

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
RECTANGULAR FAMILY PACKAGE

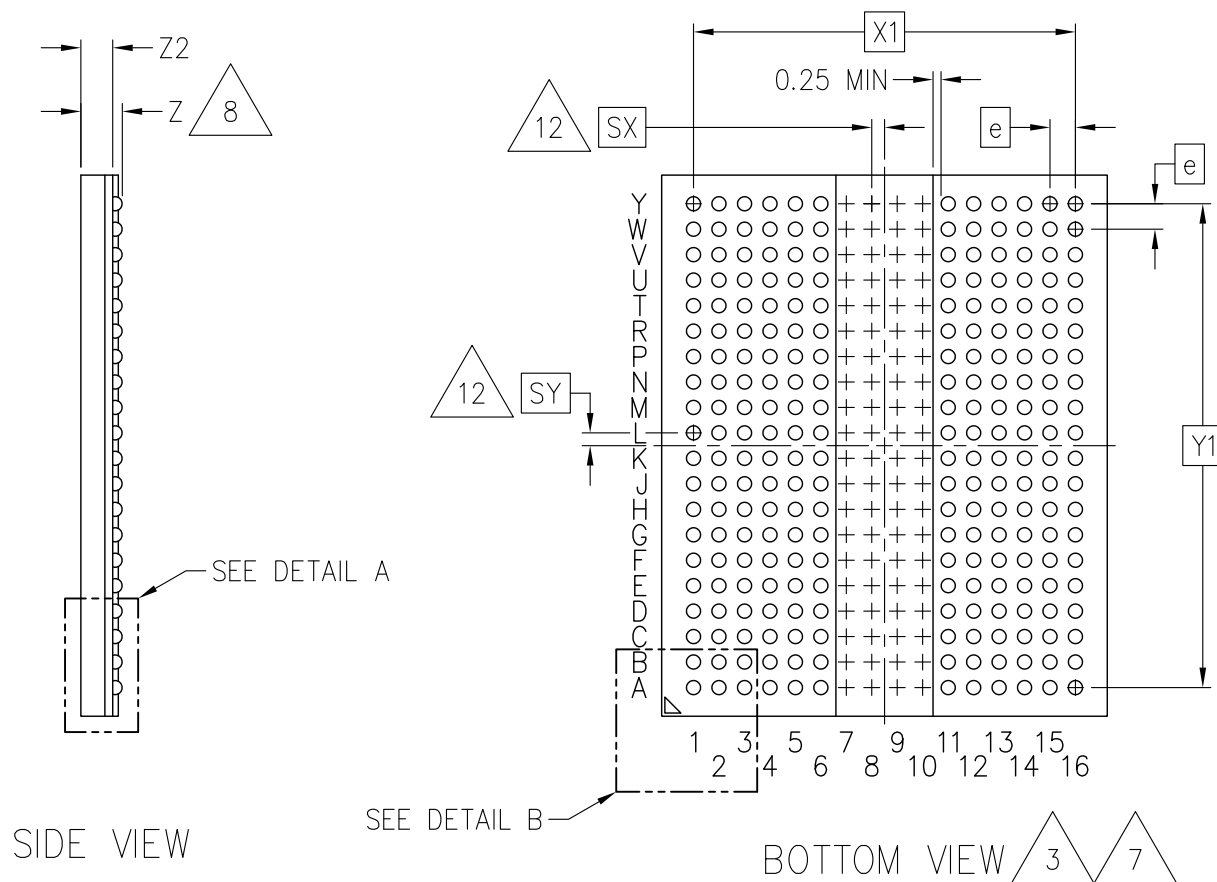
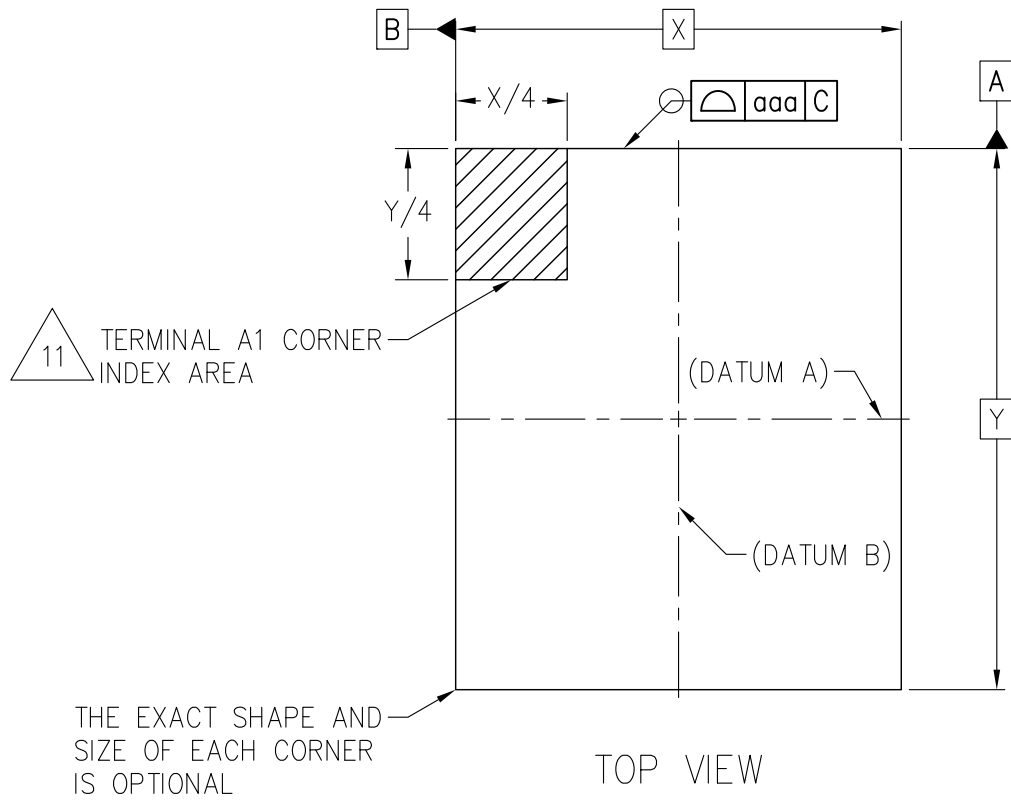
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PBGA-B#[#]
_I0p80...

NUMBER
MO-210

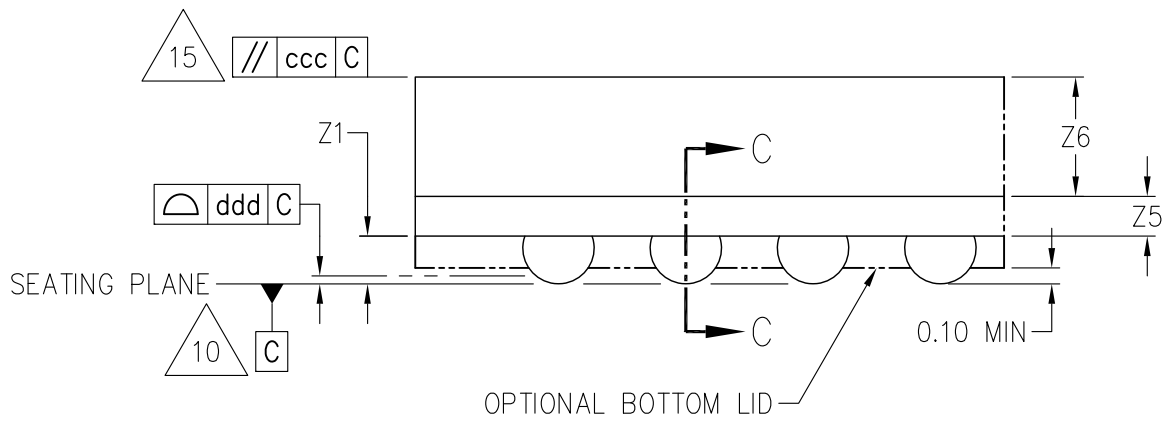
ISSUE
R

DATE
FEB 2023

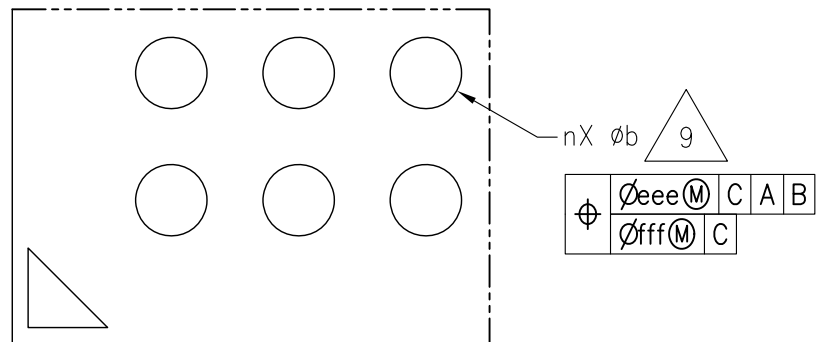
SHEET
1 OF 32



OPTIONAL BOTTOM LID VARIATION



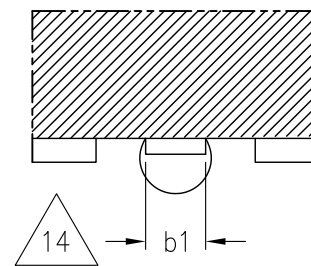
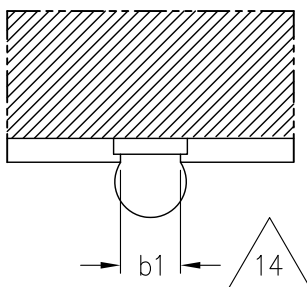
DETAIL A
(ROTATED 90° CW)



