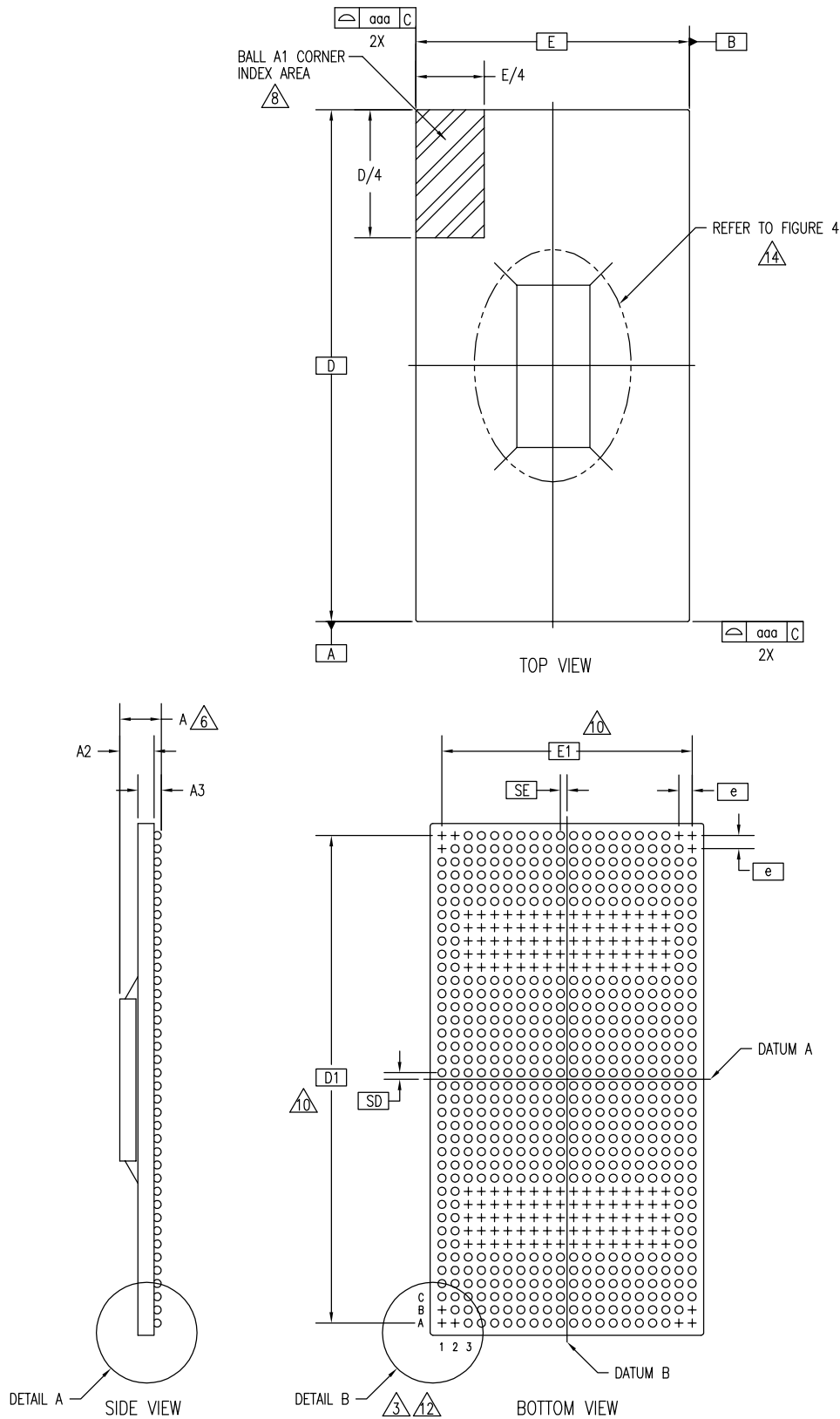


FIGURE 1: DATUMS AND PRINCIPAL DIMENSIONS



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: STANDARD & LOW, FINE PITCH
RECTANGULAR BALL GRID ARRAY FAMILY
0.65 mm PITCH

PACKAGE DESIGNATOR:
FR-XBGA
LFR-XBGA

ISSUE:
A

DATE:
May 10

MO-301

PAGE:
1 OF 7

FIGURE 2: DETAIL DRAWINGS

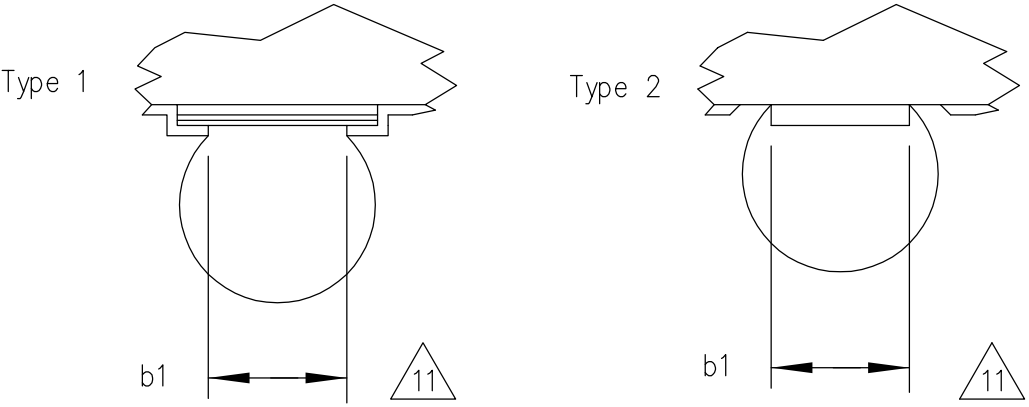
