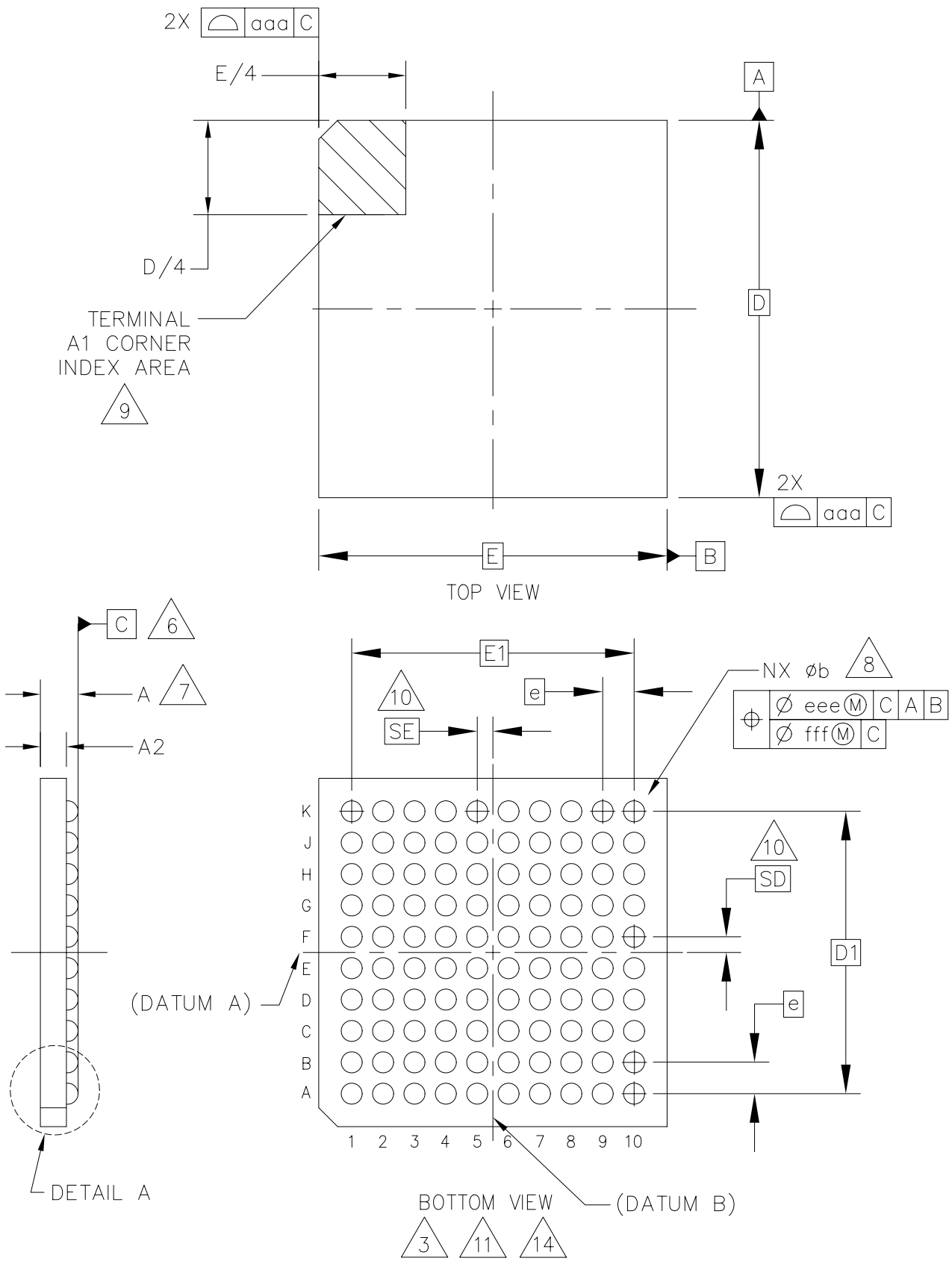
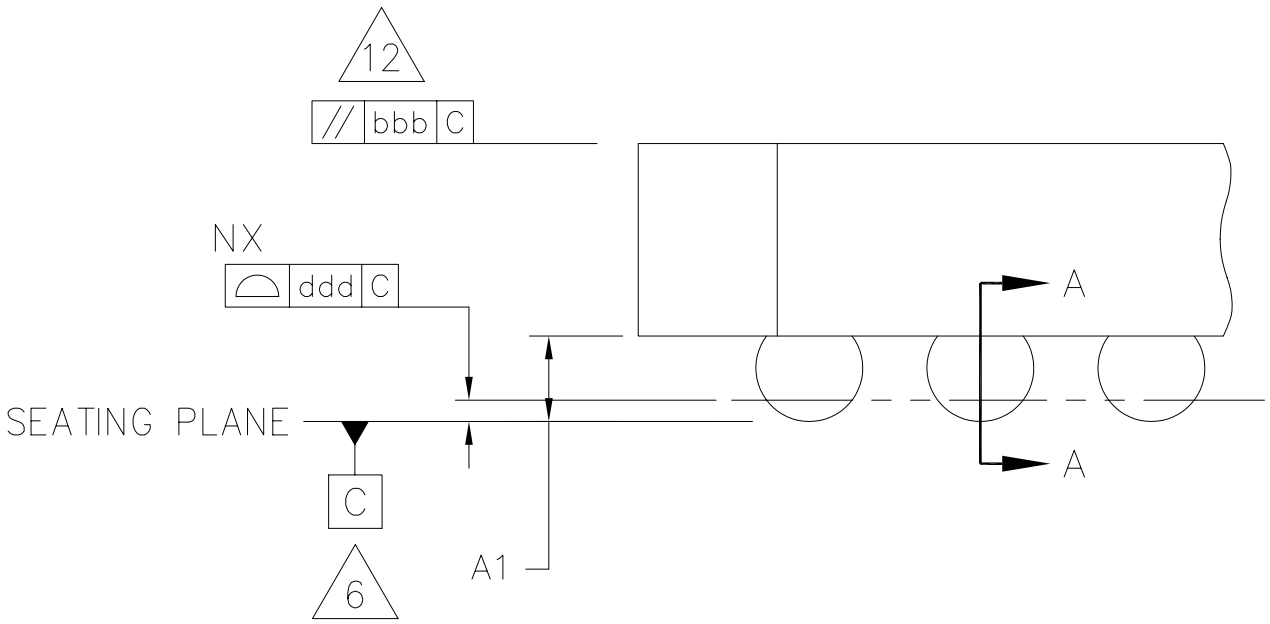


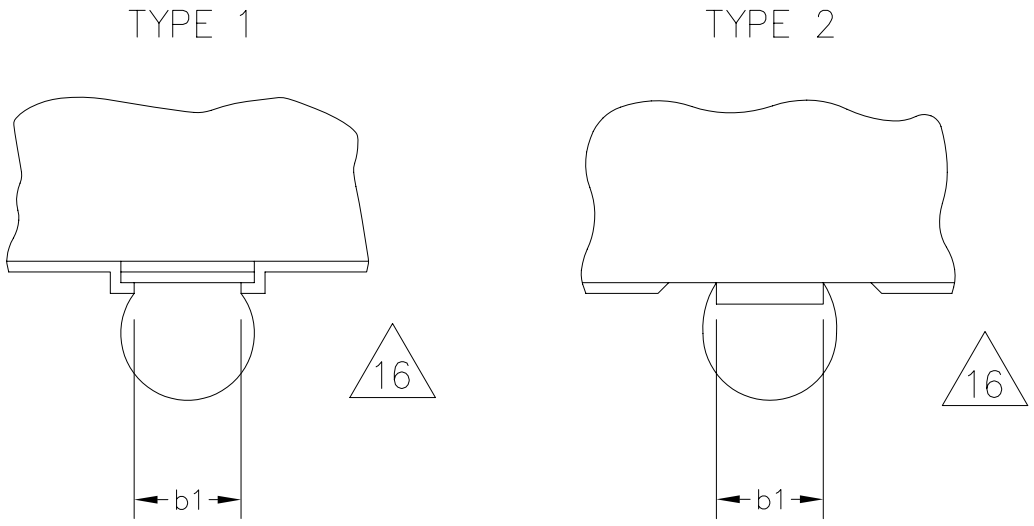
JEDEC SOLID STATE PRODUCT OUTLINE	THIS *REGISTERED OUTLINE* HAS BEEN PREPARED BY THE JEDEC JC–11 COMMITTEE AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY; CHANGES ARE LIKELY TO OCCUR.

