

RELIABILITY MONITOR REPORT
FOR

TSSOP 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		
ATK (Amkor, K)	14	TSSOP	ATK (Amkor, K)	16 TSSOP
ATK (Amkor, K)	20	TSSOP	ATP (Amkor, PI)	14 TSSOP
ATP (Amkor, PI)	16	TSSOP	ATP (Amkor, PI)	20 TSSOP
ATP (Amkor, PI)	24	TSSOP	ATP (Amkor, PI)	28 TSSOP
ATP (Amkor, PI)	8	TSSOP	ATP (Amkor, PI)	16 TSSOP & Bump Resistor
ATP (Amkor, PI)	8	TSSOP & Bump Resistor	ATP (Amkor, PI)	8 TSSOP & Bump Resistor (Pb-Free)
ATP (Amkor, PI)	14	TSSOP (Pb-Free)	ATP (Amkor, PI)	16 TSSOP (Pb-Free)
ATP (Amkor, PI)	20	TSSOP (Pb-Free)	ATP (Amkor, PI)	24 TSSOP (Pb-Free)
ATP (Amkor, PI)	28	TSSOP (Pb-Free)	ATP (Amkor, PI)	8 TSSOP (Pb-Free)
Carsem	14	TSSOP	Carsem	16 TSSOP
Carsem	20	TSSOP	Carsem	24 TSSOP
Carsem	28	TSSOP	Carsem	8 TSSOP
Carsem	14	TSSOP & Bump Resistor	Carsem	16 TSSOP & Bump Resistor
Carsem	20	TSSOP & Bump Resistor	Carsem	8 TSSOP & Bump Resistor
Carsem	16	TSSOP & Bump Resistor (Pb-Free)	Carsem	14 TSSOP (Pb-Free)
Carsem	16	TSSOP (Pb-Free)	Carsem	20 TSSOP (Pb-Free)
Carsem	24	TSSOP (Pb-Free)	Carsem	28 TSSOP (Pb-Free)
NSEB	20	TSSOP	NSEB	20 TSSOP (Pb-Free)
NSEB	28	TSSOP (Pb-Free)	OSEP	14 TSSOP
OSEP	16	TSSOP	OSEP	20 TSSOP
OSEP	24	TSSOP	OSEP	28 TSSOP
OSEP	14	TSSOP (Pb-Free)	OSEP	16 TSSOP (Pb-Free)
OSEP	20	TSSOP (Pb-Free)	OSEP	24 TSSOP (Pb-Free)
OSEP	28	TSSOP (Pb-Free)		

The calculated failure rate for this assembly is:

FAILURE RATE: MTTF (YRS): 112921 FITS: 1.0

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: TSSOP 4.4 mm
 Flammability: UL 94-V0
 Moisture Sensitivity
 (JEDEC J-STD20A) Level 1
 Date Code Range: 0424 to 0515

OPERATING LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0424	DS1848	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0425	DS4077C	125C, 3.6V (PSA) & -4.0V (PSB)	1000 HRS	45	0	
HIGH VOLTAGE LIFE	0431	DS1267	125C, 5.5 V, -4.0V	1000 HRS	80	0	

HIGH TEMP OP LIFE	0437	DS2751	125C, 5.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0440	DS13Q10	125C, 3.6 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0440	DS4550	125C, 5.5 VOLTS	1000 HRS	77	0
HIGH TEMP OP LIFE	0440	DS2764	125C, 5.5 VOLTS	1000 HRS	77	0
HIGH TEMP OP LIFE	0450	DS1856	125C, 5.5 VOLTS	1000 HRS	77	0
HIGH VOLTAGE LIFE	0452	DS2761	125C, 5.5 VOLTS	1000 HRS	77	0
HIGH TEMP OP LIFE	0515	DS2755	125C, 5.5 VOLTS	1000 HRS	45	0
Total:						0

PRECONDITIONING LEVEL 1

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
ULTRASOUND	0431	DS1267	J-STD-020		241	0	
STORAGE LIFE	0431	DS1267	125C	24 HRS	241		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	241		
CONVECTION REFLOW			235C +5/-0C	3 PASS	241	0	
PRECONDITION U/S	0431	DS1267	J-STD-020		4	0	
Total:						0	

STORAGE LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0425	DS4077C	150C	1000 HRS	77	0	
Total:						0	

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0431	DS1267	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0437	DS2751	-55C TO 125C	1000 CYS	77	0	
Total:						0	

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
BIASED MOISTURE	0431	DS1267	85/85, 5.5 VOLTS	1000 HRS	77	0	
BIASED MOISTURE	0437	DS2751	85/85, 5.5 VOLTS	1000 HRS	77	0	
Total:						0	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
AUTOCLAVE	0437	DS2751	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
Total:						0	

Assembly Information:

Package Type: TSSOP (Pb-Free) 4.4 mm
 Flammability: UL 94-V0
 Moisture Sensitivity (JEDEC J-STD20A) Level 1
 Date Code Range: 0438 to 0453

MOISTURE SENSITIVITY LEVEL 1

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
EXTERNAL VISUAL	0438	DS1673	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
EXTERNAL VISUAL	0439	DS1673	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
EXTERNAL VISUAL	0439	DS1673	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
EXTERNAL VISUAL	0446	DS2119M	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
EXTERNAL VISUAL	0451	DS2120	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
EXTERNAL VISUAL	0452	DS2120	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
EXTERNAL VISUAL	0453	DS2120	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

Total: 0

OPERATING LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE VISUAL INSPECTION	0438	DS1673	125C, 3.3 VOLTS WHISKERS < 50uM	1000 HRS	45 3	0 0	
HIGH TEMP OP LIFE VISUAL INSPECTION	0439	DS1673	125C, 3.3 VOLTS WHISKERS < 50uM	1000 HRS	45 3	0 0	
HIGH TEMP OP LIFE VISUAL INSPECTION	0439	DS1673	125C, 3.3 VOLTS WHISKERS < 50uM	1000 HRS	46 3	0 0	
HIGH TEMP OP LIFE VISUAL INSPECTION	0446	DS2119M	125C, 5.5 VOLTS WHISKERS < 50uM	1000 HRS	45 3	0 0	
HIGH TEMP OP LIFE VISUAL INSPECTION	0451	DS2120	125C, 5.5 VOLTS WHISKERS < 50uM	1000 HRS	45 3	0 0	
HIGH TEMP OP LIFE VISUAL INSPECTION	0452	DS2120	125C, 5.5 VOLTS WHISKERS < 50uM	1000 HRS	45 3	0 0	
HIGH TEMP OP LIFE VISUAL INSPECTION	0453	DS2120	125C, 5.5 VOLTS WHISKERS < 50uM	1000 HRS	45 3	0 0	
Total:						0	

PACKAGE TESTS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
SOLDERABILITY (Sn/Pb) SOLDERABILITY (Pb-Free)	0438	DS1673	JESD22-B102, COND C JESD22-B102, COND C		3 3	0 0	
X-RAY PHYSICAL DIMENSIONS MARK PERMANENCY LEAD INTEGRITY	0438	DS1673	MIL-STD-883-2012 : TOP & SIDE VIEW JESD22-B100 JESD22-B107 JESD22-B105, COND B		6 6 6 6	0 0 0 0	
SOLDERABILITY (Sn/Pb) SOLDERABILITY (Pb-Free)	0439	DS1673	JESD22-B102, COND C JESD22-B102, COND C		3 3	0 0	
X-RAY PHYSICAL DIMENSIONS MARK PERMANENCY LEAD INTEGRITY	0439	DS1673	MIL-STD-883-2012 : TOP & SIDE VIEW JESD22-B100 JESD22-B107 JESD22-B105, COND B		6 6 6 6	0 0 0 0	
SOLDERABILITY (Sn/Pb) SOLDERABILITY (Pb-Free)	0439	DS1673	JESD22-B102, COND C JESD22-B102, COND C		3 3	0 0	
X-RAY PHYSICAL DIMENSIONS MARK PERMANENCY LEAD INTEGRITY	0439	DS1673	MIL-STD-883-2012 : TOP & SIDE VIEW JESD22-B100 JESD22-B107 JESD22-B105, COND B		6 6 6 6	0 0 0 0	
SOLDERABILITY (Sn/Pb)	0439	DS1673	JESD22-B102, COND C		8	0	
SOLDERABILITY (Sn/Pb) SOLDERABILITY (Pb-Free)	0446	DS2119M	JESD22-B102, COND C JESD22-B102, COND C		3 3	0 0	
X-RAY PHYSICAL DIMENSIONS	0446	DS2119M	MIL-STD-883-2012 : TOP & SIDE VIEW JESD22-B100		6 6	0 0	

MARK PERMANENCY	0446	DS2119M	JESD22-B107	6	0
LEAD INTEGRITY			JESD22-B105, COND B	6	0
SOLDERABILITY (Sn/Pb)	0451	DS2120	JESD22-B102, COND C	3	0
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C	3	0
X-RAY	0451	DS2120	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
SOLDERABILITY (Sn/Pb)	0452	DS2120	JESD22-B102, COND C	3	0
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C	3	0
X-RAY	0452	DS2120	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
SOLDERABILITY (Sn/Pb)	0453	DS2120	JESD22-B102, COND C	3	0
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C	3	0
X-RAY	0453	DS2120	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
Total:				0	0

PRECONDITIONING LEVEL 1

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0438	DS1673	125C	24	HRS	353	
MOISTURE SOAK			85 C/85% R.H.	168	HRS	353	
CONVECTION REFLOW			260C +/-5C	3	PASS	353	0
STORAGE LIFE	0439	DS1673	125C	24	HRS	353	
MOISTURE SOAK			85 C/85% R.H.	168	HRS	353	
CONVECTION REFLOW			260C +/-5C	3	PASS	353	0
STORAGE LIFE	0439	DS1673	125C	24	HRS	353	
MOISTURE SOAK			85 C/85% R.H.	168	HRS	353	
CONVECTION REFLOW			260C +/-5C	3	PASS	353	0
STORAGE LIFE	0446	DS2119M	125C	24	HRS	353	
MOISTURE SOAK			85 C/85% R.H.	168	HRS	353	
CONVECTION REFLOW			260C +/-5C	3	PASS	353	0
STORAGE LIFE	0451	DS2120	125C	24	HRS	353	
MOISTURE SOAK			85 C/85% R.H.	168	HRS	353	
CONVECTION REFLOW			260C +/-5C	3	PASS	353	0
STORAGE LIFE	0452	DS2120	125C	24	HRS	353	
MOISTURE SOAK			85 C/85% R.H.	168	HRS	353	
CONVECTION REFLOW			260C +/-5C	3	PASS	353	0
STORAGE LIFE	0453	DS2120	125C	24	HRS	353	
MOISTURE SOAK			85 C/85% R.H.	168	HRS	353	
CONVECTION REFLOW			260C +/-5C	3	PASS	353	0
Total:				0	0	0	0

STORAGE LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0438	DS1673	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0439	DS1673	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0439	DS1673	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0446	DS2119M	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0451	DS2120	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0452	DS2120	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0453	DS2120	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
					Total:	0	

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0438	DS1673	-55C TO 125C	1000 CYS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
TEMP CYCLE	0439	DS1673	-55C TO 125C	1000 CYS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
TEMP CYCLE	0439	DS1673	-55C TO 125C	1000 CYS	76	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
TEMP CYCLE	0446	DS2119M	-55C TO 125C	1000 CYS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
TEMP CYCLE	0451	DS2120	-55C TO 125C	1000 CYS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
TEMP CYCLE	0452	DS2120	-55C TO 125C	1000 CYS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
TEMP CYCLE	0453	DS2120	-55C TO 125C	1000 CYS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
					Total:	0	

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
BIASED MOISTURE	0438	DS1673	85/85, 3.5 VOLTS	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
BIASED MOISTURE	0439	DS1673	85/85, 3.5 VOLTS	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
BIASED MOISTURE	0439	DS1673	85/85, 3.5 VOLTS	1000 HRS	76	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
BIASED MOISTURE	0446	DS2119M	85/85, 5.5 VOLTS	1000 HRS	45	0	

BIASED MOISTURE	0451	DS2120	85/85, 5.5 VOLTS	1000 HRS	45	0
VISUAL INSPECTION			WHISKERS < 50uM		3	0
BIASED MOISTURE	0452	DS2120	85/85, 5.5 VOLTS	1000 HRS	45	0
VISUAL INSPECTION			WHISKERS < 50uM		3	0
BIASED MOISTURE	0453	DS2120	85/85, 5.5 VOLTS	1000 HRS	45	0
VISUAL INSPECTION			WHISKERS < 50uM		3	0
Total:					0	0

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
AUTOCLAVE	0438	DS1673	121C, 2 ATM STEAM, UNBIASED	168 HRS	76	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
AUTOCLAVE	0439	DS1673	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
AUTOCLAVE	0439	DS1673	121C, 2 ATM STEAM, UNBIASED	168 HRS	76	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
AUTOCLAVE	0446	DS2119M	121C, 2 ATM STEAM, UNBIASED	168 HRS	74	0	
AUTOCLAVE	0451	DS2120	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
AUTOCLAVE	0452	DS2120	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
AUTOCLAVE	0453	DS2120	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
Total:					0	0	

FAILURE RATE:

MTTF (YRS): 112921

FITS: 1.0