



ATMEL CORPORATION

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AT-49BV020 FLASH MEMORY RELIABILITY DATA

- 125°C OPERATING LIFE TEST (PLASTIC)
- 150°C RETENTION BAKE (PLASTIC)
- EXTENDED TEMPERATURE CYCLE
- 85°C/85% RELATIVE HUMIDITY OPERATING LIFETEST

JULY 2003

2325 Orchard Parkway San Jose CA. 95131

AT-49BV020

150°C RETENTION BAKE

<u>LOT NUMBER</u>	<u>DATE CODE</u>	<u>SAMPLE SIZE</u>	<u>TOTAL CKT-HRS (K)</u>	<u>NUMBER OF FAILURES</u>
6H1390	6H9704	395	395.0	0
6H3909C	6H9708	529	529.0	0
6H3486-1	6H9708	200	200.0	0
6H1391	6H9710	249	249.0	0
8G1304	8G9825	300	300.0	0

FAILURE RATETOTAL DEVICE HOURS

1,673,000 DEVICE HOURS

BEST ESTIMATE $\lambda = 0.04\%$ PER 1,000 HOURS50°C AMBIENT

EXTRAPOLATION TO 50°C VIA
ARRHENNIUS EQUATION AND
ACTIVATION ENERGY OF 0.5eV
 $\lambda = 0.001\%$ PER 1,000 HOURS (6 FITS)

CONFIDENCE ESTIMATE

λ 60 = 0.001% PER 1,000 HOURS
60% CONFIDENCE (8 FITS)
 λ 90 = 0.002% PER 1,000 HOURS
90% CONFIDENCE (20 FITS)

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125°C DYNAMIC OPERATING LIFE TET

<u>LOT</u> <u>NUMBER</u>	<u>DATE</u> <u>CODE</u>	<u>PKG</u> <u>TYPE</u>	<u>SAMPLE</u> <u>SIZE</u>	<u>TOTAL</u> <u>CKT-HRS(K)</u>	<u>NUMBER</u> <u>OF FAILURES</u>
6H3486-1	6H9708	32 PLCC	200	200.0	0
6H1391	6H9710	32 PLCC	249	249.0	0

FAILURE RATETOTAL DEVICE HOURS

449,000 DEVICE HOURS

BEST ESTIMATE λ = 0.16% PER 1,000 HOURS50°C AMBIENT

EXTRAPOLATION TO 50°C VIA
ARRHENNIUS EQUATION AND
ACTIVATION ENERGY OF 0.5eV
 λ = 0.0053% PER 1,000 HOURS (53 FITS)

CONFIDENCE ESTIMATE

λ 60 = 0.007% PER 1,000 HOURS
60% CONFIDENCE (70 FITS)
 λ 90 = 0.018% PER 1,000 HOURS
90% CONFIDENCE (174 FITS)

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EXTENDED TEMPERATURE CYCLE

-65°C to +150°C PLCC/TSOP/SOIC/PDIP
-55°C to +125°C CBGA

<u>DATE</u> <u>CODE</u>	<u>PKG</u> <u>TYPE</u>	<u>SAMPLE</u> <u>SIZE</u>	<u>NUMBER</u> <u>OF CYCLES</u>	<u>NUMBER</u> <u>OF FAILURES</u>
6H9704	32 TSOP	100	1000	0
6H9710	32 TSOP	100	1000	0

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PLASTIC PACKAGE

85°C/85% RELATIVE HUMIDITY OPERATING LIFE TEST

<u>LOT</u> <u>NUMBER</u>	<u>DATE</u> <u>CODE</u>	<u>PACKAGE</u> <u>TYPE</u>	<u>SAMPLE</u> <u>SIZE</u>	<u>NUMBER OF FAILURES</u> <u>AT INDICATED HOURS</u>		
				(168)	(500)	(1000)
6H1390	6H9704	32 TSOP	75	0	0	0