

**RELIABILITY REPORT
FOR**

DS1982 iButton w/IC's or Bump

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:

DS1982 iButton w/IC's or Bump

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:

$$Fr(\text{module}) = Fr(1) + Fr(2) + Fr(3) + \dots + Fr(n)$$

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:

<u>Module Device:</u>	<u>Quantity:</u>	<u>MTTF (Yrs):</u>	<u>FITs:</u>
DS2502	1	<u>23501</u>	<u>4.9</u>
Totals:		23501	4.9

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. 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: ATEC
 Pin Count: 2
 Package Type: iButton F50
 Body Size: 0
 Mold Compound: FP4323, Dexter Hysol
 Lead Frame: PCB; FR4
 Lead Finsh:
 Die Attach: 84-3LV Epoxy Ablebond
 Bond Wire / Size: Al / 1.25 mil
 Flammability: UL 94-V0
 Moisture Sensitivity (JEDEC J-STD20A)
 Date Code Range: 0150 to 0203

MECHANICAL LIFE

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

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
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 CODE	CONDITION	READPOINT	QUANTITY	FAILS
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 CODE	CONDITION	READPOINT	QUANTITY	FAILS
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

Assembly Information:

Assembly Site: Dallas
Pin Count: 2
Package Type: iButton F50
Body Size: 0
Mold Compound: FP4323, Dexter Hysol
Lead Frame: PCB; FR4
Lead Finish:
Die Attach: 84-3LV Epoxy Ablebond
Bond Wire / Size: Al / 1.25 mil
Flammability: UL 94-V0
Moisture Sensitivity
(JEDEC J-STD20A)
Date Code Range: 9952 to 0240

MECHANICAL LIFE

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

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
STORAGE LIFE	9952	25 C	1000 HRS	22	0
STORAGE LIFE	9952	85 C	1000 HRS	77	0
STORAGE LIFE	0009	70 C	1000 HRS	77	1
STORAGE LIFE	0021	70 C	1000 HRS	77	0
STORAGE LIFE	0131	85 C	1000 HRS	77	0
Total:					1

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
TEMP CYCLE	9952	-40 TO 85C	1000 CYS	77	0
TEMP CYCLE	0009	0C TO 70C	1000 CYS	77	0
TEMP CYCLE	0020	-40 TO 85C	300 CYS	77	0
TEMP CYCLE	0021	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 CODE	CONDITION	READPOINT	QUANTITY	FAILS	
MOISTURE SOAK	9952	85 C/85% R.H.	959	HRS	77 4	
MOISTURE SOAK	0009	60C/90% R.H.	960	HRS	77 0	
MOISTURE SOAK	0021	60C/90% R.H.	960	HRS	77 0	
MOISTURE SOAK	0131	60C/90% R.H.	960	HRS	77 0	
					Total:	4

Assembly Information:

Assembly Site: Fastech
 Pin Count: 2
 Package Type: iButton F50
 Body Size: 0
 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 CODE	CONDITION	READPOINT	QUANTITY	FAILS	
MECHANICAL SHOCK	0132	200G, 1/2 SINE, 6 MS	30	CYS	50 0	
VIBRATION, VARIABLE F	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 F	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 F	0140	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50 0	
					Total:	0

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS	
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 CODE	CONDITION	READPOINT	QUANTITY	FAILS
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 CODE	CONDITION	READPOINT	QUANTITY	FAILS
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: Hana
Pin Count: 2
Package Type: iButton F50
Body Size: 0
Mold Compound: FP4323, Dexter Hysol
Lead Frame: PCB; FR4
Lead Finish:
Die Attach: 84-3J Epoxy Ablebond
Bond Wire / Size: Al / 1.25 mil
Flammability: UL 94-V0
Moisture Sensitivity
(JEDEC J-STD20A)
Date Code Range: 0249 to 0249

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
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 CODE	CONDITION	READPOINT	QUANTITY	FAILS
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 CODE	CONDITION	READPOINT	QUANTITY	FAILS
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: Dallas
Pin Count: 2
Package Type: iButton F50 w/Bump
Body Size: 0
Mold Compound: FP4323, Dexter Hysol
Lead Frame: PCB; FR4
Lead Finish:
Die Attach: Underfill FP4527, Dexter Hysol
Bond Wire / Size: Al / 1.25 mil
Flammability: UL 94-V0
Moisture Sensitivity
(JEDEC J-STD20A)
Date Code Range: 9939 to 0201

MECHANICAL LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
MECHANICAL SHOCK	9939	200G, 1/2 SINE, 6 MS	30 CYS	50	0
VIBRATION, VARIABLE F	9939	10g or 0.06", 5Hz-2KHz, X Y Z axis	9 HRS	50	0
Total:					0

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
STORAGE LIFE	9939	25 C	1144 HRS	22	0
STORAGE LIFE	9939	85 C	1000 HRS	77	0
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 CODE	CONDITION	READPOINT	QUANTITY	FAILS
TEMP CYCLE	9939	-40 TO 85C	1000 CYS	77	3
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:	3

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS	
MOISTURE SOAK	9939	85 C/85% R.H.	959 HRS	77	0	
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: Fastech
 Pin Count: 2
 Package Type: iButton F50 w/Bump
 Body Size: 0
 Mold Compound: FP4323, Dexter Hysol
 Lead Frame: PCB; FR4
 Lead Finsh:
 Die Attach: Underfill FP4527, Dexter Hysol
 Bond Wire / Size: Al / 1.25 mil
 Flammability: UL 94-V0
 Moisture Sensitivity
 (JEDEC J-STD20A)
 Date Code Range: 0133 to 0415

MECHANICAL LIFE

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

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS	
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	
					Total:	0

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
TEMP CYCLE	0133	-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	500 CYS	77	0
Total:					0

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
MOISTURE SOAK	0133	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
Total:					0

Assembly Information:

Assembly Site: Dallas
Pin Count: 2
Package Type: iButton F50w/IC's
Body Size: 0
Mold Compound: ?
Lead Frame: PCB; FR4
Lead Finsh:
Die Attach: ?
Bond Wire / Size: /
Flammability: UL 94-V0
Moisture Sensitivity
(JEDEC J-STD20A)
Date Code Range: 0130 to 0346

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
STORAGE LIFE	0346	85 C	1000 HRS	77	0
Total:					0

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
TEMP CYCLE	0130	-40 TO 85C	1000 CYS	77	0
TEMP CYCLE	0247	-55C TO 125C	1000 CYS	77	0
TEMP CYCLE	0247	-55C TO 125C	1000 CYS	77	0
TEMP CYCLE	0346	-40 TO 85C	1000 CYS	77	0
Total:					0

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
MOISTURE SOAK	0130	60C/90% R.H.	960 HRS	77	0
MOISTURE SOAK	0247	85 C/85% R.H.	1000 HRS	77	0
MOISTURE SOAK	0247	85 C/85% R.H.	1000 HRS	77	0
MOISTURE SOAK	0346	85 C/85% R.H.	1000 HRS	77	0
Total:					0

Assembly Information:

Assembly Site: Fastech
Pin Count: 2
Package Type: iButton F50w/IC's
Body Size: 0
Mold Compound: ?
Lead Frame: PCB; FR4
Lead Finsh:
Die Attach: ?
Bond Wire / Size: /
Flammability: UL 94-V0
Moisture Sensitivity
(JEDEC J-STD20A)
Date Code Range: 0211 to 0405

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
STORAGE LIFE	0211	70 C	1000 HRS	77	0
STORAGE LIFE	0238	70 C	1000 HRS	77	0
STORAGE LIFE	0301	70 C	1000 HRS	77	0
STORAGE LIFE	0304	70 C	1000 HRS	77	0
STORAGE LIFE	0337	70 C	1000 HRS	77	0
STORAGE LIFE	0405	70 C	1000 HRS	77	0
Total:					0

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
TEMP CYCLE	0211	-40 TO 85C	500 CYS	77	2
TEMP CYCLE	0238	-40 TO 85C	500 CYS	77	0

TEMP CYCLE	0301	-40 TO 85C	500	CYS	77	0
TEMP CYCLE	0304	-40 TO 85C	500	CYS	77	0
TEMP CYCLE	0337	-40 TO 85C	500	CYS	77	0
TEMP CYCLE	0405	-40 TO 85C	500	CYS	77	0
					Total:	2

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS	
MOISTURE SOAK	0211	60C/90% R.H.	1000 HRS	76	0	
MOISTURE SOAK	0238	60C/90% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0301	60C/90% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0304	60C/90% R.H.	1000 HRS	77	0	
MOISTURE SOAK	0337	60C/90% R.H.	1000 HRS	77	0	
					Total:	0