APEX MICROTECHNOLOGY CORPORATION
RELIABILITY PREDICTION
PA08M/883

by

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Date of prediction: 15-Mar-01

This reliability prediction is based on MIL-HDBK-217F, December 2, 1991 including Notice 2, February 28, 1995.

Conditions of this prediction are as follows:

Hybrid quality level is		B	
Environment is	Gf	Ground, Fixed	
Case temperature is		40	C
Internal Power Dissipation =		5	W
Supply voltage is +/-		135	V

An AC signal is applied.
Product introduction date: 01-Mar-83

The results of this prediction are:

0.67 failures per million hours; or,
MTBF=1503 thousand hours.

Transistors, Low Frequency, Bipolar:

Lp = Lb * PiT * PiR * PiS

Q18			Volts =	40	Watts =	1.2	Tj =	175	'K/W=	125	
Usage:	Vstress =	3.1	Vpwr =	3.1	Ic =	1E-06	Vs =	0.0775	Power =	3E-06	
Lb	PiT		PiR	PiS				Nc	Tj =	40	
0.00074	1.404912		1.0698	0.0572				1			6.36E-05
Q7			Volts =	40	Watts =	1.2	Tj =	175	'K/W=	125	
Usage:	Vstress =	1	Vpwr =	1	Ic =	1E-06	Vs =	0.025	Power =	1E-06	
Lb	PiT		PiR	PiS				Nc	Tj =	40	
0.00074	1.404904		1.0698	0.0486				1			5.41E-05
Q11			Volts =	40	Watts =	1.2	Tj =	175	'K/W=	125	
Usage:	Vstress =	1.3	Vpwr =	1.3	Ic =	0.003	Vs =	0.0325	Power =	0.0039	
Lb	PiT		PiR	PiS				Nc	Tj =	40.488	
0.00074	1.419733		1.0698	0.0498				1			5.59E-05
Q19			Volts =	40	Watts =	1.2	Tj =	175	'K/W=	125	
Usage:	Vstress =	1.3	Vpwr =	1.3	Ic =	1E-06	Vs =	0.0325	Power =	1E-06	
Lb	PiT		PiR	PiS				Nc	Tj =	40	
0.00074	1.404905		1.0698	0.0498				1			5.54E-05
Q6,17			Volts =	300	Watts =	26	Tj =	150	'K/W=	4.8077	
Usage:	Vstress =	267.5	Fraction Output Pwr = 1/			1	Vs =	0.8917	Power =	5	
Lb	PiT		PiR	PiS				Nc	Tj =	64.038	
0.00074	2.274314		3.3384	0.714				2			0.008023
Q3,16			Volts =	300	Watts =	1.15	Tj =	150	'K/W=	108.7	
Usage:	Vstress =	265.7	Vpwr =	133	Ic =	0.003	Vs =	0.8857	Power =	0.399	
Lb	PiT		PiR	PiS				Nc	Tj =	83.37	
0.00074	3.19605		1.0531	0.7008				2			0.003491
Q5			Volts =	300	Watts =	1.15	Tj =	150	'K/W=	108.7	
Usage:	Vstress =	126.2	Vpwr =	126.2	Ic =	0.0002	Vs =	0.4207	Power =	0.0202	
Lb	PiT		PiR	PiS				Nc	Tj =	42.195	
0.00074	1.47255		1.0531	0.1658				1			0.00019
Q8,9			Volts =	300	Watts =	1.15	Tj =	150	'K/W=	108.7	
Usage:	Vstress =	125.6	Vpwr =	125.6	Ic =	0.0005	Vs =	0.4187	Power =	0.0628	
Lb	PiT		PiR	PiS				Nc	Tj =	46.826	
0.00074	1.622742		1.0531	0.1648				2			0.000417

Q15			Volts =	300	Watts =	1.15	Tj =	150	'K/W=	108.7	
Usage:	Vstress =	127.6	Vpwr =	127.6	Ic =	0.0012	Vs =	0.4253	Power =	0.148	
Lb	PiT		PiR	PiS				Nc	Tj =	56.089	
0.00074	1.954549		1.0531	0.1682				1			0.000256

Q1			Volts =	20	Watts =	0.38	Tj =	150	'K/W=	328.95	
Usage:	Vstress =	0.6	Vpwr =	0.6	Ic =	0.0005	Vs =	0.03	Power =	0.0003	
Lb	PiT		PiR	PiS				Nc	Tj =	40.099	
0.00074	1.407894		0.6991	0.0494				1			3.6E-05

Q2			Volts =	20	Watts =	0.38	Tj =	150	'K/W=	328.95	
Usage:	Vstress =	1.67	Vpwr =	1.67	Ic =	0.0005	Vs =	0.0835	Power =	0.0008	
Lb	PiT		PiR	PiS				Nc	Tj =	40.275	
0.00074	1.413244		0.6991	0.0583				1			4.26E-05

Q4			Volts =	20	Watts =	0.38	Tj =	150	'K/W=	328.95	
Usage:	Vstress =	1.3	Vpwr =	1.3	Ic =	0.0005	Vs =	0.065	Power =	0.0006	
Lb	PiT		PiR	PiS				Nc	Tj =	40.197	
0.00074	1.410872		0.6991	0.055				1			4.02E-05

Transistors, Low Frequency, Si JFET: Lb = 0.0045

Lp = Lb * PiT

Q12			Volts =	50	Watts =	4	Tj =	150	'K/W=	31.25	
Usage:			Vpwr =	5	Id =	0.0005			Power =	0.0025	
Lb	PiT							Nc	Tj =	40.078	
0.0045	1.364935							2			0.012284

Transistors, Low Frequency, Si MOSFET: Lb = 0.012

Lp = Lb * PiT

Q10			Volts =	450	Watts =	2.25	Tj =	150	'K/W=	55.556	
Usage:			Vpwr =	261.8	Id =	0.001			Power =	0.2618	
Lb	PiT							Nc	Tj =	54.544	
0.012	1.790807							2			0.042979

Capacitors, ceramic general purpose type CK:

Lp = Lb * PiT * PiC * PiV Lb = 0.00099

C4			Volts =	200	pF =	150				
Usage:	Vstress =	6.4					S =	0.032		
Lb	PiT	PiC	Pi V					Nc		
0.00099	1.92167	0.243	1.0002					1		0.000463

C3			Volts =	300	pF =	18				
Usage:	Vstress =	265					S =	0.8833		
Lb	PiT	PiC	Pi V					Nc		
0.00099	1.92167	0.201	4.191					1		0.001602

C2			Volts =	100	pF =	1000				
Usage:	Vstress =	1					S =	0.01		
Lb	PiT	PiC	Pi V					Nc		
0.00099	1.92167	0.288	1					1		0.000549

C1			Volts =	45	pF =	47				
Usage:	Vstress =	1.2					S =	0.0267		
Lb	PiT	PiC	Pi V					Nc		
0.00099	1.92167	0.219	1.0001					1		0.000417

Diodes, Low Frequency:
Lp = Lb * PiT * PiS * PiC

Diodes, Zener, Lb = 0.002

D1,2			Volts =	3.1	Watts =	2.5	Tj =	175	'K/W=	60
Usage:					Ic =	0.001			Power =	0.0031
Lb	PiT	PiS	PiC					Nc	Tj =	40.186
0.002	1.367828	1	2					2		0.010943

Sum of all components 0.081961

Hybrid microcircuit:

Lp=sumLc*(1+.2*PiE)	* PiF	* PiQ	* PiL
0.081961	1.4	5.8	1	1

Total failures per million hours = 0.6655
Mean time between failures = 2E+06