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					
	V: VERY THIN PROFILE			T: THIN PROFILE		
	MIN	NOM	MAX	MIN	NOM	MAX
Z	< 0.80	---	1.00	< 1.00	---	1.20
Z2	---	---	0.75	---	---	0.95
eD	0.80 BASIC					
eE	0.80 BASIC					
NOTES	1, 2, 7, 8			1, 2, 7, 8		
REF	11-877, 11-917, 11-1007			11-877, 11-917, 11-1007		
ISSUE	R			R		
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					
	L: LOW PROFILE			STANDARD PROFILE		
	MIN	NOM	MAX	MIN	NOM	MAX
Z	< 1.20	---	1.70	< 1.70	---	2.45
Z2	---	---	1.45	---	---	2.20
eD	0.80 BASIC					
eE	0.80 BASIC					
NOTES	1, 2, 7, 8			1, 2, 7, 8		
REF	11-877, 11-917, 11-1007			11-877, 11-917, 11-1007		
ISSUE	R			R		
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	$b(NOM) = 0.300$	$Z2(MAX) = Z(MAX) - Z1$
	$b(NOM) = 0.450$	$Z2(MAX) = Z(MAX) - Z1$
	$b(NOM) = 0.475$	$Z2(MAX) = Z(MAX) - Z1$
	$b(NOM) = 0.500$	$Z2(MAX) = Z(MAX) - Z1$
	$b(NOM) = 0.525$	$Z2(MAX) = Z(MAX) - Z1$
Z5		OPTIONAL – PACKAGE SPECIFIC
Z6		OPTIONAL – PACKAGE SPECIFIC
e		0.80 BASIC
NOTES		2, 8, 18
REF		11–953, 11–971, 11–988, 11–1007
ISSUE		R

TABLE 3

COMMON DIMENSIONS										
SYMBOL		(b) SOLDER BALL DIAMETER								
		MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX
Z1		PACKAGE SPECIFIC	---	---	PACKAGE SPECIFIC	---	---	PACKAGE SPECIFIC	---	---
b		0.225	0.300	0.375	0.375	0.450	0.525	0.400	0.475	0.550
b1	TYPE 1	0.20	---	---	0.30	---	---	0.31	---	---
	TYPE 2	0.20	---	---	0.30	---	---	0.31	---	---
NOTES		2, 9			2, 9			2, 9		
REF		11-877, 11-971, 11-1007			11-877, 11-971, 11-1007			11-971, 11-1007		
ISSUE		R			R			R		

TABLE 3 CONTINUED

COMMON DIMENSIONS										
SYMBOL		(b) SOLDER BALL DIAMETER								
		MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX
Z1		PACKAGE SPECIFIC	---	---	PACKAGE SPECIFIC	---	---	---	---	---
b		0.425	0.500	0.575	0.450	0.525	0.600	---	---	---
b1	TYPE 1	0.33	---	---	0.35	---	---	---	---	---
	TYPE 2	0.33	---	---	0.35	---	---	---	---	---
NOTES		2, 9			2, 9					
REF		11-877, 11-971, 11-1007			11-988, 11-1007					
ISSUE		R			R					

$$b1 = b(\text{NOM}) * 0.667$$


TABLE 4

TOLERANCE OF FORM AND POSITION				
SYMBOL	PACKAGE TYPE	VALUE		
		ϕb NOM = 0.300	ϕb NOM = 0.450	ϕb NOM = 0.475
aaa	---	0.15	0.15	0.15
ccc	ENCAPSULATED	0.20	0.20	0.20
ddd	---	0.08	0.12	0.12
eee	ENCAPSULATED	0.15	0.15	0.15
fff	---	0.08	0.08	0.08
NOTES		2	2	2
REF		11-510, 11-530	11-564	11-971
ISSUE		C	D	P

TABLE 4 CONTINUED


TOLERANCE OF FORM AND POSITION				
SYMBOL	PACKAGE TYPE	VALUE		
		ϕb NOM = 0.500	ϕb NOM = 0.525	---
aaa	---	0.15	0.15	---
ccc	ENCAPSULATED	0.20	0.20	---
ddd	---	0.12	0.20	---
eee	ENCAPSULATED	0.15	0.15	---
fff	---	0.08	0.08	---
NOTES		2	2	
REF		11-670	11-988	
ISSUE		H	Q	

TABLE 5

ϕb = 0.300 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
*P9.00x6.00–8030–48B	CA–2	6.00	9.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11–564	D
PBGA–B48[48]_I0p8–R6p0x9p0Z#–C0p375Z0p13	–	6.00	9.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11–971	P
*P9.00x8.00–8030–48B	CB–2	8.00	9.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11–564	D
PBGA–B48[48]_I0p8–R8p0x9p0Z#–C0p375Z0p13	–	8.00	9.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11–971	P
*P9.00x8.00–8030–60H	CJ–2	8.00	9.00	5.60	5.60	8	8	0.40	0.40	60	64	H	11–578	E
PBGA–B60[64]_I0p8–R8p0x9p0Z#–C0p375Z0p13	–	8.00	9.00	5.60	5.60	8	8	0.40	0.40	60	64	H	11–971	P
*P12.00x6.00–8030–48B	CC–2	6.00	12.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11–564	D
PBGA–B48[48]_I0p8–R6p0x12p0Z#–C0p375Z0p13	–	6.00	12.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11–971	P
*P12.00x9.00–8030–84J	CH–2	9.00	12.00	6.40	7.20	9	10	0.00	0.40	84	90	J	11–564	D
PBGA–B48[90]_I0p8–R9p0x12p0Z#–C0p375Z0p13	–	9.00	12.00	6.40	7.20	9	10	0.40	0.40	48	90	J	11–971	P
*P12.00x11.00–8030–63C	CD–2	11.00	12.00	5.60	8.80	8	12	0.40	0.40	63	96	C	11–564	D
PBGA–B63[96]_I0p8–R11p0x12p0Z#–C0p375Z0p13	–	11.00	12.00	5.60	8.80	8	12	0.40	0.40	63	96	C	11–971	P
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.

TABLE 5 CONTINUED

øb = 0.300 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
*P14.00x8.00-8030-63C		CE-2	8.00	14.00	5.60	8.80	8	12	0.40	0.40	63	96	C	11-564	D
PBGA-B63[96]_I0p8-R8p0x14p0Z#-C0p375Z0p13		-	8.00	14.00	5.60	8.80	8	12	0.40	0.40	63	96	C	11-971	P
*P15.00x8.00-8030-40G		CF-2	8.00	15.00	4.00	7.20	6	10	0.40	0.40	40	60	G	11-564	D
PBGA-B40[60]_I0p8-R8p0x15p0Z#-C0p375Z0p13		-	8.00	15.00	4.00	7.20	6	10	0.40	0.40	40	60	G	11-971	P
*P16.00x10.00-8030-60H		CG-2	10.00	16.00	5.60	5.60	8	8	0.40	0.40	60	64	H	11-564	D
PBGA-B60[64]_I0p8-R10p0x16p0Z#-C0p375Z0p13		-	10.00	16.00	5.60	5.60	8	8	0.40	0.40	60	64	H	11-971	P
NOTES			2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

NOTE:
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THIS VARIATION SCHEME HAS BEEN REPLACED BY JESD30.

TABLE 6

$\phi b = 0.450$ 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
*P8.00x6.00-8045-48B	AB-1	6.00	8.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11-522	B
PBGA-B48[48]_I0p8-R6p0x8p0Z#-C0p525Z0p22	-	6.00	8.00	4.00	5.60	6	8	0.40	0.40	48	48	C	11-971	P
*P9.00x6.00-8045-48B	AC-1	6.00	9.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11-522	B
PBGA-B48[48]_I0p8-R6p0x9p0Z#-C0p525Z0p22	-	6.00	9.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11-971	P
*P9.00x8.00-8045-48B	AD-1	8.00	9.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11-522	B
PBGA-B48[48]_I0p8-R8p0x9p0Z#-C0p525Z0p22	-	8.00	9.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11-971	P
*P10.00x8.00-8045-60W	AV-1	8.00	10.00	6.40	8.00	9	11	0.00	0.00	60	99	W	11-574	J
PBGA-B60[99]_I0p8-R8p0x10p0Z#-C0p525Z0p22	-	8.00	10.00	6.40	8.00	9	11	0.00	0.00	60	99	W	11-971	P
*P10.00x10.00-8045-60W	AAB-1	10.00	10.00	6.40	8.00	9	11	0.00	0.00	60	99	W	11-754	J
PBGA-B60[99]_I0p8-R10p0x10p0Z#-C0p525Z0p22	-	10.00	10.00	6.40	8.00	9	11	0.00	0.00	60	99	W	11-971	P
*P11.00x9.00-8045-78AL	-	9.00	11.00	6.40	9.60	9	13	0.00	0.00	78	117	AL	11-917	N
PBGA-B78[117]_I0p8-R9p0x11p0Z#-C0p525Z0p22	-	9.00	11.00	6.40	9.60	9	13	0.00	0.00	78	117	AL	11-971	P
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.

TABLE 6 CONTINUED

ϕb = 0.450 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
*P11.50x8.00–8045–60W	AW–1	8.00	11.50	6.40	8.00	9	11	0.00	0.00	60	99	W	11–574	J
PBGA–B60[99]_I0p8–R8p0x11p5Z#–C0p525Z0p22	–	8.00	11.50	6.40	8.00	9	11	0.00	0.00	60	99	W	11–971	P
*P12.00x7.00–8045–483B	AE–1	7.00	12.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11–522	B
PBGA–B48[48]_I0p8–R7p0x12p0Z#–C0p525Z0p22	–	7.00	12.00	4.00	5.60	6	8	0.40	0.40	48	48	B	11–971	P
*P12.00x8.00–8045–60W	AY–1	8.00	12.00	6.40	8.00	9	11	0.00	0.00	60	99	W	11–574	J
PBGA–B60[99]_I0p8–R8p0x12p0Z#–C0p525Z0p22	–	8.00	12.00	6.40	8.00	9	11	0.00	0.00	60	99	W	11–971	P
*P12.50x8.00–8045–84Y	AAE–1	8.00	12.50	6.40	11.20	9	15	0.00	0.00	84	135	Y	11–754	J
PBGA–B84[135]_I0p8–R8p0x12p5Z#–C0p525Z0p22	–	8.00	12.50	6.40	11.20	9	15	0.00	0.00	84	135	Y	11–971	P
*P12.50x10.00–8045–84Y	AAH–1	10.00	12.50	6.40	11.20	9	15	0.00	0.00	84	135	Y	11–754	J
PBGA–B84[135]_I0p8–R10p0x12p5Z#–C0p525Z0p22	–	10.00	12.50	6.40	11.20	9	15	0.00	0.00	84	135	Y	11–971	P
*P13.00x8.00–8045–90AC	AAL–1	8.00	13.00	6.40	11.20	9	15	0.00	0.00	90	135	AC	11–754	J
PBGA–B90[135]_I0p8–R8p0x13p0Z#–C0p525Z0p22	–	8.00	13.00	6.40	11.20	9	15	0.00	0.00	90	135	AC	11–971	P
NOTES		2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		


NOTE:
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THIS VARIATION SCHEME HAS BEEN REPLACED BY JESD30.

