

MTBF Prediction Report

Model Name: GTM91120-3024

Customer:

Stage: EDVT1

PCB Rev.: A

Part List Rev.: 2

Spec Rev.: E

Conclusion:

<input checked="" type="checkbox"/>
<input type="checkbox"/>

PASS

FAIL

Prepared By: Michael

Checked By: JET

Approved By: JAYSON



GTM91120-3024 CMTBF REPORT LIST
PART LIST REV: 0A

COMPONENT	FAILURE RATE	Q'TY
RESISTOR	0.14512894	23
CAPACITOR (except electrolytic)	0.06225651	11
CAPACITOR (electrolytic)	0.888448248	4
DIODE	0.086806628	7
Integrated Circuits	0.491567927	1
KA431	0.5606499	1
IC-Opto-couplers	0.261631586	1
Magnetic	0.01785377	3
Fuse	0.02	2
Transistor-Power MOSFET	0.689288932	1
TOTAL	3.22363245	54
MTBF	310,209.06	
MTBF SPEC.	200,000	
Conclusion	OK	



Input Voltage	NO .	Test Item	Page
		Cover,Report,Part list,and summary	1~4
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CMTBF TEST REPORT			Test Engineer:	Maichael
Model Name:	GTM91120-3024	Customer:	Test Date:	2013-12-30
Quantity:	1	Ser. No.:		
<p>1. Purpose: Verify PSU whether or not to meet the customer CMTBF specification.</p> <p>2. Conditions: Input: 100V AC Output: 24V/1.25A Ambient: 25 degree C</p> <p>3. Equipment: Oscilloscope: Tek3054B, AC source: HP6813A, Electronic load:Chroma6310 Multimeter: Agilent34401A, Current Probe Amplifier:Tek TM502A</p> <p>4. Criteria: The life time of the power supply component shall exceed 200,000 hours when 100vac and maximun load at 25°C .Calculated using the formula by the MIL-HDBK-217F.</p> <p>5. REGISTER: Details,please refer to the report content.</p> <p>6. Result: The MTBF value meets customer spec..</p>				



MTBF prediction worksheet - Fuse

Model : GTM91120-3024

Conditions: Vin=100VAC; Output Load: +24V/1.25A

Amb. : 25°C

Component description			Component specifications	Stress	Failure rate		
Ref. Design	Part No.	Type		I(RMS) A	λ_b	πE	λ_p
F1	160-27146315®	W-F-1814	3.15A/250V	0.23	0.01	1	0.01
F2	160-27146315®	W-F-1814	3.15A/251V	0.23	0.01	1	0.01
TOTAL							0.02



MTBF prediction worksheet - Magnetics

Model : GTM91120-3024

Condi ti ons: Vi n=100VAC; Output Load: +24V/1. 25A

Amb. : 25°C

Component description			Component specifications	Stress	Failure rate				
Ref. Design	Part No.	Type	Tcore deg.C	Tcore deg.C	λ_b	π_Q	π_E	π_c	λ_p
LF1	OSP-321-03331704®	C	130	70.6	0.000584434	4	1	1	0.002337736
LF2	OSP-320-03322002®	C	130	41	0.000420607	4	1	1	0.001682426
T1	320-02889002®	X	130	73.6	0.003458402	4	1	1	0.013833607
TOTAL									0.01785377

MTBF prediction worksheet - KA431

Model : GTM91120-3024

 Conditions: $V_{in}=100VAC$; Output Load: +24V/1.25A

Amb. : 25°C

Component description				Component specifications					Stress				Failure rate						
Ref. Design	Part No.	Type	Maker	Pin NO.	VKA	IK(rms)	Rth	Tj	VKA	IK(rms)	Ta	Tj(c)	C1	C2	πT	πL	πQ	πE	λp
					V	A	degC/W	deg.C	V	A	deg.C	deg.C							
U3	270-05816001(R)	KA431	Fairchild	3	37	0.1	330	150	23.48	0.004	50.2	81.194	0.01	0.00118	5.54754	1	10	0.5	0.56065
TOTAL																			0.560650



MTBF prediction worksheet - Integrated Circuits

Model : GTM91120-3024

Conditions: Vin=100VAC; Output Load: +24V/1.25A

Amb. : 25°C

Component description				Component specifications					Sress				Failure rate						
Ref. Design	Part No.	Type	Maker	Pin NO.	VCC(max)	Ic (rms)	Rth	Tj	VCC(peak)	Ic(rms)	Ta	Tj(c)	C1	C2	πT	πL	πQ	πE	λp
					V	A	deg.C/W	deg.C	V	A	deg.C	deg.C							
U1	260-08080001(R)	PWM	ON-BRIGHT	6	30	0.01	200	150	18.68	0.002	71.3	78.772	0.01	0.0025	4.791	1	10	0.5	0.491567927
TOTAL																			0.491567927



