



08/02/2004

RELIABILITY REPORT
FOR

DS12887, Rev B1

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:

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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:

Module Device:	Quantity:	MTTF (Yrs):	FITs:
CRYSTAL	1	12458	9.2
DS12885	1	36661	3.1
BR1225	1	173708	0.7
Totals:		8826	12.9

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: Fastech
 Pin Count: 24
 Package Type: Module w/Bent Frame
 Body Size: 720
 Mold Compound: Amicon
 Lead Frame: Stamped Alloy 42
 Lead Finsh:
 Die Attach: ?
 Bond Wire / Size: /
 Flammability: UL 94-V0
 Moisture Sensitivity (JEDEC J-STD20A)
 Date Code Range: 9917 to 0415

MECHANICAL LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
VIBRATION, VARIABLE FREQUENCY	9933	10g or 0.06", 5Hz-2KHz, X Y Z axis	9 HRS	50	0	
Total:					0	

PACKAGE TESTS

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
SOLDERABILITY	9917	MIL-STD-883-2003	2 DYS	8	0	
X-RAY	9917	MIL-STD-883-2012 : TOP & SIDE VIEW	3 DYS	8	0	
PHYSICAL DIMENSIONS		MIL-STD-883-2016	6 DYS	8	0	
LEAD INTEGRITY		MIL-STD-883-2004 : COND B2	9 DYS	8	0	
CONSTRUCTION ANALYSIS	9917	SENT TO OUTSIDE SOURCE	3 WKS	5	0	
SOLDERABILITY	9933	MIL-STD-883-2003	7 DYS	3	0	
PHYSICAL DIMENSIONS	9933	MIL-STD-883-2016	7 DYS	6	0	
SOLDERABILITY	9933	MIL-STD-883-2003	2 DYS	8	0	
X-RAY	9933	MIL-STD-883-2012 : TOP & SIDE VIEW	3 DYS	8	0	
PHYSICAL DIMENSIONS		MIL-STD-883-2016	3 DYS	8	0	
MARK PERMANENCY		MIL-STD-883-2015	3 DYS	8	0	
LEAD INTEGRITY		MIL-STD-883-2004 : COND B2	3 DYS	8	0	
SOLDERABILITY	9950	MIL-STD-883-2003	1 DYS	3	0	
PHYSICAL DIMENSIONS	9950	MIL-STD-883-2016	1 DYS	6	0	
SOLDERABILITY	0027	MIL-STD-883-2003	1 DYS	3	0	

PHYSICAL DIMENSIONS	0027	MIL-STD-883-2016	1	DYS	6	0	
SOLDERABILITY	0040	MIL-STD-883-2003	1	DYS	3	0	
PHYSICAL DIMENSIONS	0040	MIL-STD-883-2016	1	DYS	6	0	
SOLDERABILITY	0043	MIL-STD-883-2003	1	DYS	3	0	
PHYSICAL DIMENSIONS	0043	MIL-STD-883-2016	1	DYS	6	0	
SOLDERABILITY	0102	MIL-STD-883-2003	1	DYS	3	0	
PHYSICAL DIMENSIONS	0102	MIL-STD-883-2016	1	DYS	6	0	
SOLDERABILITY	0121	JESD22-B102	1	DYS	3	0	
PHYSICAL DIMENSIONS	0121	JESD22-B100	1	DYS	6	0	
SOLDERABILITY	0137	JESD22-B102	1	DYS	3	0	
PHYSICAL DIMENSIONS	0137	JESD22-B100	1	DYS	6	0	
SOLDERABILITY	0219	JESD22-B102	1	DYS	3	0	
PHYSICAL DIMENSIONS	0219	JESD22-B100	1	DYS	6	0	
SOLDERABILITY	0227	JESD22-B102	1	DYS	3	0	
PHYSICAL DIMENSIONS	0227	JESD22-B100	1	DYS	6	0	
SOLDERABILITY	0231	JESD22-B102	1	DYS	3	0	
PHYSICAL DIMENSIONS	0231	JESD22-B100	1	DYS	6	0	
SOLDERABILITY	0311	JESD22-B102	1	DYS	3	0	
PHYSICAL DIMENSIONS	0311	JESD22-B100	1	DYS	6	0	
SOLDERABILITY	0318	JESD22-B102	1	DYS	3	0	
PHYSICAL DIMENSIONS	0318	JESD22-B100	1	DYS	6	0	
SOLDERABILITY	0323	JESD22-B102	1	DYS	3	0	
PHYSICAL DIMENSIONS	0323	JESD22-B100	1	DYS	6	0	
SOLDERABILITY	0415	JESD22-B102	1	DYS	3	3	No FA
					Total:	3	

STORAGE LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
STORAGE LIFE	9917	85 C	1000 HRS	22	0	
STORAGE LIFE	9917	85 C	1000 HRS	78	0	
INFANT LIFE	9933	85 C	48 HRS	200	0	
STORAGE LIFE	9933	85 C	1000 HRS	77	0	
INFANT LIFE	9950	85 C	48 HRS	200	0	
INFANT LIFE	0027	85 C	48 HRS	200	0	
INFANT LIFE	0040	85 C	48 HRS	200	0	
INFANT LIFE	0043	85 C	48 HRS	200	0	
INFANT LIFE	0102	85 C	48 HRS	200	0	

INFANT LIFE	0121	85 C	48	HRS	200	0
INFANT LIFE	0137	85 C	48	HRS	200	0
Total:						0

TEMPERATURE CYCLE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	9917	-40 TO 85C	1000 CYS	100	0	
TEMP CYCLE	9933	0C TO 70C	1000 CYS	100	0	
TEMP CYCLE	9933	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	9950	0C TO 70C	1000 CYS	100	0	
TEMP CYCLE	0027	0C TO 70C	1000 CYS	100	0	
TEMP CYCLE	0040	0C TO 70C	1000 CYS	100	0	
TEMP CYCLE	0043	-40 TO 85C	300 CYS	100	0	
TEMP CYCLE	0102	-40 TO 85C	300 CYS	100	0	
TEMP CYCLE	0121	-40 TO 85C	300 CYS	100	0	
TEMP CYCLE	0137	-40 TO 85C	300 CYS	100	0	
TEMP CYCLE	0219	-40 TO 85C	300 CYS	100	0	
TEMP CYCLE	0227	-40 TO 85C	300 CYS	100	0	
TEMP CYCLE	0231	-40 TO 85C	300 CYS	100	0	
TEMP CYCLE	0311	-40 TO 85C	300 CYS	100	0	
TEMP CYCLE	0318	-40 TO 85C	300 CYS	100	0	
TEMP CYCLE	0323	-40 TO 85C	300 CYS	100	0	
TEMP CYCLE	0415	0C TO 70C	500 CYS	77		
Total:						0

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
BIASED MOISTURE	9917	85/85, 5.5 VOLTS	959 HRS	100	0	
BIASED MOISTURE	9933	85/85, 5.5 VOLTS	959 HRS	100	0	
BIASED MOISTURE	9933	85/85, 5.5 VOLTS	959 HRS	77	1	20000023
BIASED MOISTURE	9950	85/85, 5.5 VOLTS	959 HRS	100	0	
BIASED MOISTURE	0027	85/85, 5.5 VOLTS	959 HRS	100	0	
BIASED MOISTURE	0040	85/85, 5.5 VOLTS	959 HRS	100	0	
BIASED MOISTURE	0043	85/85, 5.5 VOLTS	959 HRS	100	0	
BIASED MOISTURE	0102	85/85, 5.5 VOLTS	959 HRS	100	1	NO FA
BIASED MOISTURE	0121	85/85, 5.5 VOLTS	959 HRS	100	0	
BIASED MOISTURE	0137	85/85, 5.5 VOLTS	959 HRS	99	0	
BIASED MOISTURE	0219	85/85, 5.5 VOLTS	959 HRS	100	0	

BIASED MOISTURE	0227	85/85, 5.5 VOLTS	1000	HRS	100	0	
BIASED MOISTURE	0231	85/85, 5.5 VOLTS	1000	HRS	100	0	
BIASED MOISTURE	0311	85/85, 5.5 VOLTS	1000	HRS	100	0	
BIASED MOISTURE	0318	85/85, 5.5 VOLTS	1000	HRS	100	0	
BIASED MOISTURE	0323	85/85, 5.5 VOLTS	1000	HRS	100	0	
BIASED MOISTURE	0415	85/85, 5.5 VOLTS	500	HRS	77		
					Total:	2	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#	
MOISTURE SOAK	9917	60C/90% R.H.	960	HRS	78	1	No FA
MOISTURE SOAK	9917	60C/90% R.H.	960	HRS	22	0	
					Total:	1	