TABLE 6 CONTINUED

$\phi b = 0.450$ 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
*P13.00x10.50-8045-63AF	AAN-1	10.50	13.00	7.20	8.80	10	12	0.40	0.40	63	120	AF	11-855	K
PBGA-B63[120]_I0p8-R10p5x13p0Z#-C0p525Z0p22	-	10.50	13.00	7.20	8.80	10	12	0.40	0.40	63	120	AF	11-971	P
*P13.00x11.00-8045-60A	AG-1	11.00	13.00	5.60	11.20	8	15	0.40	0.00	60	120	A	11-530	C
PBGA-B60[120]_I0p8-R11p0x14p0Z#-C0p525Z0p22	-	11.00	13.00	5.60	11.20	8	15	0.40	0.00	60	120	A	11-971	P
*P13.00x11.00-8045-90M	AN-1	11.00	13.00	6.40	11.20	9	15	0.00	0.00	90	135	M	11-578	E
PBGA-B90[135]_I0p8-R11p0x13p0Z#-C0p525Z0p22	-	11.00	13.00	6.40	11.20	9	15	0.00	0.00	90	135	M	11-971	P
*P13.00x11.00-8045-128P	AR-1	11.00	13.00	8.80	8.80	12	12	0.40	0.40	128	144	P	11-600	F
PBGA-B128[144]_I0p8-R11p0x13p0Z#-C0p525Z0p22	-	11.00	13.00	8.80	8.80	12	12	0.40	0.40	128	144	P	11-971	P
*P13.50x10.50-8045-126AD	AAM-1	10.50	13.50	8.80	12.00	12	16	0.40	0.40	126	192	AD	11-754	J
PBGA-B126[192]_I0p8-R10p5x13p5Z#-C0p525Z0p22	-	10.50	13.50	8.80	12.00	12	16	0.40	0.40	126	192	AD	11-971	P
*P14.00x8.00-8045-60W	AAA-1	8.00	14.00	6.40	8.00	9	11	0.00	0.00	60	99	W	11-754	J
PBGA-B60[99]_I0p8-R8p0x14p0Z#-C0p525Z0p22	-	8.00	14.00	6.40	8.00	9	11	0.00	0.00	60	99	W	11-971	P
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.

TABLE 6 CONTINUED

$\phi b = 0.450$ 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
 *P14.00x8.00–8045–64AE	AF–1	8.00	14.00	5.60	8.80	8	12	0.40	0.40	64	96	AE	11–522 11–574	B
PBGA–B64[96]_I0p8– R8p0x14p0Z#–C0p525Z0p22	–	8.00	14.00	5.60	8.80	8	12	0.40	0.40	64	96	AE	11–971	P
*P14.00x8.00–8045–84Y	AAG–1	8.00	14.00	6.40	11.20	9	15	0.00	0.00	84	135	Y	11–754	J
PBGA–B84[135]_I0p8– R8p0x14p0Z#–C0p525Z0p22	–	8.00	14.00	6.40	11.20	9	15	0.00	0.00	84	135	Y	11–971	P
*P14.00x9.00–8045–96AA	AAJ–1	9.00	14.00	6.40	12.00	9	16	0.00	0.40	96	144	AA	11–754	J
PBGA–B96[144]_I0p8– R9p0x14p0Z#–C0p525Z0p22	–	9.00	14.00	6.40	12.00	9	16	0.00	0.40	96	144	AA	11–971	P
*P14.00x10.00–8045–136V	AU–1	10.00	14.00	8.80	12.80	12	17	0.40	0.00	136	204	V	11–682	I
PBGA–B136[204]_I0p8– R10p0x14p0Z#–C0p525Z0p22	–	10.00	14.00	8.80	12.80	12	17	0.40	0.00	136	204	V	11–971	P
*P14.00x10.00–8045–144AK	–	10.00	14.00	8.00	12.80	11	17	0.00	0.00	144	187	AK	11–885	M
PBGA–B144[187]_I0p8– R10p0x14p0Z#–C0p3Z0p15	–	10.00	14.00	8.00	12.80	11	17	0.00	0.00	144	187	AK	11–971	P
*P14.00x10.50–8045–144AG	---	10.50	14.00	8.00	12.80	11	17	0.00	0.00	144	187	AG	11–877	L
PBGA–B144[187]_I0p8– R10p5x14p0Z#–C0p525Z0p22	–	10.50	14.00	8.00	12.80	11	17	0.00	0.00	144	187	AG	11–971	P
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.

TABLE 6 CONTINUED

$\phi b = 0.450$ 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
*P14.00x11.00–8045–144AG	---	11.00	14.00	8.00	12.80	11	17	0.00	0.00	144	187	AG	11–877	L
PBGA–B144[187]_I0p8–R11p0x14p0Z#–C0p525Z0p22	–	11.00	14.00	8.00	12.80	11	17	0.00	0.00	144	187	AG	11–971	P
*P14.00x11.50–8045–56N	AP–1	11.50	14.00	6.40	8.00	9	11	0.00	0.00	56	99	N	11–578	E
PBGA–B56[99]_I0p8–R11p5x14p0Z#–C0p525Z0p22	–	11.50	14.00	6.40	8.00	9	11	0.00	0.00	56	99	N	11–971	P
*P14.00x11.50–8045–60W	AAC–1	11.50	14.00	6.40	8.00	9	11	0.00	0.00	60	99	W	11–754	J
PBGA–B60[99]_I0p8–R11p5x14p0Z#–C0p525Z0p22	–	11.50	14.00	6.40	8.00	9	11	0.00	0.00	60	99	W	11–971	P
*P14.00x11.50–8045–84Y	AAD–1	11.50	14.00	6.40	11.20	9	15	0.00	0.00	84	135	Y	11–754	J
PBGA–B84[135]_I0p8–R11p5x14p0Z#–C0p525Z0p22	–	11.50	14.00	6.40	11.20	9	15	0.00	0.00	84	135	Y	11–971	P
*P15.00x13.00–8045–144D	AH–1	13.00	15.00	9.60	9.60	13	13	0.00	0.00	144	169	D	11–564	D
PBGA–B144[169]_I0p8–R13p0x15p0Z#–C0p525Z0p22	–	13.00	15.00	9.60	9.60	13	13	0.00	0.00	144	169	D	11–971	P
*P15.00x13.00–8045–195E	AJ–1	13.00	15.00	9.60	11.20	13	15	0.00	0.00	195	195	E	11–564	D
PBGA–B195[195]_I0p8–R13p0x15p0Z#–C0p525Z0p22	–	13.00	15.00	9.60	11.20	13	15	0.00	0.00	195	195	E	11–971	P
*P15.00x13.00–8045–221K	AK–1	13.00	15.00	9.60	12.80	13	17	0.00	0.00	221	221	K	11–564	D
PBGA–B221[221]_I0p8–R13p0x15p0Z#–C0p525Z0p22	–	13.00	15.00	9.60	12.80	13	17	0.00	0.00	221	221	K	11–971	P
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.

TABLE 6 CONTINUED

$\phi b = 0.450$ 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
*P16.00x8.00–8045–60A	AA–1	8.00	16.00	5.60	11.20	8	15	0.40	0.00	60	120	A	11–510	A
PBGA–B60[120]_I0p8–R8p0x16p0Z#–C0p525Z0p22	–	8.00	16.00	5.60	11.20	8	15	0.40	0.00	60	120	A	11–971	P
*P16.00x9.00–8045–60F	AL–1	9.00	16.00	4.80	11.20	7	15	0.00	0.00	60	105	F	11–578	E
PBGA–B60[105]_I0p8–R9p0x16p0Z#–C0p525Z0p22	–	9.00	16.00	4.80	11.20	7	15	0.00	0.00	60	105	F	11–971	P
*P16.00x9.00–8045–64R	AT–1	9.00	16.00	6.40	11.20	9	15	0.00	0.00	64	135	R	11–622	G
PBGA–B64[135]_I0p8–R9p0x16p0Z#–C0p525Z0p22	–	9.00	16.00	6.40	11.20	9	15	0.00	0.00	64	135	R	11–971	P
*P16.00x9.00–8045–80L	AM–1	9.00	16.00	6.40	11.20	9	15	0.00	0.00	80	135	L	11.578	E
PBGA–B80[135]_I0p8–R9p0x16p0Z#–C0p525Z0p22	–	9.00	16.00	6.40	11.20	9	15	0.00	0.00	80	135	L	11–971	P
*P16.50x10.00–8045–68AB	AAK–1	10.00	16.50	6.40	14.40	9	19	0.00	0.00	68	171	AB	11–754	J
PBGA–B68[171]_I0p8–R10p0x16p5Z#–C0p525Z0p22	–	10.00	16.50	6.40	14.40	9	19	0.00	0.00	68	171	AB	11–971	P
*P16.50x10.00–8045–84Y	AAF–1	10.00	16.50	6.40	11.20	9	15	0.00	0.00	84	135	Y	11–754	J
PBGA–B84[135]_I0p8–R10p0x16p5Z#–C0p525Z0p22	–	10.00	16.50	6.40	11.20	9	15	0.00	0.00	84	135	Y	11–971	P
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.

TABLE 6 CONTINUED

øb = 0.450 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
*P18.00x12.00-8045-252AM		---	12.00	18.00	10.40	16.80	14	22	0.40	0.40	252	308	AM	11-953	O
PBGA-B252[308]_I0p8-R12p0x18p0Z#-C0p525Z0p22		-	12.00	18.00	10.40	16.80	14	22	0.40	0.40	252	308	AM	11-971	P
*P18.00x14.00-8045-272AH		---	14.00	18.00	12.00	16.80	16	22	0.40	0.40	272	352	AH	11-877	L
PBGA-B272[352]_I0p8-R14p0x18p0Z#-C0p525Z0p22		-	14.00	18.00	12.00	16.80	16	22	0.40	0.40	272	352	AH	11-971	P
*P18.00x14.00-8045-316AJ		---	14.00	18.00	12.00	16.80	16	22	0.40	0.40	316	352	AJ	11-877	L
PBGA-B316[352]_I0p8-R14p0x18p0Z#-C0p525Z0p22		-	14.00	18.00	12.00	16.80	16	22	0.40	0.40	316	352	AJ	11-971	P
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.

TABLE 7


$\phi b = 0.475$ 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-B78[117]_I0p8-R7p5x11p0Z#-C0p55Z#	-	7.50	11.00	8.00	9.60	11	13	0.00	0.00	78	117	AL	11-1007	R
PBGA-B102[153]_I0p8-R7p5x14p0Z#-C0p55Z#	-	7.50	14.00	6.40	12.80	9	17	0.00	0.00	102	153	AT	11-1007	R
PBGA-B78[117]_I0p8-R8p0x11p0Z#-C0p55Z#	-	8.00	11.00	8.00	9.60	11	13	0.00	0.00	78	117	AL	11-1007	R
PBGA-B102[153]_I0p8-R8p0x14p0Z#-C0p55Z#	-	8.00	14.00	6.40	12.80	9	17	0.00	0.00	102	153	AT	11-1007	R
PBGA-B82[143]_I0p8-R9p0x11p0Z#-C0p55Z0p24	-	9.00	11.00	8.00	9.60	11	13	0.00	0.00	82	143	AN	11-971	P
PBGA-B102[153]_I0p8-R9p0x14p0Z#-C0p55Z0p24	-	9.00	14.00	6.40	12.80	9	17	0.00	0.00	102	153	AT	11-988	Q
PBGA-B106[187]_I0p8-R9p0x14p0Z#-C0p55Z0p24	-	9.00	14.00	8.00	12.80	11	17	0.00	0.00	106	187	AU	11-988	Q
PBGA-B78[117]_I0p8-R10p0x11p0Z#-C0p55Z0p24	-	10.00	11.00	6.40	9.60	9	13	0.00	0.00	78	117	AL	11-971	P
PBGA-B82[143]_I0p8-R10p0x11p0Z#-C0p55Z0p24	-	10.00	11.00	8.00	9.60	11	13	0.00	0.00	82	143	AN	11-988	Q
PBGA-B96[144]_I0p8-R10p0x13p0Z#-C0p55Z0p24	-	10.00	13.00	6.40	12.00	9	16	0.00	0.40	96	144	AA	11-971	P
NOTES														

TABLE 7 CONTINUED




øb = 0.475 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-B102[153]_I0p8-R10p0x14p0Z#-C0p55Z0p24		-	10.00	14.00	6.40	12.80	9	17	0.00	0.00	102	153	AT	11-988	Q
PBGA-B106[187]_I0p8-R10p0x14p0Z#-C0p55Z0p24		-	10.00	14.00	8.00	12.80	11	17	0.00	0.00	106	187	AU	11-988	Q
NOTES			2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

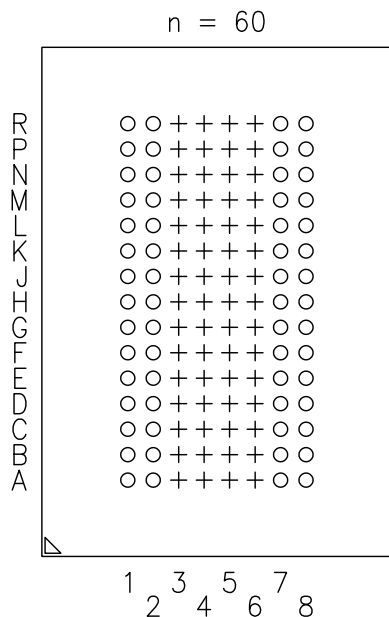
TABLE 8

øb = 0.500 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
*P10.00x11.50-8050-60U		DB-3	11.50	10.00	6.40	7.20	9	10	0.00	0.40	60	90	U	11-682	I
PBGA-B60[90]_I0p8-R11p5x10p0Z#-C0p575Z0p25		-	11.50	10.00	6.40	7.20	9	10	0.40	0.40	60	90	U	11-971	P
*P11.00x9.00-8050-78T		DA-3	9.00	11.00	7.20	9.60	10	13	0.40	0.00	78	130	T	11-670	H
PBGA-B78[130]_I0p8-R9p0x11p0Z#-C0p575Z0p25		-	9.00	11.00	7.20	9.60	10	13	0.40	0.40	78	130	T	11-971	P
NOTES			2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		

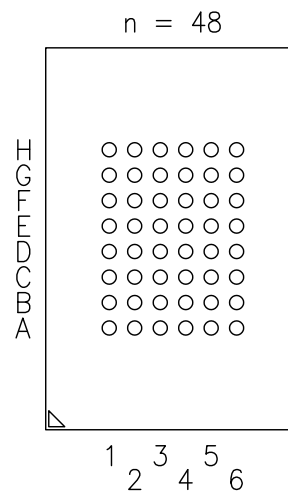
NOTE:
FOR VARIATIONS THAT BEGIN WITH *, SEE SPP-025 ISSUE C FOR EXPLANATION OF VARIATION SCHEME.
THIS VARIATION SCHEME HAS BEEN REPLACED BY JESD30.

TABLE 9

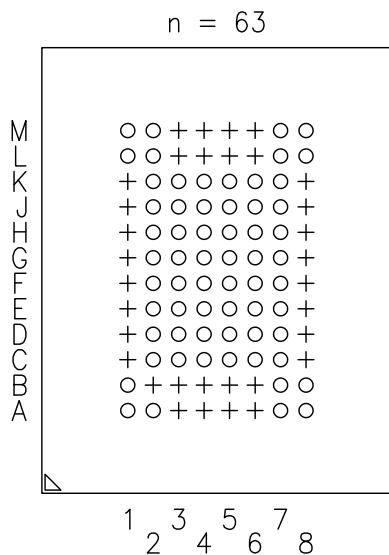
øb = 0.525 NOMINAL															
NEW VARIATION		OLD VARIATION	X BASIC	Y BASIC	X1 BASIC	Y1 BASIC	MX	MY	SX BASIC	SY BASIC	n	N	TERMINAL PATTERN	REF	ISSUE
PBGA-B96[144]_I0p8-R8p0x14p0Z#-C0p6Z0p27		-	8.00	14.00	6.40	12.00	9	16	0.00	0.40	96	144	AA	11-988	Q
PBGA-B146[165]_I0p8-R10p0x14p0Z#-C0p6Z0p27		-	10.00	14.00	8.00	11.20	11	15	0.00	0.00	146	165	AP	11-988	Q
PBGA-B146[165]_I0p8-R10p0x18p0Z#-C0p6Z0p27		-	10.00	18.00	8.00	11.20	11	15	0.00	0.00	146	165	AP	11-988	Q
PBGA-B154[195]_I0p8-R11p5x13p5Z#-C0p6Z0p27		-	11.50	13.50	9.60	11.20	13	15	0.00	0.00	154	195	AR	11-988	Q
PBGA-B154[195]_I0p8-R12p8x13p5Z#-C0p6Z0p27		-	12.80	13.50	9.60	11.20	13	15	0.00	0.00	154	195	AR	11-988	Q
NOTES			2	2	2	2	5	5	2, 12	2, 12	6, 13	6	13		



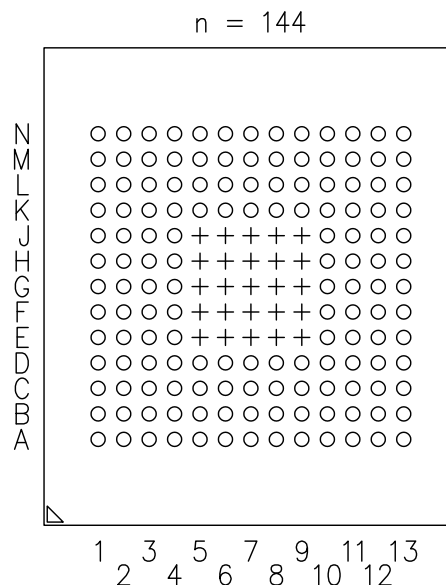
TERMINAL PATTERN A



TERMINAL PATTERN B



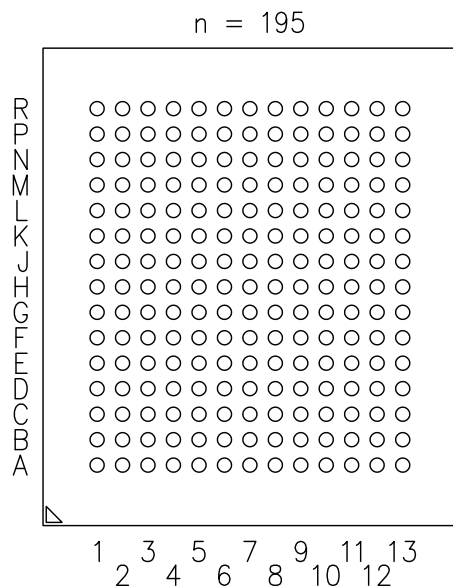
TERMINAL PATTERN C



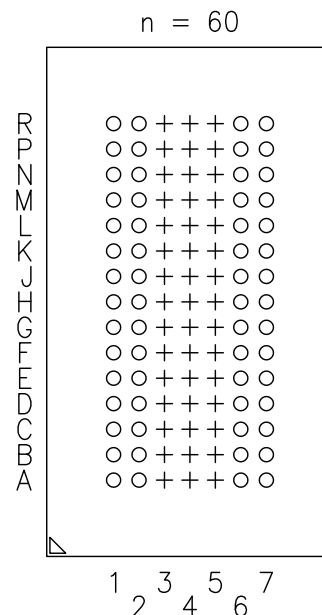
TERMINAL PATTERN D



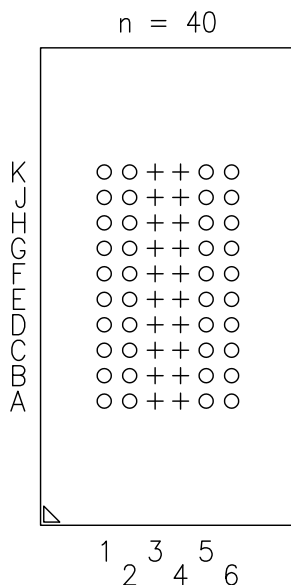
+ = DEPOPULATED TERMINAL POSITIONS



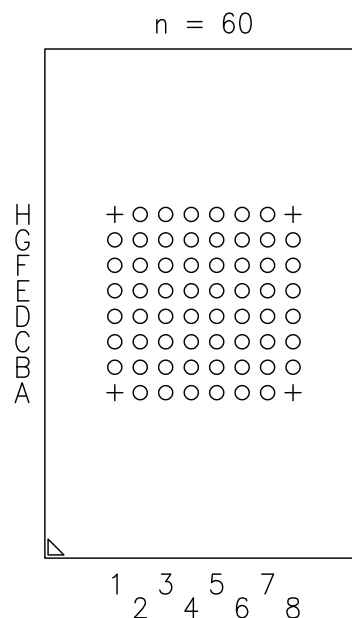
TERMINAL PATTERN E



TERMINAL PATTERN F



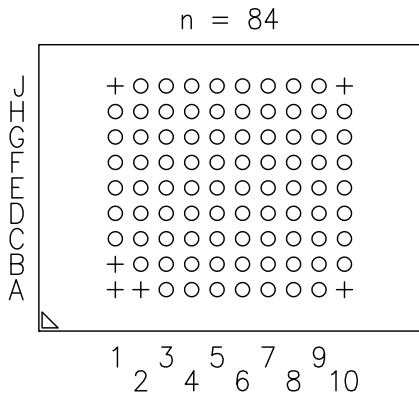
TERMINAL PATTERN G



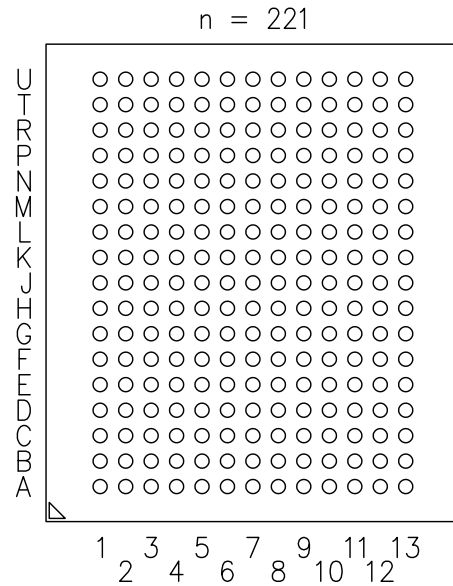
TERMINAL PATTERN H



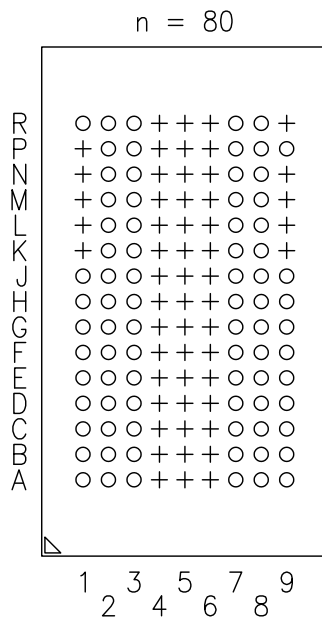
+ = DEPOPULATED TERMINAL POSITIONS



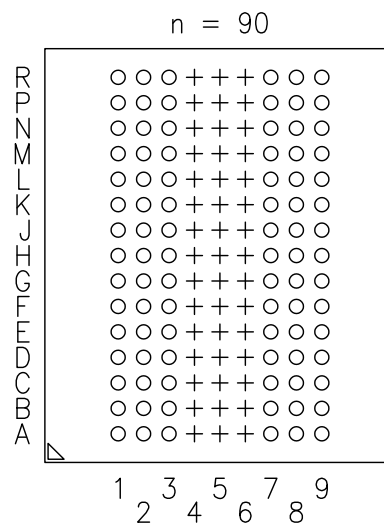
TERMINAL PATTERN J



TERMINAL PATTERN K



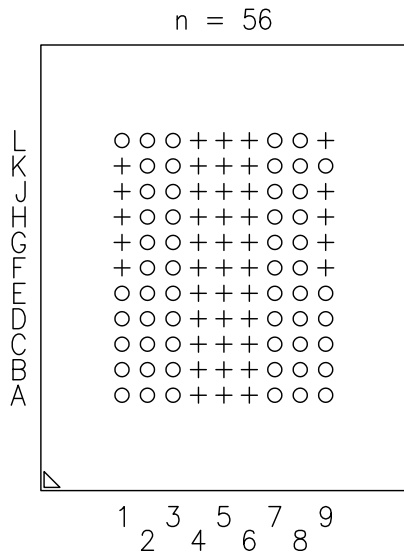
TERMINAL PATTERN L



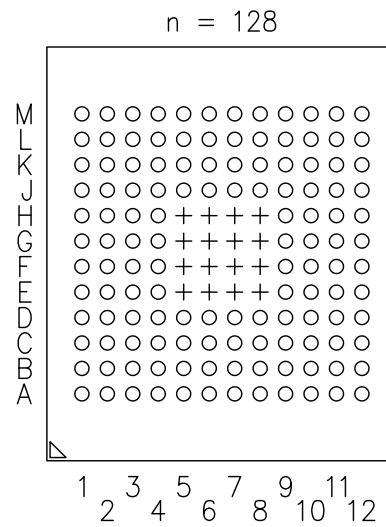
TERMINAL PATTERN M



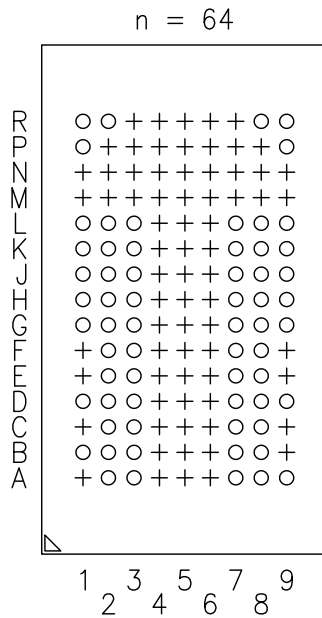
+ = DEPOPULATED TERMINAL POSITIONS



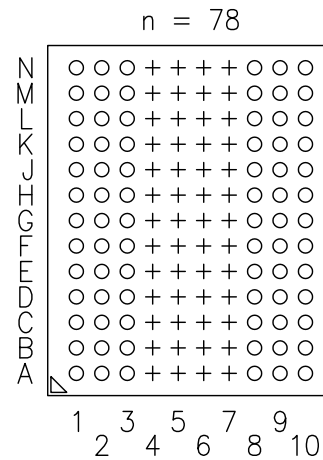
