

RELIABILITY REPORT
FOR

DS12CR887, Rev A2-C0A

Dallas Semiconductor

4401 South Beltwood Parkway
Dallas, TX 75244-3292

Prepared by:

**Don Lipps
Staff Reliability Engineer
Dallas Semiconductor
4401 South Beltwood Pkwy.
Dallas, TX 75244-3292
Email : don/lipps@dalsemi.com
ph: 972-371-3739
fax: 972-371-6016**

Conclusion:

The following qualification successfully meets the quality and reliability standards required of all Dallas Semiconductor products and processes:

DS12CR887, Rev A2-C0A

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:

$$\begin{aligned} Fr(\text{module}) &= Fr(1) + Fr(2) + Fr(3) + \dots + Fr(n) \\ Fr(\text{module}) &= \text{Failure rate of module} \\ Fr(n) &= \text{Failure rate of the nth component} \end{aligned}$$

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>
CRYSTAL	1	12458	9.2
DS12R885-5	1	74782	1.5
BR1225	1	173708	0.7
Totals:		10061	11.3

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
 Flammability: UL 94-V0
 Date Code Range: 0043 to 0323

PACKAGE TESTS

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
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
Total:				0	0

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
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 CODE	CONDITION	READPOINT	QUANTITY	FAILS
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
Total:					0

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
BIASED MOISTURE	0043	85/85, 5.5 VOLTS	959 HRS	100	0
BIASED MOISTURE	0102	85/85, 5.5 VOLTS	959 HRS	100	1
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
Total:					1

The single biased moisture failure for "wake up" (date code 0102) was not failure analyzed.