



7/19/2012

**RELIABILITY MONITOR REPORT  
FOR**

**WLP Package**

**MAXIM Integrated Products**

**120 San Gabriel Dr.  
Sunnyvale, CA 94086**

**This Report was prepared by  
Maxim Reliability Engineering**

**Summary:**

The data in the tables that follow was generated as the result of an on-going Package Reliability Monitor. The specific assemblies included in this package monitor are:

| ASSY SITE      | PINS | PACKAGE       |                |                   |
|----------------|------|---------------|----------------|-------------------|
| ASE Taiwan     | 81   | WLP (Pb-Free) | ASE Taiwan     | 117 WLP (Pb-Free) |
| ASE Taiwan     | 144  | WLP (Pb-Free) | ASE Taiwan     | 169 WLP (Pb-Free) |
| CASIO MICRONIC | 9    | WLP (Pb-Free) | CASIO MICRONIC | 12 WLP (Pb-Free)  |
| CASIO MICRONIC | 20   | WLP (Pb-Free) | CASIO MICRONIC | 25 WLP (Pb-Free)  |
| CASIO MICRONIC | 30   | WLP (Pb-Free) | CASIO MICRONIC | 81 WLP (Pb-Free)  |
| CASIO MICRONIC | 225  | WLP (Pb-Free) | DALLAS-MAXFIL  | 6 WLP (Pb-Free)   |
| DALLAS-MAXFIL  | 8    | WLP (Pb-Free) | DALLAS-MAXFIL  | 9 WLP (Pb-Free)   |
| DALLAS-MAXFIL  | 20   | WLP (Pb-Free) | DALLAS-MAXFIL  | 25 WLP (Pb-Free)  |
| DALLAS-MAXFIL  | 40   | WLP (Pb-Free) | DALLAS-MAXFIL  | 49 WLP (Pb-Free)  |
| DALLAS-MAXFIL  | 90   | WLP (Pb-Free) | DALLAS-MAXFIL  | 110 WLP (Pb-Free) |
| DALLAS-MAXFIL  | 144  | WLP (Pb-Free) | STATS-TAIWAN   | 9 WLP (Pb-Free)   |
| STATS-TAIWAN   | 81   | WLP (Pb-Free) | STATS-TAIWAN   | 108 WLP (Pb-Free) |
| STATS-TAIWAN   | 169  | WLP (Pb-Free) | TERAMIKROS     | 9 WLP (Pb-Free)   |
| TERAMIKROS     | 20   | WLP (Pb-Free) | TERAMIKROS     | 225 WLP (Pb-Free) |

The calculated failure rate for this assembly is:

**FAILURE RATE: MTTF (YRS): 142694 FITS: 0.8**

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

**Cf: 60% Ea: 0.7 Tu: 25 °C**

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 7/1/2011 and 6/30/2012.

**Assembly Information:**

Package Type: WLP (Pb-Free)

Date Code Range: 1106 to NA

**OPERATING LIFE**

| DESCRIPTION       | DATE CODE | TEST VEHICLE   | CONDITION        | READPOINT | QUANTITY | FAILS | FA NO |
|-------------------|-----------|----------------|------------------|-----------|----------|-------|-------|
| HIGH TEMP OP LIFE |           | PQ77           | 135C, 5.0V (PSA) | 192 HRS   | 48       | 0     |       |
| HIGH TEMP OP LIFE |           | MAX14568EEWA+T | 135C             | 1000 HRS  | 44       | 0     |       |
| HIGH TEMP OP LIFE | 1050      | MAX14578AETI+  | 135C             | 192 HRS   | 76       | 0     |       |
| HIGH TEMP OP LIFE | 1050      | MAX14578AETI+  | 135C             | 192 HRS   | 44       | 0     |       |
| HIGH TEMP OP LIFE | 1050      | MAX14578AETI+  | 135C             | 600 HRS   | 44       | 0     |       |
| HIGH TEMP OP LIFE | 1106      | MAX98314EWL+T  | 135C             | 1000 HRS  | 77       | 0     |       |
| HIGH TEMP OP LIFE | 1109      | MAX8939EWW+    | 135C             | 500 HRS   | 47       | 0     |       |
| HIGH TEMP OP LIFE | 1122      | MAX44269EWL+T  | 135C             | 192 HRS   | 48       | 0     |       |
| HIGH TEMP OP LIFE | 1126      | MAX15108EWP+   | 135C             | 192 HRS   | 48       | 0     |       |
| HIGH TEMP OP LIFE | 1126      | MAX15108EWP+   | 135C             | 192 HRS   | 46       | 0     |       |
| HIGH TEMP OP LIFE | 1132      | MAX97003EWP+   | 135C             | 384 HRS   | 46       | 0     |       |
| HIGH TEMP OP LIFE | 1133      | MAX8959EWG+T   | 135C             | 500 HRS   | 45       | 0     |       |

|                   |      |                |      |      |     |          |          |
|-------------------|------|----------------|------|------|-----|----------|----------|
| HIGH TEMP OP LIFE | 1139 | MAX8968EWL+CBF | 135C | 500  | HRS | 48       | 0        |
| HIGH TEMP OP LIFE | 1143 | MAX8971EWP+T   | 135C | 192  | HRS | 50       | 0        |
| HIGH TEMP OP LIFE | 1144 | MAX8930EWJ+    | 135C | 1000 | HRS | 48       | 0        |
| HIGH TEMP OP LIFE | 1145 | MAX9699EWL+    | 135C | 240  | HRS | 48       | 0        |
| HIGH TEMP OP LIFE | 1145 | MAX8959EWG+T   | 135C | 192  | HRS | 45       | 0        |
| HIGH TEMP OP LIFE | 1146 | MAX8959EWG+T   | 135C | 192  | HRS | 45       | 0        |
| HIGH TEMP OP LIFE | 1149 | MAX8971EWP+    | 135C | 192  | HRS | 48       | 0        |
| HIGH TEMP OP LIFE | 1205 | MAX77686EWE+T  | 135C | 240  | HRS | 48       | 0        |
| HIGH TEMP OP LIFE | 1206 | MAX77100EWL+T  | 135C | 192  | HRS | 48       | 0        |
| HIGH TEMP OP LIFE | N/A  | MAX98314EWL+T  | 135C | 1000 | HRS | 77       | 0        |
| HIGH TEMP OP LIFE | N/A  | MAX98314EWL+T  | 135C | 1000 | HRS | 77       | 0        |
| HIGH TEMP OP LIFE | N/A  | MAX8959EWG+T   | 135C | 1000 | HRS | 44       | 0        |
| HIGH TEMP OP LIFE | N/A  | MAX14570EZT+   | 135C | 1000 | HRS | 77       | 0        |
| HIGH TEMP OP LIFE | N/A  | MAX8959EWG+T   | 135C | 1000 | HRS | 45       | 0        |
| <b>Total:</b>     |      |                |      |      |     | <b>0</b> | <b>0</b> |

