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PRODUCT RELIABILITY REPORT
FOR

DS1394, Rev A2 (3.3V)

Dallas Semiconductor

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Conclusion:

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

DS1394, Rev A2 (3.3V)

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): 56461 FITS: 2.0

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

Cf: 60% Ea: 0.7 B: 0 Tu: 25 °C Vu: 3.3 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. "*" after DATE CODE denotes specific product data.

Device Information:

Process:	D6H-2P2M,HPVt,TCN1 ALOCOS:GOI
Passivation:	Passivation w/Nov TEOS Oxide-Nitride
Die Size:	62 x 87
Number of Transistors:	11525
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	150 Å

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE CODE		CONDITION	READPOINT		QTY	FAILS	FA#
LATCH-UP	0417	*	JESD78, I-TEST 85C	2	DYS	6	0	
ESD SENSITIVITY	0421	*	EOS/ESD S5.1 HBM 500 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0421	*	EOS/ESD S5.1 HBM 1000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0421	*	EOS/ESD S5.1 HBM 2000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0421	*	EOS/ESD S5.1 HBM 4000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0421	*	EOS/ESD S5.1 HBM 8000 VOLTS	1	PUL'S	3	3	No FA
LATCH-UP	0421	*	JESD78, I-TEST 25C	2	DYS	6	0	
LATCH-UP	0421	*	JESD78, Vsupply TEST 125C	2	DYS	6	0	
LATCH-UP	0421	*	JESD78, I-TEST 85C	2	DYS	6	0	
					Total:		**3**	

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QTY	FAILS	FA#
HIGH VOLTAGE LIFE	0310	125C, 6.0 VOLTS	1000	HRS	45	0	
HIGH VOLTAGE LIFE	0310	125C, 6.0 VOLTS	1000	HRS	45	0	
HIGH TEMP OP LIFE	0318	125C, 5.5 VOLTS	1000	HRS	77	0	
HIGH TEMP OP LIFE	0403	125C, 3.6 VOLTS	1000	HRS	45	0	
HIGH TEMP OP LIFE	0403	125C, 5.5 VOLTS	1000	HRS	77	0	

HIGH TEMP OP LIFE	0421		125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0421	*	125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0422		125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0424		125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0434		85 C, 3.3 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0440		85 C, 3.3 VOLTS	500	HRS	45	0
HIGH TEMP OP LIFE	0440		85 C, 3.3 VOLTS	1000	HRS	45	0
					Total:		**0**

FAILURE RATE: **MTTF (YRS): 56461** **FITS: 2.0**

The DS1390 1.8V and 3.0V devices pass Latchup I-Test at 85C. The DS1390 3.3V device passes Latchup I-Test at 25C and is marginal at 85C.