PRODUCT RELIABILITY REPORT
FOR

MAX17710

Maxim Integrated Products

4401 South Beltwood Parkway
Dallas, TX 75244-3292

Prepared by:

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Conclusion:
The following qualification successfully meets the quality and reliability standards required of all
Maxim products:

MAX17710

In addition, Maxim's continuous reliability monitor program ensures that all outgoing product will
continue to meet Maxim's quality and reliability standards. The current status of the reliability monitor
program can be viewed at http://www.maxim-ic.com/TechSupport/dsreliability.html.

Device Description:
A description of this device can be found in the product data sheet. You can find the product data

Reliability Derating:
The Arrhenius model will be used to determine the acceleration factor for failure mechanisms that
are temperature accelerated.

\[
AfT = \exp\left(\frac{(Ea/k)(1/Tu - 1/Ts)}{1/Tu - 1/Ts}\right) = \frac{tu}{ts}
\]

\(AfT = \) Acceleration factor due to Temperature
\(tu = \) Time at use temperature (e.g. 55°C)
\(ts = \) Time at stress temperature (e.g. 125°C)
\(k = \) Boltzmann's Constant (8.617 x 10^{-5} eV/°K)
\(Tu = \) Temperature at Use (°K)
\(Ts = \) Temperature at Stress (°K)
\(Ea = \) Activation Energy (e.g. 0.7 ev)

The activation energy of the failure mechanism is derived from either internal studies or industry
accepted standards, or activation energy of 0.7ev will be used whenever actual failure
mechanisms or their activation energies are unknown. All deratings will be done from the stress
ambient temperature to the use ambient temperature.

An exponential model will be used to determine the acceleration factor for failure mechanisms,
which are voltage accelerated.

\[
AfV = \exp(B(Vs - Vu))
\]

\(AfV = \) Acceleration factor due to Voltage
\(Vs = \) Stress Voltage (e.g. 7.0 volts)
\(Vu = \) Maximum Operating Voltage (e.g. 5.5 volts)
\(B = \) Constant related to failure mechanism type (e.g. 1.0, 2.4, 2.7, etc.)

The Constant, B, related to the failure mechanism is derived from either internal studies or industry
accepted standards, or a B of 1.0 will be used whenever actual failure mechanisms or their B are
unknown. All deratings will be done from the stress voltage to the maximum operating voltage.
Failure rate data from the operating life test is reported using a Chi-Squared statistical model at the
60% or 90% confidence level (Cf).

The failure rate, \(Fr\), is related to the acceleration during life test by:

\[
Fr = \frac{X}{(ts * AfV * AfT * N * 2)}
\]

\(X = \) Chi-Sq statistical upper limit
\(N = \) Life test sample size

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Failure Rates are reported in FITs (Failures in Time) or MTTF (Mean Time To Failure). The FIT rate is related to MTTF by:

\[ \text{MTTF} = \frac{1}{\text{Fr}} \]

NOTE: MTTF is frequently used interchangeably with MTBF.

The calculated failure rate for this device/process is:

<table>
<thead>
<tr>
<th>FAILURE RATE:</th>
<th>MTTF (YRS):</th>
<th>FITS:</th>
<th>FAILS:</th>
<th>DEVICE HOURS:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>29551</td>
<td>3.9</td>
<td>0</td>
<td>23719209</td>
</tr>
</tbody>
</table>

Only data from Operating Life or similar stresses are used for this calculation.

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

- \( \text{Cf}: 60\% \)
- \( \text{Ea}: 0.7 \)
- \( \text{B}: 0 \)
- \( \text{Tu}: 25 ^\circ \text{C} \)
- \( \text{Vu}: 5.5 \) Volts

The reliability data follows. At the start of this data is the device information. The next section is the detailed reliability data for each stress. The reliability data section includes the latest data available and may contain some generic data. **Bold** Product Number denotes specific product data.

### Device Information:
- **Process:** Maxim SA Fab S45
- **Passivation:** 15um BCB
- **Die Size:** 72 x 60
- **Number of Transistors:** 9937
- **Interconnect:** Aluminum / 0.5% Copper
- **Gate Oxide Thickness:** 140Å

### ESD HBM

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DATE CODE/PRODUCT/LOT</th>
<th>CONDITION</th>
<th>READPOIN</th>
<th>QTY</th>
<th>FAILS</th>
<th>FA#</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESD SENSITIVITY</td>
<td>1113 MAX17710</td>
<td>ZJ156745BC JESD22-A114 HBM 500 VOLTS</td>
<td>PUL’S</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>ESD SENSITIVITY</td>
<td>1113 MAX17710</td>
<td>ZJ156745BC JESD22-A114 HBM 1000 VOLTS</td>
<td>PUL’S</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>ESD SENSITIVITY</td>
<td>1113 MAX17710</td>
<td>ZJ156745BC JESD22-A114 HBM 1500 VOLTS</td>
<td>PUL’S</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>ESD SENSITIVITY</td>
<td>1113 MAX17710</td>
<td>ZJ156745BC JESD22-A114 HBM 2000 VOLTS</td>
<td>PUL’S</td>
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<td>0</td>
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</tr>
<tr>
<td>ESD SENSITIVITY</td>
<td>1113 MAX17710</td>
<td>ZJ156745BC JESD22-A114 HBM 2500 VOLTS</td>
<td>PUL’S</td>
<td>5</td>
<td>0</td>
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</tbody>
</table>

**Total:** 0

### LATCH-UP

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DATE CODE/PRODUCT/LOT</th>
<th>CONDITION</th>
<th>READPOIN</th>
<th>QTY</th>
<th>FAILS</th>
<th>FA#</th>
</tr>
</thead>
<tbody>
<tr>
<td>LATCH-UP I</td>
<td>1113 MAX17710</td>
<td>ZJ156745BC JESD78A, I-TEST 25C 250mA</td>
<td></td>
<td>6</td>
<td>0</td>
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<tr>
<td>LATCH-UP V</td>
<td>1113 MAX17710</td>
<td>ZJ156745BC JESD78A, V-SUPPLY TEST 25C</td>
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<td>6</td>
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<tr>
<td>LATCH-UP I</td>
<td>1113 MAX17710</td>
<td>ZJ156745BC JESD78A, I-TEST 25C 100mA</td>
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<td>6</td>
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</tr>
</tbody>
</table>

**Total:** 0

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<table>
<thead>
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<th>DESCRIPTION</th>
<th>DATE CODE/PRODUCT/LOT</th>
<th>CONDITION</th>
<th>READPOIN</th>
<th>QTY</th>
<th>FAILS</th>
<th>FA#</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0708 DS2731</td>
<td>XK664400AD 125C, 4.9V (PSA) &amp; 13.2V (PSB)</td>
<td>1000 HRS</td>
<td>45</td>
<td>0</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0812 DS8102</td>
<td>QJ880400AB 125C, 3.6 VOLTS</td>
<td>1000 HRS</td>
<td>45</td>
<td>0</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0816 DS4560</td>
<td>QD836692A 100C, 13.2V (PSB) &amp; 5.5V (PSA)</td>
<td>1000 HRS</td>
<td>45</td>
<td>0</td>
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</tr>
<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0819 DS2733</td>
<td>XJ881600BB 125C, 13.31V (PSB) &amp; 3.5V (PSA)</td>
<td>1000 HRS</td>
<td>45</td>
<td>0</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0835 DS8500</td>
<td>QJ982700AB 125C, 3.6 VOLTS</td>
<td>1000 HRS</td>
<td>45</td>
<td>0</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0943 MAX31190</td>
<td>WJ051035AB 125C, 3.6 VOLTS</td>
<td>192 HRS</td>
<td>45</td>
<td>0</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0950 MAX8990</td>
<td>EYGZCA004 135C, 5.0 V(PSA), 10.0V(PSB) &amp; -3.3V(PSC)</td>
<td>192 HRS</td>
<td>45</td>
<td>0</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
<td>1018 DS4560</td>
<td>WD054757A 100C, 13.2V (PSB) &amp; 5.5V (PSA)</td>
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<td>HIGH TEMP OP LIFE</td>
<td>1035 MAX34561</td>
<td>WS154453B 125C, 13.2V (PSB) &amp; 5.5V (PSA)</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
<td>1105 DS3920</td>
<td>ZJ163071AB 135C, 75V (V8)</td>
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<td>HIGH TEMP OP LIFE</td>
<td>1111 MAX31855</td>
<td>ZM163058B 125C, 3.6 VOLTS</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
<td>1113 MAX17710</td>
<td>ZJ156745BC 125C, 5.5 VOLTS</td>
<td>240 HRS</td>
<td>48</td>
<td>0</td>
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</tbody>
</table>

**Total:**

**FAILURE RATE:**

| FITS: | 3.9 |

**MTTF (YRS):**

| 29551 |

**DEVICE HOURS:**

| 237197209 |

**FAILS:**

| 0   |