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Electrical characteristics presented in this data book, unless otherwise noted, apply for the circuit type(s) listed in the page heading regardless of package. The availability of a circuit function in a particular package is denoted by an alphabetical reference above the pin-connection diagram(s). These alphabetical references refer to mechanical outline drawings shown in this section.

Factory orders for circuits described in this data book should include a four-part type number as explained in the following example.

EXAMPLE: TL 514M J /883B

Prefix

MUST CONTAIN TWO OR THREE LETTERS

- SN . . . TI Special Functions or Interface Products
- TL, TLE TI Linear Products
- TLC TI Linear Silicon-Gate CMOS Products

STANDARD SECOND-SOURCE PREFIXES

- LT . . Linear Technology uA Fairchild/National
- LTC . Linear Technology OP PMI
- MC Motorola RC, RM, or RV . . Raytheon
- LF, LM, LP, NE, SA, or SE . . Signetics
- or MF National

Unique Circuit Description Including Temperature Range

MUST CONTAIN TWO TO SIX CHARACTERS
(From Individual Data Sheets)

- Examples: 853 2652A
 1078 27M2AC

Package

MUST CONTAIN ONE OR TWO LETTERS

- D, DW, FK, FN, J, JG, L, LP, LU, N, NT, P, U, W
- (From Pin-Connection Diagrams on Individual Data Sheet)

MIL-STD-883B, Method 5004, Class B

OMIT/883B WHEN NOT APPLICABLE

Circuits are shipped in one of the carriers below. Unless a specific method of shipment is specified by the customer (with possible additional costs), circuits will be shipped in the most practical carrier.

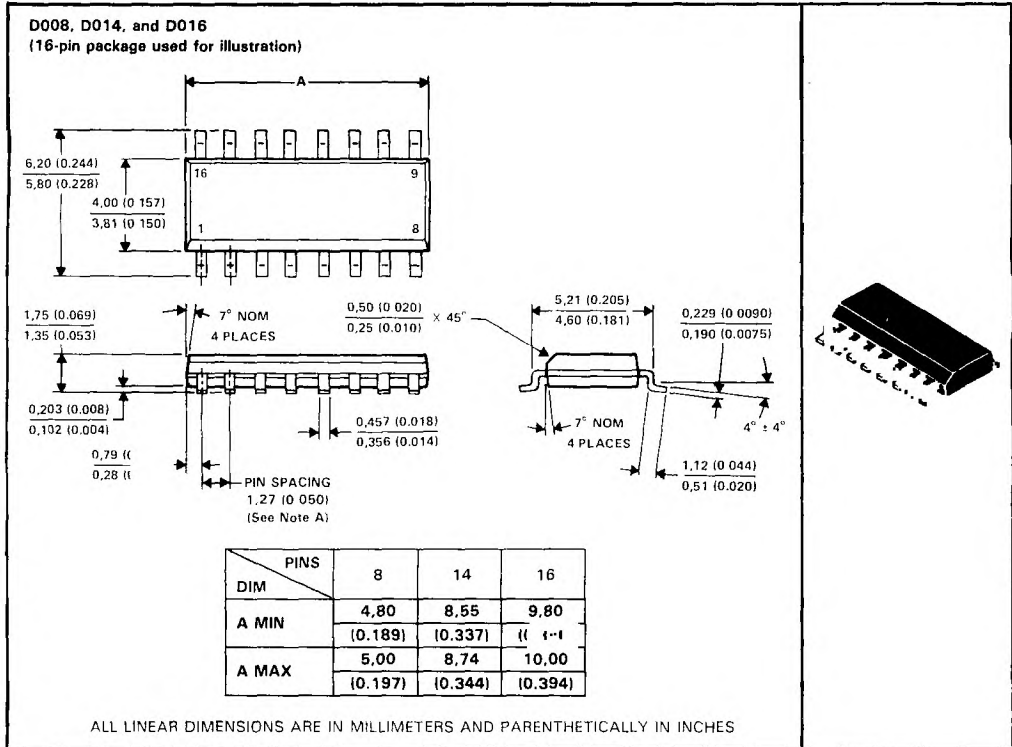
- Small Outline (D, DW)
- Dual-In-Line (J, JG, N, NT, P)
- Slide Magazines
- A-Channel Plastic Tubing
- Sectioned Cardboard Box
- Individual Cardboard Box

- Chip Carriers (FK, FN)
- Anti-Static Plastic Tubing
- Flat (U, W)
- Milton Ross Carriers

- Flat (U, LP, LU)
- Sectional Cardboard Box
- Individual Cardboard Box

D008, D014, and D016 plastic "small outline" packages

Each of these "small outline" packages consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



- NOTES: A. Leads are within 0,25 (0,010) radius of true position at maximum material dimension.
 B. Body dimensions do not include mold flash or protrusion.
 C. Mold flash or protrusion shall not exceed 0,15 (0,006).
 D. Lead tips to be planar within ±0,051 (0,002) exclusive of solder.

Mechanical Data

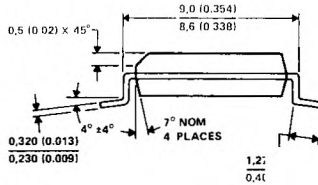
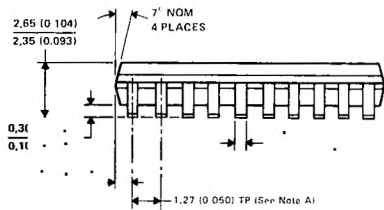
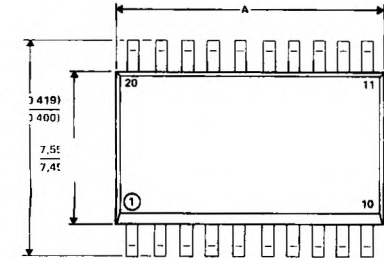
6

MECHANICAL DATA

DW016, DW020, DW024, and DW028 plastic "small outline" packages

Each of these "small outline" packages consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.

DW016, DW020, DW024, and DW028
(20-pin package used for illustration)



DIM \ PINS	PINS			
	16	20	24	28†
A MIN	10.16 (0.400)	12.70 (0.500)	15.29 (0.602)	17.68 (0.696)
A MAX	11.18 (0.439)	13.72 (0.540)	16.27 (0.641)	18.88 (0.744)

ALL LINEAR DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

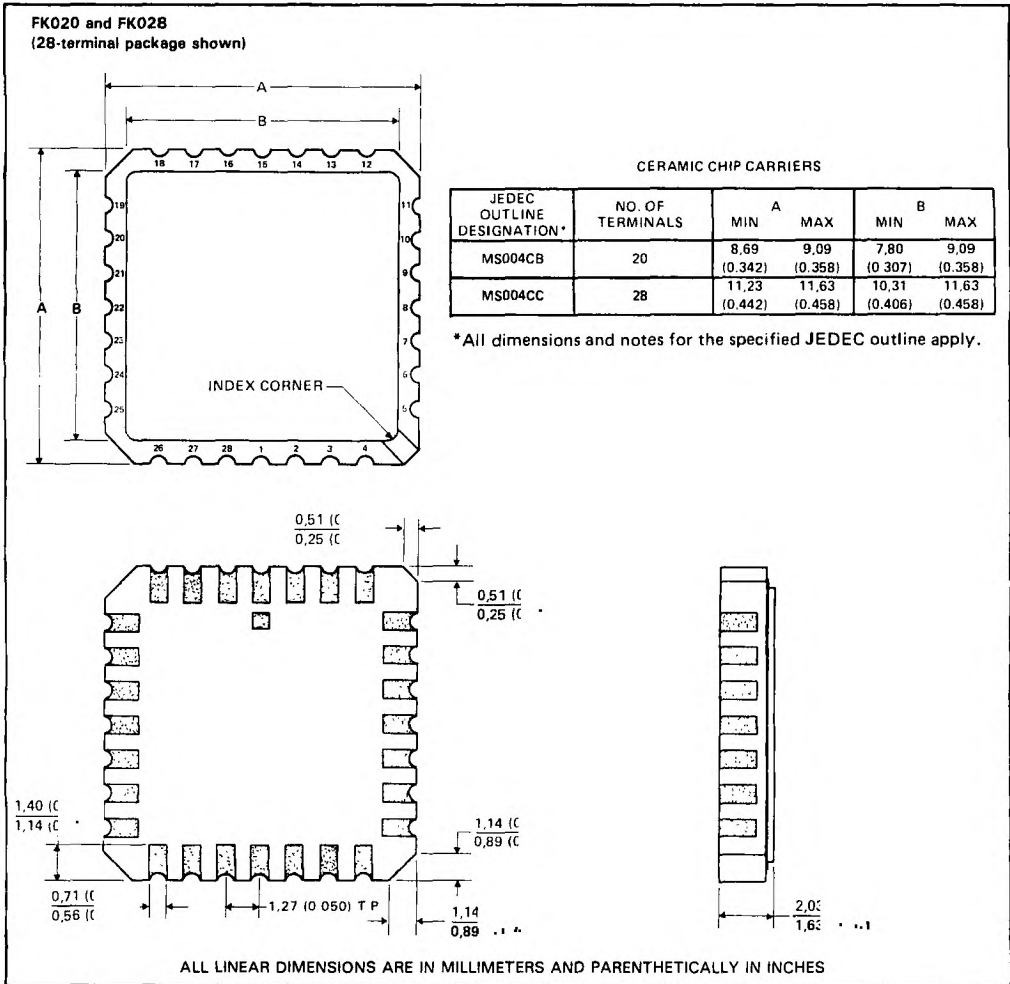
†The 28-pin package drawing is presently classified as Advance Information.

- NOTES:
- A. Leads are within 0,25 (0.010) radius of true position at maximum material dimension.
 - B. Body dimensions do not include mold flash or protrusion.
 - C. Mold flash or protrusion shall not exceed 0,15 (0.006).
 - D. Lead tips to be planar within ±0,051 (0.002) exclusive of solder.

FK020 and FK028 ceramic chip carrier packages

Each of these hermetically sealed chip carrier packages has a three-layer ceramic base with a metal lid and braze seal. The packages are intended for surface mounting on solder lands on 1,27 (0.050-inch) centers. Terminals require no additional cleaning or processing when used in soldered assembly.

FK package terminal assignments conform to JEDEC Standards 1 and 2.

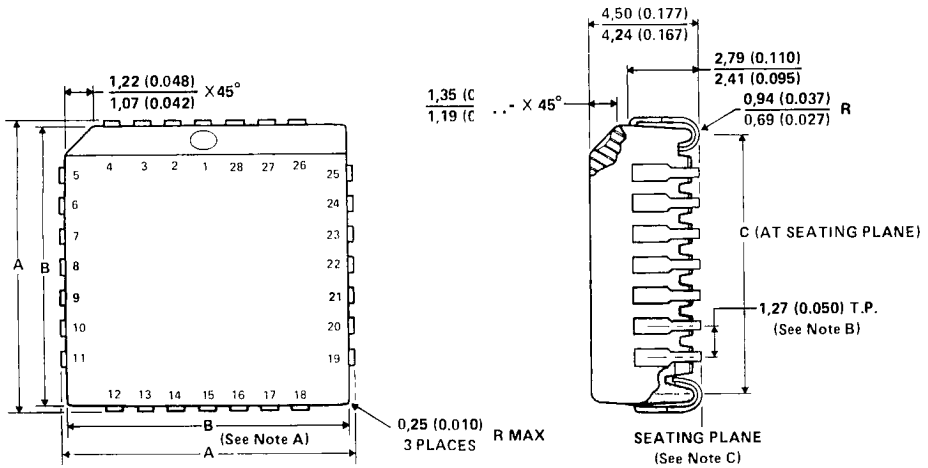


MECHANICAL DATA

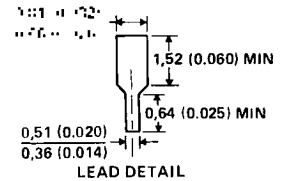
FN020, FN028, FN044, FN068, and FN084 plastic chip carrier packages

Each of these chip carrier packages consists of a circuit mounted on a lead frame and encapsulated within an electrically nonconductive plastic compound. The compound withstands soldering temperatures with no deformation, and circuit performance characteristics remain stable when the devices are operated in high-humidity conditions. The packages are intended for surface mounting on solder lands on 1,27 (0.050) centers. Leads require no additional cleaning or processing when used in soldered assembly.

FN020, FN028, FN044, FN068, and FN084
(28-terminal package used for illustration)



NO. OF TERMINALS	A		B		C	
	MIN	MAX	MIN	MAX	MIN	MAX
20	9.78 (0.385)	12.67 (0.395)	8.89 (0.350)	9.04 (0.358)	7.87 (0.310)	8.38 (0.330)
28	12.32 (0.485)	12.67 (0.495)	11.43 (0.450)	11.58 (0.458)	10.41 (0.410)	10.41 (0.430)
44	17.40 (0.685)	17.85 (0.695)	16.51 (0.650)	16.66 (0.658)	15.49 (0.610)	16.00 (0.630)
68	25.02 (0.966)	25.27 (0.995)	24.13 (0.950)	24.33 (0.958)	23.11 (0.930)	23.62 (0.930)
84	30.10 (1.185)	30.10 (1.195)	29.21 (1.150)	29.41 (1.168)	28.11 (1.099)	28.70 (1.130)

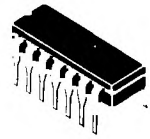
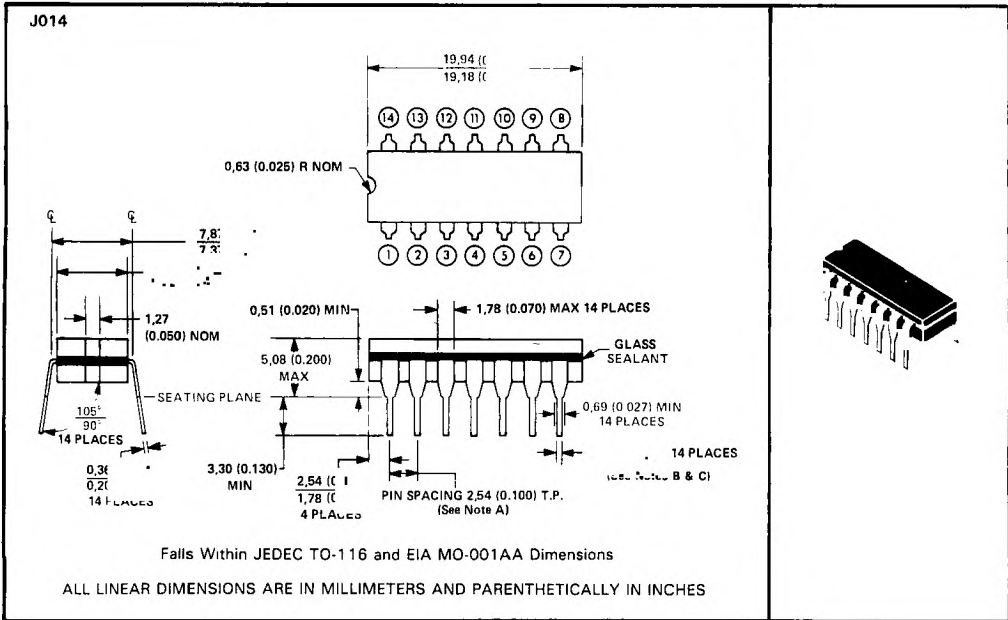


ALL LINEAR DIMENSIONS ARE IN MILLIMETERS AND PARENTHETICALLY IN INCHES

- NOTES: A. Centerline of center pin each side is within 0.10 (0.004) of package centerline as determined by dimension B.
B. Location of each pin is within 0.127 (0.005) of true position with respect to center pin on each side.
C. The lead contact points are planar within 0.10 (0.004).

J014 ceramic dual-in-line package

This hermetically sealed dual-in-line package consists of a ceramic base, ceramic cap, and a lead frame. Hermetic sealing is accomplished with glass. The package is intended for insertion in mounting-hole rows on 7,62 (0.300) centers. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Tin-plated ("bright-dipped") leads require no additional cleaning or processing when used in soldered assembly.



- NOTES: A. Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.
 B. This dimension does not apply for solder-dipped leads.
 C. When solder-dipped leads are specified, dipped area of the lead extends from the lead tip to at least 0,51 (0.020) above the seating plane.

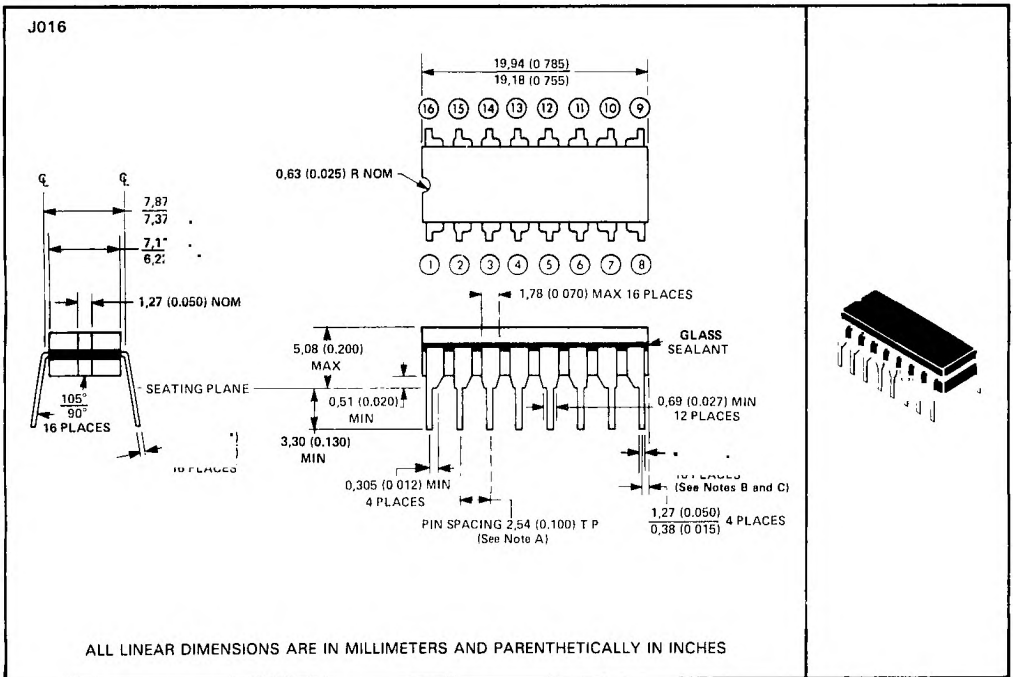
Mechanical Data

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MECHANICAL DATA

J016 ceramic dual-in-line package

This hermetically sealed dual-in-line package consists of a ceramic base, ceramic cap, and a lead frame. Hermetic sealing is accomplished with glass. The package is intended for insertion in mounting-hole rows on 7,62 (0.300) centers. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Tin-plated ("bright-dipped") leads require no additional cleaning or processing when used in soldered assembly.

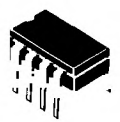
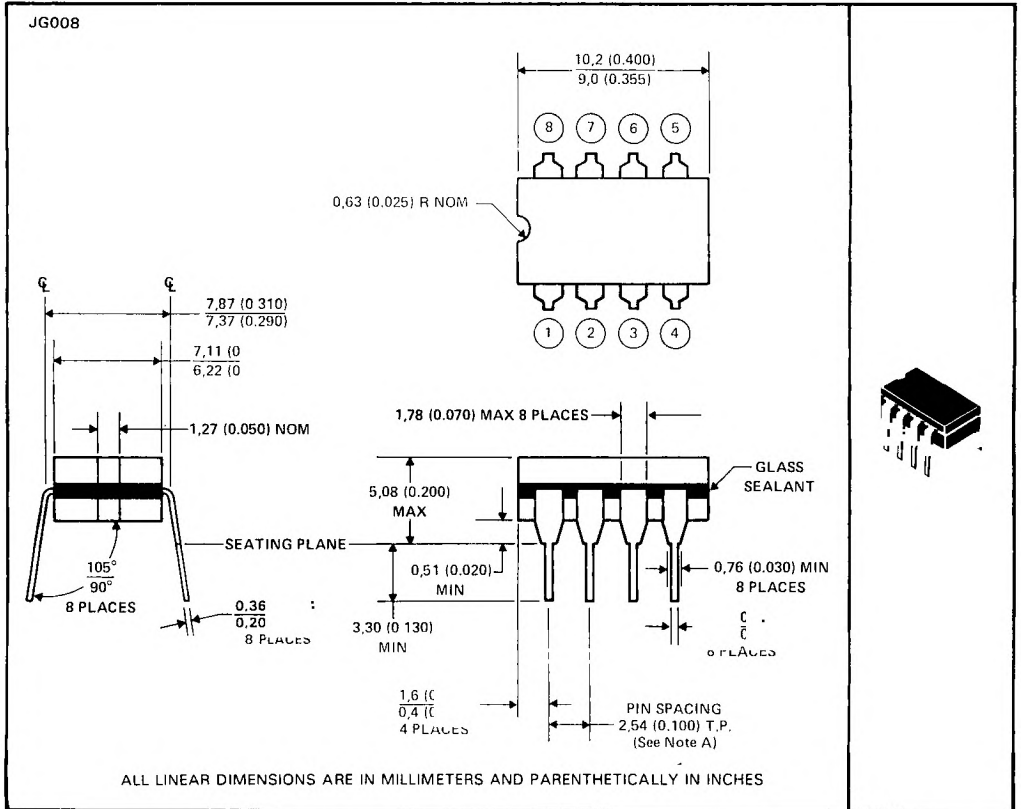


- NOTES:
- A. Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.
 - B. This dimension does not apply for solder-dipped leads.
 - C. When solder-dipped leads are specified, dipped area of the lead extends from the lead tip to at least 0,51 (0.020) above the seating plane.

MECHANICAL DATA

JG008 ceramic dual-in-line package

This hermetically sealed dual-in-line package consists of a ceramic base, ceramic cap, and an 8-pin lead frame. The package is intended for insertion in mounting-hole rows 7,62 (0.300) centers (see Note A). Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering.



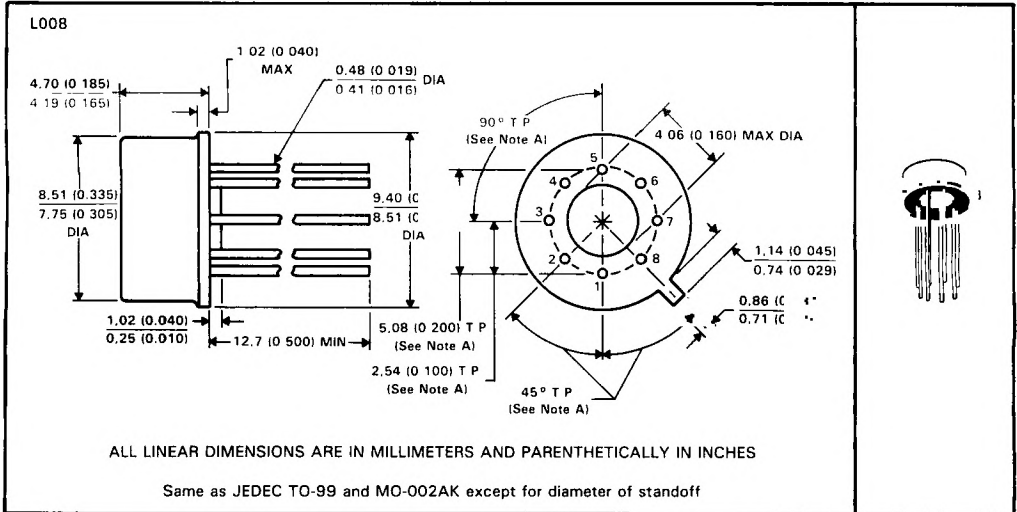
NOTE A. Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.

Mechanical Data



L008 metal cylindrical package

This hermetically sealed cylindrical package consists of a welded metal base and cap with individual leads secured by an insulating glass sealant. The gold-plated leads (-00) require no additional cleaning or processing when used in soldered assembly.

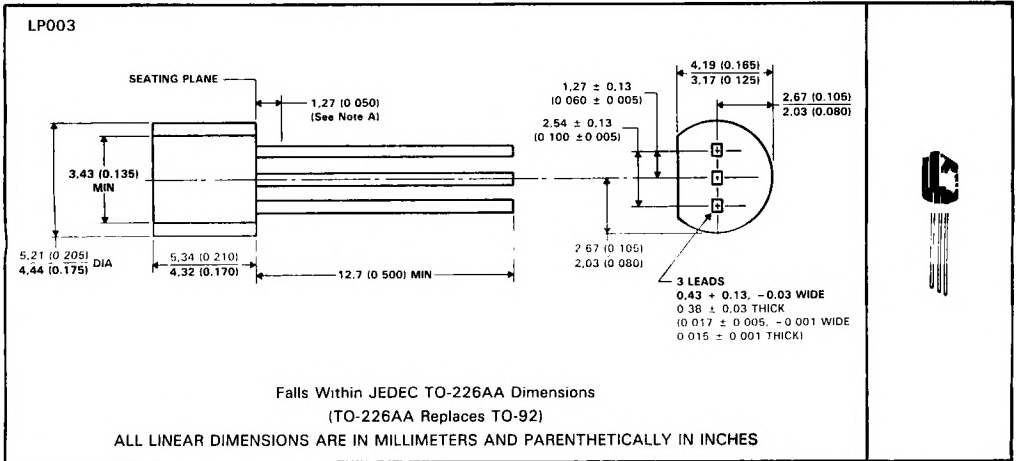


NOTE A: Each lead is located within 0,18 (0.007) of its true position at maximum material condition.

MECHANICAL DATA

LP003 cylindrical plastic package

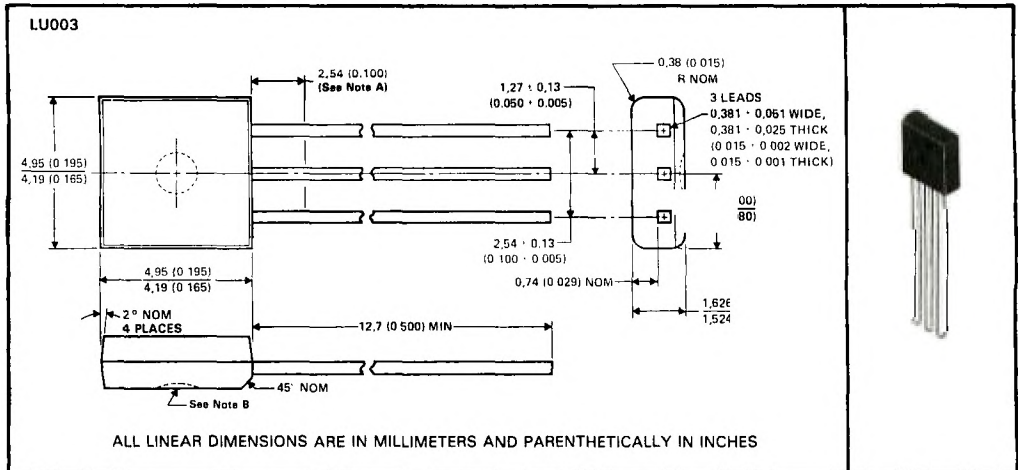
This package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation and circuit performance characteristics remain stable when operated in high-humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



NOTE A: Lead dimensions are not controlled within this area.

LU003 plastic package

This package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation and circuit performance characteristics remain stable when operated in high-humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.

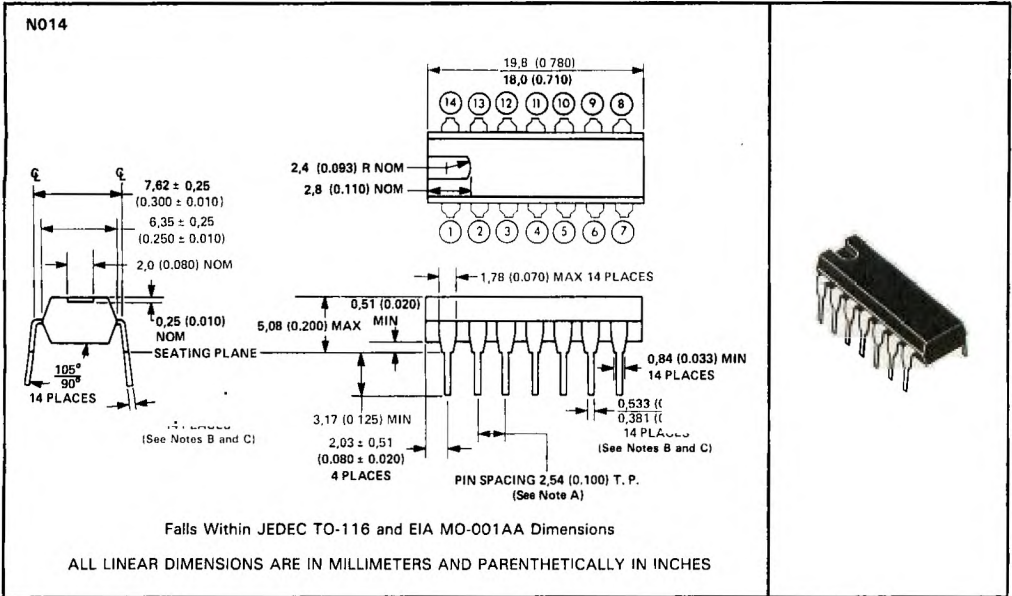


- NOTES: A. Lead dimensions are not controlled in this area.
B. The shape, dimensions, and placement of the index mark is not guaranteed.

MECHANICAL DATA

N014 plastic dual-in-line package

This dual-in-line package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. The package is intended for insertion in mounting-hole rows on 7,62 (0.300) centers (see Note A). Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Leads require no additional cleaning or processing when used in soldered assembly.



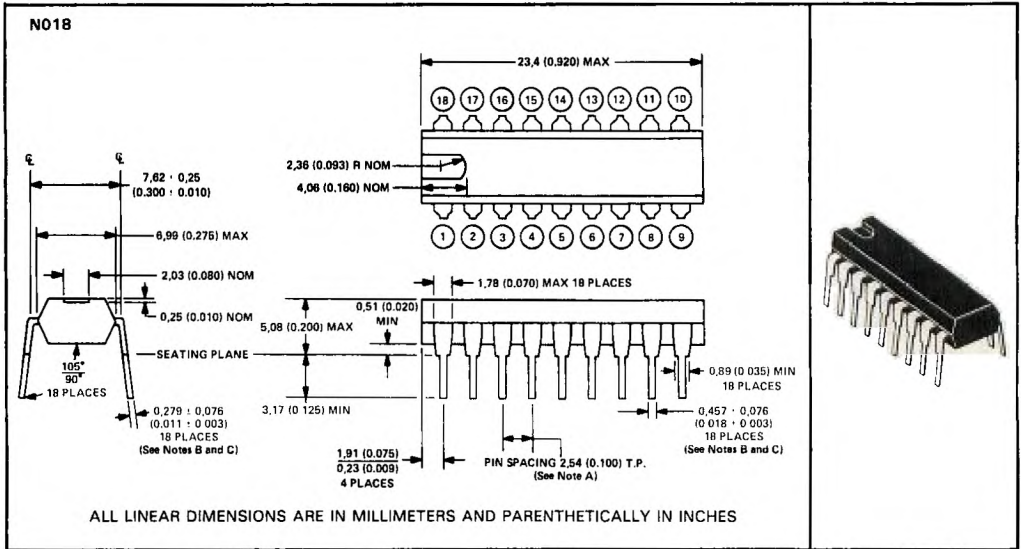
Mechanical Data

- NOTES: A. Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.
 B. This dimension does not apply for solder-dipped leads.
 C. When solder-dipped leads are specified, dipped area of the lead extends from the lead tip to at least 0,51 (0.020) above seating plane.

MECHANICAL DATA

N018 plastic dual-in-line package

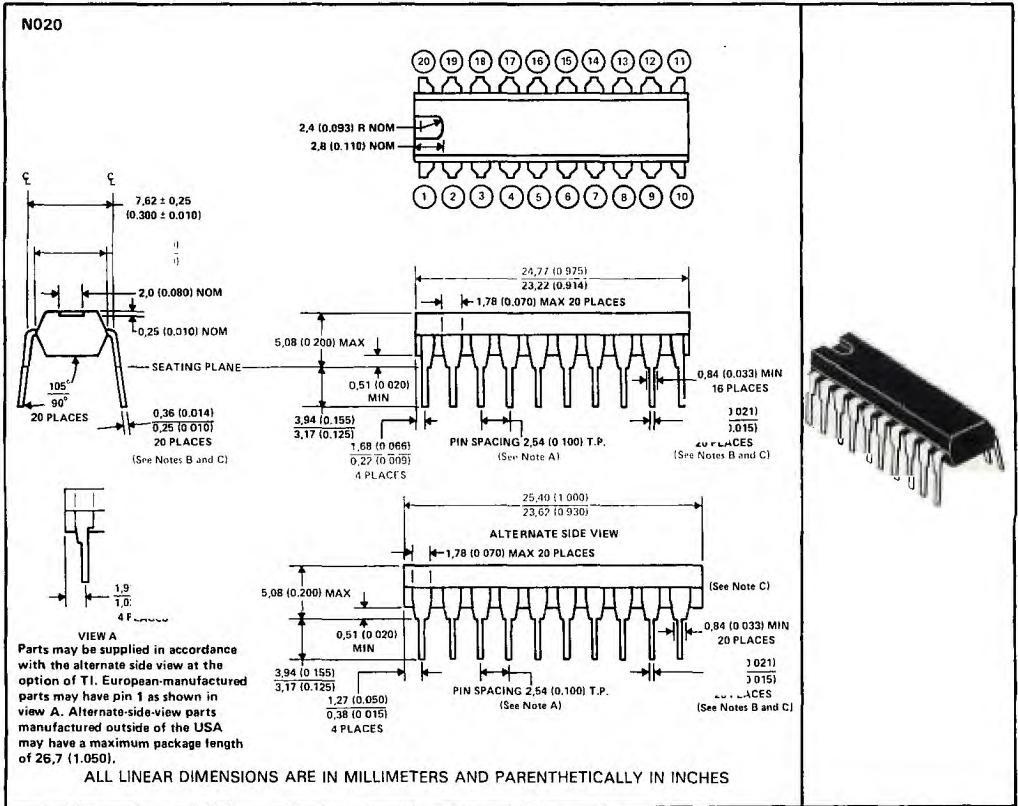
This dual-in-line package consists of a circuit mounted on a lead frame and encapsulated within an electrically nonconductive plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. The package is intended for insertion in mounting-hole rows on 7,62 (0.300) centers. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Leads require no additional cleaning or processing when used in soldered assembly.



- NOTES: A. Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.
B. This dimension does not apply for solder-dipped leads.
C. When solder-dipped leads are specified, dipped area of the lead extends from the lead tip to at least 0,51 (0.020) above seating plane.

N020 plastic dual-in-line package

This dual-in-line package consists of a circuit mounted on a lead frame and encapsulated within an electrically nonconductive plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. The package is intended for insertion in mounting-hole rows on 7,62 (0.300) centers. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Leads require no additional cleaning or processing when used in soldered assembly.



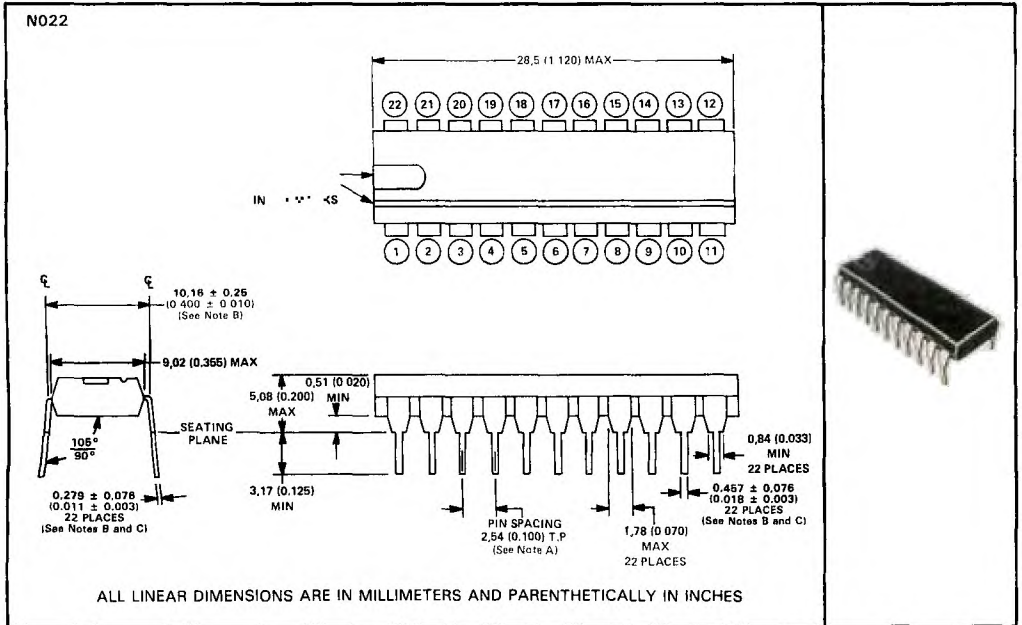
- NOTES: A. Each pin centerline is located within 0,25 (0,010) of its true longitudinal position.
 B. This dimension does not apply for solder-dipped leads.
 C. When solder-dipped leads are specified, dipped area of the lead extends from the lead tip to at least 0,51 (0,020) above seating



MECHANICAL DATA

N022 plastic dual-in-line package

This dual-in-line package consists of a circuit mounted on a lead frame and encapsulated within an electrically nonconductive plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. The package is intended for insertion in mounting-hole rows on 10,16 (0.400) centers. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Leads require no additional cleaning or processing when used in soldered assembly.



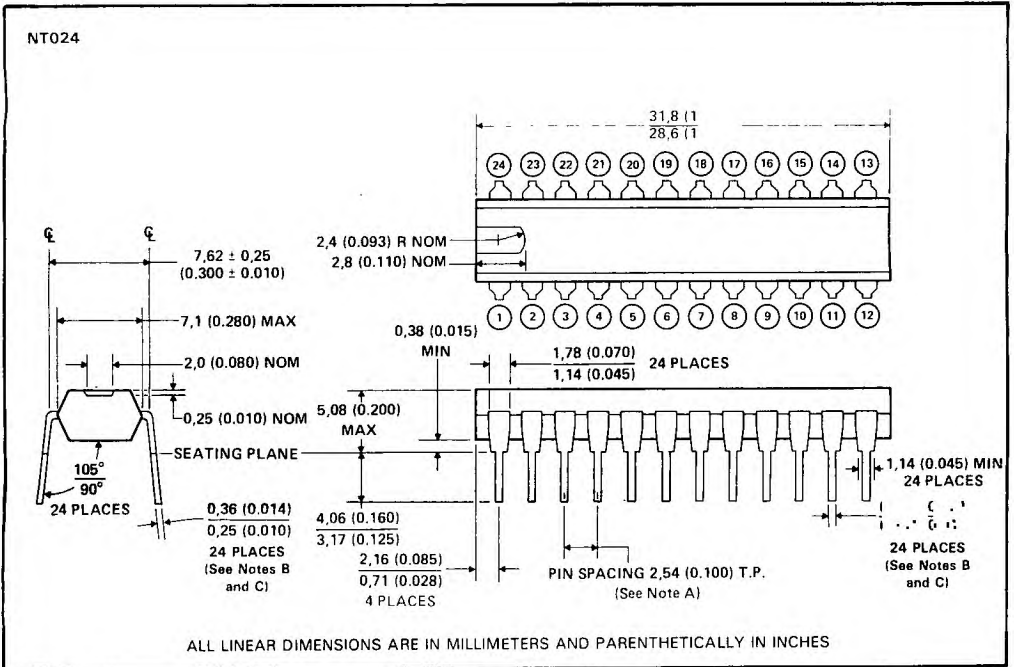
- NOTES:
- A. Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.
 - B. This dimension does not apply for solder-dipped leads.
 - C. When solder-dipped leads are specified, dipped area of the lead extends from the lead tip to at least 0,51 (0.020) above seating plane.

MECHANICAL DATA

NT024 plastic dual-in-line package

This dual-in-line package consists of a circuit mounted on a lead frame and encapsulated within an electrically nonconductive plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. The package is intended for insertion in mounting-hole rows on 7,62 (0.300) centers. Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Leads require no additional cleaning or processing when used in soldered assembly.

NOTE: For all except 24-pin packages, the letter N is used by itself since only the 24-pin package is available in more than one row-spacing. For the 24-pin package, the 7,62 (0.300) version is designated NT; the 15,24 (0.600) version is designated NW. If no second letter or row-spacing is specified, the package is assumed to have 15,24 (0.600) row-spacing.



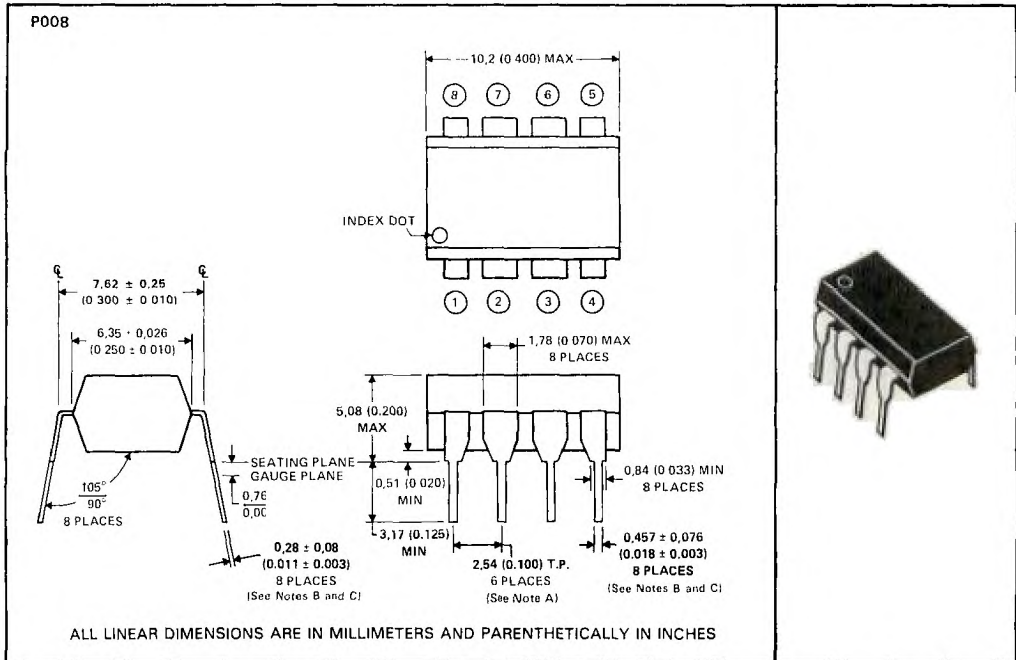
- NOTES: A. Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.
 B. This dimension does not apply for solder-dipped leads.
 C. When solder-dipped leads are specified, dipped area of the lead extends from the lead tip to at least 0,51 (0.020) above the seating plane.

Mechanical Data

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P008 dual-in-line plastic package

This package consists of a circuit mounted on an 8-pin lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high-humidity conditions. The package is intended for insertion in mounting-hole rows on 7,62 (0.300) centers (See Note A). Once the leads are compressed and inserted, sufficient tension is provided to secure the package in the board during soldering. Solder-plated leads require no additional cleaning or processing when used in soldered assembly.



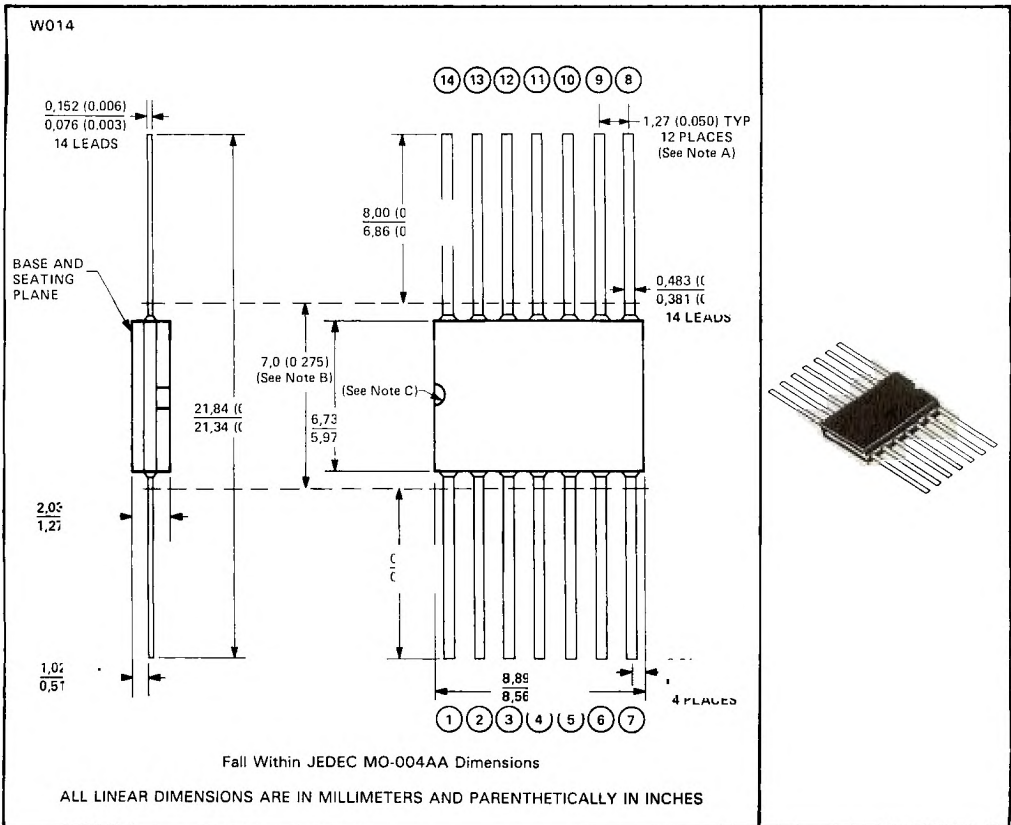
- NOTES: A. Each pin centerline is located within 0,25 (0.010) of its true longitudinal position.
 B. This dimension does not apply for solder-dipped leads.
 C. When solder-dipped leads are specified, dipped area of the lead extends from the lead tip to at least 0,51 (0.020) above seating plane.

Mechanical Data

6

W014 ceramic flat package

This hermetically sealed flat package consists of an electrically nonconductive ceramic base and cap and a lead frame. Hermetic sealing is accomplished with glass. Leads require no additional cleaning or processing when used in soldered assembly.



Mechanical Data

6

- NOTES: A. Leads are within 0.13 (0.005) radius of true position (T.P.) at maximum material condition.
 B. This dimension determines a zone within which all body and lead irregularities lie.
 C. Index point is provided on cap for terminal identification only.