

April 21, 2006

Subject: PCN# 04A-06, 90-Day Notification of Intent to Convert from the 256-ball Fine-Pitch BGA (fpBGA) to the 256-ball Fine-Pitch Thin BGA (ftBGA) Package for MachXO640 Devices

Dear Lattice Customer:

Lattice Semiconductor is providing this 90-day notification of our intent to convert from the 256-fpBGA to the 256-ftBGA package alternative for MachXO640 devices. See table below for the ordering part numbers affected by this conversion.

Current Device	Convert To
LCMXO640C-3F256C	LCMXO640C-3FT256C
LCMXO640C-3F256C4W	
LCMXO640C-3F256I	LCMXO640C-3FT256I
LCMXO640C-3F256I4W	
LCMXO640C-3FN256C	LCMXO640C-3FTN256C
LCMXO640C-3FN256C4W	
LCMXO640C-3FN256I	LCMXO640C-3FTN256I
LCMXO640C-3FN256I4W	
LCMXO640C-4F256C	LCMXO640C-4FT256C
LCMXO640C-4F256C4W	
LCMXO640C-4F256I	LCMXO640C-4FT256I
LCMXO640C-4F256I4W	
LCMXO640C-4FN256C	LCMXO640C-4FTN256C
LCMXO640C-4FN256C4W	
LCMXO640C-4FN256I	LCMXO640C-4FTN256I

Current Device	Convert To
LCMXO640C-4FN256I4W	LCMXO640C-4FTN256I
LCMXO640C-5F256C	LCMXO640C-5FT256C
LCMXO640C-5F256C4W	
LCMXO640C-5FN256C	LCMXO640C-5FTN256C
LCMXO640C-5FN256C4W	
LCMXO640E-3F256C	LCMXO640E-3FT256C
LCMXO640E-3F256I	LCMXO640E-3FT256I
LCMXO640E-3FN256C	LCMXO640E-3FTN256C
LCMXO640E-3FN256I	LCMXO640E-3FTN256I
LCMXO640E-4F256C	LCMXO640E-4FT256C
LCMXO640E-4F256I	LCMXO640E-4FT256I
LCMXO640E-4FN256C	LCMXO640E-4FTN256C
LCMXO640E-4FN256I	LCMXO640E-4FTN256I
LCMXO640E-5F256C	LCMXO640E-5FT256C
LCMXO640E-5FN256C	LCMXO640E-5FTN256C

This PCN also affects any custom devices (i.e. factory programmed, tape and reel, etc.), which are derived from any of the ordering part numbers listed above.

Data Sheet Specifications

This PCN has no impact on any data sheet performance specifications.

Package Comparison

The physical appearance of the 256-ftBGA will differ from that of the 256-fpBGA due to a different encapsulation process (saw singulated versus over-molded). Detailed package drawings for the 256-ftBGA as well as the 256-fpBGA are attached for reference in Exhibit A. Key attributes of the 256-ftBGA are listed below.

- Body size unchanged
- Footprint unchanged
- Will fit all existing PCB designs
- Physical height reduced
- Θ_{JA} is higher

The 256-ftBGA and 256-fpBGA packages compare as follows:

Characteristic	256-ftBGA	256-fpBGA
Θ_{JA} ($^{\circ}\text{C}/\text{Watt}$)	45 (2-layer board, still air)	40 (4-layer board, still air)
Footprint	Same	Same
Body Size	Same	Same
Pin / Signal Assignments	Same	Same
Height Max. (mm)	1.55	2.10
Weight (grams)	0.71	1.06
Mold Compound	Sumitomo G770	Kyocera KE-G1250
Die Attach	Ablebond 2300	Ablebond 2000B
Bond Wire	Same	Same
Substrate Material	Same	Same

Qualification Data

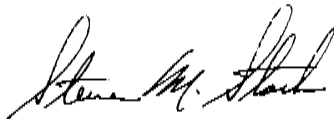
The 256-ftBGA has passed all Lattice package qualification requirements. A summary of the qualification data is attached for your review in Exhibit B.

Conversion Timing

Plans are to begin shipment of the LCMXO640 product in the 256-ftBGA after July 21, 2006 (90-days after the date of this Notice). Lattice is able to ship this material earlier than this date should you desire. If you require samples of the 256-ftBGA, please contact your Lattice Sales Representative. All orders received after July 21, 2006 must be for the 256-ftBGA package.

