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RELIABILITY REPORT
FOR

DS2409, Rev A1

Dallas Semiconductor

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Prepared by:

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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.

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:

MTTF = 1/Fr

NOTE: MTTF is frequently used interchangeably with MTBF.

The calculated failure rate for this device/process is:

FAILURE RATE: MTTF (YRS): 116320 FITS: 1.0

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. A 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, 0.6um, Pd, Ti/TiN M1 , WJ BPSG ,
Passivation:	Laser/TEOS Ox - Pass/Nit - Gen.LaserPrb
Die Size:	76 x 75
Number of Transistors:	3600
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	150 Å

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
INFANT LIFE	0007	125C, 6.0 VOLTS	48 HRS	234	0	
HIGH VOLTAGE LIFE	0007	125C, 6.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	0022	125C, 6.0 VOLTS	48 HRS	234	0	
HIGH VOLTAGE LIFE	0022	125C, 6.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	0034	125C, 6.0 VOLTS	48 HRS	234	0	
HIGH VOLTAGE LIFE	0034	125C, 6.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	0035	125C, 6.0 VOLTS	48 HRS	234	0	
HIGH VOLTAGE LIFE	0035	125C, 6.0 VOLTS	1000 HRS	77	0	
HIGH VOLTAGE LIFE	0130	125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH VOLTAGE LIFE	0207	125C, 6.0 VOLTS	1000 HRS	77	0	
HIGH VOLTAGE LIFE	0245	125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0323	125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0331	125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0345	125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0403	125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0408	125C, 6.0 VOLTS	1000 HRS	80	0	
			Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	0007	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0022	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0034	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0035	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0130	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0207	-55C TO 125C	1000 CYS	77	0	
TEMP CYCLE	0245	-55C TO 125C	1000 CYS	45	1	30011724
TEMP CYCLE	0323	-55C TO 125C	1000 CYS	45	0	
TEMP CYCLE	0331	-55C TO 125C	1000 CYS	45	0	
TEMP CYCLE	0345	-55C TO 125C	1000 CYS	45	0	
TEMP CYCLE	0403	-55C TO 125C	1000 CYS	45	0	
TEMP CYCLE	0408	-55C TO 125C	1000 CYS	45	0	
			Total:		**1**	

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
HAST	0007	130C, 85%R.H.,5.5V	100 HRS	77	0	
HAST	0022	120C, 85%R.H.,5.5V	100 HRS	77	0	
HAST	0034	130C, 85%R.H.,5.5V	100 HRS	77	0	
HAST	0035	130C, 85%R.H.,5.5V	100 HRS	77	0	
HAST	0130	130C, 85%R.H.,5.5V	100 HRS	77	0	
HAST	0207	130C, 85%R.H.,5.5V	100 HRS	77	0	
HAST	0245	130C, 85%R.H.,5.5V	96 HRS	77	0	
HAST	0323	130C, 85%R.H.,5.5V	96 HRS	77	0	
HAST	0331	130C, 85%R.H.,5.5V	96 HRS	77	0	
HAST	0345	130C, 85%R.H.,5.5V	96 HRS	77	0	
			Total:		**0**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
AUTOCLAVE	0007	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0022	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0034	121C, 2 ATM STEAM, UNBIASED	96 HRS	39	0	
AUTOCLAVE	0035	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0130	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0207	121C, 2 ATM STEAM, UNBIASED	96 HRS	77	0	
AUTOCLAVE	0245	121C, 2 ATM STEAM, UNBIASED	168 HRS	45	0	

AUTOCLAVE	0323	121C, 2 ATM STEAM, UNBIASED	168	HRS	45	0
AUTOCLAVE	0331	121C, 2 ATM STEAM, UNBIASED	168	HRS	45	0
AUTOCLAVE	0345	121C, 2 ATM STEAM, UNBIASED	168	HRS	45	0
AUTOCLAVE	0403	121C, 2 ATM STEAM, UNBIASED	168	HRS	45	0
AUTOCLAVE	0408	121C, 2 ATM STEAM, UNBIASED	168	HRS	45	0
				Total:		**0**

FAILURE RATE: **MTTF (YRS): 116320** **FITS: 1.0**