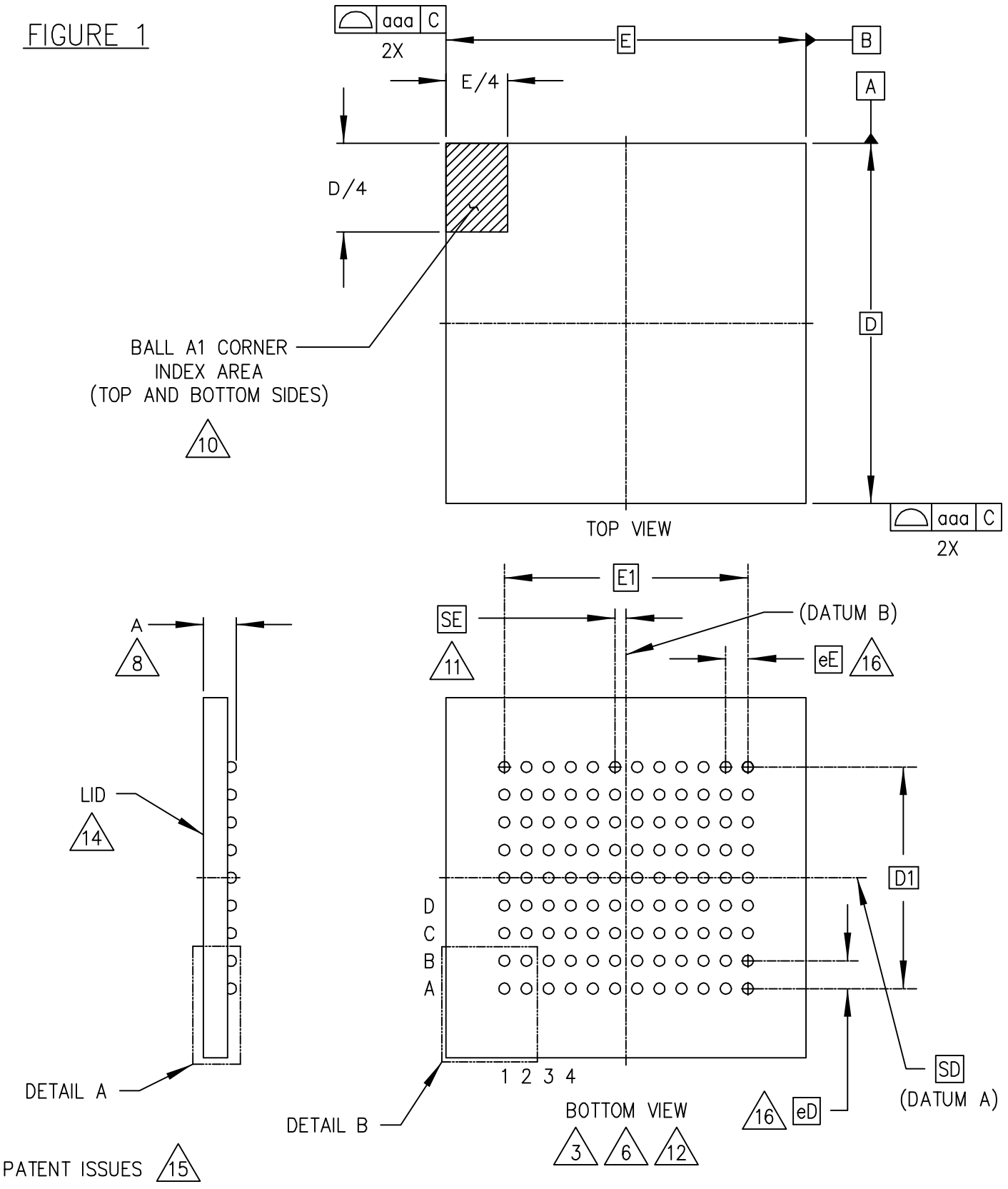
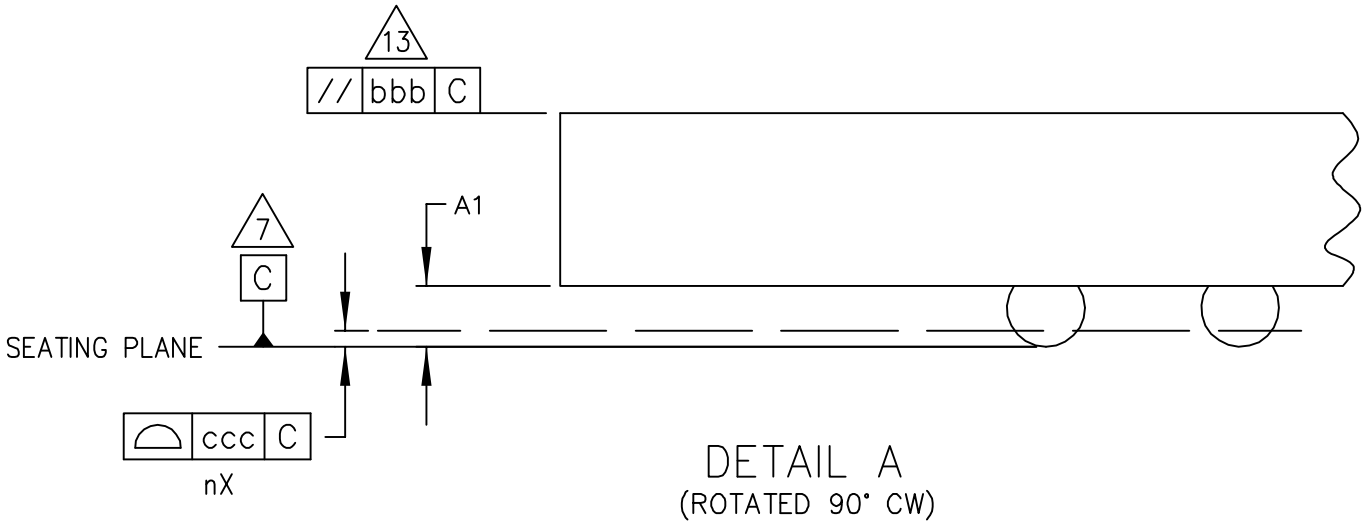
FIGURE 1



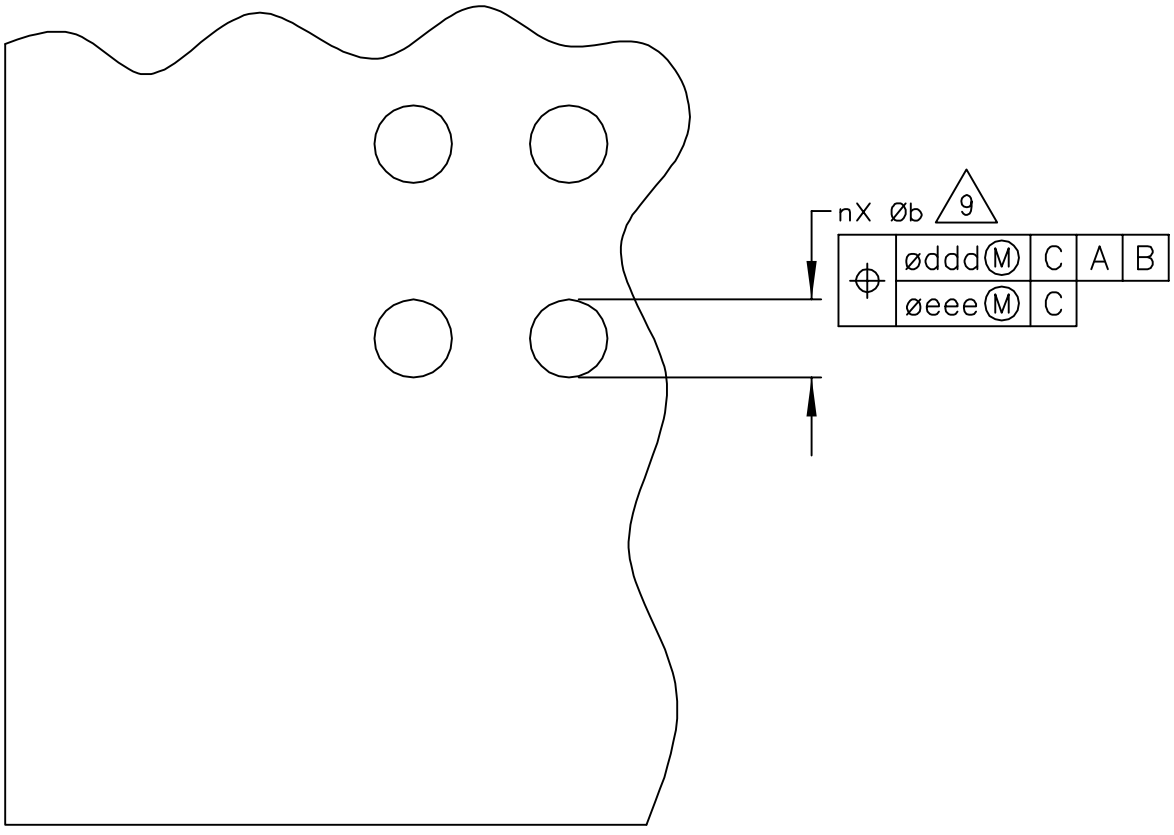
JEDEC SOLID STATE PRODUCT OUTLINE	THIS REGISTERED OUTLINE HAS BEEN PREPARED AND PUBLISHED BY THE JEDEC JC-11 COMMITTEE AND REFLECTS A PRODUCT WITH ANTICIPATED USE IN THE ELECTRONICS INDUSTRY. CHANGES ARE LIKELY TO OCCUR.

TITLE:	PACKAGE DESIGNATOR:	ISSUE:	DATE:		PAGE:
THIN, FINE-PITCH BALL GRID ARRAY FAMILY, DUAL PITCH (SQUARE)	TF-XBGA	A	03/01	MO-228	1 OF 5

FIGURE 2



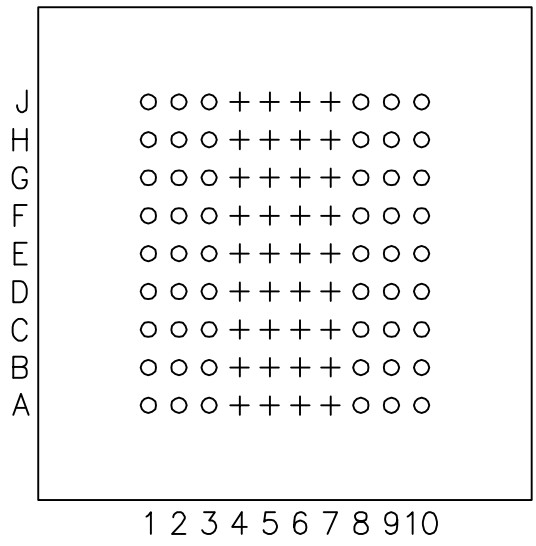
DETAIL A
(ROTATED 90° CW)



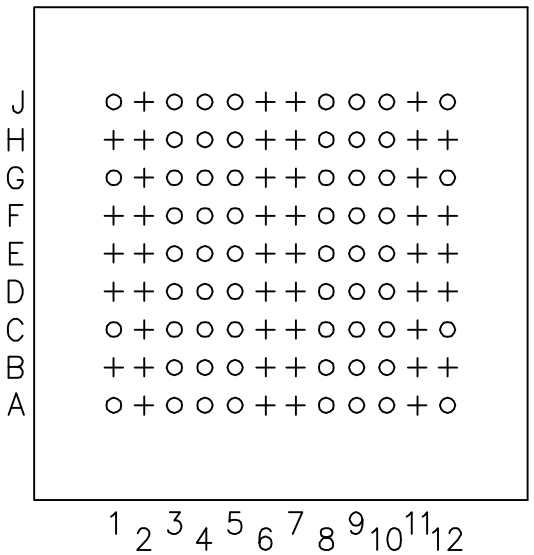
10 DETAIL B

JEDEC SOLID STATE PRODUCT OUTLINE	TITLE: THIN, FINE-PITCH BALL GRID ARRAY FAMILY, DUAL PITCH (SQUARE)	ISSUE: A	DATE: 03/01	MO-228	PAGE: 2 OF 5

FIGURE 3: SOLDER BALL PATTERNS (3) (12)
(BOTTOM VIEWS)



FOOTPRINT A



FOOTPRINT B

+ = DEPOPULATED BALL POSITION

JEDEC SOLID STATE PRODUCT OUTLINE	TITLE: THIN, FINE-PITCH BALL GRID ARRAY FAMILY, DUAL PITCH (SQUARE)	ISSUE: A	DATE: 03/01	MO-228	PAGE: 3 OF 5

SYMBOL	COMMON DIMENSIONS				SYMBOL	TOLERANCES OF FORM & POSITION
	MIN	NOM	MAX	NOTES		
A	---	---	1.20	8	aaa	0.15
A1	0.25	---	---		bbb	0.20
b	0.40	0.45	0.50	9	ccc	0.12
					ddd	0.15
					eee	0.08
NOTES	1, 2				NOTES	1, 2
REF	11-581				REF	11-581
ISSUE	A				ISSUE	A

TABLE 1: DUAL PITCH [b = 0.45 mm (nominal)]

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	13.00	13.00	8.00	7.20	9	10	0	0.40	1.00	0.80	54	A	11-581	A
AB	13.00	13.00	8.00	5.60	9	12	0	0.40	1.00	0.80	62	B	11-581	A
NOTES					4	4	11	11	16	16	5,14	14		

NOTE: VARIATION AA WAS PREVIOUSLY VARIATION BA-1 IN MO-210.

NOTES:

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

2 DIMENSIONS ARE IN MILLIMETERS.

3 BALL DESIGNATION PER JESD 95–1, SPP–010.

4 MD AND ME REPRESENT THE BALL MATRIX SIZE IN THE D AND E DIRECTIONS RESPECTIVELY.

5 n REPRESENTS THE NUMBER OF BALLS FOR EACH VARIATION.

6 9 X 12 MATRIX PATTERN IS SHOWN FOR ILLUSTRATION ONLY.

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

8 DIMENSION A INCLUDES STANDOFF HEIGHT (A1) AND PACKAGE BODY THICKNESS (A2).

9 DIMENSION b IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM C.

10 THE TERMINAL A1 CORNER MUST BE IDENTIFIED ON THE TOP AND BOTTOM SURFACE 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 CENTER BALL IN THE OUTER ROW FOR A FULLY POPULATED MD x ME MATRIX. WHERE THERE IS AN ODD NUMBER OF BALLS IN THE OUTER ROW SD OR SE = 0; WHEN THERE IS AN EVEN NUMBER OF CONTACT BALLS IN THE OUTER ROW, THE VALUE OF SD OR SE = e/2.

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

13 FOR GLOB TOP AND FLIP CHIP CONFIGURATIONS, PARALLELISM OF 0.20mm MUST BE ENSURED ONLY ON 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 PATTERN.

15 MICRON TECHNOLOGY HAS AN ISSUED PATENT-- No. 6,048,753 -- AND RELATED PATENT APPLICATIONS THAT MIGHT APPLY TO THIS REGISTRATION. IF THE CURRENT ISSUED PATENT OR LATER PATENTS RESULTING FROM THE RELATED APPLICATIONS DO APPLY, MICRON INTENDS TO COMPLY WITH THE JEDEC PATENT POLICY.

16 FOR MULTI–PITCH PACKAGES, SMALLER PITCH OF FINAL DEPOPULATED PART GOVERNS COMMON DIMENSIONS.