APEX MICROTECHNOLOGY CORPORATION
RELIABILITY PREDICTION
PA12

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		Commercial	
Environment is	Gb	Ground, Benign	
Case temperature is		40	C
Internal Power Dissipation =		50	W
Supply voltage is +/-		45	V

An AC signal is applied.
Product introduction date: 01-Sep-81

The results of this prediction are:

1.99 failures per million hours; or,
MTBF=502 thousand hours.

Monolithic Bipolar and MOS Linear Devices:
Lp = C1 * PiT

IC1			Watts =	3.14	Tj =	200	#/Qs =	56		
Usage:			Watts =	0.18			Max Tj =	50.032		
C1	PiT							Nc		
0.01	0.710994							1		0.00711

Transistors, Low Frequency, Bipolar:
Lp = Lb * PiT * PiR * PiS

Q3,5,7,8			Volts =	40	Watts =	1.2	Tj =	175	'K/W=	125	
Usage:	Vstress =	0.65	Vpwr =	0.65	Ic =	0.025	Vs =	0.0163	Power =	0.0163	
Lb	PiT		PiR	PiS				Nc	Tj =	42.031	
0.00074	1.467433		1.0698	0.0473				4			0.00022
Q4			Volts =	40	Watts =	1.2	Tj =	175	'K/W=	125	
Usage:	Vstress =	1.72	Vpwr =	1.72	Ic =	0.0064	Vs =	0.043	Power =	0.011	
Lb	PiT		PiR	PiS				Nc	Tj =	41.376	
0.00074	1.447051		1.0698	0.0514				4			0.000236
Q1			Volts =	120	Watts =	1.2	Tj =	200	'K/W=	145.83	
Usage:	Vstress =	86	Vpwr =	41	Ic =	0.0075	Vs =	0.7167	Power =	0.3075	
Lb	PiT		PiR	PiS				Nc	Tj =	84.844	
0.00074	3.275116		1.0698	0.415				1			0.001076
Q2,6			Volts =	120	Watts =	194	Tj =	200	'K/W=	0.9021	
Usage:	Vstress =	84	Fraction Output Pwr = 1/			1	Vs =	0.7	Power =	50	
Lb	PiT		PiR	PiS				Nc	Tj =	85.103	
0.00074	3.289159		7.0224	0.3941				2			0.013473

Capacitors, ceramic general purpose type CK:
Lp = Lb * PiT * PiC * PiV Lb = 0.00099

C1			Volts =	100	pF =	1000					
Usage:	Vstress =	87					S =	0.87			
Lb	PiT	PiC	Pi V					Nc			
0.00099	1.92167	0.288	4.0486					1			0.002221
C2			Volts =	100	pF =	2200					
Usage:	Vstress =	1.72					S =	0.0172			
Lb	PiT	PiC	Pi V					Nc			
0.00099	1.92167	0.31	1					1			0.000589

C3			Volts =	200	pF =	2200				
Usage:	Vstress =	87					S =	0.435		
Lb	PiT	PiC	Pi V					Nc		
0.00099	1.92167	0.31	1.3811					1		0.000813

Diodes, Low Frequency:

Lp = Lb * PiT * PiS * PiC

Diodes, Zener, Lb =					0.002					
D1,4			Volts =	3.1	Watts =	2.5	Tj =	175	'K/W=	60
Usage:					Ic =	0.0014			Power =	0.0045
Lb	PiT	PiS	PiC					Nc	Tj =	40.269
0.002	1.370068	1	2					1		0.00548
					Sum of all components					0.031219

Hybrid microcircuit:

Lp=sumLc*(1+.2*PiE)	* PiF	* PiQ	* PiL
0.031219	1.1	5.8	10	1

Total failures per million hours =	1.9918
Mean time between failures =	502071