PRODUCT RELIABILITY REPORT
FOR

DS2480B, Rev B3

Maxim Integrated

14460 Maxim Dr.
Dallas, TX 75244

Approved by:

Don Lipps
Manager, Reliability Engineering
Conclusion:
The following qualification successfully meets the quality and reliability standards required of all
Maxim Integrated products:

DS2480B, Rev B3

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.

\[ \text{AfT} = \exp \left( \frac{\text{Ea}}{k} \right) \left( \frac{1}{T_u} - \frac{1}{T_s} \right) = \frac{t_u}{t_s} \]

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

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.

\[ \text{AfV} = \exp(B \cdot (V_s - V_u)) \]

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

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, \( F_r \), is related to the acceleration during life test by:

\[ F_r = \frac{X}{(t_s \cdot \text{AfV} \cdot \text{AfT} \cdot N \cdot 2)} \]
\( X = \text{Chi-Sq statistical upper limit} \)
\( N = \text{Life test sample size} \)

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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>DEVICE HOURS</th>
<th>FAILS:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>147937</td>
<td>0.8</td>
<td>1187447397</td>
<td>0</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:

- 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 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:** SA EC8, 0.8um BiCMOS, 2 Poly, 3 Metal, 5 inch Reticles, 8 inch Wafer.
- **Passivation:** TEOS Oxide-Nitride Passivation
- **Die Size:** 114 x 77
- **Number of Transistors:** 7000
- **Interconnect:** Aluminum / 0.5% Copper
- **Gate Oxide Thickness:** 175 Å

### OPERATING LIFE

<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>HIGH TEMP OP LIFE</td>
<td>0851 DS75</td>
<td>WJ943229R 125C, 5.5 VOLTS</td>
<td>1000 HRS</td>
<td>77</td>
<td>0</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0903 DS87C520</td>
<td>WK943232A 125C, 5.5 VOLTS</td>
<td>1000 HRS</td>
<td>77</td>
<td>0</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
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<td>WJ943230BA 125C, 5.5 VOLTS</td>
<td>1000 HRS</td>
<td>77</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0906 DS75</td>
<td>WJ945780B 125C, 5.5 VOLTS</td>
<td>1000 HRS</td>
<td>77</td>
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</tr>
<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0906 DS87C520</td>
<td>WK943228G 125C, 5.5 VOLTS</td>
<td>1000 HRS</td>
<td>77</td>
<td>0</td>
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</tr>
<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0907 DS32KHZS</td>
<td>WH943227P 125C, 5.5 VOLTS</td>
<td>1000 HRS</td>
<td>77</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>HIGH TEMP OP LIFE</td>
<td>0930 DS1302</td>
<td>WJ946666A 125C, 5.5 VOLTS</td>
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<td>HIGH TEMP OP LIFE</td>
<td>1004 DS75</td>
<td>FD051295AC 125C, 5.5 VOLTS</td>
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<tr>
<td>HIGH TEMP OP LIFE</td>
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<td>FD272216AE 125C, 5.5 VOLTS</td>
<td>1000 HRS</td>
<td>80</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

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| HIGH TEMP OP LIFE | 1146 | DS75 | WD273776A | 125C, 5.5 VOLTS | 1000 HRS | 77 | 0 |
| HIGH TEMP OP LIFE | 1225 | DS75 | FK277512AA | 125C, 5.5 VOLTS | 1000 HRS | 80 | 0 |
| HIGH TEMP OP LIFE | 1234 | DS75 | FK380548AF | 125C, 5.5 VOLTS | 1000 HRS | 80 | 0 |
| **Total:** | | | | | | | |

FAILURE RATE: 0.8

MTTF (YRS): 147937

FITS: 0.8

DEVICE HOURS: 1187447397

FAILS: 0

DS2480B passes ESD HBM +/-8KV.

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