

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	Stats	100 MQFP
Stats	80	MQFP		

The calculated failure rate for this assembly is:

**FAILURE RATE:**                      **MTTF (YRS): 34311**                      **FITS: 3.3**

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

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### Assembly Information:

Package Type:                      MQFP 787  
Flammability:                      UL 94-V0  
Moisture Sensitivity  
(JEDEC J-STD20A)                      Level 4  
Date Code Range:                      0440      to      0442

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### OPERATING LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0440	DS5250	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0442	DS5002	125C, 5.0 VOLTS	1000 HRS	80	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	0442	DS5002	J-STD-020		4	0	
STORAGE LIFE	0442	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	0442	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	0442	DS5002	-55C TO 125C	1000 CYS	40	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	0442	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	0442	DS5002	121C, 2 ATM STEAM, UNBIASED	96 HRS	39	0	
<b>Total:</b>						<b>0</b>	

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**Assembly Information:**

Package Type: MQFP (Pb-Free) 787  
Flammability: UL 94-V0  
Moisture Sensitivity (JEDEC J-STD20A) Level 4  
Date Code Range: 0505 to 0505

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**MOISTURE SENSITIVITY LEVEL 3**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
EXTERNAL VISUAL	0505	DS87C550	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		
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	0505	DS87C550	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		
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	0505	DS5240	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		
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 VOLTAGE LIFE	0505	DS87C550	125C, 5.5 VOLTS	1000 HRS	45	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
HIGH VOLTAGE LIFE	0505	DS87C550	125C, 5.5 VOLTS	1000 HRS	45	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	

HIGH VOLTAGE LIFE	0505	DS5240	125C, 5.5 VOLTS	1000 HRS	45	0
VISUAL INSPECTION			WHISKERS < 50uM		3	0
<b>Total:</b>						<b>0</b>

### PACKAGE TESTS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
SOLDERABILITY (Sn/Pb)	0505	DS87C550	JESD22-B102, COND C		3	0	
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C		3	0	
X-RAY	0505	DS87C550	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)	0505	DS87C550	JESD22-B102, COND C		3	0	
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C		3	0	
X-RAY	0505	DS87C550	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)	0505	DS5240	JESD22-B102, COND C		3	0	
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C		3	0	
X-RAY	0505	DS5240	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>	

### PRECONDITIONING LEVEL 3

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0505	DS87C550	125C	48 HRS	321		
MOISTURE SOAK			30C/60% R.H.	192 HRS	321		
CONVECTION REFLOW			260C +/-5C	3 PASS	321	0	
STORAGE LIFE	0505	DS87C550	125C	48 HRS	321		
MOISTURE SOAK			30C/60% R.H.	192 HRS	321		
CONVECTION REFLOW			260C +/-5C	3 PASS	321	0	
STORAGE LIFE	0505	DS5240	125C	48 HRS	319		
MOISTURE SOAK			30C/60% R.H.	192 HRS	319		
CONVECTION REFLOW			260C +/-5C	3 PASS	319	0	
<b>Total:</b>						<b>0</b>	

### STORAGE LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0505	DS87C550	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0505	DS87C550	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
STORAGE LIFE	0505	DS5240	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	

**Total: 0**

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**TEMPERATURE CYCLE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0505	DS87C550	-55C TO 125C	1000	CYS	76	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
TEMP CYCLE	0505	DS87C550	-55C TO 125C	1000	CYS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
TEMP CYCLE	0505	DS5240	-55C TO 125C	1000	CYS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
<b>Total:</b>						<b>0</b>	<b>0</b>

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**TEMPERATURE HUMIDITY BIAS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
BIASED MOISTURE	0505	DS87C550	85/85, 5.5 VOLTS	1000	HRS	45	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
BIASED MOISTURE	0505	DS87C550	85/85, 5.5 VOLTS	1000	HRS	45	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
BIASED MOISTURE	0505	DS5240	85/85, 5.5 VOLTS	1000	HRS	45	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
<b>Total:</b>						<b>0</b>	<b>0</b>

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**UNBIASED MOISTURE RESISTANCE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
AUTOCLAVE	0505	DS87C550	121C, 2 ATM STEAM, UNBIASED	168	HRS	76	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
AUTOCLAVE	0505	DS87C550	121C, 2 ATM STEAM, UNBIASED	168	HRS	75	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
AUTOCLAVE	0505	DS5240	121C, 2 ATM STEAM, UNBIASED	168	HRS	75	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
<b>Total:</b>						<b>0</b>	<b>0</b>

**FAILURE RATE: MTTF (YRS): 34311 FITS: 3.3**