11/10/2006

RELIABILITY REPORT
FOR

DS33R11, Rev A2

Dallas Semiconductor

4401 South Beltwood Parkway
Dallas, TX 75244-3292

Prepared by:

Ken Wendel
Reliability Engineering Manager
Dallas Semiconductor
4401 South Beltwood Pkwy.
Dallas, TX 75244-3292
Email : ken.wendel@dalsemi.com
ph: 972-371-3726
fax: 972-371-6016
mbl: 214-435-6610

Conclusion:

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

DS33R11, Rev A2

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.*

Module Description

A description of this Module 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:

A module device consists of one or more IC's in a single, upward integrated, package. This package is assembled to include batteries, crystals, and other piece parts that make up the configuration of the Module. Because of either the complexity of the package or the included piece parts, standard high temperature reliability testing is not possible. Therefore, in order to determine the reliability of module products, the reliability of each of the piece parts is individually determined, then summed to determine the reliability of the integrated module product. If there are "n" significant components in the module then:

Fr (module) = Fr (1) + Fr (2) + Fr (3) + ... + Fr (n)
Fr (module) = Failure rate of module
Fr(n) = Failure rate of the nth component

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 module/assembly is:

Module Device:	Module Units:	Quantity:	Fails:	Ea:	Beta:	MTTF (Yrs):	FITs:
DS2155	**1**	**1735**	**0**	**0.7**	**0.0**	**192680**	**0.6**
DS33Z44	**1**	**225**	**0**	**0.7**	**0.0**	**26438**	**4.3**
Totals:						**23248**	**4.9**

The parameters used to calculate the module failure rate are as follows

Cf: 60% **Tu: 25 °C** **Vu: 5.5 Volts**

The reliability data follows. At the start of this data is the module assembly information. This is a description of the module. 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 packages or products.

* Some proprietary products may be excepted from this requirement

Assembly Information:

Assembly Site:	ATP (Amkor, PI)
Pin Count:	256
Package Type:	MCMBGA
Body Size:	27x27x1.73
Mold Compound:	Plaskon SMT-B-1RC
Lead Frame:	PCB; BT 4 layers
Lead Finsh:	SnPb Ball (63/37)
Die Attach:	8510A Ablebond Silverfiled Epoxy
Bond Wire / Size:	NA / 1.2 mil
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	Level 4
Date Code Range:	9918 to 0006

PACKAGE TESTS

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
X-RAY	9918	MIL-STD-883-2012 : TOP & SIDE VIEW		6	0	
PHYSICAL DIMENSIONS		MIL-STD-883-2016		6	0	
MARK PERMANENCY		MIL-STD-883-2015		6	0	
BALL SHEAR		TBD		6	0	
			Total:		**0**	

MOISTURE SENSITIVITY LEVEL 4

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
ULTRASOUND	9918	J-STD-020		8	0	
STORAGE LIFE		125C	24 HRS	8		
MOISTURE SOAK		30C/60% R.H.	144 HRS	8		
CONVECTION REFLOW		220C +5/-0C	3 PASS	8	0	
EXTERNAL VISUAL		MIL-STD-883-2009		8	0	
PRECONDITION U/S		J-STD-020		8	0	
			Total:		**0**	

PRECONDITIONING LEVEL 4

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
STORAGE LIFE	9918	125C	24 HRS	155		
MOISTURE SOAK		30C/60% R.H.	144 HRS	155		
CONVECTION REFLOW		220C +5/-0C	3 PASS	155	0	
			Total:		**0**	

FOLLOWED BY:

OPERATING LIFE

DESCRIPTION	CONDITION	READPOINT	QTY	FAILS	FA#
INFANT LIFE	125C, 6.0 VOLTS	48 HRS	154	0	
		Total:		**0**	

PRECONDITIONING LEVEL 3

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
STORAGE LIFE	0006	125C	24	HRS	77		
MOISTURE SOAK		30C/60% R.H.	240	HRS	77		
CONVECTION REFLOW		220C +5/-0C	3	PASS	77	1	No FA
				Total:		**1**	

FOLLOWED BY:

