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RELIABILITY REPORT
FOR

DS21372, Rev A2

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 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): 19907 FITS: 5.7

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:	DS2172
Process:	1P, 3M, 0.8um, HP Vts , N+ESDII, WJ BPSG,
Passivation:	Passivation w/Nov TEOS Oxide-Nitride
Die Size:	118 x 125
Number of Transistors:	21000
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	175 Å

Assembly Information:

Qualification Vehicle:	DS2172
Assembly Site:	ATK (Amkor, K)
Pin Count:	32
Package Type:	TQFP
Body Size:	7x7x1
Mold Compound:	Sumitomo 7320CR
Lead Frame:	C18045 w/Ag Spot
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:	9526 to 9828

MOISTURE SENSITIVITY LEVEL 4

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QTY	FAILS	FA#
PRECONDITION U/S	9526	J-STD-020	175	DYS	8	0	
ULTRASOUND		J-STD-020	175	DYS	8	0	
STORAGE LIFE		125C	24	HRS	8		
MOISTURE SOAK		30C/60% R.H.	144	HRS	8		
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	8	0	

EXTERNAL VISUAL	9526	MIL-STD-883-2009	174	DYS	8	0
PRECONDITION U/S	9538	J-STD-020	175	DYS	8	0
ULTRASOUND		J-STD-020	175	DYS	8	0
STORAGE LIFE		125C	24	HRS	8	
MOISTURE SOAK		30C/60% R.H.	144	HRS	8	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	8	0
EXTERNAL VISUAL		MIL-STD-883-2009	174	DYS	8	0
				Total:		**0**

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QTY	FAILS	FA#
INFANT LIFE	9526	125C, 7.0 VOLTS	48	HRS	270	0	
HIGH VOLTAGE LIFE	9526	125C, 7.0 VOLTS	1000	HRS	116	0	
INFANT LIFE	9638	125C, 7.0 VOLTS	48	HRS	270	0	
HIGH VOLTAGE LIFE	9638	125C, 7.0 VOLTS	1000	HRS	116	1	No FA
HIGH VOLTAGE LIFE	9828	125C, 7.0 VOLTS	1000	HRS	116	0	
				Total:		**1**	

POOR MAN'S HAST

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QTY	FAILS	FA#
AUTOCLAVE	9526	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0	
BIASED BAKE		25 C, 5.5 VOLTS	336	HRS	77	0	
HAST, NO BIAS	9638	120C, 85% R.H.	200	HRS	69	0	
BIASED BAKE		25 C, 5.5 VOLTS	368	HRS	69	0	
				Total:		**0**	

PRECONDITIONING LEVEL 4

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QTY	FAILS	FA#
STORAGE LIFE	9526	125C	24	HRS	270		
MOISTURE SOAK		30C/60% R.H.	144	HRS	270		
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	270	0	
				Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QTY	FAILS	FA#
TEMP CYCLE	9526	-55C TO 125C	1000	CYS	77	0	
TEMP CYCLE	9638	-55C TO 125C	1000	CYS	75	0	
TEMP CYCLE	9828	-55C TO 125C	1000	CYS	77	0	
				Total:		**0**	

FAILURE RATE: **MTTF (YRS): 19907** **FITS: 5.7**