

RELIABILITY REPORT  
FOR

**DS1807, Rev A1**

**Dallas Semiconductor**

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**Conclusion:**

The following qualification successfully meets the quality and reliability standards required of all Dallas Semiconductor products and processes:

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In addition, Dallas Semiconductor'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): 102463**                      **FITS: 1.1**

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.

**Device Information:**

Process: 1P, 1M, 0.8um, PdpIDiode, Low Vts , N+ESDII, WJ BPSG  
 Passivation: Passivation w/Nov TEOS Oxide-Nitride  
 Die Size: 105 x 80  
 Number of Transistors: 0  
 Interconnect: Aluminum / 1% Silicon / 0.5% Copper  
 Gate Oxide Thickness: 175 Å

**OPERATING LIFE**

DESCRIPTION	DATE	CODE	CONDITION	READPOINT	QTY	FAILS	FA#
HIGH VOLTAGE LIFE	0105		125C, 7.0 VOLTS	1000 HRS	77	0	
HIGH VOLTAGE LIFE	0105		125C, 7.0 VOLTS	1000 HRS	80	0	
HIGH VOLTAGE LIFE	0111		125C, 7.0 VOLTS	1000 HRS	79	0	
HIGH VOLTAGE LIFE	0147		125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH VOLTAGE LIFE	0210		125C, 7.0 VOLTS	1000 HRS	78	0	
HIGH VOLTAGE LIFE	0218		125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH VOLTAGE LIFE	0222		125C, 7.0 VOLTS	1000 HRS	78	0	
HIGH VOLTAGE LIFE	0252		125C, 7.0 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0310		125C, 5.5 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0327		125C, 5.5 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0403		125C, 5.5 VOLTS	1000 HRS	80	0	
<b>Total:</b>						<b>0</b>	

**TEMPERATURE CYCLE**

DESCRIPTION	DATE	CODE	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	0105		-55C TO 125C	1000 CYS	40	1	No FA
TEMP CYCLE	0105		-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0111		-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0222		-55C TO 125C	1000 CYS	77	0	

TEMP CYCLE	0252	-55C TO 125C	1000 CYS	40	0
TEMP CYCLE	0310	-55C TO 125C	1000 CYS	40	0
TEMP CYCLE	0327	-55C TO 125C	1000 CYS	40	0
TEMP CYCLE	0403	-55C TO 125C	1000 CYS	40	0
TEMP CYCLE	0429	-55C TO 125C	500 CYS	77	0
			<b>Total:</b>		<b>1</b>

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**TEMPERATURE HUMIDITY BIAS**

DESCRIPTION	DATE	CODE	CONDITION	READPOINT	QTY	FAILS	FA#
HAST	0105		130C, 85%R.H.,5.5V	88 HRS	77	0	
HAST	0105		130C, 85%R.H.,5.5V	100 HRS	77	1	No FA
HAST	0111		130C, 85%R.H.,5.5V	96 HRS	77	0	
BIASED MOISTURE	0222		85/85, 5.5 VOLTS	959 HRS	78	0	
HAST	0252		130C, 85%R.H.,5.5V	96 HRS	77	0	
HAST	0310		130C, 85%R.H.,5.5V	96 HRS	77	0	
HAST	0327		130C, 85%R.H.,5.5V	96 HRS	77	0	
				<b>Total:</b>		<b>1</b>	

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**UNBIASED MOISTURE RESISTANCE**

DESCRIPTION	DATE	CODE	CONDITION	READPOINT	QTY	FAILS	FA#
AUTOCLAVE	0105		121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0105		121C, 2 ATM STEAM, UNBIASED	96 HRS	39	0	
AUTOCLAVE	0111		121C, 2 ATM STEAM, UNBIASED	168 HRS	40	0	
AUTOCLAVE	0222		121C, 2 ATM STEAM, UNBIASED	168 HRS	76	0	
AUTOCLAVE	0252		121C, 2 ATM STEAM, UNBIASED	168 HRS	40	0	
AUTOCLAVE	0310		121C, 2 ATM STEAM, UNBIASED	168 HRS	40	0	
AUTOCLAVE	0327		121C, 2 ATM STEAM, UNBIASED	168 HRS	40	0	
AUTOCLAVE	0403		121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0429		121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
				<b>Total:</b>		<b>0</b>	

**FAILURE RATE:                    MTTF (YRS): 102463                    FITS: 1.1**