

**8/1/2019**



**RELIABILITY MONITOR REPORT  
FOR**

**uMAX Package**

**MAXIM INTEGRATED**

**160 RIO ROBLES  
SAN JOSE, CA 95134**

**This Report was prepared by  
MAXIM INTEGRATED 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        |                 |                   |
|-----------------|------|----------------|-----------------|-------------------|
| ATP (Amkor, PI) | 8    | uMax (Pb-Free) | ATP (Amkor, PI) | 10 uMax (Pb-Free) |
| Greatek         | 8    | uMax (Pb-Free) | UTL (NSEB) UTAC | 3 uMax (Pb-Free)  |
| UTL (NSEB) UTAC | 8    | uMax (Pb-Free) | UTL (NSEB) UTAC | 10 uMax (Pb-Free) |
| UTL (NSEB) UTAC | 20   | uMax (Pb-Free) |                 |                   |

The calculated failure rate for this assembly is:

**FAILURE RATE: MTTF (YRS): 196123 FITS: 0.6**

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 4/1/2019 and 8/1/2019.

---

### Assembly Information:

Package Type: uMax (Pb-Free)

Date Code Range: 1703 to 1912

---

### OPERATING LIFE

| DESCRIPTION       | DATE CODE | TEST VEHICLE    | CONDITION | READPOINT | QUANTITY | FAILS    | FA NO |
|-------------------|-----------|-----------------|-----------|-----------|----------|----------|-------|
| HIGH TEMP OP LIFE | 1804      | MAX6035BAUR50+T | 125°C     | 1000 HRS  | 47       | 0        |       |
| HIGH TEMP OP LIFE | 1804      | MAX6035BAUR50+T | 125°C     | 1000 HRS  | 43       | 0        |       |
| HIGH TEMP OP LIFE | 1808      | MAX41464GUB+T   | 125°C     | 192 HRS   | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1811      | MAX4003EUA+     | 125°C     | 1000 HRS  | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1811      | MAX9933BGUA+    | 125°C     | 192 HRS   | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1812      | MAX5441AEUA+    | 125°C     | 1000 HRS  | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1816      | MAX5431AEUB+    | 125°C     | 1000 HRS  | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1821      | MAX3747AEUB+    | 125°C     | 1000 HRS  | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1838      | MAX4003EUA+     | 125°C     | 500 HRS   | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1838      | MAX4003EUA+     | 125°C     | 1000 HRS  | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1843      | MAX16956AUBD/V+ | 125°C     | 500 HRS   | 78       | 0        |       |
| HIGH TEMP OP LIFE | 1843      | MAX16956AUBD/V+ | 125°C     | 1000 HRS  | 78       | 0        |       |
| HIGH TEMP OP LIFE | 1846      | MAX4477AUA/V+   | 125°C     | 1000 HRS  | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1846      | MAX4477AUA/V+   | 125°C     | 1000 HRS  | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1846      | MAX4477AUA/V+   | 125°C     | 1000 HRS  | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1846      | MAX40056FAUA/V+ | 125°C     | 192 HRS   | 80       | 0        |       |
| HIGH TEMP OP LIFE | 1911      | MAX669EUB/V+    | 125°C     | 1000 HRS  | 79       | 0        |       |
| <b>Total:</b>     |           |                 |           |           |          | <b>0</b> |       |

---

**PACKAGE TESTS**

| DESCRIPTION       | DATE CODE | TEST VEHICLE    | CONDITION     | READPOINT | QUANTITY      | FAILS    | FA NO    |
|-------------------|-----------|-----------------|---------------|-----------|---------------|----------|----------|
| CONVECTION REFLOW | 1703      | MAX20090AUP/V+  | 260C +/-5C    | 3         | PASS          | 100      | 0        |
| CONVECTION REFLOW | 1811      | MAX16992AUBB/V+ | 260C +/-5C    | 3         | PASS          | 90       | 0        |
| CONVECTION REFLOW | 1838      | MAX4003EUA+     | 85 C/85% R.H. | 3         | PASS          | 320      | 0        |
| CONVECTION REFLOW | 1843      | MAX16992AUBB/V+ | 260C +/-5C    | 3         | PASS          | 90       | 0        |
| CONVECTION REFLOW | 1843      | MAX16956AUBD/V+ | 85 C/85% R.H. | 3         | PASS          | 319      | 0        |
| CSAM              | 1846      | MAX4477AUA/V+   |               |           |               | 22       | 0        |
| CONVECTION REFLOW | 1846      | MAX4477AUA/V+   | 260C +/-5C    | 3         | PASS          | 400      | 0        |
| CSAM              | 1846      | MAX4477AUA/V+   |               |           |               | 22       | 0        |
| CONVECTION REFLOW | 1846      | MAX4477AUA/V+   | 260C +/-5C    | 3         | PASS          | 400      | 0        |
| CSAM              | 1846      | MAX4477AUA/V+   |               |           |               | 22       | 0        |
| CONVECTION REFLOW | 1846      | MAX4477AUA/V+   | 260C +/-5C    | 3         | PASS          | 400      | 0        |
| CONVECTION REFLOW | 1911      | MAX669EUB/V+    | 260C +/-5C    | 3         | PASS          | 318      | 0        |
| CONVECTION REFLOW | 1912      | MAX4080TAUA+    | 260C +/-5C    | 3         | PASS          | 320      | 0        |
|                   |           |                 |               |           | <b>Total:</b> | <b>0</b> | <b>0</b> |

---

**STORAGE LIFE**

| DESCRIPTION  | DATE CODE | TEST VEHICLE    | CONDITION | READPOINT | QUANTITY      | FAILS    | FA NO    |
|--------------|-----------|-----------------|-----------|-----------|---------------|----------|----------|
| STORAGE LIFE | 1811      | MAX4003EUA+     | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1811      | MAX9933BGUA+    | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1812      | MAX5441AEUA+    | 150°C     | 1000      | HRS           | 79       | 0        |
| STORAGE LIFE | 1816      | MAX5431AEUB+    | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1821      | MAX3747AEUB+    | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1822      | MAX1744EUB/V+   | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1838      | MAX4003EUA+     | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1843      | MAX16956AUBD/V+ | 150°C     | 1000      | HRS           | 79       | 0        |
| STORAGE LIFE | 1846      | MAX4477AUA/V+   | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1846      | MAX4477AUA/V+   | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1846      | MAX4477AUA/V+   | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1911      | MAX669EUB/V+    | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1911      | MAX4132EUA+     | 150°C     | 1000      | HRS           | 80       | 0        |
| STORAGE LIFE | 1912      | MAX4080TAUA+    | 150°C     | 1000      | HRS           | 80       | 0        |
|              |           |                 |           |           | <b>Total:</b> | <b>0</b> | <b>0</b> |

---

**TEMPERATURE CYCLE**

| DESCRIPTION                    | DATE CODE | TEST VEHICLE | CONDITION                   | READPOINT | QUANTITY | FAILS | FA NO |
|--------------------------------|-----------|--------------|-----------------------------|-----------|----------|-------|-------|
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1811      | MAX9933BGUA+ | -65C TO +150C (Condition C) | 1000      | CYS      | 80    | 0     |

|                                |      |               |                             |      |     |          |          |
|--------------------------------|------|---------------|-----------------------------|------|-----|----------|----------|
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1812 | MAX5441AEUA+  | -65C TO +150C (Condition C) | 1000 | CYS | 80       | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1816 | MAX5431AEUB+  | -65C TO +150C (Condition C) | 1000 | CYS | 80       | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1821 | MAX3747AEUB+  | -65C TO +150C (Condition C) | 1000 | CYS | 80       | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1822 | MAX1744EUB/V+ | -65C TO +150C (Condition C) | 1000 | CYS | 80       | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1838 | MAX4003EUA+   | -65C TO +150C (Condition C) | 1000 | CYS | 80       | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1846 | MAX4477AUA/V+ | -65C TO +150C (Condition C) | 1000 | CYS | 100      | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1846 | MAX4477AUA/V+ | -65C TO +150C (Condition C) | 1000 | CYS | 100      | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1846 | MAX4477AUA/V+ | -65C TO +150C (Condition C) | 1000 | CYS | 100      | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1911 | MAX669EUB/V+  | -65C TO +150C (Condition C) | 1000 | CYS | 80       | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1911 | MAX4132EUA+   | -65C TO +150C (Condition C) | 1000 | CYS | 80       | 0        |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1912 | MAX4080TAUA+  | -65C TO +150C (Condition C) | 1000 | CYS | 80       | 0        |
| <b>Total:</b>                  |      |               |                             |      |     | <b>0</b> | <b>0</b> |

#### TEMPERATURE HUMIDITY BIAS

| DESCRIPTION     | DATE CODE | TEST VEHICLE  | CONDITION      | READPOINT | QUANTITY | FAILS    | FA NO    |
|-----------------|-----------|---------------|----------------|-----------|----------|----------|----------|
| BIASED MOISTURE | 1812      | MAX5441AEUA+  | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| BIASED MOISTURE | 1816      | MAX5431AEUB+  | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| BIASED MOISTURE | 1822      | MAX1744EUB/V+ | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| BIASED MOISTURE | 1846      | MAX4477AUA/V+ | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| BIASED MOISTURE | 1846      | MAX4477AUA/V+ | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| BIASED MOISTURE | 1846      | MAX4477AUA/V+ | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| MOISTURE SOAK   | 1911      | MAX669EUB/V+  | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| BIASED MOISTURE | 1911      | MAX4132EUA+   | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| BIASED MOISTURE | 1912      | MAX4080TAUA+  | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| <b>Total:</b>   |           |               |                |           |          | <b>0</b> | <b>0</b> |

#### UNBIASED MOISTURE RESISTANCE

| DESCRIPTION   | DATE CODE | TEST VEHICLE  | CONDITION      | READPOINT | QUANTITY | FAILS    | FA NO    |
|---------------|-----------|---------------|----------------|-----------|----------|----------|----------|
| MOISTURE SOAK | 1811      | MAX9933BGUA+  | 130C, 85% R.H. | 96        | HRS      | 50       | 0        |
| MOISTURE SOAK | 1846      | MAX4477AUA/V+ | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| MOISTURE SOAK | 1846      | MAX4477AUA/V+ | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| MOISTURE SOAK | 1846      | MAX4477AUA/V+ | 130C, 85% R.H. | 96        | HRS      | 80       | 0        |
| <b>Total:</b> |           |               |                |           |          | <b>0</b> | <b>0</b> |

**FAILURE RATE: MTTF (YRS): 196123 FITS: 0.6**