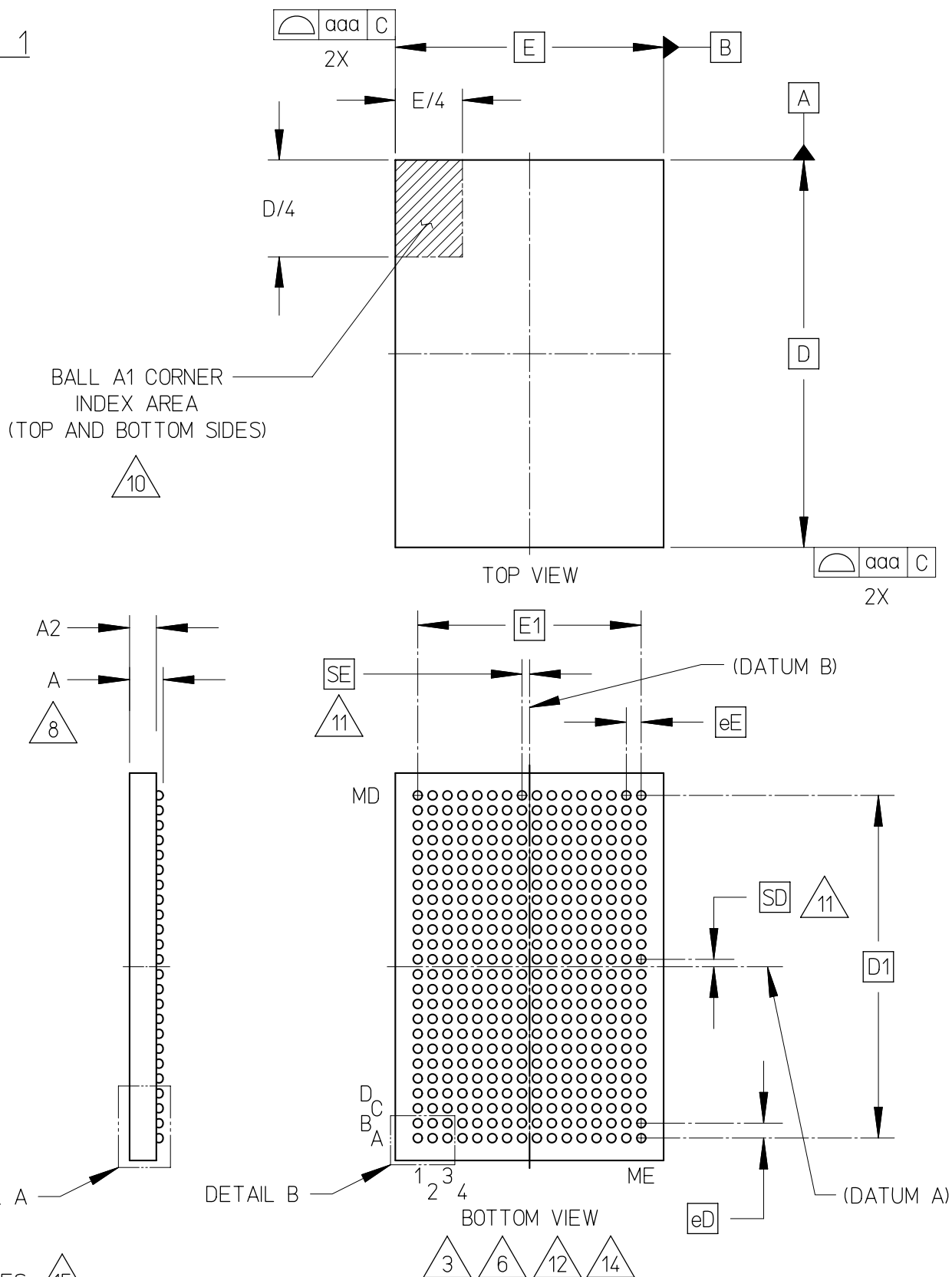


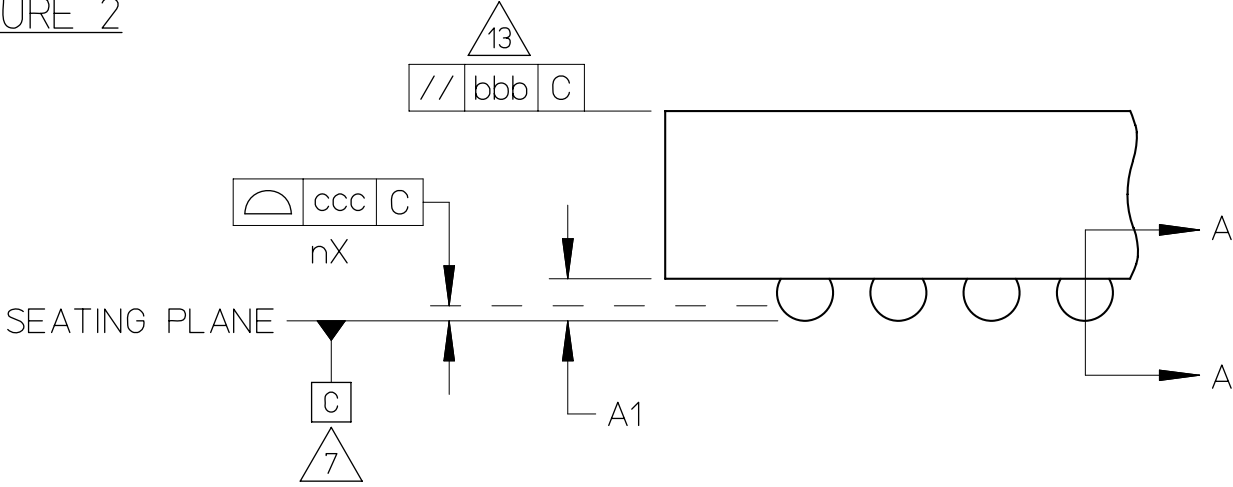
FIGURE 1



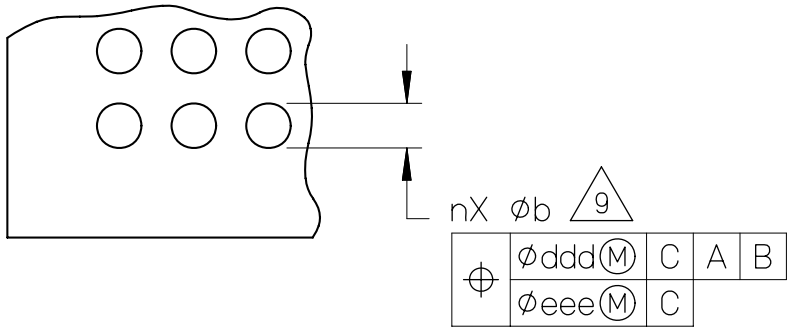
PATENT ISSUES $\triangle 15$

<p>JEDEC SOLID STATE PRODUCT OUTLINE</p>	<p>THIS REGISTERED OUTLINE HAS BEEN PREPARED AND PUBLISHED BY THE JEDEC JC-11 COMMITTEE AND REFLECTS A PRODUCT WITH ANTICIPATED USE IN THE ELECTRONICS INDUSTRY. CHANGES ARE LIKELY TO OCCUR.</p>				
<p>TITLE: THIN, FINE-PITCH, RECTANGULAR DUAL PITCH BALL GRID ARRAY FAMILY 0.80mm x 1.00mm PITCH</p>	<p>PACKAGE DESIGNATOR: TFR-XBGA</p>	<p>ISSUE: A</p>	<p>DATE: 05/07</p>	<p>ITEM # : MO-284</p>	<p>PAGE: 1 OF 6</p>