TEMPERATURE CYCLE

DESCRIPTION	CONDITION	READPOINT		QTY	FAILS	FA#
TEMP CYCLE	-55C TO 125C	1000	CYS	76	0	
			Total:		**0**	

Assembly Information:

Assembly Site:	ATP (Amkor, PI)
Pin Count:	256
Package Type:	MCMBGA (Pb-Free)
Body Size:	27x27x1.73
Mold Compound:	Nitto GE-100-L
Lead Frame:	PCB; BT 4 layers
Lead Finsh:	SnAgCu Ball (96.5/3/0.5)
Die Attach:	2300 Ablebond Silverfiled Epoxy
Bond Wire / Size:	Au / 1.2 mil
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	Level 4
Date Code Range:	0611 to 0611

PACKAGE TESTS

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
X-RAY	0611	MIL-STD-883-2012 : TOP & SIDE VIEW			6	0	
PHYSICAL DIMENSIONS		JESD22-B100			6	0	
BALL SHEAR		JESD22-B117			6	0	
				Total:		**0**	

MOISTURE SENSITIVITY LEVEL 3

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
ULTRASOUND	0611	J-STD-020			8	0	
STORAGE LIFE		125C	48	HRS	8		
MOISTURE SOAK		30C/60% R.H.	192	HRS	8		
CONVECTION REFLOW		260C +0/-5C	3	PASS	8	0	
EXTERNAL VISUAL		J-STD-020, 6.1a			8	0	
PRECONDITION U/S		J-STD-020			8	0	
				Total:		**0**	

PRECONDITIONING LEVEL 3

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
STORAGE LIFE	0611	125C	48	HRS	308		
MOISTURE SOAK		30C/60% R.H.	192	HRS	308		
CONVECTION REFLOW		260C +0/-5C	3	PASS	308	0	

FOLLOWED BY:					Total:	0

OPERATING LIFE

DESCRIPTION	CONDITION	READPOINT	QTY	FAILS	FA#
HIGH TEMP OP LIFE	125C, 3.5 VOLTS	1000 HRS	77	0	
		Total:		0	

STORAGE LIFE

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

TEMPERATURE CYCLE

DESCRIPTION	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	-55C TO 125C	1000 CYS	77	0	
		Total:		0	

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	CONDITION	READPOINT	QTY	FAILS	FA#
BIASED MOISTURE	85/85, 3.5 VOLTS	1000 HRS	45	0	
		Total:		0	

PACKAGE TESTS

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
X-RAY	0611	MIL-STD-883-2012 : TOP & SIDE VIEW		6	0	
PHYSICAL DIMENSIONS		JESD22-B100		6	0	
BALL SHEAR		JESD22-B117		6	0	
			Total:		0	

MOISTURE SENSITIVITY LEVEL 3

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
ULTRASOUND	0611	J-STD-020		8	0	
STORAGE LIFE		125C	48 HRS	8		
MOISTURE SOAK		30C/60% R.H.	192 HRS	8		
CONVECTION REFLOW		260C +0/-5C	3 PASS	8	0	
EXTERNAL VISUAL		J-STD-020, 6.1a		8	0	
PRECONDITION U/S		J-STD-020		8	0	
			Total:		0	

PRECONDITIONING LEVEL 3

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
STORAGE LIFE	0611	125C	48 HRS	308		
MOISTURE SOAK		30C/60% R.H.	192 HRS	308		
CONVECTION REFLOW		260C +0/-5C	3 PASS	308	0	

FOLLOWED BY:		Total:		0	

OPERATING LIFE

DESCRIPTION	CONDITION	READPOINT	QTY	FAILS	FA#
HIGH TEMP OP LIFE	125C, 3.5 VOLTS	1000 HRS	77	0	
		Total:		**0**	

STORAGE LIFE

DESCRIPTION	CONDITION	READPOINT	QTY	FAILS	FA#
STORAGE LIFE	150C	1000 HRS	77	0	
		Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	-55C TO 125C	1000 CYS	77	0	
		Total:		**0**	

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	CONDITION	READPOINT	QTY	FAILS	FA#
BIASED MOISTURE	85/85, 3.5 VOLTS	1000 HRS	45	0	
		Total:		**0**	