DALLAS SEMICONDUCTOR MAXIM

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RELIABILITY REPORT
FOR

DS1073, Rev A1, DS1073, 8 SOIC 150, lead free, w/Q3-6646 die coat, ATP

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:

DS1073, Rev A1, DS1073, 8 SOIC 150, lead free, w/Q3-6646 die coat, ATP

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 the device used in this qualification 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/assembly is:

FAILURE RATE: **MTTF (YRS): 27143** **FITS: 4.2**

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. Some of this data may be generic with other products.

Device Information:

Device:	DS1073
Process:	D8W-1P1M,HPVt,E2,TCN0 LOCOS:GOI
Passivation:	Passivation w/Nov TEOS Oxide-Nitride
Die Size:	75 x 106
Number of Transistors:	0
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	175 Å

Assembly Information:

Qualification Vehicle:	DS1073
Assembly Site:	ATP (Amkor, PI)
Pin Count:	8
Package Type:	SOIC (Lead Free)
Body Size:	150x1.4
Mold Compound:	Sumitomo 6600H w/Q3-6646 Die Coat
Lead Frame:	Stamped Copper CDA194
Lead Finsh:	Sn Plate 100% Matte
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 4
Date Code Range:	0412 to 0413

OPERATING LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
HIGH TEMP OP LIFE	0413	125C, 3.5 VOLTS	500 HRS	77	0	
		125C, 3.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0413	125C, 3.5 VOLTS	500 HRS	77	0	
		125C, 3.5 VOLTS	1000 HRS	77	0	

					Total:	0	

PACKAGE TESTS

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
SOLDERABILITY	0413	JESD22-B102	3	DYS	3	3	No FA
					Total:	3	

PRECONDITIONING LEVEL 4

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
STORAGE LIFE	0412	125C	24	HRS	385		
MOISTURE SOAK		30C/60% R.H.	96	HRS	385		
CONVECTION REFLOW		260 C	3	PASS	385	0	
STORAGE LIFE	0413	125C	24	HRS	385		
MOISTURE SOAK		30C/60% R.H.	96	HRS	385		
CONVECTION REFLOW		260 C	3	PASS	385	0	
STORAGE LIFE	0413	125C	24	HRS	385		
MOISTURE SOAK		30C/60% R.H.	96	HRS	385		
CONVECTION REFLOW		260 C	3	PASS	385	0	
					Total:	0	

STORAGE LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
STORAGE LIFE	0413	150C	500	HRS	77	0	
		150C	1000	HRS	77	0	
					Total:	0	

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
HAST	0413	130C, 85%R.H.,3.5V	156	HRS	45	0	
HAST	0413	130C, 85%R.H.,3.5V	156	HRS	45	0	
					Total:	0	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
AUTOCLAVE	0412	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0	
AUTOCLAVE	0413	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0	
					Total:	0	

FAILURE RATE: MTTF (YRS): 27143 FITS: 4.2