

CD40257B Types

CMOS

Quad 2-Line-to-1-Line Data Selector/Multi- plexer

High-Voltage Types (20-Volt Rating)

■ CD40257B is a Data Selector/Multi-
plexer featuring three-state outputs which
can interface directly with and drive data
lines of bus-oriented systems.

The CD40257B types are supplied in 16-lead
hermetic dual-in-line ceramic packages
(F3A suffix), 16-lead dual-in-line plastic
packages (E suffix), 16-lead small-outline
packages (M, M96, MT, and NSR suffixes), and
16-lead thin shrink small-outline packages
(PW and PWR suffixes).

MAXIMUM RATINGS, Absolute-Maximum Values:

DC SUPPLY-VOLTAGE RANGE, (V_{DD})

Voltages referenced to V_{SS} Terminal

INPUT VOLTAGE RANGE, ALL INPUTS -0.5V to V_{DD} + 0.5V

DC INPUT CURRENT, ANY ONE INPUT ±10mA

POWER DISSIPATION PER PACKAGE (P_D):

For T_A = -55°C to +100°C 500mW

For T_A = +100°C to +125°C Derate Linearly at 12mW/°C to 200mW

DEVICE DISSIPATION PER OUTPUT TRANSISTOR

For T_A = FULL PACKAGE-TEMPERATURE RANGE (All Package Types) 100mW

OPERATING-TEMPERATURE RANGE (T_A) -55°C to +125°C

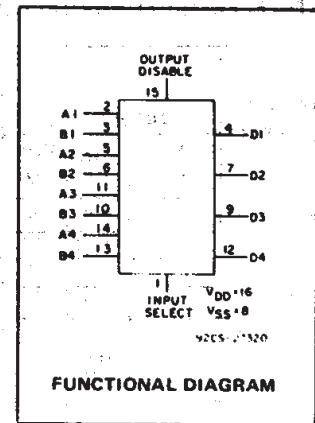
STORAGE TEMPERATURE RANGE (T_{stg}) -65°C to +150°C

LEAD TEMPERATURE (DURING SOLDERING):

At distance 1/16 ± 1/32 inch (1.59 ± 0.79mm) from case for 10s max +265°C

Features:

- 3-state outputs
- Standardized, symmetrical output characteristics
- 100% tested for quiescent current at 20 V
- Maximum input current of 1 μA at 18 V
over full package-temperature range;
100 nA at 18 V and 25°C
- Noise margin (over full package-
temperature range):
1 V at V_{DD} = 5 V
2 V at V_{DD} = 10 V
2.5 V at V_{DD} = 15 V
- 5-V, 10-V, and 15-V parametric ratings
- Meets all requirements of JEDEC
Tentative Standard No. 13A, "Standard
Specifications for Description of 'B'
Series CMOS Devices"



Applications:

- Digital Multiplexing
- Shift-right/shift-left registers
- True/complement selection

RECOMMENDED OPERATING CONDITION

For maximum reliability, nominal operating
conditions should be selected so that operation
is always within the following ranges:

CHARACTERISTIC	LIMITS		UNITS
	Min.	Max.	
Supply-Voltage Range (For T _A = Full Package- Temperature Range)	3	18	V

