

**RELIABILITY MONITOR REPORT  
FOR**

**uSOP Package**

**Dallas Semiconductor**

**4401 South Beltwood Parkway  
Dallas, TX 75244-3292**

**This Report was prepared by  
Dallas Semiconductor Reliability Engineering**

**Summary:**

The data in the tables that follow was generated as the result of an on-going Package Reliability Monitor. The assemblies covered by this package monitor are:

ASSY SITE	PINS	PACKAGE		
ATP (Amkor, PI)	10	uSOP	ATP (Amkor, PI)	8 uSOP
ATP (Amkor, PI)	10	uSOP (Pb-Free)	ATP (Amkor, PI)	8 uSOP (Pb-Free)
ATP (Amkor, PI)	8	uSOP (Pb-Free) Exposed Pad	ATP (Amkor, PI)	8 uSOP Exposed Pad
Carsem	10	uSOP	Carsem	8 uSOP
Carsem	10	uSOP (Pb-Free)	NSEB	10 uSOP
NSEB	8	uSOP	NSEB	10 uSOP (Pb-Free)
NSEB	8	uSOP (Pb-Free)		

The calculated failure rate for this assembly is:

**FAILURE RATE:                      MTTF (YRS): 49822                      FITS: 2.3**

The parameters used to calculate this 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 a description of the assembly vehicle used to generate this reliability data. The next section is the detailed reliability data for each stress. The reliability data section includes the latest data available. This report covers data between 7/1/04 and 6/30/05 .

**Assembly Information:**

Package Type:                      uSOP 3mm  
 Flammability:                      UL 94-V0  
 Moisture Sensitivity                      Level 1  
 (JEDEC J-STD20A)  
 Date Code Range:                      0421                      to                      0504

**MOISTURE SENSITIVITY LEVEL 1**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
EXTERNAL VISUAL	0504	DS1086H	J-STD-020, 6.1a		22	0	
ULTRASOUND			J-STD-020		22	0	
STORAGE LIFE			125C	24 HRS	22		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	22		
CONVECTION REFLOW			235C +5/-0C	3 PASS	22	0	
EXTERNAL VISUAL			J-STD-020, 6.1a		22	0	
PRECONDITION U/S			J-STD-020		22	0	
<b>Total:</b>						<b>0</b>	

**OPERATING LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0421	DS1390	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0422	DS1393	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0424	DS1391	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0437	DS600	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0443	DS1825	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0449	DS2703	125C, 5.5 VOLTS	1000 HRS	45	0	

HIGH TEMP OP LIFE	0501	DS1088L	125C, 3.6 VOLTS	1000 HRS	77	0
<b>Total:</b>						<b>0</b>

**PACKAGE TESTS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
SOLDERABILITY (Sn/Pb)	0504	DS1086H	JESD22-B102, COND C		15	0	
SOLDERABILITY (Sn/Pb)	0504	DS1086H	J-STD-002, WETTING BALANCE		20	0	
EXTERNAL VISUAL	0504	DS1086H	JESD22-B101		30	0	
<b>Total:</b>						<b>0</b>	

**PRECONDITIONING LEVEL 1**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0501	DS1088L	125C	24 HRS	306		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	306		
CONVECTION REFLOW			235C +/-0C	3 PASS	306	0	
STORAGE LIFE	0504	DS1086H	125C	24 HRS	320		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	320		
CONVECTION REFLOW			235C +/-0C	3 PASS	320	0	
<b>Total:</b>						<b>0</b>	

**STORAGE LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0437	DS600	150C	1000 HRS	77	0	
STORAGE LIFE	0501	DS1088L	150C	1000 HRS	77	0	
STORAGE LIFE	0504	DS1086H	150C	500 HRS	77	0	
<b>Total:</b>						<b>0</b>	

**TEMPERATURE CYCLE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0449	DS2703	-55C TO 125C	1000 CYS	77	0	
TEMP CYCLE	0501	DS1088L	-55C TO 125C	1000 CYS	77	0	
TEMP CYCLE	0504	DS1086H	-55C TO 125C	500 CYS	77	0	
<b>Total:</b>						<b>0</b>	

**TEMPERATURE HUMIDITY BIAS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HAST	0449	DS2703	130C, 85%R.H.,5.5V	96 HRS	77	0	
HAST	0504	DS1086H	130C, 85%R.H.,5.5V	100 HRS	77	0	
<b>Total:</b>						<b>0</b>	

**UNBIASED MOISTURE RESISTANCE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
AUTOCLAVE	0449	DS2703	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
AUTOCLAVE	0501	DS1088L	121C, 2 ATM STEAM, UNBIASED	168 HRS	70	0	
AUTOCLAVE	0504	DS1086H	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
<b>Total:</b>						<b>0</b>	

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**Assembly Information:**

Package Type: uSOP (Pb-Free) 3mm  
Flammability: UL 94-V0  
Moisture Sensitivity (JEDEC J-STD20A) Level 1  
Date Code Range: 0451 to 0502

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**MOISTURE SENSITIVITY LEVEL 1**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
EXTERNAL VISUAL	0451	DS600	J-STD-020, 6.1a		8	0	
ULTRASOUND			J-STD-020		8	0	
STORAGE LIFE			125C	24 HRS	8		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	8		
CONVECTION REFLOW			260C +/-5C	3 PASS	8	0	
EXTERNAL VISUAL			J-STD-020, 6.1a		8	0	
PRECONDITION U/S			J-STD-020		8	0	
<b>Total:</b>						<b>0</b>	

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**OPERATING LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0451	DS600	125C, 5.5 VOLTS	1000 HRS	45	0	
<b>Total:</b>						<b>0</b>	

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**PACKAGE TESTS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
SOLDERABILITY (Sn/Pb)	0451	DS600	JESD22-B102, COND C		3	0	
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C		3	0	
X-RAY	0451	DS600	MIL-STD-883-2012 : TOP & SIDE VIEW		6	0	
PHYSICAL DIMENSIONS			JESD22-B100		6	0	
MARK PERMANENCY			JESD22-B107		6	0	
LEAD INTEGRITY			JESD22-B105, COND B		6	0	
<b>Total:</b>						<b>0</b>	

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**PRECONDITIONING LEVEL 1**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0451	DS600	125C	24 HRS	385		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	385		
CONVECTION REFLOW			260C +/-5C	3 PASS	385	0	
STORAGE LIFE	0502	DS1086L	125C	24 HRS	318		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	318		
CONVECTION REFLOW			260C +/-5C	3 PASS	318	0	
<b>Total:</b>						<b>0</b>	

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**STORAGE LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0451	DS600	150C	1000 HRS	77	0	
STORAGE LIFE	0502	DS1086L	150C	1000 HRS	77	0	

**Total: 0**

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**TEMPERATURE CYCLE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0451	DS600	-55C TO 125C	1000 CYS	77	0	
TEMP CYCLE	0502	DS1086L	-55C TO 125C	1000 CYS	77	0	
<b>Total:</b>						<b>0</b>	

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**TEMPERATURE HUMIDITY BIAS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HAST	0502	DS1086L	130C, 85%R.H.,3.5V	96 HRS	77	0	
<b>Total:</b>						<b>0</b>	

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**UNBIASED MOISTURE RESISTANCE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HAST, NO BIAS	0451	DS600	130C, 85% R.H.	200 HRS	77	0	
AUTOCLAVE	0451	DS600	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
AUTOCLAVE	0502	DS1086L	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
<b>Total:</b>						<b>0</b>	

**FAILURE RATE: MTTF (YRS): 49822 FITS: 2.3**