



12/15/2011

**PRODUCT RELIABILITY REPORT  
FOR**

**DS1801**

**Maxim Integrated Products**

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Dallas, TX 75244-3292**

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**Conclusion:**

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

DS1801

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 sheet at [http://dbserv.maxim-ic.com/l\\_datasheet3.cfm](http://dbserv.maxim-ic.com/l_datasheet3.cfm).

**Reliability Derating:**

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

$$AfT = \exp((Ea/k) * (1/Tu - 1/Ts)) = tu/ts$$

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<sup>-5</sup> 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:

$$Fr = X / (ts * AfV * AfT * N * 2)$$

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

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

$$MTTF = 1/Fr$$

NOTE: MTTF is frequently used interchangeably with MTBF.

The calculated failure rate for this device/process is:

**FAILURE RATE:**                      **MTTF (YRS):**      **112493**      **FITS:**              **1.0**  
**DEVICE HOURS:**      **902950469**      **FAILS:**              **0**

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: 80 x 104  
 Number of Transistors: 9646  
 Interconnect: Aluminum / 0.5% Copper  
 Gate Oxide Thickness: 175 Å

**ESD CDM**

DESCRIPTION	DATE CODE/PRODUCT/LOT	CONDITION	READPOIN	QTY	FAILS	FA#
ESD SENSITIVITY	1138 <b>DS1801</b> FJ246208AB	JESD22-C101 CDM 250 VOLTS	3 PUL'S	5	0	
ESD SENSITIVITY	1138 <b>DS1801</b> FJ246208AB	JESD22-C101 CDM 500 VOLTS	6 PUL'S	5	0	
ESD SENSITIVITY	1138 <b>DS1801</b> FJ246208AB	JESD22-C101 CDM 750 VOLTS	9 PUL'S	5	1	No FA
<b>Total:</b>					<b>1</b>	

**ESD HBM**

DESCRIPTION	DATE CODE/PRODUCT/LOT	CONDITION	READPOIN	QTY	FAILS	FA#
ESD SENSITIVITY	1138 <b>DS1801</b> FJ246208AB	JESD22-A114 HBM 500 VOLTS	1 PUL'S	5	0	
ESD SENSITIVITY	1138 <b>DS1801</b> FJ246208AB	JESD22-A114 HBM 1000 VOLTS	1 PUL'S	5	0	
ESD SENSITIVITY	1138 <b>DS1801</b> FJ246208AB	JESD22-A114 HBM 1500 VOLTS	1 PUL'S	5	0	
ESD SENSITIVITY	1138 <b>DS1801</b> FJ246208AB	JESD22-A114 HBM 2000 VOLTS	1 PUL'S	5	0	
ESD SENSITIVITY	1138 <b>DS1801</b> FJ246208AB	JESD22-A114 HBM 2500 VOLTS	1 PUL'S	5	1	No FA
<b>Total:</b>					<b>1</b>	

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**OPERATING LIFE**

DESCRIPTION	DATE CODE/PRODUCT/LOT	CONDITION	READPOIN	QTY	FAILS	FA#
HIGH TEMP OP LIFE	0851 DS75	WJ943229R 125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0903 DS87C520	WK943232A 125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0905 DS75	WJ943230BA 125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0906 DS75	WJ945780B 125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0906 DS87C520	WK943228G 125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0907 DS32KHZS	WH943227P 125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0930 DS1302	WJ946666A 125C, 5.5 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	1004 DS75	FD051295AC 125C, 5.5 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	1016 DS75	FD054294AB 125C, 5.5 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	1022 DS75	FJ047086AB 125C, 5.5 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	1044 DS75	FJ160750AC 125C, 5.5 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	1051 DS75	FD162044AC 125C, 5.5 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	1138 DS75	FD272216AE 125C, 5.5 VOLTS	192 HRS	80	0	

**Total: 0**

**FAILURE RATE: MTTF (YRS): 112493 FITS: 1.0**  
**DEVICE HOURS: 902950469 FAILS: 0**