



February 5, 2010

**Subject: PCN# 01A-10, Notification of Intent to Convert the Ceramic Flip Chip BGA to the Organic Flip Chip BGA and the Discontinuance of the Ceramic Flip Chip BGA for the LatticeSC/SCM Families of FPGAs**

Dear Lattice Customers:

In accordance with our Product Change Notification (PCN) policy, Lattice is providing this notification of our intent to convert the 1152-ball and 1704-ball Ceramic Flip Chip Ball Grid Array (fcBGA) packages for the LatticeSC™ and LatticeSCM™ families assembled at Fujitsu Japan to the Organic Flip Chip Ball Grid Array assembled at Advanced Semiconductor Engineering (ASE) Kaohsiung, Taiwan. Additionally, we plan to discontinue the Ceramic fcBGA packages for the LatticeSC and LatticeSCM families.

### **AFFECTED DEVICES**

The Ordering Part Numbers (OPNs) affected by this PCN are listed in the Exhibit A.

### **PACKAGE COMPARISON**

The package characteristics comparison between the Ceramic fcBGA and Organic fcBGA packages are provided in Exhibit B. Package Outline Drawings of these packages are shown in Exhibit C and material set details are described in Exhibit D.

### **DATA SHEET SPECIFICATIONS**

The new 1152-ball and 1704-ball Organic fcBGA devices meet all data sheet performance specifications. The new version of the product data sheet will include the new / replacement OPNs; LatticeSC/M Family Data Sheet (DS1004 Version 02.3, January 2010).

### **QUALIFICATION DATA**

The new 1152-ball and 1704-ball Organic fcBGA have passed all Lattice package qualification requirements. A summary of the qualification data is available [here](#).

## **CONVERSION / DISCONTINUANCE TIMING**

Conversion timing for this PCN is 90 days from the date of this Notice. Should samples be required to complete evaluation of those new packages, such sample requests must be received **no later than March 5, 2010** (30 days after the date of this Notice).

Customers will have 4.5 months to place last time buy (LTB) orders for the 1152-ball and 1704-ball Ceramic fcBGA devices (if needed). All LTB orders for these Ceramic fcBGA devices will be non-cancelable and non-returnable. All LTB orders must be placed no later than June 18, 2010 (4.5 months after the date of this notice) with all deliveries taken no later than December 18, 2010 (10 months after the date of this notice). Orders for the Ceramic fcBGA devices received after June 18, 2010 will only be accepted based upon available inventory.

## **CONVERSION / DISCONTINUANCE TIMING – Summary**

- **Sample Request Cut-off Date: March 5, 2010**
- **Requested Conversion Date: May 5, 2010**
- **Ceramic fcBGA Last Time Buy Order Date: June 18, 2010**
- **Ceramic fcBGA Last Shipment Date: December 18, 2010**

## **RESPONSE**

In accordance with JESD46-C, this change is deemed accepted by the customer if no acknowledgement is received within 30 days from this Notice.

**Note:** Be sure to sign up for PCN “Web Alerts” (See [PCN#13A-09](#) for details) and receive all future Lattice PCNs via e-mail!

## **CONTACT**

If you have any questions or require additional information, please contact [pcn@latticesemi.com](mailto:pcn@latticesemi.com).

