

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 PLASTIC BOTTOM GRID
ARRAY BALL, 0.80MM PITCH
SQUARE FAMILY PACKAGE

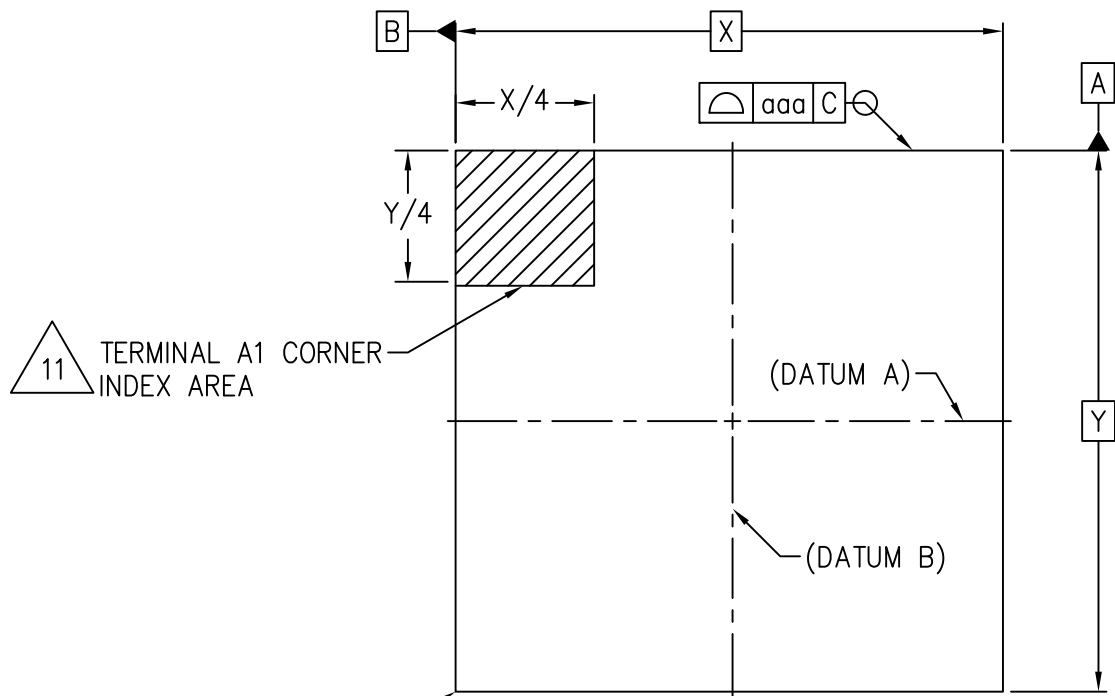
PACKAGE DESIGNATOR
PBGA-B#[#]
_I0p80...

NUMBER
MO-216

ISSUE
G

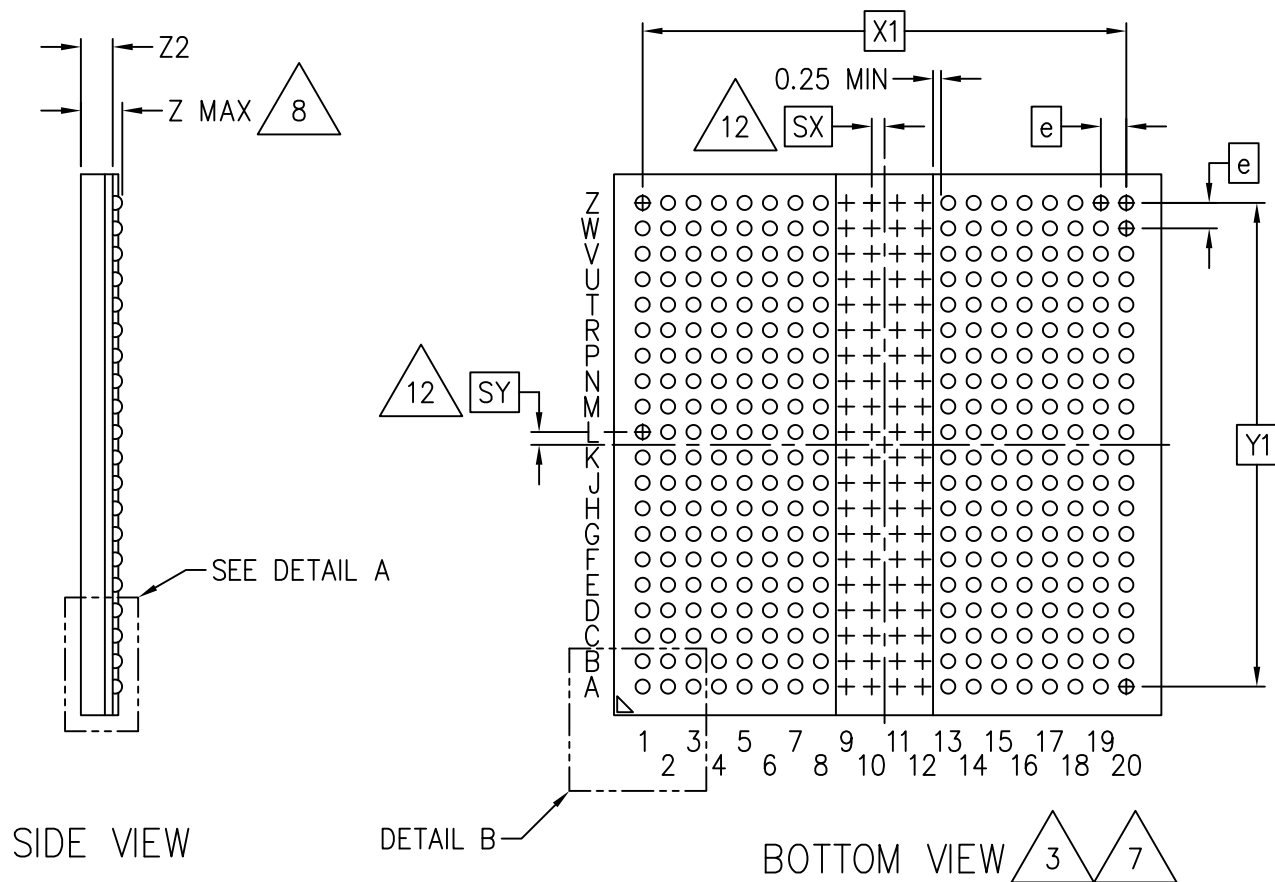
DATE
JAN 2021

SHEET
1 OF 36



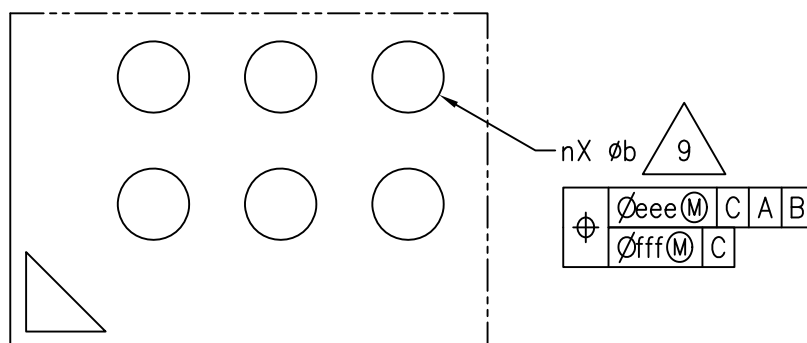
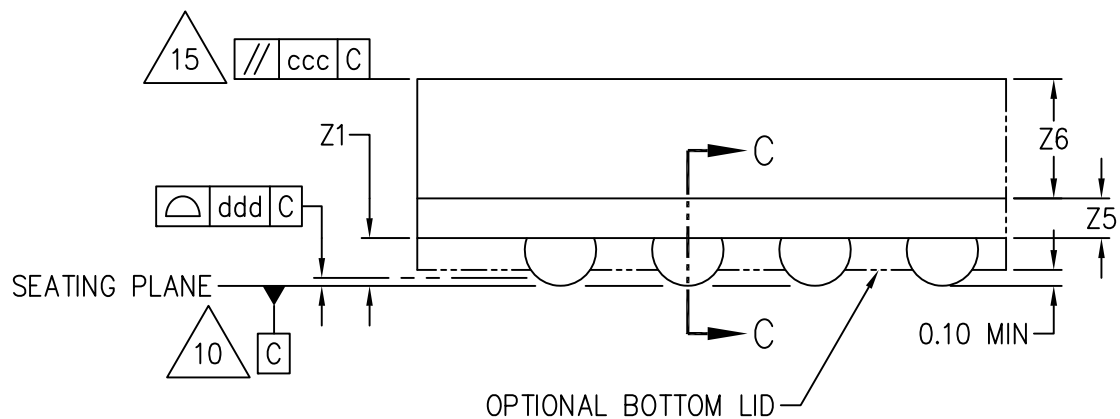
THE EXACT SHAPE AND SIZE OF EACH CORNER IS OPTIONAL

TOP VIEW

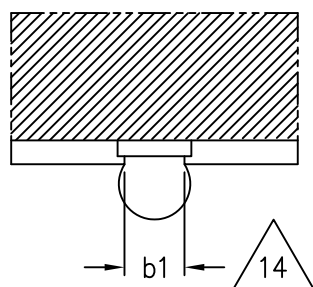


BOTTOM VIEW

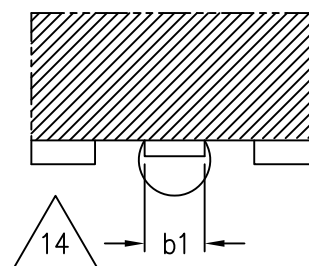
OPTIONAL BOTTOM LID VARIATION



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
	b(NOM) = 0.45	---	---	0.46	---	---	0.56
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		11-961			11-961		
ISSUE		F			F		
VARIATIONS IN THIS TABLE DO NOT MEET JEDEC PROFILE HEIGHTS DEFINED IN JESD30 AND SHOULD NOT BE USED WHEN ADDING NEW VARIATIONS.							

