



2/1/2006

**PRODUCT RELIABILITY REPORT
FOR**

DS1821, Rev A3

Dallas Semiconductor

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Conclusion

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

DS1821, Rev A3

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.

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 10⁻⁵ 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:

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

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:

$$\text{MTTF} = 1/\text{Fr}$$

NOTE: MTTF is frequently used interchangeably with MTBF.

The calculated failure rate for this device/process is:

FAILURE RATE: MTTF (YRS): 86532 FITS: 1.3

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

Cf: 60% Ea: 0.7 B: 0 Tu: 25 °C Vu: 5.5 Volt

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. "*" after DATE CODE denotes specific product

Device Information:

Process: D8W-1P1M,HPVt,E2 LOCOS:GOI
 Passivation: Passivation w/Nov TEOS Oxide-Nitride
 Die Size: 115 x 77
 Number of Transistors: 8500
 Interconnect: Aluminum / 1% Silicon / 0.5% Copper
 Gate Oxide Thickness: 175 Å

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE COD	CONDITION	READPOINT	QTY	FAILS	FA#
ESD SENSITIVITY	0548 *	EOS/ESD S5.1 HBM 500 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0548 *	EOS/ESD S5.1 HBM 1000 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0548 *	EOS/ESD S5.1 HBM 2000 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0548 *	EOS/ESD S5.1 HBM 4000 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0548 *	EOS/ESD S5.1 HBM 8000 VOLTS	1 PUL'S	3	3	No FA
LATCH-UP	0548 *	JESD78, I-TEST 125C	2 DYS	6	0	
LATCH-UP	0548 *	JESD78, Vsupply TEST 125C	2 DYS	6	0	
Total:					3	

OPERATING LIFE

DESCRIPTION	DATE COD	CONDITION	READPOINT	QTY	FAILS	FA#
INFANT LIFE	9741	125C, 7.0 VOLTS	48 HRS	237	0	
HIGH VOLTAGE LIFE	9741	125C, 7.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	9746	125C, 7.0 VOLTS	48 HRS	230	0	
HIGH VOLTAGE LIFE	9746	125C, 7.0 VOLTS	1000 HRS	77	0	
HIGH VOLTAGE LIFE	0111	125C, 7.0 VOLTS	1000 HRS	80	0	
HIGH VOLTAGE LIFE	0147	125C, 7.0 VOLTS	1000 HRS	80	0	

HIGH VOLTAGE LIFE	0147	125C, 7.0 VOLTS	1000 HRS	80	0
HIGH VOLTAGE LIFE	0249	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	0334	125C, 5.5 VOLTS	1000 HRS	80	0
HIGH TEMP OP LIFE	0350	125C, 5.5 VOLTS	1000 HRS	80	0
Total:				0	0

WRITE CYCLE STRESS

DESCRIPTION	DATE COD	CONDITION	READPOINT	QTY	FAILS	FA#
WRITE CYCLE STRESS (KCYS)	0111	85 C, 7.0 VOLTS	50 KCYS	50	0	
WRITE CYCLE STRESS (KCYS)	0249	85 C, 7.0 VOLTS	50 KCYS	50	0	
WRITE CYCLE STRESS (KCYS)	0310	85 C, 5.5 VOLTS	50 KCYS	50	0	
WRITE CYCLE STRESS (KCYS)	0334	85 C, 5.5 VOLTS	50 KCYS	50	0	
WRITE CYCLE STRESS (KCYS)	0350	85 C, 5.5 VOLTS	50 KCYS	50	0	
Total:				0	0	

FAILURE RATE:

MTTF (YRS): 86532

FITS: 1.3