

RELIABILITY MONITOR REPORT
FOR

PLCC 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)	32	PLCC	ATK (Amkor, K)	68 PLCC
ATP (Amkor, PI)	28	PLCC	ATP (Amkor, PI)	32 PLCC
ATP (Amkor, PI)	44	PLCC	ATP (Amkor, PI)	52 PLCC
ATP (Amkor, PI)	68	PLCC	ATP (Amkor, PI)	28 PLCC (Pb-Free)
ATP (Amkor, PI)	44	PLCC (Pb-Free)	OSEP	28 PLCC
OSEP	44	PLCC	OSEP	52 PLCC
OSEP	44	PLCC (Pb-Free)		

The calculated failure rate for this assembly is:

FAILURE RATE: **MTTF (YRS): 93506** **FITS: 1.2**

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 10/1/04 and 9/30/05.

Assembly Information:

Package Type: PLCC 652
 Flammability: UL 94-V0
 Moisture Sensitivity
 (JEDEC J-STD20A) Level 3
 Date Code Range: 0440 to 0509

OPERATING LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0440	DS87C520	125C, 5.5 VOLTS	12 HRS	1000	0	
HIGH TEMP OP LIFE	0440	DS87C520	125C, 5.5 VOLTS	12 HRS	1000	0	
HIGH TEMP OP LIFE	0440	DS87C520	125C, 5.5 VOLTS	12 HRS	806	0	
HIGH TEMP OP LIFE	0440	DS87C520	125C, 5.5 VOLTS	988 HRS	75	0	
HIGH TEMP OP LIFE	0444	DS80C320	125C, 5.5 VOLTS	1000 HRS	75	0	
HIGH TEMP OP LIFE	0445	DS87C520	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0509	DS80C320	125C, 5.5 VOLTS	1000 HRS	77	0	
Total:						0	

PRECONDITIONING LEVEL 3

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
ULTRASOUND	0444	DS80C320	J-STD-020		241	0	
STORAGE LIFE	0444	DS80C320	125C	24 HRS	241		
MOISTURE SOAK			30C/60% R.H.	192 HRS	241		
CONVECTION REFLOW			220C +5/-0C	3 PASS	241	0	
PRECONDITION U/S	0444	DS80C320	J-STD-020		4	0	

ULTRASOUND	0445	DS87C520	J-STD-020			4	0
STORAGE LIFE	0445	DS87C520	125C	24	HRS	241	
MOISTURE SOAK			30C/60% R.H.	192	HRS	241	
CONVECTION REFLOW			220C +5/-0C	3	PASS	241	0
PRECONDITION U/S	0445	DS87C520	J-STD-020			4	0
ULTRASOUND	0509	DS80C320	J-STD-020			6	0
STORAGE LIFE	0509	DS80C320	125C	24	HRS	241	
MOISTURE SOAK			30C/60% R.H.	192	HRS	241	
CONVECTION REFLOW			220C +5/-0C	3	PASS	241	0
PRECONDITION U/S	0509	DS80C320	J-STD-020			4	0
Total:						0	0

STORAGE LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0440	DS87C520	150C	1000	HRS	76	0
STORAGE LIFE	0444	DS80C320	150C	1000	HRS	50	0
STORAGE LIFE	0445	DS87C520	150C	1000	HRS	50	0
STORAGE LIFE	0509	DS80C320	150C	1000	HRS	50	0
Total:						0	0

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0440	DS87C520	-55C TO 125C	1000	CYS	76	0
TEMP CYCLE	0444	DS80C320	-55C TO 125C	1000	CYS	50	0
TEMP CYCLE	0445	DS87C520	-55C TO 125C	1000	CYS	50	0
TEMP CYCLE	0509	DS80C320	-55C TO 125C	1000	CYS	50	0
Total:						0	0

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HAST	0440	DS87C520	130C, 85%R.H.,5.5V	96	HRS	75	0
HAST	0444	DS80C320	130C, 85%R.H.,5.5V	96	HRS	60	0
HAST	0445	DS87C520	130C, 85%R.H.,5.5V	96	HRS	60	0
HAST	0509	DS80C320	130C, 85%R.H.,5.5V	96	HRS	59	0
Total:						0	0

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
AUTOCLAVE	0440	DS87C520	121C, 2 ATM STEAM, UNBIASED	168	HRS	76	0
Total:						0	0

Assembly Information:

Package Type: PLCC (Pb-Free)1 452
Flammability: UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A) Level 1
Date Code Range: 0501 to 0501

MOISTURE SENSITIVITY LEVEL 1

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
EXTERNAL VISUAL	0501	DS12885	J-STD-020, 6.1a		8	0	
ULTRASOUND			J-STD-020		8	0	
STORAGE LIFE			125C	48 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	0501	DS12885	J-STD-020, 6.1a		8	0	
ULTRASOUND			J-STD-020		8	0	
STORAGE LIFE			125C	48 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	0501	DS12885	125C, 5.5 VOLTS	1000 HRS	75	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
HIGH TEMP OP LIFE	0501	DS12885	125C, 5.5 VOLTS	1000 HRS	76	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
Total:						0	

PACKAGE TESTS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
SOLDERABILITY (Sn/Pb)	0501	DS12885	JESD22-B102, COND C		3	0	
X-RAY	0501	DS12885	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)	0501	DS12885	JESD22-B102, COND C		3	0	
X-RAY	0501	DS12885	MIL-STD-883-2012 : TOP & SIDE VIEW		6	0	
MARK PERMANENCY			JESD22-B107		6	0	
LEAD INTEGRITY			JESD22-B105, COND B		6	0	
Total:						0	

PRECONDITIONING LEVEL 1

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
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STORAGE LIFE	0501	DS12885	125C	48	HRS	383		
MOISTURE SOAK			85 C/85% R.H.	168	HRS	383		
CONVECTION REFLOW			260C +/-5C	3	PASS	383	0	
STORAGE LIFE	0501	DS12885	125C	48	HRS	377		
MOISTURE SOAK			85 C/85% R.H.	168	HRS	377		
CONVECTION REFLOW			260C +/-5C	3	PASS	377	0	
Total:							0	

STORAGE LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO	
STORAGE LIFE	0501	DS12885	150C	1000 HRS	76	0		
VISUAL INSPECTION			WHISKERS < 50uM		3	0		
STORAGE LIFE	0501	DS12885	150C	1000 HRS	76	0		
VISUAL INSPECTION			WHISKERS < 50uM		3	0		
Total:							0	

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO	
TEMP CYCLE	0501	DS12885	-55C TO 125C	1000 CYS	77	0		
VISUAL INSPECTION			WHISKERS < 50uM		3	0		
TEMP CYCLE	0501	DS12885	-55C TO 125C	1000 CYS	75	0		
VISUAL INSPECTION			WHISKERS < 50uM		3	0		
Total:							0	

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO	
HAST	0501	DS12885	130C, 85%R.H.,5.5V	96 HRS	77	0		
VISUAL INSPECTION			WHISKERS < 50uM		3	0		
HAST	0501	DS12885	130C, 85%R.H.,5.5V	96 HRS	75	0		
VISUAL INSPECTION			WHISKERS < 50uM		3	0		
Total:							0	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO	
AUTOCLAVE	0501	DS12885	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0		
VISUAL INSPECTION			WHISKERS < 50uM		3	0		
AUTOCLAVE	0501	DS12885	121C, 2 ATM STEAM, UNBIASED	168 HRS	75	0		
VISUAL INSPECTION			WHISKERS < 50uM		3	0		
Total:							0	

Assembly Information:

Package Type: PLCC (Pb-Free)1 652
 Flammability: UL 94-V0
 Moisture Sensitivity (JEDEC J-STD20A) Level 3
 Date Code Range: 0435 to 0451

MOISTURE SENSITIVITY LEVEL 3

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
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EXTERNAL VISUAL	0435	DS80C320	J-STD-020, 6.1a			8	0
ULTRASOUND			J-STD-020			8	0
STORAGE LIFE			125C	24	HRS	8	
MOISTURE SOAK			30C/60% R.H.	240	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	0435	DS80C320	J-STD-020, 6.1a			8	0
ULTRASOUND			J-STD-020			8	0
STORAGE LIFE			125C	24	HRS	8	
MOISTURE SOAK			30C/60% R.H.	240	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	0435	DS80C320	J-STD-020, 6.1a			8	0
ULTRASOUND			J-STD-020			8	0
STORAGE LIFE			125C	24	HRS	8	
MOISTURE SOAK			30C/60% R.H.	240	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	DS80C320	J-STD-020, 6.1a			8	0
ULTRASOUND			J-STD-020			8	0
STORAGE LIFE			125C	48	HRS	8	
MOISTURE SOAK			30C/60% R.H.	192	HRS	8	
EXTERNAL VISUAL			J-STD-020, 6.1a			8	0
PRECONDITION U/S			J-STD-020			8	0
Total:						0	0

OPERATING LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0435	DS80C320	125C, 5.5 VOLTS	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
HIGH TEMP OP LIFE	0435	DS80C320	125C, 5.5 VOLTS	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
HIGH TEMP OP LIFE	0435	DS80C320	125C, 5.5 VOLTS	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
HIGH TEMP OP LIFE	0451	DS80C320	125C, 5.5 VOLTS	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
Total:						0	0

PACKAGE TESTS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
SOLDERABILITY (Sn/Pb)	0435	DS80C320	JESD22-B102, COND C		3	0	
X-RAY	0435	DS80C320	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)	0435	DS80C320	JESD22-B102, COND C		3	0	

X-RAY	0435	DS80C320	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)	0435	DS80C320	JESD22-B102, COND C	3	0
X-RAY	0435	DS80C320	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)	0451	DS80C320	JESD22-B102, COND C	3	0
X-RAY	0451	DS80C320	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 3

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0435	DS80C320	125C	24 HRS	385		
MOISTURE SOAK			30C/60% R.H.	240 HRS	385		
CONVECTION REFLOW			260C +/-5C	3 PASS	385	0	
STORAGE LIFE	0435	DS80C320	125C	24 HRS	385		
MOISTURE SOAK			30C/60% R.H.	240 HRS	385		
CONVECTION REFLOW			260C +/-5C	3 PASS	385	0	
STORAGE LIFE	0435	DS80C320	125C	24 HRS	385		
MOISTURE SOAK			30C/60% R.H.	240 HRS	385		
CONVECTION REFLOW			260C +/-5C	3 PASS	385	0	
STORAGE LIFE	0451	DS80C320	125C	48 HRS	385		
MOISTURE SOAK			30C/60% R.H.	192 HRS	385		
CONVECTION REFLOW			260C +/-5C	3 PASS	385	0	
Total:						0	

STORAGE LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0435	DS80C320	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0435	DS80C320	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0435	DS80C320	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0451	DS80C320	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	0435	DS80C320	-55C TO 125C	1000 CYS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	

TEMP CYCLE	0435	DS80C320	-55C TO 125C	1000	CYS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
TEMP CYCLE	0435	DS80C320	-55C TO 125C	1000	CYS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
TEMP CYCLE	0451	DS80C320	-55C TO 125C	1000	CYS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
Total:						0	0

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HAST	0435	DS80C320	130C, 85%R.H.,5.5V	96	HRS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
HAST	0435	DS80C320	130C, 85%R.H.,5.5V	96	HRS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
HAST	0435	DS80C320	130C, 85%R.H.,5.5V	96	HRS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
HAST	0451	DS80C320	130C, 85%R.H.,5.5V	96	HRS	77	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	0435	DS80C320	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
AUTOCLAVE	0435	DS80C320	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
AUTOCLAVE	0435	DS80C320	121C, 2 ATM STEAM, UNBIASED	168	HRS	76	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
AUTOCLAVE	0451	DS80C320	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
Total:						0	0

FAILURE RATE: MTTF (YRS): 93506 FITS: 1.2