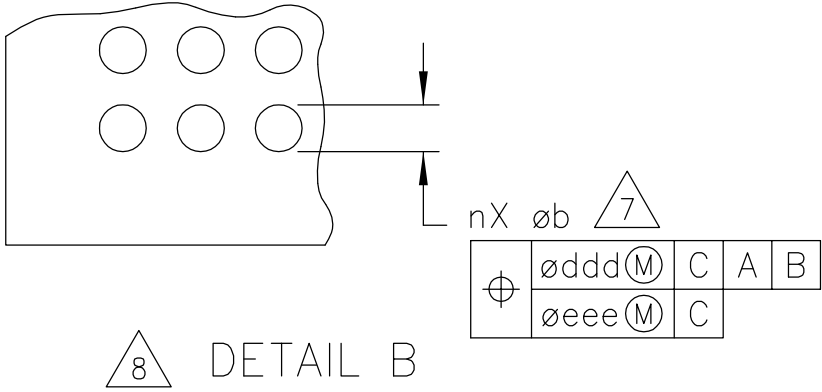
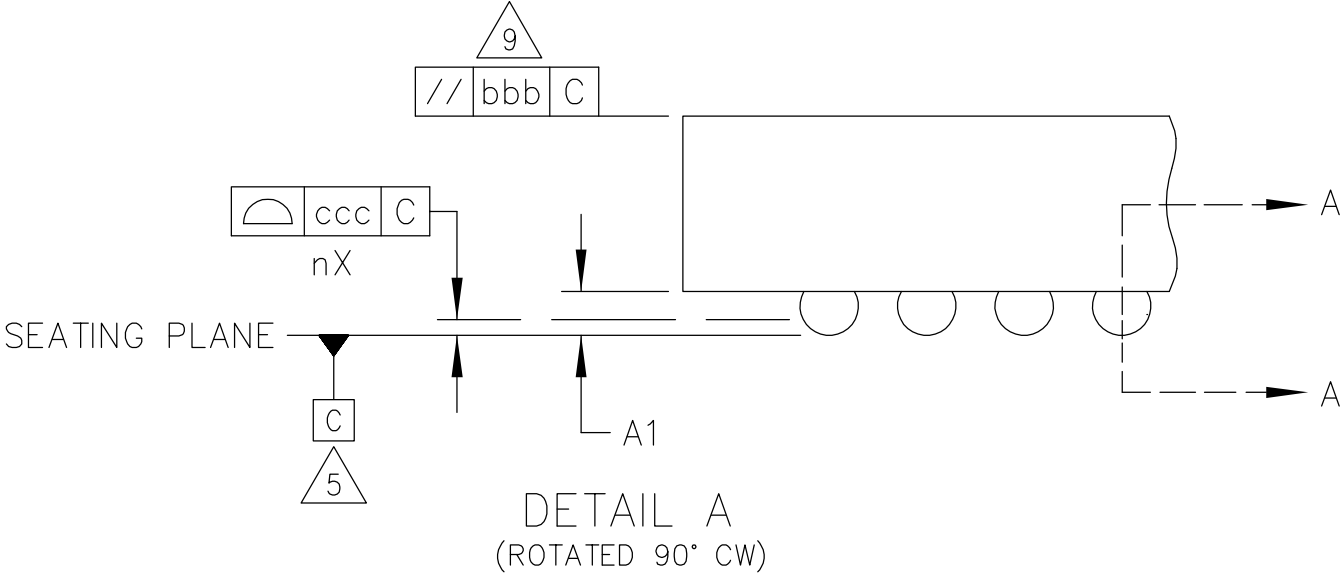
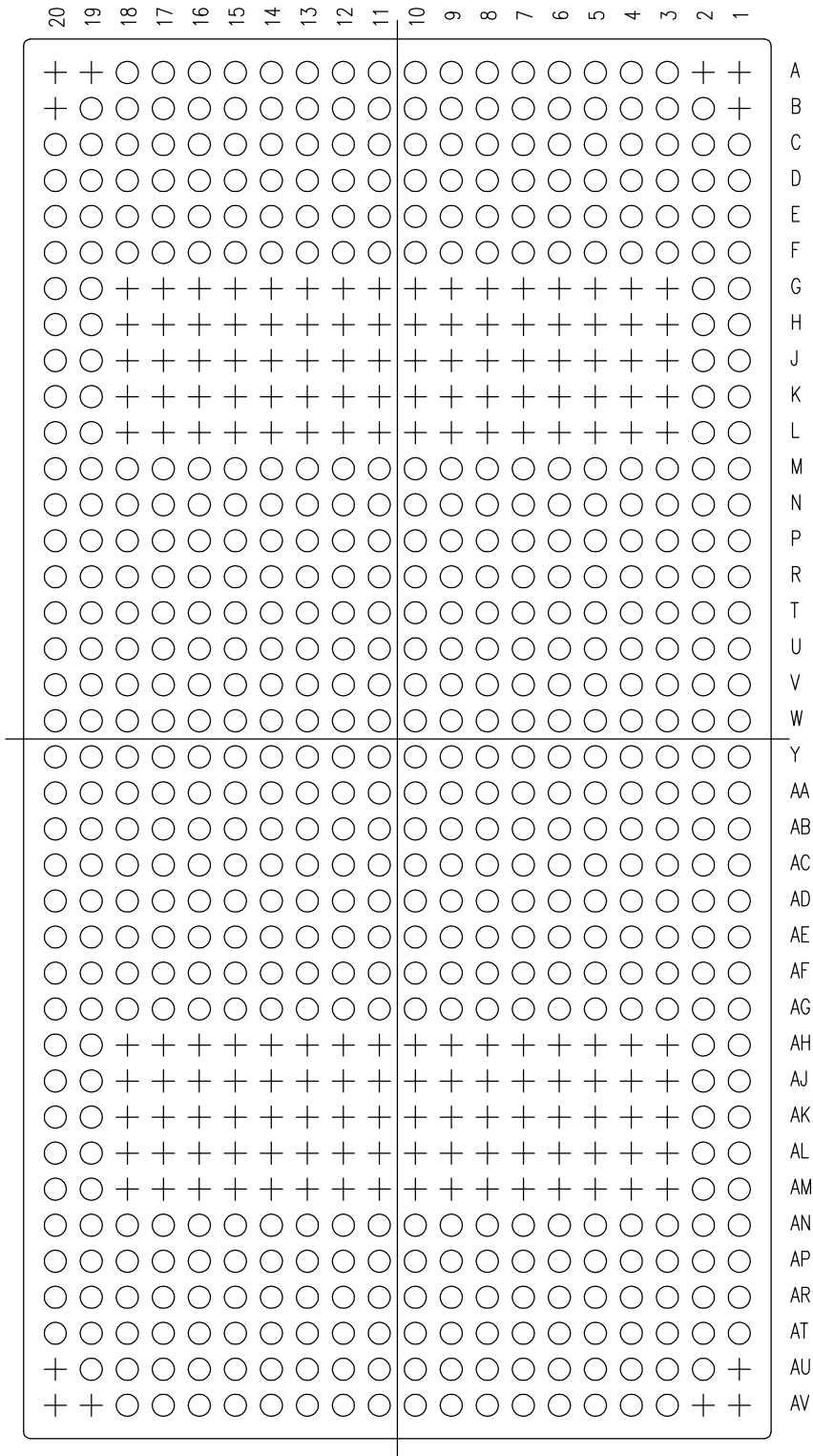


FIGURE 3: SOLDER BALL PATTERNS
(BOTTOM VIEW)



VARIATION A

+ = DEPOPULATED BALL POSITION

S Y M B O L	COMMON DIMENSIONS				S Y M B O L	TOLERANCES OF FORM and POSITION	
	MIN	NOM	MAX	NOTES		VALUE	NOTES
A	1.80	1.95	2.10	6	aaa	0.15	
A3	---	1.10	1.22	6	bbb	0.20	9
A1	0.25	---	---	6	ccc	0.20	
A2	1.55	1.65	1.75	6	ddd	0.15	
b	0.35	0.40	0.45	7	eee	0.08	
b1	Type1	0.30	---	---			
	Type2	0.30	---	---			
e	0.65 BSC						
REF	11-828				REF	11-828	
ISSUE	A				ISSUE	A	
NOTES	1,2				NOTES	1,2	

VARIATIONS												
VAR	D BSC	E BSC	D1 BSC	E1 BSC	MD	ME	n	SD BSC	SE BSC	REF	ISSUE	NOTES
A	25.20	13.50	24.05	12.35	38	20	588	0.325	0.325	11-828	A	4,10,12,13

NOTES:

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

2. DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).



SOLDER BALL POSITION DESIGNATION PER JEDEC PUBLICATION 95, SECTION 3, SPP-020. VARIATION A DEPOPULATION IS SHOWN ON THE BOTTOM VIEW OF PAGE 3 AND THE + INDICATORS ON THE DRAWING SHOW THE DEPOPULATED BALL AREAS.

4. n IS THE NUMBER OF BALLS PRESENT.



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



DIMENSION A INCLUDES THE STANDOFF HEIGHT A1 AND PACKAGE BODY THICKNESS A2. A3 IS FROM SEATING PLANE TO TOP OF SUBSTRATE BODY.



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



THE TERMINAL A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING INK OR METALLIZED MARKINGS, INDENTATIONS, OR OTHER FEATURES. THE EXACT SHAPE OF EACH CORNER IS OPTIONAL.



FOR GLOB TOP AND FLIP CHIP CONFIGURATIONS, PARALLELISM (bbb) 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.



DIMENSIONS E1 AND D1 SHALL ONLY BE A MULTIPLE OF THE PITCH e.



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.



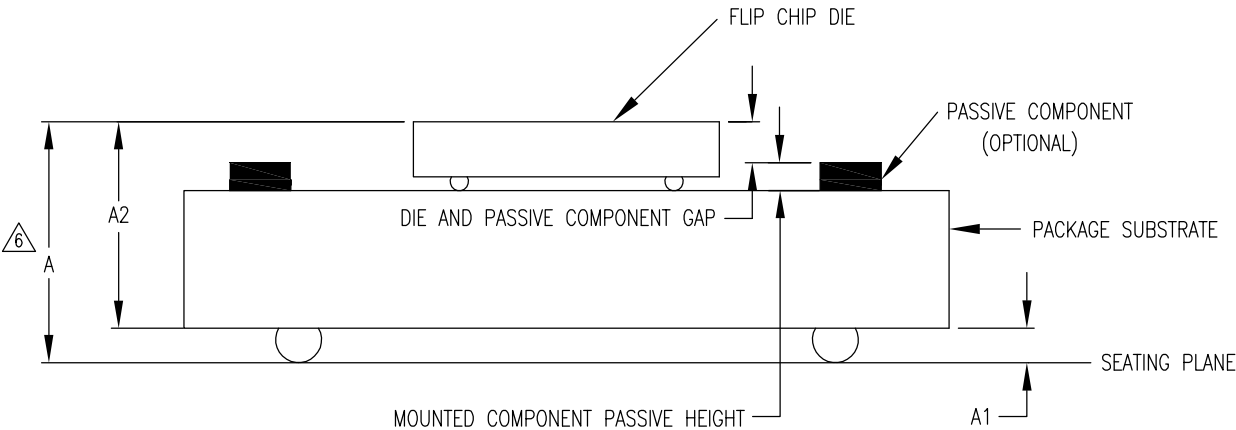
20 X 38 MATRIX PATTERN (VARIATION A) IS SHOWN FOR ILLUSTRATION ONLY.

13 SYMBOL "MD" IS THE BALL MATRIX SIZE IN THE "D" DIRECTION AND SYMBOL "ME" IS THE BALL MATRIX SIZE IN THE "E" DIRECTION. "n" IS THE ACTUAL NUMBER OF BALLS FOR MATRIX SIZE MD X ME AND DOES NOT INCLUDE BALLS FROM ANY DEPOPULATED LOCATIONS.

14 THE BARE DIE SHOWN IN TOP VIEW IS FOR REFERENCE ONLY. SINCE DIE SIZE IS DIFFERENT FOR DIFFERENT VENDORS, THE WIDTH AND LENGTH OF THE DIE IS NOT SPECIFIED.

APPLICATION NOTES:

15. WHEN PASSIVE COMPONENTS ARE PRESENT ON THE PACKAGE SUBSTRATE, THIER MAXIMUM MOUNTED HEIGHT MUST BE 0.10 MM LESS THAN THE FLIP CHIP MOUNTED MINIMUM HEIGHT. THE FLIP CHIP AND PASSIVE COMPONENT GAP MUST ALWAYS BE EQUAL TO OR GREATER THAN 0.10 MM



16. KEEP OUT AREA IS REQUIRED FOR PROTECTING THE "BARE DIE", AND OPTIONAL PASSIVE COMPONENT PLACEMENT IF NEEDED.

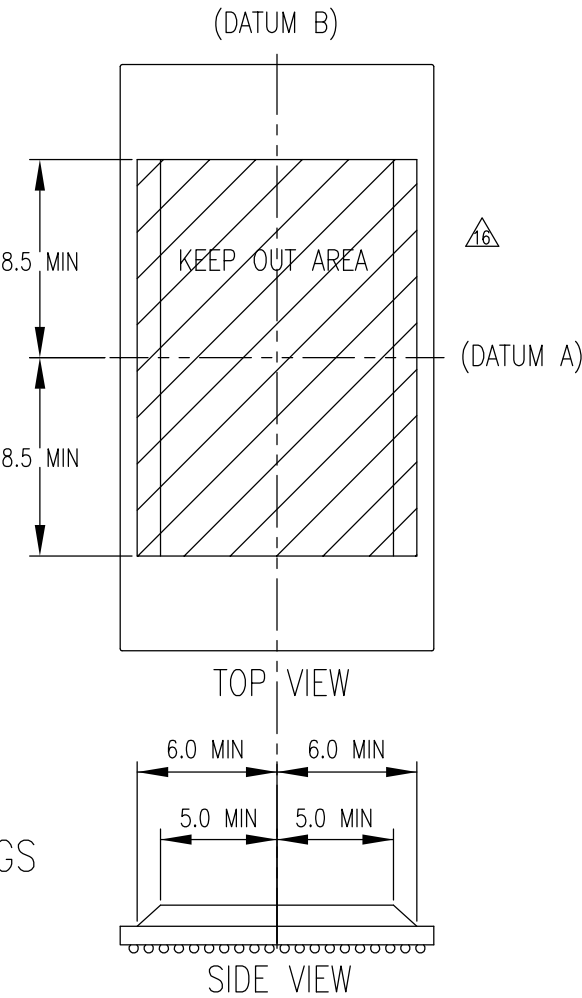


FIGURE 4: KEEP OUT AREA DRAWINGS

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: MAY 2010	JC Item: JC11.11-828
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Revision History:

Issue:	Date:	Item:
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Location	Change from:	Change to:

Issue:	Date:	Item:
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Location	Change from:	Change to:

Issue:	Date:	Item:
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Location	Change from:	Change to: