

**RELIABILITY MONITOR REPORT  
FOR**

**0.6  $\mu\text{m}$  Process**

**Dallas Semiconductor**

**4401 South Beltwood Parkway  
Dallas, TX 75244-3292**

**This Report was prepared by  
Dallas Semiconductor Reliability Engineering**

## Summary:

The data in the tables that follow was generated as the result of an on-going Process Reliability Monitor. The products covered by this process monitor are:

DS1002	DS1050	DS1052	DS1077	DS1077L
DS1085	DS1085L	DS1086	DS1086L	DS1087L
DS1090	DS1094L	DS1100	DS1100L	DS1102L
DS1110	DS1110L	DS1123L	DS1135	DS1135L
DS12885	DS12R885	DS12R885-5	DS1310	DS1311
DS1318	DS1337	DS1337C	DS1338-18	DS1338-3
DS1338-33	DS1338C	DS1339C	DS1339U-2	DS1339U-3
DS1339U-33	DS1340	DS1371	DS1374-18	DS1374-3
DS1374-33	DS1374C	DS1375	DS1390	DS1391
DS1392	DS1393	DS1482	DS1500	DS1501
DS1543	DS1553	DS1558	DS1615	DS1616
DS1620	DS1621	DS1626	DS1631	DS1631A
DS1643	DS1672	DS1678	DS1679	DS1682
DS1720	DS1721	DS1722	DS1726	DS1731
DS1743	DS1748	DS1775	DS1805	DS1809
DS1820	DS1822	DS1830	DS1831	DS1845
DS1846	DS1847	DS1848	DS1849	DS1851
DS1852	DS1854	DS1855	DS1857	DS1858
DS1859	DS1870	DS1921	DS1921H	DS1921Z
DS1961	DS2117M	DS2118M	DS2119M	DS2120
DS2125	DS2127	DS2129	DS21348	DS21349
DS21352	DS21354	DS21448	DS2148	DS2149
DS2154	DS21552	DS21554	DS21600	DS21602
DS21604	DS21610	DS2196	DS2197	DS21Q43
DS21Q50	DS21Q58	DS21Q59	DS2401	DS2405
DS2408	DS2409	DS2411	DS2415	DS2417
DS2421	DS2422	DS2432	DS2433	DS2434
DS2436	DS2438	DS2450	DS2470	DS2490
DS2501	DS2502	DS2503	DS2505	DS2702
DS2720	DS2740	DS2751	DS2760	DS2761
DS2762	DS2763	DS2770	DS2890	DS3902
DS3903	DS3904	DS3905	DS3930	DS4000
DS4301	DS4302	DS4510	DS4520	DS5001
DS5002	DS5240	DS5250	DS7864B	DS7864D
DS80C310	DS80C320	DS80C323	DS80CH11	DS87C550

The calculated failure rate for devices using this process is:

**FAILURE RATE:**                      **MTTF (YRS): 309270**                      **FITS: 0.4**

The parameters used to calculate this failure rate are as follows:

**Cf: 60%**                      **Ea: 0.7**                      **B: 0**                      **Tu: 25 °C**                      **Vu: 5.5 Volts**

The reliability data follows. At the start of this data is the process information. The next section is the detailed reliability data for each stress. The reliability data section includes the latest data available. This report covers data between 10/1/03 and 9/30/04.

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## Device Information:

Process:                      0.6 µm Process  
Interconnect:                      Aluminum / 1% Silicon / 0.5% Copper

