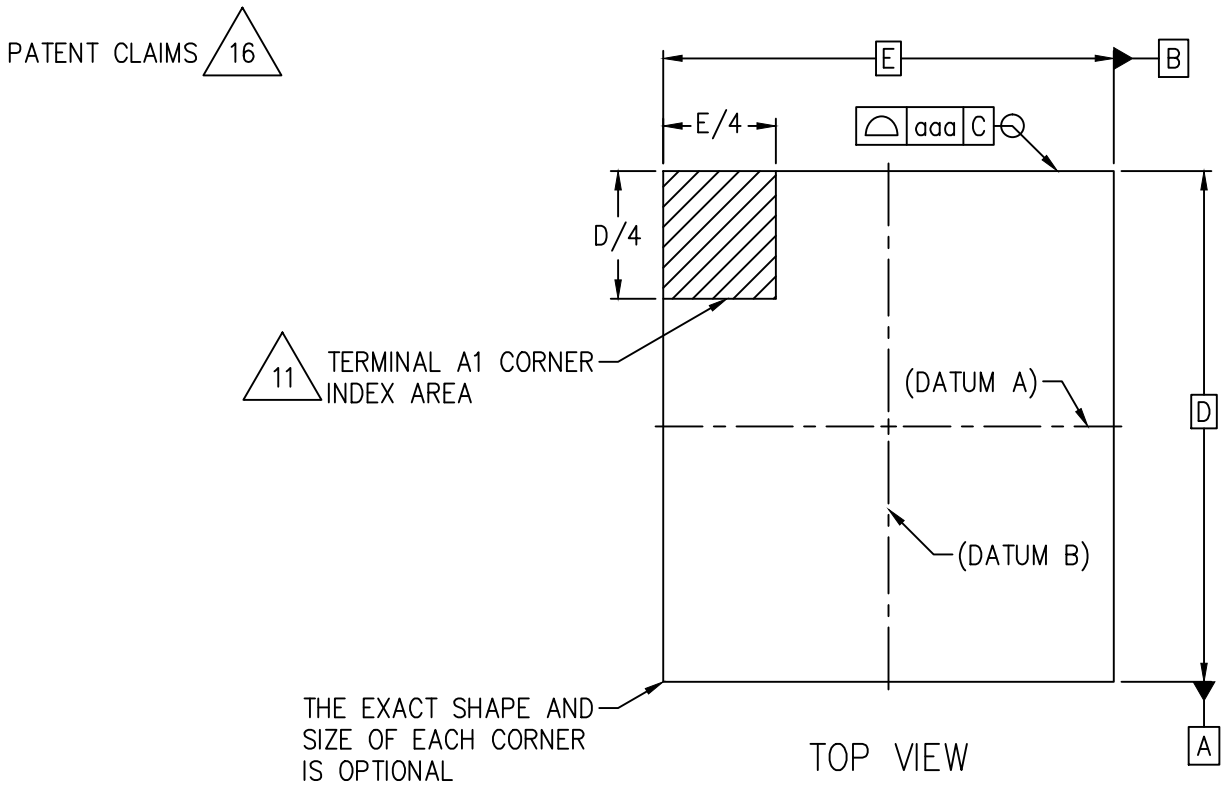
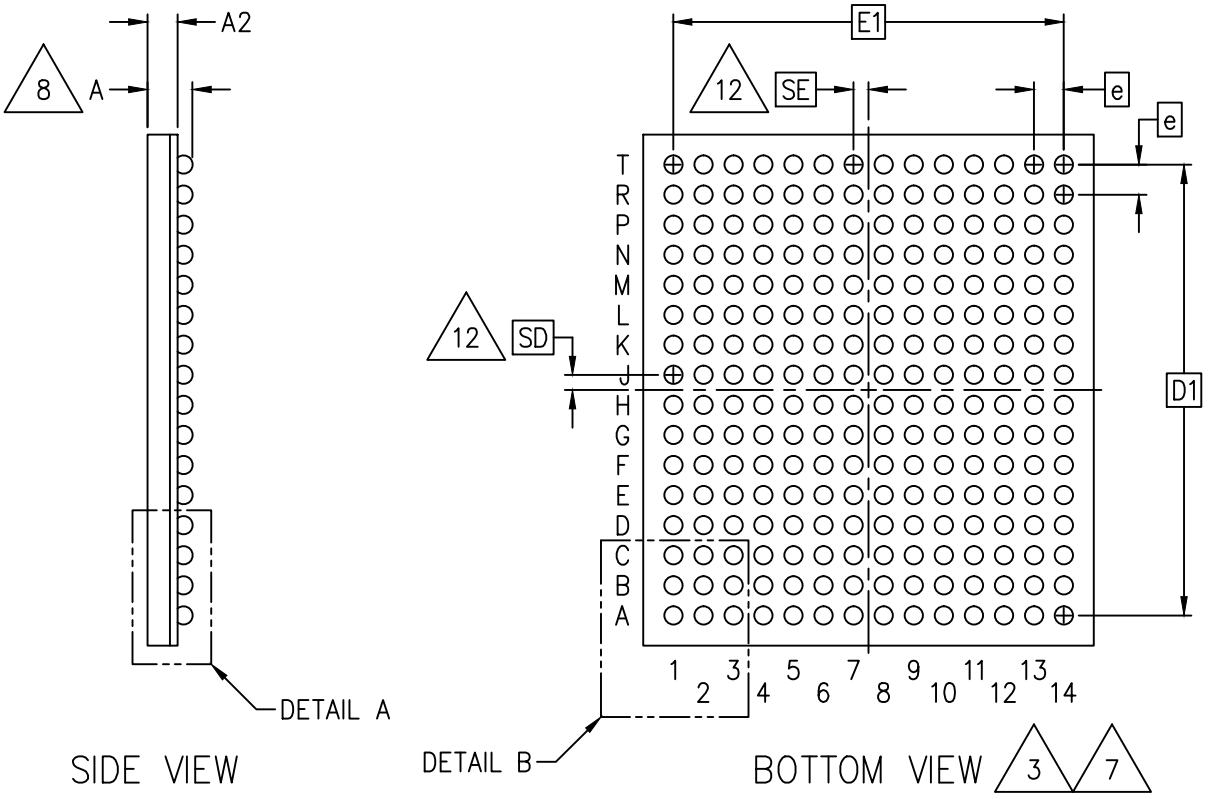
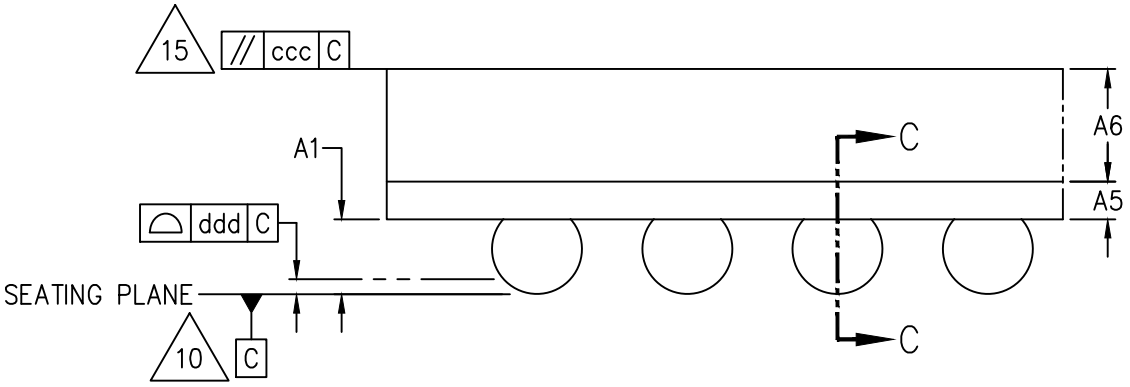


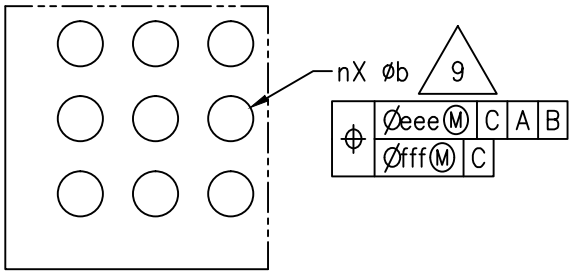


JEDEC SOLID STATE PRODUCT OUTLINE Copyright © 2018 JEDEC	THIS *REGISTERED OUTLINE* HAS BEEN PREPARED BY THE JEDEC JC-11 COMMITTEE AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY; CHANGES ARE LIKELY TO OCCUR.

TITLE	PACKAGE DESIGNATOR	NUMBER	ISSUE	DATE	SHEET
BOTTOM GRID ARRAY, BALL, 1.00 MM PITCH RECTANGULAR FAMILY	PBGA-B..._I100...	MO-234	E	JUN 2018	1 OF 24



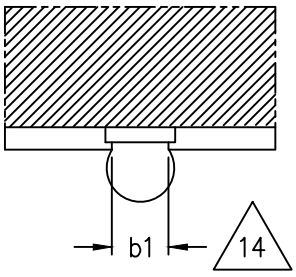
DETAIL A
(ROTATED 90° CW)

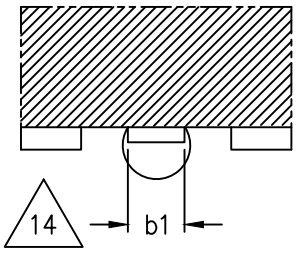


DETAIL B

TYPE 1 – SMD
(SOLDER MASK DEFINED)

TYPE 2 – NSMD
(NON SOLDER MASK DEFINED)





SECTION C–C

TABLE 1							
COMMON DIMENSIONS							
SYMBOL		P = PACKAGE PROFILE HEIGHT					
		070			080		
		MIN	NOM	MAX	MIN	NOM	MAX
A		> 0.60	---	0.70	> 0.70	---	0.80
A2	b(NOM) = 0.35	---	---	0.53	---	---	0.63
	b(NOM) = 0.40	---	---	0.50	---	---	0.60
	b(NOM) = 0.45	---	---	0.46	---	---	0.56
	b(NOM) = 0.50	---	---	0.43	---	---	0.53
	b(NOM) = 0.55	---	---	0.40	---	---	0.50
	b(NOM) = 0.60	---	---	0.40	---	---	0.50
A2(MAX) = A(MAX) – A1		SOLDER BALL SPECIFIC			SOLDER BALL SPECIFIC		
A5		OPTIONAL – DESIGN SPECIFIC					
A6		OPTIONAL – DESIGN SPECIFIC					
NOTES		2, 8			2, 8		
REF		11–935, 11–944, 11–954			11–935, 11–944, 11–954		
ISSUE		E			E		

TABLE 1 CONTINUED							
COMMON DIMENSIONS							
SYMBOL		P = PACKAGE PROFILE HEIGHT					
		090			100		
		MIN	NOM	MAX	MIN	NOM	MAX
A		> 0.80	---	0.90	> 0.90	---	1.00
A2	b(NOM) = 0.35	---	---	0.73	---	---	0.83
	b(NOM) = 0.40	---	---	0.70	---	---	0.80
	b(NOM) = 0.45	---	---	0.66	---	---	0.76
	b(NOM) = 0.50	---	---	0.63	---	---	0.73
	b(NOM) = 0.55	---	---	0.60	---	---	0.70
	b(NOM) = 0.60	---	---	0.60	---	---	0.70
A2(MAX) = A(MAX) – A1		SOLDER BALL SPECIFIC			SOLDER BALL SPECIFIC		
A5		OPTIONAL – DESIGN SPECIFIC					
A6		OPTIONAL – DESIGN SPECIFIC					
NOTES		2, 8			2, 8		
REF		11–935, 11–944, 11–954			11–935, 11–944, 11–954		
ISSUE		E			E		

TABLE 1 CONTINUED							
COMMON DIMENSIONS							
SYMBOL		P = PACKAGE PROFILE HEIGHT					
		110			120		
		MIN	NOM	MAX	MIN	NOM	MAX
A		> 1.00	---	1.10	> 1.10	---	1.20
A2	b(NOM) = 0.35	---	---	0.93	---	---	1.03
	b(NOM) = 0.40	---	---	0.90	---	---	1.00
	b(NOM) = 0.45	---	---	0.86	---	---	0.96
	b(NOM) = 0.50	---	---	0.83	---	---	0.93
	b(NOM) = 0.55	---	---	0.80	---	---	0.90
	b(NOM) = 0.60	---	---	0.80	---	---	0.90
A2(MAX) = A(MAX) – A1		SOLDER BALL SPECIFIC			SOLDER BALL SPECIFIC		
A5		OPTIONAL – DESIGN SPECIFIC					
A6		OPTIONAL – DESIGN SPECIFIC					
NOTES		2, 8			2, 8		
REF		11–935, 11–944, 11–954			11–935, 11–944, 11–954		
ISSUE		E			E		

TABLE 1 CONTINUED

COMMON DIMENSIONS								
SYMBOL		P = PACKAGE PROFILE HEIGHT					
		130			140		
		MIN	NOM	MAX	MIN	NOM	MAX
A		> 1.20	---	1.30	> 1.30	---	1.40
A2	b(NOM) = 0.35	---	---	1.13	---	---	1.23
	b(NOM) = 0.40	---	---	1.10	---	---	1.20
	b(NOM) = 0.45	---	---	1.06	---	---	1.16
	b(NOM) = 0.50	---	---	1.03	---	---	1.13
	b(NOM) = 0.55	---	---	1.00	---	---	1.10
	b(NOM) = 0.60	---	---	1.00	---	---	1.10
A2(MAX) = A(MAX) – A1		SOLDER BALL SPECIFIC			SOLDER BALL SPECIFIC		
A5		OPTIONAL – DESIGN SPECIFIC					
A6		OPTIONAL – DESIGN SPECIFIC					
NOTES		2, 8			2, 8		
REF		11–935, 11–944, 11–954			11–935, 11–944, 11–954		
ISSUE		E			E		

TABLE 1 CONTINUED							
COMMON DIMENSIONS							
SYMBOL		P = PACKAGE PROFILE HEIGHT					
		150			160		
		MIN	NOM	MAX	MIN	NOM	MAX
A		> 1.40	---	1.50	> 1.50	---	1.60
A2	b(NOM) = 0.35	---	---	1.33	---	---	1.43
	b(NOM) = 0.40	---	---	1.30	---	---	1.40
	b(NOM) = 0.45	---	---	1.26	---	---	1.36
	b(NOM) = 0.50	---	---	1.23	---	---	1.33
	b(NOM) = 0.55	---	---	1.20	---	---	1.30
	b(NOM) = 0.60	---	---	1.20	---	---	1.30
A2(MAX) = A(MAX) – A1		SOLDER BALL SPECIFIC			SOLDER BALL SPECIFIC		
A5		OPTIONAL – DESIGN SPECIFIC					
A6		OPTIONAL – DESIGN SPECIFIC					
NOTES		2, 8			2, 8		
REF		11–935, 11–944, 11–954			11–935, 11–944, 11–954		
ISSUE		E			E		

TABLE 1 CONTINUED							
COMMON DIMENSIONS							
SYMBOL		P = PACKAGE PROFILE HEIGHT					
		170			180		
		MIN	NOM	MAX	MIN	NOM	MAX
A		> 1.60	---	1.70	> 1.70	---	1.80
A2	b(NOM) = 0.35	---	---	1.53	---	---	1.63
	b(NOM) = 0.40	---	---	1.50	---	---	1.60
	b(NOM) = 0.45	---	---	1.46	---	---	1.56
	b(NOM) = 0.50	---	---	1.43	---	---	1.53
	b(NOM) = 0.55	---	---	1.40	---	---	1.50
	b(NOM) = 0.60	---	---	1.40	---	---	1.50
A2(MAX) = A(MAX) – A1		SOLDER BALL SPECIFIC			SOLDER BALL SPECIFIC		
A5		OPTIONAL – DESIGN SPECIFIC					
A6		OPTIONAL – DESIGN SPECIFIC					
NOTES		2, 8			2, 8		
REF		11–935, 11–944, 11–954			11–935, 11–944, 11–954		
ISSUE		E			E		

TABLE 2							
COMMON DIMENSIONS							
SYMBOL		(b) SOLDER BALL DIA					
		MIN	NOM	MAX	MIN	NOM	MAX
A1		0.17	---	---	0.20	---	---
b		0.30	0.35	0.40	0.35	0.40	0.45
b1	TYPE1	0.30	---	---	0.30	---	---
	TYPE2	0.30	---	---	0.25	---	---
e		1.00 BASIC					
NOTES		2			2		
REF		11-944			11-935, 11-944		
ISSUE		D			D		

TABLE 2 CONTINUED							
COMMON DIMENSIONS							
SYMBOL		(b) SOLDER BALL DIA					
		MIN	NOM	MAX	MIN	NOM	MAX
A1		0.24	---	---	0.27	---	---
b		0.40	0.45	0.50	0.45	0.50	0.55
b1	TYPE1	0.35	---	---	0.40	---	---
	TYPE2	0.30	---	---	0.35	---	---
e		1.00 BASIC					
NOTES		2			2		
REF		11-935			11-935		
ISSUE		C			C		

TABLE 2 CONTINUED							
COMMON DIMENSIONS							
SYMBOL		(b) SOLDER BALL DIA					
		MIN	NOM	MAX	MIN	NOM	MAX
A1		0.30	---	---	0.30	---	---
b		0.50	0.55	0.60	0.50	0.60	0.70
b1	TYPE1	0.42	---	---	0.45	---	---
	TYPE2	0.42	---	---	0.50	---	---
e		1.00 BASIC					
NOTES		2			2		
REF		11-954			11-935		
ISSUE		E			C		

TABLE 3		
TOLERANCE OF FORM AND POSITION		
SYMBOL	VALUE	
	HIGH MELT SOLDER BALL	LOW MELT SOLDER BALL
aaa	0.20	
ccc	0.25	
ddd	0.15	0.20
eee	0.25	
fff	0.10	
NOTES	2	
REF	11-626, 11-935, 11-954	
ISSUE	-	

TABLE 4

VARIATIONS øb = 0.35 MM NOMINAL

NEW VARIATION (17)	OLD VARIATION	D BASIC	E BASIC	D1 BASIC	E1 BASIC	MD	ME	SD BASIC	SE BASIC	n	N	FOOT PRINT	REF	ISSUE
P8.00x6.00–10035–24A	---	8.00	6.00	4.00	4.00	5	5	0.00	0.00	24	25	A	11–944	D
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

FP = FOOTPRINT

TABLE 5

VARIATIONS øb = 0.40 MM NOMINAL

NEW VARIATION (17)	OLD VARIATION	D BASIC	E BASIC	D1 BASIC	E1 BASIC	MD	ME	SD BASIC	SE BASIC	n	N	FOOT PRINT	REF	ISSUE
P8.00x6.00–10040–24J	---	8.00	6.00	5.00	3.00	6	4	0.50	0.50	24	24	J	11–944	D
P8.00x6.00–10040–24A	---	8.00	6.00	4.00	4.00	5	5	0.00	0.00	24	25	A	11–935	C
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

FP = FOOTPRINT

TABLE 6

VARIATIONS øb = 0.45 MM NOMINAL

NEW VARIATION (17)	OLD VARIATION	D BASIC	E BASIC	D1 BASIC	E1 BASIC	MD	ME	SD BASIC	SE BASIC	n	N	FOOT PRINT	REF	ISSUE
P13.00x10.00–10045–64B	MO–216 CAA–1	13.00	10.00	7.00	7.00	8	8	0.50	0.50	64	64	B	11–935	C
P13.00x10.00–10045–80C	MO–216 CAE–1	13.00	10.00	9.00	7.00	10	8	0.50	0.50	80	80	C	11–935	C
P15.00x13.00–10045–165D	MO–216 CAB–1	15.00	13.00	14.00	10.00	15	11	0.00	0.00	165	165	D	11–935	C
P15.00x13.00–10045–195E	MO–216 CAC–1	15.00	13.00	14.00	12.00	15	13	0.00	0.00	195	195	E	11–935	C
P16.50x14.00–10045–136M	MO–304 FP C	16.50	14.00	14.00	12.00	15	13	0.00	0.00	136	195	M	11–954	E
P17.00x15.00–10045–140F	MO–216 CAD–1	17.00	15.00	13.00	9.00	14	10	0.00	0.00	140	140	F	11–935	C
P18.00x12.00–10045–100K	MO–304 FP A	18.00	12.00	16.00	9.00	17	10	0.00	0.50	100	170	K	11–954	E
P18.00x12.00–10045–132L	MO–304 FP B	18.00	12.00	16.00	10.00	17	11	0.00	0.00	132	187	L	11–954	E
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

FP = FOOTPRINT

TABLE 6 CONTINUED

VARIATIONS øb = 0.45 MM NOMINAL

NEW VARIATION (17)	OLD VARIATION	D BASIC	E BASIC	D1 BASIC	E1 BASIC	MD	ME	SD BASIC	SE BASIC	n	N	FOOT PRINT	REF	ISSUE
P18.00x12.00–10045–170P	MO–304 FP E	18.00	12.00	16.00	9.00	17	10	0.00	0.50	170	170	P	11–954	E
P18.00x14.00–10045–100K	MO–304 FP A	18.00	14.00	16.00	9.00	17	10	0.00	0.50	100	170	K	11–954	E
P18.00x14.00–10045–152N	MO–304 FP D	18.00	14.00	16.00	12.00	17	13	0.00	0.00	152	221	N	11–954	E
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

FP = FOOTPRINT

TABLE 7

VARIATIONS øb = 0.50 MM NOMINAL

NEW VARIATION (17)	OLD VARIATION	D BASIC	E BASIC	D1 BASIC	E1 BASIC	MD	ME	SD BASIC	SE BASIC	n	N	FOOT PRINT	REF	ISSUE
P12.00x10.00–10050–80G	AA	12.00	10.00	9.00	7.00	10	8	0.50	0.50	80	80	G	11–626	A
P16.00x12.00–10050–165H	AB	16.00	12.00	14.00	10.00	15	11	0.00	0.00	165	165	H	11–626	A
P16.50x14.00–10050–136M	MO–304 FP C	16.50	14.00	14.00	12.00	15	13	0.00	0.00	136	195	M	11–954	E
P17.00x13.00–10050–192I	AC	17.00	13.00	15.00	11.00	16	12	0.50	0.50	192	192	I	11–717	B
P18.00x12.00–10050–100K	MO–304 FP C	18.00	12.00	16.00	9.00	17	10	0.00	0.50	100	170	K	11–954	E
P18.00x12.00–10050–132L	MO–304 FP C	18.00	12.00	16.00	10.00	17	11	0.00	0.00	132	187	L	11–954	E
P18.00x12.00–10050–170P	MO–304 FP C	18.00	12.00	16.00	9.00	17	10	0.00	0.50	170	170	?	11–954	E
P18.00x14.00–10050–100K	–	18.00	14.00	16.00	9.00	17	10	0.00	0.50	100	170	?	11–954	E
P18.00x14.00–10050–152N	MO–304 FP C	18.00	14.00	16.00	12.00	17	13	0.00	0.00	152	221	?	11–954	E
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

FP = FOOTPRINT

TABLE 8

VARIATIONS øb = 0.55 MM NOMINAL

NEW VARIATION △17	OLD VARIATION	D BASIC	E BASIC	D1 BASIC	E1 BASIC	MD	ME	SD BASIC	SE BASIC	n	N	FOOT PRINT	REF	ISSUE
P16.50x14.00–10055–136M	MO–304 FP C	16.50	14.00	14.00	12.00	15	13	0.00	0.00	136	195	M	11–954	E
P18.00x12.00–10055–100K	MO–304 FP A	18.00	12.00	16.00	9.00	17	10	0.00	0.50	100	170	K	11–954	E
P18.00x12.00–10055–132L	MO–304 FP B	18.00	12.00	16.00	10.00	17	11	0.00	0.00	132	187	L	11–954	E
P18.00x12.00–10055–170P	MO–304 FP E	18.00	12.00	16.00	9.00	17	10	0.00	0.50	170	170	P	11–954	E
P18.00x14.00–10055–100K	MO–304 FP A	18.00	14.00	16.00	9.00	17	10	0.00	0.50	100	170	K	11–954	E
P18.00x14.00–10055–152N	MO–304 FP D	18.00	14.00	16.00	12.00	17	13	0.00	0.00	152	221	N	11–954	E
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

FP = FOOTPRINT

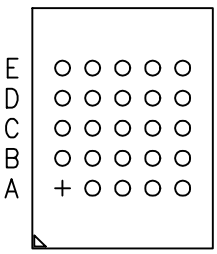
TABLE 9

VARIATIONS øb = 0.60 MM NOMINAL

NEW VARIATION (17)	OLD VARIATION	D BASIC	E BASIC	D1 BASIC	E1 BASIC	MD	ME	SD BASIC	SE BASIC	n	N	FOOT PRINT	REF	ISSUE
P17.00x13.00–10060–192I	BA	17.00	13.00	15.00	11.00	16	12	0.50	0.50	192	192	I	11–717	B
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

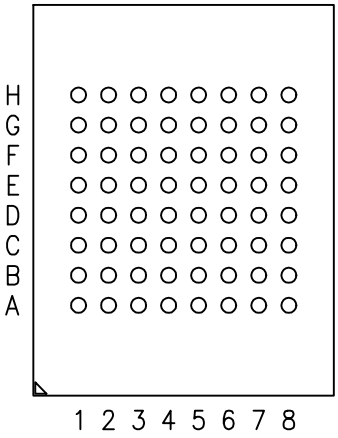
FP = FOOTPRINT

n = 24



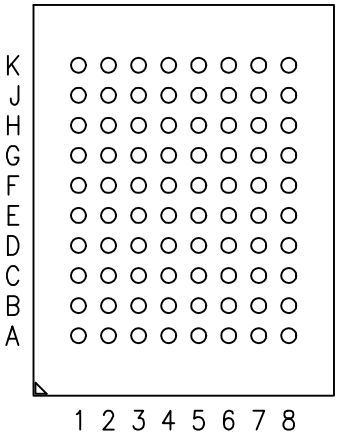
FOOTPRINT A

n = 64



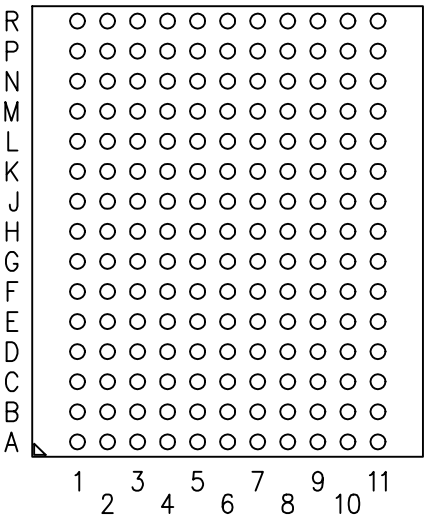
FOOTPRINT B

n = 80



FOOTPRINT C

n = 165

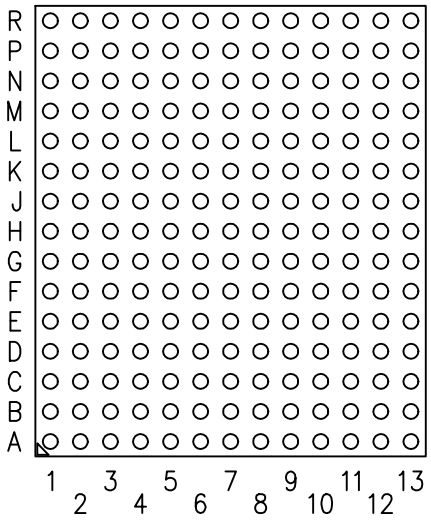


FOOTPRINT D

3 13 + = DEPOPULATED BALL POSITIONS

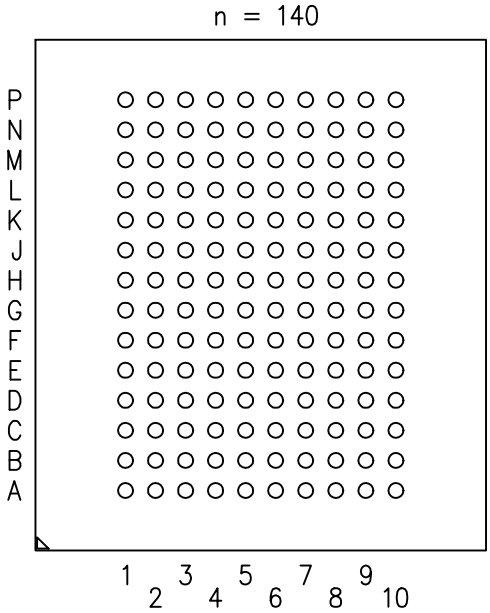
JEDEC SOLID STATE PRODUCT OUTLINE	TITLE	NUMBER	ISSUE	DATE	SHEET
	BOTTOM GRID ARRAY, BALL, 1.00 MM PITCH RECTANGULAR FAMILY	MO-234	E	JUN 2018	18 OF 24

n = 195



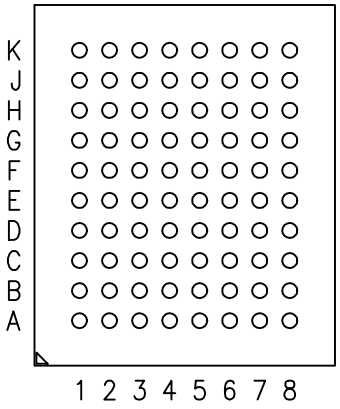
FOOTPRINT E

n = 140



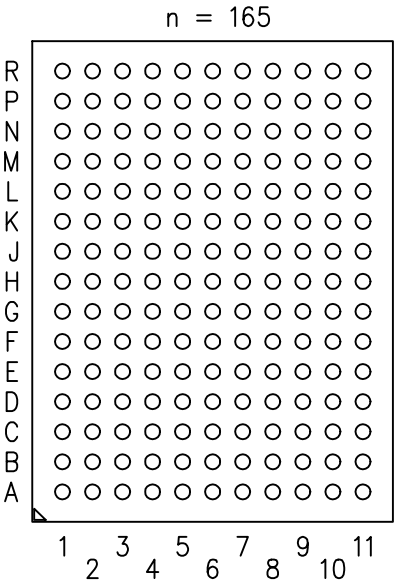
FOOTPRINT F

n = 80



FOOTPRINT G

n = 165

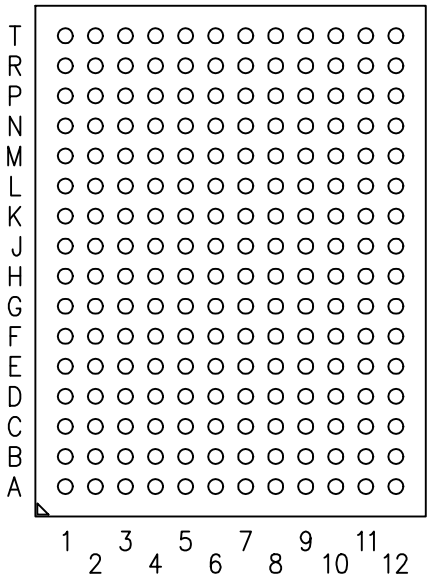


FOOTPRINT H

3 13 + = DEPOPULATED BALL POSITIONS

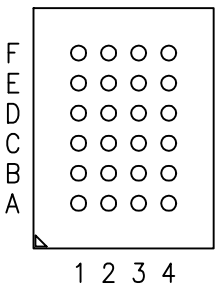
JEDEC SOLID STATE PRODUCT OUTLINE	TITLE	NUMBER	ISSUE	DATE	SHEET
	BOTTOM GRID ARRAY, BALL, 1.00 MM PITCH RECTANGULAR FAMILY	MO-234	E	JUN 2018	19 OF 24

n = 192



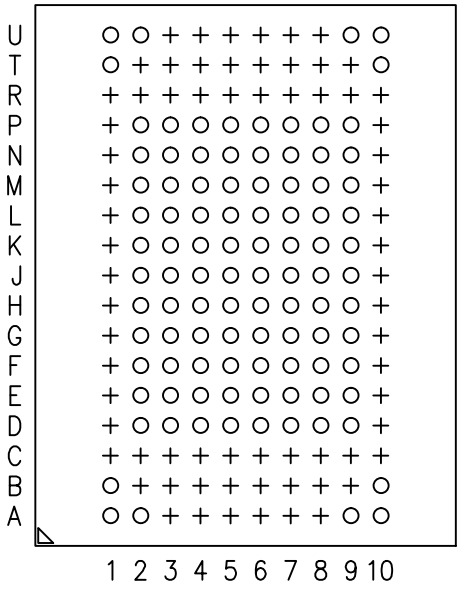
FOOTPRINT I

n = 24



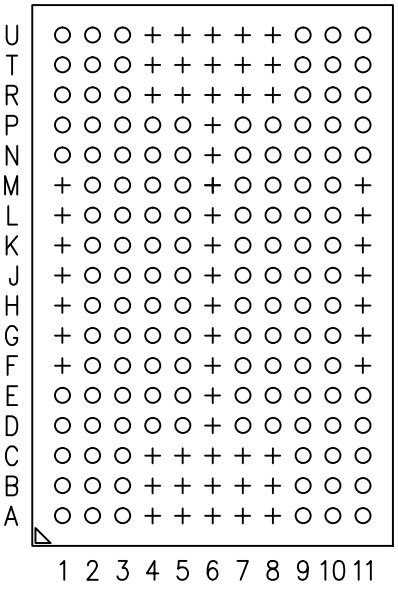
FOOTPRINT J

n=100 BALLS



FOOTPRINT K

n=132 BALLS

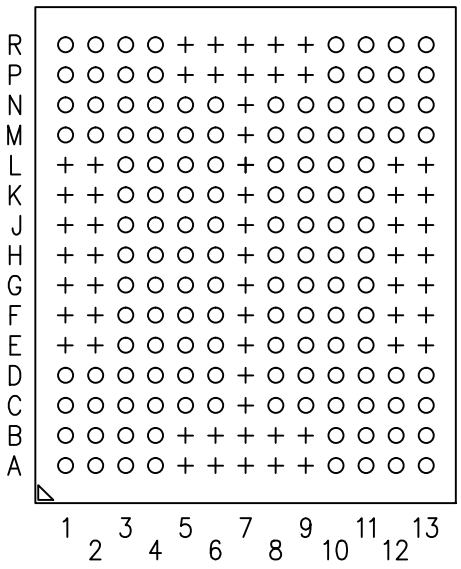


FOOTPRINT L

3 13 + = DEPOPULATED BALL POSITIONS

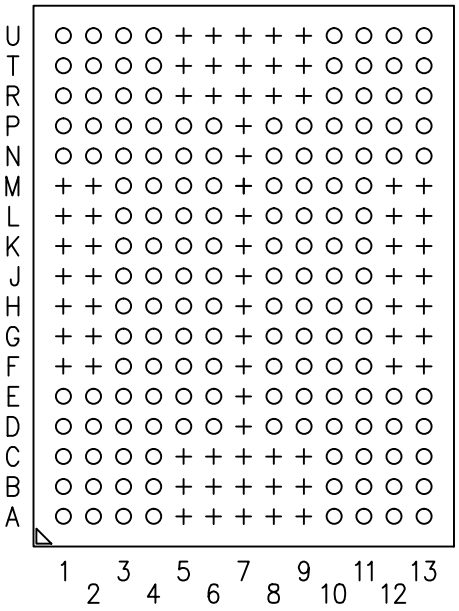
JEDEC SOLID STATE PRODUCT OUTLINE Copyright © 2018 JEDEC	TITLE: BOTTOM GRID ARRAY, BALL, 1.00 MM PITCH RECTANGULAR FAMILY	NUMBER: MO-234	ISSUE: E	DATE: JUN 2018	SHEET: 20 OF 24

n=136 BALLS



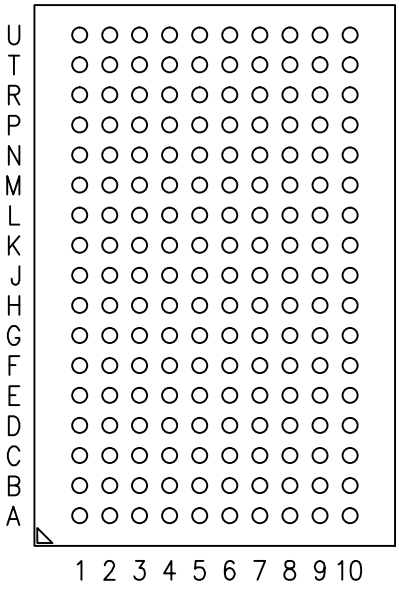
FOOTPRINT M

n=152 BALLS



FOOTPRINT N

n=170 BALLS



FOOTPRINT P

3 13 + = DEPOPULATED BALL POSITIONS

JEDEC SOLID STATE PRODUCT OUTLINE	TITLE	NUMBER	ISSUE	DATE	SHEET
	BOTTOM GRID ARRAY, BALL, 1.00 MM PITCH RECTANGULAR FAMILY	MO-234	E	JUN 2018	21 OF 24

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5–2009.
   THIS OUTLINE CONFORMS TO JEP95, SECTION 4.14.

2. ALL DIMENSIONS ARE IN MILLIMETERS.

3 SOLDER BALL POSITION DESIGNATION PER JEP95 SECTION 3, SPP–010.

4. e REPRESENTS THE SOLDER BALL GRID PITCH.

5. MD AND ME REPRESENT THE MAXIMUM MATRIX SIZE CORRESPONDING TO THE D AND E DIRECTIONS RESPECTIVELY.

6. n REPRESENTS THE ACTUAL NUMBER OF SOLDER BALLS AFTER DEPOPLUATION.
   N REPRESENTS THE MAXIMUM NUMBER OF SOLDER BALLS FOR A FULL MATRIX, MD X ME.

7 A FULLY POPULATED 14 X 16 MATRIX SIZE IS SHOWN FOR ILLUSTRATION ONLY.

8 DIMENSION "A" INCLUDES STAND–OFF HEIGHT "A1", PACKAGE BODY THICKNESS AND LID HEIGHT, BUT DOES NOT INCLUDE ATTACHED FEATURES, e.g., EXTERNAL HEATSINK. AN INTEGRAL HEATSLUG IS NOT CONSIDERED AN ATTACHED FEATURE.

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

10 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.

11 THE TERMINAL A1 CORNER 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.

12 DIMENSIONS SD AND SE ARE MEASURED WITH RESPECT TO DATUMS A AND B AND DEFINE THE POSITION OF THE CENTER SOLDER BALLS.
WHEN THERE IS AN ODD NUMBER OF SOLDER BALLS, SD OR SE = 0.00.
WHEN THERE IS IS AN EVEN NUMBER OF SOLDER BALLS, SD OR SE = e/2.

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

14 THE 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 ELLIPITACL PROVIDED THE RATIO OF THE MAJOR TO MINOR AXES IS NO GREATER THAN 2/1, AND THE SURFACE AREA IS NO LESS THEN THE MINIMUM FOR A CIRCULAR PAD. FOR TYPE 2 DESIGNS, EXPOSED COPPER TRACES ARE PERMITTED OUTSIDE THE b1 PAD AREA.

NOTES CONTINUED:

15 FOR GLOB TOP AND FLIP CHIP CONFIGURATIONS, PARALLELISM (ccc) APPLIES ONLY TO THE SURFACE DIRECTLY ABOVE THE DIE AREA. THE PARALLELISM SPECIFICALLY WILL NOT APPLY TO ANY FILLET OR SLOPED REGION OF THE ENCAPSULANT.

16 VARIOUS COMPANIES HAVE ISSUED PATENTS AND RELATED PATENT APPLICATIONS THAT MAY APPLY TO THIS REGISTRATION. IF THE CURRENT ISSUE PATENTS OR LATER PATENTS RESULTING FROM RELATED APPLICATIONS DO APPLY, THESE COMPANIES INTEND TO COMPLY WITH THE JEDEC PATENT POLICY AND LICENSE UNDER REASONABLE TERMS AND CONDITIONS THAT ARE DEMONSTRABLY FREE OF ANY UNFAIR DISCRIMINATION. REFERENCED PATENTS ARE AS FOLLOWS.

NATIONAL	US PATENT NO.: 4688152, 4778641, AND 4868349
CITIZEN	US PATENT NO.: 4822550 AND 4935581

17 EXPLANATION OF VARIATION SCHEME.
PACKAGE PROFILE HEIGHT IS THE MAXIMUM PACKAGE THICKNESS. THE VALUES OF "A" IN TABLE 1 ARE NOT THE TOLERANCE OF THE PACKAGE. IT IS THE RANGE OF THE PACKAGE THICKNESS FOR THE PACKAGE TO BE IN THE DESIGNATED PROFILE HEIGHT CODE.

PDD.DDxEE.EE–eb–nF

P = PACKAGE PROFILE HEIGHT CODE (DIMENSION A).
CONTINUES AS PER SPP–025
140 = 1.30 < A ≤ 1.40
130 = 1.20 < A ≤ 1.30
120 = 1.10 < A ≤ 1.20
110 = 1.00 < A ≤ 1.10
100 = 0.90 < A ≤ 1.00
090 = 0.80 < A ≤ 0.90
080 = 0.70 < A ≤ 0.80
070 = 0.60 < A ≤ 0.70
CONTINUES AS PER SPP–025
DD.DD = PACKAGE BODY SIZE IN THE D DIMENSION (Y AXIS) TO 2 DECIMAL PLACES.
EE.EE = PACKAGE BODY SIZE IN THE E DIMENSION (X AXIS) TO 2 DECIMAL PLACES.
EXAMPLE: D = 55.00 mm TO BE LISTED AS 55.00.
D = 5.50 mm TO BE LISTED AS 5.50.
e = BALL PITCH PER THE FOLLOWING CODES WILL FOLLOW JESD30.
150 = 1.50 mm
127 = 1.27 mm
100 = 1.00 mm
92 = 0.92 mm
80 = 0.80 mm
75 = 0.75 mm
70 = 0.70 mm
65 = 0.65 mm
60 = 0.60 mm
50 = 0.50 mm
40 = 0.40 mm

NOTES CONTINUED:

b = NOMINAL BALL DIAMETER WILL FOLLOW JESD30.
- 75 = 0.75 mm
- 70 = 0.70 mm
- 65 = 0.65 mm
- 60 = 0.60 mm
- 55 = 0.55 mm
- 50 = 0.50 mm
- 45 = 0.45 mm
- 40 = 0.40 mm
- 35 = 0.35 mm
- 30 = 0.30 mm
- 25 = 0.25 mm
- 20 = 0.20 mm
- 17 = 0.17 mm

n = ACTUAL SOLDER BALL COUNT.
F = FOOTPRINT LETTER.

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: FEBRUARY 2002	JC11 ITEM NUMBER: 11–626

CHANGE RECORD HISTORY:

ISSUE: B	DATE: SEPTEMBER 2005	ITEM NUMBER: 11–717

LOCATION:	CHANGED FROM:	CHANGED TO:
PAGE 3, TABLE 1	NO VARIATION OPTION	VARIATION OPTION Ax, Bx
PAGE 3, TABLE 3	VARIATIONS AA, AB	ADD VARIATIONS AC, BA
PAGE 4, NOTES	NOTE 2, JESD 95–1	NOTE 2, JEP95, SECTION 3.0
PAGE 1, DESIGNATOR	R–LBGA–B	LR–PBGA

ISSUE: C	DATE: JANUARY 2017	ITEM NUMBER: 11–935

LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 1	PACKAGE DESIGNATOR: S–XBGA	PACKAGE DESIGNATOR: PBGA
ALL SHEETS		UPDATED AND REDRAWN TO CURRENT STANDARDS
SHEET 6		ADDED RECT VARIATIONS FROM MO–216

ISSUE: D	DATE: DECEMBER 2017	ITEM NUMBER: 11–944

LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 3, 4 & 5		ADDED 0.35 NOM BALL DIA DIMENSIONS IN ALL HEIGHTS
		DECREASED A2 BY 0.01 FOR 0.40 BALL DIA IN ALL HEIGHTS
SHEET 6		ADDED 0.35 NOM BALL DIA
	A1 (MIN) = 0.21 FOR 0.40 NOM BALL DIA	A1 (MIN) = 0.20 FOR 0.40 NOM BALL DIA
SHEET 8		ADDED øb = 0.35 TABLE
SHEET 9		ADDED P8.0x6.0–EK–24J VARIATION
SHEET 15		ADDED FOOTPRINT J

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.

ISSUE: E	DATE: JUNE 2018	ITEM NUMBER: 11–954

LOCATION:	CHANGED FROM:	CHANGED TO:
ALL SHEETS	BALL GRID ARRAY...	BOTTOM GRID ARRAY...
SHEET 1	PBGA	PBGA–B...I100...
SHEET 2 AND TABLE 1		ADDED DIMENSIONS A5 AND A6
SHEETS 2 & 8	TOLERANCE bbb	TOLERANCE ccc
SHEET 10, TABLE 2		ADDED 0.55 NOM BALL
SHEET 10, TABLE 3	MO–304 VALUES: aaa – 0.10 ccc – 0.20 ddd – 0.12 eee – 0.15	MO–234 VALUES: aaa – 0.20 ccc – 0.25 ddd – 0.15 eee – 0.25
SHEETS 11 – 17	VARIATION: PXX.X	VARIATION: PXX.XX
	VARIATION: ...–EL–...	VARIATION: ...–10035–...
	VARIATION: ...–EK–...	VARIATION: ...–10040–...
	VARIATION: ...–EJ–...	VARIATION: ...–10045–...
	VARIATION: ...–EH–...	VARIATION: ...–10050–...
	VARIATION: ...–EF–...	VARIATION: ...–10060–...
SHEETS 13 – 16		ADDED MO–304 VARIATIONS
SHEETS 20 & 21		ADDED FOOTPRINTS K THRU P
SHEETS 22 – 24		UPDATED NOTES TO CURRENT STANDARD FOR ALL BGA PACKAGES
SHEET 23, NOTE 17		ADDED PACKAGE PROFILE HEIGHT IS THE MAXIMUM ...
		ADDED PROFILE HEIGHT CODES
		BALL PITCH WAS LETTER CODES
		BALL DIA WAS LETTER CODES