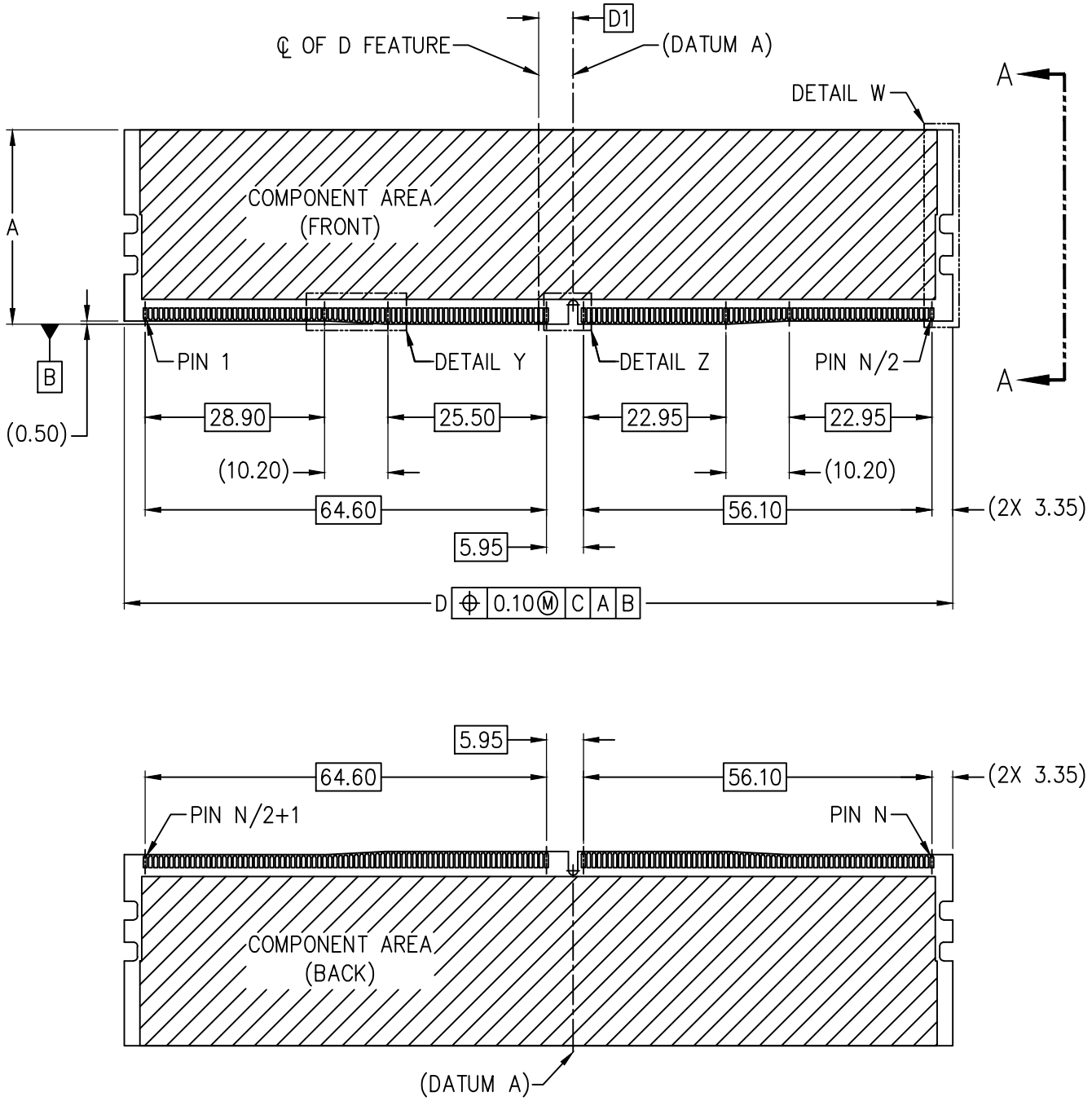
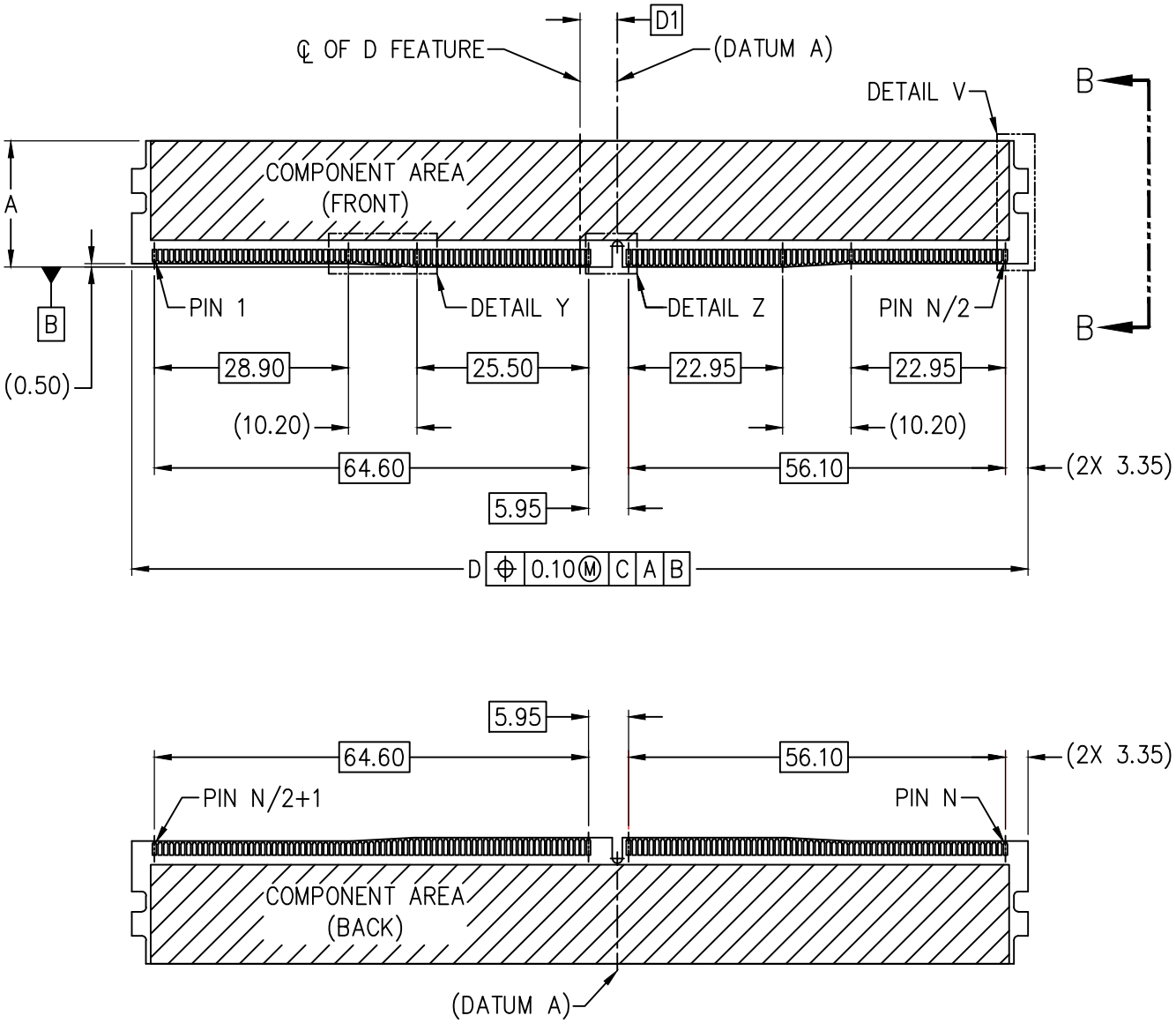
PATENT CLAIMS 13



