DALLAS SEMICONDUCTOR MAXIM

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RELIABILITY REPORT
FOR

DS1210, Rev C1

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:

DS1210, Rev C1

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): 51770 FITS: 2.2

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.

Device Information:

Device:	DS1210
Process:	1P, 1M, 3.0um, POCl3 Reflow , WJ BPSG ,
Passivation:	Passivation w/Nov TEOS Oxide-Nitride
Die Size:	98 x 130
Number of Transistors:	1301
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	500 Å

Assembly Information:

Qualification Vehicle:	DS1210
Assembly Site:	ATK (Amkor, K)
Pin Count:	16
Package Type:	SOIC
Body Size:	300x2.3
Mold Compound:	Sumitomo 6300H
Lead Frame:	Stamped Copper CDA194
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:	9623 to 9813

HIGH TEMPERATURE OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
INFANT LIFE	9623	125C, 7.0 VOLTS	48	HRS	231	0
HIGH VOLTAGE LIFE	9623	125C, 7.0 VOLTS	1000	HRS	77	0
INFANT LIFE	9643	125C, 7.0 VOLTS	48	HRS	231	0

HIGH VOLTAGE LIFE	9643	125C, 7.0 VOLTS	1000	HRS	77	0
INFANT LIFE	9647	125C, 7.0 VOLTS	48	HRS	229	0
HIGH VOLTAGE LIFE	9647	125C, 7.0 VOLTS	1000	HRS	77	0
INFANT LIFE	9811	125C, 7.0 VOLTS	48	HRS	233	0
HIGH VOLTAGE LIFE	9811	125C, 7.0 VOLTS	1000	HRS	77	0
INFANT LIFE	9813	125C, 7.0 VOLTS	48	HRS	234	0
HIGH VOLTAGE LIFE	9813	125C, 7.0 VOLTS	1000	HRS	77	0
				Total:		**0**

PRECONDITIONING

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
ULTRASOUND	9623	J-STD-020	1	DYS	2	0
SOLDER HEAT	9623	HTC VAPOR PHASE	1	PASS	233	0
PRECONDITION U/S	9623	J-STD-020	1	DYS	2	0
ULTRASOUND	9643	J-STD-020	1	DYS	4	0
SOLDER HEAT	9643	HTC VAPOR PHASE	1	PASS	235	0
PRECONDITION U/S	9643	J-STD-020	1	DYS	4	0
ULTRASOUND	9647	J-STD-020	1	DYS	4	0
SOLDER HEAT	9647	HTC VAPOR PHASE	1	PASS	233	0
PRECONDITION U/S	9647	J-STD-020	1	DYS	4	0
				Total:		**0**

PRECONDITIONING LEVEL 1

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
ULTRASOUND	9811	J-STD-020	1	DYS	4	0
STORAGE LIFE	9811	125C	24	HRS	238	
MOISTURE SOAK		85 C/85% R.H.	168	HRS	238	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	238	0
PRECONDITION U/S	9811	J-STD-020	1	DYS	4	0
ULTRASOUND	9813	J-STD-020	1	DYS	4	0
STORAGE LIFE	9813	125C	24	HRS	238	
MOISTURE SOAK		85 C/85% R.H.	168	HRS	238	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	238	0
PRECONDITION U/S	9813	J-STD-020	1	DYS	4	0
				Total:		**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
TEMP CYCLE	9623	-55C TO 125C	1000	CYS	39	0
TEMP CYCLE	9643	-55C TO 125C	1000	CYS	39	0
TEMP CYCLE	9647	-55C TO 125C	1000	CYS	39	0
TEMP CYCLE	9811	-55C TO 125C	1000	CYS	38	0

TEMP CYCLE	9813	-55C TO 125C	1000	CYS	40	0
				Total:		**0**

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
BIASED MOISTURE	9623	85/85, 5.5 VOLTS	959	HRS	77	0
BIASED MOISTURE	9643	85/85, 5.5 VOLTS	959	HRS	77	0
BIASED MOISTURE	9647	85/85, 5.5 VOLTS	959	HRS	75	0
BIASED MOISTURE	9811	85/85, 5.5 VOLTS	959	HRS	77	0
BIASED MOISTURE	9813	85/85, 5.5 VOLTS	959	HRS	77	0
				Total:		**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
AUTOCLAVE	9623	121C, 2 ATM STEAM, UNBIASED	96	HRS	38	0
AUTOCLAVE	9643	121C, 2 ATM STEAM, UNBIASED	96	HRS	38	0
AUTOCLAVE	9647	121C, 2 ATM STEAM, UNBIASED	96	HRS	38	0
AUTOCLAVE	9811	121C, 2 ATM STEAM, UNBIASED	96	HRS	38	0
AUTOCLAVE	9813	121C, 2 ATM STEAM, UNBIASED	96	HRS	40	0
				Total:		**0**

FAILURE RATE: **MTTF (YRS): 51770** **FITS: 2.2**