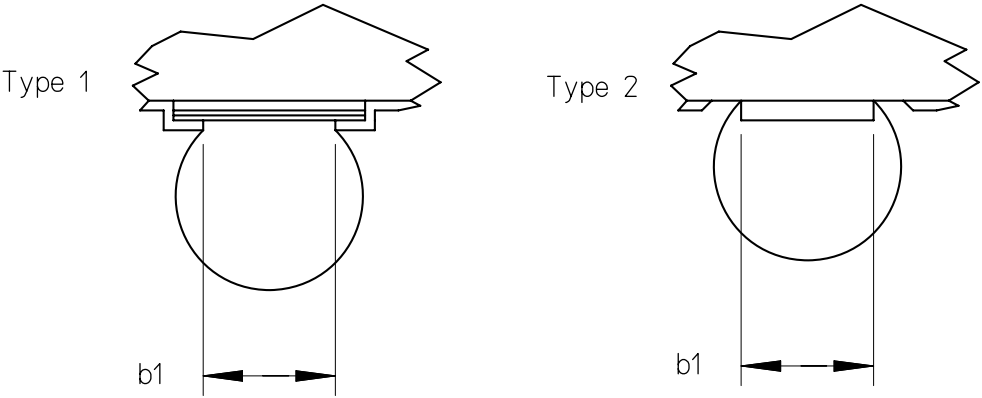
FIGURE 2



DETAIL A
(ROTATED 90° CW)

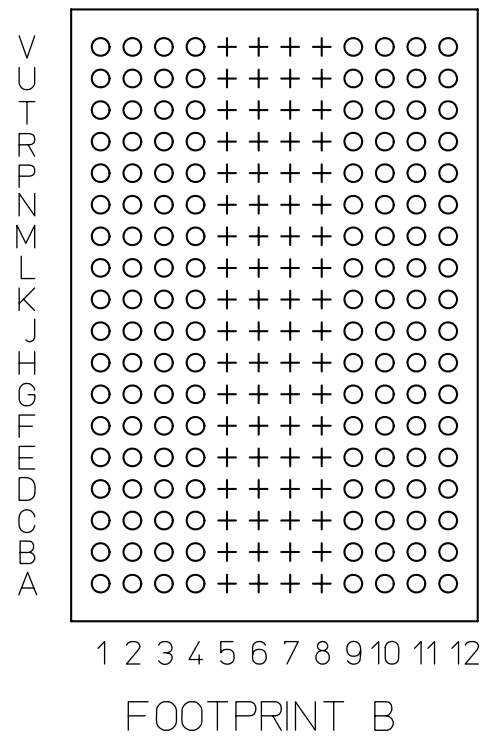
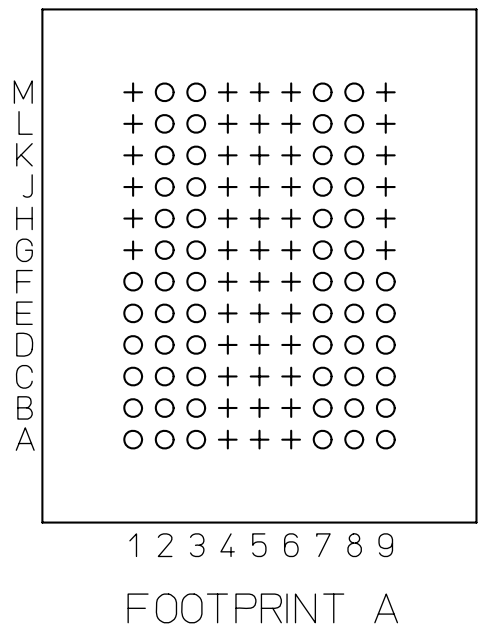


DETAIL B



SECTION A-A

FIGURE 3: SOLDER BALL PATTERNS  
(BOTTOM VIEWS)



+ = UNPOPULATED BALL POSITION

S Y M B O L	TABLE 1: COMMON DIMENSIONS			NOTES
	MIN	NOM	MAX	
A	---	---	1.20	8
A1	0.25	---	---	
A2	---	---	0.95	
b	0.40	0.45	0.50	9
b1	Type1	0.30	---	
	Type2	0.30	---	
NOTES	1, 2			
REF	11-755			
ISSUE	A			

S Y M B O L	TABLE 2: TOLERANCES OF FORM & POSITION	NOTES
aaa	0.15	
bbb	0.20	
ccc	0.12	
ddd	0.15	
eee	0.08	
NOTES	1, 2	
REF	11-755	
ISSUE	A	

TABLE 3:

VARIATION	D BSC	E BSC	D1 BSC	E1 BSC	MD	ME	SD BSC	SE BSC	eD BSC	eE BSC	n	FOOT-PRINT	REF	ISSUE
AA	14.00	8.00	11.00	6.40	12	9	0.50	0	1.00	0.80	60	A	11-755	-
AB	12.50	10.00	11.00	6.40	12	9	0.50	0	1.00	0.80	60	A	11-755	-
AC	12.50	8.00	11.00	6.40	12	9	0.50	0	1.00	0.80	60	A	11-755	-
AD	18.50	11.00	17.00	8.80	18	12	0.50	0.40	1.00	0.80	144	B	11-755	-
NOTES					4	4	11	11			5,14	14		

NOTES:

1 DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.

2 DIMENSIONS ARE IN MILLIMETERS.

3 BALL DESIGNATION PER JEP95 SECTION 3 SPP-020.

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

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

6 16 X 24 MATRIX PATTERN IS SHOWN FOR ILLUSTRATION ONLY.

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

8 DIMENSION A INCLUDES STANDOFF 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 BALL A1 CORNER MUST BE IDENTIFIED ON THE TOP AND BOTTOM SURFACES OF THE PACKAGE BY 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 ROWS FOR A FULLY POPULATED MD X ME MATRIX. WHEN THERE IS AN ODD NUMBER OF BALLS IN THE OUTER ROW, SD OR SE = 0; WHEN THERE IS AN EVEN NUMBER OF BALLS IN THE OUTER ROW, SD OR SE = $e/2$.

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

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

14 SEE FIGURE 3 FOR BALL PATTERNS.

15 MICRON TECHNOLOGY AND TESSERA HAVE STATED THAT CERTAIN U. S. PATENTS MAY APPLY TO CONFIGURATIONS OF THIS PACKAGE. THESE PATENTS INCLUDE 6,048,753 FROM MICRON TECHNOLOGY ALONG WITH 5,950,304 AND 6,133,627 FROM TESSERA. MICRON AND TESSERA INTEND TO COMPLY WITH THE JEDEC PATENT POLICY.

16 THE SOLDERABLE SURFACE MAY BE DEFINED BY AN OPENING IN THE SOLDER RESIST LAYER (Type 1) OR BY THE SIZE OF THE METALLIZED PAD (Type 2). IT MAY BE ELLIPTICAL, PROVIDED THE RATIO OF MAJOR TO MINOR AXES IS NO GREATER THAN 2/1, AND THE SURFACE AREA IS NO LESS THAN THE MINIMUM FOR A CIRCULAR PAD. FOR Type 2 DESIGNS, COPPER TRACES ARE PERMITTED OUTSIDE THE b1 PAD AREA.

JEDEC SOLID STATE PRODUCT OUTLINE	TITLE: THIN, FINE-PITCH, RECTANGULAR DUAL PITCH BALL GRID ARRAY FAMILY 0.80mm x 1.00mm PITCH	ISSUE: A	DATE: 05/07	ITEM # : MO-284	PAGE: 5 OF 6
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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 be included.

Initial Issue: A	Date: 05/07	JC11 Item Number: 11-755
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Change Record History:

Issue:	Date:	Item Number:
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Location	Changed from:	Changed to:

Issue:	Date:	Item Number:
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Location	Changed from:	Changed to:

Issue:	Date:	Item Number:
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Location	Changed from:	Changed to: