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RELIABILITY REPORT
FOR

DS2153, A7

Dallas Semiconductor

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Prepared by:

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Conclusion:

The following qualification successfully meets the quality and reliability standards required of all Dallas Semiconductor products and processes:

DS2153, A7

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): 82326 FITS: 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:	DS2153
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 263
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:	9730 to 9901

HIGH TEMPERATURE OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
INFANT LIFE	9730	125C, 6.0 VOLTS	48	HOURS	233	0
HIGH VOLTAGE LIFE	9730	125C, 6.0 VOLTS	1000	HOURS	77	0

INFANT LIFE	9734	125C, 6.0 VOLTS	48	HOURS	237	0
HIGH VOLTAGE LIFE	9734	125C, 7.0 VOLTS	1000	HOURS	77	0
INFANT LIFE	9740	125C, 6.0 VOLTS	48	HOURS	236	0
HIGH VOLTAGE LIFE	9740	125C, 7.0 VOLTS	1000	HOURS	76	0
INFANT LIFE	9749	125C, 6.0 VOLTS	48	HOURS	234	0
HIGH VOLTAGE LIFE	9749	125C, 6.0 VOLTS	1000	HOURS	77	0
INFANT LIFE	9833	125C, 6.0 VOLTS	48	HOURS	237	0
HIGH VOLTAGE LIFE	9833	125C, 6.0 VOLTS	1000	HOURS	77	0
				Total:		**0**

PRECONDITIONING LEVEL 4

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
ULTRASOUND	9730	J-STD-020			4	0
STORAGE LIFE	9730	125C	24	HOURS	237	
MOISTURE SOAK		30C/60% R.H.	168	HOURS	237	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	237	0
PRECONDITION U/S	9730	J-STD-020			4	0
ULTRASOUND	9734	J-STD-020			4	0
STORAGE LIFE	9734	125C	24	HOURS	241	
MOISTURE SOAK		30C/60% R.H.	168	HOURS	241	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	241	0
PRECONDITION U/S	9734	J-STD-020			4	0
ULTRASOUND	9740	J-STD-020			3	0
STORAGE LIFE	9740	125C	24	HOURS	241	
MOISTURE SOAK		30C/60% R.H.	168	HOURS	241	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	241	0
PRECONDITION U/S	9740	J-STD-020			4	0
ULTRASOUND	9749	J-STD-020			2	0
STORAGE LIFE	9749	125C	24	HOURS	241	
MOISTURE SOAK		30C/60% R.H.	168	HOURS	241	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	240	0
PRECONDITION U/S	9749	J-STD-020			4	0
ULTRASOUND	9833	J-STD-020			4	0
STORAGE LIFE	9833	125C	24	HOURS	241	
MOISTURE SOAK		30C/60% R.H.	168	HOURS	241	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	241	0
PRECONDITION U/S	9833	J-STD-020			4	0
ULTRASOUND	9901	J-STD-020			4	0
STORAGE LIFE	9901	125C	24	HOURS	241	

MOISTURE SOAK	9901	30C/60% R.H.	168	HOURS	241	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	241	0
PRECONDITION U/S	9901	J-STD-020			4	0
				Total:		**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
TEMP CYCLE	9730	-55C TO 125C	1000	CYCLES	56	0
TEMP CYCLE	9734	-55C TO 125C	1000	CYCLES	60	0
TEMP CYCLE	9740	-55C TO 125C	1000	CYCLES	60	0
TEMP CYCLE	9749	-55C TO 125C	1000	CYCLES	60	0
TEMP CYCLE	9833	-55C TO 125C	1000	CYCLES	60	0
TEMP CYCLE	9901	-55C TO 125C	1000	CYCLES	60	
				Total:		**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
AUTOCLAVE	9730	121C, 2 ATM STEAM, UNBIASED	96	HOURS	96	0
AUTOCLAVE	9734	121C, 2 ATM STEAM, UNBIASED	96	HOURS	100	0
AUTOCLAVE	9740	121C, 2 ATM STEAM, UNBIASED	96	HOURS	100	0
AUTOCLAVE	9749	121C, 2 ATM STEAM, UNBIASED	96	HOURS	98	0
AUTOCLAVE	9833	121C, 2 ATM STEAM, UNBIASED	96	HOURS	100	0
				Total:		**0**