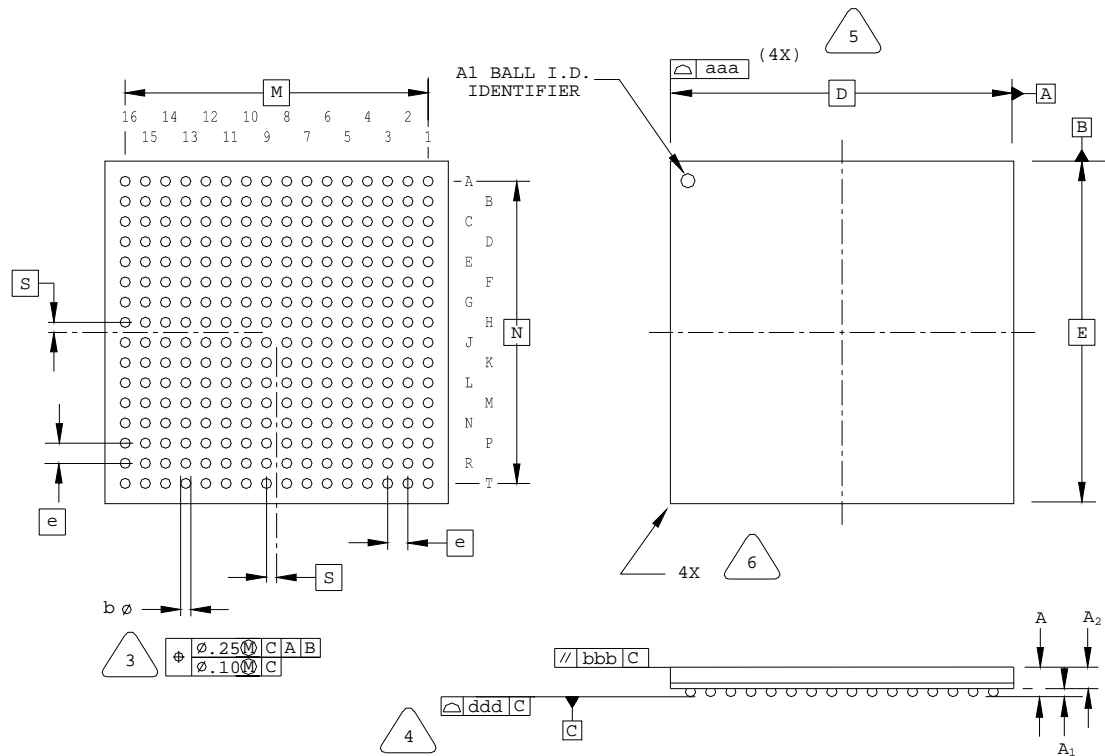
If you have any questions or require additional information, please contact your local Lattice Sales Representative or please feel free to call me at (503) 268-8386.

Regards,



Steven M. Stark
Director, Product Marketing

EXHIBIT A: 256-Ball ftBGA Package Diagram



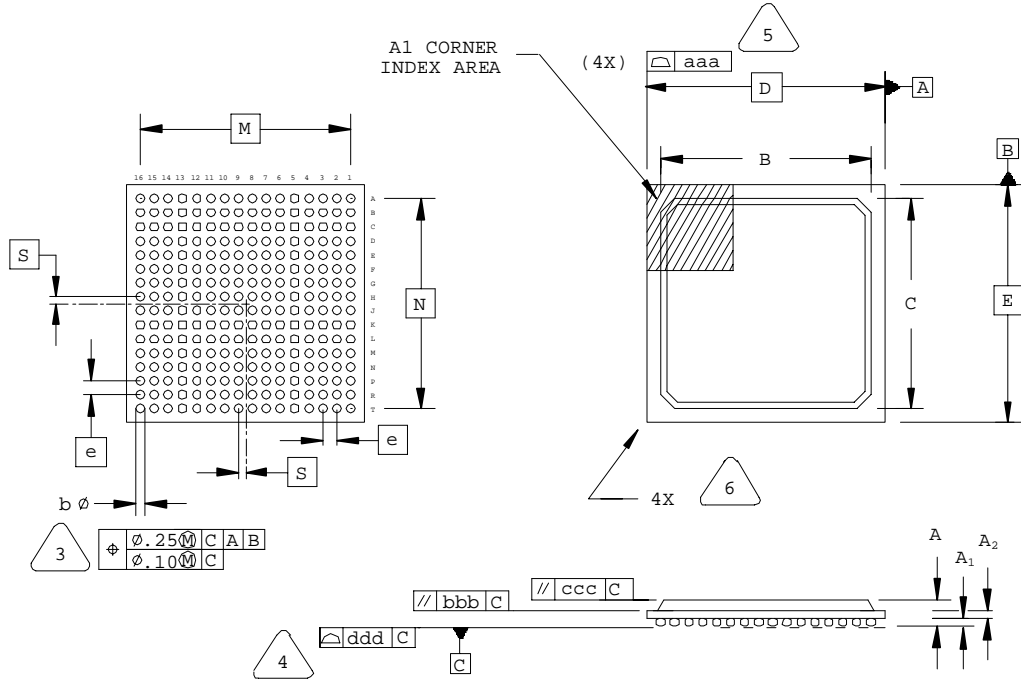
NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
2. ALL DIMENSIONS ARE IN MILLIMETERS.