VARIATIONS Axxx

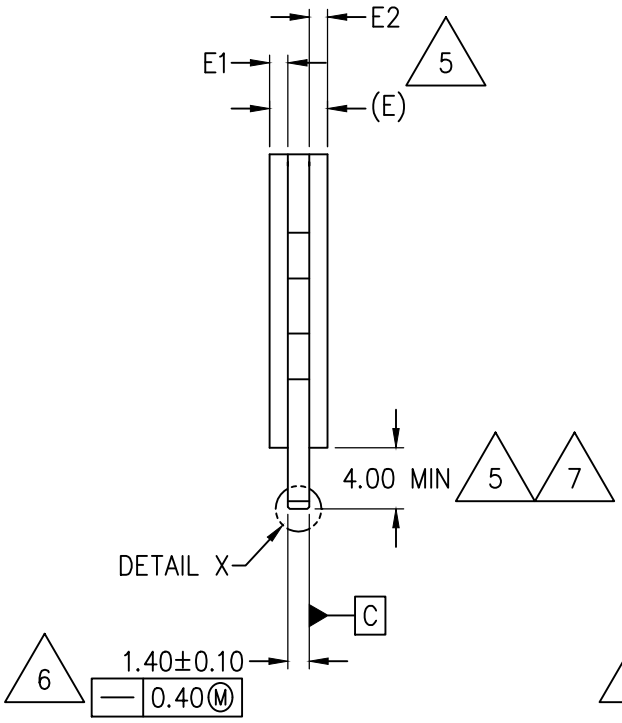
JEDEC SOLID STATE PRODUCT OUTLINE Copyright © 2015 JEDEC	THIS *REGISTERED OUTLINE* HAS BEEN PREPARED BY THE JEDEC JC-11 COMMITTEE AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY; CHANGES ARE LIKELY TO OCCUR.

TITLE	PACKAGE DESIGNATOR	NUMBER	ISSUE	DATE	SHEET
288 PIN DDR4 DIMM, 0.85 MM PITCH	DIMM	MO-309	F	MAR 2015	1 OF 13

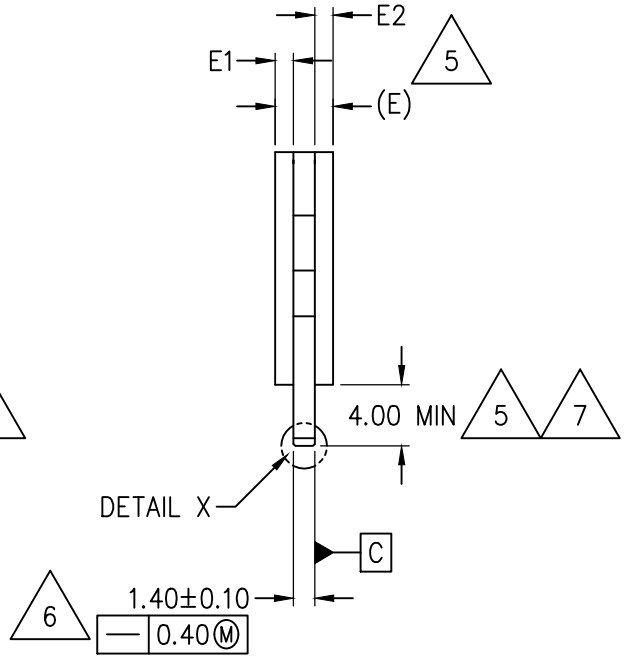


VARIATIONS Bxxx

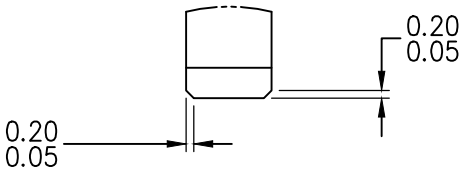
JEDEC SOLID STATE PRODUCT OUTLINE	TITLE	NUMBER	ISSUE	DATE	SHEET
Copyright © 2015 JEDEC	288 PIN DDR4 DIMM, 0.85 MM PITCH	MO-309	F	MAR 2015	2 OF 13



VIEW A–A

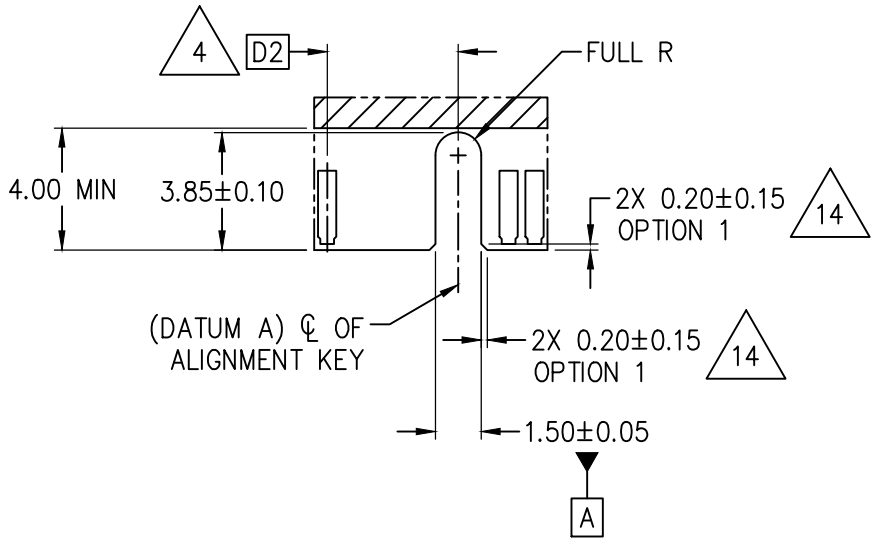


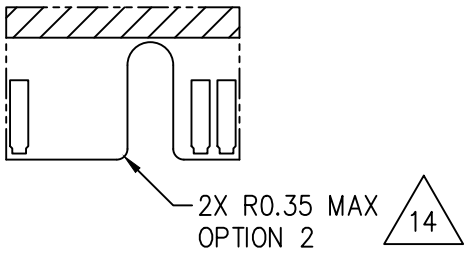
VIEW B–B



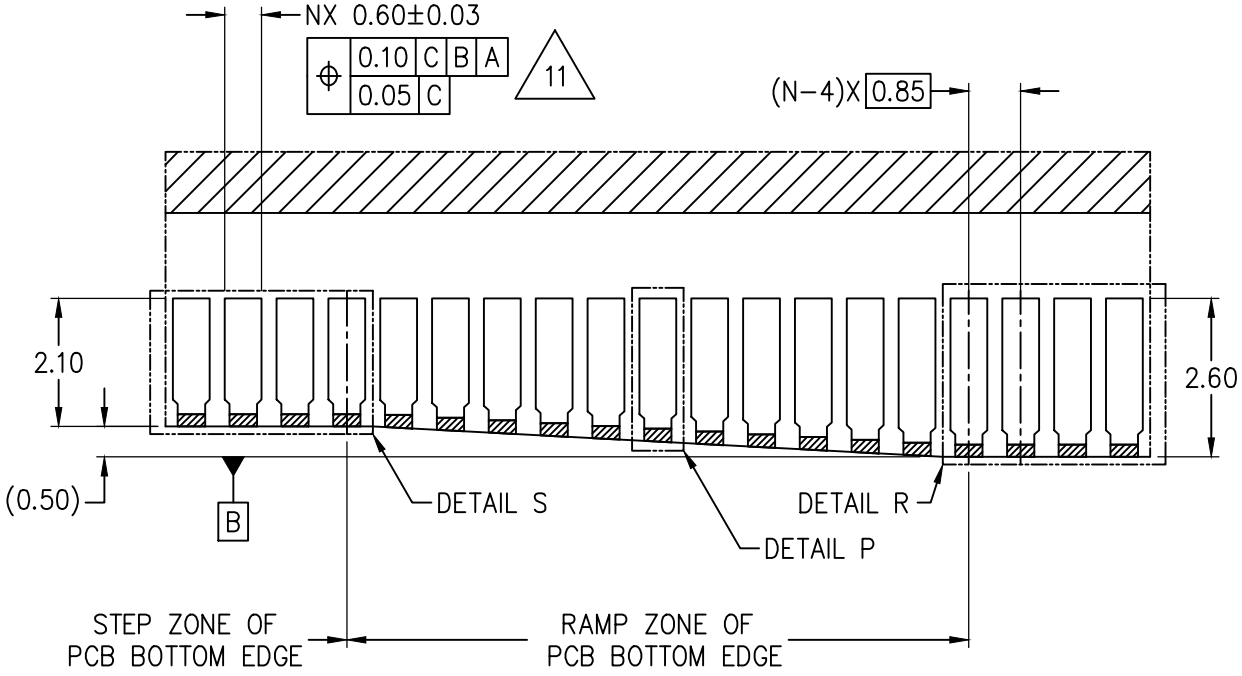
DETAIL X
(OPTIONAL)

10

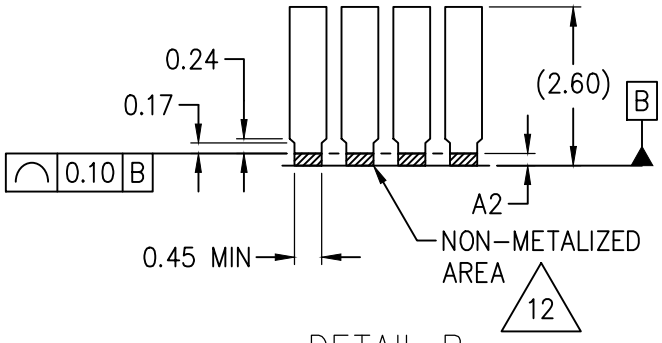

4
D2
FULL R
4.00 MIN
3.85±0.10
2X 0.20±0.15
OPTION 1
14
(DATUM A) ℄ OF
ALIGNMENT KEY
2X 0.20±0.15
OPTION 1
14
1.50±0.05
A


2X R0.35 MAX
OPTION 2
14

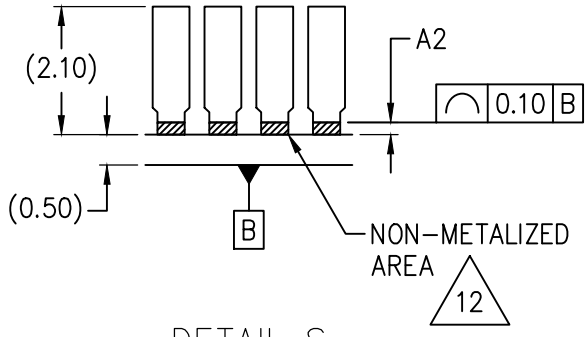
DETAIL Z



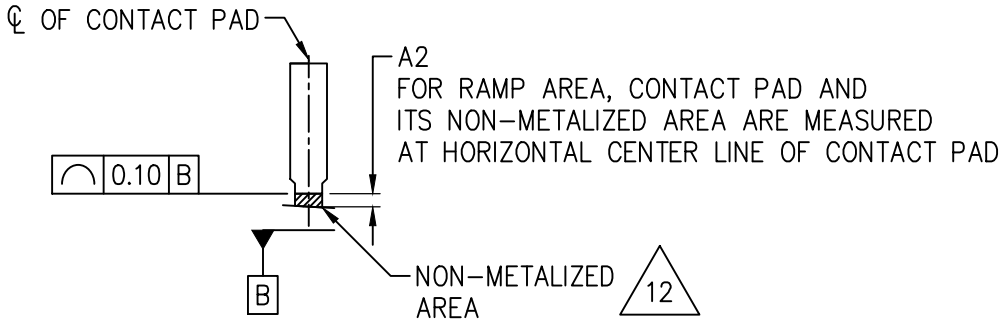
DETAIL Y



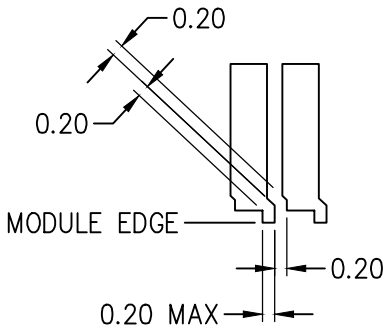
DETAIL R



DETAIL S

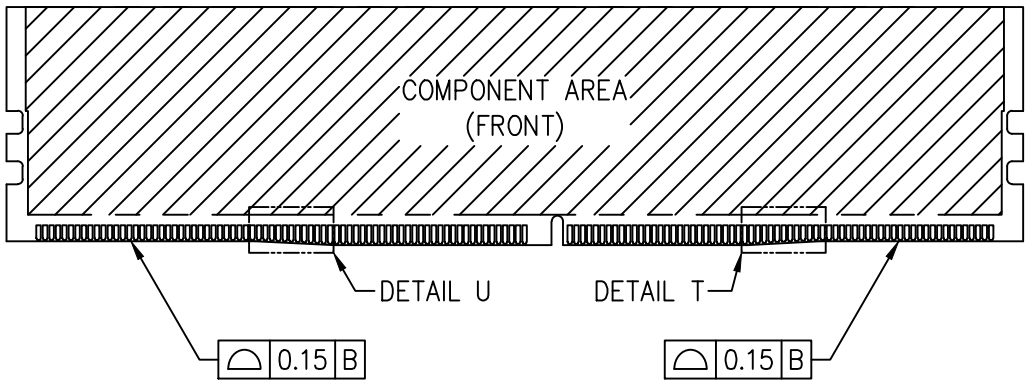


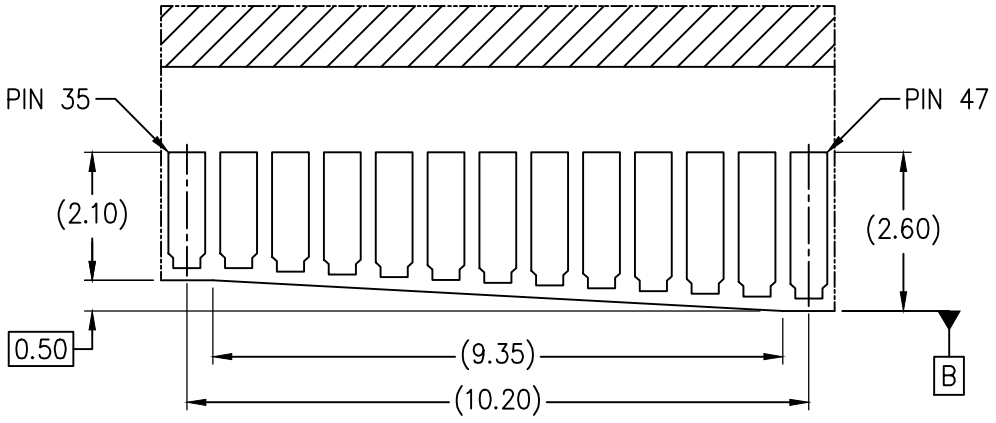
DETAIL P



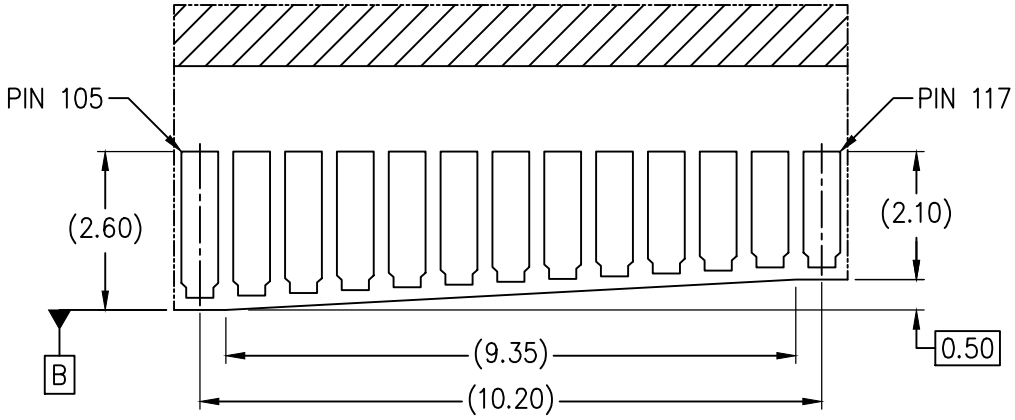
EXAMPLE OF TIE BAR
WITH CONTACT PAD

8

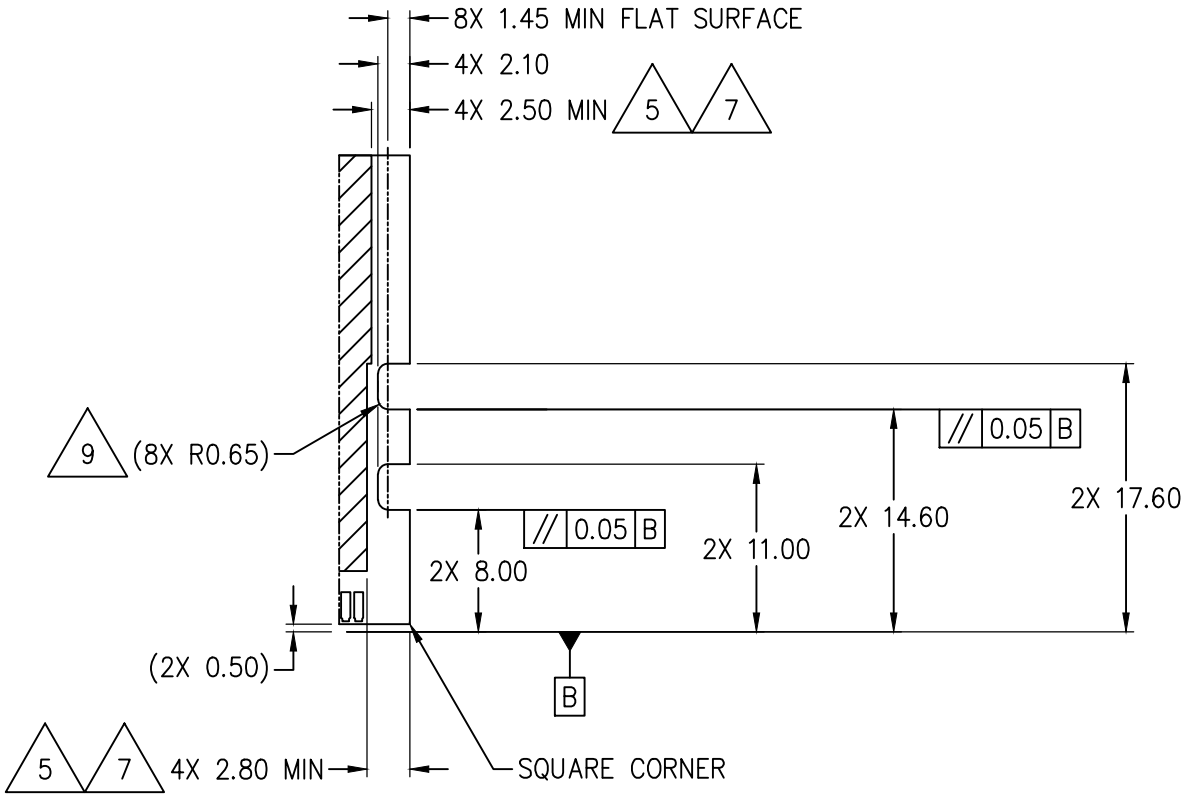


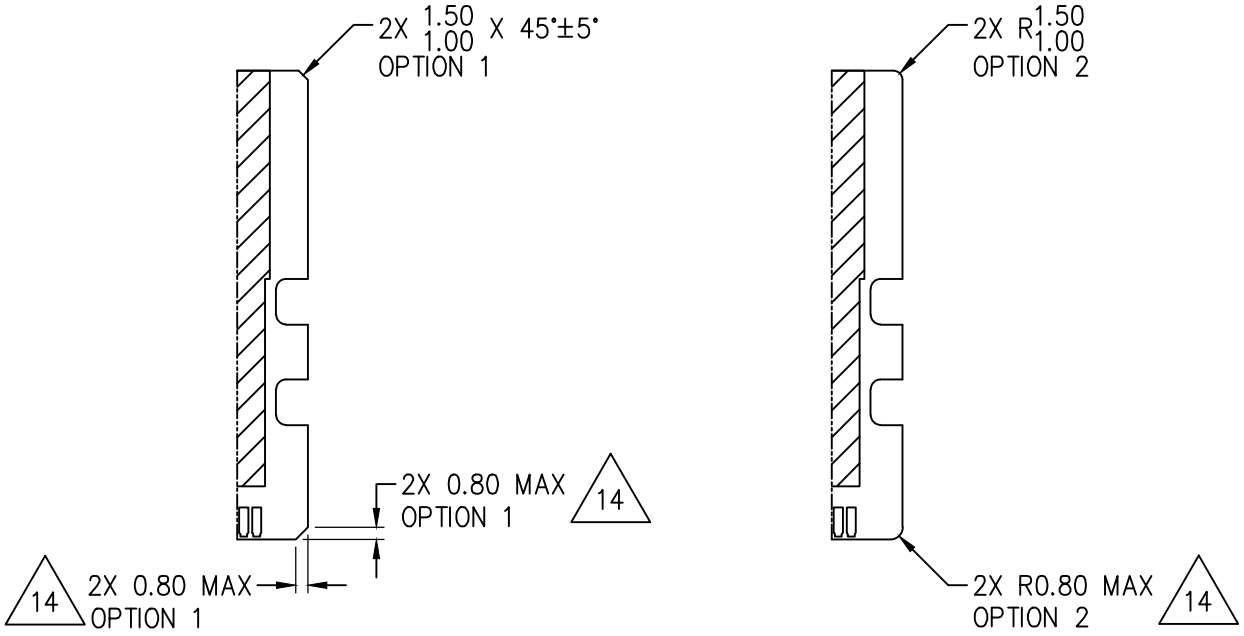


DETAIL U



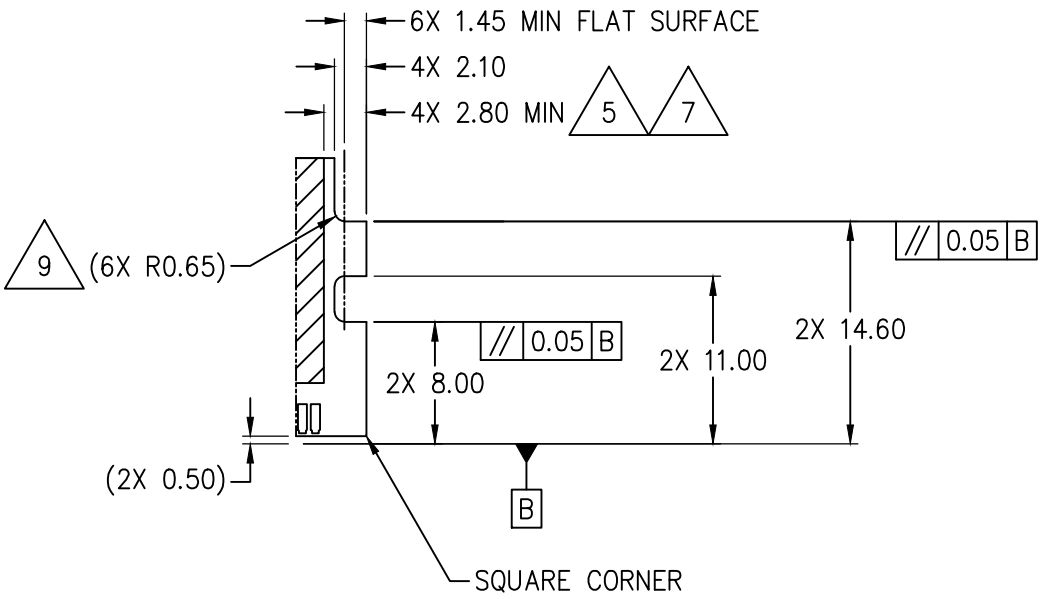
DETAIL T

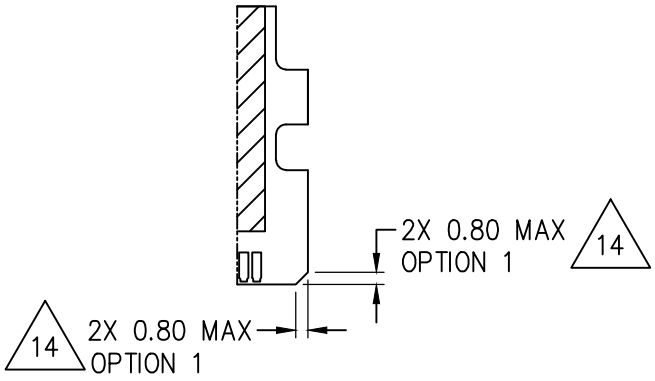


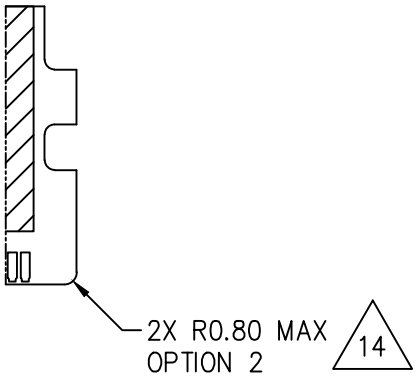


DETAIL W
ANY COMBINATION OF CHAMFER AND RADII CAN BE USED

JEDEC SOLID STATE PRODUCT OUTLINE	TITLE	NUMBER	ISSUE	DATE	SHEET
Copyright © 2015 JEDEC	288 PIN DDR4 DIMM, 0.85 MM PITCH	MO-309	F	MAR 2015	8 OF 13


6X 1.45 MIN FLAT SURFACE
4X 2.10
4X 2.80 MIN
5
7
9
(6X R0.65)
// 0.05 B
2X 14.60
// 0.05 B
2X 11.00
2X 8.00
(2X 0.50)
B
SQUARE CORNER


2X 0.80 MAX
OPTION 1
14
14
2X 0.80 MAX
OPTION 1


2X R0.80 MAX
OPTION 2
14

DETAIL V

TABLE 1

COMMON DIMENSIONS				
SYMBOL ▼	MIN	NOM	MAX	NOTES
A2	0.10	0.25	0.40	5, 7
D	133.20	133.35	133.50	5, 7
N		288		
NOTES	1, 2, 3			
REF	14–149. 14–154			
ISSUE	B			

TABLE 2

DIMM TYPE VARIATIONS			
VARIATION ▶	xxxA	xxxB	NOTES
SYMBOL ▼	DDR4 DIMM	–	
D1	5.575 BASIC	–	4
D2	4.30 BASIC	–	4
NOTES	1, 2, 3		
REF	14–144		
ISSUE	A		

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TABLE 3

MODULE HEIGHT VARIATIONS			
VARIATION ▶	Axxx	Bxxx	Cxxx
SYMBOL ▼	A		
MIN	31.10	18.60	–
NOM	31.25	18.75	–
MAX	31.40	18.90	–
NOTES	1, 2, 3	1, 2, 3	–
REF	14–144	14–144	–
ISSUE	A	A	–

TABLE 4

MODULE THICKNESS VARIATIONS			
VARIATION ▶	xAxx	xBxx	xCxx
SYMBOL ▼	MAX	MAX	MAX
(E)	4.10	4.90	7.30
E1	1.40	1.70	2.90
E2	1.40	1.70	2.90
NOTES	5		
REF	14–144, 14–167	14–144	14–154
ISSUE	E	A	B

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NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5–2009.

2. TOLERANCES ON ALL DIMENSIONS ±0.15 UNLESS OTHERWISE SPECIFIED.

3. ALL DIMENSIONS ARE MM.

4 THE POSITION OF THE ALIGNMENT KEY DOES NOT DEFINE THE MODULE VOLTAGE. THE JC–45 COMMITTEE CONTROLS THIS INFORMATION. IT IS SHOWN HERE FOR REFERENCE ONLY, AND SUBJECT TO CHANGE.

5 DIMENSIONS APPLICABLE WHEN COMPONENTS MOUNTED ON BOTH SIDES.

6 CARD THICKNESS APPLIES ACROSS TABS AND INCLUDES PLATING AND/OR METALIZED AREAS.

7 BORDER OF COMPONENT AREA.

8 EDGE OF CONTACT PADS AND TIE BARS, IF PRESENT, SHALL BE FREE OF BURRS.

9 THE (R0.65) DIMENSION IS FOR REFERENCE ONLY. THE 1.45MM MIN FLAT SURFACE AND THE 2.10 DIMENSIONS CONTROL THE FEATURE.

APPLICATION NOTES:

10 THE ADDITION OF THIS BEVEL IS A FABRICATION OPTION AND IS NOT REQUIRED. THE BEVEL IS NOT TO HIT THE PLATED CONTACTS. THE BEVEL MUST BE APPLIED ACROSS ENTIRE LENGTH OF MODULE AND BE FREE OF BURRS

11 PLATING FOR CONTACT PADS ARE:
1) VARIATION xxAx: GOLD PLATING 0.76 MICROMETERS MINIMUM OVER 2.00 MICROMETERS MINIMUM NICKEL.
2) VARIATION xxBx: GOLD PLATING 0.05 MICROMETERS MINIMUM OVER 0.25 MICROMETERS MINIMUM PALLADIUM OVER 2.00 MICROMETERS MINIMUM NICKEL.
3) VARIATION xxCx: GOLD PLATING 0.05 MICROMETERS MINIMUM OVER 2.00 MICROMETERS MINIMUM NICKEL.
MODULE PLATING RECOMMENDATIONS TESTED PER INDUSTRY STANDARD EIA 364–1000. RELIABILITY TESTING REQUIRES TEST MODULE, CONNECTOR, AND IDENTIFICATION OF TEST CONDITIONS.

12 'METALIZED' IS DEFINED AS ANY METAL SURFACE THAT HAS A RETURN PATH TO POWER SUPPLY OR GROUND, THROUGH A COMPONENT OR CONDUCTIVE PLANE VCC OR VDD, BLIND OR PLATED THROUGH HOLE (PTH), AS WELL AS NARROW OR WIDE TRACES. ANY SURFACE METALS SUCH AS CONNECTOR PIN IDENTIFICATION, PCB VENDER CODE, ETC. THAT DO NOT HAVE A METALS AS A RETURN PATH ARE ACCEPTABLE. 'NON–METALIZED' IS DEFINED AS THE OPPOSITE TO 'METALIZED' AND DOES NOT INCLUDE ANY METAL OR CONDUCTIVE ELEMENTS THAT MAY CAUSE ELECTRICAL SHORT CIRCUIT. HOWEVER, ANY SURFACE METALS SUCH AS CONNECTOR PIN IDENTIFICATION, PCB VENDOR NAME OR CODE, ETC. THAT DOES NOT HAVE CONDUCTIVE RETURN PATH TO VCC OR VDD IS ACCEPTABLE.

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13 PATENT CLAIM:
U.S. PATENT 7,547,213 HELD BY MICRON TECHNOLOGIES MAY BE RELATED TO CERTAIN IMPLEMENTATIONS OF THIS PACKAGE OUTLINE.

14 LOWER CHAMFER OR RADIUS IS OPTIONAL.

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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.

INITIAL ISSUE: A	DATE: JULY 2012	ITEM NUMBER: 14–144

CHANGE RECORD HISTORY:

ISSUE: B	DATE: JUNE 2013	ITEM NUMBER: 14–149

LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 3, VIEW A–A, VIEW B–B	A2	4.00 MIN
SHEET 3, VIEW A–A, VIEW B–B	E1 & E2 INCLUDED SUBSTRATE	E1 & E2 EXCLUDED SUBSTRATE
SHEET 3, VIEW A–A, VIEW B–B AND DETAIL X		ADDED LINES TO SHOW RAMP AREA
SHEET 5, DETAIL Y		ADDED DETAIL P
SHEET 5, BOTTOM OF CONTACT PAD IN DETAIL S, DETAIL R		ADDED PROFILE TOLERANCE OF LINE
SHEET 5, A2 IN DETAIL S, DETAIL R	A2 WAS DEFINED AS LENGTH FROM DATUM B TO BOTTOM OF CONTACT PAD	A2 WAS DEFINED AS LENGTH FROM PCB BOTTOM TO BOTTOM OF CONTACT PAD
SHEET 9, A2 IN TABLE 1	MIN: 0.05 NOM: 0.20 MAX: 0.35	MIN: 0.10 NOM: 0.25 MAX: 0.40

ISSUE: B	DATE: JUNE 2013	ITEM NUMBER: 14–152

LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 7, DETAIL W		ADDED NOTCH AT 8MM FROM DATUM B
SHEET 8, DETAIL V		ADDED NOTCH AT 8MM FROM DATUM B
SHEET 4, DETAIL Z	±0.10	±0.05

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: B	DATE: SEPTEMBER 2013	ITEM NUMBER: 14–154

LOCATION:	CHANGED FROM:	CHANGED TO:
ALL SHEETS, TITLE	284 PIN DDR4 DIMM ...	288 PIN DDR4 DIMM ...
SHEET 1	28.05, 63.75, 22.10, 4.20, & 55.25	ADDED A PIN TO EACH END MOVED PIN NUMBERS TO ADDED PINS 28.90, 64.60, 22.95, 3.55, & 56.10 RESPECTIVELY
SHEET 2	28.05, 63.75, 22.10, 4.20, & 55.25	ADDED A PIN TO EACH END MOVED PIN NUMBERS TO ADDED PINS 28.90, 64.60, 22.95, 3.55, & 56.10 RESPECTIVELY
SHEET 3	2X CHAMFER	4X CHAMFER DELETED EXAMPLE OF TIE BAR WITH CONTACT PAD
SHEET 4	4.00 2X 0.11 MAX 2X R0.20 MAX	4.00 MIN 2X 0.20±0.15 2X R0.35 MAX
SHEET 5	4.00 2X 0.11 MAX 2X R0.20 MAX	DELETED DETAIL P 4.00 MIN 2X 0.20±0.15 2X R0.35 MAX
SHEET 6		ADDED DETAIL P ADDED EXAMPLE OF TIE BAR WITH CONTACT PAD
SHEET 7	SHEET 6, PIN 34, PIN 46 SHEET 6, PIN 104, PIN 116	SHEET 7, PIN 35, PIN 47 SHEET 7, PIN 105, PIN 117
SHEETS 8 & 9	SHEET 7 & 8	SHEET 8 & 9, ADDED PIN
SHEET 10, TABLE 1	SHEET 9, 284	SHEET 10, 288
SHEET 11, TABLE 4	SHEET 10, xCxx '–' FOR VALUES OF SYMBOLS (E), E1, & E2	SHEET 11, xCxx 7.30, 2.90, & 2.90 FOR VALUES RESPECTIVELY

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: C	DATE: DECEMBER 2013	ITEM NUMBER: 14–158

LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 8	4X OPTION 1 & 2 TOP CHAMFER/RADII WAS 0.60 MAX	2X OPTION 1 & 2 2X 1.5–1.0 CHAMFER 2X R1.5–1.0 ADDED COMBINATION COMMENT
SHEET 13, NOTE 14	OPTIONAL CHAMFER OR RADIUS	LOWER CHAMFER OR RADIUS IS OPTIONAL

INITIAL ISSUE: D	DATE: MAY 2014	ITEM NUMBER: 14–166

LOCATION:	CHANGED FROM:	CHANGED TO:
SHEETS 8 & 9	OPTION 1: 2X 0.60 MAX OPTION 2: 2X R0.60 MAX	OPTION 1: 2X 0.80 MAX OPTION 1: 2X 0.80 MAX OPTION 2: 2X R0.80 MAX

INITIAL ISSUE: E	DATE: AUGUST 2014	ITEM NUMBER: 14–167

LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 11	(E)–3.90, E1–1.20, E2–1.20	(E)–4.10, E1–1.40, E2–1.40

INITIAL ISSUE: F	DATE: MARCH 2015	ITEM NUMBER: 14–176

LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 12, NOTE 10	N/A	ADDED CONTINUOUS BEVEL STATEMENT