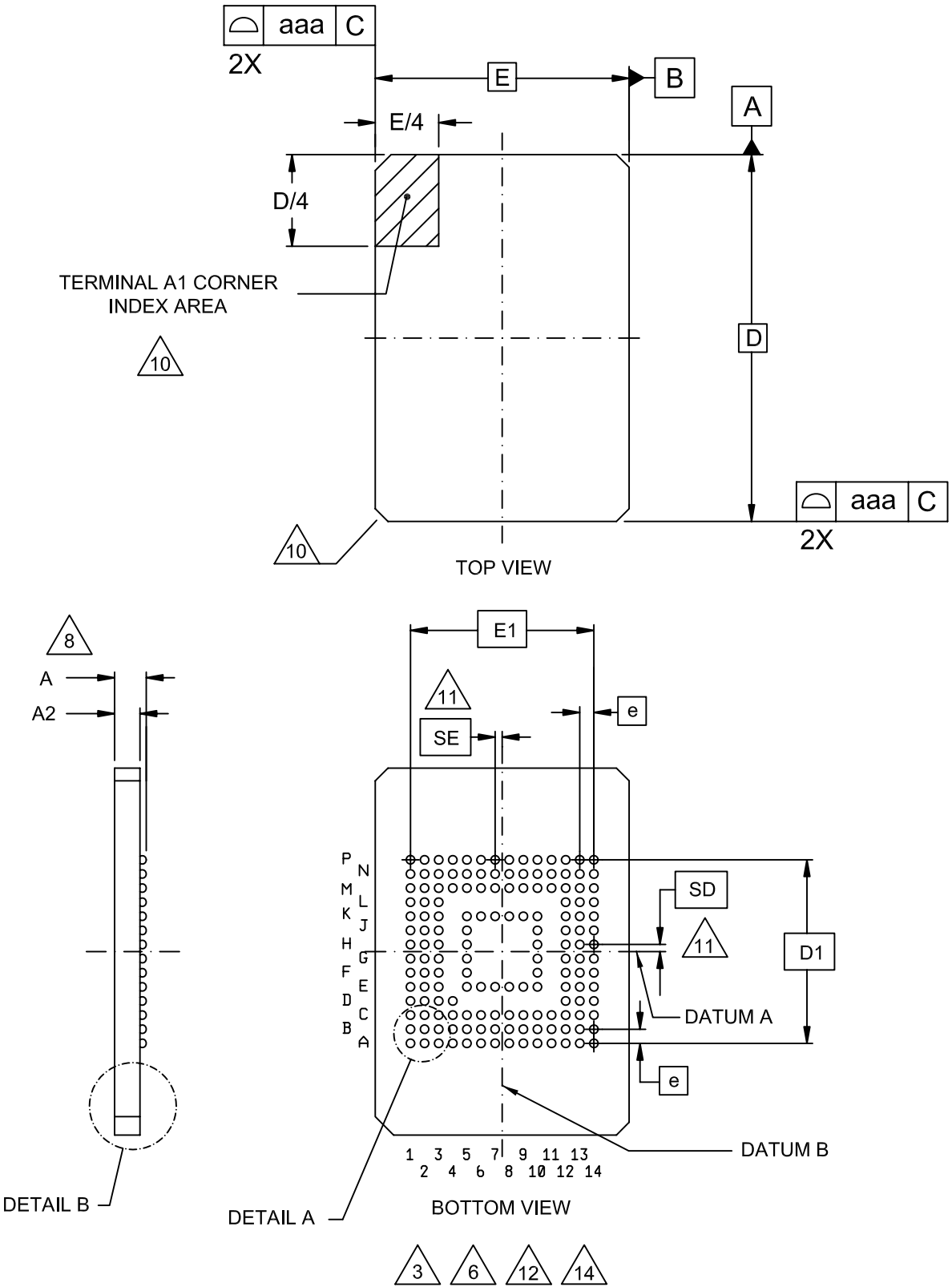
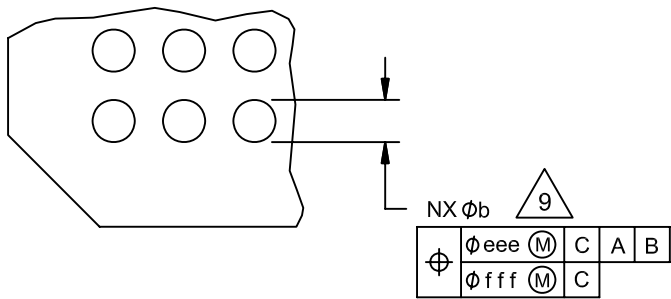


