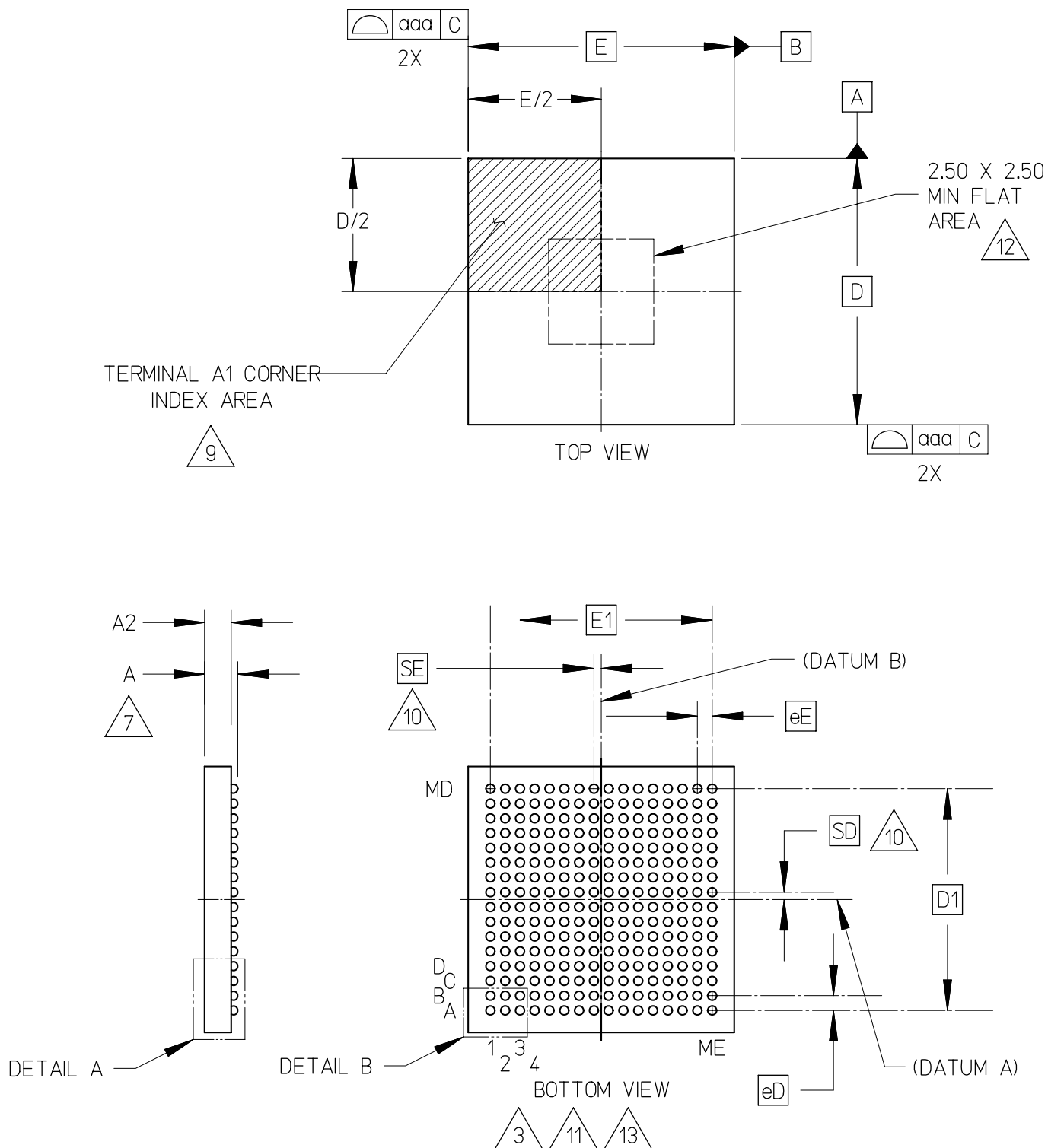


FIGURE 1



JEDEC
SOLID STATE
PRODUCT OUTLINE

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.

TITLE: VERY THIN, FINE-PITCH,
SQUARE BALL GRID ARRAY FAMILY,
SQ, 0.50/0.65 mm PITCH

PACKAGE DESIGNATOR:
VF-XBGA

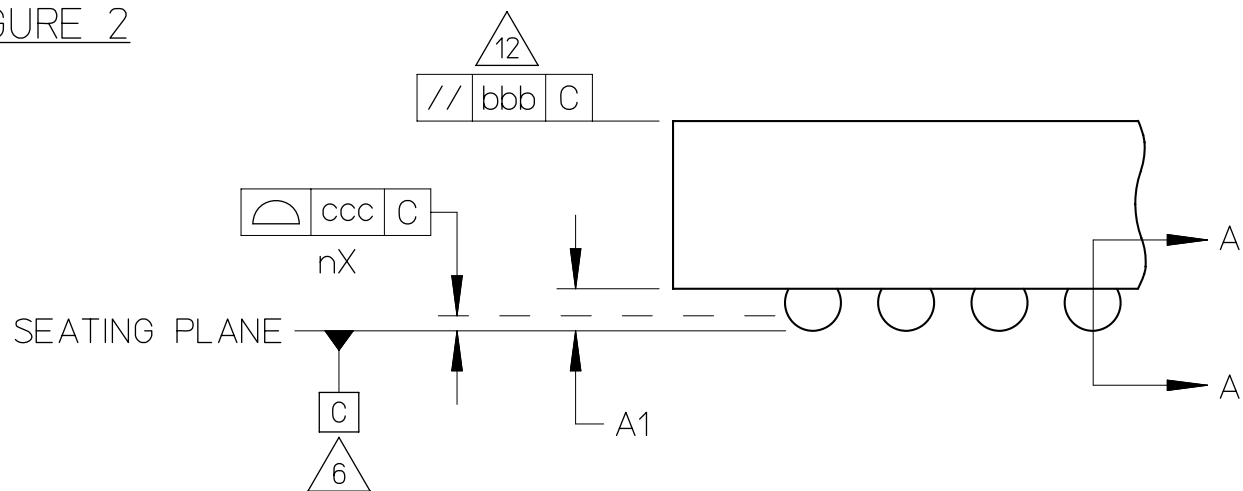
ISSUE:
C

DATE:
08/07

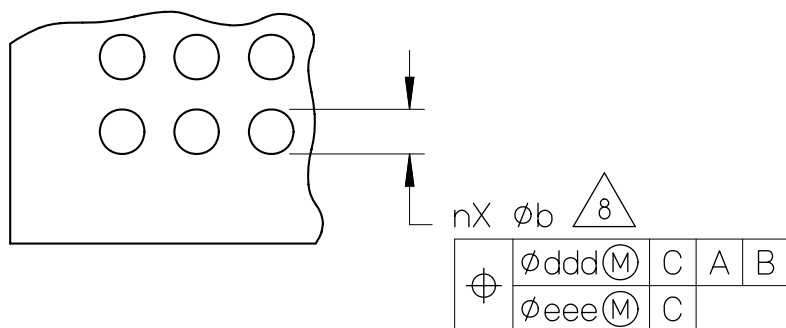
MO-225

PAGE:
1 OF 6

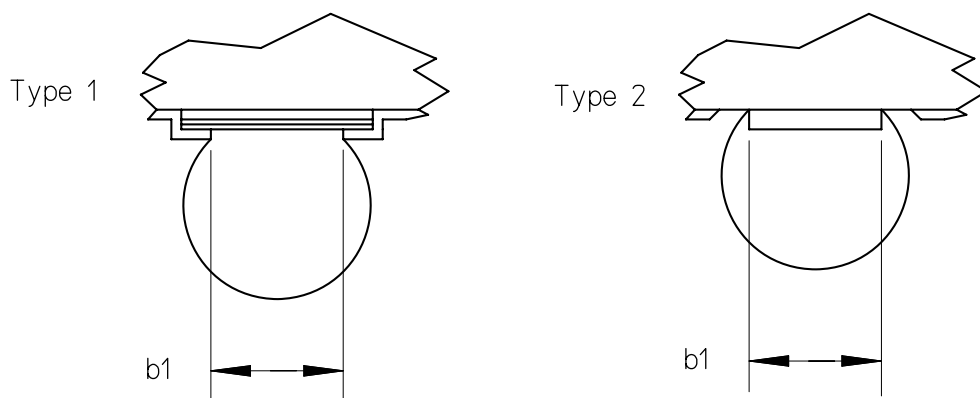
FIGURE 2



DETAIL A
(ROTATED 90° CW)



DETAIL B



SECTION A-A

S Y M B O L	TABLE 1: COMMON DIMENSIONS					
	Ax AND Bx			Cx AND Dx		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.00	---	---	1.00
A1	0.15	---	---	0.15	---	---
A2	0.65	---	---	0.65	---	---
b	0.35	0.40	0.45	0.25	0.30	0.35
b1	Type1	0.25	---	0.20	---	---
	Type2	0.25	---	0.20	---	---
NOTES	1, 2, 7, 8					
REF	11-565/576/761					
ISSUE	C					

S Y M B O L	TABLE 2: TOLERANCES OF FORM & POSITION	
	VARIATIONS	
	Ax AND Bx	Cx AND Dx
aaa	0.10	0.10
bbb	0.10	0.10
ccc	0.10	0.08
ddd	0.15	0.15
eee	0.08	0.05
NOTES	1, 2	1, 2
REF	11-565/576/761	11-565/576/761
ISSUE	C	C

TABLE 3: SQUARE VARIATIONS

$$\boxed{eD} \quad \& \quad \boxed{eE} = 0.65$$

VARIATION	D BSC	E BSC	D1 BSC	E1 BSC	MD	ME	SD BSC	SE BSC	n	REF	ISSUE
AA	3.50	3.50	1.95	1.95	4	4	0.325	0.325	16	11-565	A
AB	3.00	3.00	1.95	1.95	4	4	0.325	0.325	16	11-576	B
NOTES					4	4	10	10	5		

TABLE 4: RECTANGULAR VARIATIONS

VARIATION	THESE RECTANGULAR VARIATIONS HAVE BEEN REMOVED FROM THIS OUTLINE AND MOVED TO M0-285 A. (ITEM# 11-760)	M0-285 A (ITEM# 11-760) VARIATION DESIGNATOR
BA		BA-2
BB		BB-2
BC		BC-2

TABLE 5: SQUARE VARIATIONS

$$\boxed{eD} \quad \& \quad \boxed{eE} = 0.50$$

VARIATION	D BSC	E BSC	D1 BSC	E1 BSC	MD	ME	SD BSC	SE BSC	n	REF	ISSUE
CA	4.00	4.00	2.50	2.50	6	6	0.25	0.25	36	11-565	A
CB	4.00	4.00	3.00	3.00	7	7	0	0	49	11-565	A
CC	5.00	5.00	3.50	3.50	8	8	0.25	0.25	64	11-565	A
CD	5.00	5.00	4.00	4.00	9	9	0	0	81	11-565	A
CE	7.00	7.00	5.50	5.50	12	12	0.25	0.25	144	11-565	A
CF	7.00	7.00	6.00	6.00	13	13	0	0	169	11-565	A
CG	9.00	9.00	7.50	7.50	16	16	0.25	0.25	256	11-565	A
CH	9.00	9.00	8.00	8.00	17	17	0	0	289	11-565	A
NOTES					4	4	10	10	5		

TABLE 6: RECTANGULAR VARIATIONS

VARIATION	THESE RECTANGULAR VARIATIONS HAVE BEEN REMOVED FROM THIS OUTLINE AND MOVED TO M0-285 A. (ITEM# 11-760)	M0-285 A (ITEM# 11-760) VARIATION DESIGNATOR
DA		CA-3
DB		CB-3
DC		CC-3

NOTES:

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

2 DIMENSIONS ARE IN MILLIMETERS.

3 BALL DESIGNATION PER JEP95 SECTION 3 SPP-010.

4 'MD' AND 'ME' REPRESENT THE MATRIX SIZE CORRESPONDING TO 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 DOMED CROWNS OF THE BALLS.

7 DIMENSION 'A' INCLUDES STANDOFF HEIGHT 'A1' AND PACKAGE BODY THICKNESS 'A2' 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 DIMENSIONS 'SD' AND 'SE' ARE MEASURED WITH RESPECT TO DATUMS A AND B AND DEFINE THE POSITION OF THE CENTER BALL IN THE OUTER ROW. WHEN THERE IS AN ODD NUMBER OF BALLS IN THE OUTER ROW PARALLEL TO DIMENSION 'D' OR 'E' RESPECTIVELY, 'SD' OR 'SE' = 0. WHEN THERE IS AN EVEN NUMBER OF BALLS IN THE OUTER ROW, 'SD' OR 'SE' = $e/2$ BASIC.

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

12 PARALLELISM (bbb) ON THE TOP SURFACE APPLIES ONLY TO THE 2.50 X 2.50 mm MINIMUM FLAT AREA SHOWN ON THE TOP VIEW (SHEET 1). THIS AREA MAY BE USED FOR MARKING OR VACUUM PICKUP.

13 16 X 16 MATRIX PATTERN VARIATION (CG) IS SHOWN FOR ILLUSTRATION ONLY.

14 VARIATION Ax & Bx, DIMENSION A1 DOES NOT MEET THE DESIGN GUIDELINE. THESE VARIATIONS WERE ESTABLISHED BEFORE THE GUIDELINE WAS COMPLETE.

APPLICATION NOTES:

15 SOME TYPE OF ASYMMETRIC DEPOPULATION OF THE BALL MATRIX IS RECOMMENDED AS AN AID TO CORRECT PACKAGE ORIENTATION AT SECOND-LEVEL ASSEMBLY. DEPOPULATION OF THE A1 BALL LOCATION IS A PREFERRED IMPLEMENTATION.

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: VERY THIN, FINE-PITCH, SQUARE BALL GRID ARRAY FAMILY, SQ, 0.50/0.65 mm PITCH	ISSUE: C	DATE: 08/07	MO-225	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: B	Date: 11/00	JC11 Item Number: 11-576
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Change Record History:

Issue: C	Date: 05/07	Item Number: 11-761
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Location	Changed from:	Changed to:
ALL SHEETS	SQ/RECT	SQ
SHEET 1	RECTANGULAR PACKAGE VIEW 6 X 10 BALL MATRIX BALL POSITION TOLERANCE NO DATUM A & B LEADERS	SQUARE PACKAGE VIEW 16 X 16 BALL MATRIX MOVED TO SHEET 2, DETAIL B ADDED DATUM A & B LEADERS
SHEET 2	VIEW A REMOVED TABLE 1	DETAIL A ADDED TO TABLES 3 & 5 ADDED DETAIL B ADDED SECTION A-A
SHEET 3	TABLES 2 & 3	TABLES 1 & 2
SHEET 4	TABLES 4, 5, 6, & 7 REMOVED VARIATIONS BA-BC REMOVED VARIATIONS AA-AC TABLES 3 & 5	TABLES 3, 4, 5, & 6 ADDED CROSS REF INFO ADDED CROSS REF INFO ADDED REF & ISSUE
SHEET 5, NOTE 3 SHEET 5, NOTE 14	JESD 95-1, SPP-010 ORIGINAL NOTE 14 REMOVED	JEP95 SECTION 3 SPP-020 NEW NOTE 14

Issue: C	Date: 08/07	Item Number: 11-761E
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Location	Changed from:	Changed to:
SHEET 4, TABLE 5	VARIATION CF, D BSC 4.00	VARIATION CF, D BSC 7.00
SHEET 4, TABLE 6	VARIATION DA(CA-2) , DB(CB-2), DC(CC-2)	VARIATION DA(CA-3) , DB(CB-3), DC(CC-3)
SHEET 5, NOTE 3	SPP-020	SPP-010
SHEET 5, NOTE 5	n	N
SHEET 5, NOTE 14	GUIDLEINE	GUIDELINE