4/11/2007

RELIABILITY REPORT
FOR

DS1922L iButton, RoHS Compliant

Dallas Semiconductor

4401 South Beltwood Parkway
Dallas, TX 75244-3292

Prepared by:

Ken Wendel
Reliability Engineering Manager
Dallas Semiconductor
4401 South Beltwood Pkwy.
Dallas, TX 75244-3292
Email : ken.wendel@dalsemi.com
ph: 972-371-3726
fax: 972-371-6016
mbl: 214-435-6610

Conclusion:

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

DS1922L iButton, RoHS Compliant

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:	Beta:	MTTF (Yrs):	FITs:
BR1225	**1**	**100**	**1**	**1.0**	**0.0**	**175984**	**0.6**
CRYSTAL	**1**	**100**	**0**	**0.7**	**0.0**	**12463**	**9.2**
DS2422	**1**	**231**	**0**	**0.7**	**0.0**	**19833**	**5.8**
DS9503	**1**	**152**	**0**	**0.7**	**0.0**	**17861**	**6.4**
Totals:						**5199**	**22.0**

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

Cf: 60% **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:	2
Package Type:	Puk Can F50 Insert Mold Bump, Battery w-SMT Crystal (RoHS)
Body Size:	68
Mold Compound:	BCB
Lead Frame:	PCB; FR4
Lead Finsh:	High Pb Ball (95/5)
Die Attach:	Underfill FP4527, Dexter Hysol
Bond Wire / Size:	NA / NA
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	NA
Date Code Range:	0653 to 0703

STORAGE LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
STORAGE LIFE	0653	85 C	500 HRS	77	0	
STORAGE LIFE	0653	85 C	1000 HRS	77	0	
STORAGE LIFE	0703	85 C	1000 HRS	77	0	
			Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	0703	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0653	-40 TO 85C	1000 CYS	77	0	
TEMP CYCLE	0653	-40 TO 85C	1000 CYS	77	0	
			Total:		**0**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT	QTY	FAILS	FA#
MOISTURE SOAK	0653	85 C/85% R.H.	500 HRS	77	0	
MOISTURE SOAK	0653	85 C/85% R.H.	500 HRS	77	0	
MOISTURE SOAK	0703	85 C/85% R.H.	500 HRS	77	0	
			Total:		**0**	

Temperature Humidity was performed at an accelerated 500 hours of 85°C/85%R.H.
Requirements are 1000 hours of 60°C/90% R.H. Acceleration (Af) between these stresses is 7.5x.
Therefore the demostrated lifetime at maximum required stress conditions is 3750 hours, 3.75x in excess of requirements. See below.

Temperature - Humidity Effects (Hallberg - Peck)

Af = ((RHt/RHu)**3)*exp((Ea/k)*(1/Tu-1/Tt))

Af = acceleration factor
RHu = use environment relative humidity
RHt = test environment relative humidity
Ea = activation energy, 0.90eV
k = Boltzman's Constant (8.6171 x 10-5 eV)
Tu = use environment junction temperature (in °K)
Tt = test environment junction temperature (in °K)

NOTE: The lifetime of this product at 25°C/85%R.H. based on the above model is in excess of 15 yrs.