Gate Oxide Thickness: 150 Å

**OPERATING LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0309	DS2118M	125C, 5.5 VOLTS	500 HRS	79	0	
			125C, 5.5 VOLTS	1000 HRS	79	0	
HIGH TEMP OP LIFE	0332	DS2154	125C, 5.25 VOLTS	12 HRS	77	0	
			125C, 5.25 VOLTS	204 HRS	77	0	
			125C, 5.25 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0337	DS1859	125C, 5.5 VOLTS	500 HRS	44	0	
			125C, 5.5 VOLTS	1000 HRS	44	0	
HIGH TEMP OP LIFE	0339	DS1859	125C, 5.5 VOLTS	192 HRS	77	0	
			125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0340	DS2770	125C, 5.5 VOLTS	500 HRS	45	0	
			125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0340	DS2422	125C, 5.5V (PSA) & 3.0V (PSB)	192 HRS	77	0	
			125C, 5.5V (PSA) & 3.0V (PSB)	1000 HRS	77	0	
HIGH TEMP OP LIFE	0341	DS1859	125C, 5.5 VOLTS	500 HRS	45	0	
			125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0341	DS1859	125C, 5.5 VOLTS	500 HRS	45	0	
			125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0343	DS2401	125C, 6.0 VOLTS	192 HRS	77	0	
			125C, 6.0 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0343	DS2762	125C, 5.5 VOLTS	192 HRS	77	0	
			125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0344	DS5240	125C, 5.5 VOLTS	500 HRS	45	0	
			125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0345	DS2432	125C, 5.25 VOLTS	192 HRS	77	0	
			125C, 5.25 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0345	DS2401	125C, 6.0 VOLTS	500 HRS	80	0	
			125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0346	DS2751	125C, 5.5 VOLTS	500 HRS	45	0	
			125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH VOLTAGE LIFE	0346	DS5240	125C, 5.5 VOLTS	500 HRS	44	0	
			125C, 5.5 VOLTS	1000 HRS	44	0	
HIGH TEMP OP LIFE	0347	DS5002	125C, 5.0 VOLTS	500 HRS	75	0	
			125C, 5.0 VOLTS	1000 HRS	75	0	
HIGH TEMP OP LIFE	0347	DS5002	125C, 5.0 VOLTS	500 HRS	75	0	
			125C, 5.0 VOLTS	1000 HRS	75	0	
HIGH TEMP OP LIFE	0348	DS1086L	125C, 3.5 VOLTS	192 HRS	77	0	
			125C, 3.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0348	DS5002	125C, 5.0 VOLTS	500 HRS	75	0	
			125C, 5.0 VOLTS	1000 HRS	75	0	
HIGH TEMP OP LIFE	0349	DS2751	125C, 5.5 VOLTS	500 HRS	45	0	

HIGH TEMP OP LIFE	0349	DS2751	125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0349	DS2751	125C, 5.5 VOLTS	500	HRS	45	0
			125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0350	DS1870	125C, 5.5 VOLTS	192	HRS	45	0
			125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0401	DS4510	125C, 5.5 VOLTS	192	HRS	45	0
			125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0402	DS21448	125C, 3.5 VOLTS	192	HRS	45	0
			125C, 3.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0403	DS2401	125C, 5.5 VOLTS	500	HRS	48	0
			125C, 5.5 VOLTS	1000	HRS	48	0
HIGH TEMP OP LIFE	0403	DS2401	125C, 5.5 VOLTS	500	HRS	48	0
			125C, 5.5 VOLTS	1000	HRS	48	0
HIGH TEMP OP LIFE	0403	DS2401	125C, 5.5 VOLTS	500	HRS	48	0
			125C, 5.5 VOLTS	1000	HRS	48	0
HIGH TEMP OP LIFE	0403	DS1318	125C, 3.6 VOLTS	192	HRS	45	0
			125C, 3.6 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0403	DS12R885-5	125C, 5.5 VOLTS	192	HRS	77	0
			125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0405	DS80C320	125C, 5.5 VOLTS	192	HRS	77	0
			125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0408	DS2502	125C, 6.0 VOLTS	192	HRS	77	0
			125C, 6.0 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0409	DS2505	125C, 6.0 VOLTS	192	HRS	77	0
			125C, 6.0 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0409	DS2129	125C, 5.5 VOLTS	500	HRS	45	0
			125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0412	DS2501	125C, 6.0 VOLTS	500	HRS	77	0
			125C, 6.0 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0413	DS1094L	125C, 3.6 VOLTS	192	HRS	45	0
			125C, 3.6 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0413	DS2501	125C, 6.0 VOLTS	500	HRS	77	0
			125C, 6.0 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0414	DS2503	125C, 6.0 VOLTS	500	HRS	77	0
			125C, 6.0 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0416	DS3902	125C, 5.5 VOLTS	192	HRS	77	0
			125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0418	DS1822	125C, 5.5 VOLTS	192	HRS	77	0
			125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0420	DS21354	125C, 5.25 VOLTS	192	HRS	77	0
			125C, 3.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0421	DS21354	125C, 5.25 VOLTS	500	HRS	77	0
			125C, 5.25 VOLTS	1000	HRS	77	0

HIGH TEMP OP LIFE	0421	DS1392	125C, 5.5 VOLTS	192	HRS	45	0
			125C, 5.5 VOLTS	1000	HRS	45	0
				<b>Total:</b>			<b>0</b>

### STORAGE LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0337	DS1859	150C	500	HRS	73	0
			150C	1000	HRS	73	0
STORAGE LIFE	0340	DS2770	150C	500	HRS	77	0
			150C	1000	HRS	77	0
STORAGE LIFE	0341	DS1859	150C	500	HRS	76	0
			150C	1000	HRS	76	0
STORAGE LIFE	0341	DS1859	150C	500	HRS	73	0
			150C	1000	HRS	73	0
STORAGE LIFE	0346	DS2751	150C	500	HRS	72	0
			150C	1000	HRS	72	0
STORAGE LIFE	0349	DS2751	150C	500	HRS	52	0
			150C	1000	HRS	52	0
STORAGE LIFE	0349	DS2751	150C	500	HRS	77	0
			150C	1000	HRS	77	0
STORAGE LIFE	0403	DS2401	125C	500	HRS	80	0
			125C	1000	HRS	80	0
STORAGE LIFE	0403	DS2401	125C	500	HRS	80	0
			125C	1000	HRS	80	0
STORAGE LIFE	0403	DS2401	125C	500	HRS	80	0
			125C	1000	HRS	80	0
STORAGE LIFE	0408	DS2502	150C	96	HRS	77	0
			150C	1000	HRS	77	0
STORAGE LIFE	0409	DS2505	150C	192	HRS	77	0
			150C	1000	HRS	77	0
				<b>Total:</b>			<b>0</b>

### TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0309	DS2118M	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0337	DS1859	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0340	DS2770	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0341	DS1859	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0341	DS1859	-55C TO 125C	500	CYS	72	0
			-55C TO 125C	1000	CYS	72	0

TEMP CYCLE	0344	DS5240	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0345	DS2401	-55C TO 125C	500	CYS	45	0
			-55C TO 125C	1000	CYS	45	0
TEMP CYCLE	0346	DS2751	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0346	DS5240	-55C TO 125C	500	CYS	76	0
			-55C TO 125C	1000	CYS	76	0
TEMP CYCLE	0347	DS5002	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0347	DS5002	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0348	DS1086L	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0348	DS5002	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0349	DS2751	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0349	DS2751	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0409	DS2129	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0412	DS2501	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0413	DS1094L	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0413	DS2501	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0414	DS2503	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0421	DS21354	-55C TO 125C	500	CYS	77	0
			-55C TO 125C	1000	CYS	77	0
						<b>Total:</b>	<b>0</b>

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#### TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
BIASED MOISTURE	0340	DS2770	85/85, 5.5 VOLTS	500	HRS	77	0
			85/85, 5.5 VOLTS	1000	HRS	77	0
BIASED MOISTURE	0344	DS5240	85/85, 5.5 VOLTS	500	HRS	77	0
			85/85, 5.5 VOLTS	1000	HRS	77	0
HAST	0345	DS2401	130C, 85%R.H.,5.5V	96	HRS	77	0
BIASED MOISTURE	0346	DS2751	85/85, 5.5 VOLTS	500	HRS	77	0
			85/85, 5.5 VOLTS	1000	HRS	77	0
BIASED MOISTURE	0346	DS5240	85/85, 5.5 VOLTS	500	HRS	76	0

BIASED MOISTURE	0346	DS5240	85/85, 5.5 VOLTS	1000	HRS	76	0	
BIASED MOISTURE	0347	DS5002	85/85, 5.5 VOLTS	500	HRS	42	0	
			85/85, 5.5 VOLTS	1000	HRS	42	0	
BIASED MOISTURE	0347	DS5002	85/85, 5.5 VOLTS	500	HRS	42	0	
			85/85, 5.5 VOLTS	1000	HRS	42	0	
HAST	0348	DS1086L	130C, 85%R.H.,5.5V	96	HRS	77	0	
BIASED MOISTURE	0348	DS5002	85/85, 5.5 VOLTS	500	HRS	42	0	
			85/85, 5.5 VOLTS	1000	HRS	42	0	
BIASED MOISTURE	0349	DS2751	85/85, 5.5 VOLTS	500	HRS	70	0	
			85/85, 5.5 VOLTS	1000	HRS	70	0	
BIASED MOISTURE	0349	DS2751	85/85, 5.5 VOLTS	500	HRS	71	0	
			85/85, 5.5 VOLTS	1000	HRS	71	0	
BIASED MOISTURE	0403	DS2401	85/85, 5.5 VOLTS	500	HRS	80	0	
			85/85, 5.5 VOLTS	1000	HRS	80	0	
BIASED MOISTURE	0403	DS2401	85/85, 5.5 VOLTS	500	HRS	80	0	
			85/85, 5.5 VOLTS	1000	HRS	80	0	
BIASED MOISTURE	0403	DS2401	85/85, 5.5 VOLTS	500	HRS	80	0	
			85/85, 5.5 VOLTS	1000	HRS	80	0	
HAST	0412	DS2501	130C, 85%R.H.,5.5V	96	HRS	77	0	
HAST	0413	DS2501	130C, 85%R.H.,5.5V	96	HRS	77	0	
HAST	0414	DS2503	130C, 85%R.H.,5.5V	96	HRS	77	0	
HAST	0421	DS21354	130C, 85%R.H.,3.5V	96	HRS	45	0	
<b>Total:</b>							<b>0</b>	<b>0</b>

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### UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
AUTOCLAVE	0309	DS2118M	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0
MOISTURE SOAK	0337	DS1859	85 C/85% R.H.	500	HRS	45	0
			85 C/85% R.H.	1000	HRS	45	0
AUTOCLAVE	0340	DS2770	121C, 2 ATM STEAM, UNBIASED	168	HRS	64	0
MOISTURE SOAK	0341	DS1859	85 C/85% R.H.	500	HRS	45	0
			85 C/85% R.H.	1000	HRS	45	0
MOISTURE SOAK	0341	DS1859	85 C/85% R.H.	500	HRS	45	0
			85 C/85% R.H.	1000	HRS	45	0
HAST, NO BIAS	0344	DS5240	130C, 85% R.H.	200	HRS	77	0
AUTOCLAVE	0345	DS2401	121C, 2 ATM STEAM, UNBIASED	168	HRS	45	0
AUTOCLAVE	0346	DS2751	121C, 2 ATM STEAM, UNBIASED	168	HRS	72	0
AUTOCLAVE	0346	DS5240	121C, 2 ATM STEAM, UNBIASED	168	HRS	76	0
AUTOCLAVE	0348	DS1086L	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0
AUTOCLAVE	0349	DS2751	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0
AUTOCLAVE	0349	DS2751	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0

AUTOCLAVE	0403	DS2401	121C, 2 ATM STEAM, UNBIASED	168	HRS	80	0
AUTOCLAVE	0403	DS2401	121C, 2 ATM STEAM, UNBIASED	168	HRS	80	0
AUTOCLAVE	0403	DS2401	121C, 2 ATM STEAM, UNBIASED	168	HRS	80	0
AUTOCLAVE	0409	DS2129	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0
AUTOCLAVE	0412	DS2501	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0
AUTOCLAVE	0413	DS1094L	121C, 2 ATM STEAM, UNBIASED	168	HRS	85	0
AUTOCLAVE	0413	DS2501	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0
AUTOCLAVE	0414	DS2503	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0
HAST, NO BIAS	0421	DS21354	130C, 85% R.H.	200	HRS	77	0
<b>Total:</b>							<b>0</b>

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#### W/E ENDURANCE AND DATA RET'N

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
WRITE CYCLE STRESS STORAGE LIFE	0339	DS1859	70 C, 5.5 VOLTS	30	KCYS	77	1 30017817
			150C	96	HRS	76	0
			150C	1000	HRS	76	0
WRITE CYCLE STRESS STORAGE LIFE	0343	DS2762	85 C, 5.5 VOLTS	30	KCYS	77	0
			150C	96	HRS	77	0
			150C	1000	HRS	77	0
WRITE CYCLE STRESS STORAGE LIFE	0348	DS1086L	70 C, 3.6 VOLTS	10	KCYS	77	0
			150C	96	HRS	77	0
			150C	1000	HRS	77	0
WRITE CYCLE STRESS STORAGE LIFE	0350	DS1870	70 C, 5.5 VOLTS	30	KCYS	77	0
			150C	96	HRS	74	0
			150C	1000	HRS	74	0
WRITE CYCLE STRESS STORAGE LIFE	0401	DS4510	70 C, 5.5 VOLTS	30	KCYS	77	1 30019498
			150C	96	HRS	76	0
			150C	1000	HRS	76	0
WRITE CYCLE STRESS STORAGE LIFE	0413	DS1094L	70 C, 3.6 VOLTS	10	KCYS	77	0
			150C	96	HRS	75	0
			150C	1000	HRS	75	0
WRITE CYCLE STRESS STORAGE LIFE	0416	DS3902	70 C, 5.5 VOLTS	30	KCYS	77	0
			150C	96	HRS	77	0
			150C	1000	HRS	77	0
WRITE CYCLE STRESS STORAGE LIFE	0418	DS1822	55 C, 5.5 VOLTS	30	KCYS	77	0
			150C	96	HRS	77	0
			150C	1000	HRS	77	0
<b>Total:</b>							<b>2</b>

**FAILURE RATE:**

**MTTF (YRS): 309270**

**FITS: 0.4**