TERMINAL PATTERN N



TERMINAL PATTERN P



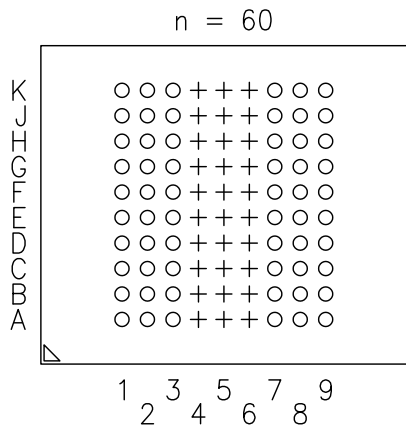
TERMINAL PATTERN R



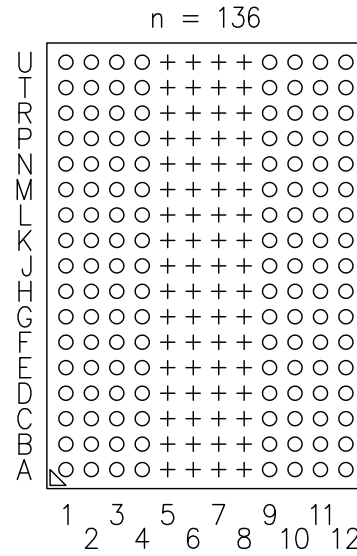
TERMINAL PATTERN T



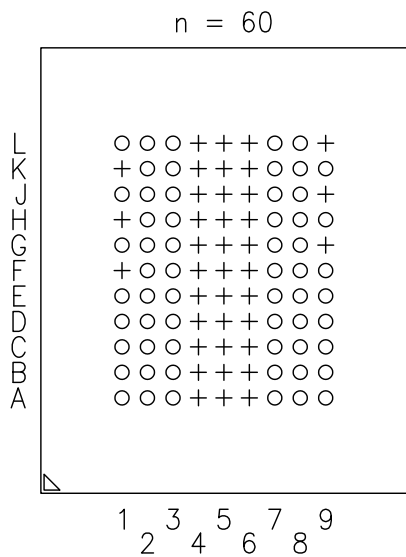
+ = DEPOPULATED TERMINAL POSITIONS



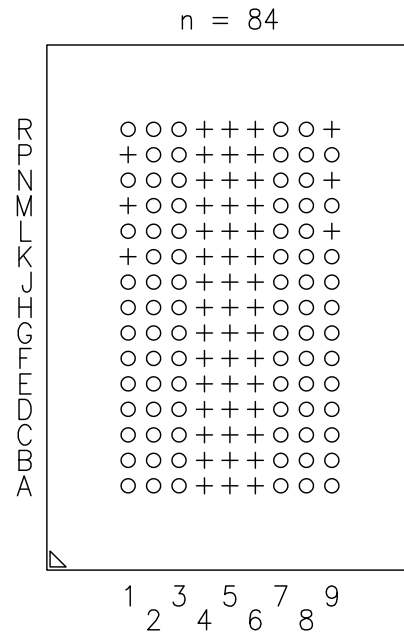
TERMINAL PATTERN U



TERMINAL PATTERN V



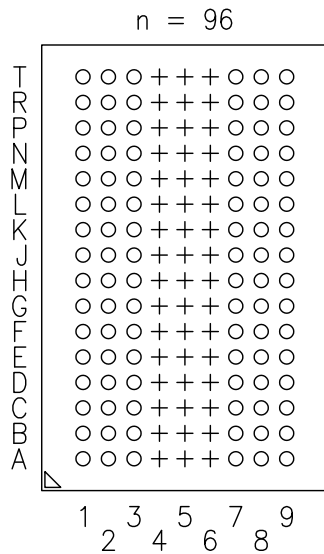
TERMINAL PATTERN W



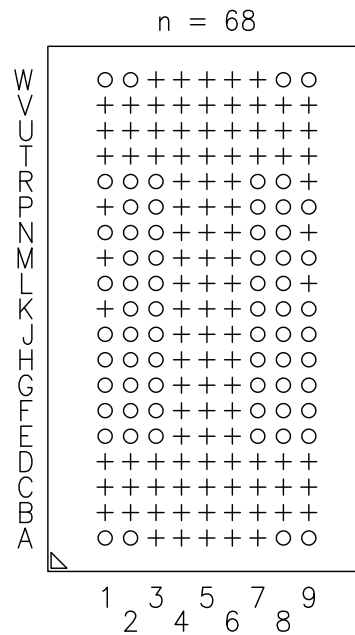
TERMINAL PATTERN Y



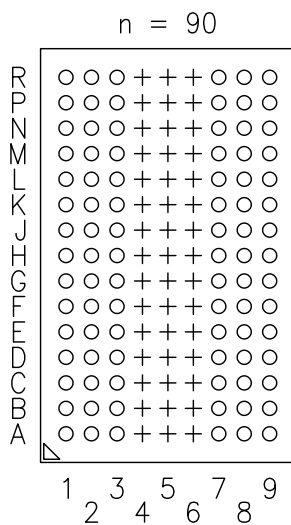
+ = DEPOPULATED TERMINAL POSITIONS



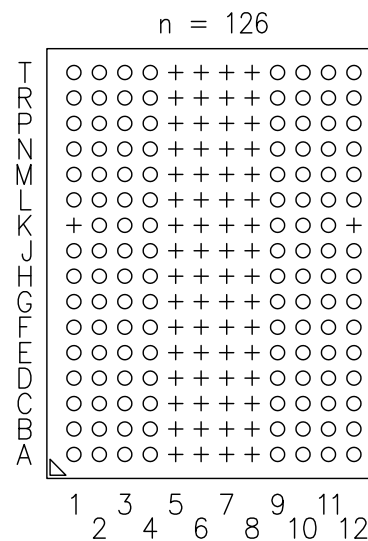
TERMINAL PATTERN AA



TERMINAL PATTERN AB



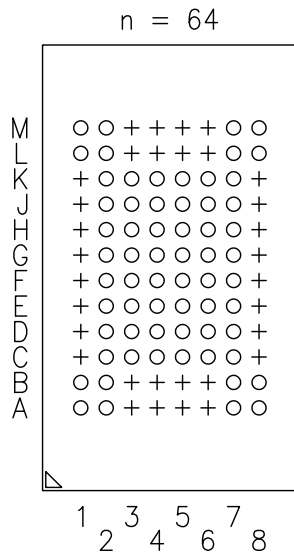
TERMINAL PATTERN AC



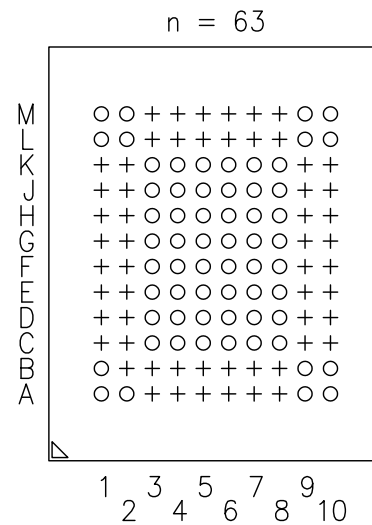
TERMINAL PATTERN AD



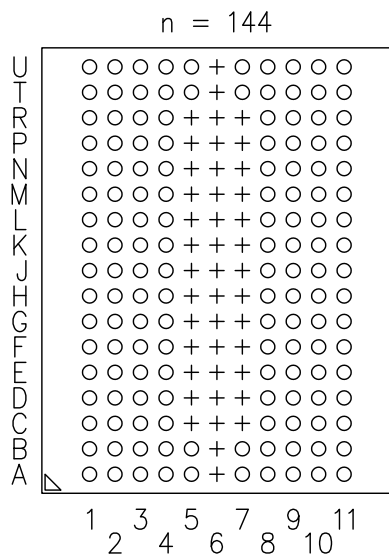
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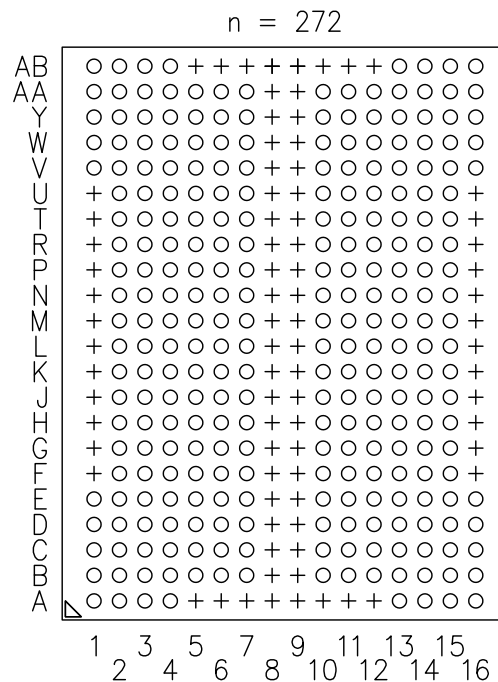
TERMINAL PATTERN AE



TERMINAL PATTERN AF



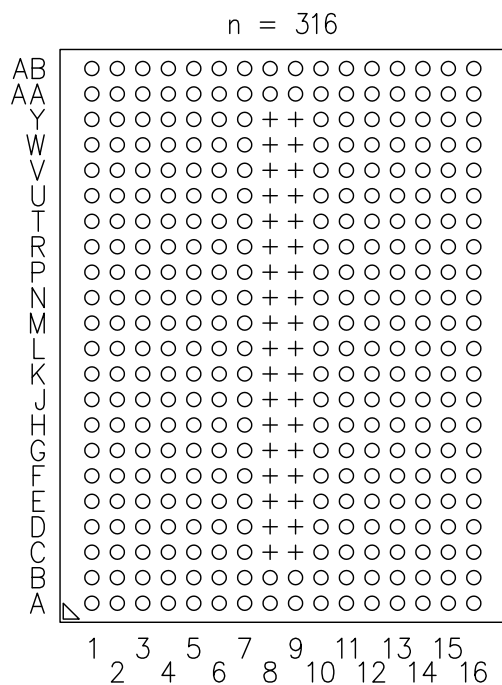
TERMINAL PATTERN AG



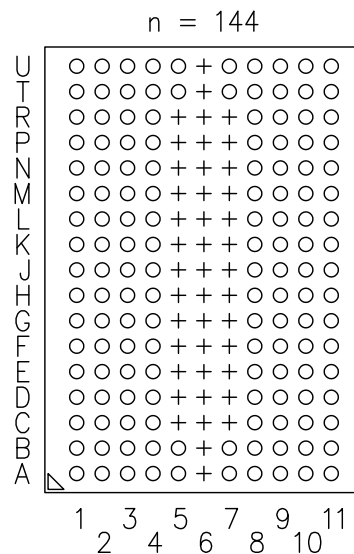
TERMINAL PATTERN AH



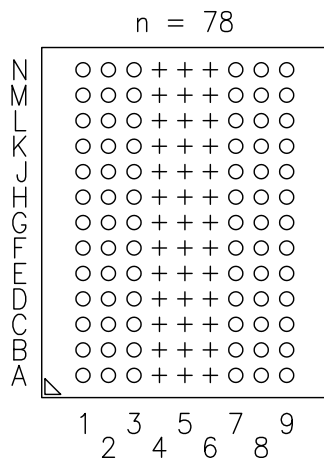
+ = DEPOPULATED TERMINAL POSITIONS



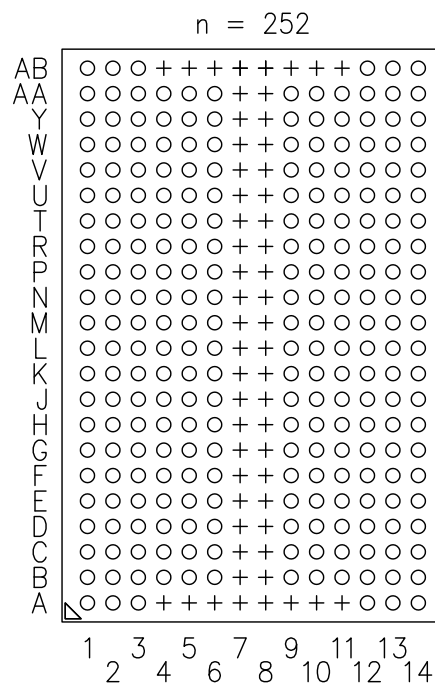
TERMINAL PATTERN AJ



TERMINAL PATTERN AK



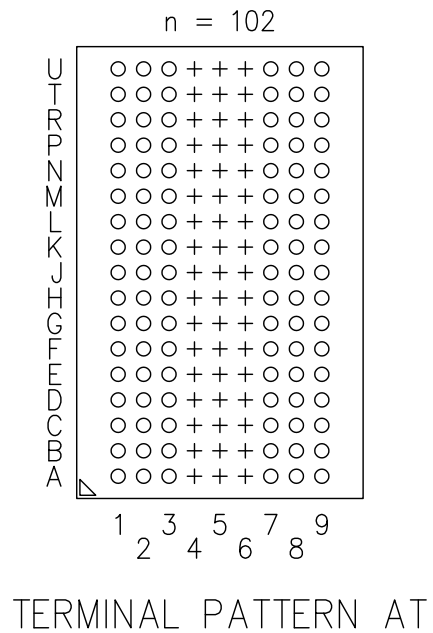
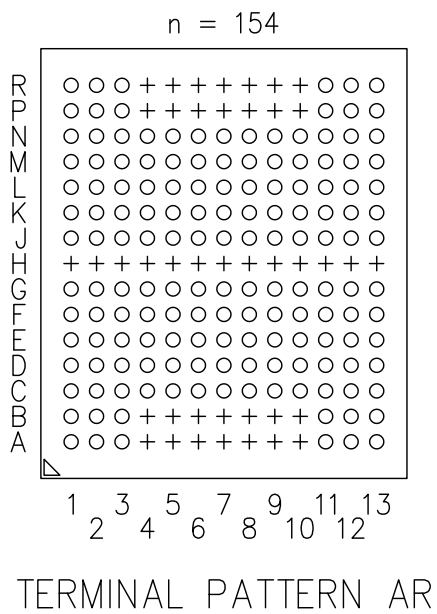
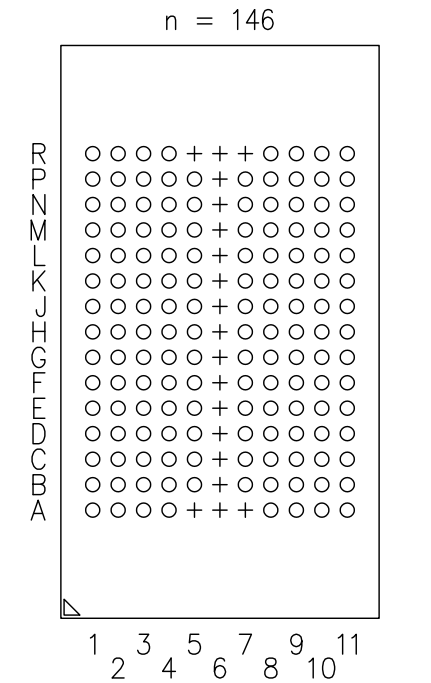
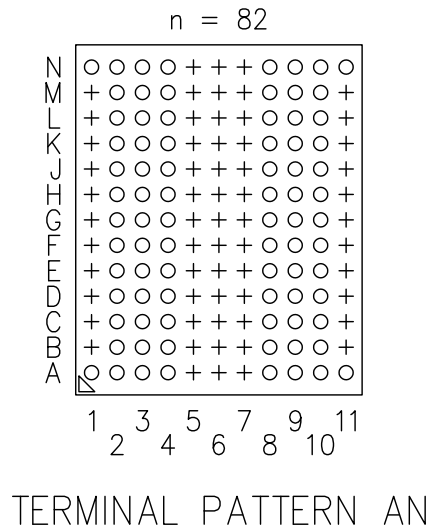
TERMINAL PATTERN AL



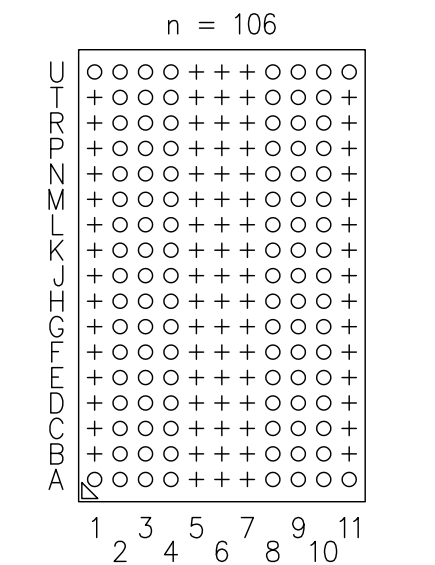
TERMINAL PATTERN AM



+ = DEPOPULATED TERMINAL POSITIONS



+ = DEPOPULATED TERMINAL POSITIONS



TERMINAL PATTERN AU



NOTES:

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

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 16 X 2220 MATRIX SIZE IS SHOWN FOR ILLUSTRATION ONLY.
SHEET 2 – A DEPOPULATED 16 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 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.

MICRON	US PATENT NO.: 6048753
TESSERA	US PATENT NO.: 5950304, 6133627

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

18. THE Z1 HEIGHT NEEDS TO BE ACCEPTABLE TO MANUFACTURING STANDARDS.

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

STP FILE NAME	DATE	ITEM NUMBER
MO-210P_PBGA-B82[143]_I0p8-R9p0x11p0Z#-C0p55Z0p24	JAN 2020	11-971
MO-210Q_PBGA-B78[117]_I0p8-R10p0x11p0Z#-C0p55Z0p24	JAN 2020	11-971
MO-210Q_PBGA-B96[144]_I0p8-R10p0x13p0Z#-C0p55Z0p24	JAN 2020	11-971
MO-210Q_PBGA-B96[144]_I0p8-R8p0x14p0Z#-C0p6Z0p27	JAN 2021	11-988
MO-210Q_PBGA-B102[153]_I0p9-R9p0x14p0Z#-C0p55Z0p24	JAN 2021	11-988
MO-210Q_PBGA-B106[187]_I0p9-R9p0x14p0Z#-C0p55Z0p24	JAN 2021	11-988
MO-210Q_PBGA-B102[153]_I0p9-R10p0x14p0Z#-C0p55Z0p24	JAN 2021	11-988
MO-210Q_PBGA-B106[187]_I0p9-R10p0x14p0Z#-C0p55Z0p24	JAN 2021	11-988
MO-210Q_PBGA-B82[143]_I0p8-R10p0x11p0Z#-C0p55Z0p24	JAN 2021	11-988
MO-210Q_PBGA-B146[165]_I0p8-R10p0x14p0Z#-C0p6Z0p27	JAN 2021	11-988
MO-210Q_PBGA-B146[165]_I0p8-R10p0x18p0Z#-C0p6Z0p27	JAN 2021	11-988
MO-210Q_PBGA-B154[195]_I0p8-R11p5x13p5Z#-C0p6Z0p27	JAN 2021	11-988
MO-210Q_PBGA-B154[195]_I0p8-R12p8x13p5Z#-C0p6Z0p27	JAN 2021	11-988
MO-210R_PBGA-B78[117]_I0p8-R7p5x11p0Z#-C0p55Z#	FEB 2023	11-1007
MO-210R_PBGA-B102[153]_I0p8-R7p5x14p0Z#-C0p55Z#	FEB 2023	11-1007
MO-210R_PBGA-B78[117]_I0p8-R8p0x11p0Z#-C0p55Z#	FEB 2023	11-1007
MO-210R_PBGA-B102[153]_I0p8-R8p0x14p0Z#-C0p55Z#	FEB 2023	11-1007

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: NOVEMBER 1998	ITEM NUMBER: 11-510
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CHANGE RECORD HISTORY:

ISSUE: J	DATE: AUGUST 2007	ITEM NUMBER: 11-754
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LOCATION:	CHANGED FROM:	CHANGED TO:
ALL SHEETS	NUMBERED 1-10	INSERTED NEW SHEET 7 RENUMBERED 1-11
SHEET 6		ADDED FOOTPRINT W
SHEET 7	NUMBERED 1-10	ADDED FOOTPRINTS: Y, AA, AB, AC, & AD
SHEET 8	NO TABLE NUMBERS	TABLES 1 & 2
SHEET 8	TABLES 1-3	RENUMBERED 3-5
SHEET 9 TABLE 3		ADDED VARIATIONS AV-1 TO AAM-1
SHEET 11 NOTE 3	JEDS 95-1, SPP-010	JEP95 SECTION 3 SPP-020
SHEET 11 NOTE 7	AND THE SEATING PLANE ARE	(SEATING PLANE) IS
SHEET 7	MISSING FOOTPRINT (ISSUE C-D)	ADDED FOOTPRINT AE
SHEET 9 VARIATION AF-1	FOOTPRINT C	FOOTPRINT AE

ISSUE: K	DATE: MARCH 2012	ITEM NUMBER: 11-855
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LOCATION:	CHANGED FROM:	CHANGED TO:
ALL SHEETS	THIN, FINE PITCH, RECTANGULAR BALL GRID ARRAY FAMILY...	UPDATED TO CURRENT FORMAT THIN, FINE PITCH, BALL GRID ARRAY FAMILY, RECTANGULAR,
SHEET 1	 aaa C 2X TERMINAL A1 CORNER ...	 aaa C \ominus TERMINAL A1 CORNER ...
SHEET 2	 ccc C nX  ϕ ddd (M) C A B  ϕ eee (M) C SECTION A-A	 ddd C  ϕ eee (M) C A B  ϕ fff (M) C SECTION C-C REMOVED DELTA FROM DETAIL B
SHEET 3 TABLE 2	SYMBOL ccc, ddd, and eee	SYMBOL ddd, eee, and fff

CHANGE RECORD

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ISSUE: K	DATE: MARCH 2012	ITEM NUMBER: 11-855
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEETS 3 – 6	SHEETS 8 – 10	SHEETS 3 – 6
SHEET 5		ADDED FOOTPRINT AF
SHEETS 7 – 13	SHEETS 3 – 7 WITH UP TO 6 FOOTPRINTS PER SHEET	SHEETS 7 – 13 WITH 4 FOOTPRINTS PER SHEET
SHEET 13		ADDED FOOTPRINT AF
SHEET 14	OLD NOTES FORMAT	CURRENT NOTES FORMAT AND UPDATED DELTA NUMBERS

ISSUE: K.01	DATE: JULY 2012	ITEM NUMBER: 11-855(E)
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LOCATION	CHANGED FROM:	CHANGED TO:
ALL SHEETS		NEW FORMAT
SHEET 13 FOOTPRINT AF	INCORRECTLY DRAWN WITH 8 COLUMNS OF I/O'S	REDRAWN WITH 10 COLUMNS OF I/O'S PER TABLE 3

ISSUE: L	DATE: MAY 2013	ITEM NUMBER: 11-877
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LOCATION	CHANGED FROM:	CHANGED TO:
ALL SHEETS	TITLE: THIN FINE PITCH BALL GRID ARRAY FAMILY...	TITLE: FINE PITCH BALL GRID ARRAY FAMILY..
SHEET 1	PKG DES: TFR-XBGA	PKG DES: (V, T, L)-XBGA
SHEET 3, TABLE 1	COMMON DIMENSIONS: SOLDER BALL VARIATIONS XX-1, XX-2 AND XX-3	COMMON DIMENSIONS: PACKAGE PROFILE HEIGHT WITH V,L AND STANDARD HEIGHTS ADDED
SHEET 4, TABLE 2		NEW TABLE FOR SOLDER BALL DIAMETERS
SHEET 4, TABLE 3	TABLE 2	TABLE 3
SHEET 5, TABLE 4		ADDED NEW VARIATION SCHEME REORDERED BASED ON D & E DIMENSION
SHEET 6 & 7, TABLE 5	TABLE 3	ADDED NEW VARIATION SCHEME REORDERED BASED ON D & E DIMENSION

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: L	DATE: MAY 2013	ITEM NUMBER: 11-877
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LOCATION	CHANGED FROM:	CHANGED TO:
SHEET 6 & 7, TABLE 5		ADDED NEW VARIATIONS P14.0x10.5-8045-144AG P14.0x11.0-8045-144AG P18.0x14.0-8045-272AH P18.0x14.0-8045-316AJ
SHEET 8, TABLE 6	TABLE 5	ADDED NEW VARIATION SCHEME REORDERED BASED ON D & E DIMENSION
SHEET 15		ADDED FOOTPRINT AG ADDED FOOTPRINT AH
SHEET 16		ADDED FOOTPRINT AJ
SHEET 17		ADDED TO NOTE 1: ... THIS OUTLINE CONFORMS TO JEP95, SECTION 4.6.
SHEET 18		ADDED NOTE 16: EXPLANATION OF VARIATION SCHEME

ISSUE: M	DATE: NOVEMBER 2013	ITEM NUMBER: 11-885
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 6		ADDED P14.0x10.0-8045-144AK
SHEET 16		ADDED FOOTPRINT AK

ISSUE: N	DATE: JANUARY 2016	ITEM NUMBER: 11-917
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 3		ADDED MIN 'A' DIMENSION
SHEET 6, TABLE 5		ADD VAR P11.0x9.0-8045-78AL
SHEET 16		ADDED FOOTPRINT AL
SHEET 18, NOTE 1	...JEP95, SECTION 4.6	...JEP95, SECTION 4.5
SHEET 18, NOTE 15	OLD PATENT NOTE STYLE	NEW PATENT NOTE STYLE
SHEET 18, NOTE 16	e - BALL PITCH K - FUTURE NEW PITCH L - 0.50 mm M - FUTURE NEW PITCH N - 0.40 mm	e - BALL PITCH K - 0.50 mm L - 0.40 mm

JEDEC SOLID STATE PRODUCT OUTLINE Copyright © 2023 JEDEC	TITLE PLASTIC BOTTOM GRID ARRAY BALL, 0.80MM PITCH RECTANGULAR FAMILY PACKAGE	NUMBER MO-210	ISSUE R	DATE FEB 2023	SHEET v
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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: 0	DATE: JUNE 2018	ITEM NUMBER: 11-953
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LOCATION:	CHANGED FROM:	CHANGED TO:
ALL SHEETS	FINE PITCH BALL GRID ARRAY...	BOTTOM GRID ARRAY...
SHEET 1	(V,T,L)FR-XBGA	PBGA-B...I80...
	DIMENSION eD and eE	DIMENSION e
SHEET 2		ADDED DIMENSIONS A5 AND A6
SHEETS 2 & 8	TOLERANCE bbb	TOLERANCE ccc
SHEETS 3-7		UPDATED TO CURRENT PROFILE HEIGHT CODES
SHEETS 9 - 12	VARIATION: PXX.X	VARIATION: PXX.XX
	VARIATION: ...-FM-...	VARIATION: ...-8030-...
	VARIATION: ...-FJ-...	VARIATION: ...-8045-...
	VARIATION: ...-FH-...	VARIATION: ...-8050-...
SHEETS 10 - 11, TABLE 6		ADDED: P18.00x12.00-8045-252AM
SHEET 20		ADDED FOOTPRINT AM
SHEETS 21 - 23		UPDATED NOTES TO CURRENT STANDARD FOR ALL BGA PACKAGES
SHEET 22, NOTE 17		ADDED PACKAGE PROFILE HEIGHT IS THE MAXIMUM ...
		ADDED PROFILE HEIGHT CODES
		BALL PITCH WAS LETTER CODES
		BALL DIA WAS LETTER CODES

ISSUE: P	DATE: JANUARY 2020	ITEM NUMBER: 11-971
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LOCATION:	CHANGED FROM:	CHANGED TO:
ALL SHEETS, TITLE	BOTTOM GRID ARRAY...	PLASTIC BOTTOM GRID ARRAY...
SHEET 1, PKG DESIGNATOR	PBGA-B...I80...	PBGA-B#[#]_I0p8...
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

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.

LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 5, TABLE 2	DELETED PACKAGE PROFILE HEIGHT 070 THRU 140 AND ASSOCIATED Z DIMENSION	ADDED $Z2(\text{MAX}) = Z(\text{MAX}) - Z1$
		ADDED $b(\text{NOM}) = 0.475$
SHEET 6, TABLE 3	0.300 BALL $A1 = 0.15$ $b \text{ MIN} = 0.25$ $b \text{ MAX} = 0.35$	0.300 BALL $Z1 = 0.13$ $b \text{ MIN} = 0.225$ $b \text{ MAX} = 0.375$
	0.450 BALL $A1 = 0.25$ $b \text{ MIN} = 0.40$ $b \text{ MAX} = 0.50$	0.450 BALL $Z1 = 0.22$ $b \text{ MIN} = 0.375$ $b \text{ MAX} = 0.525$
		ADDED 0.475 BALL DIAMETER
	0.500 BALL $b1 = 0.35$ $b \text{ MIN} = 0.45$ $b \text{ MAX} = 0.55$	0.500 BALL $b1 = 0.33$ $b \text{ MIN} = 0.425$ $b \text{ MAX} = 0.575$
SHEET 6, TABLE 4		ADDED 0.475 BALL DIAMETER
SHEETS 7 – 15 & 17	ADDED OLD VARIATION NOTE	
	ADDED NEW VARIATION SCHEME	
SHEET 16		ADDED 0.475 BALL TABLE
SHEETS 18 – 25	FOOTPRINT	TERMINAL PATTERN
SHEET 26		ADDED TERMINAL PATTERN AN
SHEET 27, NOTE 7	A FULLY POPULATED 16 X 20...	SHEET 1 – A FULLY POPULATED 16 X 22...
		ADDED SHEET 2 – A DEPOPULATED 16 X 20...
SHEET 28, NOTE 17	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

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: Q	DATE: JANUARY 2021	ITEM NUMBER: 11-988
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 6, TABLE 3		ADDED 0.525 NOM BALL
SHEET 7, TABLE 4		ADDED 0.525 NOM BALL
SHEET 17, TABLE 7		ADDED 10.00 X 11.00 82 BALL ADDED 9.00 X 14.00 102 BALL ADDED 10.00 X 14.00 102 BALL ADDED 9.00 X 14.00 106 BALL ADDED 9.00 X 14.00 106 BALL
SHEET 19, TABLE 9		ADDED 0.525 NOM BALL TABLE
SHEET 28 & 29		ADDED TERMINAL PATTERNS AP, AR, AT, AND AU

ISSUE: R	DATE: FEBRUARY 2023	ITEM NUMBER: 11-1007
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 4	A AND A2	Z AND Z2 RESPECTIVELY
SHEET 5	$Z2(\text{MAX}) = Z(\text{MAX}) - Z1(0.13)$ $Z2(\text{MAX}) = Z(\text{MAX}) - Z1(0.22)$ $Z2(\text{MAX}) = Z(\text{MAX}) - Z1(0.24)$ $Z2(\text{MAX}) = Z(\text{MAX}) - Z1(0.25)$ $Z2(\text{MAX}) = Z(\text{MAX}) - Z1(0.27)$	$Z2(\text{MAX}) = Z(\text{MAX}) - Z1$ $Z2(\text{MAX}) = Z(\text{MAX}) - Z1$ $Z2(\text{MAX}) = Z(\text{MAX}) - Z1$ $Z2(\text{MAX}) = Z(\text{MAX}) - Z1$ $Z2(\text{MAX}) = Z(\text{MAX}) - Z1$
SHEET 6	$Z1 = 0.13$ FOR b NOM = 0.300 $Z1 = 0.22$ FOR b NOM = 0.450 $Z1 = 0.24$ FOR b NOM = 0.475 $Z1 = 0.25$ FOR b NOM = 0.500 $Z1 = 0.27$ FOR b NOM = 0.525	$Z1 = \text{PACKAGE SPECIFIC}$ $Z1 = \text{PACKAGE SPECIFIC}$ $Z1 = \text{PACKAGE SPECIFIC}$ $Z1 = \text{PACKAGE SPECIFIC}$ $Z1 = \text{PACKAGE SPECIFIC}$
SHEET 17, TABLE 7		ADDED 7.50 X 11.00 78 BALL ADDED 7.50 X 14.00 102 BALL ADDED 8.00 X 11.00 78 BALL ADDED 8.00 X 14.00 102 BALL
SHEET 32		ADDED NOTE 18