- 3 DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM [C]
- 4 PRIMARY DATUM [C] AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.
- 5 BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.
- 6 EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	1.25	1.40	1.55
A1	0.30	-	-
A2	-	-	1.25
D/E	17.0 BSC		
M/N	15.0 BSC		
S	0.50 BSC		
b	0.40	0.50	0.60
e	1.0 BSC		
aaa	-	-	0.20
bbb	-	-	0.25
ddd	-	-	0.12

EXHIBIT A: 256-Ball fpBGA Package Diagram



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
2. ALL DIMENSIONS ARE IN MILLIMETERS.



DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER, PARALLEL TO PRIMARY DATUM C



PRIMARY DATUM C AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.



BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.



EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.

SYMBOL	MIN.	NOM.	MAX.
A	1.30	1.70	2.10
A1	0.30	0.50	0.70
A2	0.30	0.50	0.70
B/C	14.80	15.30	15.80
D/E	17.00 BSC		
M/N	15.00 BSC		
S	0.50 BSC		
b	0.50	0.60	0.70
e	1.00 BSC		
aaa	-	-	0.20
bbb	-	-	0.25
ccc	-	-	0.35
ddd	-	-	0.20

EXHIBIT B: Qual Summary

**Amkor "Saw Singulated" BGA Packages
(All caBGA, csBGA, ftBGA, and 100 fpBGA)
QUALIFICATION SUMMARY**

SURFACE MOUNT PRECONDITIONING

(10 Temp. Cycles, 24 hr. bake @ 125°C, 30°C/60%RH soak, 192 hrs, 240C Reflow Simulation, 3 passes)

<u>LOT#</u>	<u>PRODUCT</u>	<u>QTY.</u>	<u>PACKAGE</u>	<u>RESULTS</u>
LOT #1	ispGDX2-64	25	100 fpBGA	0
LOT #2	ispGDX2-64	75	100 fpBGA	0
LOT #1	ispMACH4256C	150	132 csBGA	0
LOT #2	ispMACH4256C	150	132 csBGA	0
LOT #3	ispMACH4256C	150	132 csBGA	0

TEMPERATURE CYCLING (-55°C to 125°C)

<u>LOT#</u>	<u>PRODUCT</u>	<u>QTY.</u>	<u>PACKAGE</u>	<u>250 CYC</u>	<u>500 CYC</u>	<u>1000 CYC</u>
LOT #1	ispGDX2-64	25	100 fpBGA	0	0	0
LOT #2	ispGDX2-64	75	100 fpBGA	0	0	0
LOT #1	ispMACH4256C	50	132 csBGA	0	0	0
LOT #2	ispMACH4256C	50	132 csBGA	0	0	0
LOT #3	ispMACH4256C	50	132 csBGA	0	0	0

BIASED HAST (130°C, 15 psig, 85% RH, Vcc=1.95V)

<u>LOT#</u>	<u>PRODUCT</u>	<u>QTY.</u>	<u>PACKAGE</u>	<u>96 HRS</u>
LOT #1	ispMACH4256C	50	132 csBGA	0
LOT #2	ispMACH4256C	50	132 csBGA	0
LOT #3	ispMACH4256C	50	132 csBGA	0

UNBIASED HAST (130°C, 15 psig, 85% RH)

<u>LOT#</u>	<u>PRODUCT</u>	<u>QTY.</u>	<u>PACKAGE</u>	<u>96 HRS</u>
LOT #1	ispMACH4256C	50	132 csBGA	0
LOT #2	ispMACH4256C	50	132 csBGA	0
LOT #3	ispMACH4256C	50	132 csBGA	0

