11/21/2002

RELIABILITY REPORT
FOR

DS1973, 4K EEPROM iButton

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:

DS1973, 4K EEPROM iButton

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:	Quantity:	MTTF (Yrs):	FITs:
DS2433	**1**	**57096**	**2.0**
Totals:		**57096**	**2**

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. A 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.

Assembly Information:

Qualification Vehicle:	DS1920
Assembly Site:	Dallas
Pin Count:	2
Package Type:	iButton F50w/IC's
Body Size:	0
Mold Compound:	?
Lead Frame:	Printed Crt Brd; FR4
Lead Finsh:	
Die Attach:	?
Bond Wire / Size:	/
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	
Date Code Range:	9835 to 9835

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
STORAGE LIFE	9835	85 C	1000	HOURS	77	0
				Total:		**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
TEMP CYCLE	9835	-40 TO 85C	1000	CYCLES	77	0
				Total:		**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
MOISTURE SOAK	9835	60C/90% R.H.	960	HOURS	77	0
				Total:		**0**

Assembly Information:

Qualification Vehicle:	DS1990
Assembly Site:	Dallas
Pin Count:	2
Package Type:	iButton F50w/IC's
Body Size:	0
Mold Compound:	?
Lead Frame:	Printed Crt Brd; FR4
Lead Finsh:	
Die Attach:	?
Bond Wire / Size:	/
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	
Date Code Range:	0130 to 0130

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
TEMP CYCLE	0130	-40 TO 85C	1000 CYCLES	77	0
			Total:		**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
MOISTURE SOAK	0130	60C/90% R.H.	960 HOURS	77	0
			Total:		**0**

Assembly Information:

Qualification Vehicle:	DS1990
Assembly Site:	Fastech
Pin Count:	2
Package Type:	iButton F50w/IC's
Body Size:	0
Mold Compound:	?
Lead Frame:	Printed Crt Brd; FR4
Lead Finsh:	
Die Attach:	?
Bond Wire / Size:	/
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	
Date Code Range:	0211 to 0211

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
STORAGE LIFE	0211	70 C	1000 HOURS	77	0
			Total:		**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS

TEMP CYCLE	0211	-40 TO 85C	500	CYCLES	77	2
				Total:		**2**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
MOISTURE SOAK	0211	60C/90% R.H.	1000	HOURS	76	0
				Total:		**0**

Assembly Information:

Qualification Vehicle:	DS2433
Assembly Site:	NSEB
Pin Count:	8
Package Type:	SOIC
Body Size:	208x1.9
Mold Compound:	Sumitomo 6600C
Lead Frame:	Stamped Copper CDA194
Lead Finsh:	SnPb Plate
Die Attach:	84-1 LMISR4 Epoxy Silverfilled Ablebond
Bond Wire / Size:	Au / 1.0 mil
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	Level 1
Date Code Range:	0125 to 0139

EEPROM WRITE/ERASE ENDURANCE AND DATA RETENTION

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
WRITE CYCLE STRESS	0125	25 C, 5.0 VOLTS	10	KCYCLS	77	0
STORAGE LIFE		150C	1000	HOURS	76	0
WRITE CYCLE STRESS	0125	25 C, 5.0 VOLTS	50	KCYCLS	77	0
STORAGE LIFE		150C	1000	HOURS	77	0
WRITE CYCLE STRESS	0132	25 C, 5.0 VOLTS	10	KCYCLS	77	1
STORAGE LIFE		150C	1000	HOURS	76	0
WRITE CYCLE STRESS	0132	25 C, 5.0 VOLTS	50	KCYCLS	77	0
STORAGE LIFE		150C	1000	HOURS	77	0
WRITE CYCLE STRESS	0139	25 C, 5.0 VOLTS	10	KCYCLS	77	0
STORAGE LIFE		150C	1000	HOURS	77	0
WRITE CYCLE STRESS	0139	25 C, 5.0 VOLTS	50	KCYCLS	77	0
STORAGE LIFE		150C	1000	HOURS	77	0
				Total:		**1**