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#### STORAGE LIFE

| DESCRIPTION  | DATE CODE | TEST VEHICLE   | CONDITION | READPOINT | QUANTITY | FAILS | FA NO |
|--------------|-----------|----------------|-----------|-----------|----------|-------|-------|
| STORAGE LIFE | 1144      | MAX8930EWJ+    | 150C      | 1000 HRS  | 80       | 0     |       |
| STORAGE LIFE | 1209      | MAXQ614        | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | 1210      | MAXQ614        | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | 1210      | MAXQ614        | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | 1242      | MAX98096EWF+T  | 150C      | 500 HRS   | 77       | 0     |       |
| STORAGE LIFE | 1242      | MAX98096EWF+T  | 150C      | 500 HRS   | 77       | 0     |       |
| STORAGE LIFE | 1242      | MAX98096EWF+T  | 150C      | 500 HRS   | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX14568EEWA+T | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX14568EEWA+T | 150C      | 1000 HRS  | 76       | 0     |       |
| STORAGE LIFE | N/A       | MAX14568EEWA+T | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX14570EZT+   | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX14570EZT+   | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX14570EZT+   | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX8997EWW+T   | 150C      | 1000 HRS  | 75       | 0     |       |
| STORAGE LIFE | N/A       | MAX8997EWW+T   | 150C      | 500 HRS   | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX8997EWW+T   | 150C      | 500 HRS   | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX8997EWW+T   | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX8997EWW+T   | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX8997EWW+T   | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX8997EWW+T   | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX8959EWG+T   | 150C      | 1000 HRS  | 77       | 0     |       |
| STORAGE LIFE | N/A       | MAX8959EWG+T   | 150C      | 1024 HRS  | 77       | 0     |       |

|               |     |               |      |          |    |          |
|---------------|-----|---------------|------|----------|----|----------|
| STORAGE LIFE  | N/A | MAX8959EWG+T  | 150C | 1024 HRS | 77 | 0        |
| STORAGE LIFE  | N/A | MAX98095EWG   | 150C | 1048 HRS | 77 | 0        |
| STORAGE LIFE  | N/A | MAX98095EWG   | 150C | 1048 HRS | 77 | 0        |
| STORAGE LIFE  | N/A | MAX98095EWG   | 150C | 1048 HRS | 77 | 0        |
| STORAGE LIFE  | N/A | MAX98095EWG   | 150C | 1000 HRS | 77 | 0        |
| STORAGE LIFE  | N/A | MAX98095EWG   | 150C | 1000 HRS | 77 | 0        |
| STORAGE LIFE  | N/A | MAX98095EWG   | 150C | 1000 HRS | 77 | 0        |
| STORAGE LIFE  | N/A | MAX14596EZA+T | 150C | 500 HRS  | 77 | 0        |
| STORAGE LIFE  | N/A | MAX14596EZA+T | 150C | 500 HRS  | 77 | 0        |
| STORAGE LIFE  | N/A | MAX14596EZA+T | 150C | 500 HRS  | 77 | 0        |
| <b>Total:</b> |     |               |      |          |    | <b>0</b> |

### TEMPERATURE CYCLE

| DESCRIPTION                     | DATE CODE | TEST VEHICLE  | CONDITION     | READPOINT | QUANTITY | FAILS | FA NO |
|---------------------------------|-----------|---------------|---------------|-----------|----------|-------|-------|
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX8899EWZ+T  | -40C TO +125C | 1000 CYS  | 200      | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX8899EWZ+T  | -40C TO +125C | 1000 CYS  | 200      | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX8899EWZ+T  | -40C TO +125C | 1000 CYS  | 200      | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX98304CEWL+ | -40C TO +125C | 500 CYS   | 100      | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX98304CEWL+ | -40C TO +125C | 500 CYS   | 100      | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX98304CEWL+ | -40C TO +125C | 500 CYS   | 97       | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX98304CEWL+ | -40C TO +125C | 500 CYS   | 100      | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX8957TEWI+T | -40C TO +125C | 410 CYS   | 77       | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX8957TEWI+T | -40C TO +125C | 500 CYS   | 77       | 1     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX8957TEWI+T | -40C TO +125C | 410 CYS   | 77       | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL |           | MAX8957TEWI+T | -40C TO +125C | 410 CYS   | 77       | 1     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1144      | MAX8930EWJ+   | -40C TO +125C | 500 CYS   | 80       | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1144      | MAX8930EWJ+   | -40C TO +125C | 1000 CYS  | 80       | 0     |       |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | 1209      | MAXQ614       | -40C TO +125C | 134 CYS   | 77       | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1209      | MAXQ614       | -40C TO +125C | 1000 CYS  | 77       | 0     |       |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | 1210      | MAXQ614       | -40C TO +125C | 134 CYS   | 77       | 0     |       |
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1210      | MAXQ614       | -40C TO +125C | 1000 CYS  | 77       | 0     |       |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | 1210      | MAXQ614       | -40C TO +125C | 134 CYS   | 77       | 0     |       |

|                                 |      |                |               |          |    |   |
|---------------------------------|------|----------------|---------------|----------|----|---|
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1210 | MAXQ614        | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1216 | MAXQ614        | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1216 | MAXQ614        | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1216 | MAXQ614        | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1242 | MAX98096EWF+T  | -40C TO +125C | 250 CYS  | 77 | 1 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1242 | MAX98096EWF+T  | -40C TO +125C | 250 CYS  | 77 | 1 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | 1242 | MAX98096EWF+T  | -40C TO +125C | 250 CYS  | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX8959EWG+T   | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX14568EEWA+T | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | N/A  | MAX14568EEWA+T | -65C TO 150C  | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX14568EEWA+T | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | N/A  | MAX14568EEWA+T | -65C TO 150C  | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX14568EEWA+T | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | N/A  | MAX14568EEWA+T | -65C TO 150C  | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX14570EZT+   | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX14570EZT+   | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX14570EZT+   | -40C TO +125C | 1000 CYS | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX8997EWW+T   | -40C TO +125C | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX8997EWW+T   | -40C TO +125C | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | N/A  | MAX8997EWW+T   | -65C TO 150C  | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX8997EWW+T   | -40C TO +125C | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | N/A  | MAX8997EWW+T   | -65C TO 150C  | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX8959EWG+T   | -40C TO +125C | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX8959EWG+T   | -40C TO +125C | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX8959EWG+T   | -40C TO +125C | 500 CYS  | 77 | 0 |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A  | MAX8957TEWI+T  | -40C TO +125C | 500 CYS  | 60 | 0 |

|                                 |     |               |               |     |     |               |          |
|---------------------------------|-----|---------------|---------------|-----|-----|---------------|----------|
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX98095EWG   | -40C TO +125C | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX98095EWG   | -40C TO +125C | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX98095EWG   | -40C TO +125C | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | N/A | MAX98095EWG   | -65C TO 150C  | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX98095EWG   | -40C TO +125C | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | N/A | MAX98095EWG   | -65C TO 150C  | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX77686EWE+  | -40C TO +125C | 250 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX77686EWE+  | -40C TO +125C | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX77686EWE+  | -40C TO +125C | 250 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX77686EWE+  | -40C TO +125C | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX77686EWE+  | -40C TO +125C | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX14596EZA+T | -40C TO +125C | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX14596EZA+T | -40C TO +125C | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 15' RAMP, 15' DWELL | N/A | MAX14596EZA+T | -40C TO +125C | 500 | CYS | 77            | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL  | NA  | MAX77663AEWJ+ | -65C TO 150C  | 500 | CYS | 77            | 0        |
|                                 |     |               |               |     |     | <b>Total:</b> | <b>4</b> |

### UNBIASED MOISTURE RESISTANCE

| DESCRIPTION   | DATE CODE | TEST VEHICLE | CONDITION      | READPOINT | QUANTITY | FAILS         | FA NO    |
|---------------|-----------|--------------|----------------|-----------|----------|---------------|----------|
| HAST, NO BIAS | 1209      | MAXQ614      | 110C, 85% R.H. | 264       | HRS      | 77            | 0        |
| HAST, NO BIAS | 1210      | MAXQ614      | 110C, 85% R.H. | 264       | HRS      | 77            | 0        |
| HAST, NO BIAS | 1210      | MAXQ614      | 110C, 85% R.H. | 264       | HRS      | 77            | 0        |
|               |           |              |                |           |          | <b>Total:</b> | <b>0</b> |

**FAILURE RATE: MTTF (YRS): 142694 FITS: 0.8**