Sincerely,

Lattice Semiconductor PCN Administration

**EXHIBIT “A” – Ceramic Flip Chip BGA to Organic Flip Chip BGA Conversion**

Device	Discontinued Part Number	Discontinued Package	New / Replacement Part Number	New / Replacement Package
SC40	LFSC3GA40E-7FC1152C	Ceramic 1152-fcBGA	LFSC3GA40E-7FF1152C	Organic 1152-fcBGA
	LFSC3GA40E-6FC1152C		LFSC3GA40E-6FF1152C	
	LFSC3GA40E-5FC1152C		LFSC3GA40E-5FF1152C	
	LFSC3GA40E-6FC1152I		LFSC3GA40E-6FF1152I	
	LFSC3GA40E-5FC1152I		LFSC3GA40E-5FF1152I	
	LFSC3GA40E-7FCN1152C	Pb-Free Ceramic 1152-fcBGA	LFSC3GA40E-7FFN1152C	Pb-Free Organic 1152-fcBGA
	LFSC3GA40E-6FCN1152C		LFSC3GA40E-6FFN1152C	
	LFSC3GA40E-5FCN1152C		LFSC3GA40E-5FFN1152C	
	LFSC3GA40E-6FCN1152I		LFSC3GA40E-6FFN1152I	
	LFSC3GA40E-5FCN1152I		LFSC3GA40E-5FFN1152I	
SCM40	LFSCM3GA40EP1-7FC1152C	Ceramic 1152-fcBGA	LFSCM3GA40EP1-7FF1152C	Organic 1152-fcBGA
	LFSCM3GA40EP1-6FC1152C		LFSCM3GA40EP1-6FF1152C	
	LFSCM3GA40EP1-5FC1152C		LFSCM3GA40EP1-5FF1152C	
	LFSCM3GA40EP1-6FC1152I		LFSCM3GA40EP1-6FF1152I	
	LFSCM3GA40EP1-5FC1152I		LFSCM3GA40EP1-5FF1152I	
	LFSCM3GA40EP1-7FCN1152C	Pb-Free Ceramic 1152-fcBGA	LFSCM3GA40EP1-7FFN1152C	Pb-Free Organic 1152-fcBGA
	LFSCM3GA40EP1-6FCN1152C		LFSCM3GA40EP1-6FFN1152C	
	LFSCM3GA40EP1-5FCN1152C		LFSCM3GA40EP1-5FFN1152C	
	LFSCM3GA40EP1-6FCN1152I		LFSCM3GA40EP1-6FFN1152I	
	LFSCM3GA40EP1-5FCN1152I		LFSCM3GA40EP1-5FFN1152I	
SC80	LFSC3GA80E-7FC1152C	Ceramic 1152-fcBGA	LFSC3GA80E-7FF1152C	Organic 1152-fcBGA
	LFSC3GA80E-6FC1152C		LFSC3GA80E-6FF1152C	
	LFSC3GA80E-5FC1152C		LFSC3GA80E-5FF1152C	
	LFSC3GA80E-6FC1152I		LFSC3GA80E-6FF1152I	
	LFSC3GA80E-5FC1152I		LFSC3GA80E-5FF1152I	
	LFSC3GA80E-7FCN1152C	Pb-Free Ceramic 1152-fcBGA	LFSC3GA80E-7FFN1152C	Pb-Free Organic 1152-fcBGA
	LFSC3GA80E-6FCN1152C		LFSC3GA80E-6FFN1152C	
	LFSC3GA80E-5FCN1152C		LFSC3GA80E-5FFN1152C	
	LFSC3GA80E-6FCN1152I		LFSC3GA80E-6FFN1152I	
	LFSC3GA80E-5FCN1152I		LFSC3GA80E-5FFN1152I	
	LFSC3GA80E-7FC1704C	Ceramic 1704-fcBGA	LFSC3GA80E-7FF1704C	Organic 1704-fcBGA
	LFSC3GA80E-6FC1704C		LFSC3GA80E-6FF1704C	
	LFSC3GA80E-5FC1704C		LFSC3GA80E-5FF1704C	
	LFSC3GA80E-6FC1704I		LFSC3GA80E-6FF1704I	
	LFSC3GA80E-5FC1704I		LFSC3GA80E-5FF1704I	
	LFSC3GA80E-7FCN1704C	Pb-Free Ceramic 1704-fcBGA	LFSC3GA80E-7FFN1704C	Pb-Free Organic 1704-fcBGA
	LFSC3GA80E-6FCN1704C		LFSC3GA80E-6FFN1704C	
	LFSC3GA80E-5FCN1704C		LFSC3GA80E-5FFN1704C	
LFSC3GA80E-6FCN1704I	LFSC3GA80E-6FFN1704I			
LFSC3GA80E-5FCN1704I	LFSC3GA80E-5FFN1704I			

**Note:** This PCN also affects any custom devices (i.e. factory programmed, special test, etc.), which are derived from any of the devices listed above.

