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AT-27C040 CMOS EPROM RELIABILITY DATA*

- 125°C DYNAMIC OPERATING LIFE TEST
- 200°C RETENTION BAKE
- PROGRAM AND ERASE
- 125°C OPERATING LIFE TEST (PLASTIC)
- 150°C RETENTION BAKE (PLASTIC)
- 15 PSIG PRESSURE POT
- 85°C,85% RELATIVE HUMIDITY OPERATING LIFE TEST
- 131°C/85% RELATIVE HUMIDITY HAST TEST
- EXTENDED TEMPERATURE CYCLE
- EXTENDED THERMAL SHOCK

* This report was generated from AT-27C040 reliability testing. This data is applicable to the following device types due to same technology grouping as defined in MIL-M-38535 Appendix A:

AT-27C1024

AT-27C512R

AT-27C010

APRIL 2007

2325 Orchard Parkway San Jose CA. 95131

AT-27C040

125°C DYNAMIC OPERATING LIFE TEST

<u>LOT NUMBER</u>	<u>DATE CODE</u>	<u>SAMPLE SIZE</u>	<u>TOTAL CKT-HRS (K)</u>	<u>NUMBER OF FAILURES</u>
133009	1D9147	80	80.0	0
134202	1D9205	31	31.0	0
231046	2A9219	77	77.0	0
232055	2B9224	45	45.0	0
231643	2B9224	45	45.0	0
232442	2C9234	45	45.0	0
232495-3	2C9235	78	78.0	0
232496C	2C9236	83	83.0	0
234870-12	2D9306	79	79.0	0
3A0182A	3A9309	157	157.0	0
3A0423	3A9313	77	77.0	0
3A0827A	3B9321	81	81.0	0
3A0601B-4	389326	66	66.0	0
3B1562	3B9337	86	86.0	0
3D1689	3D9409	80	80.0	0
4A0694	4A9415	78	78.0	0
4A1490	4A9417	104	104.0	0
4B0180	4B9425	87	87.0	0
4B1013	4B9430	84	84.0	0
4B1015	4B9433	83	83.0	0
4B1811	4B9432	80	80.0	0
4H5006	4H9445	175	175.0	0
4H5004	4H9450	93	232.5	0
5E0303	5F9522	86	215.0	0

FAILURE RATETOTAL DEVICE HOURS

2,248,000 DEVICE HOURS

BEST ESTIMATE $\lambda = 0.03\%$ PER 1,000 HOURS50°C AMBIENTEXTRAPOLATION TO 50°C VIA
ARRHENNIUS EQUATION AND ACTIVATION
ENERGY OF 0.5eV $\lambda = 0.001\%$ PER 1,000 HOURS (10 FITS)CONFIDENCE ESTIMATE $\lambda = 60 = 0.001\%$ PER 1,000 HOURS

60% CONFIDENCE (13 FITS)

 $\lambda = 90 = 0.003\%$ PER 1,000 HOURS

90% CONFIDENCE (33 FITS)

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200°C RETENTION BAKE

<u>LOT</u> <u>NUMBER</u>	<u>DATE</u> <u>CODE</u>	<u>SAMPLE</u> <u>SIZE</u>	<u>HOURS TO FAILURE</u>			
			<u>24</u>	<u>168</u>	<u>500</u>	<u>1000</u>
232496C	2C9236	78	0	0	0	0
3A0479A	3B9318	77	0	0	0	0
3B0530A	3B9330	77	0	0	0	0
3B1562	3D9337	57	0	0	0	0
4A1896	4A9419	80	0	0	0	0
4A1490	4A9417	80	0	0	0	0
4A1897	4A9424	77	0	0	0	0
4B0180	4B9425	78	0	0	0	0
4B2300	4B9431	177	0	0	0	0
4B2295	4B9438	80	0	0	0	0
4G5052	4G9450	45	0	0	0	0

FAILURE RATETOTAL DEVICE HOURS

906,000 DEVICE HOURS

BEST ESTIMATE $\lambda = 0.08\%$ PER 1,000 HOURS50°C AMBIENTEXTRAPOLATION TO 50°C VIA
ARRHENNIUS EQUATION AND ACTIVATION
ENERGY OF 0.5eV $\lambda = 0.003\%$ PER 1,000 HOURS (3 FITS)CONFIDENCE ESTIMATE $\lambda = 60 = 0.0003\%$ PER 1,000 HOURS
60% CONFIDENCE (3 FITS) $\lambda = 90 = 0.001\%$ PER 1,000 HOURS
90% CONFIDENCE (9 FITS)

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PROGRAM/ERASE CYCLE

<u>LOT</u> <u>NUMBER</u>	<u>DATE</u> <u>CODE</u>	<u>SAMPLE</u> <u>SIZE</u>	<u>NUMBER</u> <u>10</u>	<u>OF</u> <u>20</u>	<u>FAILURES</u> <u>30</u>	<u>AT</u> <u>40</u>	<u>CYCLES</u> <u>50</u>
232299	2B9229	70	0	0	0	0	0
232442	2C9234	87	0	0	0	0	0
232495-3	2C9235	79	0	0	0	0	0
232496C	2C9236	83	0	0	0	0	0
3A0827	3A9337	80	0	0	0	0	0
4H5006	4H9446	98	0	0	0	0	0

AT-27C040

PLASTIC PACKAGE

125°C DYNAMIC OPERATING LIFE TEST

<u>LOT NUMBER</u>	<u>DATE CODE</u>	<u>PKG</u>	<u>SAMPLE SIZE</u>	<u>TOTAL CKT-HRS(K)</u>	<u>NUMBER OF FAILURES</u>
234870	2D9306	32 PLCC	80	80.0	0
3A0180	3A9315	32 PLCC	80	80.0	0
3A0325	3A9315	32 PLCC	80	80.0	0
234484F7	3A9320	32 PLCC	78	78.0	0
3B0324	3B9325	32 PLCC	156	156.0	0
3A0601BF1	3B9326	32 PLCC	79	79.0	0
3B0382B-1	3B9326	40 TSOP	80	80.0	0
A3B0530F1	3B9328	32 PLCC	80	80.0	0
3B0957F3	3B9332	32 PLCC	160	160.0	0
A3B0530-2	3B9328	40 TSOP	44	44.0	0
3B1006	3B9333	32 PLCC	45	45.0	0
3B1242	3B9333	32 PLCC	45	45.0	0
3B1193	3B9333	32 PLCC	43	43.0	0
3B1166	3B9334	32 PLCC	44	44.0	0
3B1326	3B9335	32 PLCC	45	45.0	0
3B1137	3B9332	32 PLCC	45	45.0	0
3B1242	3B9333	32 PLCC	45	45.0	0
3B1331	3B9333	32 PLCC	47	47.0	0
3C1430	3C9350	40 TSOP	77	77.0	0
3C1463	3C9350	40 TSOP	77	77.0	0
A3C1430J1	3C9351	32 PLCC	77	77.0	0
A3C1463J1	3C9351	32 PLCC	77	77.0	0
3C1649	3C9348	32 PDIP	77	77.0	0
3D0504	3D9403	32 PLCC	399	399.0	0
3D1220	3D9404	32 PLCC	199	199.0	0
3D1317	3D9405	32 PLCC	400	400.0	0
3D0583AA1	3D9406	32 PLCC	85	85.0	0
3D1345	3D9410	32 PLCC	754	754.0	0
4A1896	4A9422	32 PLCC	198	198.0	0
4A1897	4A9422	32 PLCC	202	202.0	0
4B0179	4B9424	32 PLCC	389	389.0	0
4B0180	4B9425	32 PLCC	197	197.0	0
4B0183	4B9425	32 TSOP	226	226.0	0
4B0866AC	4B9432	32 PLCC	79	79.0	0
4B1926	4B9435	32 PLCC	80	80.0	0
4B2295	4B9438	32 PLCC	80	80.0	0
4B2300	4B9439	32 PLCC	437	437.0	0
4C0158	4C9439	32 PLCC	159	159.0	0
4C0161	4C9439	32 PLCC	197	197.0	0
4C1080	4C9441	32 PLCC	100	100.0	0
4C0871	4C9441	32 PLCC	99	99.0	0
4C1085	4C9441	32 PLCC	100	100.0	0
4C0876	4C9441	32 PLCC	100	100.0	0
4C0260	4C9441	32 PLCC	298	298.0	0
4C1178AE	4C9442	32 PLCC	150	150.0	0

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PLASTIC PACKAGE

125°C DYNAMIC OPERATING LIFE TEST (CONTINUED)

<u>LOT NUMBER</u>	<u>DATE CODE</u>	<u>PKG</u>	<u>SAMPLE SIZE</u>	<u>TOTAL CKT-HRS(K)</u>	<u>NUMBER OF FAILURES</u>
4C0875	4C9442	32 PLCC	199	199.0	0
4C1727	4C9444	32 PLCC	160	160.0	0
4C1942	4C9445	32 PLCC	159	159.0	0
4H5006	4H9446	32 PLCC	89	89.0	0
4H5002	4H9447	32 PLCC	79	79.0	0
4H5004	4H9447	32 PLCC	200	200.0	0
4H5006	4H9447	32 TSOP	80	80.0	0
4G5052	4D9449	32 PLCC	80	80.0	0
4D0168	4D9450	32 PLCC	80	80.0	0
4D0034	4D9451	32 PLCC	157	157.0	0
4C1948	4D9501	32 PLCC	154	154.0	0
4H5040	4H9501	32 PLCC	80	80.0	0
4D0229	4D9503	32 PLCC	319	319.0	0
4H5119	4H9503	32 PLCC	551	551.0	0
4H5024	4H9504	32 PLCC	80	80.0	0
4C2685	4C9505	32 PLCC	80	80.0	0
4H5035	4H9506	32 PLCC	154	154.0	0
4D1647	4D9511	32 PLCC	229	229.0	0
4D1648	4D9511	32 PLCC	80	80.0	0
5E0317	5E9513	32 PLCC	80	80.0	0
5E0303	5E9519	32 PLCC	160	160.0	0
5B1074	5B9526	32 PLCC	100	100.0	0
5B0553	5B9528	32 PLCC	160	160.0	0
5B1170	5B9528	32 PLCC	80	80.0	0
5B1481	5B9532	32 PLCC	77	77.0	0
5B1940A	5B9532	32 TSOP	160	160.0	0
5B1940	5B9532	32 PLCC	332	332.0	0
5B1475	5B9529	32 TSOP	80	80.0	0
5C1370	5C9544	32 PLCC	79	79.0	0
5G1341	5G9550	32 PLCC	80	80.0	0
5G1343	5G9551	32 PLCC	159	159.0	0
5B0074	5B9550	32 PLCC	240	240.0	0
5G1250	5G9552	32 PLCC	154	154.0	0
5G1340	5G9551	32 PLCC	142	142.0	0
5H0450	5H9551	32 PLCC	80	80.0	0
5C2453	5C9549	32 TSOP	100	100.0	0
5H0646	5H9552	32 PLCC	159	159.0	0
5H1831	5H9607	32 PLCC	160	160.0	0
5D2140	5D9606	32 TSOP	77	77.0	0
5H0839	5H9606	32 PLCC	398	398.0	0
5H1241	5H9606	32 PLCC	154	154.0	0
5H0918	5H9605	32 PLCC	80	80.0	0
5H0917	5H9605	32 PLCC	79	79.0	0
5H0924	5H9606	32 PDIP	80	80.0	0
5H2053	5H9609	32 PLCC	80	80.0	0

