PRODUCT RELIABILITY REPORT
FOR

MAX32620

Maxim Integrated

14460 Maxim Dr.
Dallas, TX 75244

Approved by:

Sokhom Chum
MTS, Reliability Engineering
Conclusion:
The following qualification successfully meets the quality and reliability standards required of all
Maxim Integrated products:

MAX32620

In addition, Maxim Integrated'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.maximintegrated.com/qa/reliability/monitor.

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.

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

- \(AfT\) = 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.

\[
AfV = \exp\left(\frac{B}{Vs - Vu}\right)
\]

- \(AfV\) = 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:

\[
Fr = X/(ts \cdot AfV \cdot AfT \cdot N \cdot 2)
\]

- \(X\) = Chi-Sq statistical upper limit
- \(N\) = Life test sample size
The calculated failure rate for this device/process is:

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

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

**NOTE:** MTTF is frequently used interchangeably with MTBF.

The calculated failure rate for this device/process is:

**FAILURE RATE:** 51617 FITS: 2.2

**DEVICE HOURS:** 414314450 FAILS: 0

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

- \( \text{Cf: } 60\% \)
- \( \text{Ea: } 0.7 \)
- \( \text{B: } 0 \)
- \( \text{Tu: } 25 \text{ °C} \)
- \( \text{Vu: } 3.6 \text{ Volts} \)

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:** TSMC 90nm Low Power, Embedded flash
- **Passivation:** SiO/SiN = 400nm/600nm
- **Die Size:** 154 x 154
- **Number of Transistors:** 17787494
- **Interconnect:** Aluminum / 0.5% Copper

### ESD HBM

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<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>
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<td>ESD SENSITIVITY</td>
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<td>Z4159935GC</td>
<td>PUL'S</td>
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### LATCH-UP

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<td>DESCRIPTION</td>
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**FAILURE RATE:**

**MTTF (YRS):** 51617  **FITS:** 2.2

**DEVICE HOURS:** 414314450  **FAILS:** 0