FIGURE 1

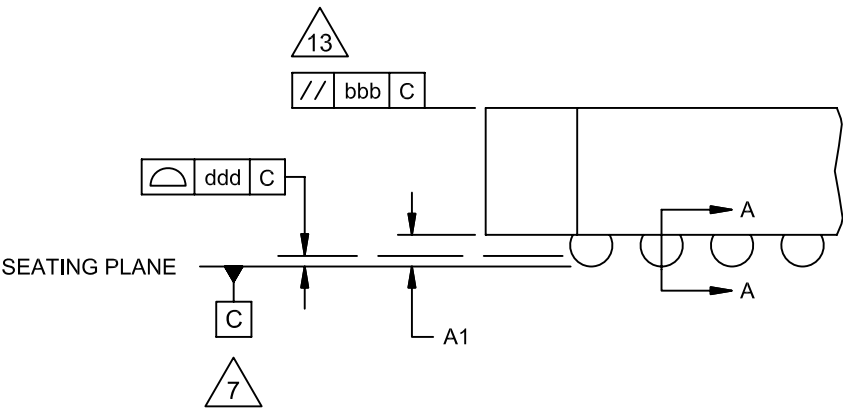


JEDEC SOLID STATE PRODUCT OUTLINES		THIS <i>REGISTERED OUTLINE</i> HAS BEEN PREPARED BY THE JEDEC JC-11 COMMITTEE AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY. CHANGES ARE LIKELY TO OCCUR.			
TITLE:	LOW PROFILE, RECTANGULAR FINE PITCH BALL GRID ARRAY FAMILY 0.50 MM PITCH	PACKAGE DESIGNATOR:	ISSUE:	DATE:	SHEET:
		LFR-XBGA	C	July 08	MO-276 1 OF 7

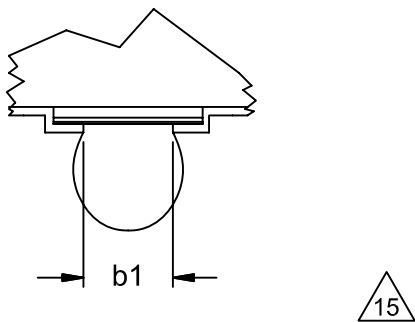
FIGURE 2



DETAIL A



DETAIL B



SECTION A-A

TABLE 1


COMMON DIMENSIONS				
SYMBOLS ▴	MIN	NOM	MAX	NOTE
b	0.25	0.30	0.35	9
b1	0.20	---	---	15
	0.50 BSC			
NOTES	1, 2, 9			
REF	11.11-756			
ISSUE	A			

TABLE 2

TOLERANCES OF FORM AND POSITION	
SYMBOLS	TOLERANCE
aaa	0.15
bbb	0.20
ddd	0.08
eee	0.15
fff	0.05
NOTES	1, 2
REF	11.11-756
ISSUE	A