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PLASTIC PACKAGE

125°C DYNAMIC OPERATING LIFE TEST (CONTINUED)

<u>LOT</u> <u>NUMBER</u>	<u>DATE</u> <u>CODE</u>	<u>PKG</u>	<u>SAMPLE</u> <u>SIZE</u>	<u>TOTAL</u> <u>CKT-HRS(K)</u>	<u>NUMBER</u> <u>OF FAILURES</u>
5H2057	5H9609	32 PLCC	200	200.0	0
5H2059	5H9609	32 PLCC	159	159.0	0
5H1827	5H9609	32 PLCC	79	79.0	0
5H2055	5H9611	32 PLCC	100	100.0	0
5H1830	5H9611	32 PLCC	199	199.0	0
6F1240AJ	6F9627	32 PLCC	80	80.0	0
6F1240J	6F9627	32 PLCC	80	80.0	0
6F1238J	6F9627	32 PLCC	80	80.0	0
6F1238AJ	6F9627	32 PLCC	80	80.0	0
6F0587-2	6F9626	32 PLCC	80	80.0	0
6F0587-1	6F9626	32 PLCC	80	80.0	0
6E2997-2	6F9622	32 PLCC	80	80.0	0
6E2442-6	6F9622	32 PLCC	80	80.0	0
6E2442-4	6F9622	32 PLCC	79	79.0	0
6E2442-7	6F9622	32 PLCC	90	90.0	0
6E2442-5	6E9622	32 PLCC	80	80.0	0
6E2997-1	6E9622	32 PLCC	80	80.0	0
6E2637-3	6E9622	32 PLCC	80	80.0	0
6E2637-2	6E9622	32 PLCC	80	80.0	0
6E2637-1	6E9622	32 PLCC	80	80.0	0
6E2442-3	6E9622	32 PLCC	80	80.0	0
6E2442-2	6E9622	32 PLCC	80	80.0	0
6E2442-1	6E9622	32 PLCC	80	80.0	0
6E1721-1	6E9620	32 PLCC	80	80.0	0
5H1832-1	5H9616	32 PLCC	80	80.0	0
5H2278-3	5H9614	32 PLCC	80	80.0	0
5H2278-2	5H9614	32 PLCC	80	80.0	0
5H2278-1	5H9614	32 PLCC	80	80.0	0
6C1911	6C9648	32 PLCC	500	500.0	0
6F0590J	6F9625	32 PLCC	80	80.0	0
6B2502A	6B9633	32 PLCC	132	132.0	0
6F1543AJ	6F9629	32 PLCC	200	200.0	0
6F2288	6F9632	32 PLCC	264	264.0	0
6F2473	6F9636	32 PLCC	263	263.0	0
9G3769D	9G9937	32 PLCC	100	100.0	0
0E2066	0E0017	32 PDIP	250	250.0	0
0H0303	0H0037	32 PDIP	100	100.0	0
1A0800-1	1A0119	32 PLCC	100	100.0	0
1A2446	1A0122	32 PDIP	250	250.0	0
2E0845-1	2E0214	32 PDIP	250	250.0	0
1J2066	1J0220	32 TSOP	100	100.0	0

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PLASTIC PACKAGE

125°C DYNAMIC OPERATING LIFE TEST (CONTINUED)

<u>LOT</u> <u>NUMBER</u>	<u>DATE</u> <u>CODE</u>	<u>PKG</u>	<u>SAMPLE</u> <u>SIZE</u>	<u>TOTAL</u> <u>CKT-HRS(K)</u>	<u>NUMBER</u> <u>OF FAILURES</u>
4E1861-1	4E0421	32 PLCC	100	100.0	0
4J7531A	4J0512	32 PLCC	100	100.0	0
6J1814-1A	6J0652	32 PDIP	100	100.0	0

FAILURE RATETOTAL DEVICE HOURS

11,415,000 DEVICE HOURS

BEST ESTIMATE $\lambda = 0.006\%$ PER 1,000 HOURS50°C AMBIENTEXTRAPOLATION TO 50°C VIA
ARRHENNIUS EQUATION AND ACTIVATION
ENERGY OF 0.5eV $\lambda = 0.0001\%$ PER 1,000 HOURS (1 FITS)CONFIDENCE ESTIMATE
 λ 60 = 0.0002% PER 1,000 HOURS
60% CONFIDENCE (2 FITS)
 λ 90 = 0.0006 PER 1,000 HOURS
90% CONFIDENCE (6 FITS)

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PLASTIC PACKAGE

150°C RETENTION BAKE

<u>LOT NUMBER</u>	<u>DATE CODE</u>	<u>PKG</u>	<u>SAMPLE SIZE</u>	<u>TOTAL CKT-HRS (K)</u>	<u>NUMBER OF FAILURES</u>
234870	2D9306	32 PLCC	77	77.0	0
234870-9	3A9307	40 TSOP	77	77.0	0
3A0180	3A9315	32 PLCC	77	77.0	0
3A0325	3A9315	32 PLCC	77	77.0	0
234484	3A9320	32 PLCC	84	84.0	0
3B0324	3B9325	32 PLCC	154	154.0	0
3A0601B-2	3B9326	40 TSOP	77	77.0	0
3A0601BF1	3B9326	32 PLCC	73	73.0	0
3B0382	3B9326	40 TSOP	167	167.0	0
3B0382F	3B9326	32 PLCC	215	215.0	0
3B0530F	3B9327	32 PLCC	45	45.0	0
A3B0530	3B9328	32 PLCC	90	90.0	0
3B0644K	3B9330	32 PLCC	77	77.0	0
3B0925	3B9331	32 PLCC	77	77.0	0
3B0870	3B9331	32 PLCC	77	77.0	0
A3B0925	3B9332	32 PLCC	154	154.0	0
A3B0952	3B9332	32 PLCC	77	77.0	0
A3B0957	3B9332	32 PLCC	154	154.0	0
3B1052F	3B9333	32 PLCC	154	154.0	0
AA3B0870	3B9333	32 PLCC	122	122.0	0
A3B0925	3B9333	40 TSOP	77	77.0	0
3B1561	3B9334	32 PLCC	77	77.0	0
3B0957	3B9334	40 TSOP	77	77.0	0
A3B0925-1	3B9334	32 PLCC	77	77.0	0
A3B0952-1	3B9334	32 PLCC	45	45.0	0
A3B0952-1	3B9334	32 PLCC	45	45.0	0
3B1562	3B9335	32 PLCC	77	77.0	0
3B0925	3B9335	40 TSOP	77	77.0	0
3B1351T-4	3B9336	32 PLCC	77	77.0	0
3B1351	3B9337	40 TSOP	77	77.0	0
3B1193	3B9337	32 PLCC	77	77.0	0
3B1193I-2	3B9337	32 PLCC	77	77.0	0
3B1429	3B9338	32 PLCC	154	154.0	0
3C0222	3C9339	32 PLCC	231	231.0	0
3C1409	3C9348	40 TSOP	171	171.0	0
3C1665	3C9348	32 PLCC	45	45.0	0
3D0168	3D9348	32 PLCC	44	44.0	0
3C1710	3C9349	32 PLCC	45	45.0	0
3D0183	3D9349	32 PLCC	44	44.0	0
3D0202	3D9349	32 PLCC	46	46.0	0

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PLASTIC PACKAGE

150°C RETENTION BAKE (CONTINUED)

<u>LOT NUMBER</u>	<u>DATE CODE</u>	<u>PKG</u>	<u>SAMPLE SIZE</u>	<u>TOTAL CKT-HRS (K)</u>	<u>NUMBER OF FAILURES</u>
3D0203	3D9349	32 PLCC	44	44.0	0
3D0235	3D9349	32 PLCC	46	46.0	0
3D0251	3D9349	32 PLCC	45	45.0	0
3D0294	3D9349	32 PLCC	45	45.0	0
3D0295	3D9349	32 PLCC	44	44.0	0
3D0327	3D9349	32 PLCC	45	45.0	0
3D0328	3D9349	32 PLCC	44	44.0	0
3D0330	3D9349	32 PLCC	45	45.0	0
3C1430	3C9350	40 TSOP	154	154.0	0
3C1463	3C9350	40 TSOP	154	154.0	0
3C1666	3C9350	32 PLCC	45	45.0	0
3D0393	3D9350	32 PLCC	46	46.0	0
3D0419	3D9350	32 PLCC	45	45.0	0
3C1430J1	3C9351	32 PLCC	154	154.0	0
A3C1463J1	3C9351	32 PLCC	77	77.0	0
3D0396	3D9351	32 PLCC	47	47.0	0
3D0775	3D9402	40 TSOP	77	77.0	0
3D0980	3D9402	32 PLCC	231	231.0	0
3D0504	3D9403	32 PLCC	77	77.0	0
3D0556	3D9403	32 PLCC	154	154.0	0
3D1220	3D9404	32 PLCC	154	154.0	0
3D1317	3D9405	32 PLCC	154	154.0	0
3D0583AA1	3D9406	32 PLCC	77	77.0	0
3D1369	3D9408	32 PLCC	650	650.0	0
3D1366	3D9410	32 PLCC	328	328.0	0
4A1490	4A9417	32 PLCC	200	200.0	0
4A1896	4A9422	32 PLCC	279	279.0	0
4A1897	4A9422	32 PLCC	146	146.0	0
4B0178	4B9425	32 PLCC	198	198.0	0
4B0179	4B9425	32 PLCC	105	105.0	0
4B0180	4B9425	32 PLCC	144	144.0	0
4B0183	4B9425	32 TSOP	150	150.0	0
4B1403	4B9430	32 PLCC	218	218.0	0
4B0866	4B9432	32 PLCC	77	77.0	0
4C1948	4D9501	32 PLCC	154	154.0	0
4H5040	4H9501	32 PLCC	80	80.0	0
4D0229	4D9503	32 PLCC	319	319.0	0
4H5119	4H9503	32 PLCC	551	551.0	0
4H5024	4H9504	32 PLCC	80	80.0	0
4C2685	4C9505	32 PLCC	80	80.0	0
4H5035	4H9506	32 PLCC	154	154.0	0
4D1647	4D9511	32 PLCC	229	229.0	0
4D1648	4D9511	32 PLCC	80	80.0	0
5E0317	5E9513	32 PLCC	80	80.0	0