TRUTH TABLE

INPUTS			OUTPUT
3-STATE OUTPUT DISABLE	SELECT	A B	
1	X	X X	Z
0	0	0 X	0
0	0	1 X	1
0	1	X 0	0
0	1	X 1	1

X = DON'T CARE LOGIC 1 = HIGH
LOGIC 0 = LOW Z = HIGH IMPEDANCE

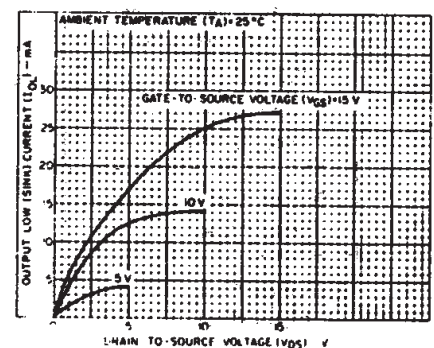
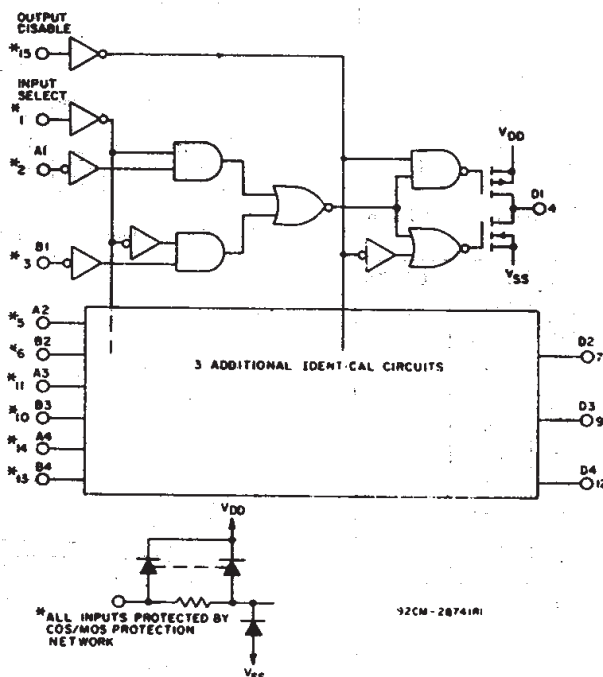


Fig. 1 - Logic diagram for CD40257B.

Fig. 2 - Typical output low (sink) current characteristics.

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STATIC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	CONDITIONS			LIMITS AT INDICATED TEMPERATURES (°C)							UNITS
	V _O (V)	V _{IN} (V)	V _{DD} (V)	-55	-40	+85	+125	+25			
								Min.	Typ.	Max.	
Quiescent Device Current I _{DD} Max.	—	0.5	5	1	1	30	30	—	0.02	1	μA
	—	0.10	10	2	2	60	60	—	0.02	2	
	—	0.15	15	4	4	120	120	—	0.02	4	
	—	0.20	20	20	20	600	600	—	0.04	20	
Output Low (Sink) Current, I _{OL} Min.	0.4	0.5	5	0.64	0.61	0.42	0.36	0.51	1	—	mA
	0.5	0.10	10	1.6	1.5	1.1	0.9	1.3	2.6	—	
	1.5	0.15	15	4.2	4	2.8	2.4	3.4	6.8	—	
Output High (Source) Current, I _{OH} Min.	4.6	0.5	5	-0.64	-0.61	-0.42	-0.36	-0.51	-1	—	
	2.5	0.5	5	-2	-1.8	-1.3	-1.15	-1.6	-3.2	—	
	9.5	0.10	10	-1.6	-1.5	-1.1	-0.9	-1.3	-2.6	—	
	13.5	0.15	15	-4.2	-4	-2.8	-2.4	-3.4	-6.8	—	
Output Voltage: Low-Level, V _{OL} Max.	—	0.5	5	0.05				—	0	0.05	V
	—	0.10	10	0.05				—	0	0.05	
	—	0.15	15	0.05				—	0	0.05	
Output Voltage: High-Level, V _{OH} Min.	—	0.5	5	4.95				4.95	5	—	
	—	0.10	10	9.95				9.95	10	—	
	—	0.15	15	14.95				14.95	15	—	
Input Low Voltage, V _{IL} Max.	0.5, 4.5	—	5	1.5				—	—	1.5	V
	1.9	—	10	3				—	—	3	
	1.5, 13.5	—	15	4				—	—	4	
Input High Voltage, V _{IH} Min.	0.5, 4.5	—	5	3.5				3.5	—	—	
	1.9	—	10	7				7	—	—	
	1.5, 13.5	—	15	11				11	—	—	
Input Current, I _{IN} Max.	—	0.18	18	±0.1	±0.1	±1	±1	—	±10 ⁻⁵	±0.1	μA
3-State Output Leakage Current I _{OUT} Max.		0.18	18	±0.4	±0.4	±12	±12	—	±10 ⁻⁴	±0.4	μA

DYNAMIC ELECTRICAL CHARACTERISTICS at $T_A = 25^\circ C$; Input $t_r, t_f = 20$ ns, $C_L = 50$ pF, $R_L = 200$ K Ω

CHARACTERISTIC	TEST CONDITIONS	LIMITS		UNITS
		$V_{DD}(V)$	Typ. Max.	
Propagation Delay Time: Data Input to Output, t_{PHL}, t_{PLH}		5	150 300	ns
		10	70 140	
		15	50 100	
Select to Output, t_{PHL}, t_{PLH}		5	190 380	ns
		10	85 170	
		15	65 130	
Output Disable to Output, t_{PHL}, t_{PLH}		5	95 190	ns
		10	50 100	
		15	40 80	
Transition Time, t_{THL}, t_{TLH}		5	100 200	ns
		10	50 100	
		15	40 80	
Input Capacitance, C_{IN}	Any Input	—	5 7.5	pF

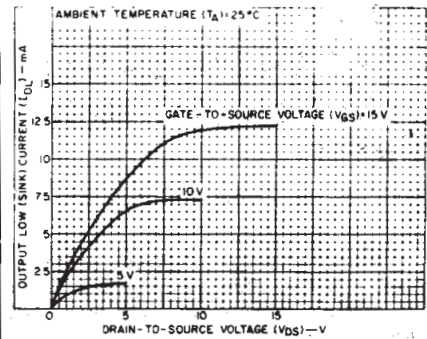


Fig.3 — Minimum output low (sink) current characteristics.

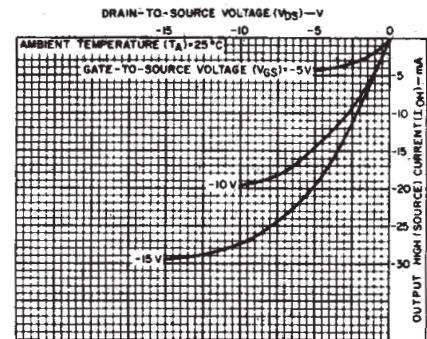


Fig.4 — Typical output high (source) current characteristics.

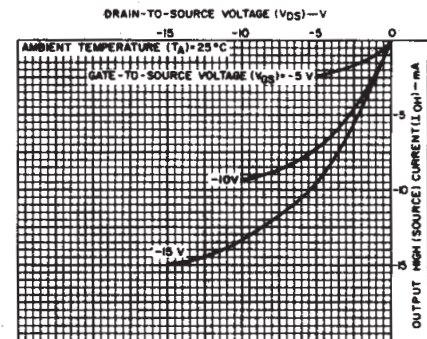


Fig.5 — Minimum output high (source) current characteristics.

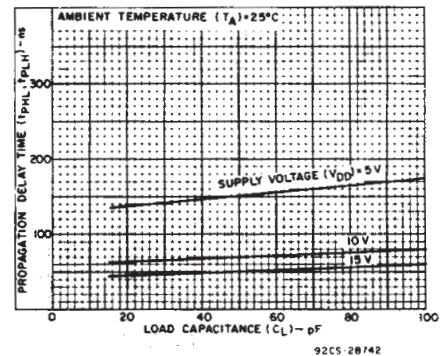


Fig.6 — Typical propagation delay time as a function of load capacitance (DATA INPUT to OUTPUT).

CD40257B Types

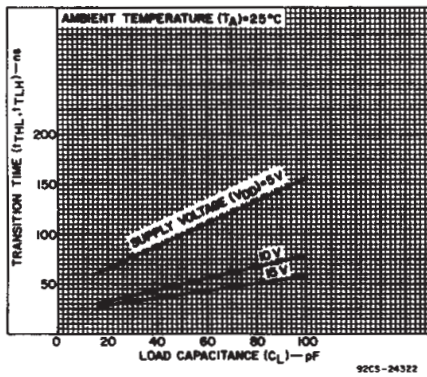


Fig. 7 - Typical transition time as a function of load capacitance.

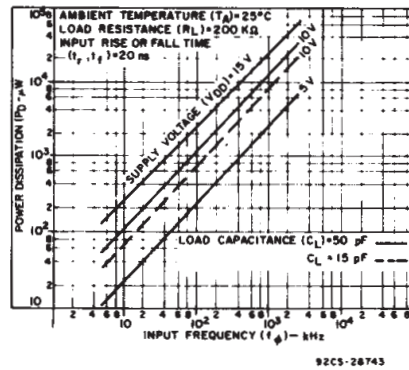


Fig. 8 - Typical dynamic power dissipation as a function of input frequency (one INPUT to one OUTPUT).

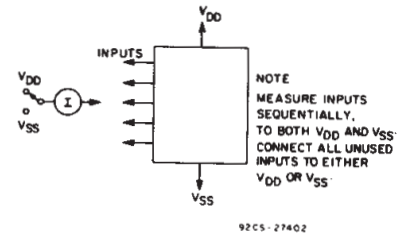


Fig. 9 - Input current test circuit.