MTBF prediction worksheet - Zener Diodes

Model : GTM91120-3024

Condi ti ons: Vi n=100VAC; Output Load: +24V/1.25A

Amb. : 25°C

Component description			Component specifications					Stress				Failure rate						
Ref. Desig.	Part No.	Maker	Vz	Iz	Pd	Rth	Tj	Vz	Iz(rms)	Ta	Tj(c)	λb	πE	πQ	πt	πs	πc	λp
			V	I	W	deg.C/W	deg. C	V	A	deg.C	deg.C							
ZD1	211-01207008®	PANJIT	30	0.0085	1	667	150	24.07	0.002	46.5	78.609	0.002	1	5.5	2.67756	1	1	0.029453
TOTAL																		0.029453

MTBF prediction worksheet - Capacitors, except electrolytic

Model : GTM91120-3024

Conditions: Vin=100VAC; Output Load: +24V/1.25A

Amb. : 25°C

Component description				Component specifications			Stress			Failure rate				
Ref. Design	Part No.	Type	Maker	Cap. uF	Vmax rated V	temp. rated deg C	Tc deg.C	V V	V ratio	π_{cv}	λ_b	π_Q	π_E	λ_p
CX1	125-08045475(R)	MEF	DAIN	0.47	275	100	52.1	100	0.36364	1.031623	0.001981	10	1	0.0204356
CY1/CY2	122-11044103(R)	DIS	TDK	0.001	250	85	54.7	67	0.268	0.876564	0.001283	3	1	0.0033752
C3	122-39131103(R)	DIS	TDK	0.001	1000	125	53.5	127	0.127	0.876564	0.000803	3	1	0.0021128
C9	122-39131103(R)	MON	TDK	0.001	1000	125	51.5	69.77	0.06977	0.876564	0.000752	3	1	0.0019775
C4	122-38141225(R)	MON	TDK	0.01	1000	125	60.4	142	0.142	1.129234	0.000842	3	1	0.0028527
C4A	122-05031474(R)	MON	TDK	0.047	1000	125	63.5	147	0.147	1.338797	0.000858	3	1	0.0034473
C6	120-26091002(R)	MON	TDK	0.0001	50	125	69.6	1.28	0.0256	0.680431	0.000782	3	1	0.0015955
C5	120-26091004(R)	MON	TDK	0.01	50	125	68.7	2.18	0.0436	1.129234	0.000782	3	1	0.0026478
C14	120-26091005(R)	MON	TDK	0.1	50	125	52.5	20.57	0.4114	1.454735	0.002665	3	1	0.0116316
C15	120-26091005(R)	MON	TDK	0.1	50	125	53.61	20.98	0.4196	1.454735	0.002791	3	1	0.0121806
TOTAL														0.0622565



MTBF prediction worksheet - Capacitors, electrolytic

Model : GTM91120-3024

Condi tions: Vi n=100VAC; Output Load: +24V/1.25A

Amb. : 25°C

Component description				Component specifications						Stress			Failure rate				
Ref.Design	Part No.	Type	Maker	Cap. (uF)	Vmax	Ripple current	F	T	Temp.	Tc	V	Vratio	πcv	λb	πQ	πE	λp
				(uF)	V	A			deg.C	deg.C	Vmax						
C2	123-63431687®	ELE	SAMXON	68	400	0.391	1 1.4	2.2	105	68.6	147	0.368	0.7267	0.0763	3	1	0.166301
C11	123-51091478(R)	ELE	SAMXON	470	35	1.05	1	2.44	105	52.8	24.9	0.711	1.0291	0.111	3	1	0.342598
C12	123-51211278(R)	ELE	SAMXON	270	35	0.84	1	2.44	105	47.5	24.9	0.711	0.9314	0.0917	3	1	0.256251
C7	123-59047104R)	ELE	CHEN	10	50	0.1	1	2.44	105	69.3	18.7	0.374	0.5146	0.0799	3	1	0.123298
TOTAL																	0.888448



MTBF prediction worksheet - Transistor-Power MOSFET

Model : GTM91120-3024

Conditions: Vin=100VAC; Output Load: +24V/1.25A

Amb. : 25°C

Component description				Component specifications							Stress				Failure rate					
Ref. Design	Part No.	Type	Maker	Pd rated	Vds rated	Id rated	Vgs rated	Rth	Rdc(on)	Tj rated	Id(rms)	Pd	Tc	Tj(c)	πT	λb	πA	πQ	πE	λp
				W	V	A	V	deg.C/W	Ohm	deg.C	A	W	deg.C	deg.C						
Q1	226-08311001(R)	M	AUK	30	600	7	30	4.16	1.2	150	0.4	0.19	76.2	77	2.611	0.012	4	5.5	1	0.689289
TOTAL																				0.689289



MTBF prediction worksheet - Resistors

Model : GTM91120-3024

Conditions: Vi n=100VAC; Output Load: +24V/1.25A

Amb. : 25°C

Component description				Component specifications					Stress				Failure Rate				
Ref. Design	Part No.	Type	Maker	Resistance	Power	V rms rated	temp.	K	Tc	Vrms	Power actual	Watt ratio	πR	λb	πQ	πE	λp
				Ohm	W	V	deg.C		deg.C	V	W						
R1	100-12011006(R)	R.CF	YAGEO	1000000	0.25	200	155	1.00	71.2	50.39	0.003	0.01	1.10	0.001045	5.00	1.00	0.005747160
R2	100-12011007(R)	R.CF	YAGEO	1000000	0.25	200	155	1.00	71.3	50.71	0.003	0.01	1.10	0.001046	5.00	1.00	0.005753176
R1A	100-12014995(R)	R.CF	YAGEO	499000	0.25	200	155	1.00	70.9	41.6	0.003	0.01	1.10	0.001047	5.00	1.00	0.005758845
R1B	100-12014995(R)	R.CF	YAGEO	499000	0.25	200	155	1.00	70.8	41.2	0.003	0.01	1.10	0.001046	5.00	1.00	0.005751831
R3	100-12052005(R)	R.CF	YAGEO	200000	0.25	200	155	1.00	70.6	80.75	0.033	0.13	1.10	0.001209	5.00	1.00	0.006650955
R4	100-12052005(R)	R.CF	YAGEO	200000	0.25	200	155	1.00	70.5	80.75	0.033	0.13	1.10	0.001208	5.00	1.00	0.006644792
R5	100-12051002(R)	R.CF	YAGEO	100	0.25	200	155	1.00	70.3	3.69	0.136	0.54	1.00	0.002030	5.00	1.00	0.010150981
R6	100-12051001(R)	R.CF	YAGEO	10	0.25	200	155	1.00	70.4	0.598	0.036	0.14	1.00	0.001226	5.00	1.00	0.006131770
R8	100-08019104(R)	MOF	YAGEO	91000	0.125	150	155	1.00	71.2	1.5	0.000	0.00	1.00	0.001032	5.00	1.00	0.005159499
R14A	100-12053301(R)	R.CF	YAGEO	33	0.25	200	155	1.00	46.8	2.49	0.188	0.75	1.00	0.002008	5.00	1.00	0.010037998
R11	100-12053000(R)	R.CF	YAGEO	3	0.25	200	155	1.00	70.6	0.372	0.046	0.18	1.00	0.001294	5.00	1.00	0.006472368
R12	100-12053000(R)	R.CF	YAGEO	3	0.25	200	155	1.00	70.4	0.372	0.046	0.18	1.00	0.001292	5.00	1.00	0.006460121
R13	100-12053000(R)	R.CF	YAGEO	3	0.25	200	155	1.00	70.3	0.372	0.046	0.18	1.00	0.001291	5.00	1.00	0.006454006
R14	100-12052700(R)	R.CF	YAGEO	2.7	0.25	200	155	1.00	70.3	0.372	0.051	0.21	1.00	0.001325	5.00	1.00	0.006622558
R9	100-08056801(R)	R.CF	YAGEO	68	0.125	150	155	1.00	71.2	1.52	0.034	0.27	1.00	0.001453	5.00	1.00	0.007266625
R17	100-12015102(R)	R.CF	YAGEO	510	0.25	200	155	1.00	46.5	0.141	0.000	0.00	1.00	0.000830	5.00	1.00	0.004151881
R17A	100-08011503(R)	R.CF	YAGEO	1500	0.125	150	155	1.00	48.6	2.001	0.003	0.02	1.00	0.000867	5.00	1.00	0.004336218
R21	100-08011203(R)	R.CF	YAGEO	1200	0.125	150	155	1.00	47.2	0.313	0.000	0.00	1.00	0.000836	5.00	1.00	0.004179956
R22	100-08053901(R)	R.CF	YAGEO	39	0.125	150	155	1.00	71.6	0.022	0.000	0.00	1.00	0.001035	5.00	1.00	0.005177037
R10	100-08018202(R)	R.CF	YAGEO	820	0.125	150	155	1.00	70.8	0.524	0.000	0.00	1.00	0.001031	5.00	1.00	0.005157469
R19	100-08014434(R)	R.CF	YAGEO	44200	0.125	150	155	1.00	47.2	21.21	0.010	0.08	1.00	0.000919	5.00	1.00	0.004595308
R20	100-08055103(R)	R.CF	YAGEO	5100	0.125	150	155	1.00	46.9	2.19	0.001	0.01	1.00	0.000841	5.00	1.00	0.004202638
R23	100-08013903(R)	R.CF	YAGEO	3900	0.125	150	155	1.00	46.7	21.22	0.115	0.92	1.00	0.002453	5.00	1.00	0.012265754
TOTAL																	0.145128945