

APEX MICROTECHNOLOGY CORPORATION  
RELIABILITY PREDICTION  
PA97

by

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Date of prediction: 06-Dec-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 =	2 W
Supply voltage is +/-	400 V
An AC signal is applied.	
Product introduction date:	25-May-00

The results of this prediction are:

31.1 failures per million hours; or,  
MTBF=32.1 thousand hours.



Q14		Volts = 450	Watts = 4	Tj =	150	'K/W= 31.25	
Usage:		Vpwr = 397	Id = 0.0002			Power = 0.0794	
Lb	PiT				Nc	Tj = 42.481	
0.012	1.430384				1		0.017165
Q4,11,12,16		Volts = 450	Watts = 3.125	Tj =	150	'K/W= 40	
Usage:		Fraction Output Pwr = 1/	2			Power = 1	
Lb	PiT				Nc	Tj = 80	
0.012	2.735936				4		0.131325
Q3,6,13		Volts = 450	Watts = 3.125	Tj =	150	'K/W= 40	
Usage:		Vpwr = 200	Id = 0.0003			Power = 0.06	
Lb	PiT				Nc	Tj = 42.4	
0.012	1.428137				3		0.051413

Capacitors, ceramic general purpose type CK:

$L_p = L_b * P_{iT} * P_{iC} * P_{iV}$        $L_b = 0.00099$

C1		Volts = 50	pF = 470				
Usage:	Vstress = 1.5			S =	0.03		
Lb	PiT	PiC	Pi V		Nc		
0.00099	1.92167	0.269	1.0001		1		0.000513

Diodes, Low Frequency:

$L_p = L_b * P_{iT} * P_{iS} * P_{iC}$

Diodes, Zener,  $L_b = 0.002$

D1		Volts = 8.7	Watts = 1.35	Tj =	175	'K/W= 111.11	
Usage:			Ic = 1E-06			Power = 9E-06	
Lb	PiT	PiS	PiC		Nc	Tj = 40.001	
0.002	1.362867	1	2		1		0.005451

Sum of all components      0.311446

Hybrid microcircuit:

$L_p = \text{sum} L_c * (1 + 2 * P_{iE}) * P_{iF} * P_{iQ} * P_{iL}$   
 0.311446    1.4      5.8    10      1.2307

Total failures per million hours =      31.123

Mean time between failures =      32130