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RELIABILITY REPORT
FOR

DS21Q55, Rev B2, ASAT (no underfill)

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:

DS21Q55, Rev B2, ASAT (no underfill)

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:	Quantity:	MTTF (Yrs):	FITs:
DS2155	**4**	**16333**	**7.0**
Totals:		**16333**	**7**

The parameters used to calculate the module 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 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 proprietary products may be excepted from this requirement.

Assembly Information:

Qualification Vehicle: DS21Q348
Assembly Site: ASAT
Pin Count: 144
Package Type: CSBGA Interposer; SnPb Balls
Body Size: 17x17X1.6
Mold Compound: Nitto HC-100-XG-BF1
Lead Frame: PCB; BT; No Pb Balls CSBGA; Eutectic Paste
Lead Finsh:
Die Attach: No Underfill
Bond Wire / Size: /
Flammability: UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A) Level 4
Date Code Range: 0312 to 0312

CONSTRUCTION ANALYSIS

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
PACKAGE, ASSEMBLY P	0312	TO BE SUBMITTED BY ASSEMBLY SITE	2	WKS	0	0
				Total:		**0**

PACKAGE TESTS

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
X-RAY	0312	MIL-STD-883-2012 : TOP & SIDE VIEW	6	DYS	6	0
PHYSICAL DIMENSIONS		JESD22-B100	6	DYS	6	0
BALL SHEAR		JESD22-B117	6	DYS	6	0
		JESD22-B117	12	DYS	6	0
X-RAY	0312	MIL-STD-883-2012 : TOP & SIDE VIEW	6	DYS	6	0
PHYSICAL DIMENSIONS		JESD22-B100	6	DYS	6	0
BALL SHEAR		JESD22-B117	6	DYS	6	0
		JESD22-B117	12	DYS	6	0
				Total:		**0**

PRECONDITIONING LEVEL 4

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
STORAGE LIFE	0312	125C	24	HRS	135	
MOISTURE SOAK		30C/60% R.H.	96	HRS	135	
CONVECTION REFLOW		220C	3	PASS	135	0
STORAGE LIFE	0312	125C	24	HRS	135	
MOISTURE SOAK		30C/60% R.H.	96	HRS	135	
CONVECTION REFLOW		220C	3	PASS	135	0

			Total:		**0**

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
STORAGE LIFE	0312	125C	1000 HRS	42	0
STORAGE LIFE	0312	125C	1000 HRS	41	0
			Total:		**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
TEMP CYCLE	0312	-55C TO 125C	1000 CYS	45	0
TEMP CYCLE	0312	-55C TO 125C	1000 CYS	45	0
			Total:		**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
MOISTURE SOAK	0312	85 C/85% R.H.	1000 HRS	45	0
MOISTURE SOAK	0312	85 C/85% R.H.	1000 HRS	45	0
			Total:		**0**

Assembly Information:

Qualification Vehicle:	DS21Q348
Assembly Site:	ASAT
Pin Count:	144
Package Type:	CSBGA Interposer; SnPb Balls
Body Size:	17x17X1.6
Mold Compound:	Nitto HC-100-XG-BF1
Lead Frame:	PCB; BT; No Pb Balls CSBGA; No Pb Paste
Lead Finsh:	
Die Attach:	No Underfill
Bond Wire / Size:	/
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	Level 4
Date Code Range:	0330 to 0330

PACKAGE TESTS

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
X-RAY	0330	MIL-STD-883-2012 : TOP & SIDE VIEW	6 DYS	6	0
PHYSICAL DIMENSIONS		JESD22-B100	6 DYS	6	0
BALL SHEAR		JESD22-B117	6 DYS	6	0
		JESD22-B117	12 DYS	6	0
			Total:		**0**

PRECONDITIONING LEVEL 4

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
STORAGE LIFE	0330	125C	24 HRS	135	
MOISTURE SOAK		30C/60% R.H.	96 HRS	135	

CONVECTION REFLOW	0330	220C	3	PASS	135	0
					Total:	**0**

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
STORAGE LIFE	0330	125C	1000	HRS	45	0
					Total:	**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
TEMP CYCLE, SLOW	0330	-40C TO +125C	1000	CYS	45	0
					Total:	**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
MOISTURE SOAK	0330	85 C/85% R.H.	1000	HRS	45	0
					Total:	**0**

Assembly Information:

Qualification Vehicle:	DS21Q55
Assembly Site:	ASAT
Pin Count:	256
Package Type:	CSBGA Interposer; SnPb Balls
Body Size:	27x27x1.73
Mold Compound:	?
Lead Frame:	PCB; BT; No Pb Balls CSBGA; No Pb Paste
Lead Finsh:	
Die Attach:	No Underfill
Bond Wire / Size:	/
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	Level 4
Date Code Range:	0310 to 0334

MOISTURE SENSITIVITY LEVEL 4

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
EXTERNAL VISUAL	0310	J-STD-020, 6.1a	3	DYS	8	0
ULTRASOUND		J-STD-020	3	DYS	8	0
STORAGE LIFE		125C	24	HRS	8	
MOISTURE SOAK		30C/60% R.H.	96	HRS	8	
CONVECTION REFLOW		220C	3	PASS	8	0
EXTERNAL VISUAL		J-STD-020, 6.1a	3	DYS	8	0
PRECONDITION U/S		J-STD-020	3	DYS	8	0
					Total:	**0**

PACKAGE TESTS

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
X-RAY	0310	MIL-STD-883-2012 : TOP & SIDE VIEW	6	DYS	6	0
PHYSICAL DIMENSIONS		JESD22-B100	6	DYS	6	0

BALL SHEAR	0310	JESD22-B117	6 DYS	6	0
		JESD22-B117	12 DYS	6	0
				Total:	**0**

PRECONDITIONING LEVEL 4

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
STORAGE LIFE	0310	125C	24 HRS	135	
MOISTURE SOAK		30C/60% R.H.	96 HRS	135	
CONVECTION REFLOW		220C	3 PASS	135	0
STORAGE LIFE	0334	125C	24 HRS	77	
MOISTURE SOAK		30C/60% R.H.	96 HRS	77	
CONVECTION REFLOW		220C	3 PASS	77	0
				Total:	**0**

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
STORAGE LIFE	0310	125C	1000 HRS	45	0
				Total:	**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
TEMP CYCLE	0310	-55C TO 125C	500 CYS	45	0
				Total:	**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
MOISTURE SOAK	0310	85 C/85% R.H.	1000 HRS	45	0
				Total:	**0**