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RELIABILITY REPORT
FOR

DS2151, Rev B5

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:

DS2151, Rev B5

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): 18357 FITS: 6

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:	DS2151
Process:	2P, 1M, 0.8um, Ndepl Cap, P2 Capacitor , N+ESDII, WJ BP
Passivation:	Laser/TEOS Ox - Pass/Nit - Gen.LaserPrb
Die Size:	241 x 243
Number of Transistors:	60000
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	175 Å

Assembly Information:

Assembly Site:	ATK (Amkor, K)
Pin Count:	44
Package Type:	PLCC
Body Size:	650x650x3.87
Mold Compound:	Nitto MP8000C
Lead Frame:	Etched copper
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 3
Date Code Range:	9610 to 9745

HIGH TEMPERATURE OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
INFANT LIFE	9625	125C, 7.0 VOLTS	48	HOURS	329	0
HIGH VOLTAGE LIFE	9625	125C, 7.0 VOLTS	1000	HOURS	150	0

HIGH VOLTAGE LIFE	9745	125C, 6.0 VOLTS	1000	HOURS	119	1
HIGH VOLTAGE LIFE	9745	125C, 7.0 VOLTS	1000	HOURS	60	0
				Total:		**1**

MOISTURE SENSITIVITY LEVEL 4

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
ULTRASOUND	9610	J-STD-020			8	0
STORAGE LIFE		125C	26	HOURS	8	
MOISTURE SOAK		30C/60% R.H.	194	HOURS	8	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	8	
EXTERNAL VISUAL		MIL-STD-883-2009			8	0
PRECONDITION U/S		J-STD-020			8	0
ULTRASOUND	9709	J-STD-020			8	
STORAGE LIFE		125C	26	HOURS	8	
MOISTURE SOAK		30C/60% R.H.	170	HOURS	8	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	8	
EXTERNAL VISUAL		MIL-STD-883-2009			8	0
PRECONDITION U/S		J-STD-020			8	0
				Total:		**0**

PRECONDITIONING LEVEL 4

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
STORAGE LIFE	9610	125C	24	HOURS	352	
MOISTURE SOAK		30C/60% R.H.	168	HOURS	352	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	352	0
STORAGE LIFE	9709	125C	24	HOURS	298	
MOISTURE SOAK		30C/60% R.H.	168	HOURS	298	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	298	0
				Total:		**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
TEMP CYCLE	9610	-55C TO 125C	1000	CYCLES	73	0
TEMP CYCLE	9709	-55C TO 125C	1000	CYCLES	77	0
				Total:		**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
AUTOCLAVE	9610	121C, 2 ATM STEAM, UNBIASED	168	HOURS	45	0
AUTOCLAVE	9625	121C, 2 ATM STEAM, UNBIASED	168	HOURS	100	0
AUTOCLAVE	9709	121C, 2 ATM STEAM, UNBIASED	168	HOURS	45	0
				Total:		**0**

FAILURE RATE: **MTTF (YRS): 18357** **FITS: 6**