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PLASTIC PACKAGE

150°C RETENTION BAKE (CONTINUED)

<u>LOT NUMBER</u>	<u>DATE CODE</u>	<u>PKG</u>	<u>SAMPLE SIZE</u>	<u>TOTAL CKT-HRS (K)</u>	<u>NUMBER OF FAILURES</u>
4B1926	4B9435	32 PLCC	77	77.0	0
4C0161	4C9439	32 PLCC	173	173.0	0
4C0871	4C9441	32 PLCC	150	150.0	0
4C1080	4C9441	32 PLCC	150	150.0	0
4B2300	4C9439	32 PLCC	307	307.0	0
4C0158	4C9439	32 PLCC	154	154.0	0
4C1075	4C9439	32 PLCC	77	77.0	0
4C0260	4C9441	32 PLCC	199	199.0	0
4C0875	4C9442	32 PLCC	101	101.0	0
4C1178	4C9442	32 PLCC	175	175.0	0
4C1727	4C9444	32 PLCC	154	154.0	0
4C1942	4C9445	32 PLCC	87	87.0	0
4H5006	4H9446	32 PLCC	173	173.0	0
4H5004	4H9447	32 PLCC	96	96.0	0
4H5002	4H9447	32 PLCC	77	77.0	0
4H5006	4H9447	32 TSOP	77	77.0	0
4D0034	4D9451	32 PLCC	354	354.0	0
4C1948	4D9501	32 TSOP	158	158.0	0
4H5040	4H9501	32 PLCC	100	100.0	0
4D0229	4D9503	32 PLCC	257	257.0	0
4H5024	4H9504	32 SOIC	77	77.0	0
B4C2685	4C9505	32 PLCC	79	79.0	0
4H5035	4H9506	32 TSOP	122	122.0	0
4D1647	4D9511	32 PLCC	308	308.0	0
4D1648	4D9511	32 PLCC	301	301.0	0
4C2685	4C9513	32 PLCC	156	156.0	0
4D1479	4C9514	32 PLCC	158	158.0	0
4H5252	4H9514	32 PLCC	157	157.0	0
5E0303	5E9519	32 PLCC	154	154.0	0
5A0169	5A9523	32 PLCC	77	77.0	0
5B0553	5B9528	32 PLCC	191	191.0	0
5B1170	5B9528	32 PLCC	182	182.0	0
5B1475	5B9529	32 PLCC	300	300.0	0
5B1478	5B9529	32 PLCC	370	370.0	0
5B1481	5B9532	32 PLCC	49	49.0	0
5B1940	5B9532	32 TSOP	103	103.0	0
5B0074	5B9550	32 PLCC	171	171.0	0
5G1343	5G9551	32 PLCC	142	142.0	0
5G1340	5G9551	32 PLCC	111	111.0	0
5G1250	5G9552	32 PLCC	98	98.0	0
5H0450	5H9551	32 PLCC	232	232.0	0
5C2453	5C9549	32 TSOP	100	100.0	0

AT-27C040

PLASTIC PACKAGE

150°C RETENTION BAKE (CONTINUED)

<u>LOT</u> <u>NUMBER</u>	<u>DATE</u> <u>CODE</u>	<u>PKG</u>	<u>SAMPLE</u> <u>SIZE</u>	<u>TOTAL</u> <u>CKT-HRS (K)</u>	<u>NUMBER</u> <u>OF FAILURES</u>
5H0446	5H9602	32 PLCC	200	200.0	0
5H0646	5H9552	32 PLCC	189	189.0	0
5C2196	5C9552	32 PLCC	113	113.0	0
5H0274	5H9602	32 PLCC	178	178.0	0
5H0925	5H9602	32 PLCC	141	141.0	0
5H0839	5H9606	32 PLCC	566	566.0	0
5H1245	5H9606	32 PLCC	92	92.0	0
5H1241	5H9606	32 PLCC	168	168.0	0
5H1831	5H9607	32 PLCC	164	164.0	0
5H1827	5H9606	32 PLCC	127	127.0	0
5H2057	5H9609	32 PLCC	170	170.0	0
5H2053	5H9609	32 PLCC	350	350.0	0
5H2059	5H9609	32 PLCC	167	167.0	0
5H2055	5H9611	32 PLCC	340	340.0	0
5H2278	5H9614	32 PLCC	313	313.0	0
5H1832-1	5H9616	32 PLCC	78	78.0	0
5H2278-2	5H9614	32 PLCC	93	93.0	0
5H2278-1	5H9614	32 PLCC	126	126.0	0
5H1832	5H9616	32 PLCC	78	78.0	0
6D0989	6D9702	32 PLCC	425	425.0	0
6E0841	6E9614	32 PLCC	308	308.0	0
6C1911	6C9648	32 PLCC	495	495.0	0
6D0989	6D9702	32 PLCC	425	425.0	0
6F1543	6F9629	32 PLCC	511	511.0	0
6F2288	6F9632	32 PLCC	588	588.0	0
6F2473	6F9636	32 PLCC	439	439.0	0
6F0590J-1	6F9625	32 PLCC	85	85.0	0
6B0791-5	6B9628	32 PLCC	378	378.0	0
6B07915	6B9626	32 PLCC	372	372.0	0
6F1240AJ	6F9627	32 PLCC	82	82.0	0
6F1240J	6F9627	32 PLCC	77	77.0	0
6F0587-1	6F9626	32 PLCC	96	96.0	0
6F0587-2	6F9626	32 PLCC	101	101.0	0
6F1238A	6F9627	32 PLCC	96	96.0	0
6F1238J	6F9627	32 PLCC	106	106.0	0
6E2442-6	6E9622	32 PLCC	96	96.0	0
6E2442-7	6E9622	32 PLCC	87	87.0	0
6E2442-4	6E9622	32 PLCC	81	81.0	0
6E2997-2	6E9622	32 PLCC	98	98.0	0
6E2442-5	6E9622	32 PLCC	103	103.0	0
6E2997-1	6E9622	32 PLCC	101	101.0	0
6E2637-3	6E9622	32 PLCC	99	99.0	0
6E2637-2	6E9622	32 PLCC	99	99.0	0
6E2637-1	6E9622	32 PLCC	107	107.0	0
6E2442-3	6E9622	32 PLCC	84	84.0	0

AT-27C040

PLASTIC PACKAGE

150°C RETENTION BAKE (CONTINUED)

<u>LOT NUMBER</u>	<u>DATE CODE</u>	<u>PKG</u>	<u>SAMPLE SIZE</u>	<u>TOTAL CKT-HRS (K)</u>	<u>NUMBER OF FAILURES</u>
6E2442-2	6E9622	32 PLCC	99	99.0	0
6E2442-1	6E9622	32 PLCC	87	87.0	0
6E1721-1	6E9620	32 PLCC	79	79.0	0
8B0697	8B9832	32 PLCC	250	250.0	0
9G3769D	9G9937	32 PLCC	50	50.0	0
0E2066	0E0017	32 PDIP	250	250.0	0
0H0303	0H0037	32 PDIP	50	50.0	0
1A0800-1	1A0119	32 PLCC	50	50.0	0
1A2446	1A0122	32 PDIP	249	249.0	0
1C1336A	1C0209	32 SOIC	50	50.0	0
1J2066	1J0220	32 TSOP	100	100.0	0
3E3751	3E0322	32 PDIP	500	500.0	0
4E2401	4E0415	32 PLCC	500	500.0	0
4E1861-1	4E0421	32 PLCC	100	100.0	0
6J1814-1A	6J0652	32 PDIP	77	77.0	0

FAILURE RATETOTAL DEVICE HOURS

26,749,000 DEVICE HOURS

BEST ESTIMATE λ = 0.003% PER 1,000 HOURS50°C AMBIENTEXTRAPOLATION TO 50°C VIA
ARRHENNIUS EQUATION AND ACTIVATION
ENERGY OF 0.5eV λ = 0.0001% PER 1,000 HOURS (1 FITS)CONFIDENCE ESTIMATE
 λ 60 = 0.0001% PER 1,000 HOURS
60% CONFIDENCE (1 FITS)
 λ 90 = 0.0001% PER 1,000 HOURS
90% CONFIDENCE (1 FITS)