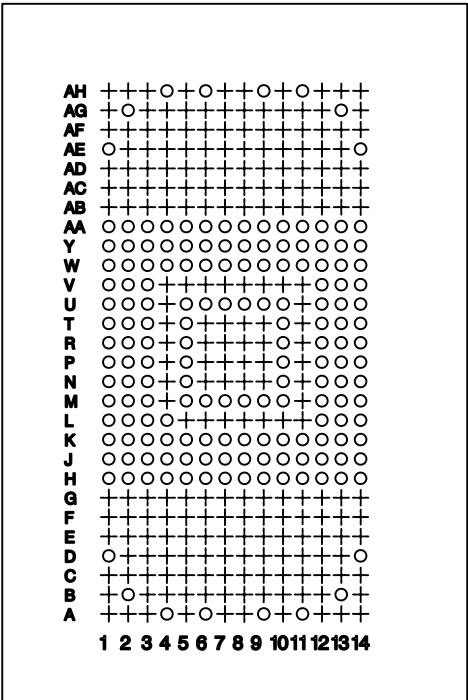
TABLE 3

VARIATION TABLE						
VARIATION ▴ SYMBOLS ▴		AA	AB	AC	AD	NOTES
A	MIN	---	---	---	---	8
	NOM	---	---	---	---	
	MAX	1.40	1.40	1.40	1.40	
A1	MIN	0.15	0.15	0.15	0.15	8
	NOM	---	---	---	---	
	MAX	---	---	---	---	
A2	MIN	---	---	---	---	8
	NOM	---	---	---	---	
	MAX	1.20	1.20	1.20	1.20	
D BSC		16.00	18.00	18.00	12.00	
D1 BSC		13.50	13.50	13.50	10.50	
E BSC		12.00	12.00	14.00	9.00	
E1 BSC		6.50	6.50	6.50	7.50	
MD		28	28	28	22	4, 12
ME		14	14	14	16	4, 12
n		169	169	169	199	5, 12
SD		0.25	0.25	0.25	0.25	11
SE		0.25	0.25	0.25	0.25	11
FOOTPRINT		1	1	1	3	14
NOTE		1, 2	1, 2	1, 2	1, 2	
ITEM		11.11-756	11.11-756	11.11-786	11.11-797	
ISSUE		A	A	B	C	

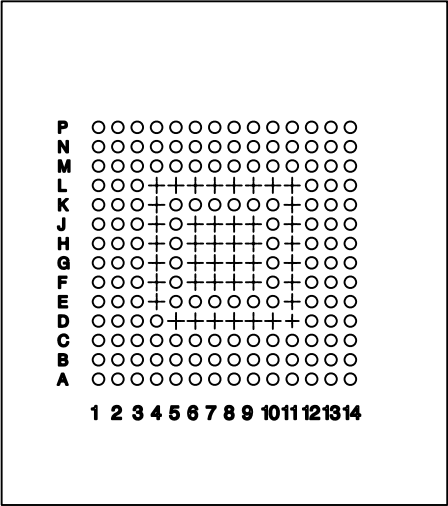
TABLE 4

VARIATION TABLE						
VARIATION ► SYMBOLS ▼		BA				NOTES
A	MIN	---				8
	NOM	---				
	MAX	1.30				
A1	MIN	0.15				8
	NOM	---				
	MAX	---				
A2	MIN	---				8
	NOM	---				
	MAX	1.10				
D BSC		13.00				
D1 BSC		6.50				
E BSC		11.50				
E1 BSC		6.50				
MD		14				4, 12
ME		14				4, 12
n		153				5, 12
SD		0.25				11
SE		0.25				11
FOOTPRINT		2				14
NOTE		1, 2				
ITEM		11.11-756				
ISSUE		A				

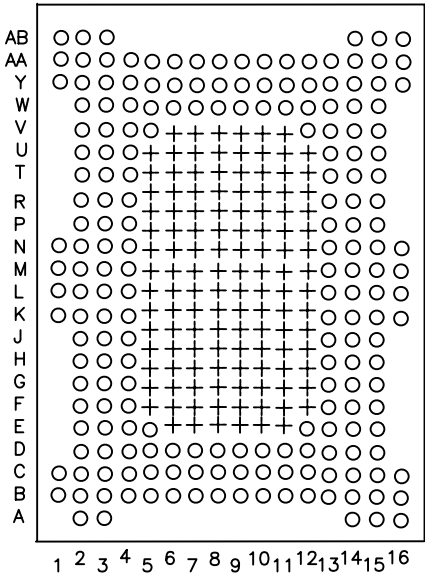
FIGURE 3. SOLDER BALL PATTERNS (BOTTOM VIEWS)



FOOTPRINT 1



FOOTPRINT 2



FOOTPRINT 3

+ = DEPOPULATED BALL POSITION

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994. THIS OUTLINE CONFORMS TO JEP95, SECTION 4.6.



