09/20/2004

RELIABILITY REPORT
FOR

DS1647P, 34 Pin Power Cap Base w/DS9034X Cap

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:

DS1647P, 34 Pin Power Cap Base w/DS9034X Cap

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:	MTTF (Yrs):	FITs:
4MEG SRAM 5V	**1**	**1474**	**0**	**0.7**	**173200**	**0.7**
BR1632	**1**	**100**	**1**	**1.0**	**47996**	**2.4**
CRYSTAL	**1**	**100**	**0**	**0.7**	**12463**	**9.2**
DS1648	**1**	**1760**	**3**	**0.7**	**30066**	**3.8**
Totals:					**7137**	**16.0**

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

Cf: 60% **Tu: 25** **°C**

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 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:	34
Package Type:	Power Cap
Body Size:	980x980x1.0
Mold Compound:	?
Lead Frame:	PCB; FR4
Lead Finsh:	
Die Attach:	?
Bond Wire / Size:	/
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	Level 3
Date Code Range:	0115 to 0231

MECHANICAL LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
MECHANICAL SHOCK	0115	HALF-SINE,200G,6.0MS-5 PULSES IN 6 ORIENTATIONS	30	CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0115	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50	0	
MECHANICAL SHOCK	0119	HALF-SINE,200G,6.0MS-5 PULSES IN 6 ORIENTATIONS	30	CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0119	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50	0	
MECHANICAL SHOCK	0134	HALF-SINE,200G,6.0MS-5 PULSES IN 6 ORIENTATIONS	30	CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0134	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50	0	
MECHANICAL SHOCK	0135	HALF-SINE,200G,6.0MS-5 PULSES IN 6 ORIENTATIONS	30	CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0135	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50	0	
MECHANICAL SHOCK	0231	HALF-SINE,200G,6.0MS-5 PULSES IN 6 ORIENTATIONS	30	CYS	50	0	
VIBRATION, VARIABLE FREQUENCY	0231	10g or 0.06", 5Hz-2KHz, X Y Z axis	9	HRS	50	0	
				Total:		**0**	

OPERATING LIFE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
HIGH TEMP OP LIFE	0119	85 C, 5.5V (PSA) & -3.0V (PSB)	1000	HRS	77	0	

HIGH TEMP OP LIFE	0134	85 C, 5.5V (PSA) & -3.0V (PSB)	336	HRS	77	0
HIGH TEMP OP LIFE	0135	85 C, 5.5V (PSA) & -3.0V (PSB)	1000	HRS	77	0
HIGH TEMP OP LIFE	0231	85 C, 3.3V (PSA) & 0.0V (PSB)	1000	HRS	76	0
				Total:		**0**

PACKAGE TESTS

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
SOLDERABILITY	0115	JESD22-B102	2	DYS	3	0	
X-RAY	0115	MIL-STD-883-2012 : TOP & SIDE VIEW	2	DYS	6	0	
PHYSICAL DIMENSIONS		JESD22-B100	2	DYS	6	0	
LEAD INTEGRITY		JESD22-B105 TEST CONDITION B	2	DYS	6	0	
MARK PERMANENCY		JESD22-B107	2	DYS	6	0	
SOLDERABILITY	0119	MIL-STD-883-2003	2	DYS	3	0	
X-RAY	0119	MIL-STD-883-2012 : TOP & SIDE VIEW	2	DYS	6	0	
PHYSICAL DIMENSIONS		MIL-STD-883-2016	2	DYS	6	0	
LEAD INTEGRITY		MIL-STD-883-2004 : COND B2	2	DYS	6	0	
MARK PERMANENCY		MIL-STD-883-2015	2	DYS	6	0	
SOLDERABILITY	0134	MIL-STD-883-2003	2	DYS	3	0	
X-RAY	0134	MIL-STD-883-2012 : TOP & SIDE VIEW	2	DYS	6	0	
PHYSICAL DIMENSIONS		MIL-STD-883-2016	2	DYS	6	0	
LEAD INTEGRITY		MIL-STD-883-2004 : COND B2	2	DYS	6	0	
MARK PERMANENCY		MIL-STD-883-2015	2	DYS	6	0	
SOLDERABILITY	0135	MIL-STD-883-2003	2	DYS	3	0	
X-RAY	0135	MIL-STD-883-2012 : TOP & SIDE VIEW	2	DYS	6	0	
PHYSICAL DIMENSIONS		MIL-STD-883-2016	2	DYS	6	0	
LEAD INTEGRITY		MIL-STD-883-2004 : COND B2	2	DYS	6	0	
MARK PERMANENCY		MIL-STD-883-2015	2	DYS	6	0	
X-RAY	0231	MIL-STD-883-2012 : TOP & SIDE VIEW	2	DYS	6	0	
PHYSICAL DIMENSIONS		JESD22-B100	2	DYS	6	0	
				Total:		**0**	

PRECONDITIONING LEVEL 3

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
STORAGE LIFE	0115	125C	24	HRS	279		
MOISTURE SOAK		30C/60% R.H.	240	HRS	279		
CONVECTION REFLOW		220C	2	PASS	279	0	
STORAGE LIFE	0119	125C	24	HRS	331		
MOISTURE SOAK		30C/60% R.H.	240	HRS	331		
CONVECTION REFLOW		220C	2	PASS	331	0	
STORAGE LIFE	0134	125C	24	HRS	331		
MOISTURE SOAK		60C/60% R.H.	40	HRS	331		
CONVECTION REFLOW		235C +5/-0C	2	PASS	331	0	
STORAGE LIFE	0135	125C	24	HRS	331		
MOISTURE SOAK		60C/60% R.H.	40	HRS	331		
CONVECTION REFLOW		235C +5/-0C	2	PASS	331	0	

					Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
TEMP CYCLE	0115	-40 TO 85C	1000	CYS	77	0	
TEMP CYCLE	0119	-40 TO 85C	1000	CYS	77	0	
TEMP CYCLE	0134	-40 TO 85C	1000	CYS	75	1	30002243
TEMP CYCLE	0135	-40 TO 85C	1000	CYS	76	0	
TEMP CYCLE	0212	-40 TO 85C	1000	CYS	100	0	
TEMP CYCLE	0231	-40 TO 85C	2000	CYS	76	0	
				Total:		**1**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CD	CONDITION	READPOINT		QTY	FAILS	FA#
MOISTURE SOAK	0115	60C/90% R.H.	960	HRS	77	1	30001083
MOISTURE SOAK	0119	60C/90% R.H.	960	HRS	56	0	
MOISTURE SOAK	0134	60C/90% R.H.	960	HRS	75	0	
MOISTURE SOAK	0135	60C/90% R.H.	960	HRS	77	0	
MOISTURE SOAK	0231	60C/90% R.H.	1000	HRS	76	0	
				Total:		**1**	