

RELIABILITY MONITOR REPORT  
FOR

**MQFP 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	MQFP	ATK (Amkor, K)	80 MQFP
ATP (Amkor, PI)	100	MQFP	ATP (Amkor, PI)	44 MQFP
ATP (Amkor, PI)	80	MQFP	ATP (Amkor, PI)	100 MQFP (Pb-Free)
ATP (Amkor, PI)	44	MQFP (Pb-Free)	ATP (Amkor, PI)	80 MQFP (Pb-Free)
Carsem	80	MQFP	Carsem	80 MQFP (Pb-Free)
SCS (Stats Chippac S	100	MQFP	SCS (Stats Chippac S	80 MQFP
SCS (Stats Chippac S	100	MQFP (Pb-Free)	SCS (Stats Chippac S	80 MQFP (Pb-Free)

The calculated failure rate for this assembly is:

**FAILURE RATE:                      MTTF (YRS): 39599                      FITS: 2.9**

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 10/1/2005 and 9/30/2006.

**Assembly Information:**

Package Type:                      MQFP 14x20x2.7  
 Flammability:                      UL 94-V0  
 Moisture Sensitivity                      Level 4  
 (JEDEC J-STD20A)  
 Date Code Range:                      0528      to      0614

**OPERATING LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0528	DS5002	125C, 5.0 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0614	DS5250	125C, 5.5 VOLTS	1000 HRS	77	0	
<b>Total:</b>						<b>0</b>	

**PACKAGE TESTS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
DROP	0528	DS5002	25 C	36 CYS	215		
<b>Total:</b>							

**PRECONDITIONING LEVEL 3**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
ULTRASOUND	0528	DS5002	J-STD-020		4	0	
STORAGE LIFE	0528	DS5002	125C	24 HRS	206		
MOISTURE SOAK			30C/60% R.H.	192 HRS	206		
CONVECTION REFLOW			220C +5/-0C	3 PASS	206	0	
PRECONDITION U/S	0528	DS5002	J-STD-020		4	0	
<b>Total:</b>						<b>0</b>	

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**TEMPERATURE CYCLE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0528	DS5002	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0614	DS5250	-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
BIASED MOISTURE	0528	DS5002	85/85, 5.5 VOLTS	1000 HRS	42	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
AUTOCLAVE	0528	DS5002	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0614	DS5250	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0	
<b>Total:</b>						<b>0</b>	

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**Assembly Information:**

Package Type: MQFP (Pb-Free) 14x20x2.7  
Flammability: UL 94-V0  
Moisture Sensitivity (JEDEC J-STD20A) Level 4  
Date Code Range: 0622 to 0627

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**MOISTURE SENSITIVITY LEVEL 3**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
ULTRASOUND	0622	DS5002	J-STD-020		8	0	
STORAGE LIFE			125C	48 HRS	8		
MOISTURE SOAK			30C/60% R.H.	192 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	
ULTRASOUND	0622	DS5002	J-STD-020		8	0	
STORAGE LIFE			125C	48 HRS	8		
MOISTURE SOAK			30C/60% R.H.	192 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	
ULTRASOUND	0622	DS5002	J-STD-020		8	0	
STORAGE LIFE			125C	48 HRS	8		
MOISTURE SOAK			30C/60% R.H.	192 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	
ULTRASOUND	0627	DS5002	J-STD-020		8	0	
STORAGE LIFE			125C	48 HRS	8		
MOISTURE SOAK			30C/60% R.H.	192 HRS	8		
CONVECTION REFLOW			260C +/-5C	3 PASS	8	0	

EXTERNAL VISUAL	0627	DS5002	J-STD-020, 6.1a	8	0
PRECONDITION U/S			J-STD-020	8	0
<b>Total:</b>				<b>0</b>	<b>0</b>

### OPERATING LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH VOLTAGE LIFE	0622	DS5002	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH VOLTAGE LIFE	0622	DS5002	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH VOLTAGE LIFE	0622	DS5002	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH VOLTAGE LIFE	0627	DS5002	125C, 5.5 VOLTS	1000 HRS	45	0	
<b>Total:</b>						<b>0</b>	<b>0</b>

### PACKAGE TESTS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
SOLDERABILITY (Sn/Pb)	0622	DS5002	JESD22-B102, COND C		3	0	
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C		3	0	
X-RAY	0622	DS5002	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)	0622	DS5002	JESD22-B102, COND C		3	0	
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C		3	0	
X-RAY	0622	DS5002	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)	0622	DS5002	JESD22-B102, COND C		3	0	
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C		3	0	
X-RAY	0622	DS5002	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)	0627	DS5002	JESD22-B102, COND C		3	0	
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C		3	0	
X-RAY	0627	DS5002	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>	<b>0</b>

### PRECONDITIONING LEVEL 3

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0622	DS5002	125C	48 HRS	321		
MOISTURE SOAK			30C/60% R.H.	192 HRS	321		
CONVECTION REFLOW			260C +/-5C	3 PASS	321	0	

STORAGE LIFE	0622	DS5002	125C	48	HRS	321		
MOISTURE SOAK			30C/60% R.H.	192	HRS	321		
CONVECTION REFLOW			260C +/-5C	3	PASS	321	0	
STORAGE LIFE	0622	DS5002	125C	48	HRS	321		
MOISTURE SOAK			30C/60% R.H.	192	HRS	321		
CONVECTION REFLOW			260C +/-5C	3	PASS	321	0	
STORAGE LIFE	0627	DS5002	125C	48	HRS	321		
MOISTURE SOAK			30C/60% R.H.	192	HRS	321		
CONVECTION REFLOW			260C +/-5C	3	PASS	321	0	
<b>Total:</b>							<b>0</b>	

### STORAGE LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO	
STORAGE LIFE	0622	DS5002	150C	1000 HRS	77	0		
STORAGE LIFE	0622	DS5002	150C	1000 HRS	77	0		
STORAGE LIFE	0622	DS5002	150C	1000 HRS	77	0		
STORAGE LIFE	0627	DS5002	150C	1000 HRS	77	0		
<b>Total:</b>							<b>0</b>	

### TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO	
TEMP CYCLE	0622	DS5002	-55C TO 125C	1000 CYS	77	0		
TEMP CYCLE	0622	DS5002	-55C TO 125C	1000 CYS	77	0		
TEMP CYCLE	0622	DS5002	-55C TO 125C	1000 CYS	77	0		
TEMP CYCLE	0627	DS5002	-55C TO 125C	1000 CYS	77	0		
<b>Total:</b>							<b>0</b>	

### TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO	
BIASED MOISTURE	0622	DS5002	85/85, 5.5 VOLTS	1000 HRS	45	0		
BIASED MOISTURE	0622	DS5002	85/85, 5.5 VOLTS	1000 HRS	45	0		
BIASED MOISTURE	0622	DS5002	85/85, 5.5 VOLTS	1000 HRS	454	0		
BIASED MOISTURE	0627	DS5002	85/85, 5.5 VOLTS	1000 HRS	45	0		
<b>Total:</b>							<b>0</b>	

### UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO	
AUTOCLAVE	0622	DS5002	121C, 2 ATM STEAM, UNBIASED	168 HRS	75	0		
AUTOCLAVE	0622	DS5002	121C, 2 ATM STEAM, UNBIASED	168 HRS	75	0		
AUTOCLAVE	0622	DS5002	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0		
AUTOCLAVE	0627	DS5002	121C, 2 ATM STEAM, UNBIASED	168 HRS	77	0		
<b>Total:</b>							<b>0</b>	

**FAILURE RATE:**

**MTTF (YRS): 39599**

**FITS: 2.9**