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
	b(NOM) = 0.45	---	---	0.66	---	---	0.76
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		11-961			11-961		
ISSUE		F			F		
VARIATIONS IN THIS TABLE DO NOT MEET JEDEC PROFILE HEIGHTS DEFINED IN JESD30 AND SHOULD NOT BE USED WHEN ADDING NEW VARIATIONS.							

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
	b(NOM) = 0.45	---	---	0.86	---	---	0.96
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		11-961			11-961		
ISSUE		F			F		
VARIATIONS IN THIS TABLE DO NOT MEET JEDEC PROFILE HEIGHTS DEFINED IN JESD30 AND SHOULD NOT BE USED WHEN ADDING NEW VARIATIONS.							

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
	b(NOM) = 0.45	---	---	1.06	---	---	1.16
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		11-961			11-961		
ISSUE		F			F		
VARIATIONS IN THIS TABLE DO NOT MEET JEDEC PROFILE HEIGHTS DEFINED IN JESD30 AND SHOULD NOT BE USED WHEN ADDING NEW VARIATIONS.							

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
	b(NOM) = 0.45	---	---	1.26	---	---	1.36
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		11-961			11-961		
ISSUE		F			F		
VARIATIONS IN THIS TABLE DO NOT MEET JEDEC PROFILE HEIGHTS DEFINED IN JESD30 AND SHOULD NOT BE USED WHEN ADDING NEW VARIATIONS.							

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
	b(NOM) = 0.45	---	---	1.46	---	---	1.56
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		11–961			11–961		
ISSUE		F			F		
VARIATIONS IN THIS TABLE DO NOT MEET JEDEC PROFILE HEIGHTS DEFINED IN JESD30 AND SHOULD NOT BE USED WHEN ADDING NEW VARIATIONS.							

TABLE 2

COMMON DIMENSIONS		
SYMBOL		
Z		PACKAGE SPECIFIC
Z2	b(NOM) = 0.450	$Z2(MAX) = Z(MAX) - Z1(0.22)$
	b(NOM) = 0.525	$Z2(MAX) = Z(MAX) - Z1(0.27)$
Z5		OPTIONAL – PACKAGE SPECIFIC
Z6		OPTIONAL – PACKAGE SPECIFIC
e		0.80 BASIC
NOTES		2, 8
REF		11–989
ISSUE		G

TABLE 3

COMMON DIMENSIONS							
SYMBOL							
		MIN	NOM	MAX	MIN	NOM	MAX
Z1		0.22	---	---	0.27	---	---
b		0.375	0.450	0.525	0.450	0.525	0.600
b1	TYPE1	0.30	---	---	0.35	---	---
	TYPE2	0.30	---	---	0.35	---	---
NOTES		2, 9			2, 9		
REF		11-961, 11-989			11-989		
ISSUE		G			G		


$$b1 = b(NOM) * 0.667$$

$$Z1(MIN) = b(MIN) * 0.60$$

TABLE 4

TOLERANCE OF FORM AND POSITION			
SYMBOL	PACKAGE TYPE	VALUE	
		ϕ b NOM = 0.450	ϕ b NOM = 0.525
aaa	---	SEE NOTE 1 BELOW	SEE NOTE 1 BELOW
ccc	ENCAPSULATED	0.20	0.20
ddd	---	0.20	0.20
eee	ENCAPSULATED	0.15	0.15
fff	---	0.08	0.08
NOTES		2	2
REF		11-564	11-989
ISSUE		D	G
NOTE 1: FOR X AND Y \leq 21.00 aaa = 0.15 FOR X AND Y $>$ 21.00 aaa = 0.20			

TABLE 5

VARIATIONS $\phi_b = 0.450$ MM NOMINAL														
NEW VARIATION 	OLD VARIATION	X BASIC	Y BASIC	X1 BASIC	Y1 BASIC	MX	MY	SX BASIC	SY BASIC	n	N	TERMINAL PATTERN	REF	ISSUE
*P6.00x6.00–8045–36A	BBA–2	6.00	6.00	4.00	4.00	6	6	0.40	0.40	36	36	A	11–961	F
PBGA–B36[36]_I0p8– R6p0x6p0Z#–C0p525Z0p22	–	6.00	6.00	4.00	4.00	6	6	0.40	0.40	36	36	A	11–989	G
*P6.00x6.00–8045–49B	BBA–1	6.00	6.00	4.80	4.80	7	7	0.00	0.00	49	49	B	11–961	F
PBGA–B49[49]_I0p8– R6p0x6p0Z#–C0p525Z0p22	–	6.00	6.00	4.80	4.80	7	7	0.00	0.00	49	49	B	11–989	G
*P7.00x7.00–8045–49B	BAB–2	7.00	7.00	4.80	4.80	7	7	0.00	0.00	49	49	B	11–961	F
PBGA–B49[49]_I0p8– R7p0x7p0Z#–C0p525Z0p22	–	7.00	7.00	4.80	4.80	7	7	0.00	0.00	49	49	B	11–989	G
*P7.00x7.00–8045–64C	BAB–1	7.00	7.00	5.60	5.60	8	8	0.40	0.40	64	64	C	11–961	F
PBGA–B64[64]_I0p8– R7p0x7p0Z#–C0p525Z0p22	–	7.00	7.00	5.60	5.60	8	8	0.40	0.40	64	64	C	11–989	G
*P8.00x8.00–8045–64C	BAC–2	8.00	8.00	5.60	5.60	8	8	0.40	0.40	64	64	C	11–961	F
PBGA–B64[64]_I0p8– R8p0x8p0Z#–C0p525Z0p22	–	8.00	8.00	5.60	5.60	8	8	0.40	0.40	64	64	C	11–989	G
*P8.00x8.00–8045–81D	BAC–1	8.00	8.00	6.40	6.40	9	9	0.00	0.00	81	81	D	11–961	F
PBGA–B81[81]_I0p8– R8p0x8p0Z#–C0p525Z0p22	–	8.00	8.00	6.40	6.40	9	9	0.00	0.00	81	81	D	11–989	G
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

NOTE:


FOR VARIATIONS THAT BEGIN WITH *, SEE SPP–025 ISSUE C FOR EXPLANATION OF VARIATION SCHEME.

THIS VARIATION SCHEME HAS BEEN REPLACED BY JESD30.

1.00 MM PITCH RECTANGULAR VARIATIONS CAA–1 THRU CAD–1 HAVE MOVED TO MO–234.

1.00 MM PITCH SQUARE VARIATIONS AAA–1 THRU AAY–1 AND AAA–2 THRU AAY–2 HAVE MOVED TO MO–331.

TABLE 5 CONTINUED

VARIATIONS $\phi_b = 0.450$ MM NOMINAL														
NEW VARIATION 	OLD VARIATION	X BASIC	Y BASIC	X1 BASIC	Y1 BASIC	MX	MY	SX BASIC	SY BASIC	n	N	TERMINAL PATTERN	REF	ISSUE
*P9.00x9.00–8045–81D	BAD–2	9.00	9.00	6.40	6.40	9	9	0.00	0.00	81	81	D	11–961	F
PBGA–B81[81]_I0p8– R9p0x9p0Z#–C0p525Z0p22	–	9.00	9.00	6.40	6.40	9	9	0.00	0.00	81	81	D	11–989	G
*P9.00x9.00–8045–100E	BAD–1	9.00	9.00	7.20	7.20	10	10	0.40	0.40	100	100	E	11–961	F
PBGA–B100[100]_I0p8– R9p0x9p0Z#–C0p525Z0p22	–	9.00	9.00	7.20	7.20	10	10	0.40	0.40	100	100	E	11–989	G
*P10.00x10.00–8045–121F	BAE–2	10.00	10.00	8.00	8.00	11	11	0.00	0.00	121	121	F	11–961	F
PBGA–B121[121]_I0p8– R10p0x10p0Z#–C0p525Z0p22	–	10.00	10.00	7.20	7.20	10	10	0.40	0.40	100	100	E	11–989	G
*P10.00x10.00–8045–144G	BAE–1	10.00	10.00	8.80	8.80	12	12	0.40	0.40	144	144	G	11–961	F
PBGA–B144[144]_I0p8– R10p0x10p0Z#–C0p525Z0p22	–	10.00	10.00	8.80	8.80	12	12	0.40	0.40	144	144	G	11–989	G
*P11.00x11.00–8045–144G	BAF–2	11.00	11.00	8.80	8.80	12	12	0.40	0.40	144	144	G	11–961	F
PBGA–B144[144]_I0p8– R11p0x11p0Z#–C0p525Z0p22	–	11.00	11.00	8.80	8.80	12	12	0.40	0.40	144	144	G	11–989	G
*P11.00x11.00–8045–169H	BAF–1	11.00	11.00	9.60	9.60	13	13	0.00	0.00	169	169	H	11–961	F
PBGA–B169[169]_I0p8– R11p0x11p0Z#–C0p525Z0p22	–	11.00	11.00	9.60	9.60	13	13	0.00	0.00	169	169	H	11–989	G
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

NOTE:


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1.00 MM PITCH SQUARE VARIATIONS AAA–1 THRU AAY–1 AND AAA–2 THRU AAY–2 HAVE MOVED TO MO–331.

TABLE 5 CONTINUED

VARIATIONS $\phi_b = 0.450$ MM NOMINAL														
NEW VARIATION 	OLD VARIATION	X BASIC	Y BASIC	X1 BASIC	Y1 BASIC	MX	MY	SX BASIC	SY BASIC	n	N	TERMINAL PATTERN	REF	ISSUE
*P12.00x12.00–8045–169H	BAG–2	12.00	12.00	9.60	9.60	13	13	0.00	0.00	169	169	H	11–961	F
PBGA–B169[169]_I0p8– R12p0x12p0Z#–C0p525Z0p22	–	12.00	12.00	9.60	9.60	13	13	0.00	0.00	169	169	H	11–989	G
*P12.00x12.00–8045–196I	BAG–1	12.00	12.00	10.40	10.40	14	14	0.40	0.40	196	196	I	11–961	F
PBGA–B196[196]_I0p8– R12p0x12p0Z#–C0p525Z0p22	–	12.00	12.00	10.40	10.40	14	14	0.40	0.40	196	196	I	11–989	G
*P13.00x13.00–8045–196I	BAH–2	13.00	13.00	10.40	10.40	14	14	0.40	0.40	196	196	I	11–961	F
PBGA–B196[196]_I0p8– R13p0x13p0Z#–C0p525Z0p22	–	13.00	13.00	10.40	10.40	14	14	0.40	0.40	196	196	I	11–989	G
*P13.00x13.00–8045–225J	BAH–1	13.00	13.00	11.20	11.20	15	15	0.00	0.00	225	225	J	11–961	F
PBGA–B225[225]_I0p8– R13p0x13p0Z#–C0p525Z0p22	–	13.00	13.00	11.20	11.20	15	15	0.00	0.00	225	225	J	11–989	G
*P14.00x14.00–8045–256K	BAJ–2	14.00	14.00	12.00	12.00	16	16	0.40	0.40	256	256	K	11–961	F
PBGA–B256[256]_I0p8– R14p0x14p0Z#–C0p525Z0p22	–	14.00	14.00	11.20	11.20	16	16	0.40	0.40	256	256	K	11–989	G
*P14.00x14.00–8045–289L	BAJ–1	14.00	14.00	12.80	12.80	17	17	0.00	0.00	289	289	L	11–961	F
PBGA–B289[289]_I0p8– R14p0x14p0Z#–C0p525Z0p22	–	14.00	14.00	12.80	12.80	17	17	0.00	0.00	289	289	L	11–989	G
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		


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1.00 MM PITCH SQUARE VARIATIONS AAA–1 THRU AAY–1 AND AAA–2 THRU AAY–2 HAVE MOVED TO MO–331.

TABLE 5 CONTINUED

VARIATIONS $\phi_b = 0.450$ MM NOMINAL														
NEW VARIATION 	OLD VARIATION	X BASIC	Y BASIC	X1 BASIC	Y1 BASIC	MX	MY	SX BASIC	SY BASIC	n	N	TERMINAL PATTERN	REF	ISSUE
*P15.00x15.00–8045–289L	BAK–2	15.00	15.00	12.80	12.80	17	17	0.00	0.00	289	289	L	11–961	F
PBGA–B289[289]_I0p8– R15p0x15p0Z#–C0p525Z0p22	–	15.00	15.00	12.80	12.80	17	17	0.00	0.00	289	289	L	11–989	G
*P15.00x15.00–8045–324M	BAK–1	15.00	15.00	13.60	13.60	18	18	0.40	0.40	324	324	M	11–961	F
PBGA–B324[324]_I0p8– R15p0x15p0Z#–C0p525Z0p22	–	15.00	15.00	13.60	13.60	18	18	0.40	0.40	324	324	M	11–989	G
*P16.00x16.00–8045–324M	BAL–2	16.00	16.00	13.60	13.60	18	18	0.40	0.40	324	324	M	11–961	F
PBGA–B324[324]_I0p8– R16p0x16p0Z#–C0p525Z0p22	–	16.00	16.00	13.60	13.60	18	18	0.40	0.40	324	324	M	11–989	G
*P16.00x16.00–8045–361N	BAL–1	16.00	16.00	14.40	14.40	19	19	0.00	0.00	361	361	N	11–961	F
PBGA–B361[361]_I0p8– R16p0x16p0Z#–C0p525Z0p22	–	16.00	16.00	14.40	14.40	19	19	0.00	0.00	361	361	M	11–989	G
*P17.00x17.00–8045–361N	BAM–2	17.00	17.00	14.40	14.40	19	19	0.00	0.00	361	361	N	11–961	F
PBGA–B361[361]_I0p8– R17p0x17p0Z#–C0p525Z0p22	–	17.00	17.00	14.40	14.40	19	19	0.00	0.00	361	361	N	11–989	G
*P17.00x17.00–8045–4000	BAM–1	17.00	17.00	15.20	15.20	20	20	0.40	0.40	400	400	O	11–961	F
PBGA–B400[400]_I0p8– R17p0x17p0Z#–C0p525Z0p22	–	17.00	17.00	15.20	15.20	20	20	0.40	0.40	400	400	O	11–989	G
NOTES			2	2	2		5	5	2, 12	6, 13	6	13		

NOTE:


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1.00 MM PITCH SQUARE VARIATIONS AAA–1 THRU AAY–1 AND AAA–2 THRU AAY–2 HAVE MOVED TO MO–331.

TABLE 5 CONTINUED

VARIATIONS $\phi_b = 0.450$ MM NOMINAL														
NEW VARIATION 	OLD VARIATION	X BASIC	Y BASIC	X1 BASIC	Y1 BASIC	MX	MY	SX BASIC	SY BASIC	n	N	TERMINAL PATTERN	REF	ISSUE
*P18.00x18.00–8045–441P	BAN–2	18.00	18.00	16.00	16.00	21	21	0.00	0.00	441	441	P	11–961	F
PBGA–B441[441]_I0p8– R18p0x18p0Z#–C0p525Z0p22	–	18.00	18.00	16.00	16.00	21	21	0.00	0.00	441	442	P	11–989	G
*P18.00x18.00–8045–484Q	BAN–1	18.00	18.00	16.80	16.80	22	22	0.40	0.40	484	484	Q	11–961	F
PBGA–B484[484]_I0p8– R18p0x18p0Z#–C0p525Z0p22	–	18.00	18.00	16.80	16.80	22	22	0.40	0.40	484	484	Q	11–989	G
*P19.00x19.00–8045–484Q	BAP–2	19.00	19.00	16.80	16.80	22	22	0.40	0.40	484	484	Q	11–961	F
PBGA–B484[484]_I0p8– R19p0x19p0Z#–C0p525Z0p22	–	19.00	19.00	16.80	16.80	22	22	0.40	0.40	484	484	Q	11–989	G
*P19.00x19.00–8045–529R	BAP–1	19.00	19.00	17.60	17.60	23	23	0.00	0.00	529	529	R	11–961	F
PBGA–B529[529]_I0p8– R19p0x19p0Z#–C0p525Z0p22	–	19.00	19.00	17.60	17.60	23	23	0.00	0.00	529	529	R	11–989	G
*P20.00x20.00–8045–529R	BAR–2	20.00	20.00	17.60	17.60	23	23	0.00	0.00	529	529	R	11–961	F
PBGA–B529[529]_I0p8– R20p0x20p0Z#–C0p525Z0p22	–	20.00	20.00	17.60	17.60	23	23	0.00	0.00	529	529	R	11–989	G
*P20.00x20.00–8045–576S	BAR–1	20.00	20.00	18.40	18.40	24	24	0.40	0.40	576	576	S	11–961	F
PBGA–B576[576]_I0p8– R20p0x20p0Z#–C0p525Z0p22	–	20.00	20.00	18.40	18.40	24	24	0.40	0.40	576	576	S	11–989	G
NOTES			2	2	2		5	5	2, 12	6, 13	6	13		


NOTE:

FOR VARIATIONS THAT BEGIN WITH *, SEE SPP–025 ISSUE C FOR EXPLANATION OF VARIATION SCHEME.
THIS VARIATION SCHEME HAS BEEN REPLACED BY JESD30.

1.00 MM PITCH RECTANGULAR VARIATIONS CAA–1 THRU CAD–1 HAVE MOVED TO MO–234.

1.00 MM PITCH SQUARE VARIATIONS AAA–1 THRU AAY–1 AND AAA–2 THRU AAY–2 HAVE MOVED TO MO–331.

TABLE 5 CONTINUED

VARIATIONS $\phi_b = 0.450$ MM NOMINAL														
NEW VARIATION 	OLD VARIATION	X BASIC	Y BASIC	X1 BASIC	Y1 BASIC	MX	MY	SX BASIC	SY BASIC	n	N	TERMINAL PATTERN	REF	ISSUE
*P21.00x21.00–8045–576S	BAS–2	21.00	21.00	18.40	18.40	24	24	0.40	0.40	576	576	S	11–961	F
PBGA–B576[576]_I0p8– R21p0x21p0Z#–C0p525Z0p22	–	21.00	21.00	18.40	18.40	24	24	0.40	0.40	576	576	S	11–989	G
*P21.00x21.00–8045–625T	BAS–1	21.00	21.00	19.20	19.20	25	25	0.00	0.00	625	625	T	11–961	F
PBGA–B625[625]_I0p8– R21p0x21p0Z#–C0p525Z0p22	–	21.00	21.00	19.20	19.20	25	25	0.00	0.00	625	625	T	11–989	G
*P22.00x22.00–8045–676U	BAT–2	22.00	22.00	20.00	20.00	26	26	0.40	0.40	676	676	U	11–961	F
PBGA–B625[625]_I0p8– R22p0x22p0Z#–C0p525Z0p22	–	22.00	22.00	20.00	20.00	26	26	0.40	0.40	676	676	U	11–989	G
*P22.00x22.00–8045–729V	BAT–1	22.00	22.00	20.80	20.80	27	27	0.00	0.00	729	729	V	11–961	F
PBGA–B729[729]_I0p8– R22p0x22p0Z#–C0p525Z0p22	–	22.00	22.00	20.80	20.80	27	27	0.00	0.00	729	729	V	11–989	G
*P23.00x23.00–8045–729V	BAU–2	23.00	23.00	20.80	20.80	27	27	0.00	0.00	729	729	V	11–961	F
PBGA–B729[729]_I0p8– R23p0x23p0Z#–C0p525Z0p22	–	23.00	23.00	20.80	20.80	27	27	0.00	0.00	729	729	V	11–989	G
*P23.00x23.00–8045–784W	BAU–1	23.00	23.00	21.60	21.60	28	28	0.40	0.40	784	784	W	11–961	F
PBGA–B784[784]_I0p8– R23p0x23p0Z#–C0p525Z0p22	–	23.00	23.00	21.60	21.60	28	28	0.40	0.40	784	784	W	11–989	G
NOTES			2	2	2		5	5	2, 12	6, 13	6	13		


NOTE:

FOR VARIATIONS THAT BEGIN WITH *, SEE SPP–025 ISSUE C FOR EXPLANATION OF VARIATION SCHEME.
THIS VARIATION SCHEME HAS BEEN REPLACED BY JESD30.

1.00 MM PITCH RECTANGULAR VARIATIONS CAA–1 THRU CAD–1 HAVE MOVED TO MO–234.

1.00 MM PITCH SQUARE VARIATIONS AAA–1 THRU AAY–1 AND AAA–2 THRU AAY–2 HAVE MOVED TO MO–331.

TABLE 5 CONTINUED

VARIATIONS $\phi_b = 0.450$ MM NOMINAL														
NEW VARIATION 	OLD VARIATION	X BASIC	Y BASIC	X1 BASIC	Y1 BASIC	MX	MY	SX BASIC	SY BASIC	n	N	TERMINAL PATTERN	REF	ISSUE
*P24.00x24.00–8045–784W	BAV–2	24.00	24.00	21.90	21.90	28	28	0.40	0.40	784	784	W	11–961	F
PBGA–B784[784]_I0p8– R24p0x24p0Z#–C0p525Z0p22	–	24.00	24.00	21.90	21.90	28	28	0.40	0.40	784	784	W	11–989	G
*P24.00x24.00–8045–841X	BAV–1	24.00	24.00	22.40	22.40	29	29	0.00	0.00	841	841	X	11–961	F
PBGA–B841[841]_I0p8– R24p0x24p0Z#–C0p525Z0p22	–	24.00	24.00	22.40	22.40	29	29	0.00	0.00	841	841	X	11–989	G
*P25.00x25.00–8045–900Y	BAW–2	25.00	25.00	23.20	23.20	30	30	0.40	0.40	900	900	Y	11–961	F
PBGA–B900[900]_I0p8– R25p0x25p0Z#–C0p525Z0p22	–	25.00	25.00	23.20	23.20	30	30	0.40	0.40	900	900	Y	11–989	G
*P25.00x25.00–8045–961Z	BAW–1	25.00	25.00	24.00	24.00	31	31	0.00	0.00	961	961	Z	11–961	G
PBGA–B961[961]_I0p8– R25p0x25p0Z#–C0p525Z0p22	–	25.00	25.00	24.00	24.00	31	31	0.00	0.00	961	961	Z	11–989	G
P26.00x26.00–8045–961Z	BAX–2	26.00	26.00	24.00	24.00	31	31	0.00	0.00	961	961	Z	11–961	F
PBGA–B961[961]_I0p8– R26p0x26p0Z#–C0p525Z0p22	–	26.00	26.00	24.00	24.00	31	31	0.00	0.00	961	961	Z	11–989	G
P26.00x26.00–8045–1024AA	BAX–1	26.00	26.00	24.80	24.80	32	32	0.40	0.40	1024	1024	AA	11–961	F
PBGA–B1024[1024]_I0p8– R26p0x26p0Z#–C0p525Z0p22	–	26.00	26.00	24.80	24.80	32	32	0.40	0.40	1024	1024	AA	11–989	G
NOTES			2	2	2		5	5	2, 12	6, 13	6	13		


NOTE:

FOR VARIATIONS THAT BEGIN WITH *, SEE SPP–025 ISSUE C FOR EXPLANATION OF VARIATION SCHEME.
THIS VARIATION SCHEME HAS BEEN REPLACED BY JESD30.

1.00 MM PITCH RECTANGULAR VARIATIONS CAA–1 THRU CAD–1 HAVE MOVED TO MO–234.

1.00 MM PITCH SQUARE VARIATIONS AAA–1 THRU AAY–1 AND AAA–2 THRU AAY–2 HAVE MOVED TO MO–331.

TABLE 5 CONTINUED

VARIATIONS $\phi_b = 0.450$ MM NOMINAL														
NEW VARIATION 	OLD VARIATION	X BASIC	Y BASIC	X1 BASIC	Y1 BASIC	MX	MY	SX BASIC	SY BASIC	n	N	TERMINAL PATTERN	REF	ISSUE
P27.00x27.00-8045-1024AA	BAY-2	27.00	27.00	24.80	24.80	32	32	0.40	0.40	1024	1024	AA	11-961	F
PBGA-B1024[1024]_I0p8-R27p0x27p0Z#-C0p525Z0p22	-	27.00	27.00	24.80	24.80	32	32	0.40	0.40	1024	1024	AA	11-989	G
P27.00x27.00-8045-1089AB	BAY-1	27.00	27.00	25.60	25.60	33	33	0.00	0.00	1089	1089	AB	11-961	F
PBGA-B1089[1089]_I0p8-R27p0x27p0Z#-C0p525Z0p22	-	27.00	27.00	25.60	25.60	33	33	0.00	0.00	1089	1089	AA	11-989	G
NOTES			2	2	2		5	5	2, 12	6, 13	6	13		

NOTE:


FOR VARIATIONS THAT BEGIN WITH *, SEE SPP-025 ISSUE C FOR EXPLANATION OF VARIATION SCHEME.

THIS VARIATION SCHEME HAS BEEN REPLACED BY JESD30.

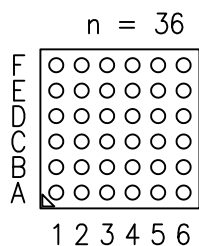
1.00 MM PITCH RECTANGULAR VARIATIONS CAA-1 THRU CAD-1 HAVE MOVED TO MO-234.

1.00 MM PITCH SQUARE VARIATIONS AAA-1 THRU AAY-1 AND AAA-2 THRU AAY-2 HAVE MOVED TO MO-331.

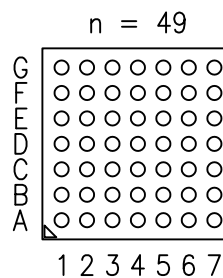
VARIATIONS $\phi_b = 0.525$ MM NOMINAL

VARIATIONS $\phi b = 0.525$ MM NOMINAL														
NEW VARIATION 	OLD VARIATION	X BASIC	Y BASIC	X1 BASIC	Y1 BASIC	MX	MY	SX BASIC	SY BASIC	n	N	TERMINAL PATTERN	REF	ISSUE
PBGA-B178[225]_I0p8-R24p0x24p0Z#-C0p6Z0p27	—	13.50	13.50	11.20	11.20	15	15	0.00	0.00	178	225	AC	11-989	G
NOTES			2	2	2		5	5	2, 12	6, 13	6	13		

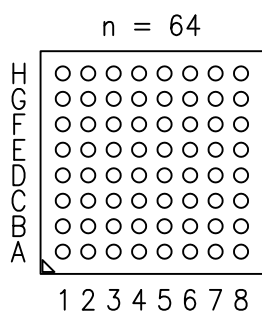
1.00 MM PITCH SQUARE VARIATIONS AAA-1 THRU AAY-1 AND AAA-2 THRU AAY-2 HAVE MOVED TO MO-331.



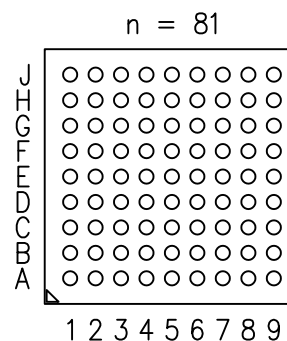
TERMINAL PATTERN A



TERMINAL PATTERN B



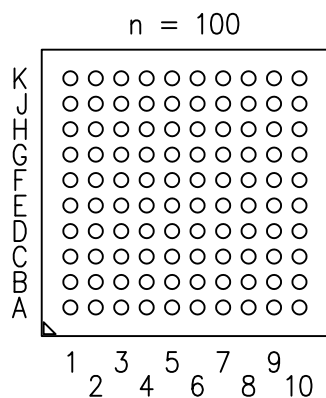
TERMINAL PATTERN C



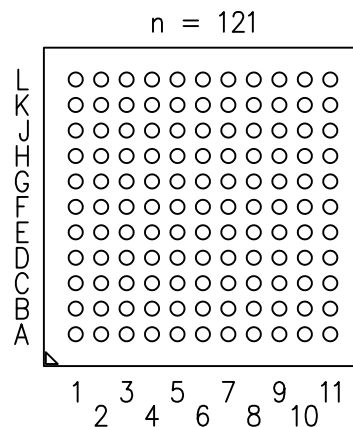
TERMINAL PATTERN D



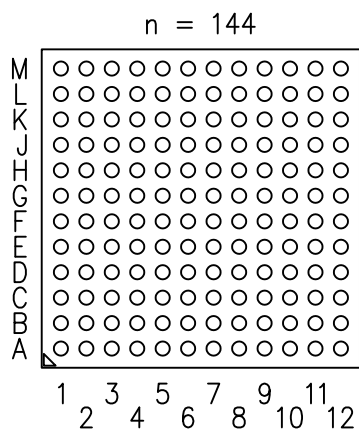
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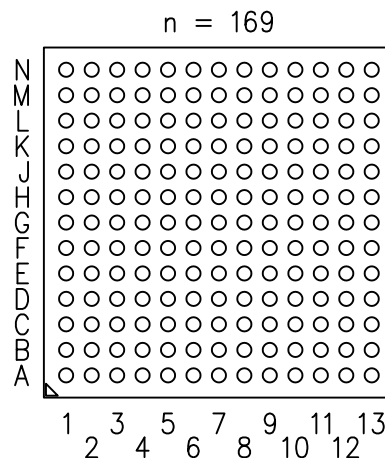
TERMINAL PATTERN E



TERMINAL PATTERN F



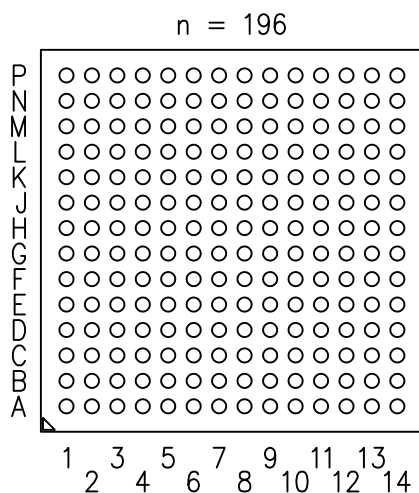
TERMINAL PATTERN G



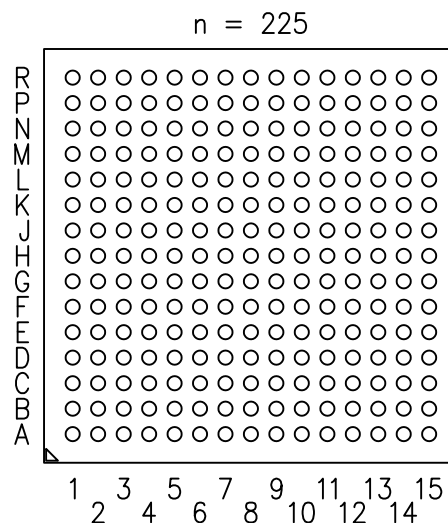
TERMINAL PATTERN H



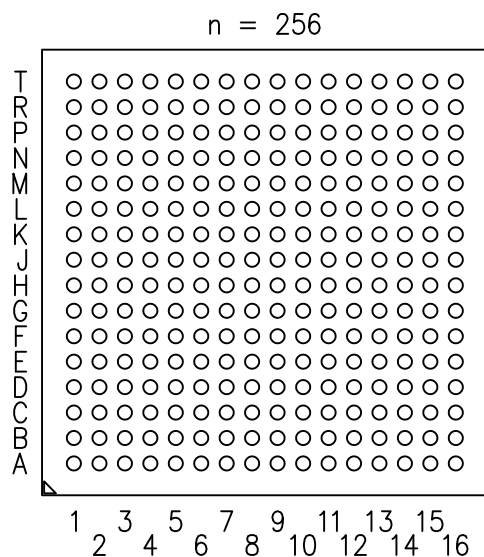
+ = DEPOPULATED BALL POSITIONS



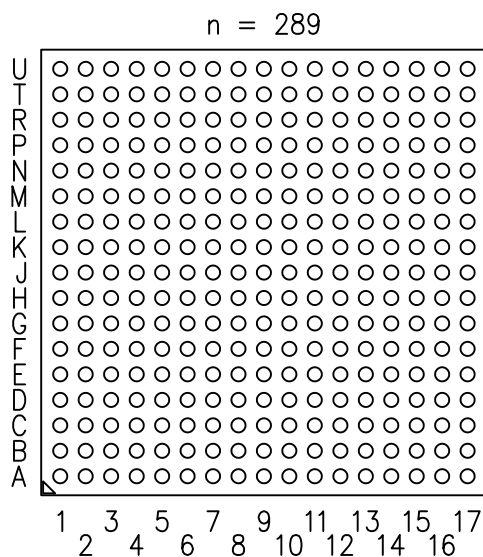
TERMINAL PATTERN I



TERMINAL PATTERN J



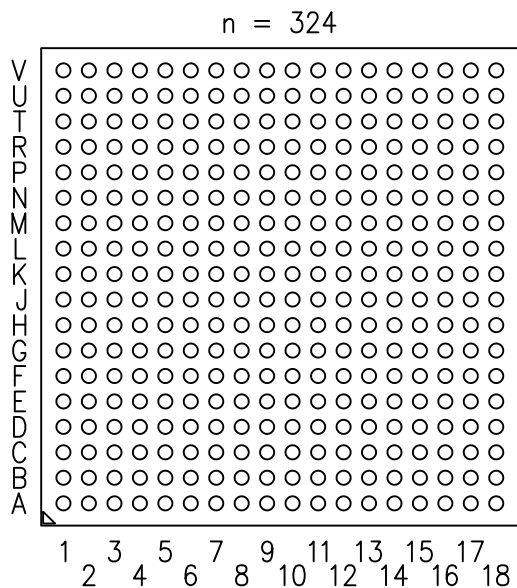
TERMINAL PATTERN K



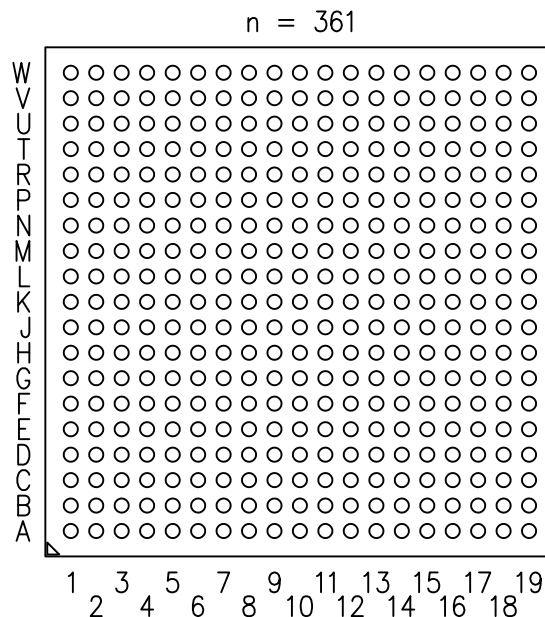
TERMINAL PATTERN L



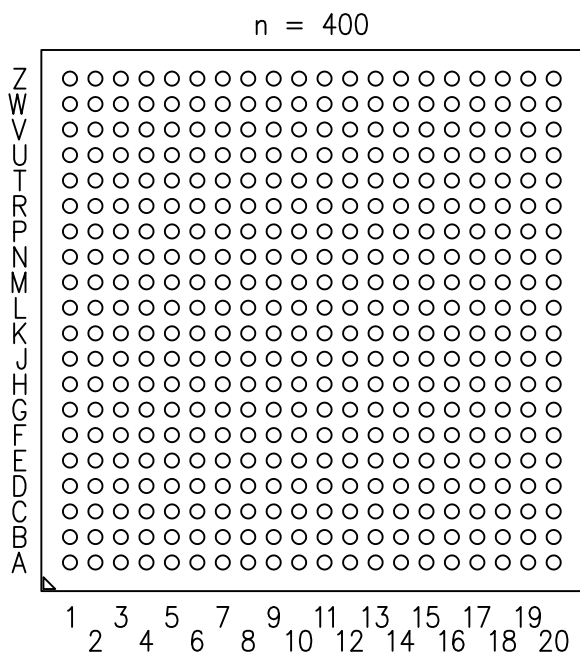
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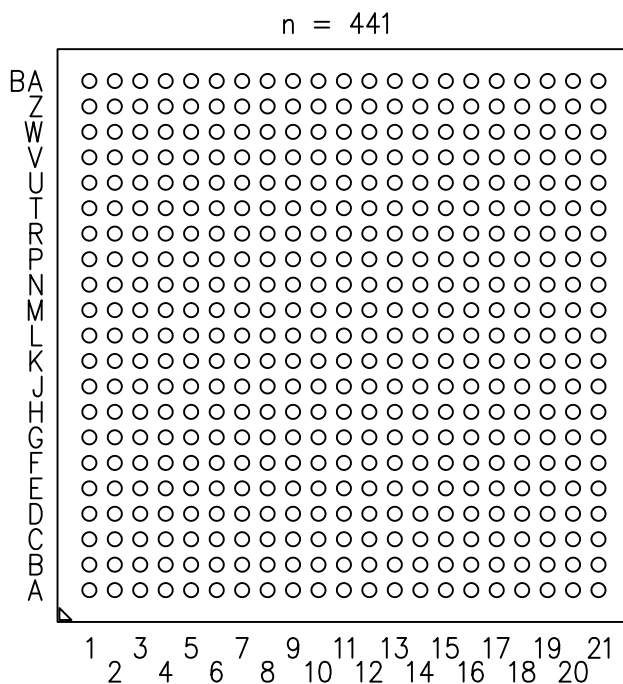
TERMINAL PATTERN M



TERMINAL PATTERN N



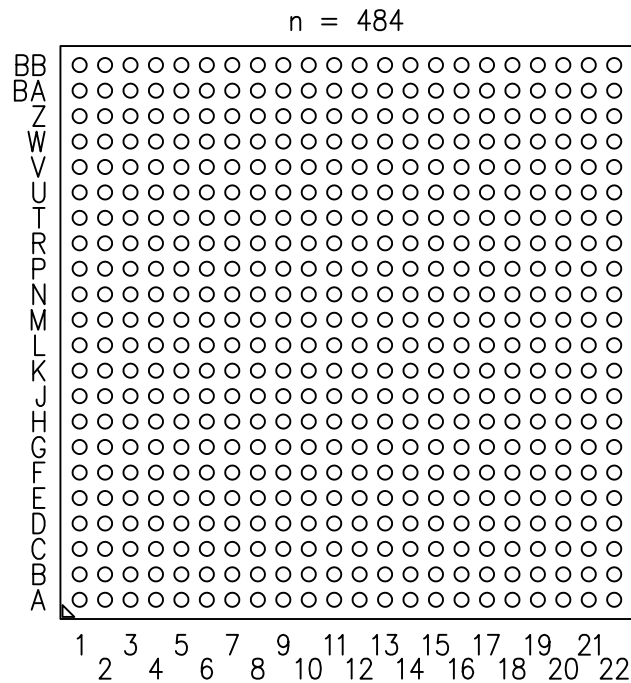
TERMINAL PATTERN O



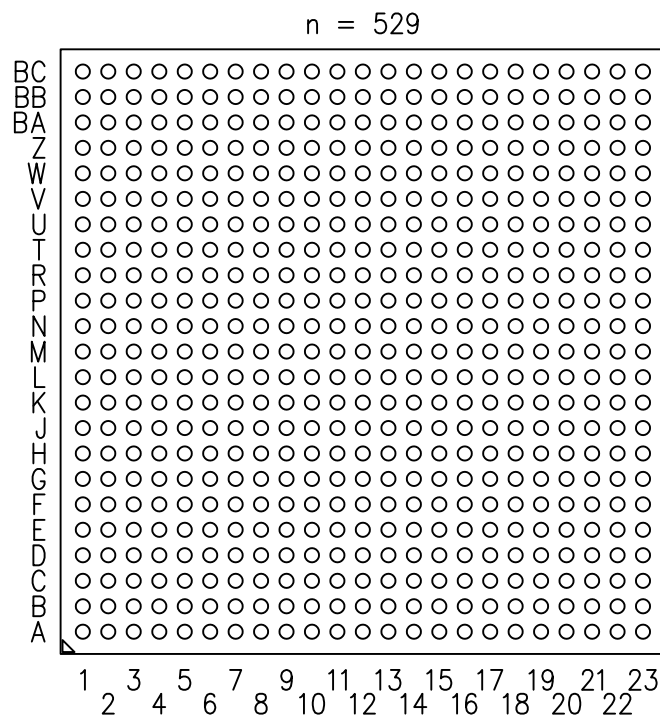
TERMINAL PATTERN P



+ = DEPOPULATED BALL POSITIONS



TERMINAL PATTERN Q

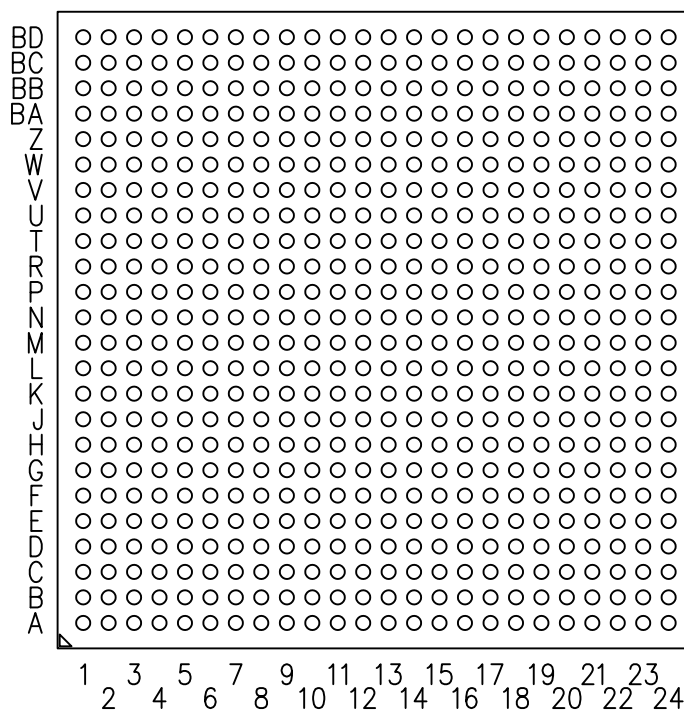


TERMINAL PATTERN R



+ = DEPOPULATED BALL POSITIONS

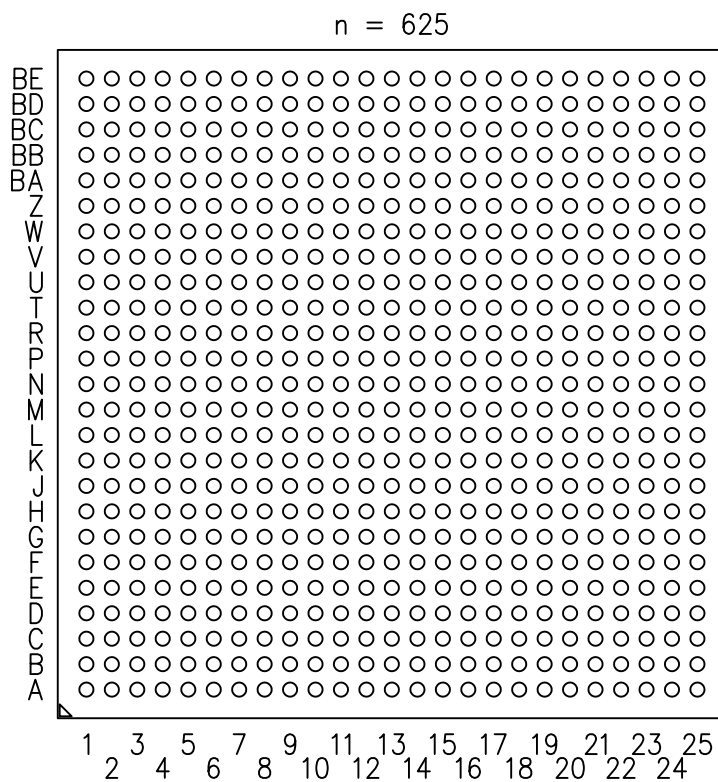
n = 576



TERMINAL PATTERN S



+ = DEPOPULATED BALL POSITIONS

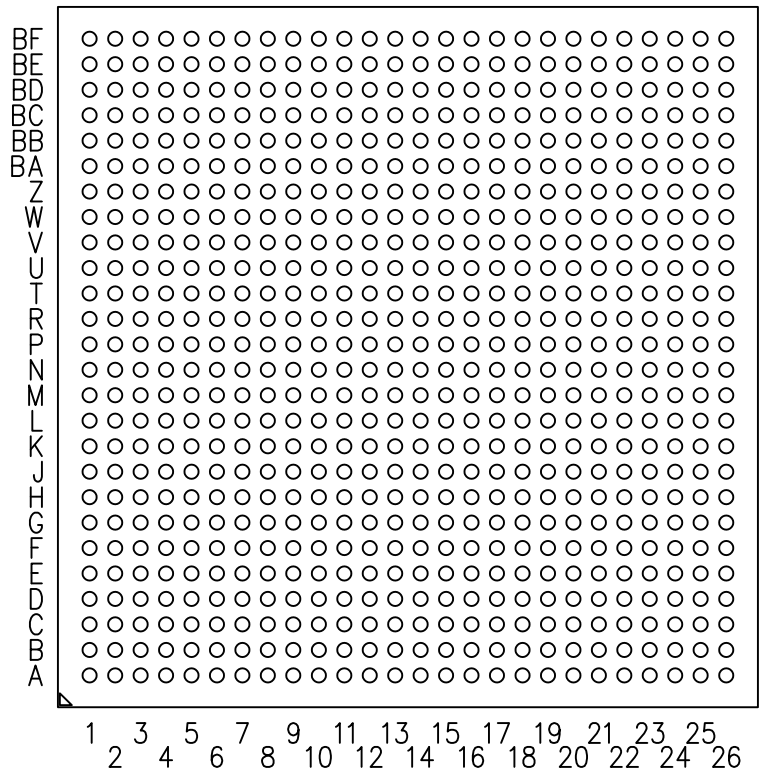


TERMINAL PATTERN T

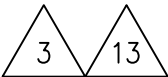


+ = DEPOPULATED BALL POSITIONS

n = 676

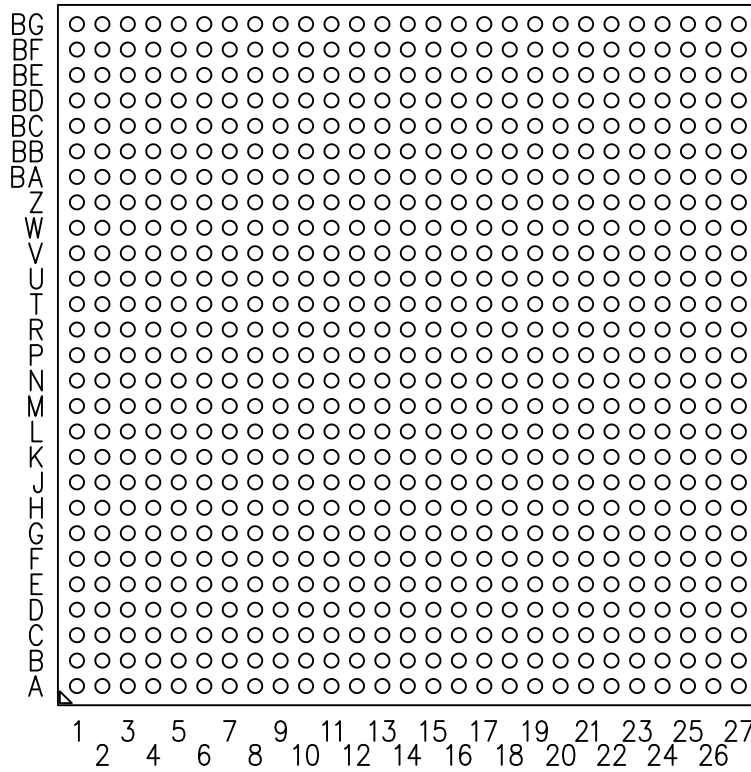


TERMINAL PATTERN U



+ = DEPOPULATED BALL POSITIONS

n = 729

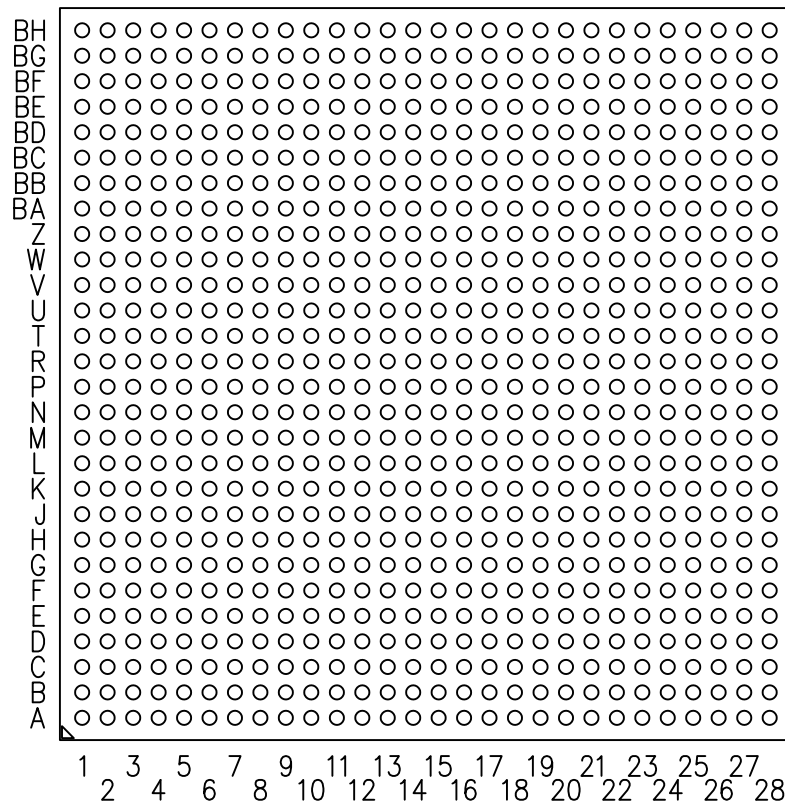


TERMINAL PATTERN V



+ = DEPOPULATED BALL POSITIONS

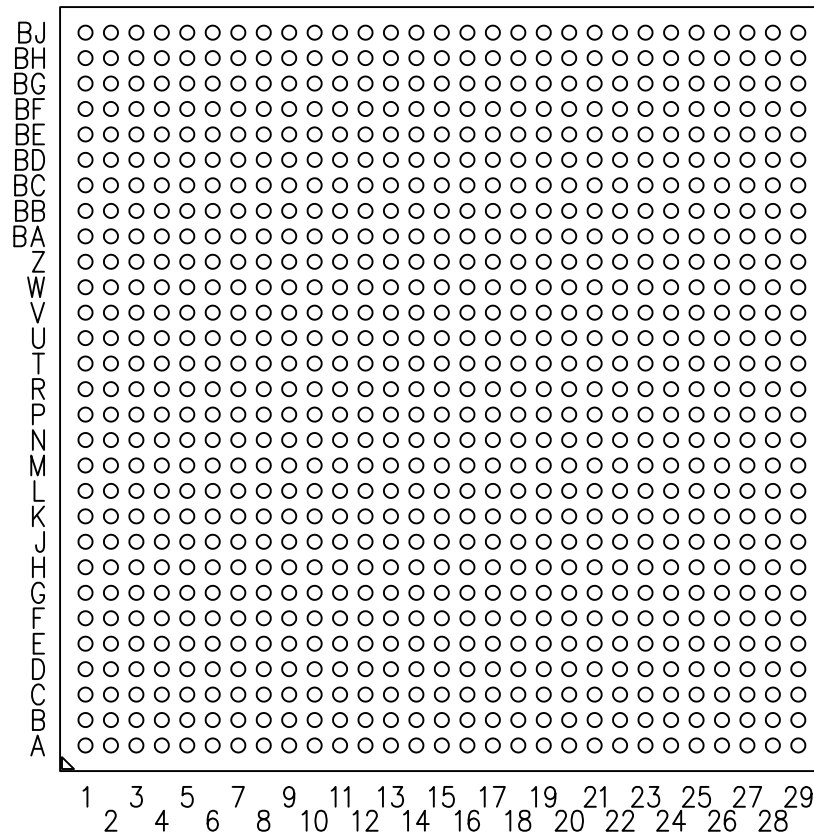
n = 784



TERMINAL PATTERN W



n = 841

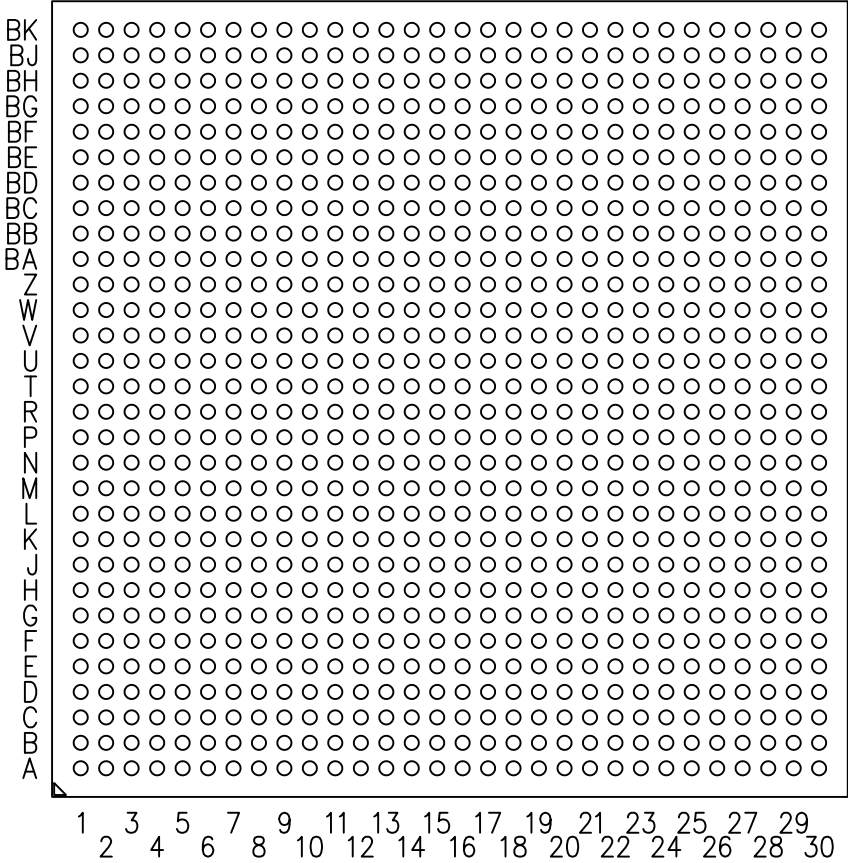


TERMINAL PATTERN X

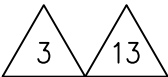


+ = DEPOPULATED BALL POSITIONS

n = 900



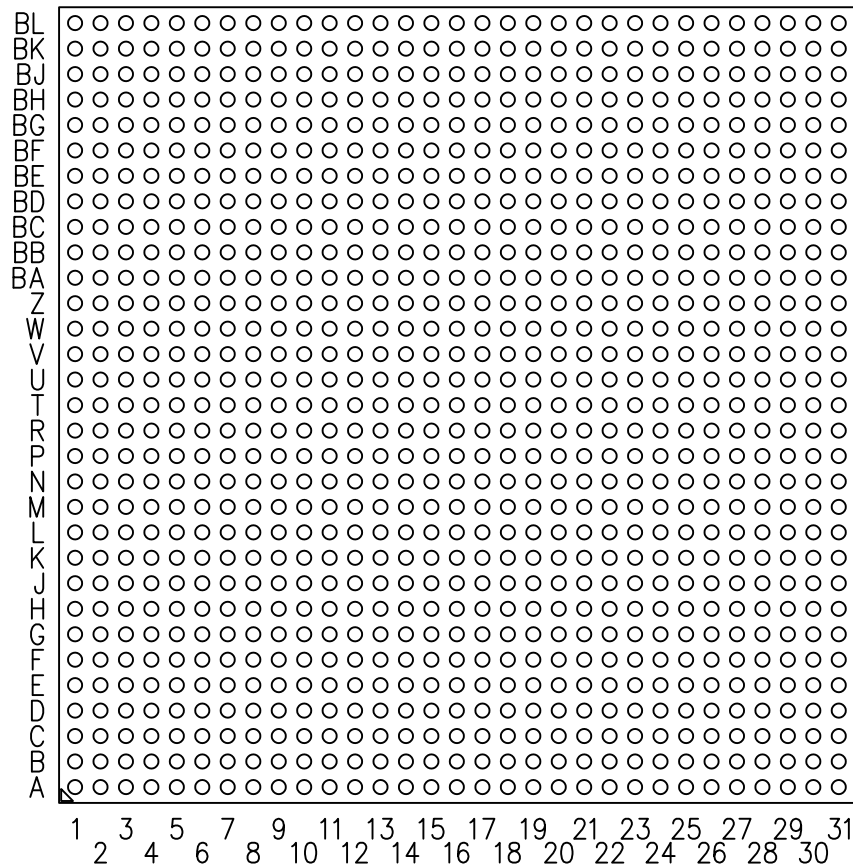
TERMINAL PATTERN Y



+ = DEPOPULATED BALL POSITIONS

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n = 961

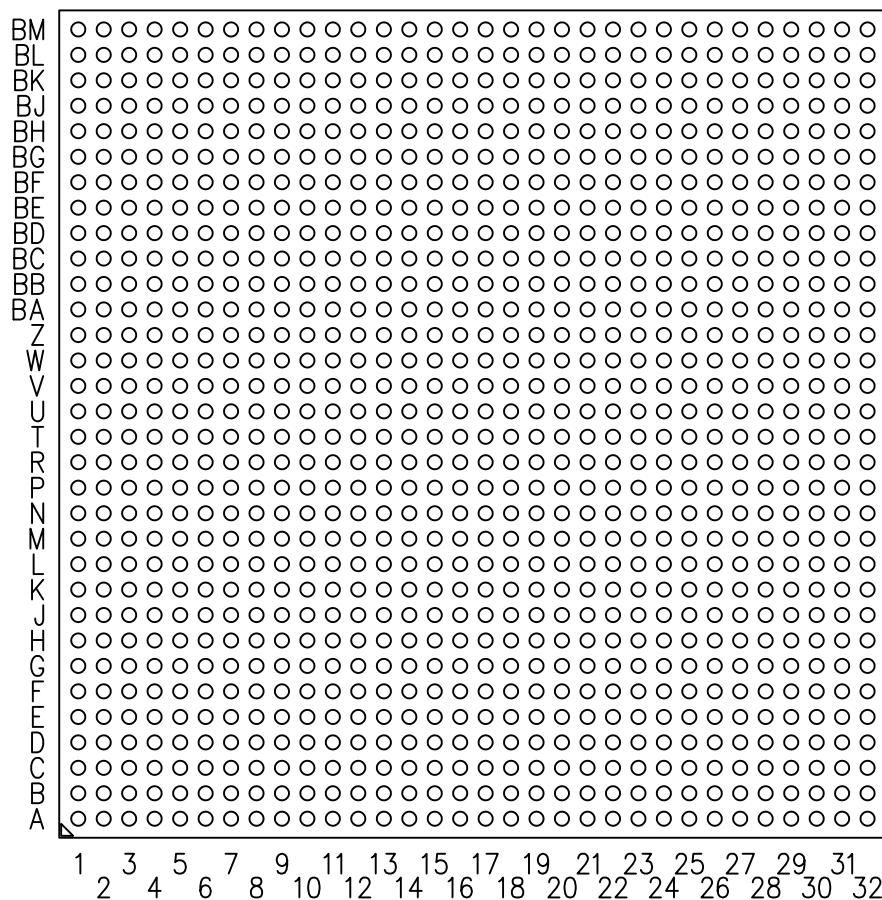


TERMINAL PATTERN Z



+ = DEPOPULATED BALL POSITIONS

n = 1024

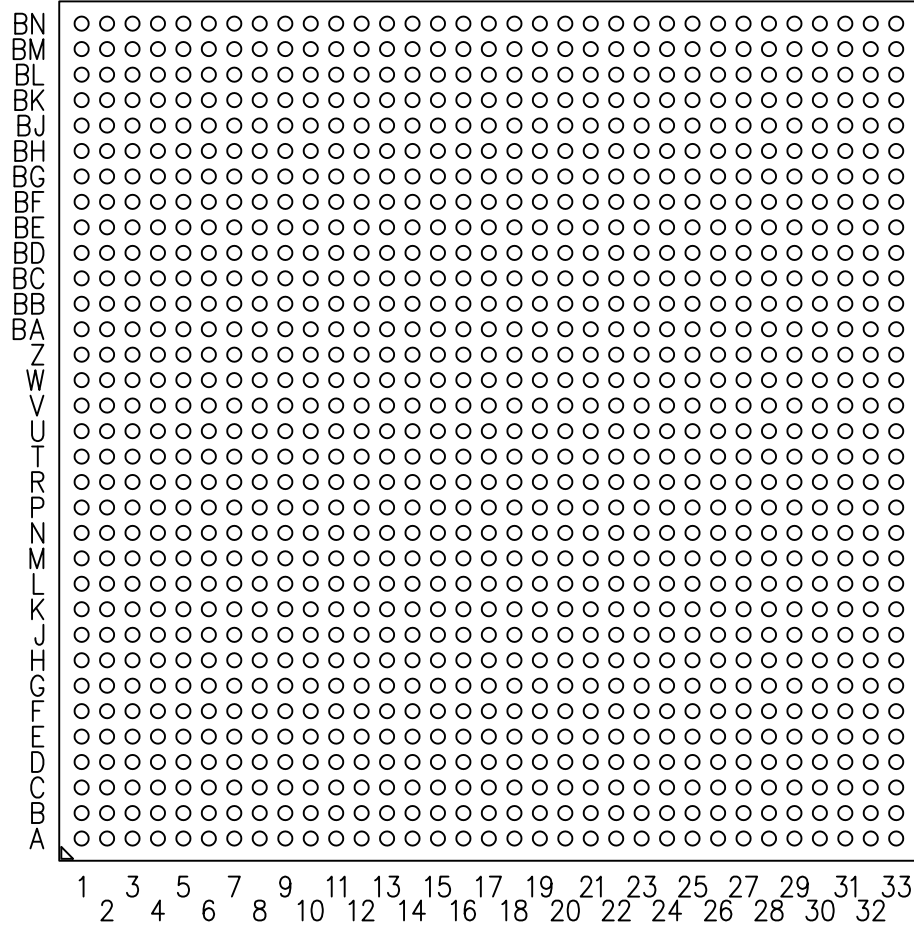


TERMINAL PATTERN AA



+ = DEPOPULATED BALL POSITIONS

n = 1089

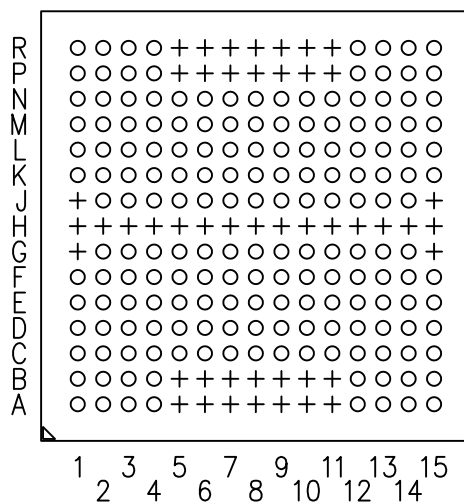


TERMINAL PATTERN AB



+ = DEPOPULATED BALL POSITIONS

n = 178



TERMINAL PATTERN AC



+ = DEPOPULATED BALL POSITIONS

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5–2009.
THIS OUTLINE CONFORMS TO JEP95, SECTION 4.5 AND 4.27.

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. MX AND MY REPRESENT THE MAXIMUM MATRIX SIZE CORRESPONDING TO THE
X AND Y 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. SHEET 1 – A FULLY POPULATED 20 X 20 MATRIX SIZE IS SHOWN FOR ILLUSTRATION ONLY.
SHEET 2 – A DEPOPULATED 20 X 20 MATRIX SIZE IS SHOWN FOR ILLUSTRATION ONLY.



8. DIMENSION Z INCLUDES STAND–OFF HEIGHT Z1, 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 A1 TERMINAL CORNER MUST BE IDENTIFIED ON BOTH THE BOTTOM AND TOP SIDES
OF THE PACKAGE, THE IDENTIFICATION FEATURE CAN BE MADE USING INK, METALIZED
MARKINGS, IDENTATIONS, OR OTHER FEATURES.



12. DIMENSIONS SX AND SY 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, SX OR SY = 0.00.
WHEN THERE IS IS AN EVEN NUMBER OF SOLDER BALLS, SX OR SD = e/2.



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



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 SEE JESD30 FOR EXPLANATION OF VARIATION SCHEME.
PACKAGE HEIGHT IS THE MAXIMUM PACKAGE THICKNESS.

STP (3D) FILE RECORD
3D FILE NAMES MAY EXCEED LENGTH REQUIREMENTS FOR SOME SOFTWARE TOOLS.

STP FILE NAME	ISSUE	DATE	ITEM NUMBER
PBGA-B178[225]_I0p8-R13p5x13p5Z#-C0p525Z0p22	G	JAN 2021	11-989

TASK GROUP CONTRIBUTORS

MICRON TECHNOLOGY INC.

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 1999	JC11 ITEM NUMBER: 11-535
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CHANGE RECORD HISTORY:

ISSUE: B	DATE: NOVEMBER 1999	ITEM NUMBER: 11-541
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ISSUE: C	DATE: OCTOBER 2000	ITEM NUMBER: 11-573
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ISSUE: D	DATE: SEPTEMBER 2002	ITEM NUMBER: 11-630
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ISSUE: E	DATE: JULY 2003	ITEM NUMBER: 11-658
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ISSUE: F	DATE: NOVEMBER 2018	ITEM NUMBER: 11-961
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LOCATION:	CHANGED FROM:	CHANGED TO:
ALL SHEETS		REDRAWN AND UPDATED TO CURRENT STANDARDS
SHEET 1, TITLE	THIN PROFILE, SQUARE & RECTANGULAR, BALL GRID ARRAY FAMILY, 1.00 & 0.80 PITCHES	PLASTIC BOTTOM GRID ARRAY BALL, 0.80MM PITCH SQUARE FAMILY PACKAGE
SHEET 1, PKG DESIGNATOR	T-XBGA, TF-XBGA, TR-XBGA	PBGA-B#[#]_180...
SHEET 6, TABLE 3	aaa 0.10 ddd 0.12	aaa 0.15/0.20 ddd 0.20
VARIATIONS CAA-1 THRU CAD-1 HAVE MOVED TO MO-234. VARIATIONS AAA-1 THRU AAY-1 AND AAA-2 THRU AAY-2 HAVE MOVED TO MO-331.		

ISSUE: G	DATE: JANUARY 2021	ITEM NUMBER: 11-989
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LOCATION:	CHANGED FROM:	CHANGED TO:
ALL SHEETS	SYMBOLS A, D, AND E	SYMBOLS Z, Y, AND X RESPECTIVELY
SHEET 2		ADDED OPTIONAL BOTTOM LID VARIATION
SHEET 3		ADDED OPTIONAL BOTTOM LID CALLOUT AND 0.10 MIN DIM

JEDEC SOLID STATE PRODUCT OUTLINE Copyright © 2021 JEDEC	TITLE PLASTIC BOTTOM GRID ARRAY BALL, 0.80MM PITCH SQUARE FAMILY PACKAGE	NUMBER MO-216	ISSUE G	DATE JAN 2021	SHEET iii
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 4 – 7, TABLES 1 & 2	DISCONTINUED PACKAGE PROFILE HEIGHT 070 THRU 180 AND ASSOCIATED Z DIMENSION	ADDED TABLE 2 ADDED $Z2(\text{MAX}) = Z(\text{MAX}) - Z1$
		ADDED 0.525 BALL DIAMETER
SHEET 8, TABLE 3	0.450 BALL $A1 = 0.24$ $b \text{ MIN} = 0.40$ $b \text{ MAX} = 0.50$	0.450 BALL $Z1 = 022$ $b \text{ MIN} = 0.375$ $b \text{ MAX} = 0.525$
		ADDED 0.525 BALL DIAMETER
SHEET 9, TABLE 4		ADDED 0.525 BALL DIAMETER
SHEETS 10 – 17		ADDED OLD VARIATION NOTE
		ADDED NEW VARIATION SCHEME
SHEET 18		ADDED 0.525 BALL TABLE
SHEETS 19 – 33	FOOTPRINT	TERMINAL PATTERN
SHEET 34		TERMINAL PATTERN AC
SHEET 35, NOTE 7	A FULLY POPULATED...	SHEET 1 – A FULLY POPULATED 20 X 20...
		ADDED SHEET 2 – A DEPOPULATED 20 X 20...
SHEET 36, NOTE 16	EXPLANATION OF VARIATION SCHEME	SEE JESD30 FOR EXPLANATION OF VARIATION SCHEME
	PACKAGE PROFILE HEIGHT IS... IT IS THE RANGE... ...DESIGNATED PROFILE HEIGHT CODE.	PACKAGE HEIGHT IS THE MAXIMUM THICKNESS
		REMOVED SPP-025 VARIATION SCHEME