

RELIABILITY MONITOR REPORT  
FOR

**LQFP 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)	100	LQFP	ATK (Amkor, K)	128 LQFP
ATK (Amkor, K)	48	LQFP	ATK (Amkor, K)	64 LQFP
ATK (Amkor, K)	48	LQFP (Pb-Free)	ATK (Amkor, K)	48 LQFP Exposed Pad (Pb-Free)
ATP (Amkor, PI)	100	LQFP	ATP (Amkor, PI)	128 LQFP
Stats	100	LQFP	Stats	128 LQFP
Stats	48	LQFP	Stats	64 LQFP

The calculated failure rate for this assembly is:

**FAILURE RATE:                    MTTF (YRS): 114684                    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 04/01/2004 and 03/31/2005.

**Assembly Information:**

Package Type:                    LQFP 10 mm  
 Flammability:                    UL 94-V0  
 Moisture Sensitivity  
 (JEDEC J-STD20A)                    Level 1  
 Date Code Range:                    0418    to    0418

**OPERATING LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0418	DS26502	125C, 3.5 VOLTS	1000 HRS	45	0	
<b>Total:</b>						<b>0</b>	

**PRECONDITIONING LEVEL 1**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0418	DS26502	125C	24 HRS	199	0	
MOISTURE SOAK			85 C/85% R.H.	168 HRS	199	0	
CONVECTION REFLOW			235C +5/-0C	3 PASS	199	0	
<b>Total:</b>						<b>0</b>	

**TEMPERATURE CYCLE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0418	DS26502	-55C TO 125C	1000 CYS	77	0	
<b>Total:</b>						<b>0</b>	

**UNBIASED MOISTURE RESISTANCE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
AUTOCLAVE	0418	DS26502	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
<b>Total:</b>						<b>0</b>	

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**Assembly Information:**

Package Type: LQFP 14 mm  
Flammability: UL 94-V0  
Moisture Sensitivity (JEDEC J-STD20A) Level 4  
Date Code Range: 0411 to 0446

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**OPERATING LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0411	DS2154	125C, 5.0 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0415	DS21352	125C, 3.3 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0418	DS21Q50	125C, 5.0 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0420	DS21354	125C, 3.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0421	DS21354	125C, 5.25 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0425	DS2155	125C, 3.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0431	DS2155	125C, 3.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0432	DS2154	125C, 5.0 VOLTS	1000 HRS	80	0	
HIGH VOLTAGE LIFE	0435	DS80C400	125C, 5.5V (PSA) & 3.3V (PSB)	1000 HRS	77	0	
HIGH TEMP OP LIFE	0438	DS2154	125C, 5.0 VOLTS	1000 HRS	78	0	
HIGH TEMP OP LIFE	0440	DS80C410	125C, 5.5V (PSA) & 3.3V (PSB)	1000 HRS	77	0	
HIGH TEMP OP LIFE	0446	DS21354	125C, 5.25 VOLTS	1000 HRS	77	0	
					<b>Total:</b>	<b>0</b>	

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**PACKAGE TESTS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
ULTRASOUND	0432	DS2154	J-STD-020		4	0	
					<b>Total:</b>	<b>0</b>	

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**PRECONDITIONING LEVEL 3**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
ULTRASOUND	0411	DS2154	J-STD-020		4	0	
STORAGE LIFE	0411	DS2154	125C	24 HRS	241	0	
MOISTURE SOAK			30C/60% R.H.	192 HRS	241	0	
CONVECTION REFLOW			235C +5/-0C	3 PASS	241	0	
PRECONDITION U/S	0411	DS2154	J-STD-020		4	0	
ULTRASOUND	0415	DS21352	J-STD-020		4	0	
STORAGE LIFE	0415	DS21352	125C	24 HRS	241	0	
MOISTURE SOAK			30C/60% R.H.	192 HRS	241	0	
CONVECTION REFLOW			235C +5/-0C	3 PASS	241	0	
PRECONDITION U/S	0415	DS21352	J-STD-020		4	0	
STORAGE LIFE	0432	DS2154	125C	24 HRS	241	0	
MOISTURE SOAK			30C/60% R.H.	192 HRS	241	0	
CONVECTION REFLOW			235C +5/-0C	3 PASS	241	0	

PRECONDITION U/S	0432	DS2154	J-STD-020			4	0
STORAGE LIFE	0438	DS2154	125C	24	HRS	241	0
MOISTURE SOAK			30C/60% R.H.	192	HRS	241	0
CONVECTION REFLOW			235C +5/-0C	3	PASS	241	0
<b>Total:</b>						<b>0</b>	<b>0</b>

**TEMPERATURE CYCLE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0411	DS2154	-55C TO 125C	1000	CYS	80	0
TEMP CYCLE	0415	DS21352	-55C TO 125C	1000	CYS	80	0
TEMP CYCLE	0421	DS21354	-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0425	DS2155	-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0431	DS2155	-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0432	DS2154	-55C TO 125C	1000	CYS	80	0
TEMP CYCLE	0435	DS80C400	-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0438	DS2154	-55C TO 125C	1000	CYS	78	0
TEMP CYCLE	0446	DS21354	-55C TO 125C	1000	CYS	77	0
<b>Total:</b>						<b>0</b>	<b>0</b>

**TEMPERATURE HUMIDITY BIAS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HAST	0421	DS21354	130C, 85%R.H.,3.5V	96	HRS	45	0
HAST	0425	DS2155	130C, 85%R.H.,3.5V	96	HRS	45	0
HAST	0435	DS80C400	130C, 85%R.H.,3.5V	96	HRS	77	0
<b>Total:</b>						<b>0</b>	<b>0</b>

**UNBIASED MOISTURE RESISTANCE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HAST, NO BIAS	0411	DS2154	130C, 85% R.H.	100	HRS	77	0
HAST, NO BIAS	0415	DS21352	130C, 85% R.H.	100	HRS	80	0
HAST, NO BIAS	0421	DS21354	130C, 85% R.H.	200	HRS	77	0
HAST, NO BIAS	0425	DS2155	130C, 85% R.H.	200	HRS	77	0
HAST, NO BIAS	0431	DS2155	130C, 85% R.H.	200	HRS	77	0
HAST, NO BIAS	0432	DS2154	130C, 85% R.H.	100	HRS	77	0
HAST, NO BIAS	0435	DS80C400	130C, 85% R.H.	200	HRS	77	0
HAST, NO BIAS	0438	DS2154	130C, 85% R.H.	100	HRS	77	0
<b>Total:</b>						<b>0</b>	<b>0</b>

**FAILURE RATE:**

**MTTF (YRS): 114684**

**FITS: 1.0**