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RELIABILITY REPORT
FOR

DS1846D, 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.

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): 9400 FITS: 12.1

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. A the start of this data is the device information. This is a description of the device either used as a reliability test vehicle for a process / assembly qualification / monitor or a device used as part of a product qualification / monitor. Following this is the assembly information. This section includes a description of the assembly vehicle used to generate this reliability data for both qualifications and monitors. The next section is the detailed reliability data for each stress found in the qualification / monitor. If there are additional processes or assemblies used as part of this report, a description of each will follow which includes the respective reliability data for that process/ assembly. The reliability data section includes the latest data available.

Device Information:

Device:	DS1846
Process:	1P, 2M, 0.6um, E2, DSD w/LVWells,HP Vts, WJ BPSG
Passivation:	Passivation w/Nov TEOS Oxide-Nitride
Die Size:	114 x 87
Number of Transistors:	15000
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	150 Å

Assembly Information:

Qualification Vehicle:	DS1846
Assembly Site:	ATP (Amkor, PI)
Pin Count:	20
Package Type:	TSSOP
Body Size:	4.4x0.9
Mold Compound:	Sumitomo 7351T
Lead Frame:	Stamped Copper C7025
Lead Finsh:	SnPb Plate
Die Attach:	84-1 LMISR4 Epoxy Silverfilled Ablebond
Bond Wire / Size:	Au / 1.0 mil
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	Level 1
Date Code Range:	0204 to 0204

EEPROM WRITE/ERASE ENDURANCE AND DATA RETENTION

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
WRITE CYCLE STRESS	0204	85 C, 6.0 VOLTS	30	KCYCLS	77	1

STORAGE LIFE	0204	150C	1000	HOURS	76	0
				Total:		**1**

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
ESD SENSITIVITY	0204	EOS/ESD S5.1 HBM 500 VOLTS	2	PULSES	3	0
ESD SENSITIVITY	0204	EOS/ESD S5.1 HBM 1000 VOLTS	2	PULSES	3	0
ESD SENSITIVITY	0204	EOS/ESD S5.1 HBM 2000 VOLTS	2	PULSES	3	0
ESD SENSITIVITY	0204	EOS/ESD S5.1 HBM 4000 VOLTS	2	PULSES	3	3
ESD SENSITIVITY	0204	EOS/ESD S5.1 HBM 8000 VOLTS	2	PULSES	3	3
LATCH-UP	0204	JESD78, I-TEST 125C			3	0
LATCH-UP	0204	JESD78, Vsupply TEST 125C			3	0
				Total:		**6**

HIGH TEMPERATURE OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
HIGH VOLTAGE LIFE	0204	125C, 6.0 VOLTS	1000	HOURS	80	0
				Total:		**0**

FAILURE RATE: MTTF (YRS): 9400 FITS: 12.1

Write cycle failure is a gate oxide defect on the sense transistor of the failing cell.