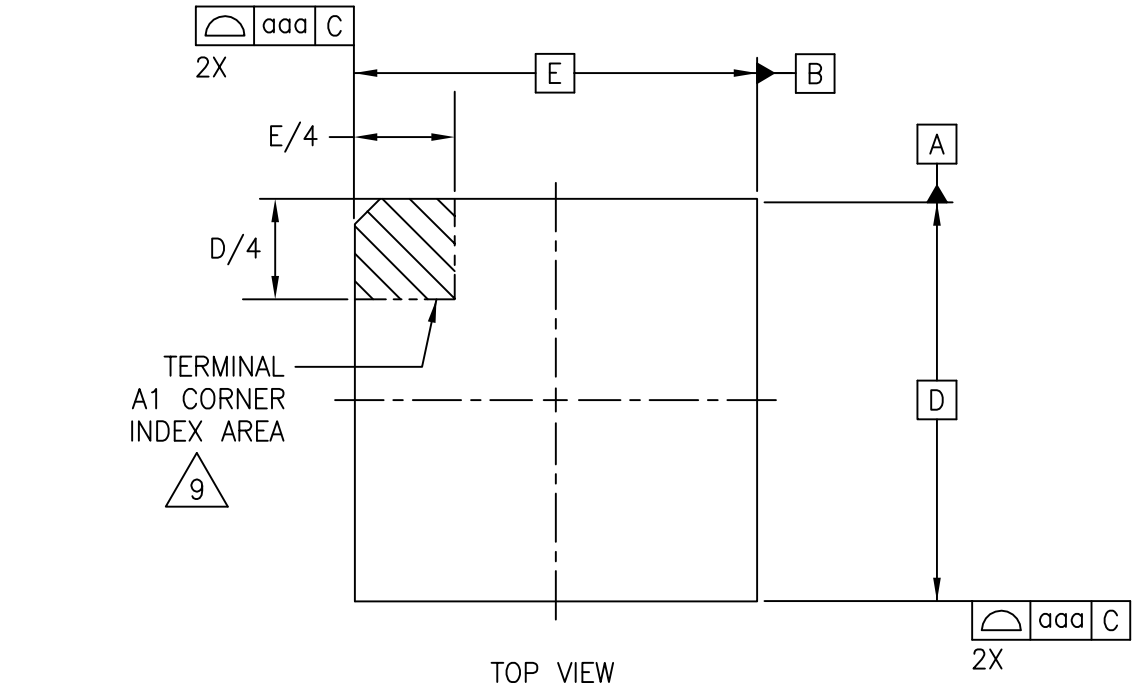
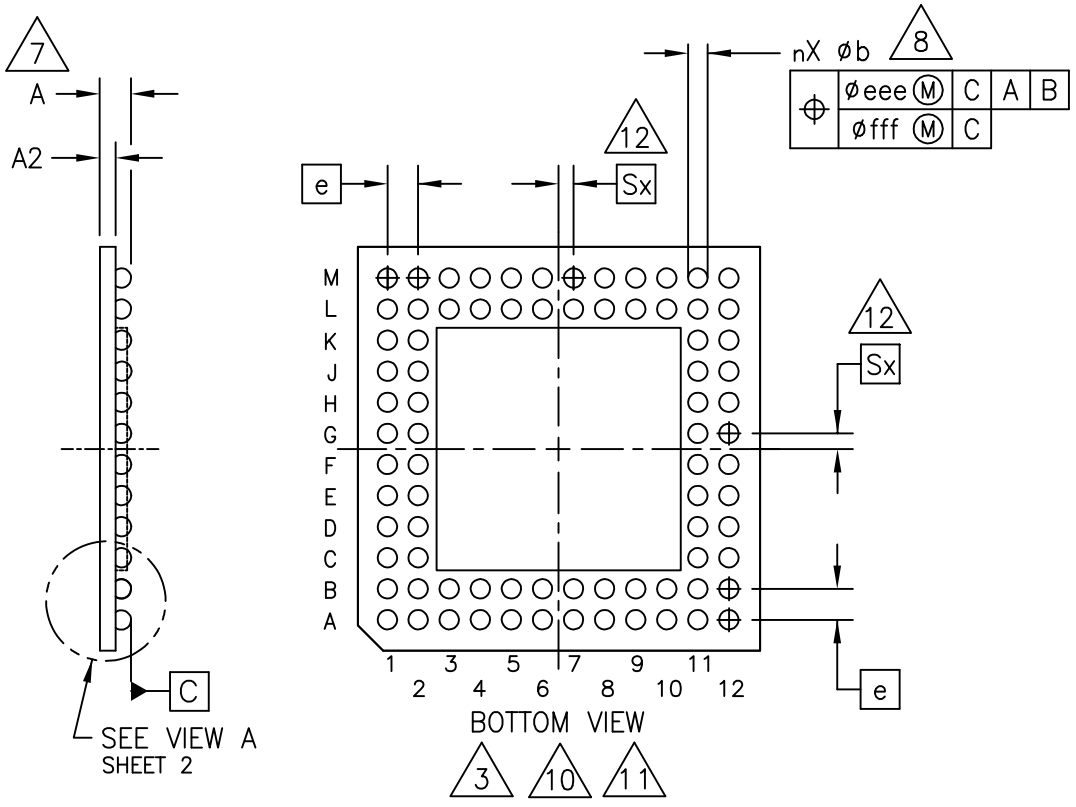
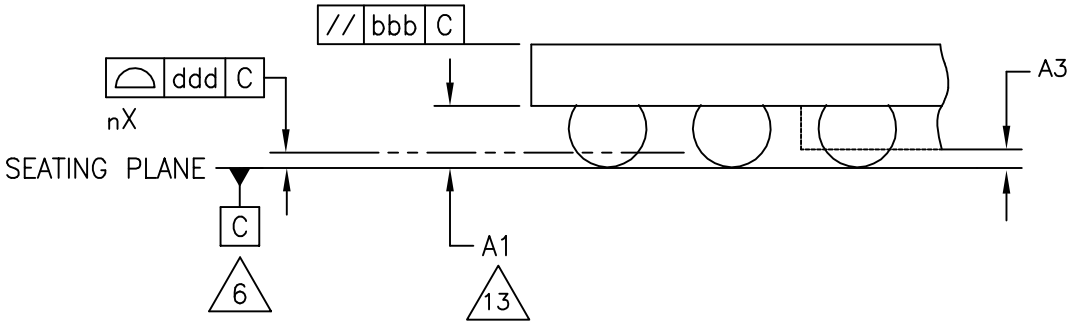


TOP VIEW



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
EXTREMELY THIN PROFILE TWO ROW CAVITY DOWN 0.50 mm PITCH BALL GRID ARRAY FAMILY	XF-XBGA	C	05/01	MO-221	1 OF 3



VIEW A
SHEET 1

TABLE 1: COMMON DIMENSIONS & TOLERANCES OF FORM AND POSITION

SYMBOL	COMMON DIMENSIONS			NOTES	SYMBOL	TOLERANCES OF FORM AND POSITION	NOTES
	MINIMUM	NOMINAL	MAXIMUM				
A	–	–	0.50	7	aaa	0.10	
A1	0.15	–	–	7	bbb	0.10	
A2	0.15	–	0.20		ddd	0.08	
A3	0.02	–	–		eee	0.15	
b	0.25	0.30	0.35	8	fff	0.05	
NOTES	1,2						
REF	11–557						
ISSUE	A						

TABLE 2: SQUARE VARIATIONS – 0.50PITCH

D / E	e = 0.50											
	M1	n1	S1	VARIATION	REF	ISSUE	M2	n2	S2	VARIATION	REF	ISSUE
4.00	8	48	0.25	AAA–1	1–580E	B	7	40	0.0	AAA–2	11–604	C
5.00	10	64	0.25	AAB–1	1–580E	B	9	56	0.0	AAB–2	11–604	C
6.00	12	80	0.25	AAC–1	1–580E	B	11	72	0.0	AAC–2	11–604	C
7.00	14	96	0.25	AAD–1	1–580E	B	13	88	0.0	AAD–2	11–604	C
8.00	16	112	0.25	AAE–1	1–580E	B	15	104	0.0	AAE–2	11–604	C
9.00	18	128	0.25	AAF–1	1–580E	B	17	120	0.0	AAF–2	11–604	C
10.00	20	144	0.25	AAG–1	1–580E	B	19	136	0.0	AAG–2	11–604	C
11.00	22	160	0.25	AAH–1	1–580E	B	21	152	0.0	AAH–2	11–604	C
12.00	24	176	0.25	AAJ–1	1–580E	B	23	168	0.0	AAJ–2	11–604	C
Notes:	4	5	12				4	5	12			

NOTES:

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

2. DIMENSIONS ARE IN MILLIMETERS.

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

4. M1 IS THE MAXIMUM BALL MATRIX SIZE FOR THE "D" AND "E" DIMENSION RESPECTIVELY. M2 IS THE MAXIMUM BALL MATRIX – 1 ROW AND COLUMN FOR "D" AND "E" RESPECTIVELY.

5. n1 AND n2 ARE THE MAXIMUM NUMBER OF BALLS FOR A 2 OUTER ROW DEPOPULATED SPECIFIED MATRIX SIZES M1 AND M2.

6. PRIMARY DATUM C AND SEATING PLANE ARE 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, 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 A1 CORNER MUST BE UNIQUE. SOME ORIENTATION FEATURE ON THE BALL ATTACH SIDE IS RECOMMENDED.

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

11. 12 X 12 MATRIX PATTERN (VARIATION AAC–1) IS SHOWN FOR ILLUSTRATION ONLY.

12. $\boxed{Sx}$ IS MEASURED WITH RESPECT TO DATUM A AND DATUM B AND DEFINES THE POSITION OF THE CENTER SOLDER BALL IN THE OUTER ROW. WHEN THERE IS AN ODD NUMBER OF SOLDER BALL IN THE OUTER ROW. $\boxed{Sx}$ = 0.0; WHEN THERE IS AN EVEN NUMBER OF SOLDER BALLS IN THER OUTER ROW, $\boxed{Sx}$ = $\boxed{e/2}$. $\boxed{Sx}$ = $\boxed{S1}$ OR $\boxed{S2}$ CORRESPONDING TO M1 OR M2.

13. A1 IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY, EXCLUDING THE LID AND OR THERMAL ENHANCEMENTS ON CAVITY DOWN PACKAGE CONFIGURATIONS.