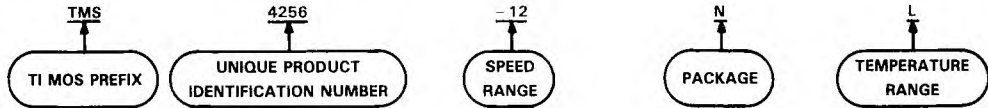


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general

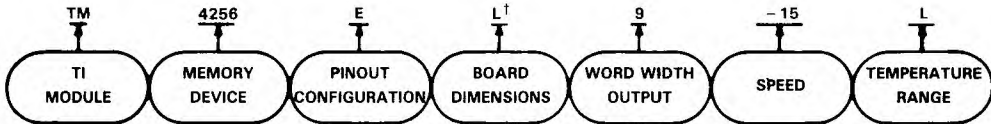
Electrical characteristics presented in this catalog, unless otherwise noted, apply to device type(s) listed in the page heading, regardless of package. Factory orders for devices described should include the complete part-type numbers listed on each page.

MOS memory device numbering system



	Max Access		
TMS Commercial MOS	- 4 45 ns - 20 200 ns	DJ Plastic SOJ Package	E -40°C to 85°C
SMJ Military MOS	- 5 55 ns - 25 250 ns	FM Plastic Chip Carrier	L 0°C to 70°C
TMX Pre-production MOS	- 7 70 ns - 30 300 ns	FP Plastic Chip Carrier	M -55°C to 125°C
	- 10 100 ns - 35 350 ns	J Cerpak/Cerdip	S -55°C to 100°C
	- 12 120 ns - 45 450 ns	JD Side Braze	
	- 15 150 ns	N Plastic DIP	

TI single-in-line package nomenclature



Max Access	L 0°C to 70°C
- 12 120 ns	
- 15 150 ns	
- 20 200 ns	

†The board dimensions for the various single-in-line package designators are given on pages 11-16 thru 11-23.

manufacturing information

Die-attach is by standard gold silicon eutectic or by conductive polymer.

Thermal compression gold wire bonding is used on plastic packaged circuits. Typical bond strength is 5 grams. Bond strength is monitored on a lot-to-lot basis. Any preseat bond strength of less than 2 grams causes rejection of the entire lot of devices. On hermetic devices either thermal compression or ultrasonic wire bonding is used. All hermetic MOS LSI and VLSI devices produced by TI are capable of withstanding 5×10^{-7} atm cc/sec inspection and may be screened to 5×10^{-8} atm cc/sec fine leak, if desired by the customer, for special applications.

All packages are capable of withstanding a shock of 3000 g. All packages are capable of passing a 20,000 g acceleration (centrifuge) test in the Y-axis. Pin strength is measured by a pin-shearing test. All pins are able to withstand the application of a force of 6 pounds at 45°C in the peel-off direction.

dual-in-line packages

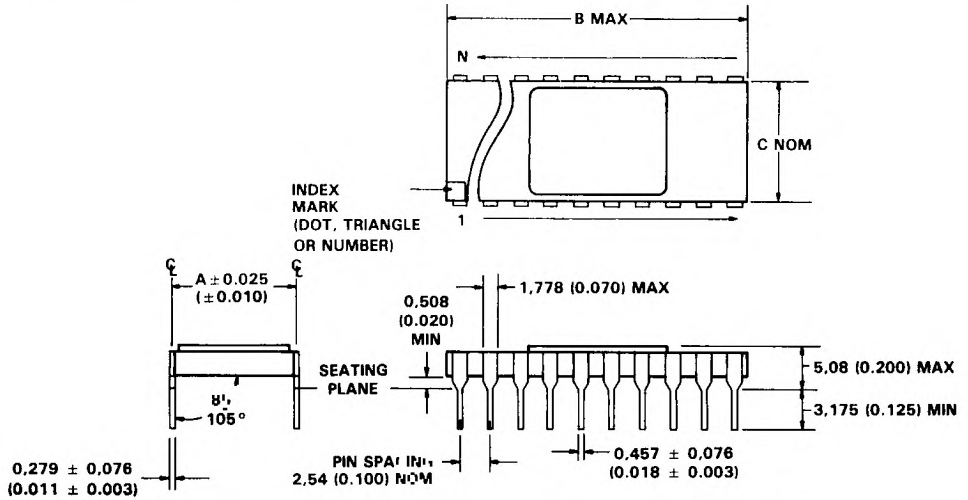
A pin-to-pin spacing of 2,54 mm (100 mils) has been selected for standard dual-in-line packages (both plastic and ceramic).

MECHANICAL DATA

TI uses three types of hermetically sealed ceramic dual-in-line packages: cerdip, cerpak, and sidebrazed. The cerdip and cerpak packages have tin-plated leads. The sidebraze package has gold-plated leads. The plastic package may have tin-plated leads, 60/40 solder-plated leads, or 60/40 hot-solder-dipped-finished-leads.

ceramic packages

side braze (JD suffix)

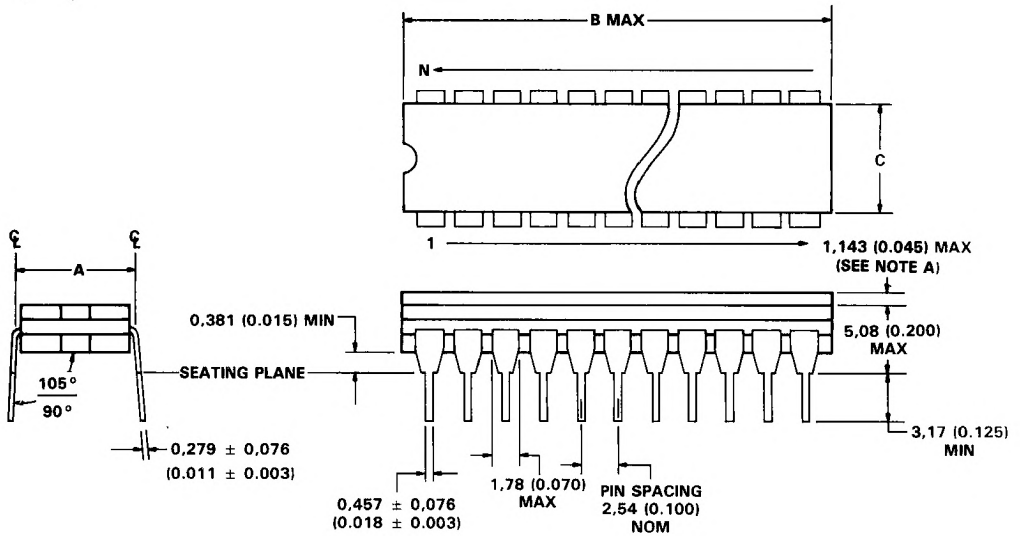


DIM	PINS							
	16	18	20	22	24	24	28	40
$A \pm 0.025$ (± 0.010)	7,62 (0.300)	7,62 (0.300)	7,62 (0.300)	10,16 (0.400)	7,62 (0.300)	15,24 (0.600)	15,24 (0.600)	15,24 (0.600)
B(MAX)	20,57 (0.810)	23,11 (0.910)	25,65 (1.010)	27,94 (1.100)	30,86 (1.215)	32,77 (1.290)	35,94 (1.415)	51,31 (2.020)
C(NOM)	7,493 (0.295)	7,493 (0.295)	7,493 (0.295)	10,03 (0.395)	7,493 (0.295)	15,11 (0.595)	15,11 (0.595)	15,11 (0.595)

ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

MECHANICAL DATA

cerdip/300 mil cerpak (J suffix)



DIM	PINS			
	16†	18	20	24
A(MAX)	8,255 (0.325)	8,255 (0.325)	8,255 (0.325)	8,255 (0.325)
B(MAX)	19,56 (0.770)	22,86 (0.900)	24,38 (0.960)	32,00 (1.260)
C(MAX)	7,645 (0.301)	7,645 (0.301)	7,645 (0.301)	7,645 (0.301)

†Dimensions A, B, and C are applicable for both 16-pin cerdip and cerpak.

NOTE A: Cerpak only

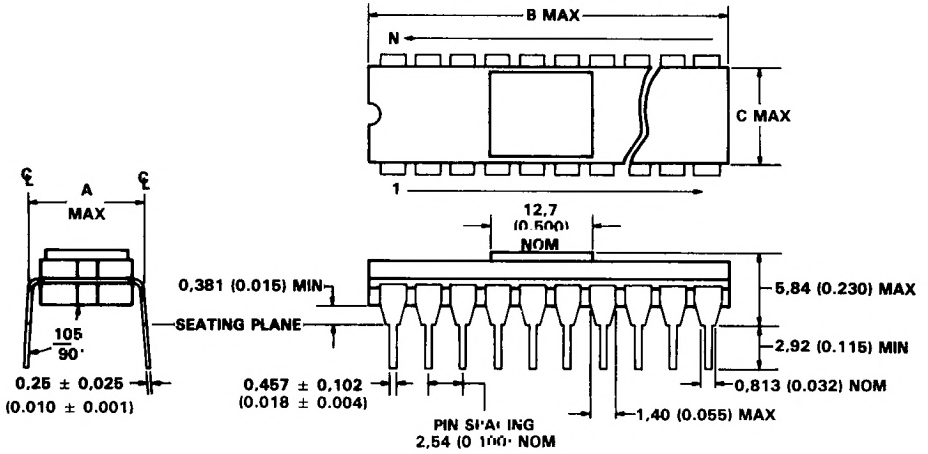
ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

Mechanical Data

11

MECHANICAL DATA

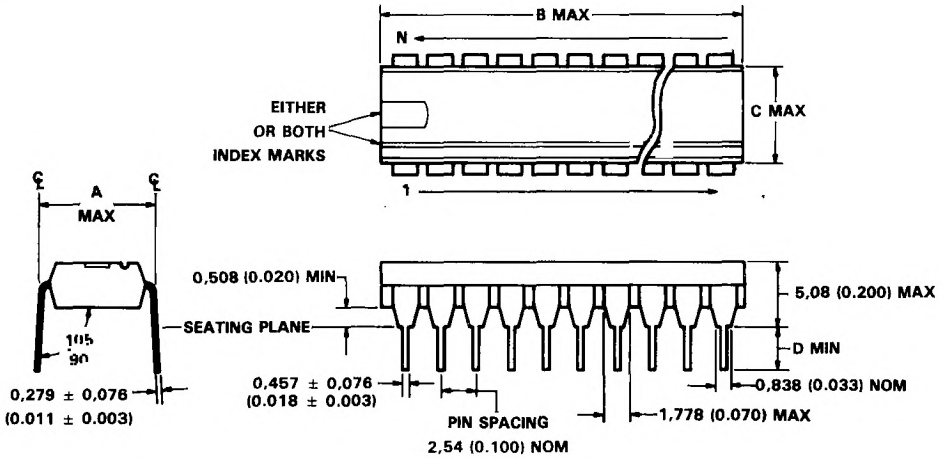
600-mil cerpak (J suffix)



DIM	PIN	
	24	28
A(MAX)	15,88 (0.625)	15,88 (0.625)
B(MAX)	32,77 (1.290)	37,85 (1.490)
C(MAX)	15,24 (0.600)	15,24 (0.600)

ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

plastic packages (N suffix)

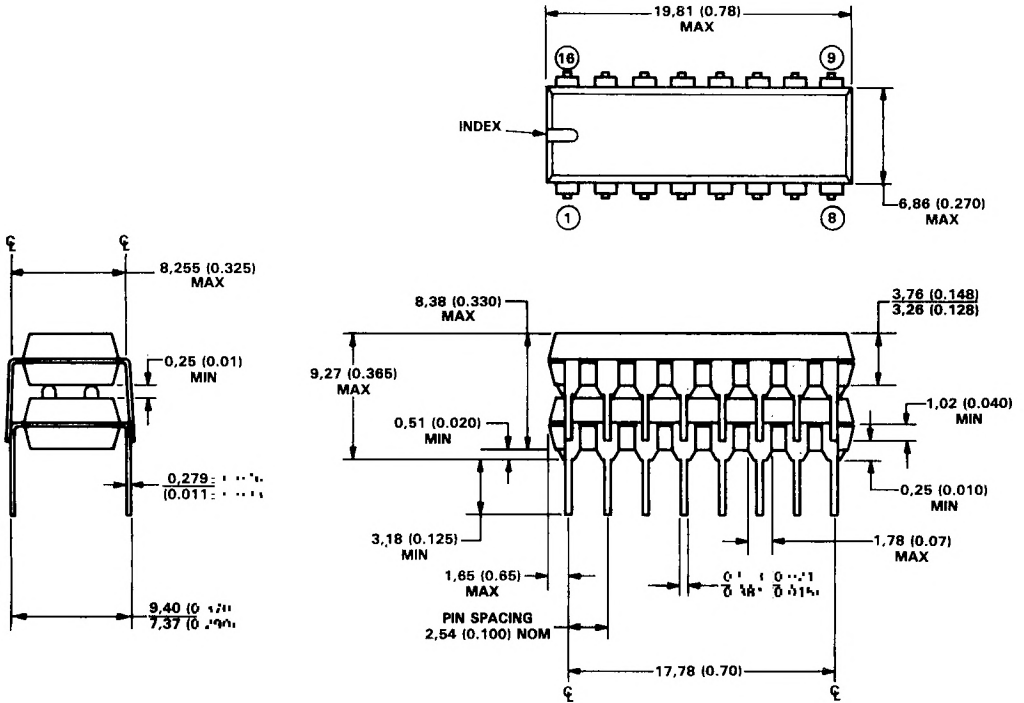


DIM	PINS							
	16	18	20	22	24	28	40	
A (MAX)	8,255 (0.325)	8,255 (0.325)	8,255 (0.325)	10,80 (0.425)	15,88 (0.625)	15,88 (0.625)	15,49 (0.61)	
B (MAX)	22,1 (0.870)	23,37 (0.920)	27,18 (1.070)	28,45 (1.120)	32,26 (1.270)	36,58 (1.440)	53,1 (2.090)	
C (MAX)	6,858 (0.270)	6,858 (0.270)	6,858 (0.270)	9,017 (0.355)	13,97 (0.550)	13,97 (0.550)	13,97 (0.550)	
D (MIN)	3,175 (0.125)	2,921 (0.115)	2,921 (0.115)	3,175 (0.125)	2,921 (0.115)	2,921 (0.115)	3,175 (0.125)	

ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

MECHANICAL DATA

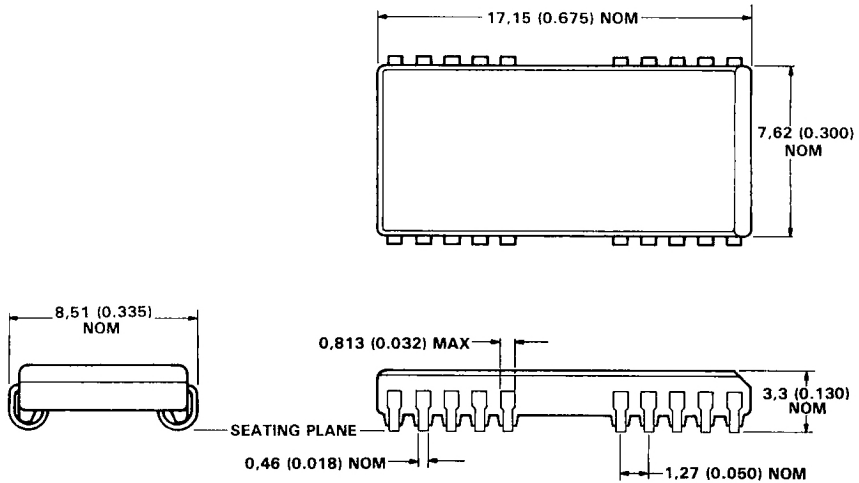
16-pin plastic dual-in-line stacked packages



ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

MECHANICAL DATA

26/20-lead plastic small outline J-lead surface mount package (DJ suffix)

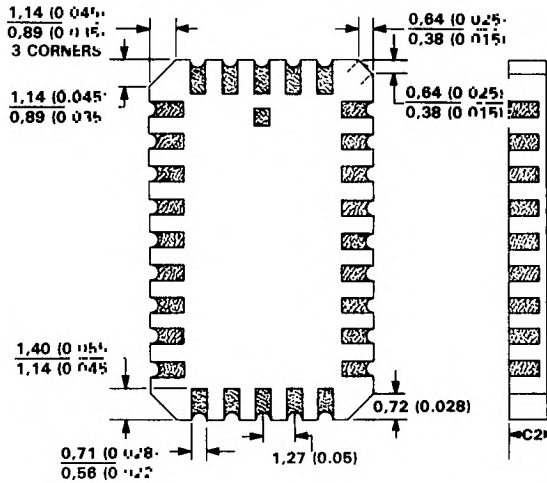
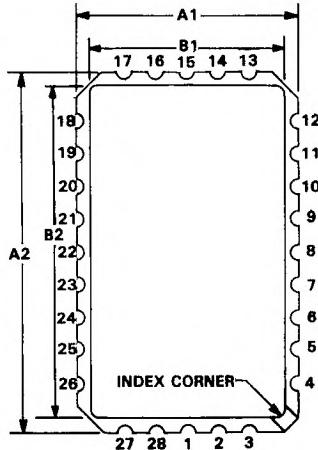


ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

MECHANICAL DATA

ceramic chip carrier packages

ceramic chip carrier package (FE suffix)

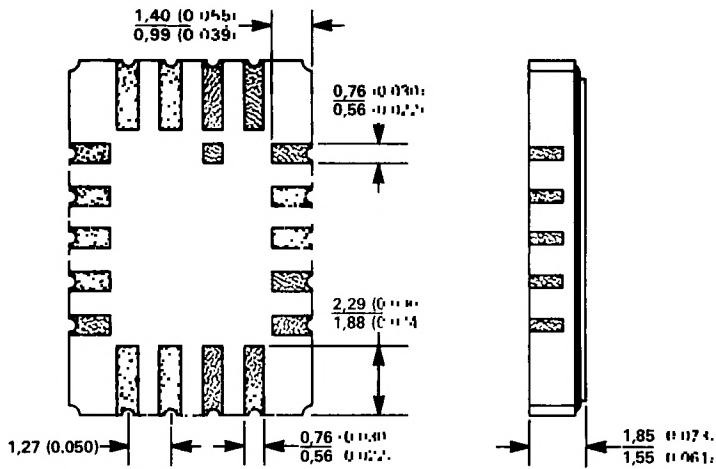
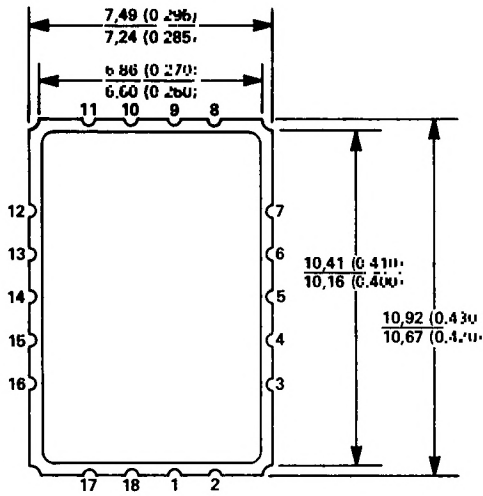


NUMBER OF TERMINALS	A1		A2		B1		B2		C2	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
28	8,76 (0.345)	9,02 (0.355)	13,84 (0.545)	14,10 (0.555)	7,80 (0.307)	7,95 (0.313)	12,88 (0.507)	13,03 (0.513)	1,65 (0.065)	2,01 (0.079)
32	11,30 (0.445)	11,56 (0.455)	13,84 (0.545)	14,10 (0.555)	10,34 (0.407)	13,03 (0.513)	12,88 (0.507)	13,03 (0.513)	1,65 (0.065)	2,01 (0.079)

ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

MECHANICAL DATA

ceramic chip carrier package (FG suffix)



ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

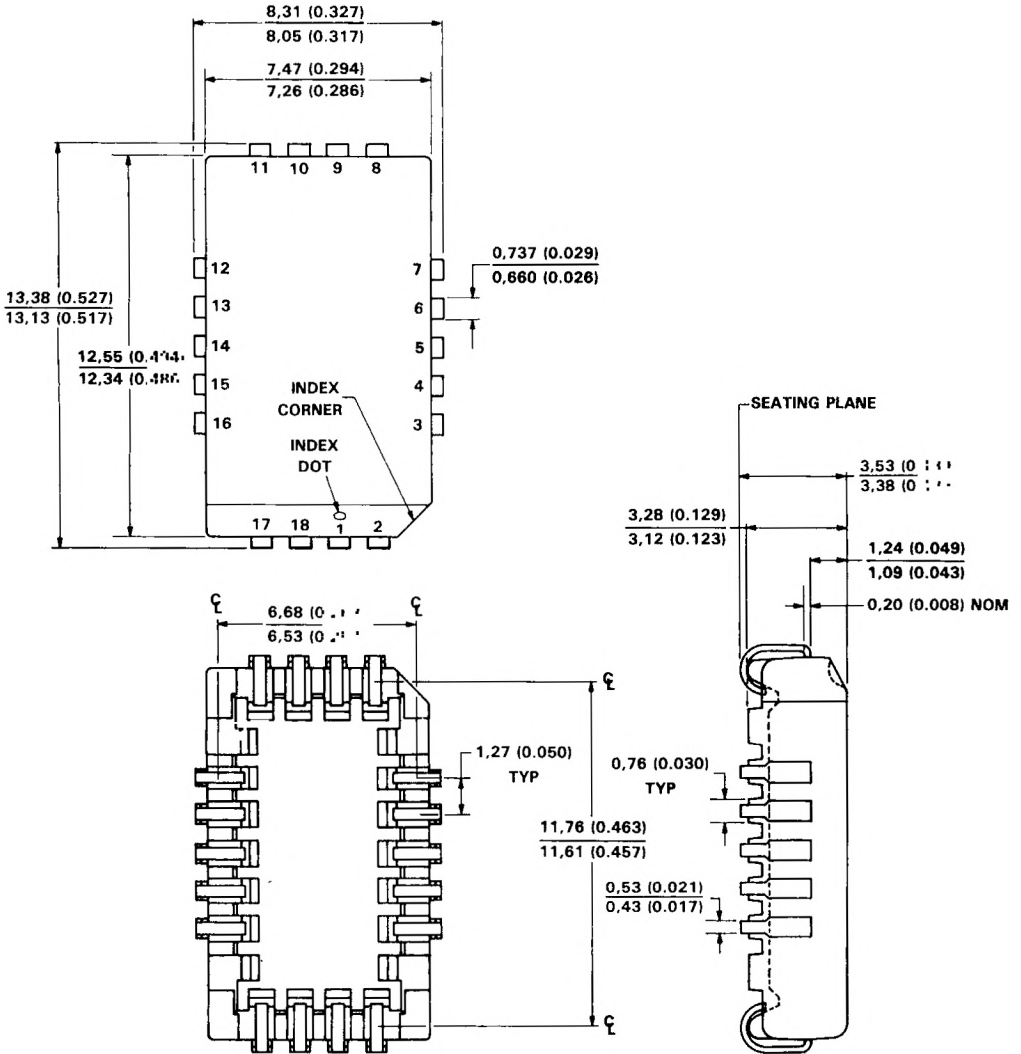
Mechanical Data

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MECHANICAL DATA

plastic chip carrier packages

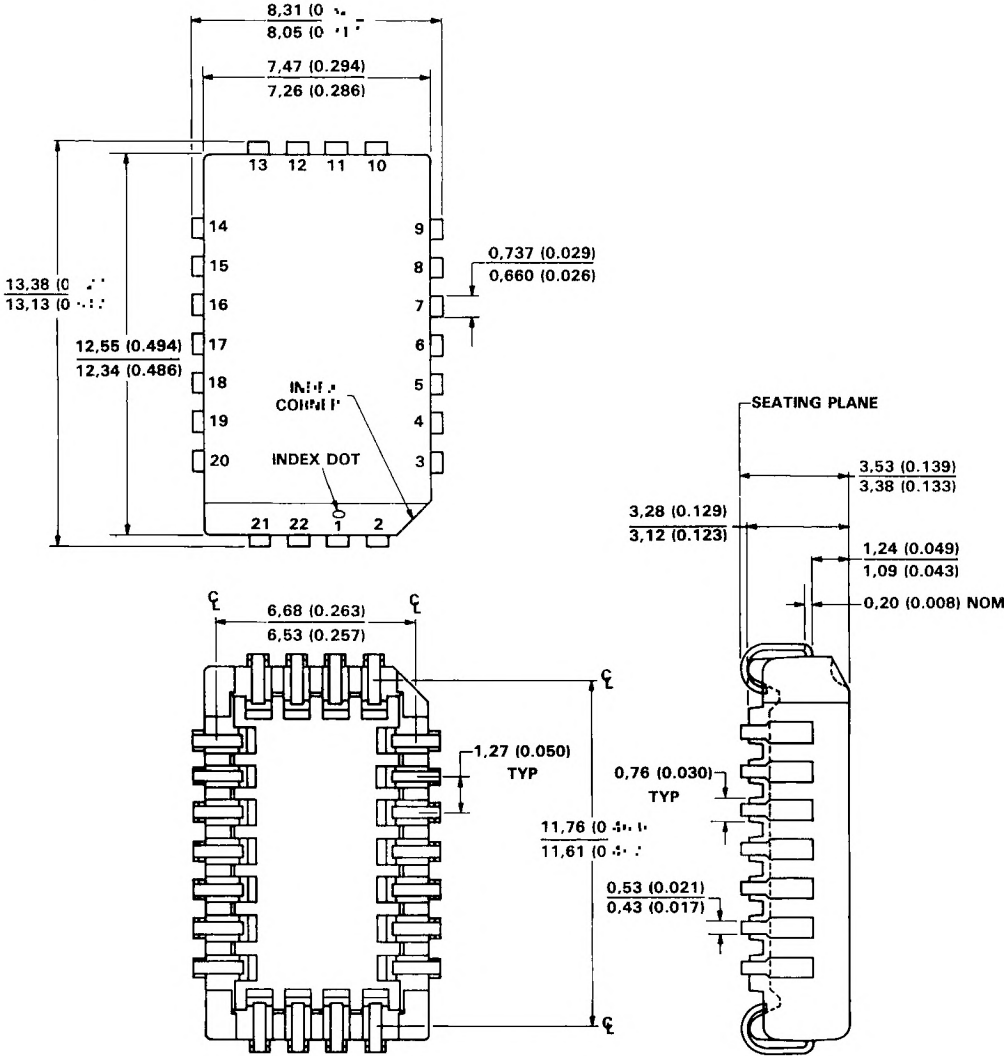
18-lead plastic chip carrier package (FM suffix)



ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

MECHANICAL DATA

22-lead plastic chip carrier package (FM suffix)

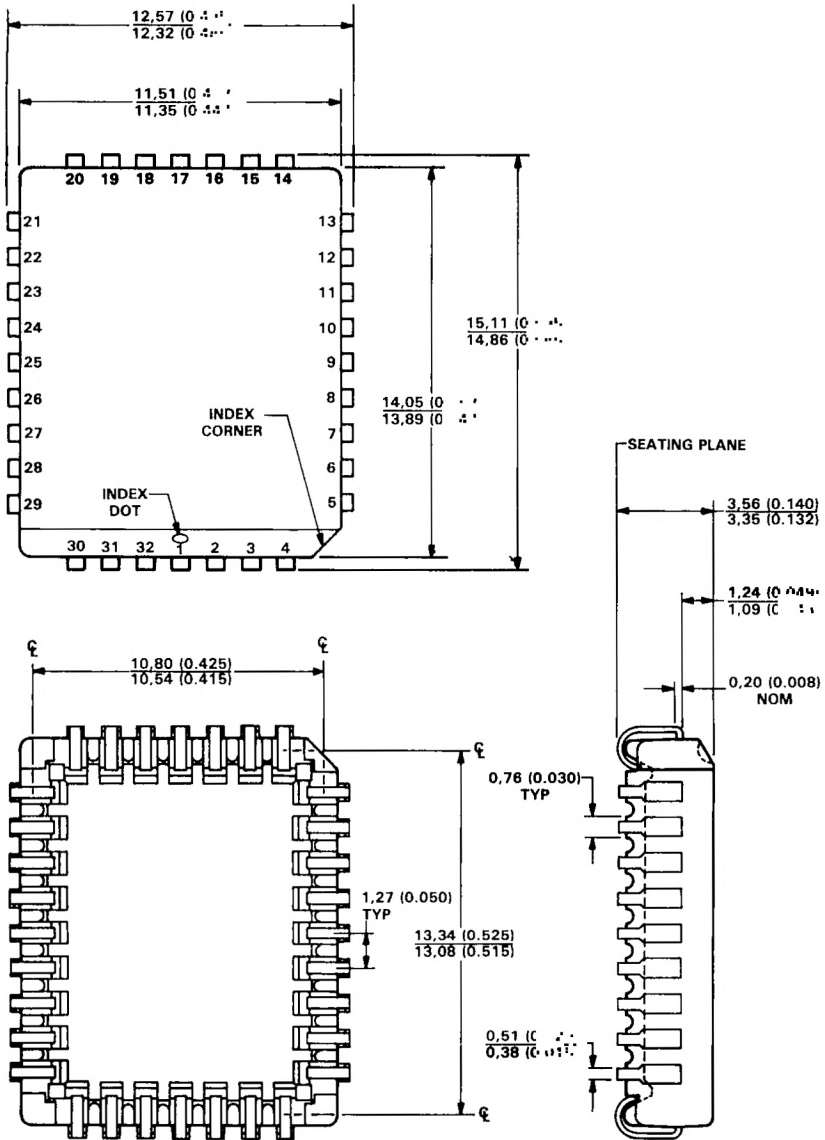


ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHECALLY IN INCHES

Mechanical Data

MECHANICAL DATA

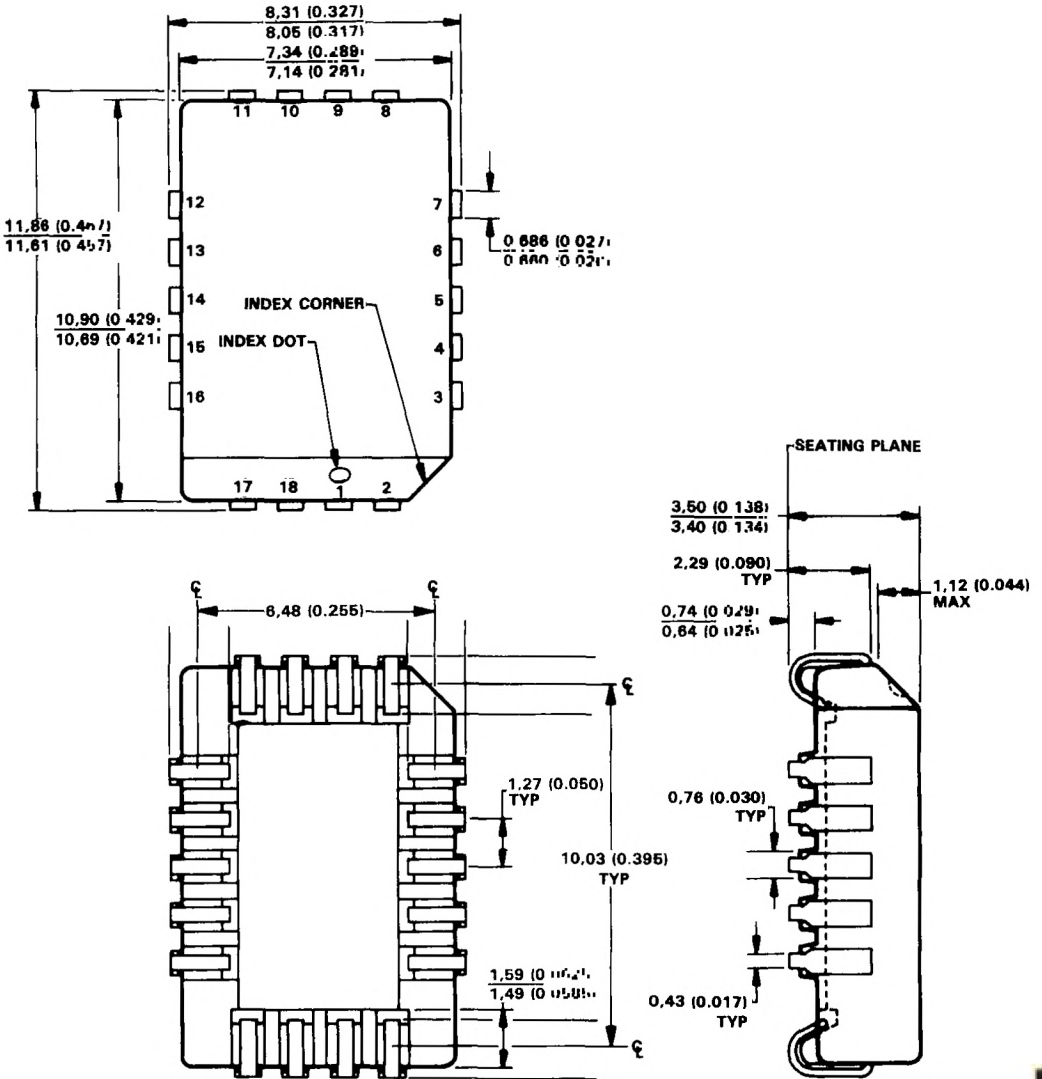
32-lead plastic chip carrier package (FM suffix)



ALL DIMENSIONS ARE IN MILLIMETERS AND PARENTHEMICALLY IN INCHES

MECHANICAL DATA

plastic chip carrier package (FP suffix)



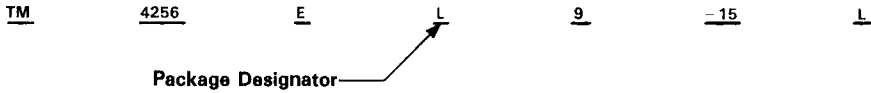
Mechanical Data

11

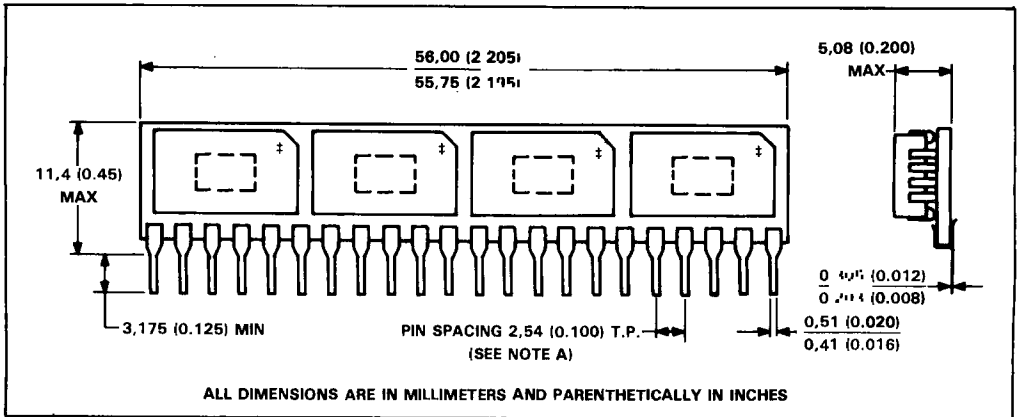
MECHANICAL DATA

MECHANICAL DATA

single-in-line packages (C, E, L, M, P, Q, U, V, W, and Y designators)



22-pin C single-in-line package †

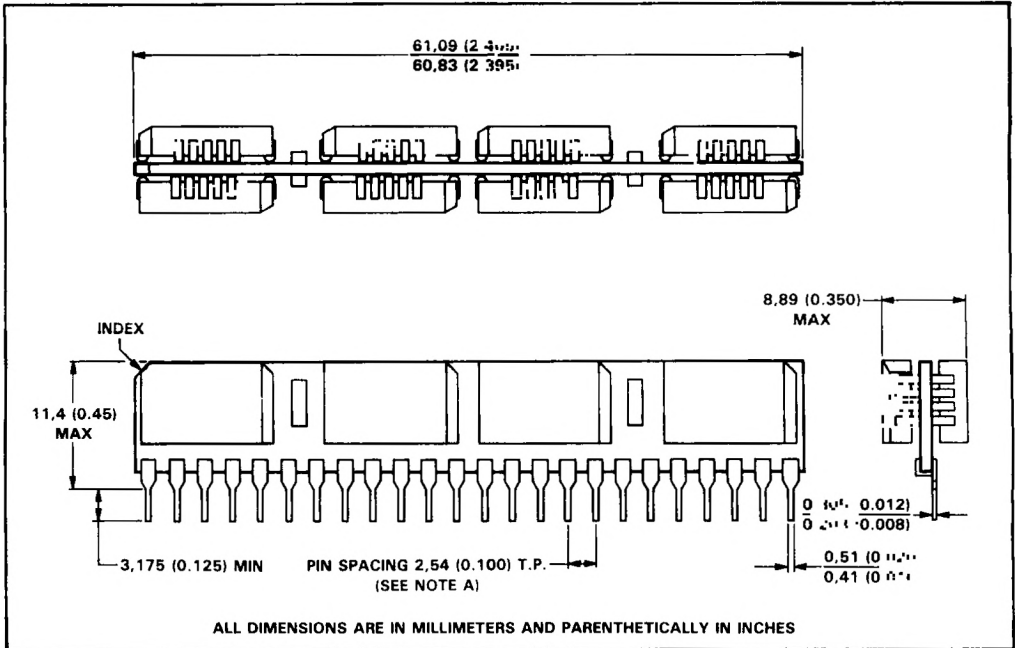


†This package is used for the TM4164EC4, TM4256EC4, TM4256FC1, TM4257EC4, and TM4257FC1.

‡For specific chip carrier orientation, see the pinout drawing for that device.

NOTE A: Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.

22-pin E single-in-line package†

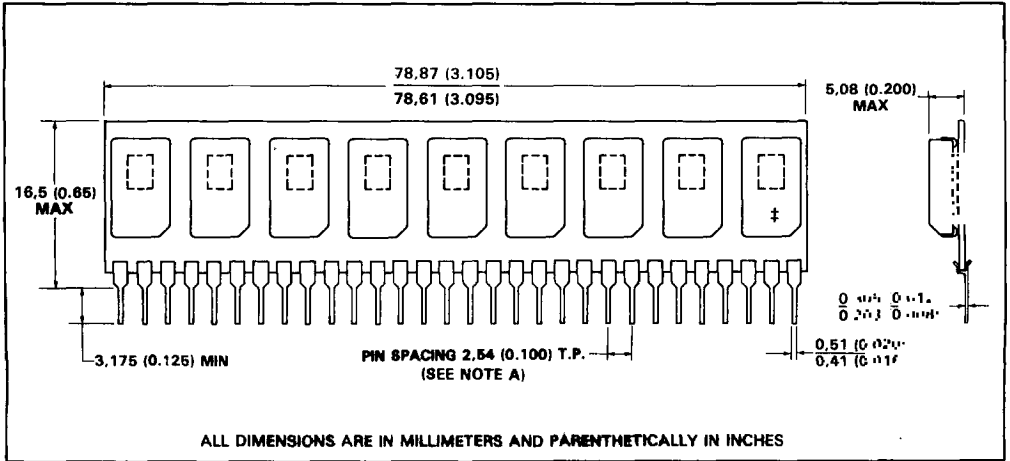


†This package is used for the TM4256HE4.

NOTE A: Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.

MECHANICAL DATA

30-pin L single-in-line package[†]

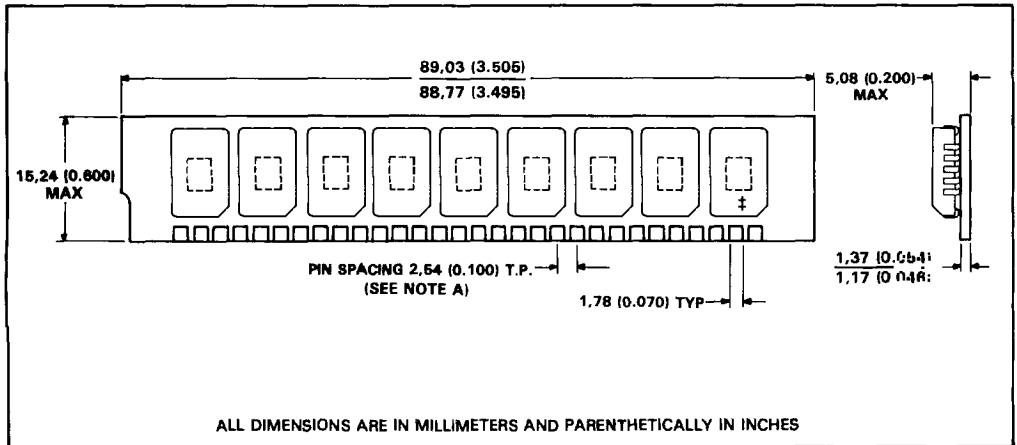


[†]This package is used for the TM4164EL9, TM4164FL8, TM4256EL9, TM4256FL8, TM4257EL9, and TM4257FL8.

[‡]This chip carrier is not present on the TM4164FL8, TM4256FL8, and TM4257FL8 packages.

NOTE A: Each pin centerline is located within 0.25 (0.010) of its true longitudinal position.

30-pin M single-in-line package[†]

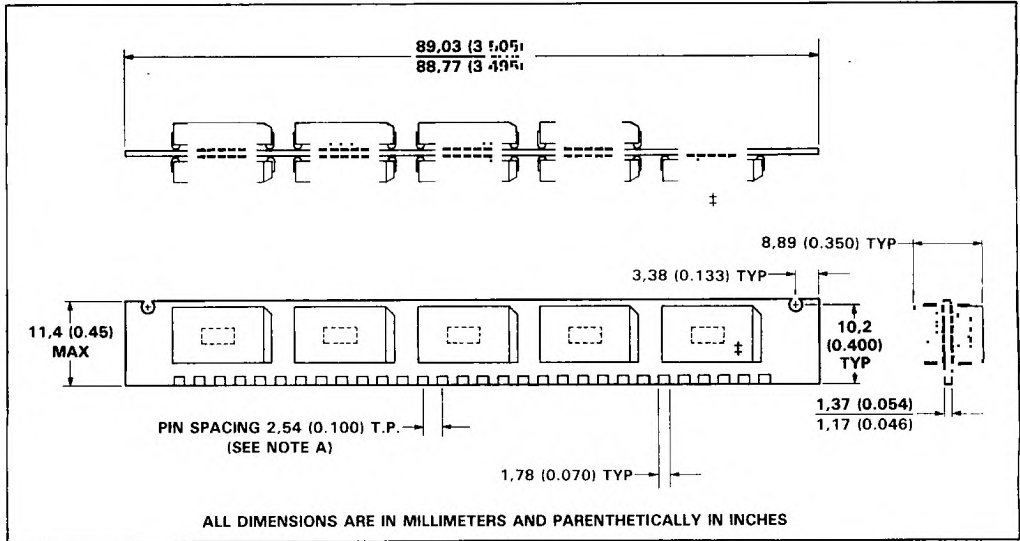


[†]This package is used for the TM4164FM8 and TM4164FM9.

[‡]This chip carrier is not present on the TM4164FM8 package.

NOTE A: Each pin centerline is located within 0.25 (0.010) of its true longitudinal position.

30-pin P single-in-line package †

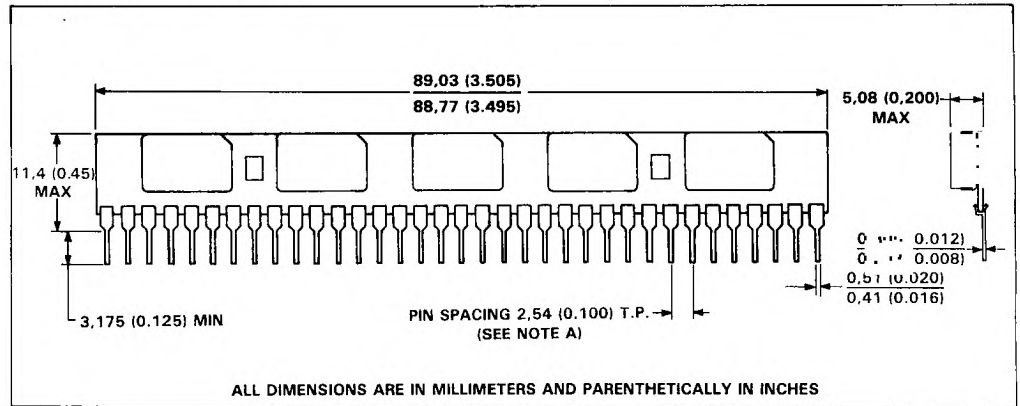


†This package is used for the TM4256GP8 and TM4256GP9.

‡This chip carrier is not present on the TM4256GP8.

NOTE A: Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.

35-pin P single-in-line package †

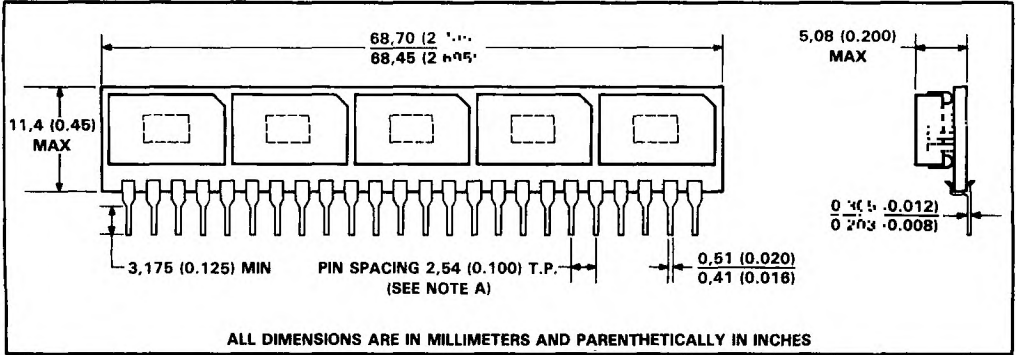


†This package is used for the TM4161EP5.

NOTE A: Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.

MECHANICAL DATA

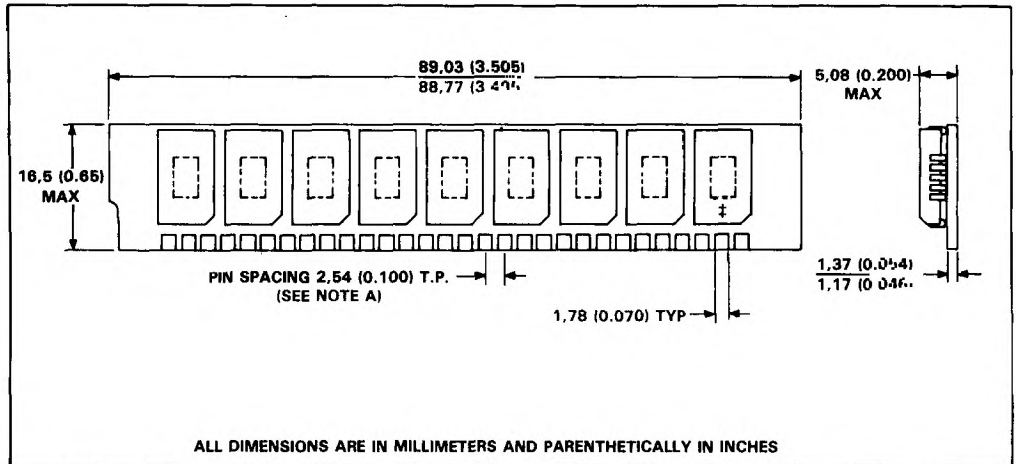
24-pin Q single-in-line package[†]



[†]This package is used for the TM4164EQ5, TM4256EQ5, and TM4257EQ5.

NOTE A: Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.

30-pin U single-in-line package[†]

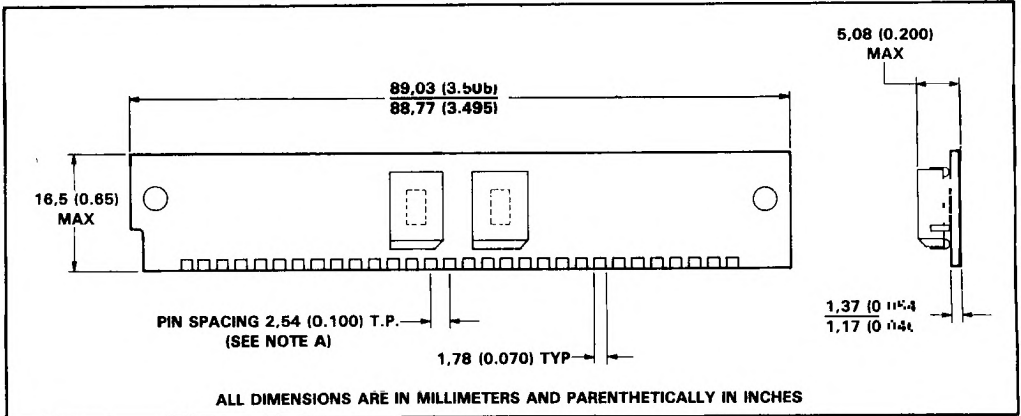


[†]This package is used for the TM4256GU8, TM4256GU9, TM4257GU8, and TM4257GU9.

[‡]This chip carrier is not present on the TM4256GU8 and TM4257GU8.

NOTE A: Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.

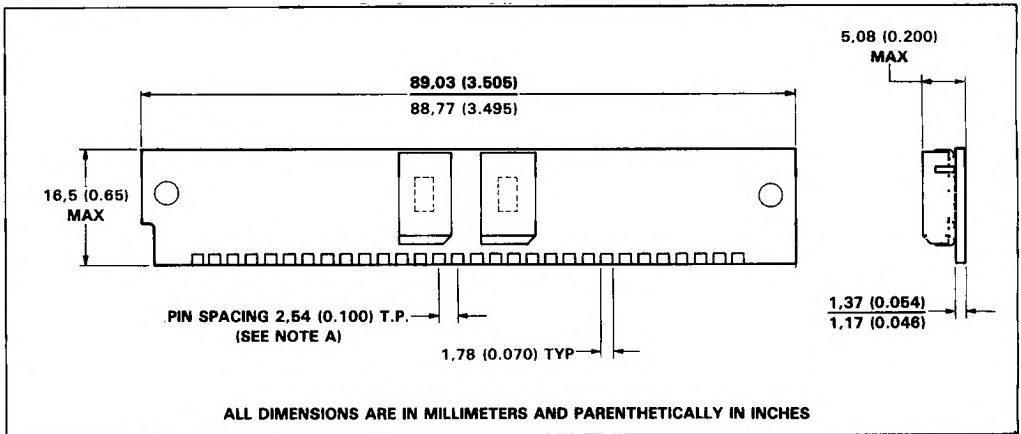
30-pin U single-in-line package †



† This package is used for the TM4416KU8.

NOTE A: Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.

30-pin U single-in-line package †

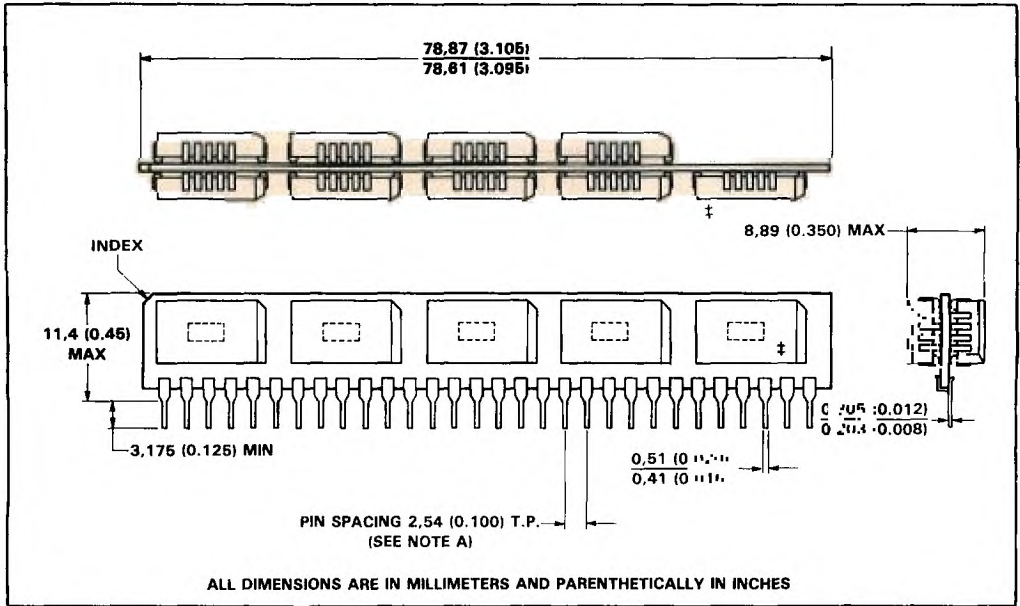


† This package is used for the TM4464LU8.

NOTE A: Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.

MECHANICAL DATA

30-pin V single-in-line package †

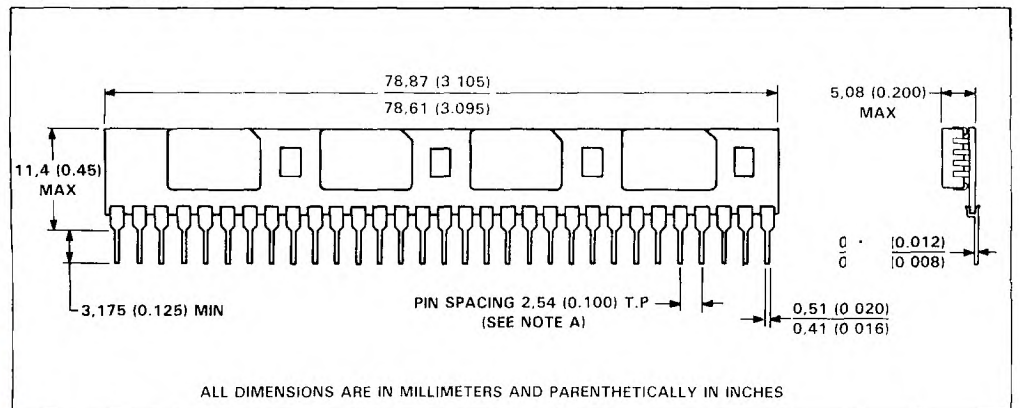


†This package is used for the TM4256GV8 and TM4256GV9.

‡This chip carrier is not present on the TM4256GV8.

NOTE A: Each pin centerline is located within 0.25 (0.010) of its true longitudinal position.

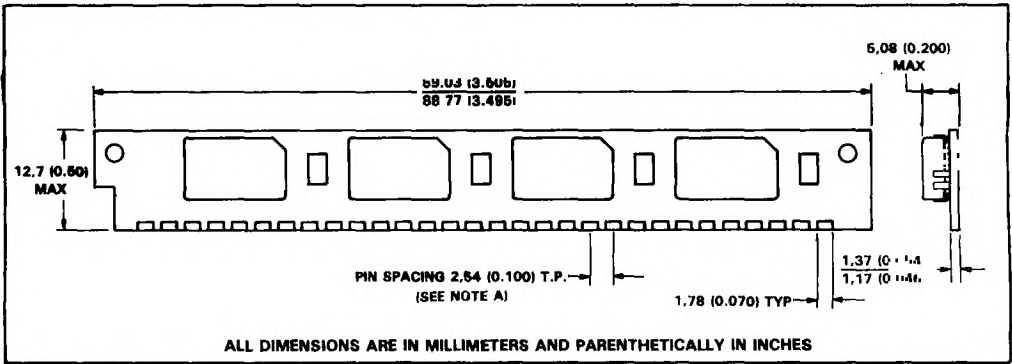
31-pin V single-in-line package †



†This package is used for the TM4161EV4.

NOTE A: Each pin centerline is located within 0.25 (0.010) of its true longitudinal position.

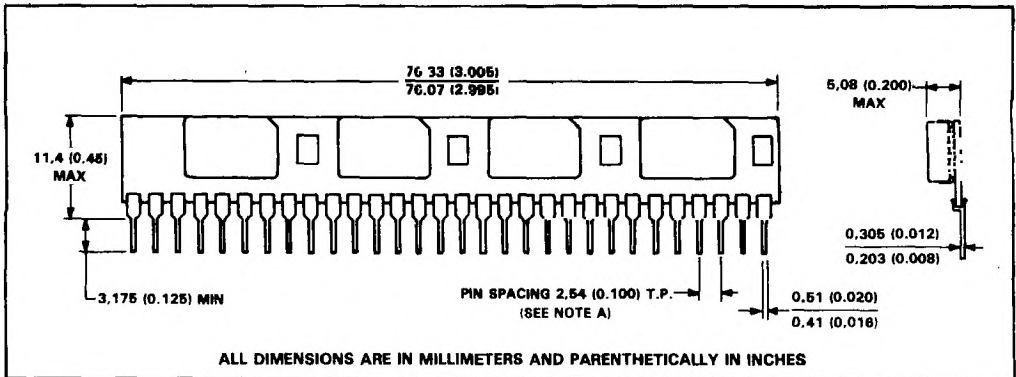
30-pin W single-in-line package †



†This package is used for the TM4161GW4.

NOTE A: Each pin centerline is located within 0.25 (0.010) of its true longitudinal position.

30-pin Y single-in-line package †



†This package is used for the TM4161GY4.

NOTE A: Each pin centerline is located within 0.25 (0.010) of its true longitudinal position.