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RELIABILITY REPORT
FOR

DS1991, iButton Assembly

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:

DS1991, iButton Assembly

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:**	**MTTF (Yrs):**	**FITs:**
DS1205	**1**	**1551**	**0**	**0.7**	**99196**	**1.2**
Totals:					**99196**	**1.2**

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

Cf: 60% **Tu: 25 °C**

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:	Dallas
Pin Count:	2
Package Type:	iButton F50 (Pb-Free)
Body Size:	68
Mold Compound:	FP4323, Dexter Hysol
Lead Frame:	PCB; FR4
Lead Finsh:	Sn Plate/Ni/Stainless Steel
Die Attach:	84-3LV Epoxy Ablebond
Bond Wire / Size:	Al/Si Ultrasonic / 1.25 mil
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	
Date Code Range:	9952 to 0240

MECHANICAL LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
MECHANICAL SHOCK	9952	200G, 1/2 SINE, 6 MS	30	CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	9952	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50	0	
MECHANICAL SHOCK	0131	200G, 1/2 SINE, 6 MS	30	CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0131	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50	0	
				Total:		**0**	

STORAGE LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
STORAGE LIFE	9952	25 C	1000	HRS	22	0	
STORAGE LIFE	9952	85 C	1000	HRS	77	0	
STORAGE LIFE	0021	70 C	1000	HRS	77	0	
STORAGE LIFE	0046	70 C	1000	HRS	77	0	
STORAGE LIFE	0131	85 C	1000	HRS	77	0	
				Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
TEMP CYCLE	9952	-40 TO 85C	1000	CYS	77	0	
TEMP CYCLE	0021	0C TO 70C	1000	CYS	77	0	
TEMP CYCLE	0046	0C TO 70C	1000	CYS	77	0	

TEMP CYCLE	0131	-40 TO 85C	1000	CYS	77	0	
TEMP CYCLE	0240	-55C TO 125C	1000	CYS	77	0	
TEMP CYCLE	0240	-55C TO 125C	1000	CYS	77	0	
				Total:		**0**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
MOISTURE SOAK	0021	60C/90% R.H.	960	HRS	77	0	
MOISTURE SOAK	0046	60C/90% R.H.	960	HRS	77	0	
MOISTURE SOAK	0131	60C/90% R.H.	960	HRS	77	0	
				Total:		**0**	

Assembly Information:

Assembly Site:	Dallas
Pin Count:	2
Package Type:	iButton F50 w/Bump
Body Size:	68
Mold Compound:	FP4323, Dexter Hysol
Lead Frame:	PCB; FR4
Lead Finsh:	High Pb Ball (95/5)
Die Attach:	Glob Top 4323, Dexter Hysol
Bond Wire / Size:	Al/Si Ultrasonic / 1.25 mil
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	NA
Date Code Range:	0048 to 0201

STORAGE LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
STORAGE LIFE	0122	70 C	1000	HRS	77	0	
STORAGE LIFE	0136	70 C	1000	HRS	77	0	
STORAGE LIFE	0201	70 C	1000	HRS	77	0	
				Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
TEMP CYCLE	0048	-40 TO 85C	1000	CYS	77	0	
TEMP CYCLE	0048	-40 TO 85C	1000	CYS	77	0	
TEMP CYCLE	0122	-40 TO 85C	300	CYS	77	0	
TEMP CYCLE	0136	-40 TO 85C	300	CYS	77	0	
TEMP CYCLE	0201	-40 TO 85C	300	CYS	77	0	
				Total:		**0**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
MOISTURE SOAK	0122	60C/90% R.H.	960	HRS	77	0	

MOISTURE SOAK	0136	60C/90% R.H.	960 HRS	77	0	
MOISTURE SOAK	0201	60C/90% R.H.	960 HRS	77	0	
			Total:		**0**	

Assembly Information:

Assembly Site:	Dallas
Pin Count:	2
Package Type:	iButton F50 w/Bump (RoHS)
Body Size:	68
Mold Compound:	FP4323, Dexter Hysol
Lead Frame:	PCB; FR4
Lead Finsh:	High Pb Ball (95/5)
Die Attach:	Underfill FP4527, Dexter Hysol
Bond Wire / Size:	/
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	NA
Date Code Range:	0437 to 0437

OPERATING LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
HIGH TEMP OP LIFE	0437	125C, 6.0 VOLTS	1000 HRS	80	0	
		125C, 6.0 VOLTS	1000 HRS	80	0	
			Total:		**0**	

STORAGE LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
STORAGE LIFE	0437	125C	1000 HRS	80	0	
		125C	1000 HRS	80	0	
			Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	0437	-40 TO 85C	1000 CYS	80	0	
		-40 TO 85C	1000 CYS	80	0	
			Total:		**0**	

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
BIASED MOISTURE	0437	85/85, 5.5 VOLTS	1000 HRS	80	0	
		85/85, 5.5 VOLTS	1000 HRS	80	0	
			Total:		**0**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
AUTOCLAVE	0437	121C, 2 ATM STEAM, UNBIASED	168 HRS	76	0	
		121C, 2 ATM STEAM, UNBIASED	168 HRS	76	0	
			Total:		**0**	

Assembly Information:

Assembly Site:	Dallas
Pin Count:	2
Package Type:	iButton F50w/IC's
Body Size:	68
Mold Compound:	?
Lead Frame:	PCB; FR4
Lead Finsh:	Sn Plate/Ni/Stainless Steel
Die Attach:	?
Bond Wire / Size:	/
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	
Date Code Range:	0343 to 0343

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
ESD SENSITIVITY	0343	IEC 61000-4-2 CONTACT 2000 VOLTS	10	PUL'S	3	0	
ESD SENSITIVITY	0343	IEC 61000-4-2 CONTACT 4000 VOLTS	10	PUL'S	3	0	
ESD SENSITIVITY	0343	IEC 61000-4-2 CONTACT 6000 VOLTS	10	PUL'S	3	0	
ESD SENSITIVITY	0343	IEC 61000-4-2 CONTACT 8000 VOLTS	10	PUL'S	3	0	
ESD SENSITIVITY	0343	IEC 61000-4-2 AIR 2000 VOLTS	10	PUL'S	3	0	
ESD SENSITIVITY	0343	IEC 61000-4-2 AIR 4000 VOLTS	10	PUL'S	3	0	
ESD SENSITIVITY	0343	IEC 61000-4-2 AIR 8000 VOLTS	10	PUL'S	3	0	
ESD SENSITIVITY	0343	IEC 61000-4-2 AIR 15000 VOLTS	10	PUL'S	3	0	
ESD SENSITIVITY	0343	IEC 61000-4-2 AIR 20000 VOLTS	10	PUL'S	3	0	
				Total:		**0**	

Assembly Information:

Assembly Site:	Fastech
Pin Count:	2
Package Type:	iButton F50 (Pb-Free)
Body Size:	68
Mold Compound:	FP4323, Dexter Hysol
Lead Frame:	PCB; FR4
Lead Finsh:	
Die Attach:	84-3LV Epoxy Ablebond
Bond Wire / Size:	/
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	
Date Code Range:	0131 to 0140

MECHANICAL LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
MECHANICAL SHOCK	0132	200G, 1/2 SINE, 6 MS	30	CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0132	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50	0	

MECHANICAL SHOCK	0132	200G, 1/2 SINE, 6 MS	30 CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0132	10g or 0.06", 5Hz-2KHz, X Y Z axis	9 HRS	50	0	
MECHANICAL SHOCK	0140	200G, 1/2 SINE, 6 MS	30 CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0140	10g or 0.06", 5Hz-2KHz, X Y Z axis	9 HRS	50	0	
			Total:		**0**	

STORAGE LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
STORAGE LIFE	0132	85 C	1000 HRS	77	0	
STORAGE LIFE	0132	85 C	1000 HRS	77	0	
STORAGE LIFE	0140	85 C	1000 HRS	77	0	
			Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	0131	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0131	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0132	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0132	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0140	-40 TO 85C	1000 CYS	77	0	
			Total:		**0**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
MOISTURE SOAK	0131	60C/90% R.H.	960 HRS	77	0	
MOISTURE SOAK	0131	60C/90% R.H.	960 HRS	77	0	
MOISTURE SOAK	0132	60C/90% R.H.	960 HRS	77	0	
MOISTURE SOAK	0132	60C/90% R.H.	960 HRS	77	0	
MOISTURE SOAK	0140	60C/90% R.H.	960 HRS	77	0	
			Total:		**0**	

Assembly Information:

Assembly Site:	Fastech
Pin Count:	2
Package Type:	iButton F50 w/Bump
Body Size:	68
Mold Compound:	FP4323, Dexter Hysol
Lead Frame:	PCB; FR4
Lead Finsh:	High Pb Ball (95/5)
Die Attach:	Underfill FP4527, Dexter Hysol
Bond Wire / Size:	Al/Si Ultrasonic / 1.25 mil
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	NA
Date Code Range:	0128 to 0450

MECHANICAL LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
MECHANICAL SHOCK	0133	200G, 1/2 SINE, 6 MS	30	CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0133	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50	0	
MECHANICAL SHOCK	0327	200G, 1/2 SINE, 6 MS	30	CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0327	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50	0	
				Total:		**0**	

STORAGE LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
STORAGE LIFE	0133	85 C	1000	HRS	77	0	
STORAGE LIFE	0209	70 C	1000	HRS	77	0	
STORAGE LIFE	0220	70 C	1000	HRS	77	0	
STORAGE LIFE	0238	70 C	1000	HRS	77	0	
STORAGE LIFE	0315	70 C	1000	HRS	77	0	
STORAGE LIFE	0327	85 C	1000	HRS	77	0	
STORAGE LIFE	0332	70 C	1000	HRS	77	0	
STORAGE LIFE	0350	70 C	1000	HRS	77	0	
STORAGE LIFE	0415	85 C	1000	HRS	77	0	
STORAGE LIFE	0423	70 C	1000	HRS	77	0	
STORAGE LIFE	0435	70 C	1000	HRS	77	0	
STORAGE LIFE	0450	70 C	1000	HRS	77	0	
				Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
TEMP CYCLE	0128	-40 TO 85C	1000	CYS	77	0	

