

RELIABILITY MONITOR REPORT  
FOR

**TQFP 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	TQFP	ATK (Amkor, K)	44 TQFP
ATK (Amkor, K)	48	TQFP	ATK (Amkor, K)	52 TQFP
ATK (Amkor, K)	64	TQFP	ATK (Amkor, K)	144 TQFP (Pb-Free)
ATK (Amkor, K)	32	TQFP (Pb-Free)	ATK (Amkor, K)	44 TQFP (Pb-Free)
ATK (Amkor, K)	48	TQFP (Pb-Free)	ATK (Amkor, K)	144 TQFP Exposed Pad
ATP (Amkor, PI)	32	TQFP	ATP (Amkor, PI)	44 TQFP
ATP (Amkor, PI)	48	TQFP	ATP (Amkor, PI)	52 TQFP
OSET	32	TQFP	OSET	48 TQFP
SCS (Stats Chippac S	44	TQFP	SCS (Stats Chippac S	48 TQFP

The calculated failure rate for this assembly is:

**FAILURE RATE:**                      **MTTF (YRS): 27143**                      **FITS: 4.2**

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 04/01/2005 and 03/31/2006 .

**Assembly Information:**

Package Type:                      TQFP 276  
 Flammability:                      UL 94-V0  
 Moisture Sensitivity  
 (JEDEC J-STD20A)                      Level 3  
 Date Code Range:                      0508      to      0508

**OPERATING LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0508	DS3988	125C, 5.5 VOLTS	1000 HRS	77	0	
<b>Total:</b>						<b>0</b>	

**Assembly Information:**

Package Type:                      TQFP (Pb-Free) 276  
 Flammability:                      UL 94-V0  
 Moisture Sensitivity  
 (JEDEC J-STD20A)                      Level 3  
 Date Code Range:                      0527      to      0527

**MOISTURE SENSITIVITY LEVEL 1**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
ULTRASOUND	0527	DS3150	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	0527	DS3150	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 TEMP OP LIFE	0527	DS3150	125C, 3.5 VOLTS	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	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)	0527	DS3150	JESD22-B102, COND C		3	0	
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C		3	0	
X-RAY	0527	DS3150	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	
EDX			25 C		6	0	
<b>Total:</b>					<b>0</b>	<b>0</b>	

### PRECONDITIONING LEVEL 1

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0527	DS3150	125C	24 HRS	385		
MOISTURE SOAK			85 C/85% R.H.	168 HRS	385		
CONVECTION REFLOW			260C +/-5C	3 PASS	385	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	0527	DS3150	125C	24 HRS	77		
MOISTURE SOAK			30C/60% R.H.	192 HRS	77		
CONVECTION REFLOW			260C +/-5C	3 PASS	77	0	
<b>Total:</b>					<b>0</b>	<b>0</b>	

### STORAGE LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0527	DS3150	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	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	0527	DS3150	-55C TO 125C	1000 CYS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	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	0527	DS3150	130C, 85%R.H.,3.5V	96	HRS	72	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
<b>Total:</b>							<b>0</b>

---

### UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HAST, NO BIAS	0527	DS3150	130C, 85% R.H.	200	HRS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	0
<b>Total:</b>							<b>0</b>

---

### Assembly Information:

Package Type: TQFP (Pb-Free) 394  
 Flammability: UL 94-V0  
 Moisture Sensitivity (JEDEC J-STD20A) Level 3  
 Date Code Range: 0524 to 0524

---

### MOISTURE SENSITIVITY LEVEL 3

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
ULTRASOUND	0524	DS80C320	J-STD-020			8	0
STORAGE LIFE			125C	24	HRS	8	
MOISTURE SOAK			30C/60% R.H.	192	HRS	8	
CONVECTION REFLOW			260C +0/-5C	3	PASS	8	0
EXTERNAL VISUAL			J-STD-020, 6.1a			8	0
<b>Total:</b>							<b>0</b>

---

### OPERATING LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	0524	DS80C320	125C, 5.5 VOLTS	1000	HRS	77	0
VISUAL INSPECTION			WHISKERS < 50uM			3	
<b>Total:</b>							<b>0</b>

---

### PACKAGE TESTS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
SOLDERABILITY (Sn/Pb)	0524	DS80C320	JESD22-B102, COND C			3	0
SOLDERABILITY (Pb-Free)			JESD22-B102, COND C			3	0
X-RAY	0524	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
EDX			25 C			6	0
<b>Total:</b>							<b>0</b>

---

### PRECONDITIONING LEVEL 3

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0524	DS80C320	125C	24	HRS	385	
MOISTURE SOAK			30C/60% R.H.	192	HRS	385	
CONVECTION REFLOW			260C +0/-5C	3	PASS	385	0
<b>Total:</b>							<b>0</b>

---

**STORAGE LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	0524	DS80C320	150C	1000 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3		
				<b>Total:</b>		<b>0</b>	

---

**TEMPERATURE CYCLE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
TEMP CYCLE	0524	DS80C320	-55C TO 125C	1000 CYS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
				<b>Total:</b>		<b>0</b>	

---

**TEMPERATURE HUMIDITY BIAS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HAST	0524	DS80C320	130C, 85%R.H.,5.5V	96 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
				<b>Total:</b>		<b>0</b>	

---

**UNBIASED MOISTURE RESISTANCE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HAST, NO BIAS	0524	DS80C320	130C, 85% R.H.	200 HRS	77	0	
VISUAL INSPECTION			WHISKERS < 50uM		3	0	
				<b>Total:</b>		<b>0</b>	

---

**FAILURE RATE:****MTTF (YRS): 27143****FITS: 4.2**