

1/24/2019



RELIABILITY MONITOR REPORT  
FOR

**TSSOP Package**

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134

This Report was prepared by  
**MAXIM INTEGRATED Reliability Engineering**

**Summary:**

The data in the tables that follow was generated as the result of an on-going Package Reliability Monitor. The specific assemblies included in this package monitor are:

ASSY SITE	PINS	PACKAGE		
ATP (Amkor, PI)	16	TSSOP (Pb-Free)	ATP (Amkor, PI)	20 TSSOP (Pb-Free)
ATP (Amkor, PI)	28	TSSOP-CU (Pb-free)	Carsem-M	14 TSSOP (Pb-Free)
Carsem-M	20	TSSOP-EP (Pb-Free)	Greatek	20 TSSOP (Pb-Free)
Greatek	28	TSSOP (Pb-Free)	Greatek	56 TSSOP (Pb-Free)
Greatek	28	TSSOP-CU (Pb-free)	UTL (NSEB) UTAC	14 TSSOP (Pb-Free)
UTL (NSEB) UTAC	16	TSSOP (Pb-Free)	UTL (NSEB) UTAC	17 TSSOP (Pb-Free)
UTL (NSEB) UTAC	20	TSSOP (Pb-Free)	UTL (NSEB) UTAC	10 TSSOP-CU (Pb-free)
UTL (NSEB) UTAC	20	TSSOP-CU (Pb-free)	UTL (NSEB) UTAC	28 TSSOP-CU (Pb-free)

The calculated failure rate for this assembly is:

**FAILURE RATE: MTTF (YRS): 385691 FITS: 0.3**

The parameters used to calculate this failure rate are as follows:

**Cf: 60% Ea: 0.7 Tu: 25 °C**

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 10/1/2018 and 12/31/2018.

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**Assembly Information:**

Package Type: TSSOP (Pb-Free)  
 Date Code Range: 1720 to 1837

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**OPERATING LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE		MAX3222CUP+	125°C	1000 HRS	79	0	
HIGH TEMP OP LIFE	1720	MAX17840AGUN/V+ CQ	135°C	1000 HRS	10	0	
HIGH TEMP OP LIFE	1733	MAX15005BAUE/V+	135°C	1000 HRS	48	0	
HIGH TEMP OP LIFE	1733	MAX15005BAUE/V+	135°C	1000 HRS	32	0	
HIGH TEMP OP LIFE	1748	MAX4581EUE+	135°C	1000 HRS	80	0	
HIGH TEMP OP LIFE	1811	MAX5170BEEE+	125°C	1000 HRS	80	0	
HIGH TEMP OP LIFE	1813	MAX4478AUD+	125°C	500 HRS	80	0	
HIGH TEMP OP LIFE	1817	MAX3222CUP+	125°C	1000 HRS	80	0	
HIGH TEMP OP LIFE	1818	MAX5100BEUP+	125°C	1000 HRS	79	0	
HIGH TEMP OP LIFE	1818	MAX5100BEUP+	125°C	1000 HRS	80	0	
HIGH TEMP OP LIFE	1818	MAX5100BEUP+	125°C	1000 HRS	79	0	
HIGH TEMP OP LIFE	1820	MAX4581EUE+	125°C	1000 HRS	79	0	
HIGH TEMP OP LIFE	1823	MAX15005BAUE/V+	125°C	1000 HRS	42	0	
HIGH TEMP OP LIFE	1826	MAX7034AUI/V+	125°C	1000 HRS	80	0	
HIGH TEMP OP LIFE	1826	MAX7034AUI/V+	125°C	500 HRS	80	0	

HIGH TEMP OP LIFE	1829	MAX9201EUE+	125°C	1000 HRS	80	0
HIGH TEMP OP LIFE	1832	MAX2235EUP+	125°C	1000 HRS	80	0
HIGH TEMP OP LIFE	1837	MAX4581EUE+	125°C	1000 HRS	80	0
<b>Total:</b>						<b>0</b>

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### PACKAGE TESTS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
CONVECTION REFLOW	1748	MAX4581EUE+	260C +/-5C	3 PASS	320	0	
<b>Total:</b>						<b>0</b>	

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### STORAGE LIFE

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE		MAX3222CUP+	150°C	1000 HRS	80	0	
STORAGE LIFE	1748	MAX4581EUE+	150°C	500 HRS	80	0	
STORAGE LIFE	1805	MAX15034BAUI/V+	150°C	1000 HRS	28	0	
STORAGE LIFE	1811	MAX5170BEEE+	150°C	500 HRS	80	0	
STORAGE LIFE	1813	MAX4478AUD+	150°C	1000 HRS	80	0	
STORAGE LIFE	1817	MAX3222CUP+	150°C	1000 HRS	75	0	
STORAGE LIFE	1818	MAX5100BEUP+	150°C	1000 HRS	79	0	
STORAGE LIFE	1818	MAX5100BEUP+	150°C	1000 HRS	80	0	
STORAGE LIFE	1818	MAX5100BEUP+	150°C	1000 HRS	79	0	
STORAGE LIFE	1823	MAX15005BAUE/V+	150°C	1000 HRS	80	0	
STORAGE LIFE	1826	MAX7034AUI/V+	150°C	1000 HRS	80	0	
STORAGE LIFE	1826	MAX7034AUI/V+	150°C	1000 HRS	80	0	
STORAGE LIFE	1829	MAX9201EUE+	150°C	1000 HRS	80	0	
STORAGE LIFE	1830	MAX4478AUD+	150°C	1000 HRS	79	0	
STORAGE LIFE	1830	MAX4478AUD+	150°C	1000 HRS	80	0	
STORAGE LIFE	1832	MAX2235EUP+	150°C	500 HRS	80	0	
STORAGE LIFE	1835	MAX3815CCM+	150°C	1000 HRS	79	0	
STORAGE LIFE	1837	MAX4581EUE+	150°C	1000 HRS	80	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, 5' RAMP, 10' DWELL		MAX3222CUP+	-65C TO +150C (Condition C)	1000 CYS	80	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1748	MAX4581EUE+	-65C TO +150C (Condition C)	500 CYS	80	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1811	MAX5170BEEE+	-65C TO +150C (Condition C)	1000 CYS	80	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1813	MAX4478AUD+	-65C TO +150C (Condition C)	500 CYS	80	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1817	MAX3222CUP+	-65C TO +150C (Condition C)	1000 CYS	80	0	

TEMP CYCLE, 5' RAMP, 10' DWELL	1818	MAX5100BEUP+	-65C TO +150C (Condition C)	1000	CYS	80	0
TEMP CYCLE, 5' RAMP, 10' DWELL	1818	MAX5100BEUP+	-65C TO +150C (Condition C)	1000	CYS	80	0
TEMP CYCLE, 5' RAMP, 10' DWELL	1818	MAX5100BEUP+	-65C TO +150C (Condition C)	1000	CYS	78	0
TEMP CYCLE, 5' RAMP, 10' DWELL	1823	MAX15005BAUE/V+	-65C TO +150C (Condition C)	1000	CYS	80	0
TEMP CYCLE, 5' RAMP, 10' DWELL	1826	MAX7034AUI/V+	-65C TO +150C (Condition C)	1000	CYS	80	0
TEMP CYCLE, 5' RAMP, 10' DWELL	1826	MAX7034AUI/V+	-65C TO +150C (Condition C)	1000	CYS	80	0
TEMP CYCLE, 5' RAMP, 10' DWELL	1829	MAX9201EUE+	-65C TO +150C (Condition C)	1000	CYS	80	0
TEMP CYCLE, 5' RAMP, 10' DWELL	1830	MAX4478AUD+	-65C TO +150C (Condition C)	1000	CYS	80	0
TEMP CYCLE, 5' RAMP, 10' DWELL	1832	MAX2235EUP+	-65C TO +150C (Condition C)	1000	CYS	80	0
TEMP CYCLE, 5' RAMP, 10' DWELL	1835	MAX3815CCM+	-65C TO +150C (Condition C)	1000	CYS	80	0
TEMP CYCLE, 5' RAMP, 10' DWELL	1837	MAX4581EUE+	-65C TO +150C (Condition C)	1000	CYS	80	0
<b>Total:</b>						<b>0</b>	<b>0</b>

#### TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
BIASED MOISTURE		MAX3222CUP+	130C, 85% R.H.	HRS	80	0	
BIASED MOISTURE		MAX3222CUP+	130C, 85% R.H.	96 HRS	80	0	
BIASED MOISTURE	1748	MAX4581EUE+	85 C/85% R.H.	96 HRS	78	0	
BIASED MOISTURE	1811	MAX5170BEEE+	130C, 85% R.H.	HRS	80	0	
BIASED MOISTURE	1813	MAX4478AUD+	130C, 85% R.H.	HRS	80	0	
BIASED MOISTURE	1818	MAX5100BEUP+	130C, 85% R.H.	96 HRS	75	0	
BIASED MOISTURE	1818	MAX5100BEUP+	130C, 85% R.H.	96 HRS	71	0	
BIASED MOISTURE	1818	MAX5100BEUP+	130C, 85% R.H.	96 HRS	80	0	
BIASED MOISTURE	1823	MAX15005BAUE/V+	130C, 85% R.H.	HRS	80	0	
BIASED MOISTURE	1830	MAX4478AUD+	130C, 85% R.H.	96 HRS	80	0	
BIASED MOISTURE	1832	MAX2235EUP+	130C, 85% R.H.	96 HRS	80	0	
BIASED MOISTURE	1835	MAX3815CCM+	130C, 85% R.H.	96 HRS	80	0	
BIASED MOISTURE	1837	MAX4581EUE+	130C, 85% R.H.	96 HRS	77	0	
<b>Total:</b>						<b>0</b>	<b>0</b>

#### Assembly Information:

Package Type: TSSOP-CU (Pb-free)  
Date Code Range: 1703 to 1816

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**OPERATING LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE		MAX20097AUI/V+	125°C	1000 HRS	80	0	
HIGH TEMP OP LIFE		MAX20097AUI/V+	125°C	1000 HRS	77	0	
HIGH TEMP OP LIFE		MAX20097AUI/V+	125°C	1000 HRS	80	0	
HIGH TEMP OP LIFE		MAX20097AUI/V+	125°C	1000 HRS	79	0	
HIGH TEMP OP LIFE	1703	MAX20090AUP/V+	135°C	1000 HRS	79	0	
HIGH TEMP OP LIFE	1703	MAX20090AUP/V+	135°C	1000 HRS	80	0	
HIGH TEMP OP LIFE	1703	MAX20090AUP/V+	135°C	1000 HRS	78	0	
HIGH TEMP OP LIFE	1736	MAX20097AUI/V+	125°C	192 HRS	78	0	
HIGH TEMP OP LIFE	1736	MAX20097AUI/V+	135°C	192 HRS	80	0	
HIGH TEMP OP LIFE	1736	MAX20097AUI/V+	125°C	1000 HRS	79	0	
					<b>Total:</b>	<b>0</b>	

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**PACKAGE TESTS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
CONVECTION REFLOW		MAX20097AUI/V+	260C +0/-5C	PASS	80	0	
CONVECTION REFLOW		MAX20097AUI/V+	260C +0/-5C	PASS	80	0	
CONVECTION REFLOW		MAX20097AUI/V+	260C +0/-5C	PASS	80	0	
CONVECTION REFLOW	1736	MAX20097AUI/V+	260C +0/-5C	PASS	80	0	
CONVECTION REFLOW	1736	MAX20097AUI/V+	260C +0/-5C	PASS	80	0	
CONVECTION REFLOW	1736	MAX20097AUI/V+	260C +0/-5C	3 PASS	448	0	
CONVECTION REFLOW	1736	MAX20097AUI/V+	260C +0/-5C	PASS	80	0	
CONVECTION REFLOW	1736	MAX20097AUI/V+	260C +0/-5C	PASS	80	0	
CONVECTION REFLOW	1816	MXL1543CAI+	260C +0/-5C	168 PASS	400	0	
CONVECTION REFLOW	1816	MXL1543CAI+	260C +0/-5C	168 PASS	400	0	
					<b>Total:</b>	<b>0</b>	

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**STORAGE LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE		MAX20097AUI/V+	150°C	1000 HRS	85	0	
STORAGE LIFE		MAX20097AUI/V+	150°C	1000 HRS	48	0	
STORAGE LIFE	1736	MAX20097AUI/V+	150°C	1000 HRS	85	0	
STORAGE LIFE	1736	MAX20097AUI/V+	150°C	1000 HRS	48	0	
STORAGE LIFE	1736	MAX20097AUI/V+	150°C	1000 HRS	85	0	
STORAGE LIFE	1736	MAX20097AUI/V+	150°C	1000 HRS	48	0	
STORAGE LIFE	1816	MXL1543CAI+	150°C	1000 HRS	85	0	
STORAGE LIFE	1816	MXL1543CAI+	150°C	1000 HRS	84	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, 5' RAMP, 10' DWELL		MAX20097AUI/V+	-65C TO +150C (Condition C)	1000 CYS	73	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1703	MAX20090AUP/V+	-65C TO +150C (Condition C)	500 CYS	30	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1703	MAX20090AUP/V+	-65C TO +150C (Condition C)	1000 CYS	10	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1703	MAX20090AUP/V+	-65C TO +150C (Condition C)	1000 CYS	10	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1703	MAX20090AUP/V+	-65C TO +150C (Condition C)	1000 CYS	10	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1736	MAX20097AUI/V+	-65C TO +150C (Condition C)	1000 CYS	80	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1736	MAX20097AUI/V+	-65C TO +150C (Condition C)	1000 CYS	72	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1736	MAX20097AUI/V+	-65C TO +150C (Condition C)	1000 CYS	80	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1736	MAX20097AUI/V+	-65C TO +150C (Condition C)	1000 CYS	73	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1743	MAX20097AUI/V+	-65C TO +150C (Condition C)	500 CYS	100	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1816	MXL1543CAI+	-65C TO +150C (Condition C)	1000 CYS	80	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1816	MXL1543CAI+	-65C TO +150C (Condition C)	1000 CYS	80	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		MAX20097AUI/V+	130C, 85% R.H.	96 HRS	80	0	
BIASED MOISTURE	1736	MAX20097AUI/V+	130C, 85% R.H.	96 HRS	80	0	
BIASED MOISTURE	1736	MAX20097AUI/V+	85 C/85% R.H.	96 HRS	80	0	
BIASED MOISTURE	1743	MAX20097AUI/V+	85 C/85% R.H.	96 HRS	80	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
MOISTURE SOAK	1736	MAX20097AUI/V+	130C, 85% R.H.	96 HRS	80	0	
MOISTURE SOAK	1736	MAX20097AUI/V+	130C, 85% R.H.	96 HRS	80	0	
MOISTURE SOAK	1743	MAX20097AUI/V+	130C, 85% R.H.	96 HRS	80	0	
MOISTURE SOAK	1816	MXL1543CAI+	130C, 85% R.H.	96 HRS	80	0	
MOISTURE SOAK	1816	MXL1543CAI+	130C, 85% R.H.	96 HRS	80	0	
					<b>Total:</b>	<b>0</b>	

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**Assembly Information:**

Package Type: TSSOP-EP (Pb-Free)

Date Code Range: 1738 to 1744

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**OPERATING LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
HIGH TEMP OP LIFE	1738	MAX3223EEUP+	135°C	1000 HRS	80	0	
HIGH TEMP OP LIFE	1744	MAX13235EEUP+	135°C	1000 HRS	48	0	
HIGH TEMP OP LIFE	1744	MAX13235EEUP+	135°C	1000 HRS	32	0	
					<b>Total:</b>	<b>0</b>	

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**PACKAGE TESTS**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
CONVECTION REFLOW	1738	MAX3223EEUP+	260C +/-5C	3 PASS	320	0	
CONVECTION REFLOW	1744	MAX13235EEUP+	260C +/-5C	3 PASS	320	0	
					<b>Total:</b>	<b>0</b>	

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**STORAGE LIFE**

DESCRIPTION	DATE CODE	TEST VEHICLE	CONDITION	READPOINT	QUANTITY	FAILS	FA NO
STORAGE LIFE	1738	MAX3223EEUP+	150°C	1000 HRS	80	0	
STORAGE LIFE	1744	MAX13235EEUP+	150°C	1000 CYS	80	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, 5' RAMP, 10' DWELL	1738	MAX3223EEUP+	-65C TO +150C (Condition C)	1000 CYS	80	0	
TEMP CYCLE, 5' RAMP, 10' DWELL	1744	MAX13235EEUP+	-65C TO +150C (Condition C)	1000 CYS	80	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	1738	MAX3223EEUP+	85 C/85% R.H.	96 HRS	78	0	
BIASED MOISTURE	1744	MAX13235EEUP+	85 C/85% R.H.	96 HRS	78	0	
					<b>Total:</b>	<b>0</b>	

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**FAILURE RATE: MTTF (YRS): 385691 FITS: 0.3**