SURFACE MOUNT PRECONDITIONING

(10 Temp. Cycles, 24 hr. bake @ 125°C, 30°C/60%RH soak, 192 hrs, 250C Reflow Simulation, 3 passes)

<u>LOT#</u>	<u>PRODUCT</u>	<u>QTY.</u>	<u>PACKAGE</u>	<u>RESULTS</u>
LOT #1	ispLSI 2128VE	135	100 caBGA	0
LOT #2	ispLSI 2128VE	135	100 caBGA	0
LOT #3	ispLSI 2128VE	135	100 caBGA	0

85°C/85% RH (VCC=3.6 V, alternate pin biasing)

<u>LOT#</u>	<u>PRODUCT</u>	<u>QTY.</u>	<u>PACKAGE</u>	<u>96 HRS</u>
LOT #1	ispLSI 2128VE	45	100 caBGA	0
LOT #2	ispLSI 2128VE	45	100 caBGA	0
LOT #3	ispLSI 2128VE	45	100 caBGA	0

TEMPERATURE CYCLING (-55°C to 125°C)

<u>LOT#</u>	<u>PRODUCT</u>	<u>QTY.</u>	<u>PACKAGE</u>	<u>250 CYC</u>	<u>500 CYC</u>	<u>1000 CYC</u>
LOT #1	ispLSI 2128VE	45	100 caBGA	0	0	0
LOT #2	ispLSI 2128VE	45	100 caBGA	0	0	0
LOT #3	ispLSI 2128VE	45	100 caBGA	0	0	0

UNBIASED HAST (130°C, 15 psig, 85% RH)

<u>LOT#</u>	<u>PRODUCT</u>	<u>QTY.</u>	<u>PACKAGE</u>	<u>96 HRS</u>
LOT #1	ispLSI 2128VE	45	100 caBGA	0
LOT #2	ispLSI 2128VE	45	100 caBGA	0
LOT #3	ispLSI 2128VE	45	100 caBGA	0

SURFACE MOUNT PRECONDITIONING

(10 Temp. Cycles, 24 hr. bake @ 125°C, 30°C/60%RH soak, 192 hrs, 260C Reflow Simulation, 3 passes)

<u>LOT#</u>	<u>PRODUCT</u>	<u>QTY.</u>	<u>PACKAGE</u>	<u>RESULTS</u>
LOT #1	ispLSI 2128VE	30	100 caBGA	0
LOT #1	ispLSI 2128VE	46	100 caBGA	0
LOT #1	ispGDX2-64	25	100 fpBGA	0
LOT #2	ispGDX2-64	75	100 fpBGA	0
LOT #1	ispMACH4256C	50	132 csBGA	0
LOT #2	ispMACH4256C	50	132 csBGA	0
LOT #3	ispMACH4256C	48	132 csBGA	0
LOT #1	MachXO 2280C	45	324 ftBGA	0
LOT #2	MachXO 2280C	45	324 ftBGA	0

TEMPERATURE CYCLING (-55°C to 125°C)

<u>LOT#</u>	<u>PRODUCT</u>	<u>QTY.</u>	<u>PACKAGE</u>	<u>250 CYC</u>	<u>500 CYC</u>	<u>1000 CYC</u>
LOT #1	ispLSI 2128VE	30	100 caBGA	0	0	0
LOT #2	ispLSI 2128VE	46	100 caBGA	0	0	0
LOT #1	ispGDX2-64	25	100 fpBGA	0	0	0
LOT #2	ispGDX2-64	75	100 fpBGA	0	0	0
LOT #1	ispMACH4256C	50	132 csBGA	0	0	0
LOT #2	ispMACH4256C	50	132 csBGA	0	0	0
LOT #3	ispMACH4256C	48	132 csBGA	0	0	0
LOT #1	MachXO 2280C	45	324 ftBGA	0	0	0
LOT #2	MachXO 2280C	45	324 ftBGA	0	0	0

The ispLSI 2128VE in the 100 caBGA package, ispGDX2-64 in the 100 fpBGA package, the ispMACH 4265C in the 132 csBGA, and the MachXO 2280C in the 324 ftBGA were the qualification vehicles for this package family.

The 49 caBGA, 56 csBGA, 100 csBGA and 256 ftBGA packages are qualified by extension.