

**RELIABILITY MONITOR REPORT  
FOR**

**LQFP Package**

**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 Package Reliability Monitor. The assemblies covered by this package monitor are:

| ASSY SITE       | PINS | PACKAGE                    |                 |                    |
|-----------------|------|----------------------------|-----------------|--------------------|
| ATK (Amkor, K)  | 100  | LQFP                       | ATK (Amkor, K)  | 128 LQFP           |
| ATK (Amkor, K)  | 48   | LQFP                       | ATK (Amkor, K)  | 64 LQFP            |
| ATK (Amkor, K)  | 100  | LQFP (Pb-Free)             | ATK (Amkor, K)  | 128 LQFP (Pb-Free) |
| ATK (Amkor, K)  | 48   | LQFP (Pb-Free)             | ATK (Amkor, K)  | 64 LQFP (Pb-Free)  |
| ATK (Amkor, K)  | 48   | LQFP Exposed Pad (Pb-Free) | ATP (Amkor, PI) | 100 LQFP           |
| ATP (Amkor, PI) | 128  | LQFP                       | Stats           | 100 LQFP           |
| Stats           | 128  | LQFP                       | Stats           | 48 LQFP            |
| Stats           | 64   | LQFP                       |                 |                    |

The calculated failure rate for this assembly is:

**FAILURE RATE:**                      **MTTF (YRS): 27261**                      **FITS: 4.2**

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 a description of the assembly vehicle used to generate this reliability data. 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 10/1/04 and 9/30/05 .

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### Assembly Information:

Package Type:                      LQFP 551  
Flammability:                      UL 94-V0  
Moisture Sensitivity  
(JEDEC J-STD20A)                      Level 4  
Date Code Range:                      0435      to      0445

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### OPERATING LIFE

| DESCRIPTION       | DATE CODE | TEST VEHICLE | CONDITION                     | READPOINT     | QUANTITY | FAILS    | FA NO |
|-------------------|-----------|--------------|-------------------------------|---------------|----------|----------|-------|
| HIGH VOLTAGE LIFE | 0435      | DS80C400     | 125C, 5.5V (PSA) & 3.3V (PSB) | 1000 HRS      | 77       | 0        |       |
| HIGH TEMP OP LIFE | 0438      | DS2154       | 125C, 5.0 VOLTS               | 1000 HRS      | 78       | 0        |       |
| HIGH TEMP OP LIFE | 0440      | DS80C410     | 125C, 5.5V (PSA) & 3.3V (PSB) | 1000 HRS      | 77       | 0        |       |
|                   |           |              |                               | <b>Total:</b> |          | <b>0</b> |       |

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### PRECONDITIONING LEVEL 3

| DESCRIPTION       | DATE CODE | TEST VEHICLE | CONDITION    | READPOINT     | QUANTITY | FAILS    | FA NO |
|-------------------|-----------|--------------|--------------|---------------|----------|----------|-------|
| STORAGE LIFE      | 0438      | DS2154       | 125C         | 24 HRS        | 241      | 0        |       |
| MOISTURE SOAK     |           |              | 30C/60% R.H. | 192 HRS       | 241      | 0        |       |
| CONVECTION REFLOW |           |              | 235C +5/-0C  | 3 PASS        | 241      | 0        |       |
| PRECONDITION U/S  | 0438      | DS2154       | J-STD-020    |               | 8        | 0        |       |
|                   |           |              |              | <b>Total:</b> |          | <b>0</b> |       |

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### TEMPERATURE CYCLE

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION    | READPOINT | QUANTITY | FAILS | FA NO |
|-------------|-----------|--------------|--------------|-----------|----------|-------|-------|
| TEMP CYCLE  | 0435      | DS80C400     | -55C TO 125C | 1000 CYS  | 77       | 0     |       |

|               |      |        |              |      |     |          |          |
|---------------|------|--------|--------------|------|-----|----------|----------|
| TEMP CYCLE    | 0438 | DS2154 | -55C TO 125C | 1000 | CYS | 78       | 0        |
| TEMP CYCLE    | 0445 | DS2155 | -55C TO 125C | 1000 | CYS | 77       | 0        |
| <b>Total:</b> |      |        |              |      |     | <b>0</b> | <b>0</b> |

**TEMPERATURE HUMIDITY BIAS**

| DESCRIPTION   | DATE CODE | TEST VEHICLE | CONDITION          | READPOINT | QUANTITY | FAILS    | FA NO    |
|---------------|-----------|--------------|--------------------|-----------|----------|----------|----------|
| HAST          | 0435      | DS80C400     | 130C, 85%R.H.,3.5V | 96        | HRS      | 77       | 0        |
| HAST          | 0445      | DS2155       | 130C, 85%R.H.,3.5V | 96        | HRS      | 45       | 0        |
| <b>Total:</b> |           |              |                    |           |          | <b>0</b> | <b>0</b> |

**UNBIASED MOISTURE RESISTANCE**

| DESCRIPTION   | DATE CODE | TEST VEHICLE | CONDITION      | READPOINT | QUANTITY | FAILS    | FA NO    |
|---------------|-----------|--------------|----------------|-----------|----------|----------|----------|
| HAST, NO BIAS | 0435      | DS80C400     | 130C, 85% R.H. | 200       | HRS      | 77       | 0        |
| HAST, NO BIAS | 0438      | DS2154       | 130C, 85% R.H. | 100       | HRS      | 77       | 0        |
| HAST, NO BIAS | 0445      | DS2155       | 130C, 85% R.H. | 200       | HRS      | 77       | 0        |
| <b>Total:</b> |           |              |                |           |          | <b>0</b> | <b>0</b> |

**FAILURE RATE:**                      **MTTF (YRS): 27261**                      **FITS: 4.2**