

# μModule LGA Level 2 Interconnect Reliability Data

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## LTC Demo Board Details

<b>PCB Material</b>	FR-4
<b># Metal Layers</b>	2
<b>Board Size</b>	4 3/4" x 3"
<b>Thickness</b>	62 mils or 93 mils (see details)
<b>Pad Type</b>	NSMD
<b>Pad Finish</b>	NiAu
<b>Pad Size</b>	0.635mm
<b>Soldermask opening</b>	0.686mm
<b>Soldermask thickness</b>	0.02 - 0.03mm
<b>Method for Detecting Interconnect Failure</b>	Bench set-up, Functional test

**DEMO BOARD MOUNT TEMP CYCLE DATA FOR THE LTM46XX FAMILY (15mmX15mm)**

DATE CODE	DEVICE TYPE	PKG TYPE	BOARD THICKNESS	SAMPLE SIZE	BENCH REJECTS	CYCLES ON TC		SOLDER PASTE
						-40°C TO +125°C	DEVICE CYCLES ON TC -40°C TO +125°C	
0513	LTM4600	LGA-104	62 mils	99	0	2,000	198,000	SnPb
0525	LTM4600	LGA-104	62 mils	96	0	2,000	192,000	SnPb
0546	LTM4600	LGA-104	62 mils	93	0	2,000	186,000	SnAgCu
0623	LTM4601	LGA-118	62 mils	88	0	2,000	176,000	SnAgCu
0738	LTM4616	LGA-144	62 mils	96	0	2,000	192,000	SnAgCu
0846	LTM4617	LGA-144	62 mils	77	0	1,500	115,500	SnAgCu

6 LOTS 549 0 1,059,500

\* 10 °C per minute ramp rate

\* 10 minute dwell time

DATE CODE	DEVICE TYPE	PKG TYPE	BOARD THICKNESS	SAMPLE SIZE	BENCH REJECTS	CYCLES ON TC		SOLDER PASTE
						0°C TO +100°C	DEVICE CYCLES ON TC 0°C TO +100°C	
0715	LTM4600	LGA-104	62 mils	40	0	5,000	200,000	SnAgCu
0632	LTM4601	LGA-118	62 mils	44	0	3,500	154,000	SnPb

2 LOTS 84 0 354,000

\* 10 °C per minute ramp rate

\* 10 minute dwell time

DATE CODE	DEVICE TYPE	PKG TYPE	BOARD THICKNESS	SAMPLE SIZE	BENCH REJECTS	CYCLES ON TC		SOLDER PASTE
						-55°C TO +125°C	DEVICE CYCLES ON TC -55°C TO +125°C	
0624	LTM4600	LGA-104	62 mils	65	0	1,500	97,500	SnPb
0624	LTM4600	LGA-104	62 mils	76	0	1,500	114,000	SnPb

2 LOTS 141 0 211,500

\* 10 °C per minute ramp rate

\* 10 minute dwell time

**DEMO BOARD MOUNT TEMP CYCLE DATA FOR THE LTM46XX FAMILY (15mmX9mm)**

DATE CODE	DEVICE TYPE	PKG TYPE	BOARD THICKNESS	SAMPLE SIZE	ATE REJECTS	CYCLES ON TC		SOLDER PASTE
						-40°C TO +125°C	DEVICE CYCLES ON TC -40°C TO +125°C	
0714	LTM4604	LGA-66	62 mils	79	0	2,000	158,000	SnPb
0714	LTM4604	LGA-66	62 mils	79	0	2,000	158,000	SnAgCu
0728	LTM4608	LGA-68	93 mils	116	0	1,000	116,000	SnPb
0729	LTM4608	LGA-68	93 mils	116	0	1,000	116,000	SnAgCu
4	LOTS			390	0		548,000	

\* 10 °C per minute ramp rate  
 \* 10 minute dwell time

## Rider Card PCB Details

<b>PCB Material</b>	FR-4 or Polyimide
<b># Metal Layers</b>	4
<b>Board Size</b>	1 1/2" x 1 1/4"
<b>Thickness</b>	93 mils
<b>Pad Type</b>	NSMD
<b>Pad Finish</b>	NiAu
<b>Pad Size</b>	0.635mm
<b>Soldermask opening</b>	0.686mm
<b>Soldermask thickness</b>	0.02 - 0.03mm
<b>Method for Detecting Interconnect Failure</b>	ATE, Functional test

**RIDER CARD MOUNT TEMP CYCLE DATA FOR THE LTM80XX FAMILY**

<b>DATE CODE</b>	<b>DEVICE TYPE</b>	<b>PKG TYPE</b>	<b>BOARD THICKNESS</b>	<b>SAMPLE SIZE</b>	<b>ATE REJECTS</b>	<b>CYCLES ON TC -40°C TO +125°C</b>	<b>DEVICE CYCLES ON TC -40°C TO +125°C</b>	<b>SOLDER PASTE</b>
0723	LTM8023	LGA-50	93 mils	114	0	2,000	228,000	SnPb
0723	LTM8023	LGA-50	93 mils	107	0	2,000	214,000	SnAgCu
2	LOTS		0	221	0		442,000	

\* 10 °C per minute ramp rate

\* 10 minute dwell time

## Daisy-Chain PCB Details

<b>Material</b>	FR-4
<b># Metal Layers</b>	6
<b>Board Size</b>	6 1/4" x 6 1/4"
<b>Thickness</b>	93 mils
<b>Pad Type</b>	SMD
<b>Pad Finish</b>	NiAu
<b>Pad Size</b>	0.730mm x 0.730mm
<b>Soldermask opening</b>	0.630mm x 0.630mm
<b>Soldermask thickness</b>	0.035mm ± 0.010mm

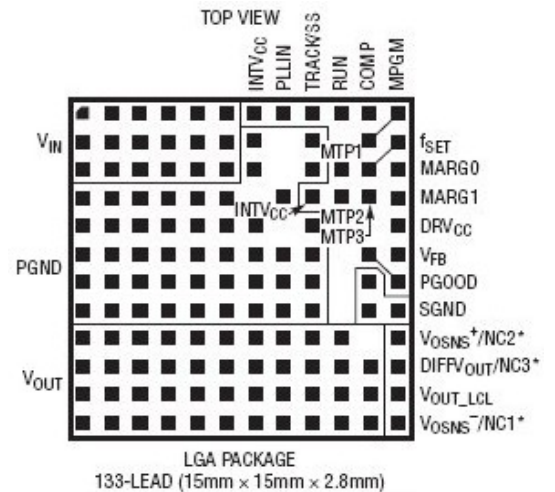
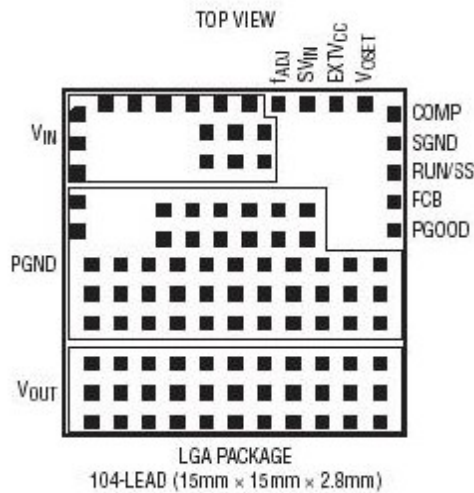
## Daisy-Chain Test Details

<b>Tests Conform to</b>	IPC-9701A
<b>Ramp Rate</b>	10°C / minute
<b>Dwell Time</b>	10 minutes
<b>Method for Detecting Interconnect Failure</b>	Daisy Chain with Real-Time Resistivity Monitor

## DAISY CHAIN TEMP CYCLE DATA

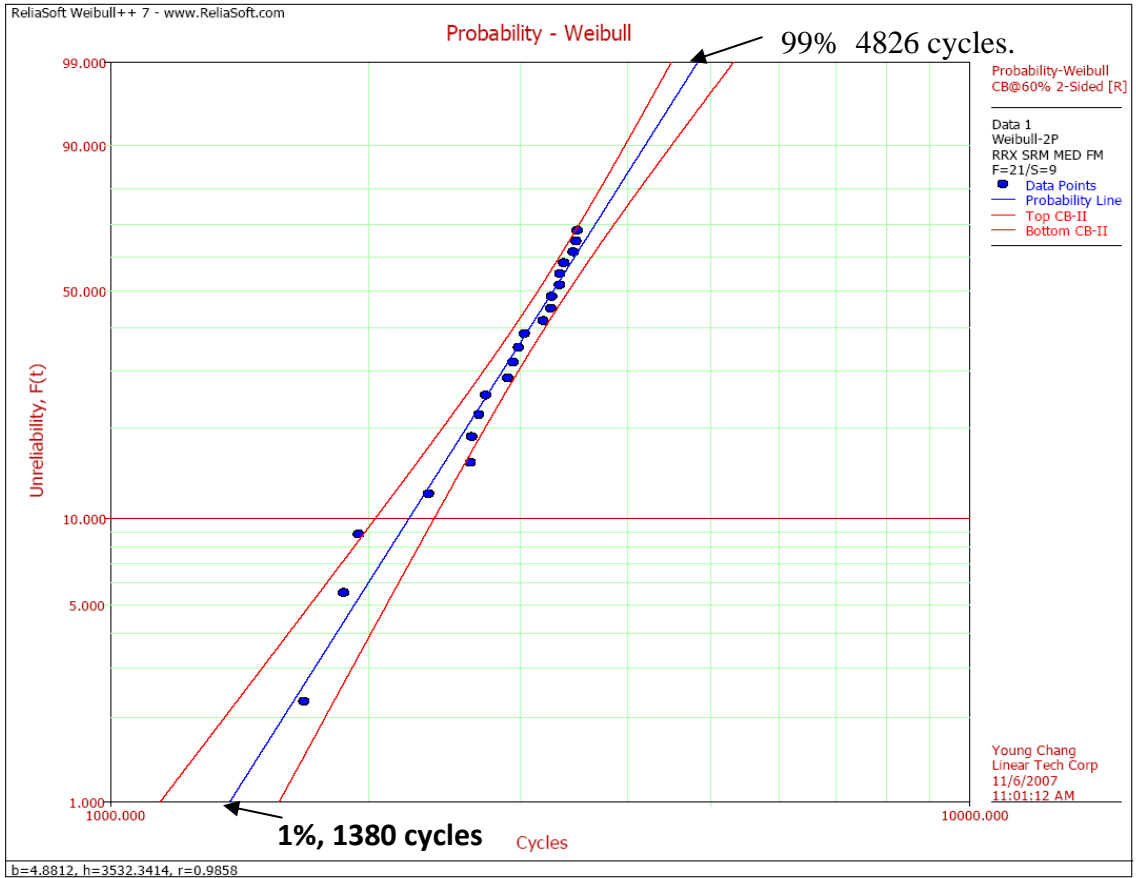
DATE CODE	DEVICE TYPE	PKG TYPE	SAMPLE SIZE	CONTINUITY REJECTS	CYCLES ON TC 0°C TO +100°C	DEVICE CYCLES ON TC 0°C TO +100°C	SOLDER PASTE
0640	LTM4600	LGA-104	30	21	3,500	105,000	PbSn
0640	LTM4600	LGA-104	30	0	4,000	120,000	SnAgCu
0748	LTM4601A	LGA-133	40	5	6,000	240,000	PbSn
0748	LTM4601A	LGA-133	40	0	3,500	140,000	SnAgCu
0847	LTM2880	LGA-68	80	0	3,500	280,000	SnAgCu
0911	LTM9004	LGA-204	40	0	6,000	240,000	SnAgCu
0927	LTM4617	LGA-133	40	0	6,000	240,000	SnAgCu
1007	LTM2885	LGA-32	40	2	6,000	240,000	SnAgCu
1027	LTM4620	LGA-144	40	0	6,000	240,000	SnAgCu
1224	LTM4676	LGA-144	40	0	6,000	240,000	SnAgCu
10	LOTS		420	28		2,085,000	

## LTM46xx $\mu$ Module Footprint Comparisons

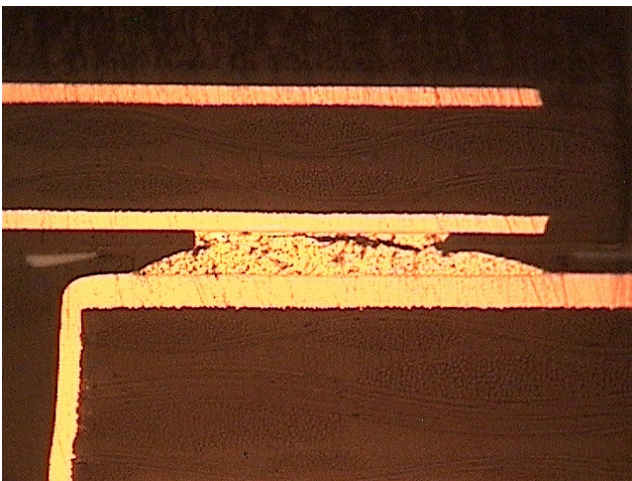




# LTM4600 Daisy Chain Failure Analysis



Weibull plot for LTM4600 daisy chain **Pb** board mounted units after 0/100C 3500 cycles test. No failures found from **PbF** solder paste (up to 4000 T/C)

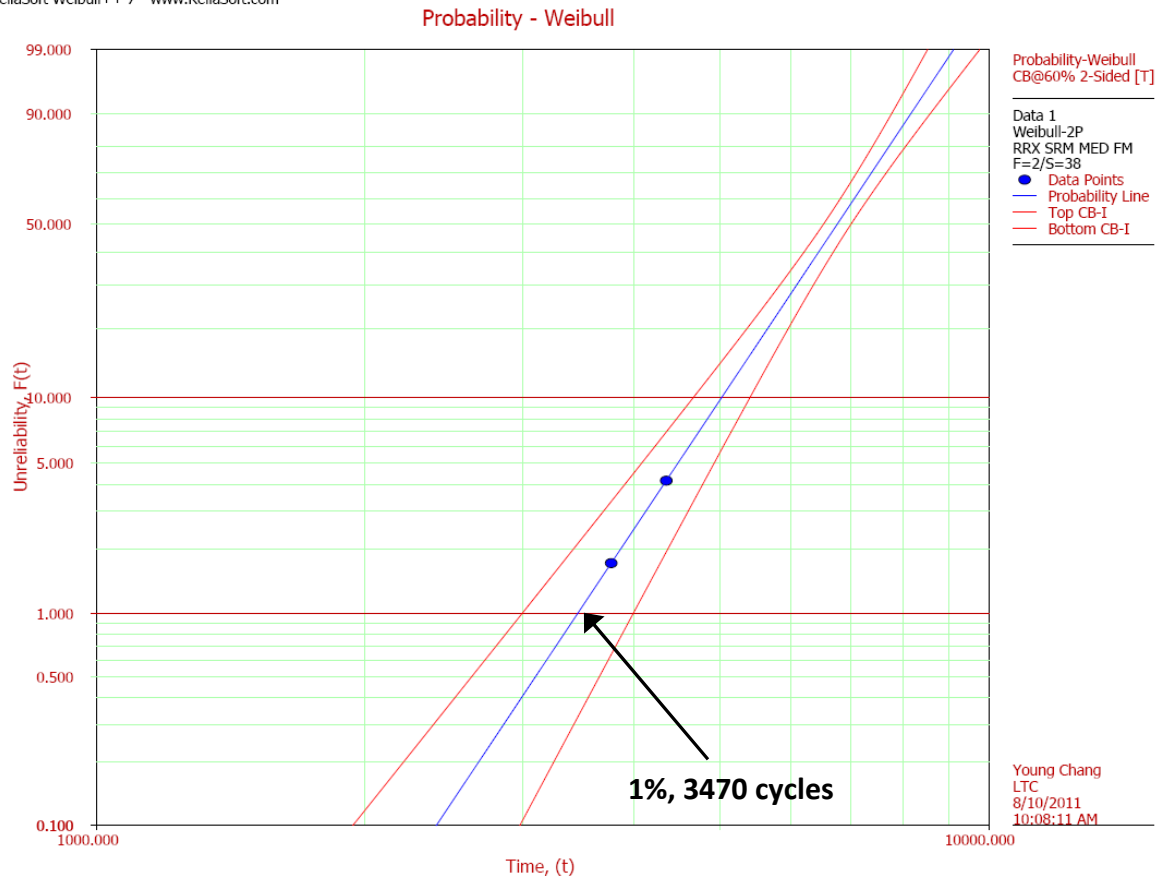


Solder Fatigue and Edge Crack found at Corner Pin after 3500 cycles (**Pb** solder paste).

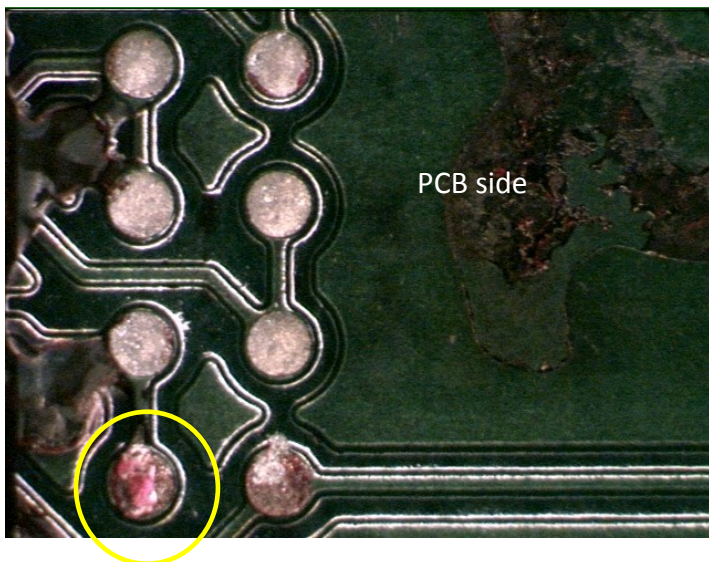


# LTM2885 Daisy Chain Failure Analysis

ReliaSoft Weibull++ 7 - www.ReliaSoft.com



B=6.3240, n=7164.5495, o=1.0000



Dye and pry after 6000 cycles shows A1 corner pin saturated. This DUT failed at 3773 cycles. Presence of dye indicates a solder joint failure at the A1 pin location.