

APEX MICROTECHNOLOGY CORPORATION
RELIABILITY PREDICTION
PA51M

by

Granger Scofield

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	Gf	Ground, Fixed
Case temperature is		40 C
Internal Power Dissipation =		25 W
Supply voltage is +/-		28 V
An AC signal is applied.		
Product introduction date:		1-Aug-93

The results of this prediction are:

1 failures per million hours; or,
MTBF=1003 thousand hours.

Monolithic Bipolar and MOS Linear Devices:

$L_p = C_1 * PiT$

IC1		Watts = 2.68	Tj = 200	#/Qs = 56		
Usage:		Watts = 0.1		Max Tj = 46.53		
C1	PiT			Nc		
0.01	0.550451			1		0.005505

Transistors, Low Frequency, Bipolar:

$L_p = L_b * PiT * PiR * PiS$

Q2,5		Volts = 40	Watts = 1.2	Tj = 175	'K/W= 125	
Usage:	Vstress = 1	Vpwr = 1	Ic = 0.025	Vs = 0.025	Power = 0.025	
Lb	PiT	PiR	PiS	Nc	Tj = 43.125	
0.00074	1.501901	1.0698	0.048626	2		0.000116

Q3,4		Volts = 40	Watts = 1.2	Tj = 175	'K/W= 125	
Usage:	Vstress = 0.35	Vpwr = 0.35	Ic = 0.025	Vs = 0.0088	Power = 0.0088	
Lb	PiT	PiR	PiS	Nc	Tj = 41.094	
0.00074	1.438334	1.0698	0.046237	2		0.000105

Q1		Volts = 100	Watts = 145	Tj = 200	'K/W= 1.2069	
Usage:	Vstress = 53.5	Fraction Output Pwr = 1/	1	Vs = 0.535	Power = 25	
Lb	PiT	PiR	PiS	Nc	Tj = 70.172	
0.00074	2.544136	6.3053	0.236314	2		0.00561

Capacitors, ceramic general purpose type CK:

$L_p = L_b * PiT * PiC * PiV$ Lb = 0.00099

C6		Volts = 100	pF = 1000			
Usage:	Vstress = 53.5			S = 0.535		
Lb	PiT	PiC	PiV	Nc		
0.00099	1.92167	0.288	1.7089	1		0.000938

Sum of all components 0.012274

Hybrid microcircuit:

$L_p = \text{sum} L_c * (1 + 2 * PiE) * PiF * PiQ * PiL$

0.012274	1.4	5.8	10	1
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Total failures per million hours = 0.996611

Mean time between failures = 1003400