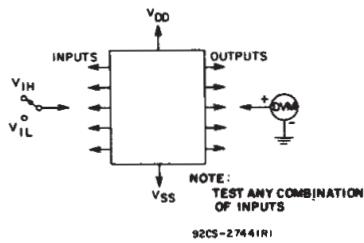


Fig. 10 - Input voltage test circuit.

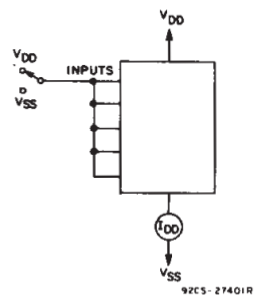


Fig. 11 - Quiescent device current test circuit.

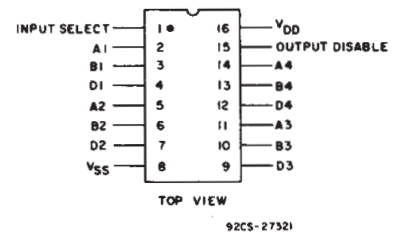
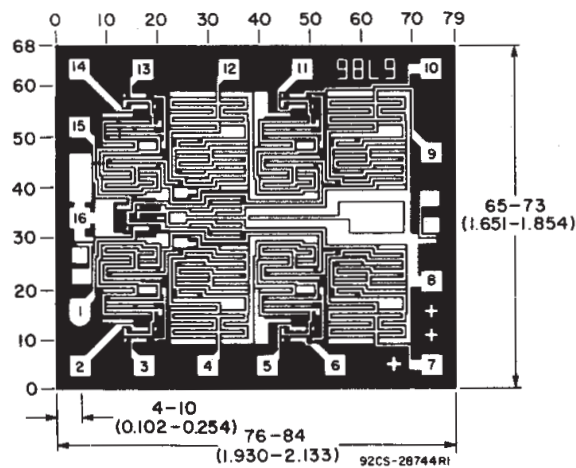


Fig. 12 - Terminal assignment.

Dimensions and pad layout for CD40257BH.



Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions as indicated. Grid graduations are in mils (10^{-3} inch).

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
CD40257BE	Active	Production	PDIP (N) 16	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD40257BE
CD40257BE.A	Active	Production	PDIP (N) 16	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD40257BE
CD40257BEE4	Active	Production	PDIP (N) 16	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD40257BE
CD40257BF3A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	CD40257BF3A
CD40257BF3A.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	CD40257BF3A
CD40257BM	Active	Production	SOIC (D) 16	40 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD40257BM
CD40257BM.A	Active	Production	SOIC (D) 16	40 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD40257BM

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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OTHER QUALIFIED VERSIONS OF CD40257B, CD40257B-MIL :

- Catalog : [CD40257B](#)
- Military : [CD40257B-MIL](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

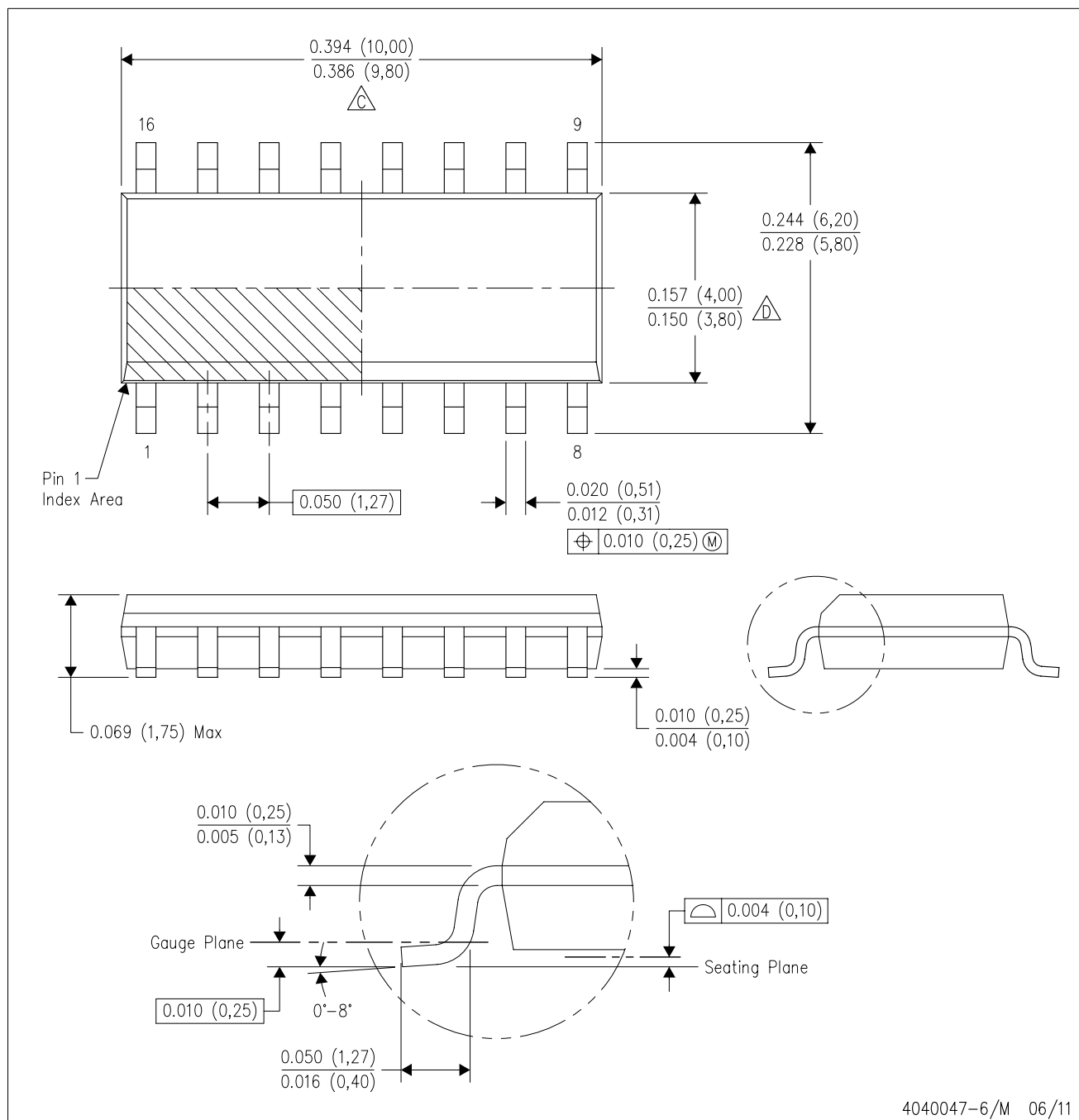
TUBE


*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
CD40257BE	N	PDIP	16	25	506	13.97	11230	4.32
CD40257BE	N	PDIP	16	25	506	13.97	11230	4.32
CD40257BE.A	N	PDIP	16	25	506	13.97	11230	4.32
CD40257BE.A	N	PDIP	16	25	506	13.97	11230	4.32
CD40257BEE4	N	PDIP	16	25	506	13.97	11230	4.32
CD40257BEE4	N	PDIP	16	25	506	13.97	11230	4.32
CD40257BM	D	SOIC	16	40	507	8	3940	4.32
CD40257BM.A	D	SOIC	16	40	507	8	3940	4.32

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



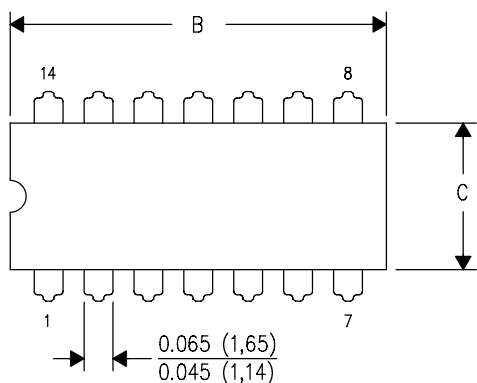
4040047-6/M 06/11

- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
 - D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
 - E. Reference JEDEC MS-012 variation AC.

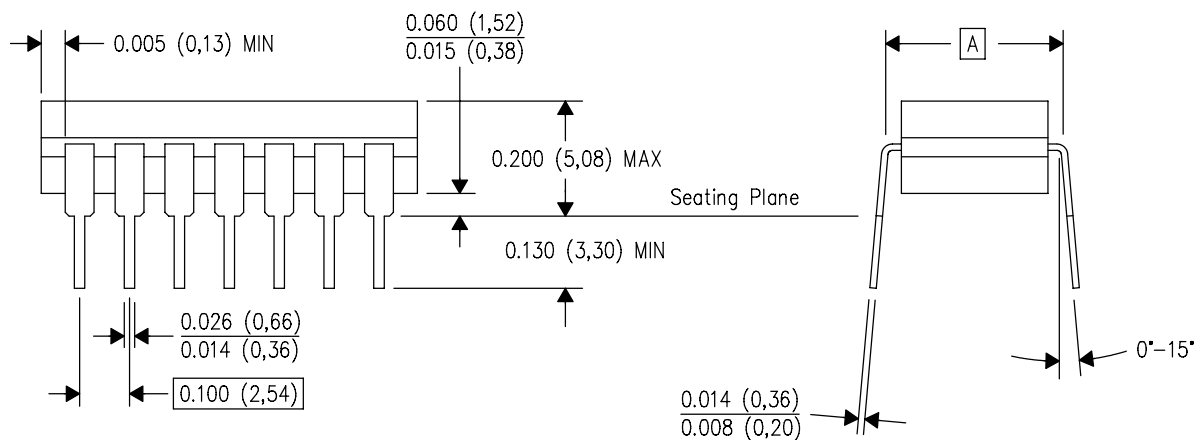
J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



PINS ** DIM	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



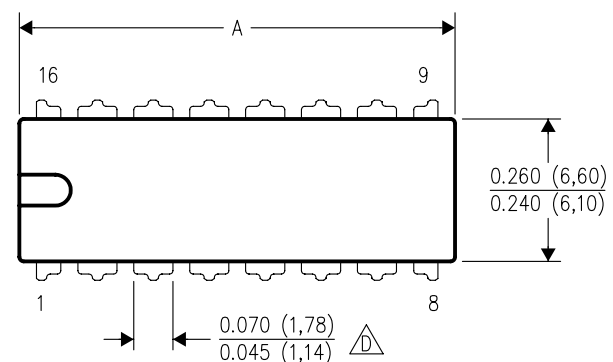
4040083/F 03/03

- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package is hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
 - E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

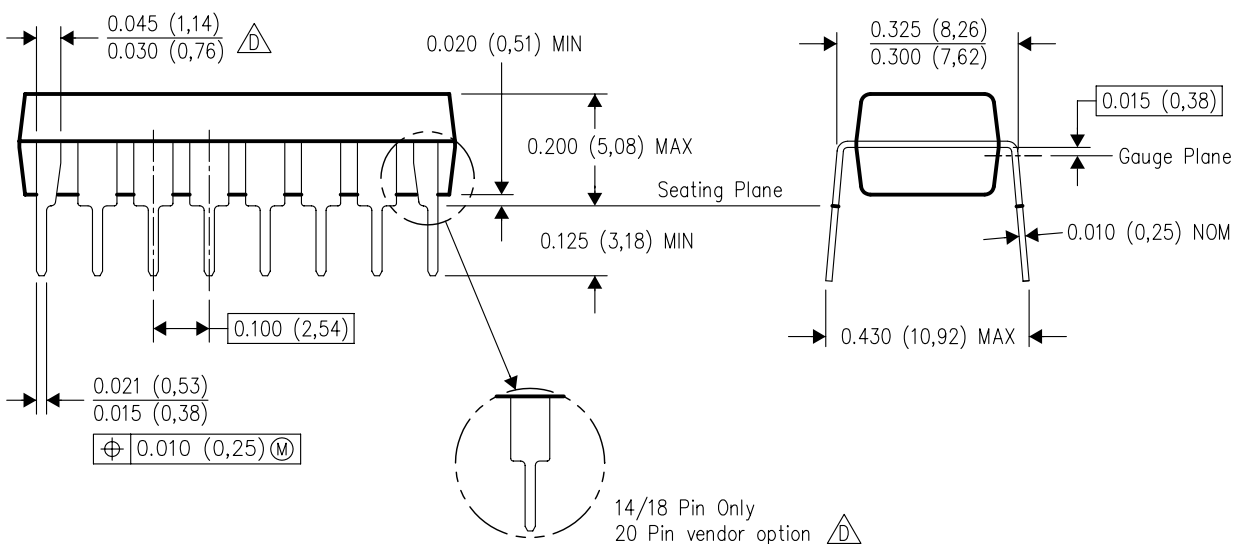
N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



PINS ** DIM	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS-001 VARIATION	AA	BB	AC	AD



4040049/E 12/2002

NOTES:

- A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
-  Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 The 20 pin end lead shoulder width is a vendor option, either half or full width.

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