AT-27C040

PRESSURE POT TEST

<u>DATE</u> <u>CODE</u>	<u>PACKAGE</u> <u>TYPE</u>	<u>SAMPLE</u> <u>SIZE</u>	NUMBER OF FAILURES AT INDICATE HOURS			
			(24)	(48)	(72)	(96)
3A9315	32 PLCC	45	0	0	0	0
3B9319	32 PLCC	45	0	0	0	0
3B9321	32 PLCC	45	0	0	0	0
3B9325	32 PLCC	45	0	0	0	0
3B9326	40 TSOP	135	0	0	0	0
3B9326	32 PLCC	212	0	0	0	0
3B9332	32 PLCC	167	0	0	0	0
3B9333	40 TSOP	77	0	0	0	0
3B9333	32 PLCC	212	0	0	0	0
3B9334	32 PLCC	90	0	0	0	0
3B9335	32 PLCC	45	0	0	0	0
3B9336	32 PLCC	45	0	0	0	0
3B9338	32 PLCC	45	0	0	0	0
3C9339	32 PLCC	77	0	0	0	0
3D9402	32 PLCC	77	0	0	0	0
3D9405	32 PLCC	77	0	0	0	0
3D9406	32 PLCC	154	0	0	0	0
3D9408	32 PLCC	231	0	0	0	0
4A9422	32 PLCC	153	0	0	0	0
4B9424	32 PLCC	239	0	0	0	0
4B9425	32 PLCC	483	0	0	0	0
4B9425	32 TSOP	44	0	0	0	0
4B9428	32 TSOP	81	0	0	0	0
4B9430	32 PLCC	231	0	0	0	0
4B9432	32 PLCC	235	0	0	0	0
4B9435	32 PLCC	77	0	0	0	0
4B9436	32 PLCC	44	0	0	0	0
4B9438	32 PLCC	74	0	0	0	0
4B9439	32 PLCC	302	0	0	0	0
4C9441	32 PLCC	813	0	0	0	0
4C9442	32 PLCC	430	0	0	0	0
4C9445	32 PLCC	122	0	0	0	0
4C9446	32 PLCC	77	0	0	0	0
4C9447	32 PLCC	151	0	0	0	0
4C9447	32 TSOP	123	0	0	0	0
4H9447	32 PLCC	77	0	0	0	0
4D9450	32 PLCC	90	0	0	0	0
4D9451	32 PLCC	134	0	0	0	0
4H9501	32 PLCC	77	0	0	0	0
4D9503	32 PLCC	276	0	0	0	0
4H9504	32 SOIC	77	0	0	0	0
4H9450	32 TSOP	77	0	0	0	0
5C9505	32 PLCC	77	0	0	0	0
4C9513	32 PLCC	77	0	0	0	0

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PRESSURE POT TEST (CONTINUED)

<u>DATE</u> <u>CODE</u>	<u>PACKAGE</u> <u>TYPE</u>	<u>SAMPLE</u> <u>SIZE</u>	NUMBER OF FAILURES AT INDICATE HOURS			
			24)	(48)	(72)	(96)
4D9514	32 PLCC	77	0	0	0	0
5E9519	32 PLCC	77	0	0	0	0
5B9529	32 TSOP	307	0	0	0	0
5B9532	32 PLCC	358	0	0	0	0
5B9532	32 TSOP	165	0	0	0	0
5C9544	32 PLCC	77	0	0	0	0
5B9550	32 PLCC	308	0	0	0	0
5G9551	32 PLCC	167	0	0	0	0
5C9552	32 PLCC	154	0	0	0	0
5H9606	32 PLCC	531	0	0	0	0
5H9611	32 PLCC	77	0	0	0	0
6B9628	32 PLCC	77	0	0	0	0
6B9626	32 PLCC	77	0	0	0	0
6F9627	32 PLCC	77	0	0	0	0
6F9627	32 PLCC	76	0	0	0	0
6B9628	32 PLCC	77	0	0	0	0
6B9626	32 PLCC	77	0	0	0	0
6F9627	32 PLCC	77	0	0	0	0
6F9627	32 PLCC	77	0	0	0	0
6F9626	32 PLCC	77	0	0	0	0
6F9626	32 PLCC	77	0	0	0	0
6F9626	32 PLCC	77	0	0	0	0
6F9626	32 PLCC	77	0	0	0	0
6F9626	32 PLCC	76	0	0	0	0
6E9622	32 PLCC	77	0	0	0	0
6F9629	32 PLCC	77	0	0	0	0
6F9632	32 PLCC	154	0	0	0	0
6F9636	32 PLCC	132	0	0	0	0
6D9702	32 PLCC	200	0	0	0	0
8B9832	32 PLCC	100	0	0	0	0
7B9851	32 TSOP	41	0	0	0	0
1A0119	32 PLCC	49	0	0	0	0
1A0122	32 PDIP	100	0	0	0	0
2E0214	32 PDIP	100	0	0	0	0
1C0209	32 SOIC	50	0	0	0	0
1J0220	32 TSOP	50	0	0	0	0
3E0322	32 PDIP	100	0	0	0	0
4E0415	32 PLCC	77	0	0	0	0
4E0421	32 PLCC	77	0	0	0	0
6J0652	32 PDIP	77	0	0	0	0

AT-27C040

PLASTIC PACKAGE

85°C/85% RELATIVE HUMIDITY OPERATING LIFE TEST

<u>LOT NUMBER</u>	<u>DATE CODE</u>	<u>PACKAGE TYPE</u>	<u>SAMPLE SIZE</u>	<u>NUMBER OF FAILURES AT INDICATED HOURS</u>		
				(168)	(500)	(1000)
3D1369	3D9408	32 PLCC	45	0	0	0
4B0180-6	4B9425	32 TSOP	45	0	0	0
4B1018	4A9428	32 TSOP	32	0	0	0
4B1018	4A9432	32 PLCC	45	0	0	0
4B1926	4B9435	32 PLCC	63	0	0	0
4H5006	4H9446	32 PLCC	53	0	0	0
4H5006-3	4H9447	32 TSOP	45	0	0	0
4H5003	4H9450	32 TSOP	77	0	0	0
B4C2685	4C9505	32 PLCC	48	0	0	0
4H5024	4H9504	32 PLCC	78	0	0	0
4C2685	4C9513	32 PLCC	35	0	0	0
4H5252	4H9514	32 PLCC	36	0	0	0
5A0169	5A9523	32 PLCC	36	0	0	0
5B1940A	5B9532	32 PLCC	32	0	0	0
5C0838	5C9544	32 PLCC	45	0	0	0
5C2454	5C9605	32 TSOP	19	0	0	0
5C2453	5C9549	32 TSOP	19	0	0	0
8B9832	8B0697	32 PLCC	100	0	0	0

Date: November 19, 1993
Subject: AT27C040 (18710A Stepping) Latchup Characterization
From: May Lai
To: G. Korsh, E. Hui, C. Lionbarger, L. Y. Lee

Packaged units of AT27C040 (18710A Stepping) from lot 3C1660 were tested for latchup. A curve tracer was used to force current into each pin and observe the latchup trigger current and voltage. A 9 ohm resistor was connected in parallel across the Vcc power supply to allow current to be forced out of the Vcc pin during testing. A separate ammeter was connected in series with the Vcc power supply to verify when latchup occurred.

The results in Table 1 indicate that the AT27C040 (18710A) is quite immune to latchup under normal operating conditions (Vcc = 5.0V, Room Temperature). All input pins can sustain more than -600mA and junction breakdown occurs at voltages greater than 23V. The only latchup occurrence is observed for positive output voltages of 14.0V, requiring a current of 580mA. No latchup is observed for negative output voltages up to -2.0V & -600mA.

Table 1. AT27C040 Latchup Trigger Current and Voltage at 5.5V LOT# 3C1660 (18710A Stepping)

PIN NO.	FUNCTION	+I	+V	-I	-V
1	VPP			>6000	3.8
2	A16			>6000	5.0
3	A15			>6000	5.0
4	A12			>6000	5.1
5	A7			>6000	5.2
6	A6			>6000	5.3
7	A5			>6000	5.0
8	A4			>6000	5.0
9	A3			>6000	4.3
10	A2			>6000	4.2
11	A1			>6000	4.0
12	A0			>6000	4.2
13	O0	>600	14.8	>6000	2.6
14	O1	>600	14.4	>6000	2.5
15	O2	>600	14.2	>6000	2.5
16	GND				
17	O3	>600	14.8	>6000	2.6
18	O4	>600	14.4	>6000	2.6
19	O5	>600	14.4	>6000	2.6
20	O6	>600	14.0	>6000	2.7
21	O7	>600	14.0	>6000	2.7
22	CE			>6000	4.0
23	A10			>6000	4.2
24	OE			>6000	4.3
25	A11			>6000	5.0
26	A9			>6000	5.0
27	A8			>6000	5.0
28	A13			>6000	5.0
29	A14			>6000	5.0
30	A17			>6000	5.0
31	A18			>6000	5.2

AT-27C040

PLASTIC PACKAGE

131°C/85% RELATIVE HUMIDITY HAST TEST

<u>LOT NUMBER</u>	<u>DATE CODE</u>	<u>PACKAGE TYPE</u>	<u>SAMPLE SIZE</u>	<u>TOTAL HRS</u>	<u>NUMBER OF FAILURES</u>
6D0217	6D9632	32 PLCC	100	100	0
6D0989	6D9702	32 PLCC	100	100	0
6D1722	6D9704	32 PLCC	100	100	0
6C1631	6C9641	32 TSOP	90	100	0
0E2066	0E0017	32 PDIP	100	100	0
0H0303	0H0037	32 PDIP	100	100	0
1A0800-1	1A0119	32 PLCC	50	100	0
2E0845-1	2E0214	32 PDIP	70	100	0
1J2066	1J0220	32 TSOP	50	100	0
6J1814-1A	6J0652	32 PDIP	77	100	0

AT-27C040

PLASTIC PACKAGE

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>PACKAGE</u> <u>TYPE</u>	<u>SAMPLE</u> <u>SIZE</u>	<u>NUMBER</u> <u>OF CYCLES</u>	<u>NUMBER</u> <u>OF FAILURES</u>
6D9702	32 PLCC	100	1000	0
8B9832	32 PLCC	100	1000	0
9G9937	32 PLCC	50	1000	0
0E0017	32 PDIP	99	1000	0
0H0037	32 PDIP	50	1000	0
1A0119	32 PLCC	50	1000	0
1A0122	32 PDIP	100	1000	0
1B0206	32 PDIP	100	1000	0
2E0214	32 PDIP	100	1000	0
1J0220	32 TSOP	50	1000	0
4E0415	32 PLCC	77	1000	0
4E0421	32 PLCC	100	1000	0
6J0652	32 PDIP	77	1000	0

AT-27C040

PLASTIC PACKAGE

EXTENDED THERMAL SHOCK

-55°C TO +125°C

<u>DATE CODE</u>	<u>PACKAGE TYPE</u>	<u>SAMPLE SIZE</u>	<u>NUMBER OF CYCLES</u>	<u>NUMBER OF FAILURES</u>
6D9702	32 PLCC	100	1000	0