Assembly Information:

Assembly Site:	ATP (Amkor, PI)
Pin Count:	44
Package Type:	PLCC
Body Size:	650x650x3.87
Mold Compound:	Nitto MP8000C
Lead Frame:	Stamped Copper CDA151
Lead Finsh:	SnPb Plate
Die Attach:	8361J Epoxy Silverfilled Ablebond
Bond Wire / Size:	Au / 1.0 mil
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	Level 3
Date Code Range:	9840 to 9840

HIGH TEMPERATURE OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
INFANT LIFE	9840	125C, 7.0 VOLTS	48	HOURS	293	0
HIGH VOLTAGE LIFE	9840	125C, 7.0 VOLTS	1000	HOURS	116	0
				Total:		**0**

MOISTURE SENSITIVITY LEVEL 3

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
ULTRASOUND	9840	J-STD-020			8	0
STORAGE LIFE		125C	26	HOURS	8	
MOISTURE SOAK		30C/60% R.H.	240	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**

PACKAGE TESTS

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
SOLDERABILITY	9840	MIL-STD-883-2003			3	0
X-RAY	9840	MIL-STD-883-2012 : TOP & SIDE VIEW			6	
PHYSICAL DIMENSIONS		MIL-STD-883-2016			6	
LEAD INTEGRITY		MIL-STD-883-2004 : COND B2			6	0
				Total:		**0**

PRECONDITIONING LEVEL 3

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
STORAGE LIFE	9840	125C	24	HOURS	293	
MOISTURE SOAK		30C/60% R.H.	240	HOURS	293	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	293	0
				Total:		**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
TEMP CYCLE	9840	-55C TO 125C	1000	CYCLES	77	0
				Total:		**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
AUTOCLAVE	9840	121C, 2 ATM STEAM, UNBIASED	168	HOURS	100	0
				Total:		**0**

Assembly Information:

Assembly Site:	Hana
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:	/
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	Level 3
Date Code Range:	9824 to 9824

HIGH TEMPERATURE OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
INFANT LIFE	9824	125C, 7.0 VOLTS	48	HOURS	293	0
HIGH VOLTAGE LIFE	9824	125C, 7.0 VOLTS	1000	HOURS	116	0
				Total:		**0**

MOISTURE SENSITIVITY LEVEL 1

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
ULTRASOUND	9824	J-STD-020			8	0
STORAGE LIFE		125C	26	HOURS	8	
MOISTURE SOAK		85 C/85% 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
				Total:		**0**

MOISTURE SENSITIVITY LEVEL 3

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
ULTRASOUND	9824	J-STD-020			8	0
STORAGE LIFE		125C	26	HOURS	8	
MOISTURE SOAK		30C/60% R.H.	240	HOURS	8	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	8	
EXTERNAL VISUAL		MIL-STD-883-2009			8	0
PRECONDITION U/S		J-STD-020			5	0
				Total:		**0**

PACKAGE TESTS

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
SOLDERABILITY	9824	MIL-STD-883-2003			3	0
X-RAY	9824	MIL-STD-883-2012 : TOP & SIDE VIEW			6	
PHYSICAL DIMENSIONS		MIL-STD-883-2016			6	
LEAD INTEGRITY		MIL-STD-883-2004 : COND B2			6	0
				Total:		**0**

PRECONDITIONING LEVEL 1

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
STORAGE LIFE	9824	125C	24	HOURS	293	
MOISTURE SOAK		85 C/85% R.H.	168	HOURS	293	
SOLDER HEAT		HTC VAPOR PHASE	3	PASS	293	0
				Total:		**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
TEMP CYCLE	9824	-55C TO 125C	1000	CYCLES	77	0
				Total:		**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
AUTOCLAVE	9824	121C, 2 ATM STEAM, UNBIASED	168	HOURS	100	0
				Total:		**0**

FAILURE RATE: **MTTF (YRS): 82326** **FITS: 1**