**EXHIBIT “A” – Ceramic Flip Chip BGA to Organic Flip Chip BGA Conversion (Cont’d)**

Device	Discontinued Part Number	Discontinued Package	New / Replacement Part Number	New / Replacement Package		
SCM80	LFSCM3GA80EP1-7FC1152C	Ceramic 1152-fcBGA	LFSCM3GA80EP1-7FF1152C	Organic 1152-fcBGA		
	LFSCM3GA80EP1-6FC1152C		LFSCM3GA80EP1-6FF1152C			
	LFSCM3GA80EP1-5FC1152C		LFSCM3GA80EP1-5FF1152C			
	LFSCM3GA80EP1-6FC1152I		LFSCM3GA80EP1-6FF1152I			
	LFSCM3GA80EP1-5FC1152I		LFSCM3GA80EP1-5FF1152I			
	LFSCM3GA80EP1-7FCN1152C		LFSCM3GA80EP1-7FFN1152C			
	LFSCM3GA80EP1-6FCN1152C	Pb-Free Ceramic 1152-fcBGA	LFSCM3GA80EP1-6FFN1152C	Pb-Free Organic 1152-fcBGA		
	LFSCM3GA80EP1-5FCN1152C		LFSCM3GA80EP1-5FFN1152C			
	LFSCM3GA80EP1-6FCN1152I		LFSCM3GA80EP1-6FFN1152I			
	LFSCM3GA80EP1-5FCN1152I		LFSCM3GA80EP1-5FFN1152I			
	LFSCM3GA80EP1-7FC1704C		Ceramic 1704-fcBGA		LFSCM3GA80EP1-7FF1704C	Organic 1704-fcBGA
	LFSCM3GA80EP1-6FC1704C				LFSCM3GA80EP1-6FF1704C	
	LFSCM3GA80EP1-5FC1704C	LFSCM3GA80EP1-5FF1704C				
	LFSCM3GA80EP1-6FC1704I	LFSCM3GA80EP1-6FF1704I				
	LFSCM3GA80EP1-5FC1704I	LFSCM3GA80EP1-5FF1704I				
	LFSCM3GA80EP1-7FCN1704C	Pb-Free Ceramic 1704-fcBGA		LFSCM3GA80EP1-7FFN1704C	Pb-Free Organic 1704-fcBGA	
	LFSCM3GA80EP1-6FCN1704C		LFSCM3GA80EP1-6FFN1704C			
	LFSCM3GA80EP1-5FCN1704C		LFSCM3GA80EP1-5FFN1704C			
LFSCM3GA80EP1-6FCN1704I	LFSCM3GA80EP1-6FFN1704I					
LFSCM3GA80EP1-5FCN1704I	LFSCM3GA80EP1-5FFN1704I					
LFSCM3GA80EP1-5FCN1704I	LFSCM3GA80EP1-5FFN1704I					
SC115	LFSC3GA115E-6FC1152C	Ceramic 1152-fcBGA	LFSC3GA115E-6FF1152C	Organic 1152-fcBGA		
	LFSC3GA115E-5FC1152C		LFSC3GA115E-5FF1152C			
	LFSC3GA115E-6FC1152I		LFSC3GA115E-6FF1152I			
	LFSC3GA115E-5FC1152I		LFSC3GA115E-5FF1152I			
	LFSC3GA115E-6FCN1152C		LFSC3GA115E-6FFN1152C			
	LFSC3GA115E-5FCN1152C	Pb-Free Ceramic 1152-fcBGA	LFSC3GA115E-5FFN1152C	Pb-Free Organic 1152-fcBGA		
	LFSC3GA115E-6FCN1152I		LFSC3GA115E-6FFN1152I			
	LFSC3GA115E-5FCN1152I		LFSC3GA115E-5FFN1152I			
	LFSC3GA115E-6FC1704C		LFSC3GA115E-6FF1704C			
	LFSC3GA115E-5FC1704C		LFSC3GA115E-5FF1704C			
	LFSC3GA115E-6FC1704I	Ceramic 1704-fcBGA	LFSC3GA115E-6FF1704I	Organic 1704-fcBGA		
	LFSC3GA115E-5FC1704I		LFSC3GA115E-5FF1704I			
	LFSC3GA115E-6FCN1704C		LFSC3GA115E-6FFN1704C			
	LFSC3GA115E-5FCN1704C		LFSC3GA115E-5FFN1704C			
	LFSC3GA115E-6FCN1704I		LFSC3GA115E-6FFN1704I			
LFSC3GA115E-5FCN1704I	Pb-Free Ceramic 1704-fcBGA	LFSC3GA115E-5FFN1704I	Pb-Free Organic 1704-fcBGA			
LFSC3GA115E-6FCN1704I		LFSC3GA115E-6FFN1704I				
LFSC3GA115E-5FCN1704I		LFSC3GA115E-5FFN1704I				

**Note:** This PCN also affects any custom devices (i.e. factory programmed, special test, etc.), which are derived from any of the devices listed above.

**EXHIBIT “A” – Ceramic Flip Chip BGA to Organic Flip Chip BGA Conversion (Cont’d)**

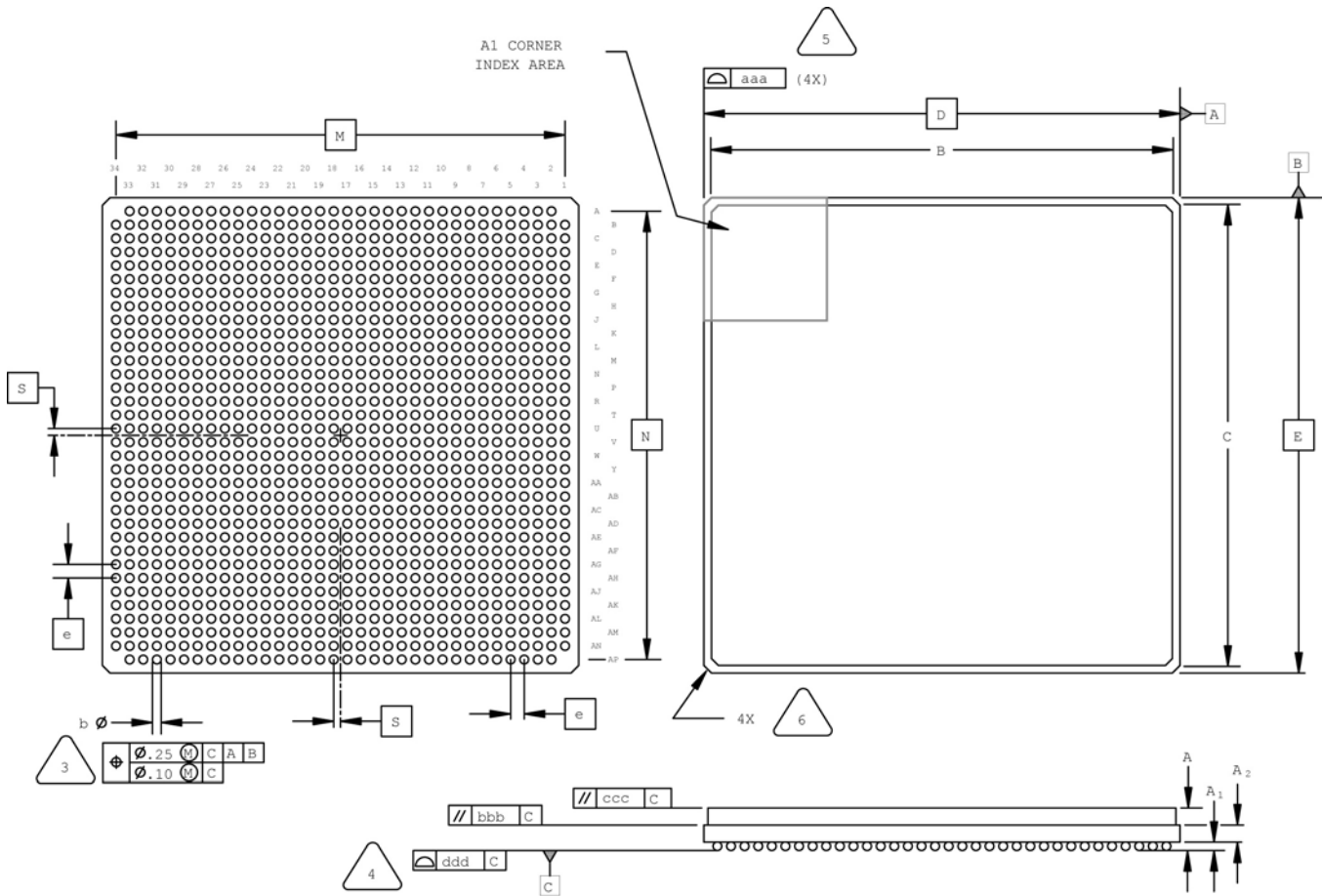
Device	Discontinued Part Number	Discontinued Package	New / Replacement Part Number	New / Replacement Package
SCM115	LFSCM3GA115EP1-6FC1152C	Ceramic 1152-fcBGA	LFSCM3GA115EP1-6FF1152C	Organic 1152-fcBGA
	LFSCM3GA115EP1-5FC1152C		LFSCM3GA115EP1-5FF1152C	
	LFSCM3GA115EP1-6FC1152I		LFSCM3GA115EP1-6FF1152I	
	LFSCM3GA115EP1-5FC1152I		LFSCM3GA115EP1-5FF1152I	
	LFSCM3GA115EP1-6FCN1152C	Pb-Free Ceramic 1152-fcBGA	LFSCM3GA115EP1-6FFN1152C	Pb-Free Organic 1152-fcBGA
	LFSCM3GA115EP1-5FCN1152C		LFSCM3GA115EP1-5FFN1152C	
	LFSCM3GA115EP1-6FCN1152I		LFSCM3GA115EP1-6FFN1152I	
	LFSCM3GA115EP1-5FCN1152I		LFSCM3GA115EP1-5FFN1152I	
	LFSCM3GA115EP1-6FC1704C	Ceramic 1704-fcBGA	LFSCM3GA115EP1-6FF1704C	Organic 1704-fcBGA
	LFSCM3GA115EP1-5FC1704C		LFSCM3GA115EP1-5FF1704C	
	LFSCM3GA115EP1-6FC1704I		LFSCM3GA115EP1-6FF1704I	
	LFSCM3GA115EP1-5FC1704I		LFSCM3GA115EP1-5FF1704I	
	LFSCM3GA115EP1-6FCN1704C	Pb-Free Ceramic 1704-fcBGA	LFSCM3GA115EP1-6FFN1704C	Pb-Free Organic 1704-fcBGA
	LFSCM3GA115EP1-5FCN1704C		LFSCM3GA115EP1-5FFN1704C	
	LFSCM3GA115EP1-6FCN1704I		LFSCM3GA115EP1-6FFN1704I	
	LFSCM3GA115EP1-5FCN1704I		LFSCM3GA115EP1-5FFN1704I	

**Note:** This PCN also affects any custom devices (i.e. factory programmed, special test, etc.), which are derived from any of the devices listed above.

**EXHIBIT “B” – Package Characteristics Comparison**

Package Characteristics		1152-ball Ceramic fcBGA	1152-ball Organic fcBGA	1704-ball Ceramic fcBGA	1704-ball Organic fcBGA
$\theta_{JA}$ 0 LFM	(°C/W)	Same (9.5)		Same (7.7)	
$\theta_{JA}$ 200 LFM	(°C/W)	Same (7.3)		Same (5.5)	
$\theta_{JC}$	(°C/W)	Same (0.6)		Same (0.5)	
Body Size	(mm)	Same (35x35)		Same (42.5x42.5)	
Height	(mm)	4.6 ± 0.60	2.9 ± 0.50	4.6 ± 0.60	2.9 ± 0.50
Weight	(gram)	12.7	10.8	19.0	19.2
Foot Print	See Exhibit C	Same		Same	
Ball Assignment	See Exhibit C	Same		Same	
Die Bump		Same (Pb-Free)		Same (Pb-Free)	

# EXHIBIT "C" – Package Outline Drawing (1152-ball Ceramic fcBGA)



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.



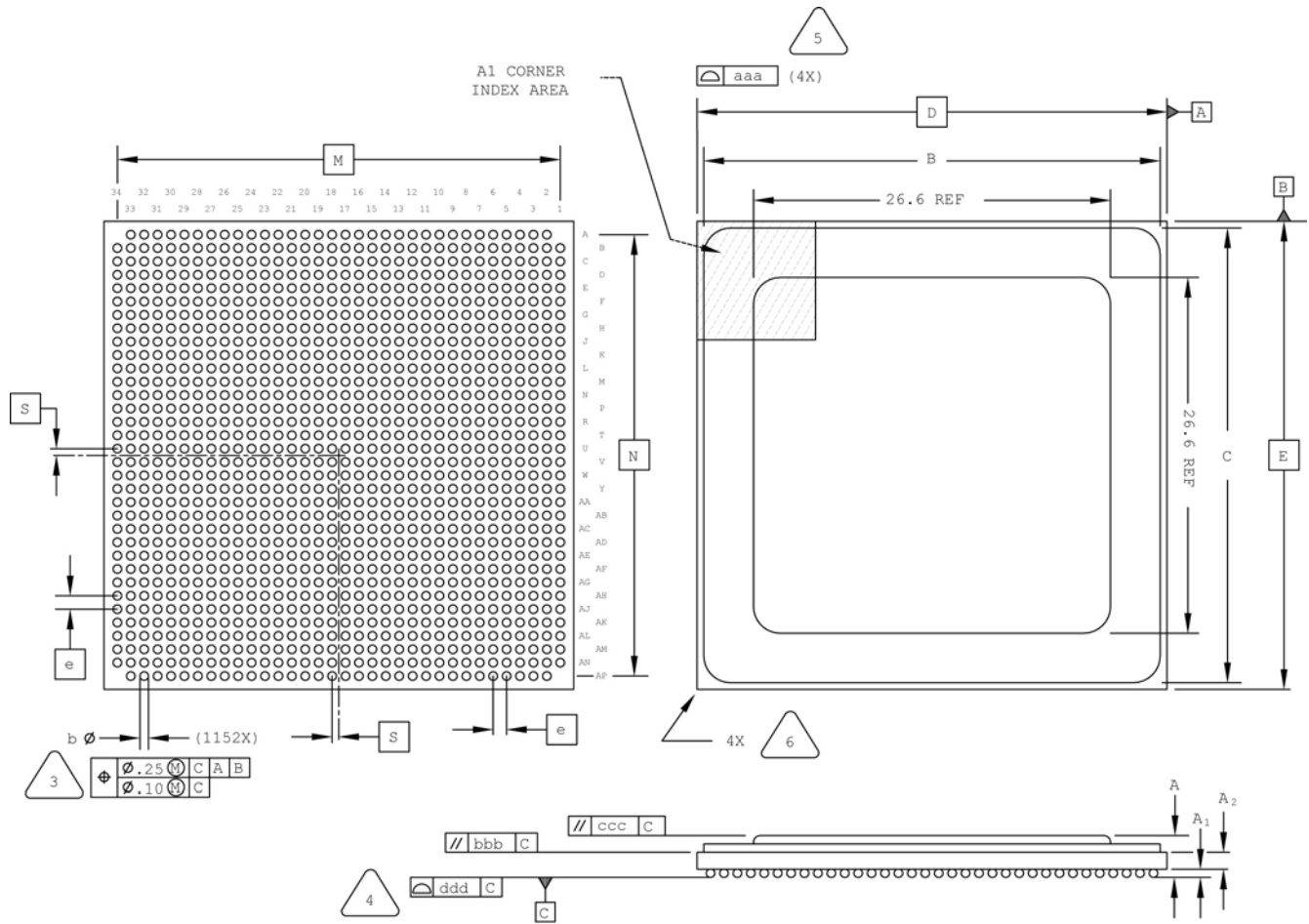
BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.



EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.





SYMBOL	MIN.	NOM.	MAX.
A	4.00	4.60	5.20
A1	0.30	0.50	0.70
A2	1.40 REF		
B/C	33.10	34.00	34.90
D/E	35.00 BSC		
M/N	33.00 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 "C" – Package Outline Drawing (1152-ball Organic fcBGA)



NOTES: UNLESS OTHERWISE SPECIFIED

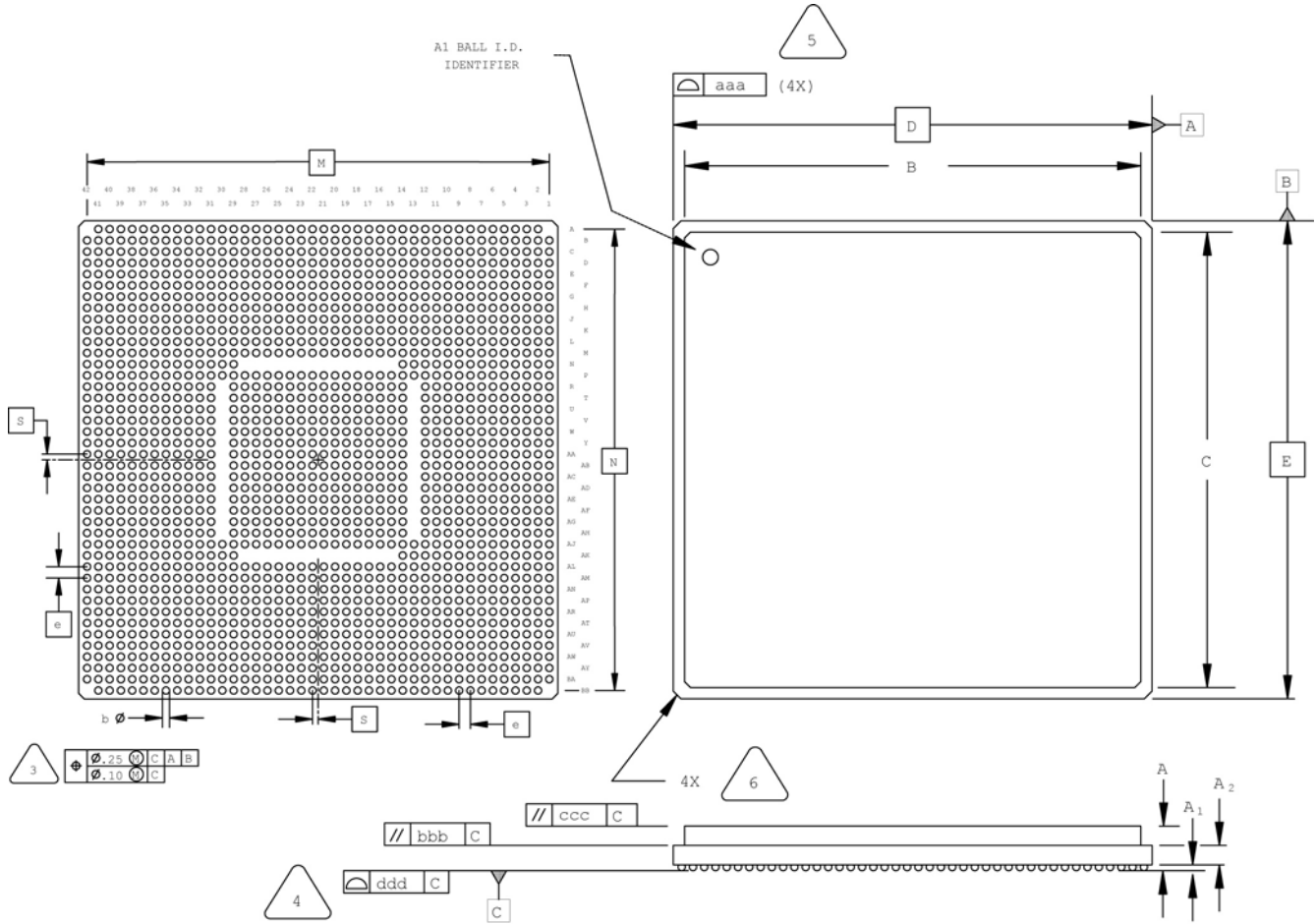
- DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
- ALL DIMENSIONS ARE IN MILLIMETERS.

-  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	2.55	2.90	3.25
A1	0.35	0.50	0.65
A2	1.20 REF		
B/C	34.25	34.50	34.75
D/E	35.00 BSC		
M/N	33.00 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 "C" – Package Outline Drawing (1704-ball Ceramic fcBGA)