2. DIMENSIONS ARE IN MILLIMETERS.

3. BALL DESIGNATIONS PER JEP95, SECTION 3, SPP-020.

4. MD AND ME REPRESENT THE MAXIMUM MATRIX SIZE CORRESPONDING TO THE D AND E DIRECTIONS, RESPECTIVELY.

5. n REPRESENTS THE NUMBER OF BALLS POPULATED ON THE BOTTOM SIDE FOR EACH VARIATION.



6. A 14X14 PERIPHERAL MATRIX IS SHOWN FOR ILLUSTRATION ONLY.



7. DATUM C (SEATING PLANE) IS DEFINED BY THE CROWNS OF THE BALLS.



8. PACKAGE PROFILE HEIGHT (A) INCLUDES STAND-OFF HEIGHT (A1) AND BODY THICKNESS (A2).



9. DIMENSION b IS MEASURED AT THE MAXIMUM BALL DIAMETER IN A PLANE PARALLEL TO DATUM C.



10. THE CORNER A1 MUST BE IDENTIFIED ON BOTH THE BOTTOM AND TOP SIDES OF THE PACKAGE. THE IDENTIFICATION FEATURE CAN BE MADE USING INK OR METALIZED MARKINGS, INDENTATIONS, OR OTHER FEATURES. THE EXACT SHAPE OF EACH CORNER IS OPTIONAL.



11. DIMENSIONS SD AND SE ARE MEASURED WITH RESPECT TO DATUMS A AND B AND DEFINE THE POSITION OF THE CENTERMOST BALLS IN THE OUTER ROW FOR A FULLY POPULATED MD X ME. WHEN THERE IS AN ODD NUMBER OF BALLS IN THE OUTER ROW, SD AND SE = 0. WHEN THERE IS AN EVEN NUMBER OF BALLS IN THE OUTER ROW, SD AND SE = e/2.



12. THE BALL ARRAY MAY BE DEPOPULATED IN ANY PATTERN. DEPOPULATION IS THE OMISSION OF BALLS FROM A FULL MD X ME MATRIX.



13. PARALLELISM (bbb) APPLIES ONLY TO THE SURFACE DIRECTLY ABOVE THE DIE AREA FOR GLOB TOP, OVER MOLDED AND / OR FLIP CHIP CONFIGURATIONS. THE PARALLELISM SPECIFICATION WILL NOT APPLY TO ANY FILLET OR SLOPED REGION OF THE ENCAPSULANT.



14. SEE FIGURE 3 FOR ALL BALL DEPOPULATIONS.



15. THE SOLDERABLE SURFACE MAY BE DEFINED BY AN OPENING IN THE SOLDER RESIST LAYER. IT MAY BE ELLIPTICAL, PROVIDED THE RATIO OF MAJOR TO MINOR AXIS IS NO GREATER THAN 2/1, AND THE SURFACE AREA IS NO LESS THAN THE MINIMUM FOR A CIRCULAR PAD.

## CHANGE RECORD

If the change involves any words added or deleted (excluding deletion of accidentally repeated words), the change is to be included below.  
Punctuation changes may or may not occur.

Issue:	Date:	JC-11 Item Number:
A	September 2006	11.11-756

### Change Record History

Issue: B	Date: Jan. 2008	Item Number: 11.11-786
Location:	Changed From:	Changed To:
Sheet 3 Table 3	Non-existent	Added Variation AC 18x14 mm 169-ball Footprint 1
All pages	Drawing generated in Catia, text not editable in AutoCAD.	Text was converted to and now editable in AutoCAD.

Issue: C	Date: July 2008	Item Number:
Location:	Changed From:	Changed To:
pages 3, 4	Jan. 2008	added footprint 3, var AD

Issue:	Date:	Item Number:
Location:	Changed From:	Changed To: