CHANGE NOTIFICATION

Linear Technology Corporation
1630 McCarthy Blvd., Milpitas, CA 95035-7417
(408) 432-1900

March 19, 2014

Dear Sir/Madam: PCN# 031914

Subject: **Notification of Assembly Process Change for LTM8040**

Please be advised that Linear Technology Corporation has made a minor change to the internal package construction to facilitate the use of one attach material for both die and components. The die attach material is changed from epoxy to solder for all dice, which is already used for attaching components in the same µModule device package. In order to use the solder die attach, the die attach paddle (DAP) has been modified by splitting the DAP into multiple pads for dice U1 and D1. The component attach pads for component C2 and C3 have also been split into multiple pads. Linear has been shipping several µModule devices using solder for die attach and component attach.

Besides these changes, no functional, parametric, mechanical, or datasheet specifications are affected and the component bill of materials remains unchanged. Similarly, there are no changes associated with the package footprint, PCB layout or product top marking, so the customer applications will be unaffected.

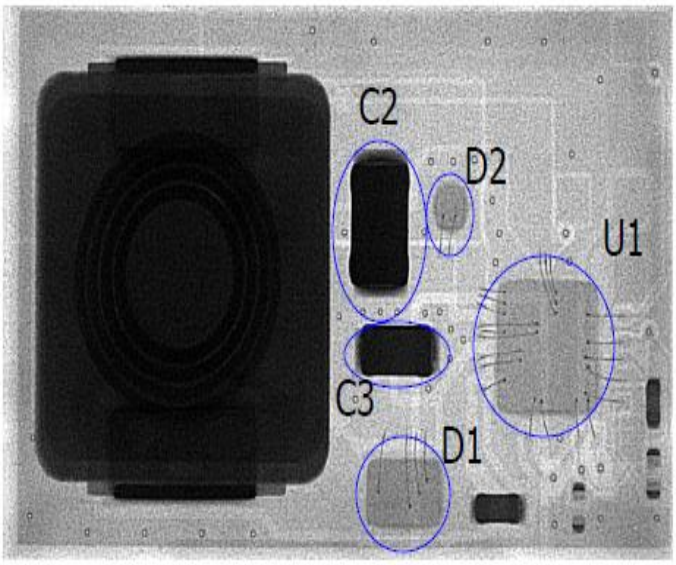
Parts incorporating the new substrate design have been fully characterized and tested for package level reliability. The change was qualified by performing extensive characterization over the full operating voltage and temperature ranges and MSL3 preconditioning. Devices from the same µModule device product families have been subjected to 1000 cycles of temperature cycles and thermal shock. Products built using the improved design are targeted for shipment after May 20, 2014.

Should you have any further questions, please feel free to contact me at 408-432-1900 ext. 2077, or by E-mail JASON.HU@LINEAR.COM. If I do not hear from you by May 20, 2014, we will consider this change approved by your company.

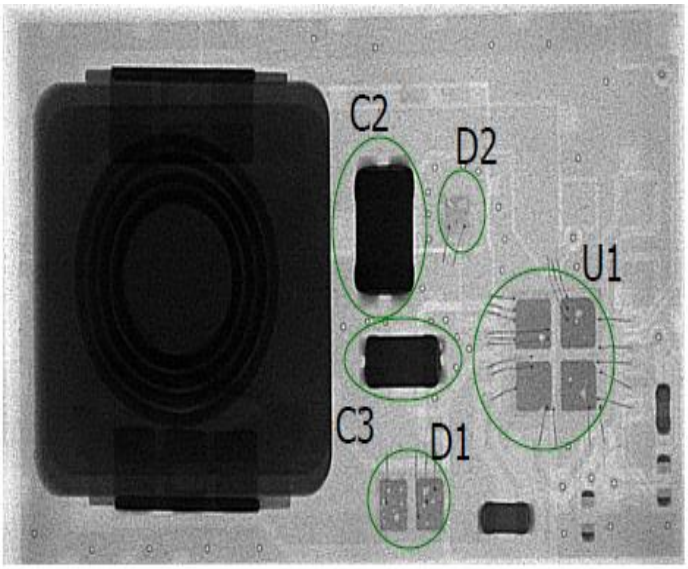
Sincerely,

Jason Hu
Quality Assurance Engineer

LTM8040- Current and New Design



BEFORE: EPOXY + STD DAP



AFTER CHANGE: SOLDER + WP DAP

PACKAGE RELIABILITY DATA
LTM80xx Solder Die Attach Qualification Report
3/3/2014

• OPERATING LIFE TEST

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE HOURS AT +150°C	NUMBER OF FAILURES
LTM8008	77	1210	1210	77.00	0
	77			77.00	0

• J-STD-020 MSL 3 PRECONDITIONING: 192h +30°C/60%R.H. SOAK, 3x REFLOW AT +245°C PEAK

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE		NUMBER OF FAILURES
LTM8001	199	1236	1236		0
LTM8008	462	1210	1210		0
LTM8021	204	1306	1306		0
LTM8023	204	1245	1245		0
LTM8025	204	1245	1245		0
LTM8027	77	1320	1320		0
LTM8028	184	1236	1236		0
LTM8029	246	1239	1239		0
LTM8032	204	1302	1302		0
LTM8033	204	1306	1306		0
LTM8040	223	1345	1345		0
LTM8042	230	1339	1339		0
LTM8045	152	1225	1225		0
LTM8047	77	1242	1242		0
LTM8048	274	1232	1236		0
LTM8052	358	1239	1239		0
LTM8058	204	1239	1239		0
LTM8061	204	1309	1309		0
LTM8062	231	1330	1330		0
	4,141				0

• HIGH TEMPERATURE BAKE at +150°C

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE HOURS AT +150°C	NUMBER OF FAILURES
LTM8001	25	1236	1236	25.00	0
LTM8008	77	1210	1210	77.00	0
LTM8021	50	1306	1306	50.00	0
LTM8023	50	1245	1245	50.00	0
LTM8025	50	1245	1245	50.00	0
LTM8029	50	1239	1239	50.00	0
LTM8032	74	1302	1302	74.00	0
LTM8033	77	1306	1306	77.00	0
LTM8042	77	1339	1339	77.00	0
LTM8045	50	1225	1225	50.00	0
LTM8052	50	1239	1239	50.00	0
LTM8058	50	1239	1239	50.00	0
LTM8062	77	1330	1330	77.00	0
	757			757.00	0

• HIGHLY ACCELERATED STRESS TEST (+130°C/85%R.H. w BIAS)

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE HOURS AT +85°C	NUMBER OF FAILURES
LTM8008	46	1210	1210	88.32	0
	46			88.32	0

• UNBIASED HIGHLY ACCELERATED STRESS TEST (+130°C/85%R.H.) [1]

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE HOURS AT +130°C	NUMBER OF FAILURES
LTM8001	43	1236	1236	4.13	0
LTM8023	50	1245	1245	4.80	0
LTM8025	50	1245	1245	4.80	0
LTM8028	30	1236	1236	2.88	0
LTM8029	70	1239	1239	6.72	0
LTM8032	50	1302	1302	4.80	0
LTM8033	50	1306	1306	4.80	0
LTM8042	77	1339	1339	7.39	0
LTM8045	49	1225	1225	8.23	0
LTM8052	50	1239	1239	4.80	0
LTM8058	50	1239	1239	4.80	0
LTM8061	50	1309	1309	4.80	0
LTM8062	77	1330	1330	7.39	0
	742			72.55	0

PACKAGE RELIABILITY DATA
LTM80xx Solder Die Attach Qualification Report
3/3/2014

• TEMPERATURE/HUMIDITY STORAGE (+85°C/85%R.H.) [1]

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE HOURS AT +85°C	NUMBER OF FAILURES
LTM8008	77	1210	1210	77.00	0
LTM8062	50	1330	1330	25.00	0
	127			102.00	0

• TEMP CYCLE FROM -65°C to +150°C [1]

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES	NUMBER OF FAILURES
LTM8008	231	1210	1210	231.00	0
LTM8032	77	1302	1302	77.00	0
LTM8033	77	1306	1306	77.00	0
LTM8052	77	1239	1239	77.00	0
LTM8061	77	1309	1309	77.00	0
	539			539.00	0

• TEMP CYCLE FROM -55°C to +125°C [1]

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES	NUMBER OF FAILURES
LTM8001	77	1236	1236	77.00	0
LTM8021	77	1306	1306	77.00	0
LTM8023	77	1245	1245	77.00	0
LTM8025	77	1245	1245	77.00	0
LTM8027	77	1320	1320	77.00	0
LTM8028	77	1236	1236	77.00	0
LTM8029	77	1239	1239	77.00	0
LTM8042	77	1339	1339	77.00	0
LTM8045	77	1225	1225	77.00	0
LTM8047	77	1242	1242	77.00	0
LTM8048	102	1232	1236	140.50	0
LTM8052	77	1239	1239	77.00	0
LTM8058	77	1239	1239	77.00	0
LTM8062	77	1330	1330	77.00	0
	1,103			1,141.50	0

• THERMAL SHOCK FROM -65°C to +150°C [1]

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES	NUMBER OF FAILURES
LTM8008	231	1210	1210	231.00	0
LTM8032	77	1302	1302	77.00	0
LTM8033	77	1306	1306	77.00	0
LTM8052	77	1239	1239	77.00	0
LTM8061	77	1309	1309	77.00	0
	539			539.00	0

• THERMAL SHOCK FROM -55°C to +125°C [1]

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES	NUMBER OF FAILURES
LTM8001	77	1236	1236	77.00	0
LTM8021	77	1306	1306	77.00	0
LTM8023	77	1245	1245	77.00	0
LTM8025	77	1245	1245	77.00	0
LTM8028	77	1236	1236	77.00	0
LTM8029	77	1239	1239	77.00	0
LTM8042	76	1339	1339	77.00	0
LTM8045	75	1225	1225	75.00	0
LTM8048	126	1232	1236	126.00	0
LTM8052	77	1239	1239	77.00	0
LTM8058	77	1239	1239	77.00	0
LTM8062	77	1330	1330	77.00	0
	970			971.00	0

• BOARD MOUNT TEMP CYCLE FROM -40°C to +125°C

DEVICE TYPE	SAMPLE SIZE	OLDEST DATE CODE	NEWEST DATE CODE	K DEVICE CYCLES	NUMBER OF FAILURES
LTM8008	15	1210	1210	22.50	0
	15			22.50	0

(1) Environmental stress are preceded by JEDEC Level 3 Preconditioning: 192h 30°C/60% R.H. soak, followed by 3x Reflow at 245°C