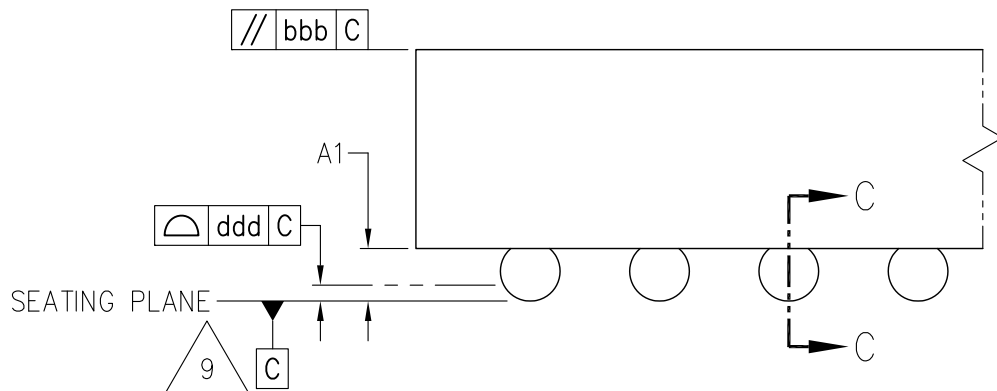


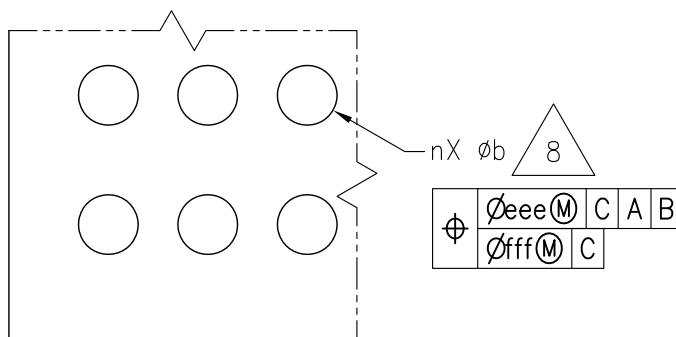
JEDEC SOLID STATE
PRODUCT OUTLINE
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THIS **REGISTERED OUTLINE** HAS BEEN PREPARED BY THE JEDEC JC-11 COMMITTEE AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY; CHANGES ARE LIKELY TO OCCUR.

TITLE	PACKAGE DESIGNATOR	ISSUE	DATE	SHEET
DUAL-PITCH, RECTANGULAR BALL GRID ARRAY PACKAGE, 0.50 mm X 0.65 mm PITCH	LFR-XBGA	A	Dec 2011	1 OF 6

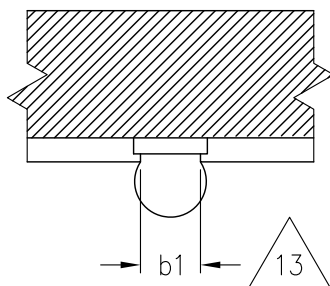


DETAIL A
(ROTATED 90° CW)

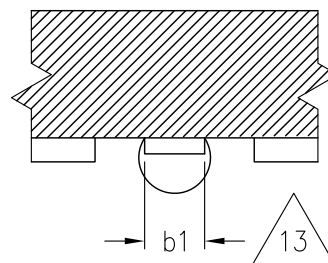


DETAIL B

TYPE 1 – SMD
(SOLDER MASK DEFINED)



TYPE 2 – NSMD
(NON SOLDER MASK DEFINED)



SECTION C-C

TABLE 1

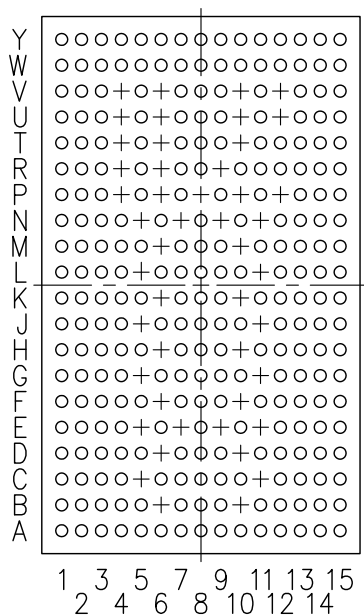
COMMON DIMENSIONS				
SYMBOL	L: LOW PROFILE			NOTES
	MIN	NOM	MAX	
A	>1.20	—	1.40	7
A1	0.15	—	—	7
A2	—	—	1.15	
b	0.25	0.30	0.35	
b1	TYPE1	0.20	—	
	TYPE2	0.20	—	
eD	0.65 BSC			4
eE	0.50 BSC			4
NOTES	1, 2			
REF	11–856			
ISSUE	A			

TABLE 2

RECTANGULAR VARIATIONS		
VARIATION ► SYMBOL ▼	AA	NOTES
D BSC	13.50	2
E BSC	8.00	2
D1 BSC	12.35	2
E1 BSC	7.00	2
MD	20	
ME	15	
SD BSC	0.325	2
SE BSC	0.00	2
n	253	12
N	300	5
FOOTPRINT	1	12
NOTES	1	
REF	11–856	
ISSUE	A	

TABLE 3

TOLERANCE OF FORM AND POSITION	
SYMBOL	VALUE
aaa	0.15
bbb	0.20
ddd	0.08
eee	0.15
fff	0.05
NOTES	1, 2
REF	11–856
ISSUE	A



FOOTPRINT 1  

+ = DEPOPULATED BALL POSITIONS

NOTES:

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

2. ALL DIMENSIONS ARE IN MILLIMETERS.



3. SOLDER BALL POSITION DESIGNATOR PER JEP95, SECTION 3, SPP-020.

4. 'eD' AND 'eE' REPRESENT THE SOLDER BALL GRID PITCH CORRESPONDING TO THE D AND E DIRECTIONS RESPECTIVELY.

5. N REPRESENTS THE MAXIMUM NUMBER OF SOLDER BALLS FOR MATRIX SIZES MD, ME.



6. A FULLY POPULATED 16 X 20 MATRIX SIZE IS SHOWN FOR ILLUSTRATION ONLY.



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



8. DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER PARALLEL TO PRIMARY DATUM C.



9. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE PLANE ESTABLISHED BY THE CONTACT POINTS OF THREE OR MORE SOLDER BALLS THAT SUPPORT THE DEVICE WHEN IT IS PLACED ON TOP OF A PLANAR SURFACE.



10. THE CORNER A1 MUST BE IDENTIFIED ON BOTH THE BOTTOM AND TOP SIDES OF THE PACKAGE, THE IDENTIFICATION FEATURE CAN BE MADE USING INK OR METALIZED MARKINGS, IDENTATIONS, OR OTHER FEATURES. THE EXACT SHAPE OF EACH CORNER IS OPTIONAL.



11. DIMENSIONS 'SD' AND 'SE' ARE MEASURED WITH RESPECT TO DATUM A AND DATUM B AND DEFINE THE POSITION OF THE CENTER SOLDER BALL IN THE OUTER ROW. WHEN THERE IS AN ODD NUMBER OF SOLDER BALLS IN THE OUTER ROW 'SD' OR 'SE' = 0 WHEN THERE IS AN EVEN NUMBER OF SOLDER BALLS IN THE OUTER ROW, 'SD' = $eD/2$ AND 'SE' = $eE/2$.



12. SOLDER BALL DEPOPULATION IS ALLOWED. DEPOPULATION IS THE OMISSION OF SOLDER BALLS FROM A FULL MATRIX (MD, ME).



13. SOLDERABLE SURFACE MAY BE DEFINED BY AN OPENING IN THE SOLDER RESIST LAYER (TYPE 1) OR BY THE SIZE OF A METALIZED 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: December 2011	ITEM NUMBER: 11-856
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CHANGE RECORD HISTORY:

ISSUE	DATE:	ITEM NUMBER:
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LOCATION	CHANGER FROM:	CHANGED TO:

ISSUE:	DATE:	ITEM NUMBER:
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LOCATION	CHANGER FROM:	CHANGED TO: