

**RELIABILITY MONITOR REPORT  
FOR**

**1.2  $\mu\text{m}$  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:

|         |        |         |        |          |
|---------|--------|---------|--------|----------|
| DS1000  | DS1004 | DS1012  | DS1040 | DS1045   |
| DS1202  | DS1205 | DS1233  | DS1267 | DS1336   |
| DS1380  | DS1384 | DS14285 | DS1589 | DS1602   |
| DS1609  | DS1610 | DS1620  | DS1632 | DS1640   |
| DS1648  | DS1666 | DS1669  | DS1688 | DS1689   |
| DS1820B | DS1833 | DS1867  | DS1869 | DS2016   |
| DS2107A | DS2130 | DS2143  | DS2164 | DS2165   |
| DS2404  | DS2435 | DS5001  | DS5002 | DS50C302 |
| DS9502  | DS9503 |         |        |          |

The calculated failure rate for devices using this process is:

**FAILURE RATE:**                      **MTTF (YRS): 33708**                      **FITS: 3.4**

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 10/01/2004 and 09/30/2005 .

**Device Information:**

Process:                      1.2 µm Process  
Interconnect:                      Aluminum / 1% Silicon / 0.5% Copper  
Gate Oxide Thickness:                      225 Å

**OPERATING LIFE**

| DESCRIPTION       | DATE CODE | TEST VEHICLE | CONDITION                     | READPOINT | QUANTITY | FAILS    | FA NO |
|-------------------|-----------|--------------|-------------------------------|-----------|----------|----------|-------|
| HIGH VOLTAGE LIFE | 0431      | DS1267       | 125C, 5.5 V, -4.0V            | 1000 HRS  | 80       | 0        |       |
| HIGH TEMP OP LIFE | 0452      | DS1644       | 85 C, 5.5V (PSA) & 0.0V (PSB) | 1000 HRS  | 77       | 0        |       |
| HIGH TEMP OP LIFE | 0512      | DS1669       | 125C, 5.5 VOLTS               | 1000 HRS  | 77       | 0        |       |
| VISUAL INSPECTION |           |              | WHISKERS < 50µM               |           | 3        | 0        |       |
| HIGH TEMP OP LIFE | 0513      | DS1669       | 125C, 5.5 VOLTS               | 1000 HRS  | 77       | 0        |       |
| VISUAL INSPECTION |           |              | WHISKERS < 50µM               |           | 3        | 0        |       |
| HIGH TEMP OP LIFE | 0514      | DS1669       | 125C, 5.5 VOLTS               | 1000 HRS  | 45       | 0        |       |
| VISUAL INSPECTION |           |              | WHISKERS < 50µM               |           | 3        | 0        |       |
| <b>Total:</b>     |           |              |                               |           |          | <b>0</b> |       |

**STORAGE LIFE**

| DESCRIPTION       | DATE CODE | TEST VEHICLE | CONDITION       | READPOINT | QUANTITY | FAILS | FA NO |
|-------------------|-----------|--------------|-----------------|-----------|----------|-------|-------|
| STORAGE LIFE      | 0512      | DS1669       | 150C            | 1000 HRS  | 77       | 0     |       |
| VISUAL INSPECTION |           |              | WHISKERS < 50µM |           | 3        | 0     |       |
| STORAGE LIFE      | 0513      | DS1669       | 150C            | 1000 HRS  | 77       | 0     |       |
| VISUAL INSPECTION |           |              | WHISKERS < 50µM |           | 3        | 0     |       |
| STORAGE LIFE      | 0514      | DS1669       | 150C            | 1000 HRS  | 77       | 0     |       |

|                   |      |        |                 |  |  |               |          |
|-------------------|------|--------|-----------------|--|--|---------------|----------|
| VISUAL INSPECTION | 0514 | DS1669 | WHISKERS < 50uM |  |  | 3             | 0        |
|                   |      |        |                 |  |  | <b>Total:</b> | <b>0</b> |

### TEMPERATURE CYCLE

| DESCRIPTION       | DATE CODE | TEST VEHICLE | CONDITION       | READPOINT | QUANTITY | FAILS         | FA NO    |
|-------------------|-----------|--------------|-----------------|-----------|----------|---------------|----------|
| TEMP CYCLE        | 0431      | DS1267       | -55C TO 125C    | 1000 CYS  | 40       | 0             |          |
| TEMP CYCLE        | 0452      | DS1644       | -40 TO 85C      | 1000 CYS  | 77       | 0             |          |
| TEMP CYCLE        | 0512      | DS1669       | -55C TO 125C    | 1000 CYS  | 77       | 0             |          |
| VISUAL INSPECTION |           |              | WHISKERS < 50uM |           | 3        | 0             |          |
| TEMP CYCLE        | 0513      | DS1669       | -55C TO 125C    | 1000 CYS  | 77       | 0             |          |
| VISUAL INSPECTION |           |              | WHISKERS < 50uM |           | 3        | 0             |          |
| TEMP CYCLE        | 0514      | DS1669       | -55C TO 125C    | 1000 CYS  | 76       | 0             |          |
| VISUAL INSPECTION |           |              | WHISKERS < 50uM |           | 3        | 0             |          |
|                   |           |              |                 |           |          | <b>Total:</b> | <b>0</b> |

### TEMPERATURE HUMIDITY BIAS

| DESCRIPTION       | DATE CODE | TEST VEHICLE | CONDITION        | READPOINT | QUANTITY | FAILS         | FA NO    |
|-------------------|-----------|--------------|------------------|-----------|----------|---------------|----------|
| BIASED MOISTURE   | 0431      | DS1267       | 85/85, 5.5 VOLTS | 1000 HRS  | 77       | 0             |          |
| BIASED MOISTURE   | 0512      | DS1669       | 85/85, 5.5 VOLTS | 1000 HRS  | 77       | 0             |          |
| VISUAL INSPECTION |           |              | WHISKERS < 50uM  |           | 3        | 0             |          |
| BIASED MOISTURE   | 0513      | DS1669       | 85/85, 5.5 VOLTS | 1000 HRS  | 77       | 0             |          |
| VISUAL INSPECTION |           |              | WHISKERS < 50uM  |           | 3        | 0             |          |
| BIASED MOISTURE   | 0514      | DS1669       | 85/85, 5.5 VOLTS | 1000 HRS  | 45       | 0             |          |
| VISUAL INSPECTION |           |              | WHISKERS < 50uM  |           | 3        | 0             |          |
|                   |           |              |                  |           |          | <b>Total:</b> | <b>0</b> |

### UNBIASED MOISTURE RESISTANCE

| DESCRIPTION       | DATE CODE | TEST VEHICLE | CONDITION                   | READPOINT | QUANTITY | FAILS         | FA NO    |
|-------------------|-----------|--------------|-----------------------------|-----------|----------|---------------|----------|
| MOISTURE SOAK     | 0452      | DS1644       | 60C/90% R.H.                | 1000 HRS  | 77       | 0             |          |
| AUTOCLAVE         | 0512      | DS1669       | 121C, 2 ATM STEAM, UNBIASED | 168 HRS   | 82       | 0             |          |
| VISUAL INSPECTION |           |              | WHISKERS < 50uM             |           | 3        | 0             |          |
| AUTOCLAVE         | 0513      | DS1669       | 121C, 2 ATM STEAM, UNBIASED | 168 HRS   | 83       | 0             |          |
| VISUAL INSPECTION |           |              | WHISKERS < 50uM             |           | 3        | 0             |          |
| AUTOCLAVE         | 0514      | DS1669       | 121C, 2 ATM STEAM, UNBIASED | 168 HRS   | 66       | 0             |          |
| VISUAL INSPECTION |           |              | WHISKERS < 50uM             |           | 3        | 0             |          |
|                   |           |              |                             |           |          | <b>Total:</b> | <b>0</b> |

**FAILURE RATE:**                      **MTTF (YRS): 33708**                      **FITS: 3.4**