TEMP CYCLE	0133	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0140	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0209	-40 TO 85C	300 CYS	77	0	
TEMP CYCLE	0220	-40 TO 85C	500 CYS	77	0	
TEMP CYCLE	0238	-40 TO 85C	500 CYS	77	0	
TEMP CYCLE	0315	-40 TO 85C	500 CYS	77	0	
TEMP CYCLE, SLOW	0327	-40C TO +125C	1000 CYS	77	0	
TEMP CYCLE	0332	-40 TO 85C	500 CYS	77	0	
TEMP CYCLE	0350	-40 TO 85C	500 CYS	77	0	
TEMP CYCLE	0415	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0423	-40 TO 85C	500 CYS	77	0	
TEMP CYCLE	0435	-40 TO 85C	500 CYS	77	0	
TEMP CYCLE	0450	-40 TO 85C	500 CYS	77	0	
			Total:		**0**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
MOISTURE SOAK	0128	60C/90% R.H.	960 HRS	77	0	
MOISTURE SOAK	0133	60C/90% R.H.	960 HRS	77	0	
MOISTURE SOAK	0140	60C/90% R.H.	960 HRS	77	0	
MOISTURE SOAK	0209	60C/90% R.H.	960 HRS	77	0	
MOISTURE SOAK	0220	60C/90% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0238	60C/90% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0315	60C/90% R.H.	1000 HRS	76	0	
MOISTURE SOAK	0327	85 C/85% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0332	60C/90% R.H.	1000 HRS	75	0	
MOISTURE SOAK	0350	60C/90% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0415	85 C/85% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0423	60C/90% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0435	60C/90% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0450	60C/90% R.H.	1000 HRS	77	0	
			Total:		**0**	

Assembly Information:

Assembly Site:	Hana
Pin Count:	2
Package Type:	iButton F50 (Pb-Free)
Body Size:	68
Mold Compound:	FP4323, Dexter Hysol
Lead Frame:	PCB; FR4
Lead Finsh:	Sn Plate/Ni/Stainless Steel
Die Attach:	84-3J Epoxy Ablebond
Bond Wire / Size:	Al/Si Ultrasonic / 1.25 mil
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	
Date Code Range:	0249 to 0249

STORAGE LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
STORAGE LIFE	0249	85 C	1000 HRS	77	0	
STORAGE LIFE	0249	85 C	1000 HRS	77	0	
STORAGE LIFE	0249	85 C	1000 HRS	77	0	
			Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	0249	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0249	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0249	-40 TO 85C	1000 CYS	77	0	
			Total:		**0**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
MOISTURE SOAK	0249	60C/90% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0249	60C/90% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0249	60C/90% R.H.	1000 HRS	77	0	
			Total:		**0**	

Assembly Information:

Assembly Site:	ISPL (ATEC, PI)
Pin Count:	2
Package Type:	iButton F50 (Pb-Free)
Body Size:	68
Mold Compound:	FP4323, Dexter Hysol
Lead Frame:	PCB; FR4
Lead Finsh:	Sn Plate/Ni/Stainless Steel
Die Attach:	84-3LV Epoxy Ablebond
Bond Wire / Size:	Al/Si Ultrasonic / 1.25 mil
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	
Date Code Range:	0150 to 0203

MECHANICAL LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
MECHANICAL SHOCK	0150	200G, 1/2 SINE, 6 MS	30 CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0150	10g or 0.06", 5Hz-2KHz, X Y Z axis	9 HRS	50	0	
MECHANICAL SHOCK	0150	200G, 1/2 SINE, 6 MS	30 CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0150	10g or 0.06", 5Hz-2KHz, X Y Z axis	9 HRS	50	0	
MECHANICAL SHOCK	0203	200G, 1/2 SINE, 6 MS	30 CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0203	10g or 0.06", 5Hz-2KHz, X Y Z axis	9 HRS	50	0	
			Total:		**0**	

STORAGE LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
STORAGE LIFE	0150	85 C	1000 HRS	77	0	
STORAGE LIFE	0150	85 C	1000 HRS	77	0	
STORAGE LIFE	0203	85 C	1000 HRS	77	0	
			Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	0150	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0150	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0203	-40 TO 85C	1000 CYS	77	0	
			Total:		**0**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
MOISTURE SOAK	0150	60C/90% R.H.	960 HRS	77	0	
MOISTURE SOAK	0150	60C/90% R.H.	960 HRS	77	0	

MOISTURE SOAK	0203	60C/90% R.H.	960	HRS	77	0
				Total:		**0**