

RELIABILITY REPORT  
FOR

**DS9490, Rev A, Fastech**

**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:

DS9490, Rev A, Fastech

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](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:

<b>Module Device:</b>	<b>Quantity:</b>	<b>MTTF (Yrs):</b>	<b>FITs:</b>
<b>DS2490</b>	<b>1</b>	<b>9400</b>	<b>12.1</b>
<b>CRYSTAL</b>	<b>1</b>	<b>12458</b>	<b>9.2</b>
<b>DS2401</b>	<b>1</b>	<b>22756</b>	<b>5.0</b>
<b>Totals:</b>		<b>4337</b>	<b>26</b>

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 proprietary products may be excepted from this requirement.

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**Assembly Information:**

Assembly Site: Fastech  
 Package Type: Dongle/Fob  
 Flammability: UL 94-V0  
 Date Code Range: 0131 to 0304

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**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
<b>Total:</b>					<b>0</b>

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**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
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
<b>Total:</b>					<b>0</b>

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**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
TEMP CYCLE	0211	-40 TO 85C	500	CYS	77	2
TEMP CYCLE	0230	-40 TO 85C	200	CYS	250	0
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
					<b>Total:</b>	<b>2</b>

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**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	
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	
					<b>Total:</b>	<b>0</b>