

VARIATION: AAxA 15
SINGLE DIE ASSEMBLY SHOWN

12 PATENT CLAIMS

JEDEC SOLID STATE
PRODUCT OUTLINE
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AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY;
CHANGES ARE LIKELY TO OCCUR.

TITLE 288 TERM DDR5 DIMM,
0.85 MM PITCH,
MICROELECTRONIC ASSEMBLY

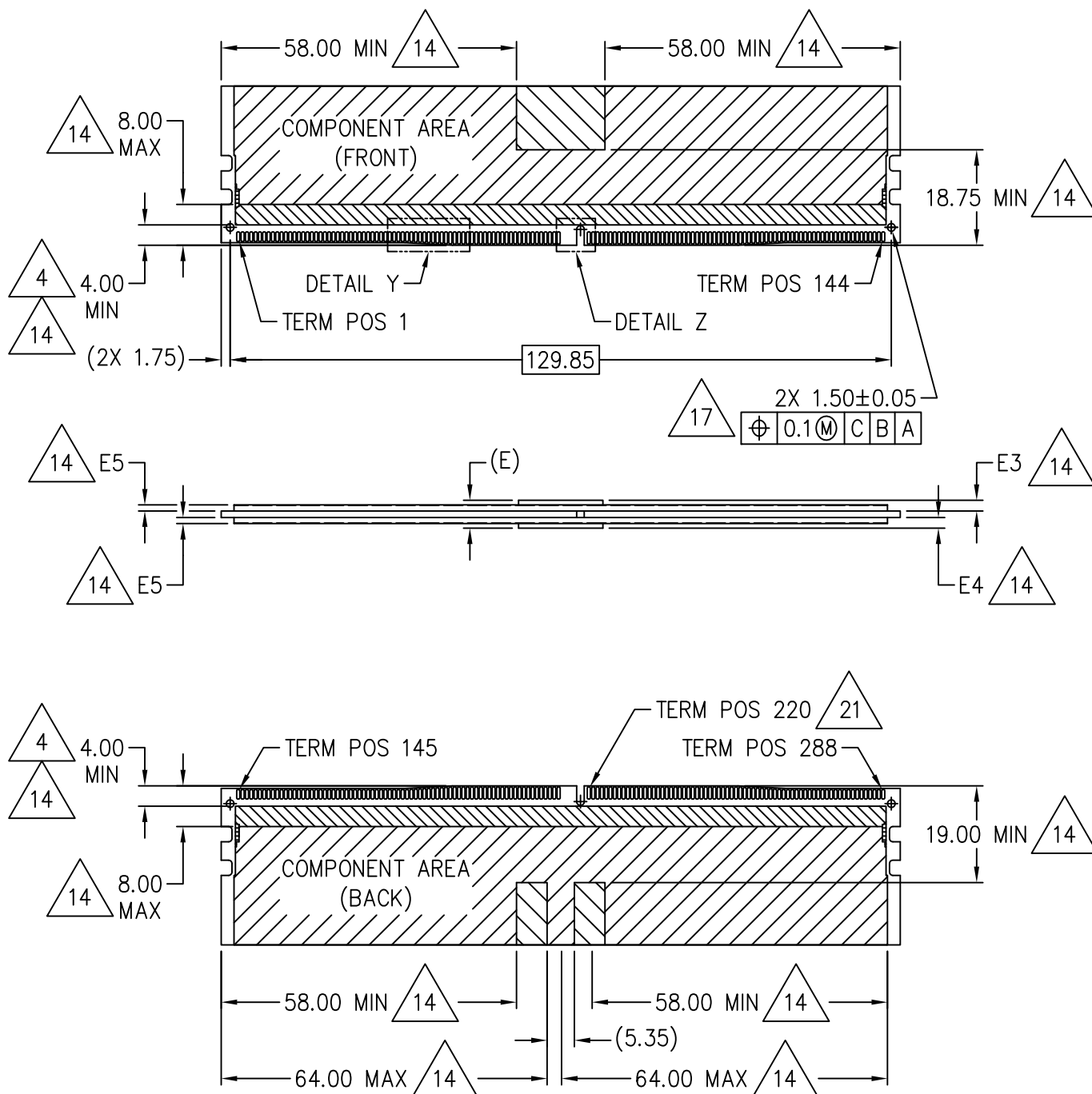
PACKAGE DESIGNATOR
PDMA-N288_l0p85-...

NUMBER
MO-329

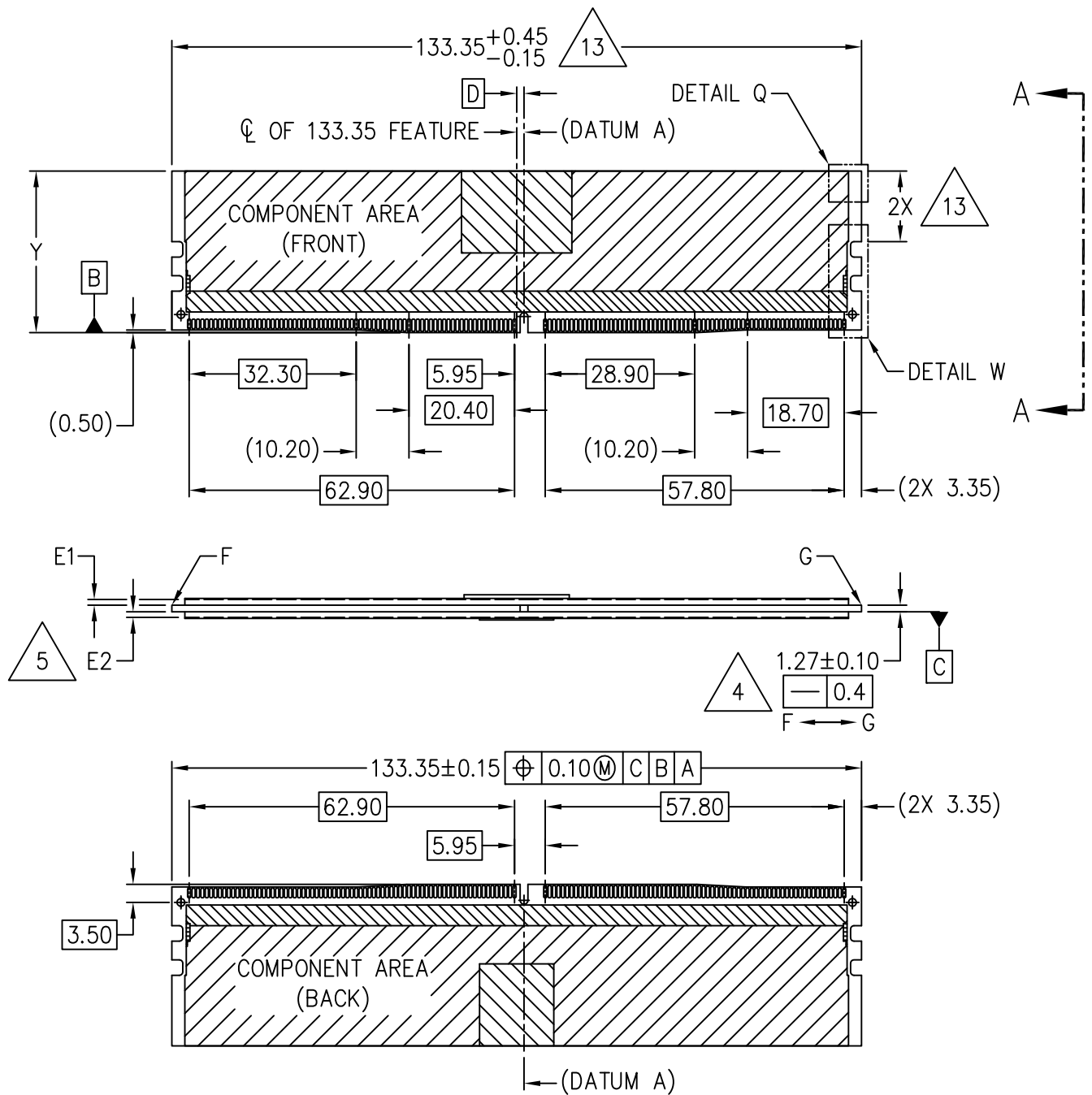
ISSUE
H.01

DATE
JUN 2024

SHEET
1 OF 19

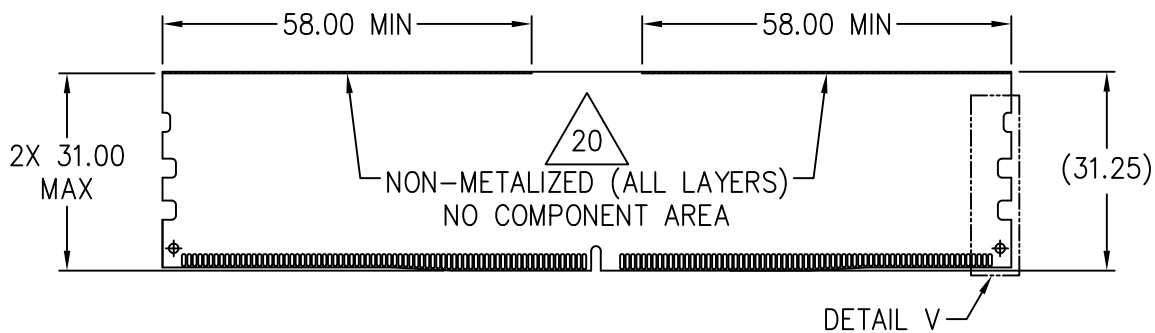


VARIATION: AAxA¹⁵
SINGLE DIE ASSEMBLY SHOWN

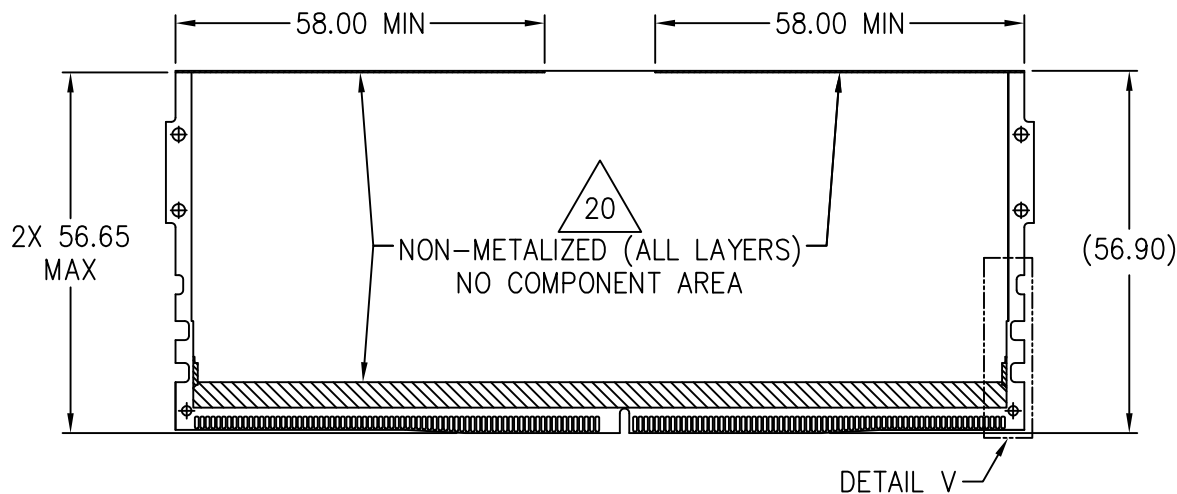


VARIATION: ABxB 15

JEDEC SOLID STATE PRODUCT OUTLINE Copyright © 2024 JEDEC	TITLE 288 TERM DDR5 DIMM, 0.85 MM PITCH, MICROELECTRONIC ASSEMBLY	NUMBER MO-329	ISSUE H.01	DATE JUN 2024	SHEET 3 OF 19
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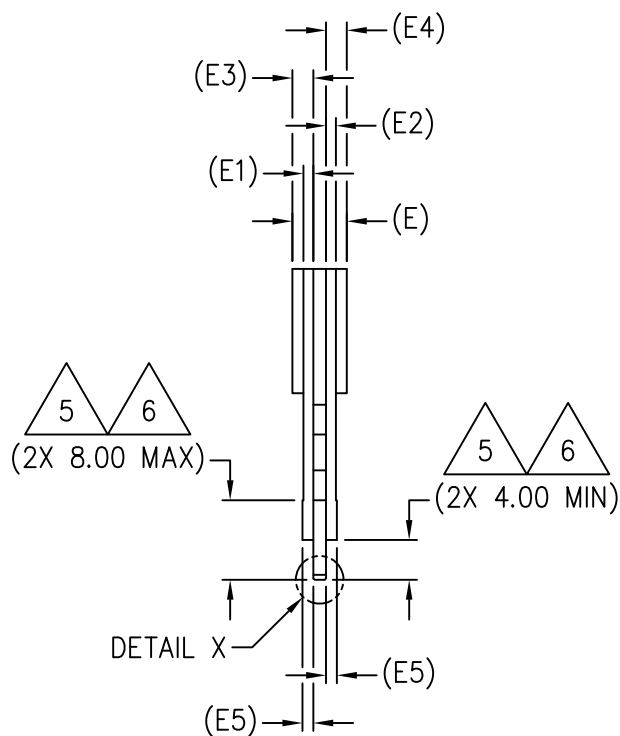


(OPTIONAL)

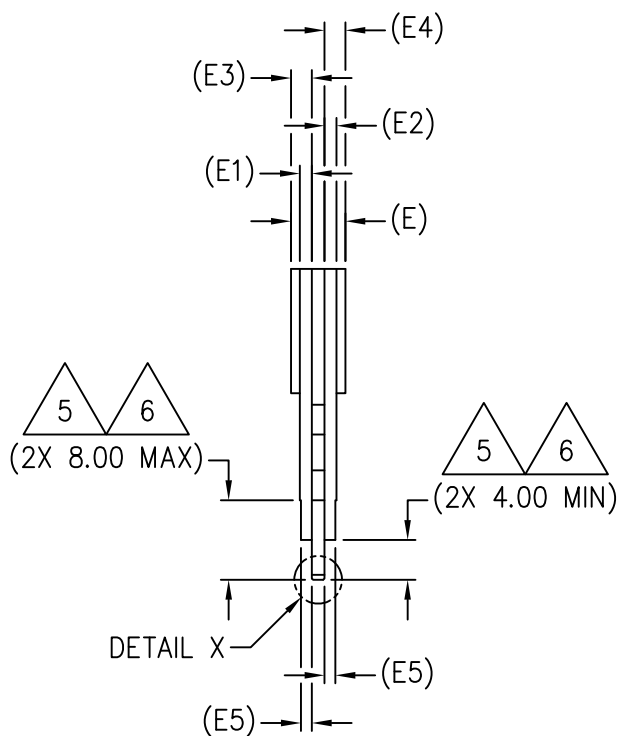


(OPTIONAL)

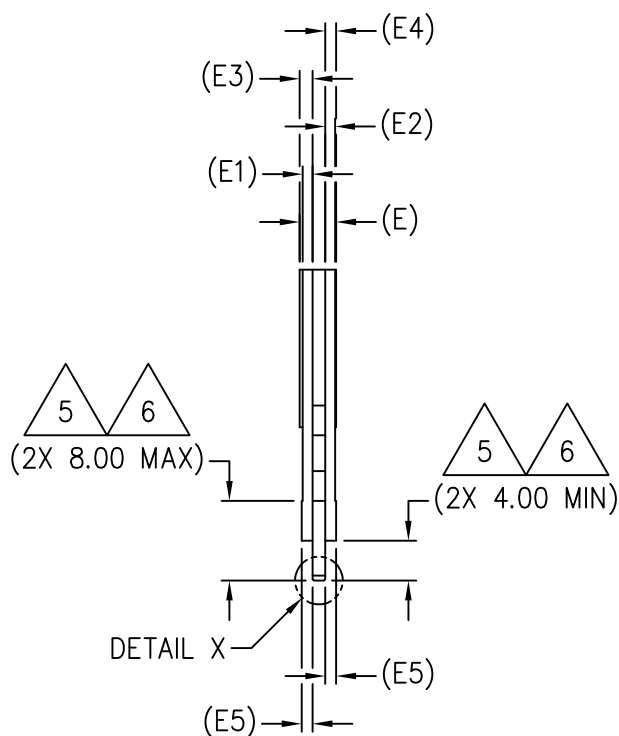
VARIATION: AAxA, BAxA, AND ABxB 15



VARIATION: AAxA
SINGLE DIE PACKAGE

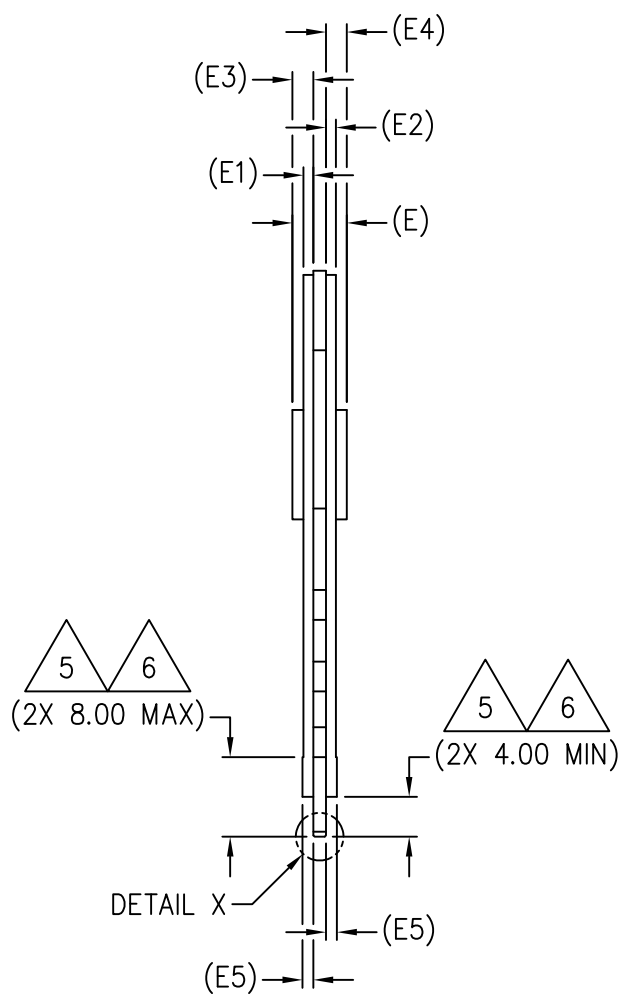


VARIATION: AAxA
MULTI DIE PACKAGE

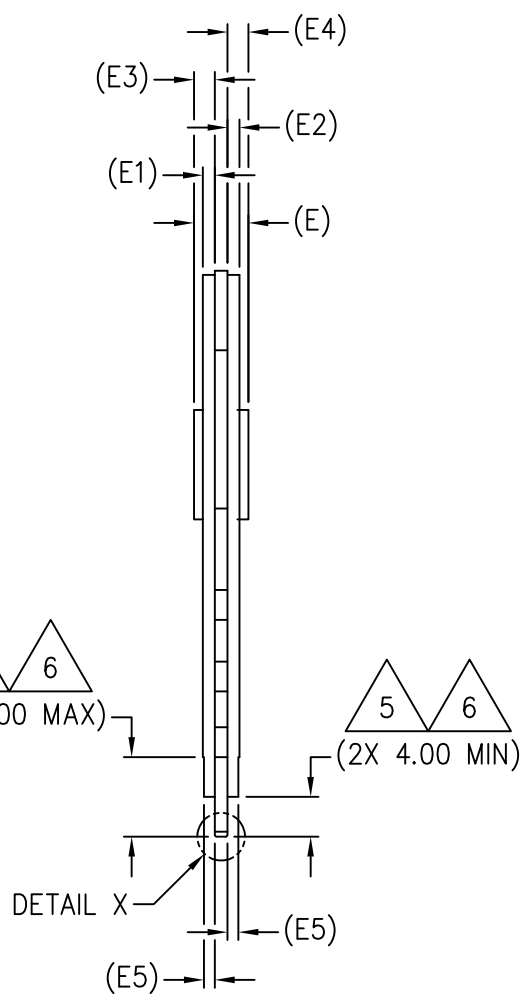


VARIATION: ABxB

VIEW A-A

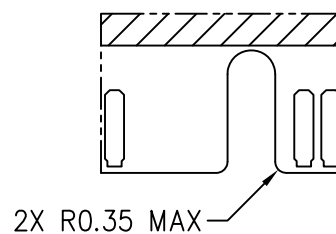
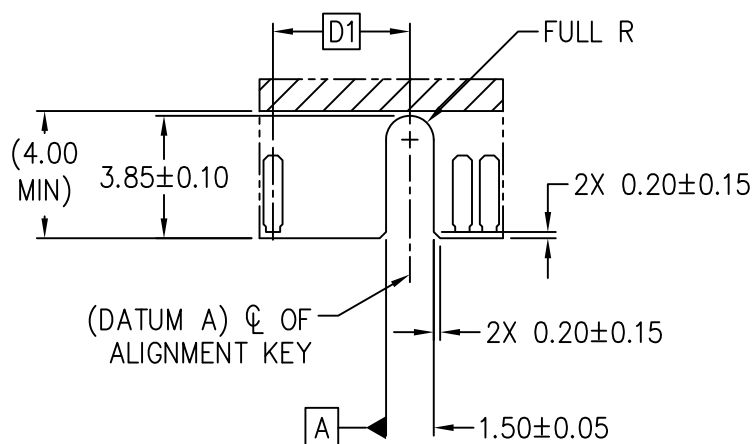
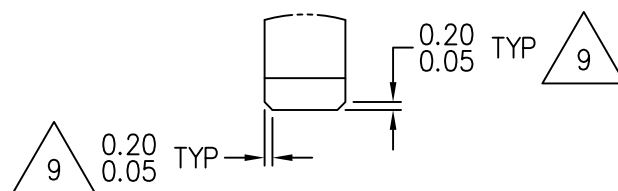
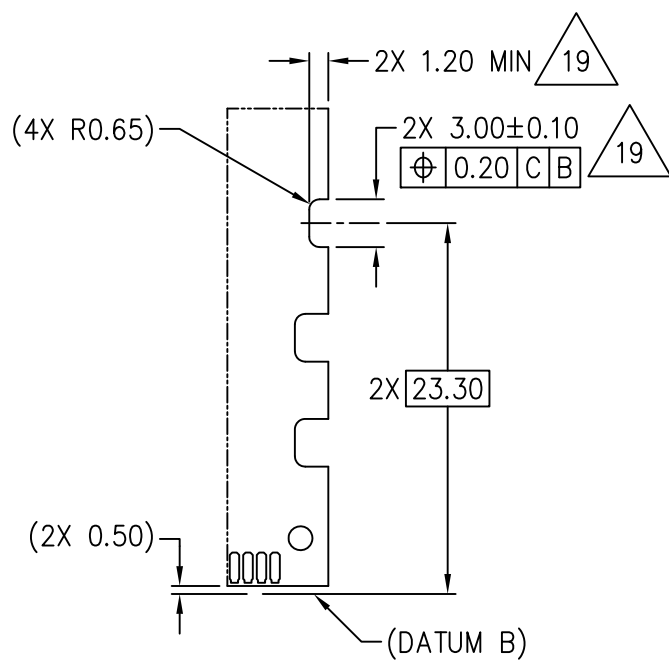


VARIATION: BAxA
SINGLE DIE PACKAGE



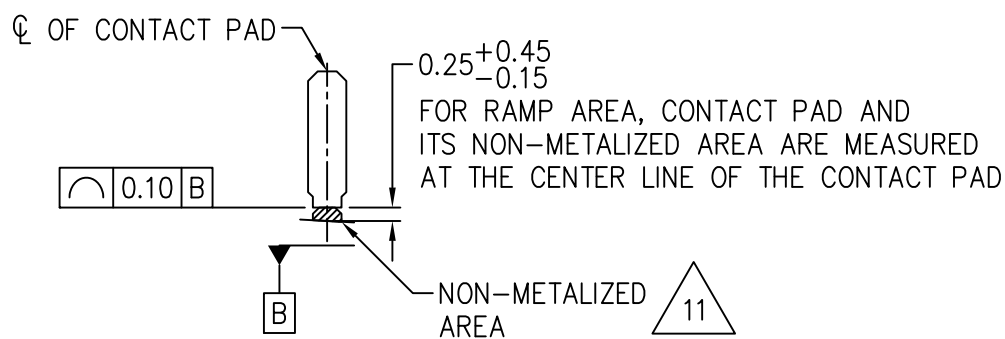
VARIATION: BAxA
MULTI DIE PACKAGE

VIEW A-A

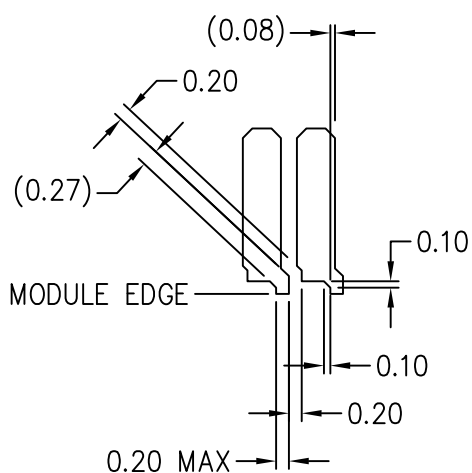


EITHER A CHAMFER OR RADII CAN BE USED

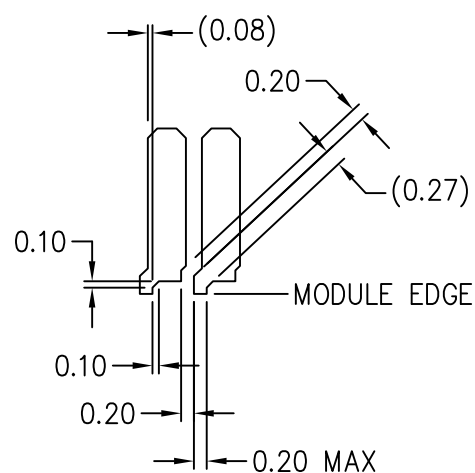




DETAIL P

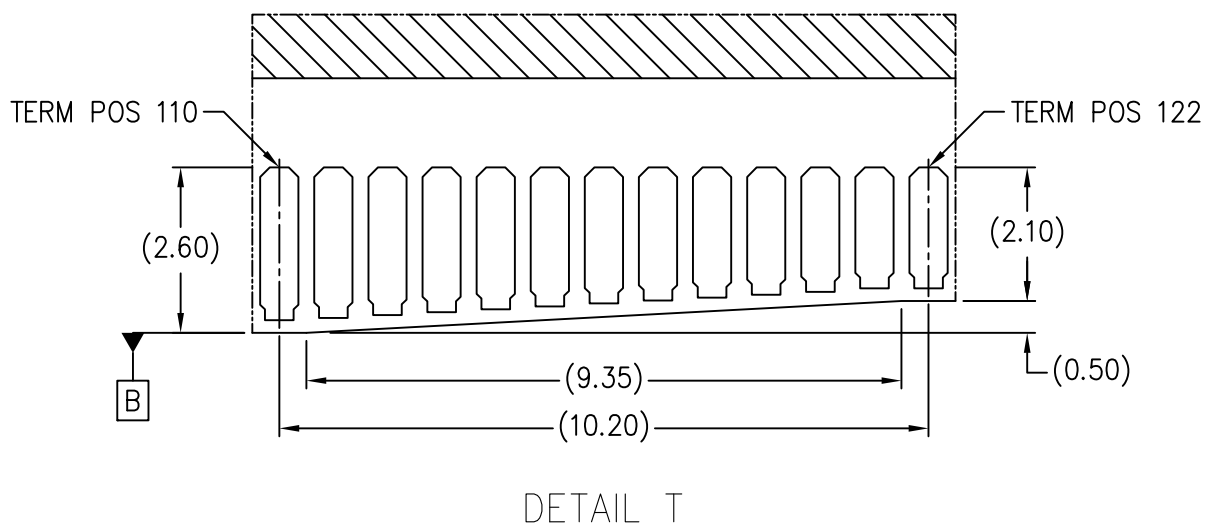
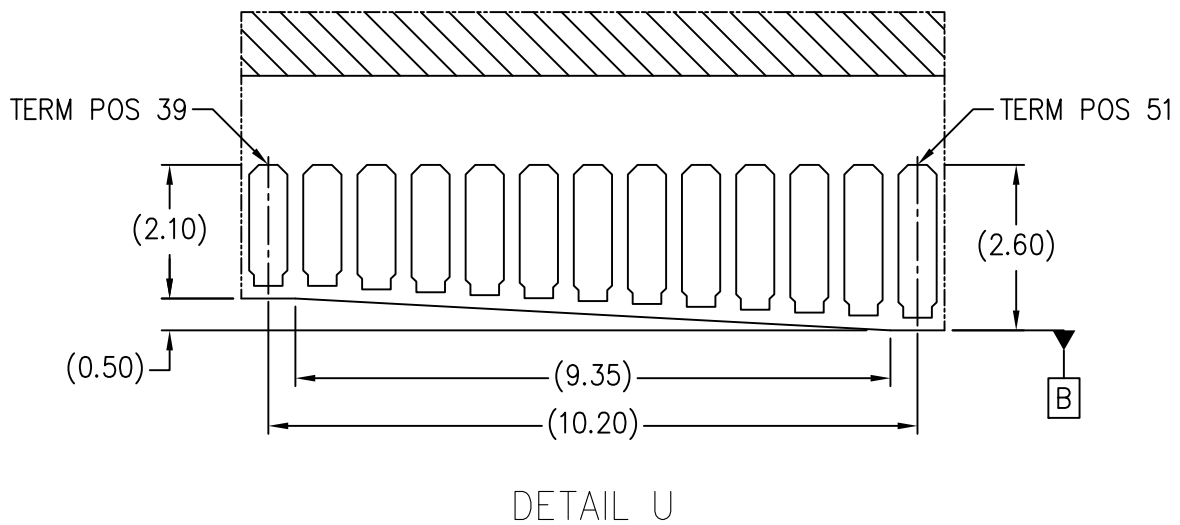
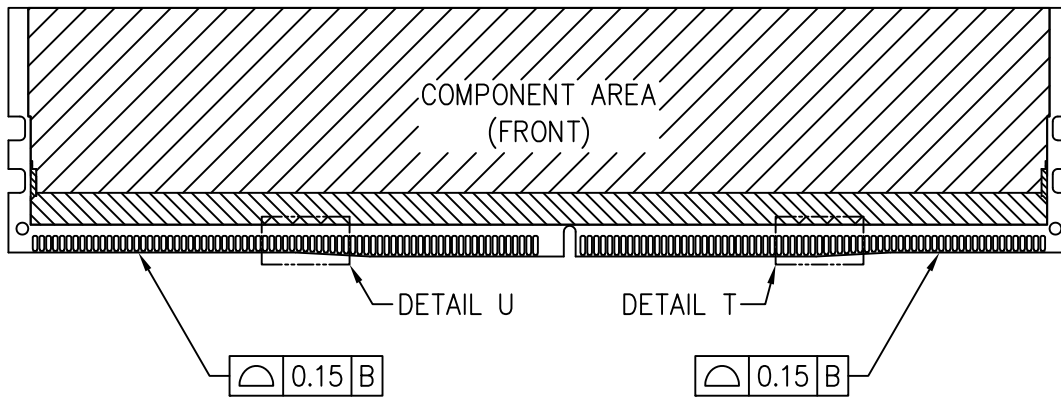


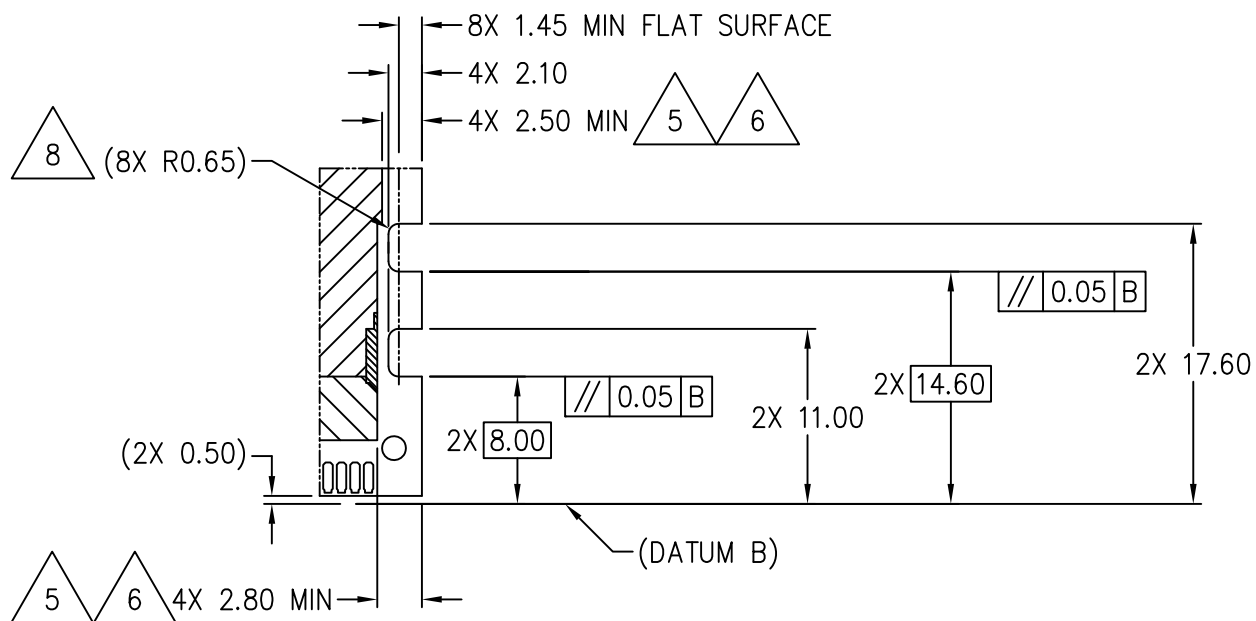
EXAMPLE(1) OF TIE BAR WITH CONTACT PAD
DIMENSIONS ARE FOR REFERENCE



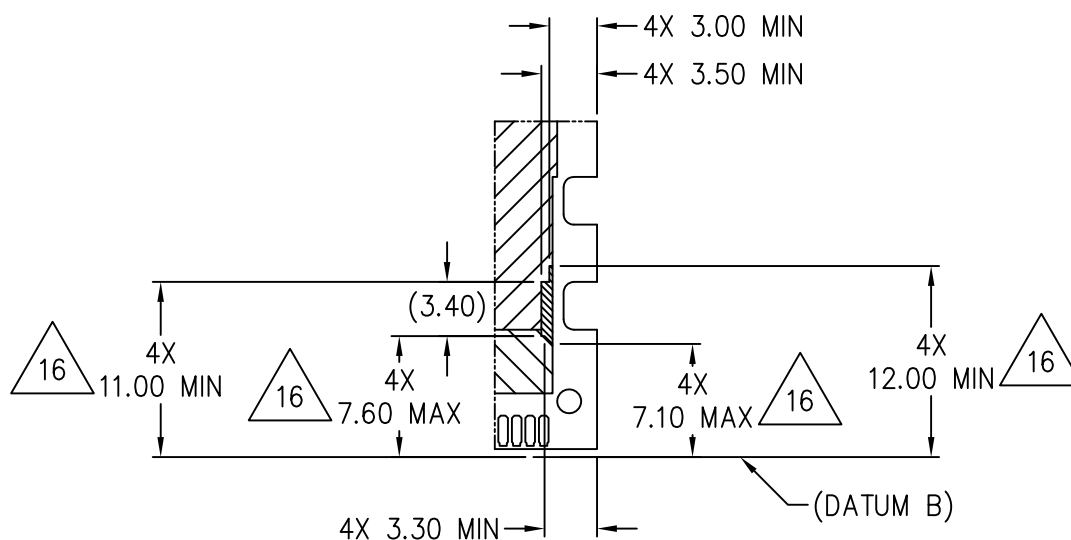
EXAMPLE(2) OF TIE BAR WITH CONTACT PAD
DIMENSIONS ARE FOR REFERENCE



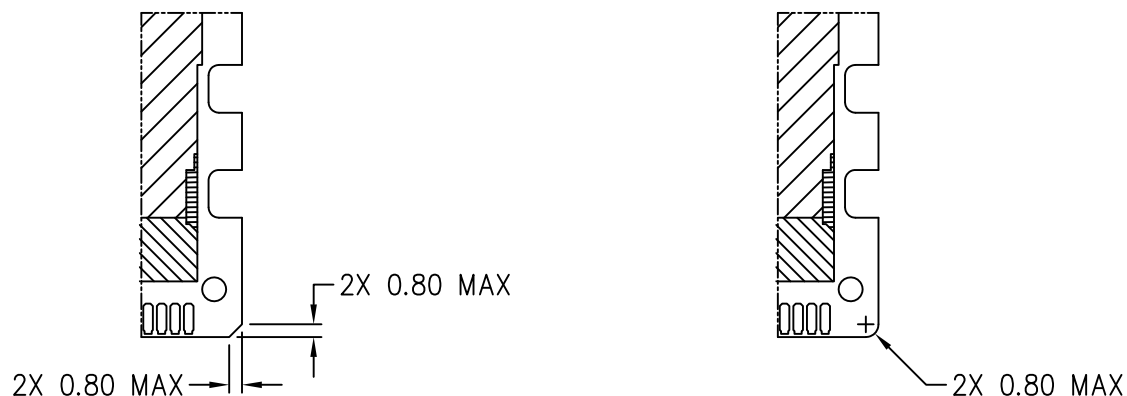




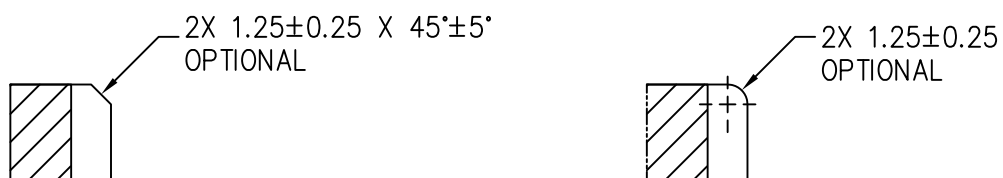
DETAIL W
LATCH NOTCH DETAIL



DETAIL W
DISCRETE COMPONENT KEEP OUT AREA DETAIL



DETAIL W



DETAIL Q

ANY COMBINATION OF CHAMFER OR RADII CAN BE USED

VARIATION Xxxx IS USED FOR MODULE HEIGHT.

TABLE 1

MODULE HEIGHT									
VARIATION ►	Axxx			Bxxx			---		
SYMBOL ▼	MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX
Y	31.10	31.25	31.80	56.75	56.90	57.05	---	---	---
NOTES	---			---			---		
REF	14–224			14–224			---		
ISSUE	H			H			---		

TABLE 2

MODULE THICKNESS VARIATIONS			
VARIATION ►	xAxx	xBxx	---
SYMBOL ▼	MAX	MAX	---
(E)	5.57	3.77	---
E1 (FRONT)	1.00(*)/1.20(**)	1.00	---
E2 (BACK)	1.00(*)/1.20(**)	1.00	---
E3 (FRONT)	2.10	1.30	---
E4 (BACK)	2.10	1.10	---
E5	1.10	1.10	---
NOTES	5, 22	5	---
REF	14–184, 14–197 14–206, 14–224	14–201, 14–206	---
ISSUE	H	D	---

* SINGLE DIE PACKAGE

** MULTI DIE PACKAGE

VARIATION xxXx IS USED FOR PLATING AND FOUND IN NOTE 10.

TABLE 3

MECHANICAL KEYING (FRONT VIEW)			
VARIATION ►	xxxA	xxxB	---
SYMBOL ▼			---
D	3.875 BASIC	1.425 BASIC	---
D1	4.30 BASIC	1.85 BASIC	---
NOTES	15		
REF	14–184, 14–206	14–201, 14–206	---
ISSUE	D	D	---

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 CARD THICKNESS APPLIES ACROSS TABS AND INCLUDES PLATING AND/OR METALIZATION. STRAIGHTNESS CALLOUT APPLIES TO ZONE DEFINED BY THE 4.00 MM CONTACT AREA DIMENSION FOR THE ENTIRE LENGTH OF 133.35 MM.

5 DIMENSIONS APPLICABLE WHEN COMPONENTS MOUNTED ON BOTH SIDES. DIMM LABEL IS NOT A PART OF THE COMPONENTS.

6 BORDER OF COMPONENT AREA.

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

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

APPLICATION NOTES:

9 THE BEVEL IS NOT TO HIT THE PLATED CONTACTS.

- 10 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.

11 '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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- 12 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.: 7547213
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- 13 THE DIMENSION ONLY APPLIES TO THE MODULE AREA AS INDICATED ABOVE THE NOTCH.
- 14 THE DIMENSION DEFINES THE BOUNDARY OF COMPONENTS, SUCH AS CAPACITORS AND INDUCTORS. ALL DIMENSIONS WITHIN THE BOX REFER TO THIS NOTE.
- 15 VARIATION $x_A \times x_A$ IS DEDICATED FOR DDR5 R/MR DIMM.
VARIATION $AB \times B$ IS DEDICATED FOR DDR5 UDIMM AND CUDIMM.
- 16 DISCRETE COMPONENT, SUCH AS CAPACITOR OR RESISTOR, IS NOT ALLOWED IN THIS AREA TO PREVENT DAMAGE DUE TO IMPROPER MODULE INSTALLATION. DRAM IS ALLOWED IN THIS AREA.
- 17 THE LOCATION AND SIZE OF THE TOOLING HOLES ARE OPTIONAL, BUT RECOMMENDED TO PREVENT CONNECTOR PIN DAMAGE DUE TO IMPROPER MODULE INSTALLATION.
- 18 THE CHAMFER FEATURE MAY NOT BE PRESENT WHEN TRACE CONNECTED TO THE GOLD FINGER.
- 19 (OPTIONAL) THE SIDE NOTCHES ARE RESERVED FOR THERMAL SOLUTION RETENTION FOR THE DIMM THAT ARE COOLING IS NOT SUFFICIENT
- 20 (OPTIONAL) THE AREAS ARE RESERVED FOR THERMAL SOLUTION RETENTION FOR THE DIMM THAT ARE COOLING IS NOT SUFFICIENT
- 21 NO GOLD FINGER AT TERMINAL POS 220 FOR ALL DDR5 MRDIMM AND DDR5 RDIMM WITH DATA RATE OVER 7200 MT/S. GOLD FINGER IS REQUIRED AT TERMINAL POS 220 FOR ALL DDR5 U/CU DIMM AND DDR5 RDIMM WITH DATA RATE EQUAL OR BELOW 7200 MT/S.
- 22 E1 AND E2 DIMENSIONS ARE RELATED TO DRAM PACKAGE STACKING.

STP (3D) FILE RECORD

3D FILE NAMES MAY EXCEED LENGTH REQUIREMENTS FOR SOME SOFTWARE TOOLS.

STP FILE NAME	DATE	ITEM NUMBER
MO-329D-ABxB_PDMA-N288_I0p85-R133p8x5p57Z31p8R2p55x0p6	SEP 2021	14-206
MO-329E-AAxA_PDMA-N288_I0p85-R133p8x5p57Z31p8R2p55x0p6	JAN 2022	14-212
MO-329H-BAxA_PDMA-N288_I0p85-R136p5x5p57Z57p05R2p55x0p6	MAY 2024	14-224

TASK GROUP CONTRIBUTORS

AMPHENOL EAST ASIA LTD.
ARGOSY RESEARCH INC.
DELL INC.
FOXCONN INTERCONNECT TECHNOLOGY LTD
HEWLETT PACKARD ENTERPRISE COMPANY
HP INC.
IBM CORPORATION
INTEL CORPORATION
INVENTEC CORPORATION
LOTES CO. LTD.
LUXSHARE-ICT, INC.
MICRON TECHNOLOGY INC.
MOLEX LLC
SAMSUNG SEMICONDUCTOR
SHENZHEN DEREN ELECTRONIC CO. LTD.
SK HYNIX INC.
TE CONNECTIVITY
WLCO SHENZHEN CO. LTD.

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 2017	ITEM NUMBER: 14-184
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ISSUE: B	DATE: APRIL 2020	ITEM NUMBER: 14-197
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LOCATION:	CHANGED FROM:	CHANGED TO:
ALL SHEETS	288 PIN DDR5 DIMM, 0.85MM 0.85MM PITCH	288 PIN DDR5 DIMM, 0.85MM PITCH MICROELECTRONIC ASSEMBLY
SHEET 1	DIMM	PDMA-N288-10p85- R133p8x5p57Z31p8R2p55x0p6
	A	$31.25^{+0.55}_{-0.15}$
	D	133.35
		ADDED BOUNDARY AREAS
SHEET 2		ADD NEW BOUNDARY AREAS AND ADDED DIMENSIONS: 58.60 MIN, 19.25 MAX, 7.60 MAX, 8.00 MAX E3, E4, AND E5.
		DELETED VARIATIONS Bxxx
SHEET 3		ADDED BOUNDARY TO VIEW A-A, DELETED VIEW B-B.
SHEET 4		ADDED 0.15 X 0.15 CHAMFER DIMENSION
SHEET 5		DIMENSIONS ARE FOR REFERENCE
SHEET 6		ADD NEW BOUNDARY
		DELETED DETAIL V FOR VARIATIONS Bxxx SHEET
SHEET 8		DELETED MODULE HEIGHT VARIATIONS TABLE
	WAS VARIATION xBxx SYMBOL (E) WAS 4.05 SYMBOL E1 AND E2 WERE 1.65	NOW VARIATION Axxx SYMBOL (E) NOW 5.57 SYMBOL E1 AND E2 NOW 1.00 ADDED SYMBOLS E3, E4, E5 WITH VARIATION 2.10.
SHEET 10		ADDED NOTES 14, 15, AND 16.

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: C	DATE: SEPTEMBER 2020	ITEM NUMBER: 14-201
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 1	3.875	D
SHEETS 1 & 2		ADDED TOOLING HOLES AND ASSOCIATED DIMENSIONS/NOTES
		ADDED 2.5 X 0.7 KEEPOUT
		ADDED VARIATION AAxx TEXT
SHEET 2		ADDED NOTE 14 TO E3 & E4
SHEETS 3 & 4		NEW SHEETS FOR VARAIATION BBxx
SHEET 5		ADDED VARIATION BBxx FOR VIEW A-A
	4.30	D1
SHEET 6		ADDED NOTE 18 DELTAS
SHEET 8		UPDATED HATCH FOR COMPONENT AREA
SHEET 9		ADDED 2.5 X 0.7 KEEPOUT AND ASSOCIATED DIMENSIONS/NOTES
		ADDED TOOLING HOLES
SHEET 10		ADDED VARIATION Bxxx IN TABLE 1
		ADDED TABLE 2
SHEET 12		ADDED NOTES 15 – 18
SHEET i		ADDED BBxx STEP FILE
SHEET ii		ADDED DELL INC.

ISSUE: D	DATE: SEPTEMBER 2021	ITEM NUMBER: 14-206
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEETS 1, 2, & 5	VARIATION AAxx	VARIATION AAxA
SHEETS 3, 4, 5	VARIATION BBxx	VARIATION ABxB
SHEETS 1-4, 8		MODIFIED THE COMPONENT AREA NEAR THE SIDE NOTCHES AND PINS

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 2	58.60 MIN (4X)	58.00 MIN (4X)
	19.25 MIN	18.75 MIN
	19.25 MIN	19.00 MIN
	E3 & E4	E4 & E3 (SWAPPED POSITIONS)
		ADDED (E)
		DELETED HORIZONTAL 8.00 MAX AND ASSOCIATED NOTE 14 (2X)
	7.60 MAX (2X)	8.00 MAX (2X)
SHEET 4	56.50 MIN (2X)	56.00 MIN (2X)
	15.80 MIN	15.40 MIN
	18.00 MIN	15.40 MIN
	E3 & E4	E4 & E3 (SWAPPED POSITIONS)
		ADDED (E)
		ADDED E5 AND ASSOCIATED NOTE 14 (2X)
		ADDED 8.00 MAX AND ASSOCIATED NOTE 14 (2X)
SHEET 5		ADDED (E1) & (E2) (2X)
SHEET 9		ADDED: LATCH NOTCH DETAIL
		ADDED LOWER DETAIL W
SHEETS 9 & 10		MODIFIED THE COMPONENT AREA NEAR THE SIDE NOTCHES AND PINS
SHEET 10		ADDED VARIATION NOTES Xxxx AND xxXx
	TABLE 1: Axxx & Bxxx	TABLE 1: xAxx & xBxx
	TABLE 1: E1	TABLE 1: E1 (FRONT)
	TABLE 1: E2	TABLE 1: E2 (BACK)
	TABLE 1: E3 1.10	TABLE 1: E3 (FRONT) 1.30
	TABLE 1: E4 1.30	TABLE 1: E4 (BACK) 1.10
	TABLE 1: E5 2.10 & ---	TABLE 1: E5 1.10 & 1.10
	TABLE 2: xAxx & xBxx	TABLE 1: xxxA & xxxB
SHEET 13, NOTE 14		REMOVED: FOR VOLTAGE REGULATOR
SHEET 13, NOTE 15	AAxx AND BBxx	AAxA AND ABxB

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 13, NOTE 18	FEATUER	FEATURE

ISSUE:E	DATE: JANUARY 2022	ITEM NUMBER:14–212
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEETS 1 & 2		UPDATED COMPONENT AREA
SHEET 2		ADDED 64.00 MAX DIMENSION ADDED (5.35) DIMENSION
SHEET 3		NEW SHEET
SHEET 14		ADDED NOTES 19 AND 20

ISSUE:F	DATE: AUGUST 2023	ITEM NUMBER:14–220
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LOCATION:	CHANGED FROM:	CHANGED TO:
ALL SHEETS: TITLE	288 PIN DDR5 DIMM, 0,85MM PITCH MICRO ELECTRONIC ASSEMBLY	288 TERM DDR5 DIMM, 0,85MM PITCH, MICRO ELECTRONIC ASSEMBLY
SHEETS 1, 3, & 9	PIN	TERM POS
SHEET 3		MOVED TO SHEET 5
SHEETS 7 & 8	0.25±0.15	0.25 ^{+0.45} _{-0.15}
SHEET 12	E1=1.00 MAX; E2=1.00 MAX	E1=1.20 MAX; E2=1.20 MAX
SHEET 14, NOTE 15	...R/LR DIMM... ...DDR5 UDIMM.	...R/LR/MR DIMM... ...DDR5 UDIMM AND CUDIMM.

ISSUE:G	DATE:NOVEMBER 2023	ITEM NUMBER:14–221
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEETS 1, 3		ADDED TERM POS 220
SHEET 13, NOTE 5		ADDED: DIMM LABEL IS NOT A PART OF THE COMPONENTS
SHEET 14		ADDED NOTE 21

CHANGE RECORD

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ISSUE:H	DATE:MAY 2024	ITEM NUMBER:14-224
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 1	PDMA-N288-I0p85-R133p8x#p#7Z31p8:R2p55x0p6	PDMA-N288_I0p85-...
SHEETS 1 & 3		ADDED DETAIL Q
		CORRECTED POSITION, E1 & E2
SHEETS 2 & 4		ADDED 4.00 MIN
SHEETS 5 & 6		NEW SHEETS FOR VARIATION BAxA
SHEET 7		ADDED VARIATION BAxA
SHEET 8		ADDED VARIATION AAxA MULTI DIE ASSEMBLY
		ADDED DIMENSIONS E3, E4, E5
		ADDED DIMENSIONS E3, E4, E5 (8.00 MAX)
	4.00 MIN	(4.00 MIN)
SHEET 9		NEW SHEETS FOR VARIATION BAxA
SHEET 11	0.17	$0.17^{+0.45}_{-0.15}$
	0.24	$0.24^{+0.45}_{-0.15}$
SHEET 15		ADDED DETAIL Q
SHEET 16		DELETED: THIS MICROELECTRONIC ...THIS VARIATION IS A.
		ADDED MODULE HEIGHT TABLE
		ADDED SINGLE/MULTI DIE PACKAGE
SHEET 19, NOTE 15	VARIATION AAxA IS DEDICATED FOR DDR5 R/LR/MR DIMM.	VARIATION xAxA IS DEDICATED FOR DDR5 R/MR DIMM.
SHEET 19		ADDED NOTE 22

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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:H.01	DATE: JUNE 2024	ITEM NUMBER:14–224E
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LOCATION:	CHANGED FROM:	CHANGED TO:
SHEET 3		REMOVED ERRONEOUS 4.00 MIN DIMENSION
SHEET 5		REMOVED DUPLICATE 5.95 BASIC DIMENSION
SHEET 6	(2X 1.40)	(2X 1.75) – SAME AS REV H
SHEET 10	2X 1.07 MIN	2X 1.20 MIN – SAME AS REV H
SHEET 14	4X 1.08	4X 2.10 – SAME AS REV H
SHEET 19, NOTE 21	NO GOLD FINGER PRESENT ... GOLD FINGER PRESENT ...	NO GOLD FINGER ... GOLD FINGER IS REQUIRED ...