
	$\lambda p = \lambda b \cdot \pi E \cdot \pi Q \cdot \pi T$			(opto couple)		
	$\lambda p = \lambda b \cdot \pi E \cdot \pi Q \cdot \pi C \cdot \pi S \cdot \pi T$			(Diode)		
	$\lambda p = \lambda b \cdot \pi E \cdot \pi Q \cdot \pi R \cdot \pi A \cdot \pi S \cdot \pi T$			(BJT)		
	$\lambda p = \lambda b \cdot \pi E \cdot \pi Q \cdot \pi A \cdot \pi T$			(Si FET)		
	= 0.902799	Failures / 1000000	Hours			
2.3 Resistors		(Section 9)				
	$\lambda p = \lambda b \cdot \pi E \cdot \pi Q \cdot \pi P \cdot \pi S \cdot \pi T$					
	= 0.98964	Failures / 1000000	Hours			
2.4 Capacitors		(Section 10)				
	$\lambda p = \lambda b \cdot \pi E \cdot \pi Q \cdot \pi sR \cdot \pi V \cdot \pi C \cdot \pi T$					
	= 1.549887	Failures / 1000000	Hours			
2.5 Inductive Devices		(Section 11)				
	$\lambda p = \lambda b \cdot \pi E \cdot \pi Q \cdot \pi T$					
	= 0.195666	Failures / 1000000	Hours			
2.6 Connectors		(Section 15)				
	$\lambda p = \lambda b \cdot \pi E \cdot \pi Q \cdot \pi K \cdot \pi T$					
	= 0.030229	Failures / 1000000	Hours			
2.7 Interconnection Assemblies		(Section 16)				
	$\lambda p = \lambda b \cdot (N1 \cdot \pi C + N2 \cdot (\pi E + 13)) \cdot \pi Q \cdot \pi E$					
	= 0.032096	Failures / 1000000	Hours			
2.8 Fuses		(Section 22)				
	$\lambda p = \lambda b \cdot \pi E$					
	= 0.01000	Failures / 1000000	Hours			
3. Result						
	Total of λp	MTBF	RESULT			
	(Fail. / 1000000 Hrs)	(Hours)				
	3.90	256460	PASS			

PREPARED: TH
04/09/04

CHECKED: KJ
04/09/04

APPROVED: JB
04/09/04

Microelectronic devices				Ambient: 25°C		Input: 115V ac 50Hz					
Location	Part type	T _j °C	Pin	π E	π Q	π T	π L	C2	C1	λ P	MTBF
U1	NCP1200P60	65.2	8	2	2	2.0263	1	0.003	0.02	0.091634	10912974.5
U3	AZ431	67.4	3	2	2	2.3405	1	0.001	0.02	0.097289	10278669.8
					Total Of This Page					0.188923	5293164.6

Discrete semiconductors				Ambient: 25°C		Input: 115V ac 50Hz									
LOCATION	PART TYPE	Vmax (V)	Base data								Measure & Calculation Data				MTBF
			π R	π A	λ b	π S	π T	π C	π Q	π E	Vop	I op/ Prat	TJ (C)	λ P	
BD1	BRIDGE-DIODE	600	—	—	0.0010	0.0399	6.1114	2.0	5.5	6.0	159.40	—	88.0	0.01609993	62112080.6
D1	FAST DIODE	1000	—	—	0.0010	0.0081	5.5793	2.0	5.5	6.0	137.80	—	84.2	0.002982	335350393.4
D2	FAST DIODE	1000	—	—	0.0010	0.0006	5.4853	2.0	5.5	6.0	47.50	—	83.5	0.000220	4538247383.8
D3	IN4148	75	—	—	0.0010	0.0041	5.5658	2.0	5.5	6.0	7.8100	—	84.1	0.001506	664023851.6
D4	IN4148	75	—	—	0.0010	0.0001	5.4322	2.0	5.5	6.0	1.620	—	83.1	0.000032	31100025406.8
D5	SHKY-DIODE	100	—	—	0.0010	0.1483	5.3794	2.0	5.5	6.0	45.60	—	82.7	0.052670	18986198.9
D7	FAST DIODE	1000	—	—	0.0010	0.0000	5.1978	2.0	5.5	6.0	0.303	—	81.3	0.000000	1034498126435420.0
ZD1	SMD-ZENER	12.7	—	—	0.0010	0.0008	4.1946	1.0	5.5	6.0	0.675	—	72.8	0.000111	9033035212.3
ZD4	ZENER-DIODE	15	—	—	0.0010	0.6113	3.9509	2.0	5.5	6.0	12.250	—	70.5	0.159407	6273257.0
Q1	MOS-FET	600	—	4.0	0.0010	—	2.7023	—	5.5	6.0	365.60	—	79.2	0.356698	2803493.5
U4	Photo couple	—	—	—	0.0025	—	3.7948	—	5.5	6.0	—	—	74.5	0.313073	3194139.9
										Total of this page				0.902799	1107666.4

Resistor					Ambient: 25°C		Input: 115V ac 50Hz							
LOCATION	PARTS TYPE	Resistance (ohm)	Prate (W)				Basic Data				Measure & Calculation Data			MTBF
				λ b	π T	π p	π s	π Q	π E	Top (C)	Vop (V)	Pd (W)	λ P	(Hours)
R1A-C	SMD-RES	470000.0	0.250	0.0037	1.465	0.128	0.726	5	16	66.6	49. 24	0.005	0.040368	24772066.7
R2 R3 R4	SMD-RES	1000000.0	0.250	0.0037	1.551	0.083	0.715	5	16	73.9	41. 2	0.002	0.027298	36632113.3
R5 R6 R7 R8	SMD-RES	200000	0.250	0.0037	1.567	0.235	0.791	5	16	75.2	69. 98	0.024	0.086314	11585582.5
R16	SMD-RES	75.00	0.250	0.0037	1.530	0.387	1.043	5	16	72.1	2. 56	0.087	0.182533	5478452.4
R18	SMD-RES	1200.0	0.125	0.0037	1.550	0.009	0.710	5	16	73.8	0. 087	0.000	0.003054	327410153.2
R22	SMD-RES	1500.0	0.125	0.0037	1.553	0.045	0.712	5	16	74.0	0. 724	0.000	0.014685	68098016.4
R19	RDE-M.O.F	0.5	2.00	0.0037	1.693	0.579	0.813	5	10	85.6	0. 351	0.246	0.147460	6781507.6
R19A	SMD-RES	2.0	0.250	0.0037	1.593	0.316	0.893	5	16	77.4	0. 323	0.052	0.133150	7510323.2
R20	SMD RES	100.0	0.125	0.0037	1.585	0.172	0.782	5	16	76.7	1. 05	0.011	0.063277	15803607.9
R21	SMD RES	33000.0	0.125	0.0037	1.553	0.014	0.710	5	16	74.0	0. 77	0.000	0.004602	217309887.0
R23	SMD-RES	10000	0.125	0.0037	1.536	0.009	0.710	5	16	72.6	0. 25	0.000	0.003015	331650284.6
R26	SMD-RES	15000	0.125	0.0037	1.550	0.145	0.756	5	16	73.8	10. 33	0.007	0.050402	19840379.6
R24A-B	SMD-RES	47.0	0.250	0.0037	1.731	0.345	0.946	5	16	88.7	1. 75	0.065	0.167031	5986905.2
R28	SMD-RES	39000.0	0.125	0.0037	1.639	0.095	0.725	5	16	81.2	9. 68	0.002	0.033487	29862142.0
R29	SMD-RES	10000.0	0.125	0.0037	1.732	0.056	0.714	5	16	88.8	2. 49	0.001	0.020537	48691583.7
R31	SMD RES	1000.0	0.250	0.0037	1.722	0.034	0.711	5	16	88.0	0. 419	0.000	0.012426	80475958.2
									Total of This Page				0.989641	1010467.8

Capacitor					Ambient: 25°C		Input: 115V ac		50Hz							
LOCATION	PARTS TYPE	Tmax (C)	Vmax (V)	C (uF)	Basic Data						Measure & Calculation Data				MTBF	
					λ b	π T	π C	π V	π sr	π Q	π E	Ta (C)	VOP (V)	S		λ P
C1	E-CAP	105	400.00	120.0	0.00110	2.255	1.539	1.105	1	3	6	73.2	153.0	0.383	0.075940	13168275.8
C9	E-CAP	105	16	1000.0	0.00110	2.275	1.862	5.786	1	3	6	73.8	13.13	0.821	0.485310	2060538.1
C10	E-CAP	105	16	1000.0	0.00110	2.187	1.862	5.786	1	3	6	71.1	13.13	0.821	0.466568	2143312.6
C4	E-CAP	105	50	47.0	0.00110	2.362	1.414	1.009	1	3	6	76.4	11.62	0.232	0.066700	14992519.5
C7	E-CAP	105	50	4.70	0.00110	2.402	1.149	1.000	1	3	6	77.6	0.32	0.006	0.054672	18291055.3
C11	E-CAP	105	25	100.0	0.00110	2.033	1.514	1.508	1	3	6	66.2	13.10	0.524	0.091879	10883877.9
C17	SMD-CAP	125	50	0.10	0.00110	2.308	0.813	1.005	1	3	6	74.8	10.30	0.206	0.037323	26792921.4
C2	CERAMIC-CAP	125	1000	0.00220	0.00110	2.464	0.577	1.000	1	3	6	79.4	120.00	0.120	0.028135	35543206.0
C8	CERAMIC-CAP	125	1000	0.00220	0.00180	2.301	0.577	1.000	1	3	6	74.6	36.60	0.037	0.042989	23261593.2
CX1	X-CAP	125	275	0.4700	0.00110	2.070	0.934	1.164	1	3	6	67.4	115.00	0.418	0.044594	22424647.9
CX2	X-CAP	125	275	0.1500	0.00110	2.149	0.843	1.164	1	3	6	69.9	115.00	0.418	0.041766	23942756.8
CY1	Y-CAP	125	250	0.00047	0.00110	1.948	0.502	1.000	1	3	6	63.4	20.02	0.080	0.019353	51670304.1
CY2	Y-CAP	125	250	0.00047	0.00110	1.906	0.502	1.132	1	3	6	62.0	100.00	0.400	0.021433	46657852.3
CY3	Y-CAP	125	250	0.00330	0.00110	2.335	0.598	1.008	1	3	6	75.6	57.20	0.229	0.027865	35887613.2
CY4	Y-CAP	125	250	0.00330	0.00110	2.298	0.598	1.000	1	3	10	74.5	29.61	0.118	0.045361	22045421.0
										Total of This Page					1.549887	645208.2

connector			Ambient: 25℃ Input: 115V ac 50Hz									
LOCATION	PARTS TYPE	PIN NO.	Basic Data						Measure & Caculation Data			MTBF
			λ b	π T	π K	π Q	π E	Ta (C)	aT (C)	To (C)	λ P	(Hours)
CON1	inlet	3	0.00700	1.0240	1	2	1	35.6	0.6482	26.3000	0.014335	69756971.8
CON2	2 Wire	2	0.00700	1.1353	1	2	1	37.2	0.6482	32.1000	0.015894	62917490.1
							Total of This Page				0.030229	33080470.2

Inductive			Ambient: 25°C	Input: 115V ac 50Hz						
LOCATION	PARTS TYPE	INSULATION CLASS	TMAX (C)	Basic Data				Measure & Calculation Data		MTBF (hours)
				λ b	π T	π Q	π E	Ths (C)	λ P	
LF1	CHOKE	----	125	0.00003	1.8571	3	6	75. 7	0.001003	997157850.0
LF3	CHOKE	----	130	0.00003	1.7406	3	6	69. 6	0.000940	1063895593.9
L3	REF	----	130	0.00003	1.6624	3	6	65. 4	0.000898	1113936258.4
T 1	TRANSFORMER	-----	130	0.00540	2.0130	3	6	83. 6	0.195666	5110750.3
						Total of This Page			0.195666	5110750.3

PCB					Ambient: 25°C		Input: 115V ac		50Hz												
LOCA -TION	PARTS TYPE	Basic Data								Measure & Calculation Data										MTBF	
		λ b	π C	π Q/aT	π E	CR	π LC	as	acc	N1	N2	d	h	Trise	Nf	aSMT	LC	ECF	λ P/ λ smt	(Hours)	
PCB	PCB	0.000017	1	2	2	---	---	---	---	38	31	---	---	---	---	---	---	---	0.032096	31156530.4	
										Total of This Page										0.032096	31156530.4

Fuse	Ambient: 25°C		Input: 115V ac		50Hz		
LOCATION	PARTS TYPE	Base data		Calculation data		MTBF	
		λb	πE	λP		(Hours)	
FUSE	250V/3.15AH	0.01	1.0	0.01		100000000	
		Total of this page		0.01		100000000	