NOTES: UNLESS OTHERWISE SPECIFIED

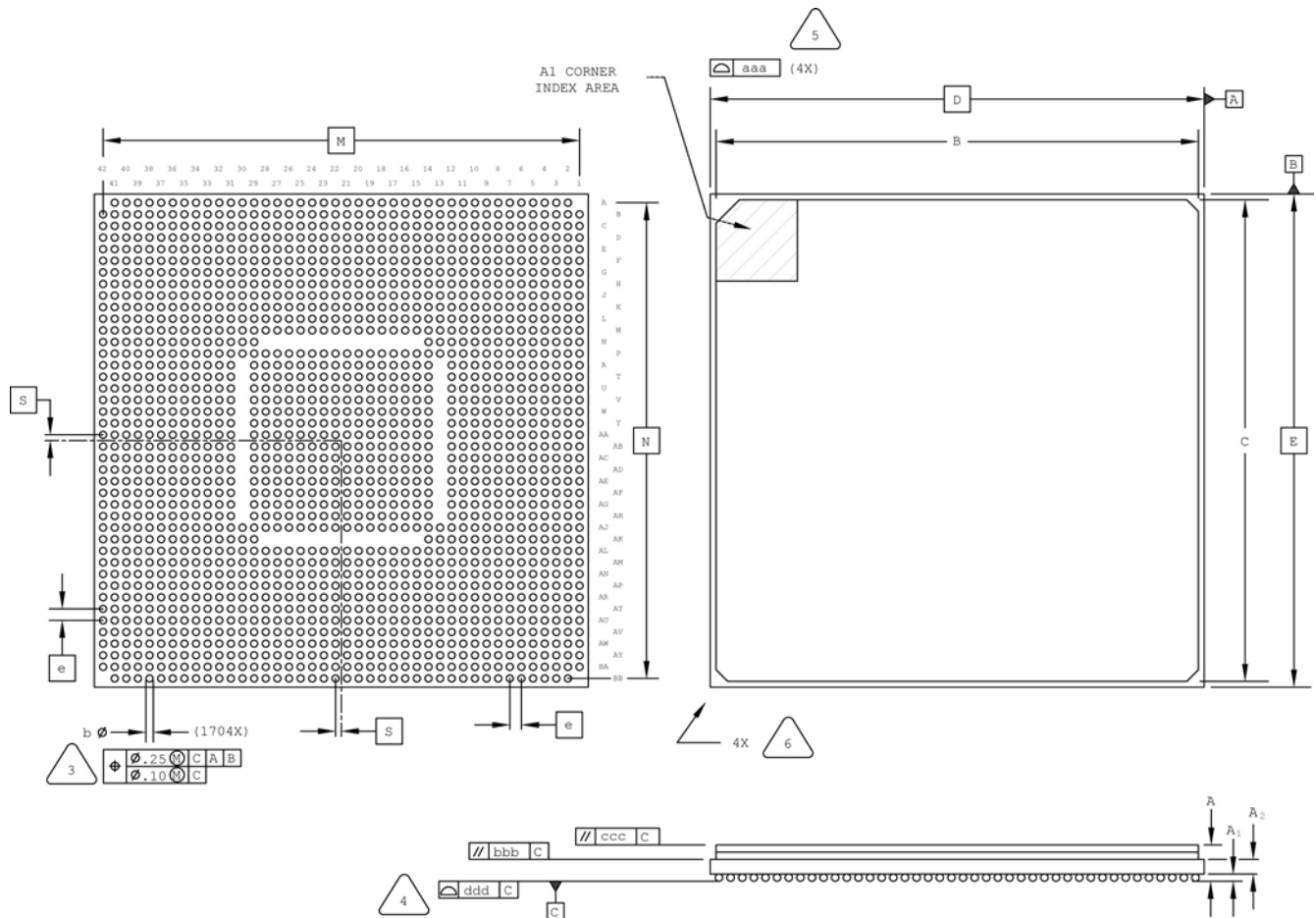
1. DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.

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	4.30	4.80	5.30
A1	0.30	0.50	0.70
A2	1.30	1.60	1.90
B/C	40.50	41.50	42.50
D/E	42.50 BSC		
M/N	41.00 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 "C" – Package Outline Drawing (1704-ball Organic fcBGA)



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	2.55	2.90	3.25
A1	0.35	0.50	0.65
A2	1.20 REF		
B/C	41.70	42.00	42.30
D/E	42.50 BSC		
M/N	42.50 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 “D” – ASE Kaohsiung, Taiwan Qualified Material Set**

Package Type		Ceramic fcBGA				Organic fcBGA			
		Assembly Site	Material Set			Assembly Site	Material Set		
			Underfill	Bump	Solder Ball		Underfill	Bump	Solder Ball
1152-fcBGA	Standard	Fujitsu	UF-01	Sn97.4Ag2.6	Sn63Pb37	ASE Kaohsiung	UA	Sn97.4Ag2.6	Sn63Pb37
	Pb-Free				Sn96.5Ag3.0Cu0.5				Sn96.5Ag3.0Cu0.5
1704-fcBGA	Standard	Fujitsu	UF-01	Sn97.4Ag2.6	Sn63Pb37	ASE Kaohsiung	UA	Sn97.4Ag2.6	Sn63Pb37
	Pb-Free				Sn96.5Ag3.0Cu0.5				Sn96.5Ag3.0Cu0.5