TITLE	PACKAGE DESIGNATOR	ISSUE	DATE		SHEET
ULTRA THIN AND VERY, VERY THIN PROFILE, FINE PITCH BALL GRID ARRAY FAMILY (SQ.)	(U,W)F–XBGA	A	SEPT 06	MO–280	1 OF 7



DETAIL A

ROTATED 90°
CLOCKWISE



SECTION A–A

JEDEC SOLID STATE PRODUCT OUTLINE	TITLE ULTRA THIN AND VERY, VERY THIN PROFILE, FINE PITCH, BALL GRID ARRAY FAMILY (SQ.)	ISSUE A	DATE SEPT 06	MO–280	SHEET 2 OF 7

TABLE 1 13 15

VARIATION DESIGNATORS									
FIRST DIGIT CODE		SECOND DIGIT CODE		THIRD DIGIT CODE		FOURTH DIGIT CODE		FIFTH DIGIT CODE	
OVER-ALL HEIGHT		*BODY SIZE*		*BALL PITCH*		*NOMINAL BALL SIZE*		*MAXIMUM MATRIX SIZE*	
A (MAX.)	LETTER CODE	D/E	LETTER CODE	e	LETTER CODE	b	LETTER CODE	COLUMN/ROW	NUMBER CODE
0.80	W	4.0	A	0.80	A	0.30	A	MD/ME	A
0.65	U	4.5	B	0.65	B	0.25	B	MD−1/ME−1	B
− − −	− − −	5.0	C	0.50	C	− − −	− − −	− − −	− − −
− − −	− − −	5.5	D	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	6.0	E	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	6.5	F	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	7.0	G	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	7.5	H	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	8.0	J	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	8.5	K	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	9.0	L	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	9.5	M	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	10.0	N	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	10.5	P	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	11.0	R	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	11.5	T	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	12.0	U	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	12.5	V	− − −	− − −	− − −	− − −	− − −	− − −
− − −	− − −	13.0	W	− − −	− − −	− − −	− − −	− − −	− − −

TABLE 2

COMMON DIMENSIONS										
OVER−ALL HEIGHT / BALL SIZE		W: VERY, VERY THIN						U: ULTRA THIN		
		b = 0.30 NOMINAL			b = 0.25 NOMINAL			b = 0.25 NOMINAL		
SYMBOL		MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX
A		− − −	− − −	0.80	− − −	− − −	0.80	− − −	− − −	0.65
A1		0.15	− − −	− − −	0.12	− − −	− − −	0.12	− − −	− − −
A2		0.50 REF			0.50 REF			0.40 REF		
b		0.25	0.30	0.35	0.20	0.25	0.30	0.20	0.25	0.30
b1	TYPE 1	0.20	− − −	− − −	0.20	− − −	− − −	0.20	− − −	− − −
	TYPE 2	0.20	− − −	− − −	0.20	− − −	− − −	0.20	− − −	− − −
NOTES		1, 2, 7, 8, 16								
REF		11−759								
ISSUE		A								

TABLE 3

TOLERANCES OF FORM AND POSITION			
SYMBOL	VALUE	VALUE	VALUE
[e]	0.80	0.65	0.50
aaa	0.15	0.15	0.15
bbb	0.10	0.10	0.10
ddd	0.08	0.08	0.08
eee	0.15	0.15	0.15
fff	0.08	0.08	0.05
NOTES	1, 2		
REF	11−759		
ISSUE	A		

TABLE 4

VERY, VERY THIN VARIATIONS, b (NOM) = 0.30, [e] = 0.50, MD/ME VARIATIONS									
D/E BSC	D1/E1 BSC	MD/ME	SD/SE BSC	N	n	FOOTPRINT	VARIATION	REF	ISSUE
5.00	4.00	9	0.00	81	65	C1	WCCAA-1	11-759	A
8.00	7.00	15	0.00	225	176	J1	WJCAA-1	11-759	A
NOTES		4	10	5		11	13		

TABLE 5

VERY, VERY THIN VARIATIONS, b (NOM) = 0.30, [e] = 0.65, MD-1/ME-1 VARIATIONS									
D/E BSC	D1/E1 BSC	MD-1/ME-1	SD/SE BSC	N	n	FOOTPRINT	VARIATION	REF	ISSUE
13.00	11.05	18	0.325	324	248	W1	WWBAB-1	11-759	A
NOTES		4	10	5		11	13		

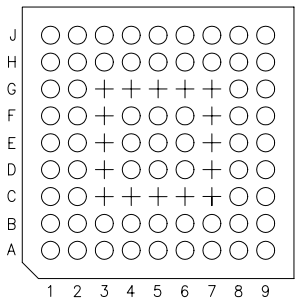
TABLE 6

ULTRA THIN VARIATIONS, b (NOM) = 0.25, [e] = 0.50, MD/ME VARIATIONS									
D/E BSC	D1/E1 BSC	MD/ME	SD/SE BSC	N	n	FOOTPRINT	VARIATION	REF	ISSUE
5.00	4.00	9	0.00	81	81	-----	UCCBA	11-759	A
6.00	5.00	11	0.00	121	95	E1	UECBA-1	11-759	A
10.00	8.00	19	0.00	361	192	N1	UNCBA-1	11-759	A
NOTES		4	10	5		11	13		

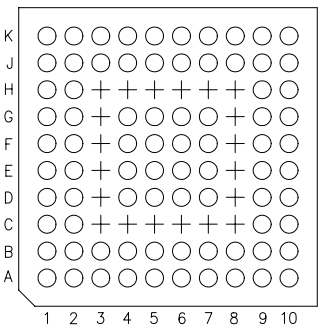
TABLE 7

ULTRA THIN VARIATIONS, b (NOM) = 0.25, [e] = 0.50, MD-1/ME-1 VARIATIONS									
D/E BSC	D1/E1 BSC	MD-1/ME-1	SD/SE BSC	N	n	FOOTPRINT	VARIATION	REF	ISSUE
5.50	4.50	10	0.25	100	80	D1	UDCBB-1	11-759	A
NOTES		4	10	5		11	13		

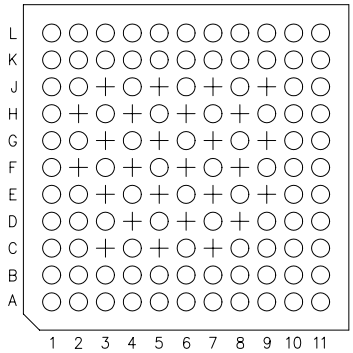
FIGURE 1: SOLDER BALL PATTERNS 11



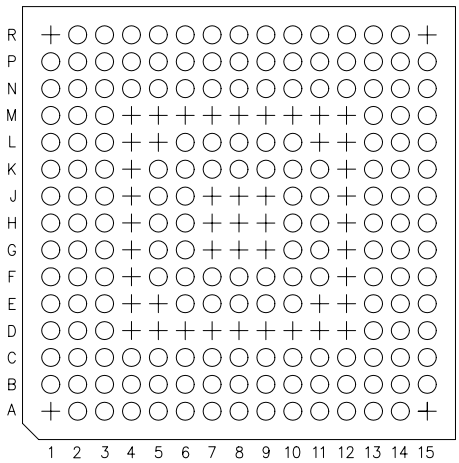
FOOTPRINT C1



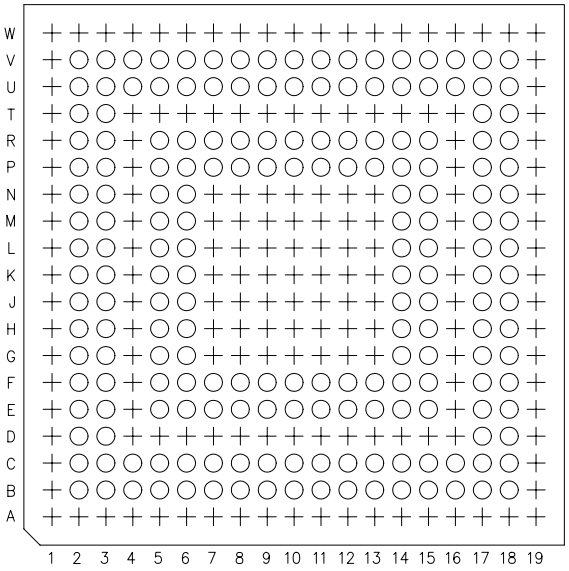
FOOTPRINT D1



FOOTPRINT E1



FOOTPRINT J1



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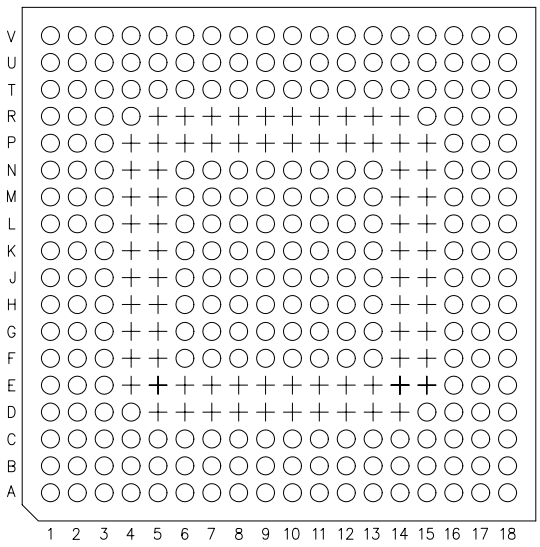

FOOTPRINT W1

JEDEC SOLID STATE PRODUCT OUTLINE	TITLE ULTRA THIN AND VERY, VERY THIN PROFILE, FINE PITCH, BALL GRID ARRAY FAMILY (SQ.)	ISSUE A	DATE SEPT 06	MO–280	SHEET 5 OF 7

NOTES:

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

2. DIMENSIONS ARE IN MILLIMETERS.

3. CONTACT BALL DESIGNATION PER JEP95 SECTION 3, SPP–010.

4. 'MD' AND 'ME' ARE THE MAXIMUM BALL MATRIX SIZE FOR THE 'D' AND 'E' DIMENSIONS, RESPECTIVELY.

5. 'N' IS THE MAXIMUM NUMBER OF BALLS FOR A SPECIFIED MATRIX SIZE.

6. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.

7. DIMENSION 'A' INCLUDES STANDOFF HEIGHT 'A1', PACKAGE BODY THICKNESS AND LID HEIGHT, BUT DOES NOT INCLUDE ATTACHED FEATURES, e.g. EXTERNAL HEAT SINK OR CHIP CAPACITORS. AN INTEGRAL HEAT SLUG IS NOT CONSIDERED AN ATTACHED FEATURE.

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

9. THE A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, INDENTATION OR OTHER FEATURE OF PACKAGE BODY, LID, OR INTEGRAL HEAT SLUG. IF THE OPTIONAL CHAMFERED CORNER IS USED, THE MAXIMUM NUMBER OF SOLDER BALLS 'N' MAY BE REDUCED. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE UNIQUE. SOME ORIENTATION FEATURE ON THE BALL ATTACH SIDE IS RECOMMENDED.

10. DIMENSION 'SD/SE' IS MEASURED WITH RESPECT TO DATUMS A AND B AND DEFINES THE POSITION OF THE CENTER CONTACT BALL IN THE OUTER ROW. WHEN THERE IS AN ODD NUMBER OF CONTACT BALLS IN THE OUTER ROW OF A FULL MATRIX, SD/SE=0; WHEN THERE IS AN EVEN NUMBER OF CONTACT BALLS IN THE OUTER ROW, SD/SE=e/2.

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

12. THE PARALLELISM TOLERANCE (bbb) APPLIES ONLY TO THE SURFACE ABOVE THE DIE AREA. THE SIZE OF THIS AREA IS DESIGN SPECIFIC. THE PARALLELISM REQUIREMENT DOES NOT APPLY TO ANY FILLET OR SLOPED REGION OF THE ENCAPSULANT.

13. WHEN MORE THAN ONE BALL COUNT EXIST FOR THE SAME PROFILE HEIGHT, BODY SIZE, BALL PITCH, BALL SIZE AND BALL MATRIX (AS A RESULT OF BALL DEPOPULATION), THEN THOSE VARIATIONS WILL BE DENOTED BY AN ADDITIONAL DASH NUMBER DESIGNATOR (i.e.; –1, –2, etc.) TO IDENTIFY THEM.

14. A 10X10 MATRIX PATTERN IS SHOWN FOR ILLUSTRATION PURPOSES.

15. VARIATIONS WITH 0.5 MM BODY SIZE INCREMENTS MUST COMPLY WITH THE D/E RANGE SPECIFIED IN JEP95 SECTION 4.5.

APPLICATION NOTE:

16. THE SOLDERABLE SURFACE MAY BE DEFINED BY AN OPENING IN THE SOLDER RESIST LAYER (TYPE 1) OR BY THE SIZE OF A 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, EXPOSED COPPER TRACES ARE PERMITTED OUTSIDE THE b1 PAD AREA.

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: Sept. 2006	Item: 11-759

Revision History:

Issue:	Date:	Item:

Location	Change from:	Change to:

Issue:	Date:	Item:

Location	Change from:	Change to:

Issue:	Date:	Item:

Location	Change from:	Change to: