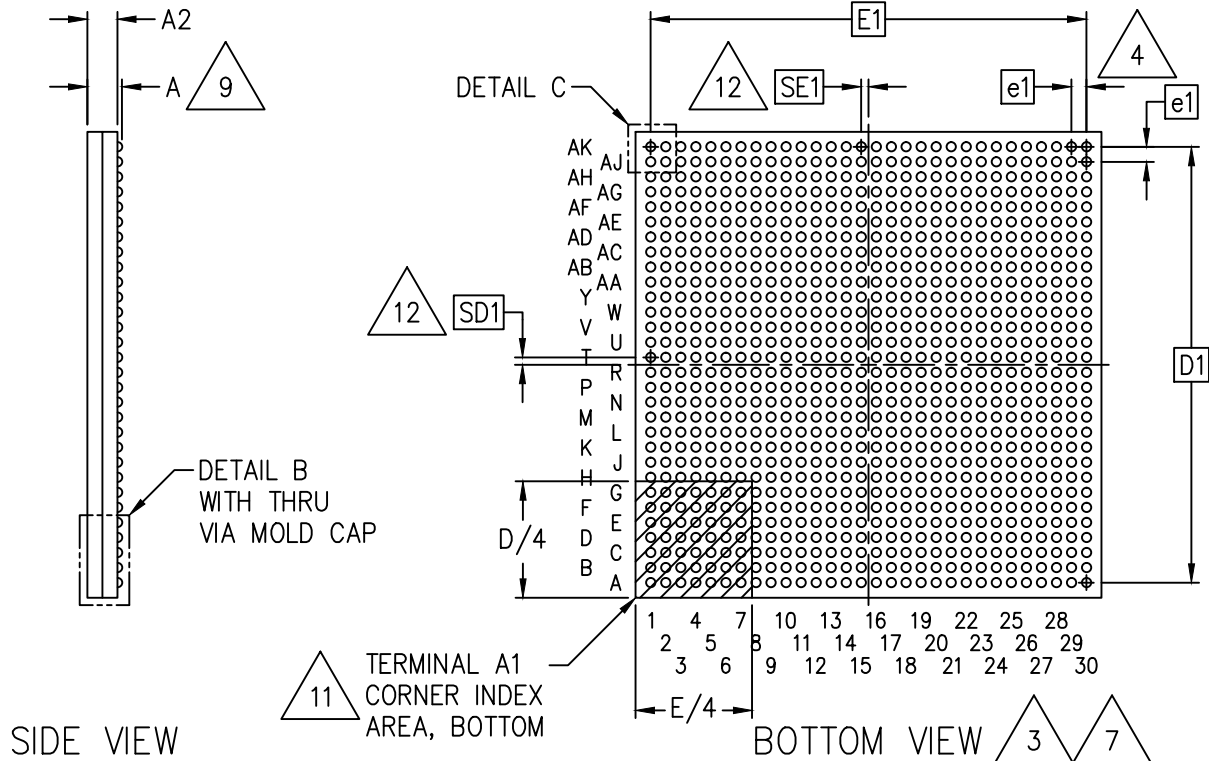
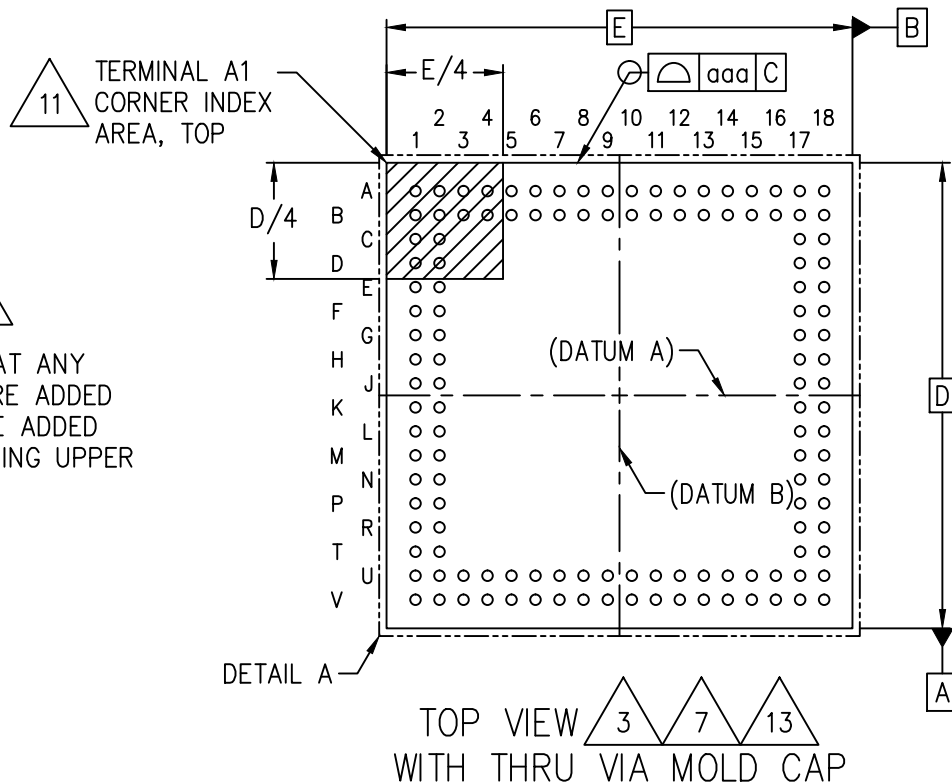


PATENT CLAIMS 16

IT IS REQUESTED THAT ANY FOOTPRINTS THAT ARE ADDED TO THIS MO ALSO BE ADDED TO THE CORRESPONDING UPPER POP PACKAGE.



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.

LOWER POP BALL GRID
ARRAY FAMILY, SQUARE,
0.80 MM TOP, 0.50 MM BOT PITCH

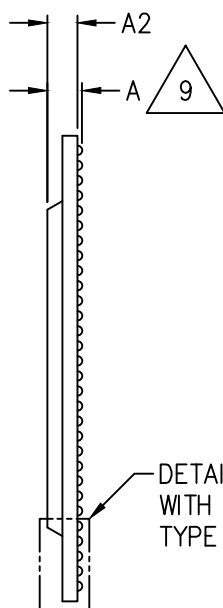
PACKAGE DESIGNATOR
S-XBGA

ITEM
MO-326

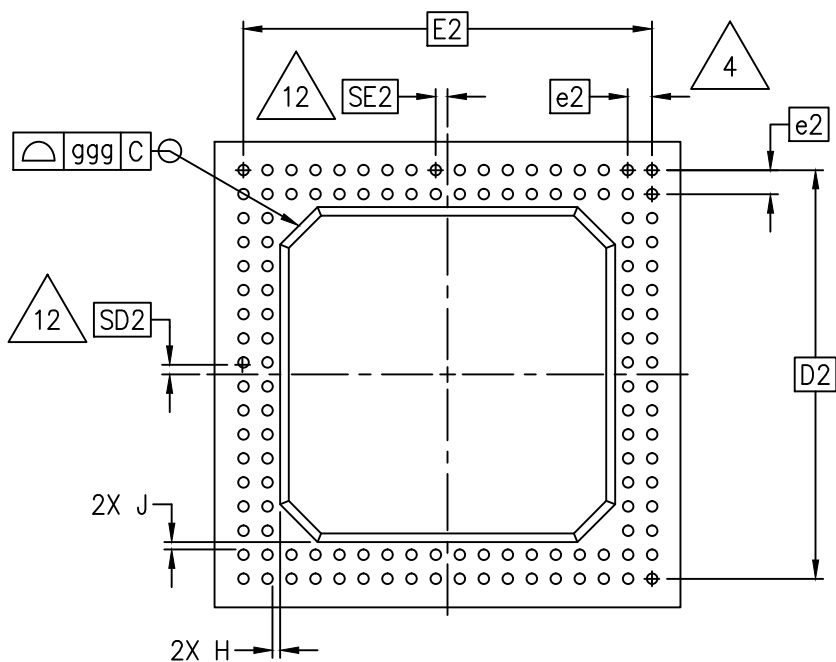
ISSUE
A

DATE
AUG 2016

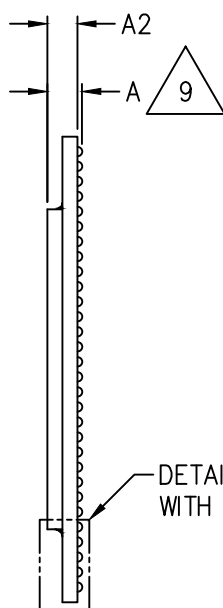
SHEET
1 OF 12



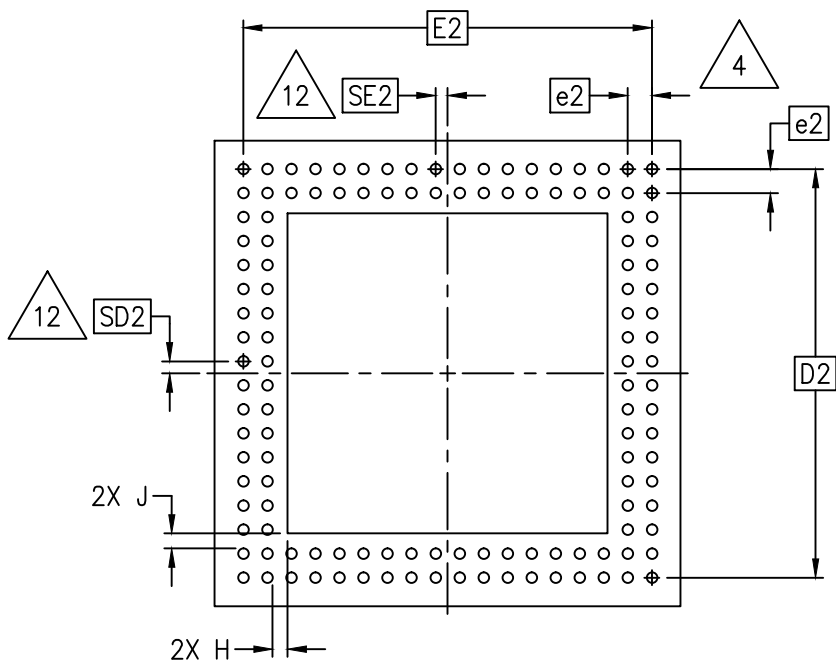
SIDE VIEW



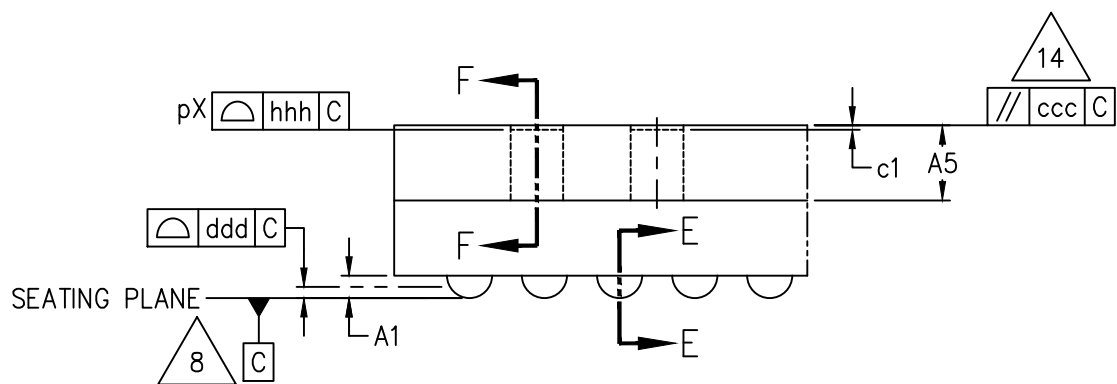
DETAIL A
WITH FLANGED TYPE MOLD CAP



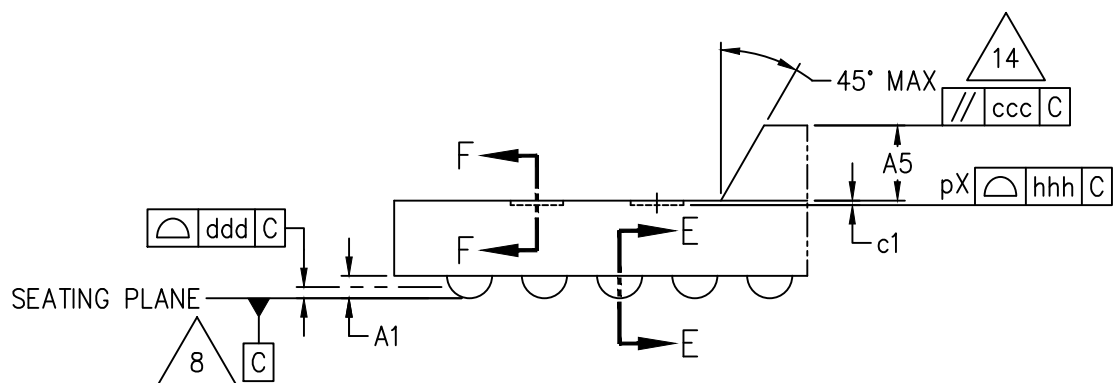
SIDE VIEW



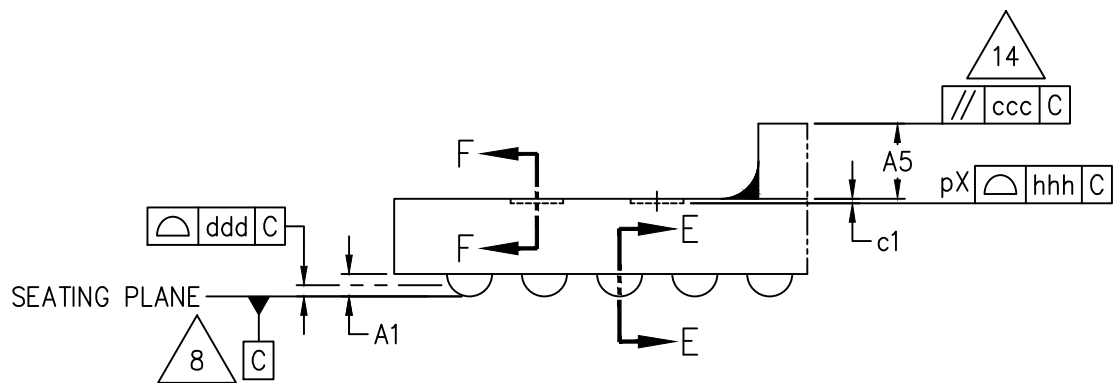
DETAIL A
WITH BARE DIE



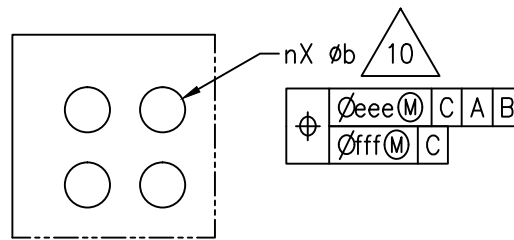
DETAIL B WITH THROUGH VIA MOLD CAP
(ROTATED 90° CW)



DETAIL B WITH FLANGED TYPE MOLD CAP
(ROTATED 90° CW)



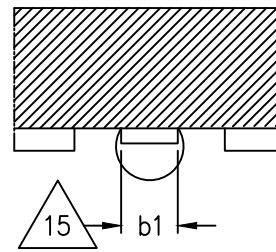
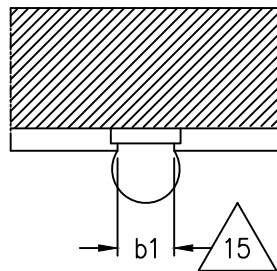
DETAIL B WITH BARE DIE
(ROTATED 90° CW)



DETAIL C
(PACKAGE BOTTOM)

TYPE 1 – SMD
(SOLDER MASK DEFINED)

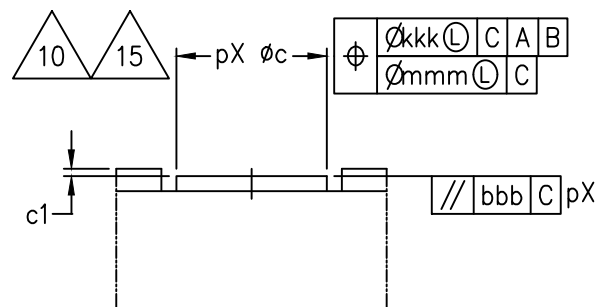
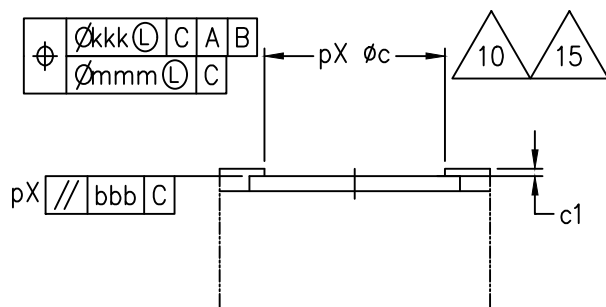
TYPE 2 – NSMD
(NON SOLDER MASK DEFINED)



SECTION E-E

TYPE 1 – SMD
(SOLDER MASK DEFINED)

TYPE 2 – NSMD
(NON SOLDER MASK DEFINED)



SECTION F-F

TABLE 1

COMMON DIMENSIONS						
SYMBOL	P = PACKAGE PROFILE HEIGHT					
	100			---		
	MIN	NOM	MAX	MIN	NOM	MAX
A	> 0.90	---	1.00	---	---	---
A2	---	---	0.85	---	---	---
A5	---	---	0.40	---	---	---
e1	0.50 BASIC					
e2	0.80 BASIC					
H	0.10	---	---	---	---	---
J	0.10	---	---	---	---	---
NOTES	1, 2, 4, 9, 18			-		
REF	11-928			-		
ISSUE	A			-		


TABLE 2

COMMON DIMENSIONS				
SYMBOL		(b) SOLDER BALL DIAMETER		
		MIN	NOM	MAX
A1		0.15	---	---
b		0.25	0.30	0.35
b1	TYPE 1	0.20	---	---
	TYPE 2	0.20	---	---
		(c) SOLDER LAND DIAMETER		
c		0.32	0.35	0.38
c1		---	---	0.40
NOTES		1, 2, 18		
REF		11-928		
ISSUE		A		

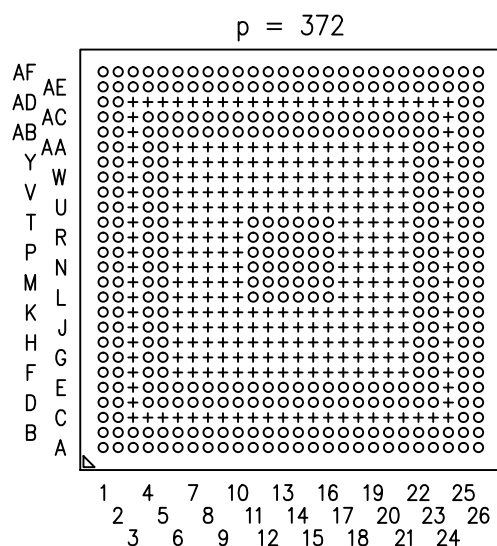
TABLE 3

TOLERANCE OF FORM AND POSITION		
SYMBOL	VALUE	
	b NOM = 0.30	
aaa	0.10	
bbb	0.10	
ccc	0.20	
ddd	D OR E	
	≤10.00	0.08
	> 10.00, < 14.00	0.10
	≥ 14.00	0.12
eee	0.15	
fff	0.05	
hhh	0.20	
ggg	0.15	
kkk	0.15	
mmm	0.08	
NOTES	1, 2	
REF	11-928	
ISSUE	A	

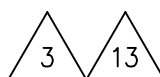
TABLE 4

øb = 0.30 MM NOMINAL															
VARIATION		OLD VARIATION	D BASIC	E BASIC	D2 BSC D1 BSC	E2 BSC E1 BSC	MD2 MD1	ME2 ME1	SD2 BSC SD1 BSC	SE2 BSC SE1 BSC	p n	P N	FOOT PRINT	REF	ISSUE
P14.0X14.0-F-120A		MO-266 CA	14.00	14.00	12.80 12.50	12.80 12.50	17	17	0.00	0.00	120	289	TA	11-928	A
P14.0X14.0-KM-372A							26	26	0.25	0.25	372	676	BA		
		NOTES	2	2	2	2	5	5	2, 12	2, 12	6	6	13		

BOTTOM VIEW

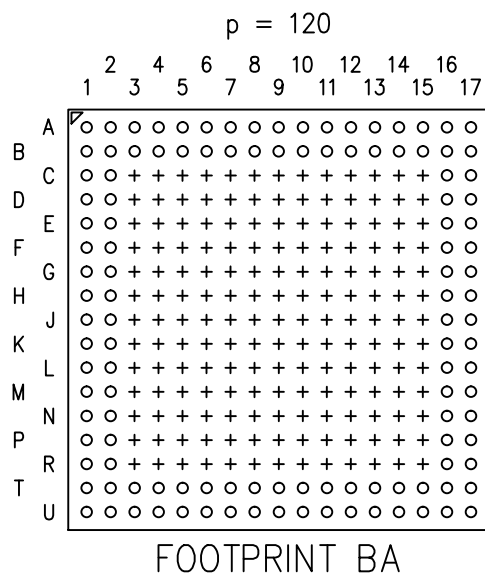


FOOTPRINT TA



+ = DEPOPULATED BALL POSITIONS

TOP VIEW



+ = DEPOPULATED BALL POSITIONS

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5–2009.
THIS OUTLINE CONFORMS TO JEP95, SECTION 4.22.

2. ALL DIMENSIONS ARE IN MILLIMETERS.



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



4 "e1" AND "e2" REPRESENT THE SOLDER BALL AND LAND GRID PITCH RESPECTIVELY.

5. (MD1 AND ME1) AND (MD2 AND ME2) REPRESENT THE MAXIMUM MATRIX SIZE
CORRESPONDING TO THE D AND E DIRECTIONS, RESPECTIVELY.

6. PACKAGE BOTTOM

n REPRESENTS THE ACTUAL NUMBER OF SOLDER BALLS AFTER DEPOPLUATION.

N REPRESENTS THE MAXIMUM NUMBER OF SOLDER BALLS FOR A FULL MATRIX, MD1 X ME1.
PACKAGE TOP

p REPRESENTS THE ACTUAL NUMBER OF SOLDER BALLS AFTER DEPOPLUATION.

P REPRESENTS THE MAXIMUM NUMBER OF SOLDER BALLS FOR A FULL MATRIX, MD2 X ME2.



7 PACKAGE BOTTOM

A FULLY POPULATED 30 X 30 MATRIX SIZE IS SHOWN FOR ILLUSTRATION ONLY.

PACKAGE TOP

A DEPOPULATED 30 X 30 MATRIX SIZE IS SHOWN FOR ILLUSTRATION ONLY.



8 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.



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



10 DIMENSION "b" IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER PARALLEL
TO DATUM C. DIMENSION "c" IS MEASURED AT THE LEAST LAND DIAMETER PARALLEL
TO DATUM C.



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



12 DIMENSIONS (SD1 AND SE1) AND (SD2 AND SE2) ARE MEASURED WITH RESPECT TO DATUM A
AND DATUM B AND DEFINE THE POSITION OF THE CENTER SOLDER BALL IN THE OUTER ROW.
WHEN THERE IS AN ODD NUMBER OF SOLDER BALLS IN THE OUTER ROW, (SD1 OR SE1)
OR (SD2 OR SE2) = 0
WHEN THERE IS AN EVEN NUMBER OF SOLDER BALLS IN THE OUTER ROW,
SD1 OR SD2 = $e/2$ AND SE1 OR SE2 = $e/2$.

13 SOLDER BALL AND/OR LAND DEPOPULATION IS ALLOWED. DEPOPULATION IS THE OMISSION OF SOLDER BALLS OR LANDS FROM A FULL MATRIX (MD1, ME1) OR (MD2, ME2).

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

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

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.

AMKOR TECHNOLOGIES	6,048,753
TESSERA	5,950,305 6,133,627

17 EXPLANATION OF VARIATION SCHEME.

PDD.DxEE.E–eb–nF

P = PACKAGE PROFILE HEIGHT CODE (DIMENSION A).

CONTINUES AS PER SPP–025

140 = $1.30 < A \leq 1.40$

130 = $1.20 < A \leq 1.30$

120 = $1.10 < A \leq 1.20$

110 = $1.00 < A \leq 1.10$

100 = $0.90 < A \leq 1.00$

090 = $0.80 < A \leq 0.90$

080 = $0.70 < A \leq 0.80$

070 = $0.60 < A \leq 0.70$

CONTINUES AS PER SPP–025

DD.D = PACKAGE BODY SIZE IN THE D DIMENSION (Y AXIS) TO 1 DECIMAL PLACE.

EE.E = PACKAGE BODY SIZE IN THE E DIMENSION (X AXIS) TO 1 DECIMAL PLACE.

EXAMPLE: D = 55.00 mm TO BE LISTED AS 55.0

D = 5.50 mm TO BE LISTED AS 5.5.

e = BALL PITCH PER THE FOLLOWING CODES.

A = FUTURE NEW BALL PITCH.

B = FUTURE NEW BALL PITCH.

C = 1.50 mm

D = 1.27 mm

E = 1.00 mm

F = 0.80 mm

G = 0.75 mm

H = 0.65 mm

J = FUTURE NEW PITCH

K = 0.50 mm

L = 0.40 mm

b = NOMINAL BALL DIAMETER.

A = FUTURE NEW BALL DIAMETER.

B = FUTURE NEW BALL DIAMETER.

C = 0.75 mm

D = 0.70 mm

E = 0.65 mm

F = 0.60 mm

G = 0.55 mm

H = 0.50 mm

J = 0.45 mm

K = 0.40 mm

L = 0.35 mm

M = 0.30 mm

N = 0.25 mm

P = 0.20 mm

R = 0.17 mm

n = ACTUAL SOLDER BALL COUNT.

F = FOOTPRINT LETTER.

APPLICATION NOTES:



DUE TO THE THICKNESS OF THE LID, ENCAPSULATION OR MOLD CAP OF THE BOTTOM PACKAGE, THE 'A5' VALUES DEFINED IN THIS OUTLINE SHOULD BE COMPATIBLE WITH THE SOLDER BALL VALUES OF THE CORRESPONDING UPPER PACKAGE. REFER TO JEP95 SECTION 4.22 FOR THE SUGGESTED VALUES. IF 'A1 MIN' OF THE UPPER PACKAGE IS SMALLER THAN THE 'A5 MAX' OF THE LOWER PACKAGE, ADDITION OF SOLDER PASTE MAY BE REQUIRED DURING THE ASSEMBLY OF THE TWO PACKAGES.

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: AUGUST 2016	ITEM NUMBER: 11-928
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CHANGE RECORD HISTORY:

INITIAL ISSUE: -	DATE: -	ITEM NUMBER: -
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LOCATION:	CHANGED FROM:	CHANGED TO: