FOR SYMMETRICAL GENERATION OF COMPLEMENTARY TTL SIGNALS

- Switching Time Skew of the Complementary Outputs Is Typically 0.5 ns . . . Not More than 3 ns at Rated Loading

- Full Fan-Out to 20 High-Level and 10 Low-Level 54/74 Loads

- Active Pull-Down Provides Square Transfer Characteristics

description

The SN54265 and SN74265 circuits feature complementary outputs from each logic element, which have virtually symmetrical switching time delays from the triggering input. They are designed specifically for use in applications such as:

- Symmetrical clock/$\overline{\text{clock}}$ generators

- Complementary input circuit for decoders and code converters

- Switch debouncing

- Differential line driver

Examples of these four functions are illustrated in the typical application data.

The SN54265 is characterized for operation over the full military temperature range of −55°C to 125°C; the SN74265 is characterized for operation from 0°C to 70°C.

SN54265 . . . J OR W PACKAGE
SN74265 . . . N PACKAGE
(TOP VIEW)

1A	1	16	V_CC
1W	2	15	4A
1Y	3	14	4W
2A	4	13	4Y
2B	5	12	3B
2W	6	11	3A
2Y	7	10	3W
GND	8	9	3Y
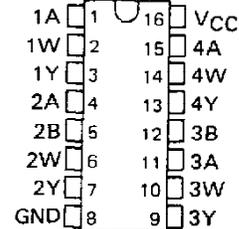
NC No internal connection

schematics of inputs and outputs
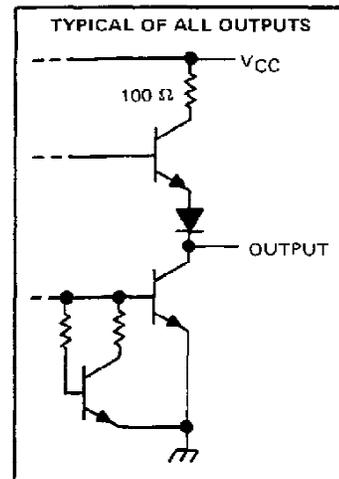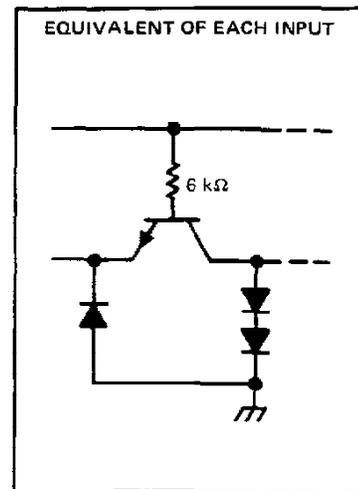
EQUIVALENT OF EACH INPUT

6 kΩ

logic symbol†

†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

TYPICAL OF ALL OUTPUTS

V_CC
100 Ω
OUTPUT

logic diagrams

ELEMENTS 1 and 4

A — Y
W

ELEMENTS 2 and 3

A
B — Y
W

positive logic

$Y = \overline{A}$ $W = A$

$Y = \overline{AB}$ or $Y = \overline{A} + \overline{B}$
$W = AB$ or $W = \overline{\overline{A} + \overline{B}}$

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1) . . . . 7 V
Input voltage . . . . 5.5 V
Operating free-air temperature range: SN54265 . . . . $-55°C$ to $125°C$
 SN74265 . . . . $0°C$ to $70°C$
Storage temperature range . . . . $-65°C$ to $150°C$

NOTE 1. Voltage values are with respect to network ground terminal.

recommended operating conditions

	SN54265			SN74265			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			−800			−800	μA
Low-level output current, I_{OL}			16			16	mA
Operating free-air temperature, T_A	−55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS[†]		MIN	TYP[‡]	MAX	UNIT
V_{IH}	High-level input voltage			2			V
V_{IL}	Low-level input voltage					0.8	V
V_{IK}	Input clamp voltage	V_{CC} = MIN,	I_I = −12 mA			−1.5	V
V_{OH}	High-level output voltage	V_{CC} = MIN,	I_{OH} = −800 μA	2.4	3.4		V
V_{OL}	Low-level output voltage	V_{CC} = MIN,	I_{OL} = 16 mA		0.2	0.4	V
I_I	Input current at maximum input voltage	V_{CC} = MAX,	V_I = 5.5 V			1	mA
I_{IH}	High-level input current	V_{CC} = MAX,	V_I = 2.4 V			40	μA
I_{IL}	Low-level input current	V_{CC} = MAX,	V_I = 0.4 V			−1.6	mA
I_{OS}	Short-circuit output current[§]	V_{CC} = MAX,	SN54265	−20		−57	mA
			SN74265	−18		−57	
I_{CC}	Supply current	V_{CC} = MAX,	See Note 2		25	34	mA

[†]For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
[‡]All typical values are at V_{CC} = 5 V, T_A = 25°C.
[§]Not more than one output should be shorted at a time.
NOTE 2: I_{CC} is measured with all outputs open and all inputs grounded.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER[¶]	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH(W)}$	A or B (as applicable)	W	R_L = 400 Ω, C_L = 15 pF, See Note 3		11.6	18	ns
$t_{PHL(Y)}$		Y			11.3	18	
$t_{PHL(W)}$	A or B (as applicable)	W			9.8	18	ns
$t_{PLH(Y)}$		Y			10.2	18	
$t_{PLH(W)}−t_{PHL(Y)}$	A or B (as applicable)	W with respect to Y			+0.3	±3	ns
$t_{PHL(W)}−t_{PLH(Y)}$					−0.4	±3	

t_{PLH} = propagation delay time, low-to-high-level output
t_{PHL} = propagation delay time, high-to-low-level output
$t_{PXX(W)}−t_{PXX(Y)}$ = Difference in indicated propagation delay times at the W and Y outputs, respectively.
NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

TYPICAL CHARACTERISTICS†

PROPAGATION DELAY TIME DIFFERENCE
vs
FREE-AIR TEMPERATURE
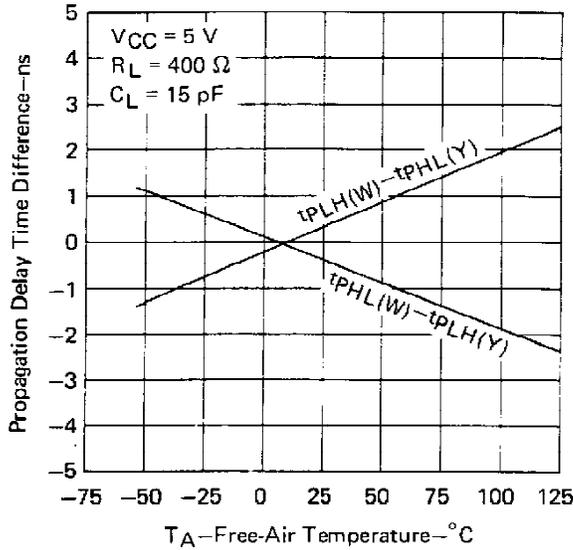
PROPAGATION DELAY TIME DIFFERENCE
vs
SUPPLY VOLTAGE
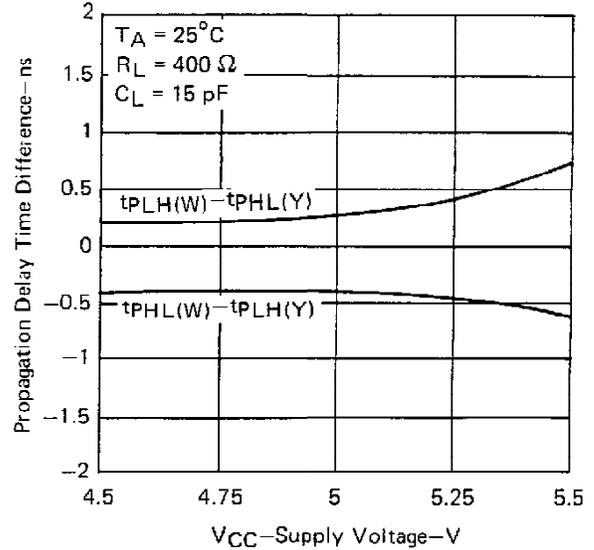
FIGURE 1

FIGURE 2

PROPAGATION DELAY TIME DIFFERENCE vs LOAD CAPACITANCE
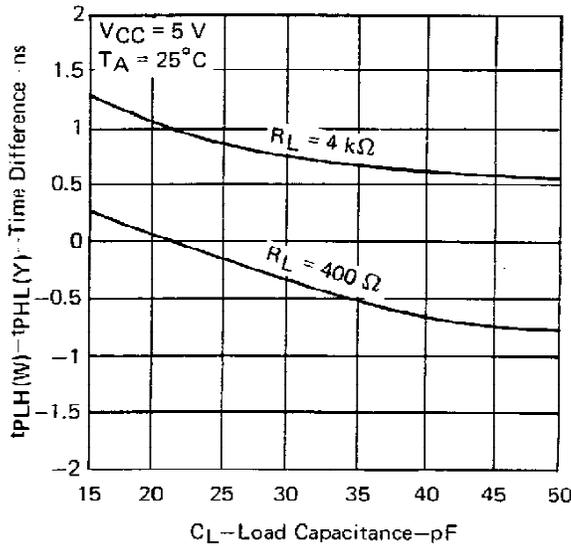
FIGURE 3
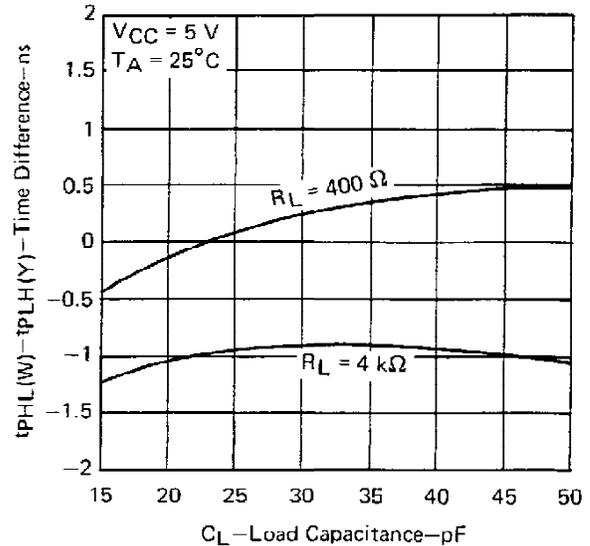
FIGURE 4

†Data for temperatures below 0°C and above 70°C and for supply voltages below 4.75 V and above 5.25 V are applicable for SN54265 only.

TEXAS
INSTRUMENTS

## TYPICAL APPLICATION DATA
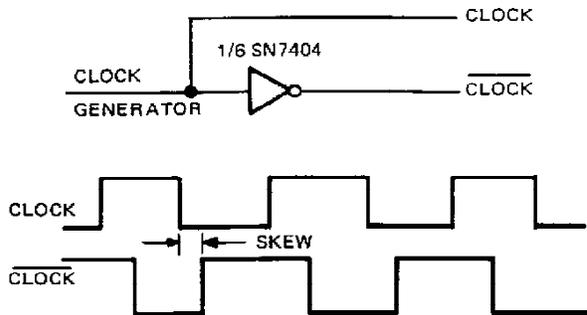
FIGURE A — TYPICAL CLOCK/CLOCK GENERATOR CIRCUIT
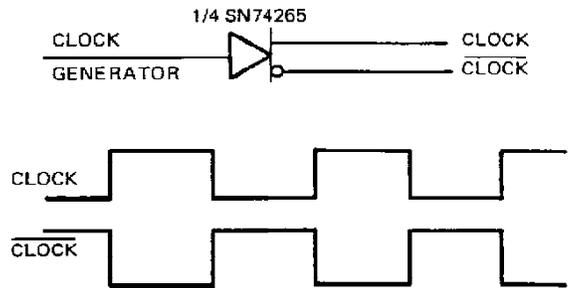
FIGURE B — SKEWLESS CLOCK/CLOCK GENERATOR CIRCUIT
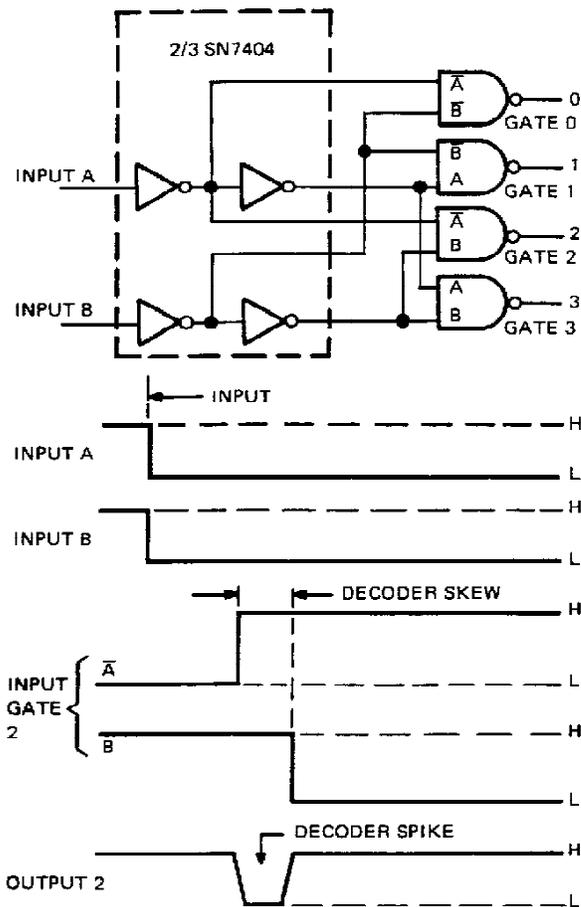
FIGURE C — TYPICAL DECODER/CODE CONVERTER
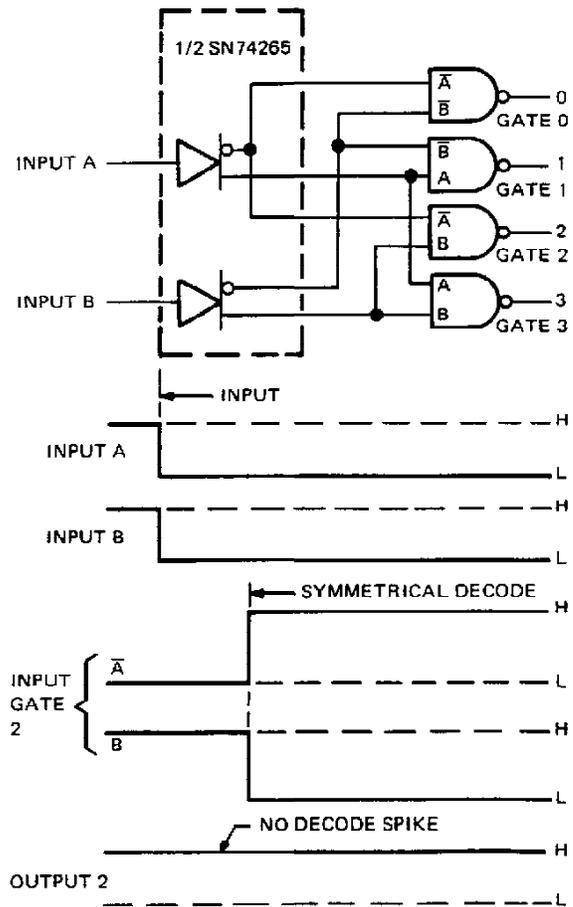
FIGURE D — SYMMETRICAL DECODER/CODE CONVERTER

TYPICAL APPLICATION DATA

1/4 SN74265

390 Ω
1/4 SN74265

INPUT — 5 V — 0 V

INPUT — 5 V — 0 V

W OUTPUT — V_OH — V_OL

W OUTPUT — V_OH — V_OL

Y OUTPUT — V_OH — V_OL

Y OUTPUT — V_OH — V_OL

WITHOUT FEEDBACK

WITH FEEDBACK TO STABILIZE INPUT
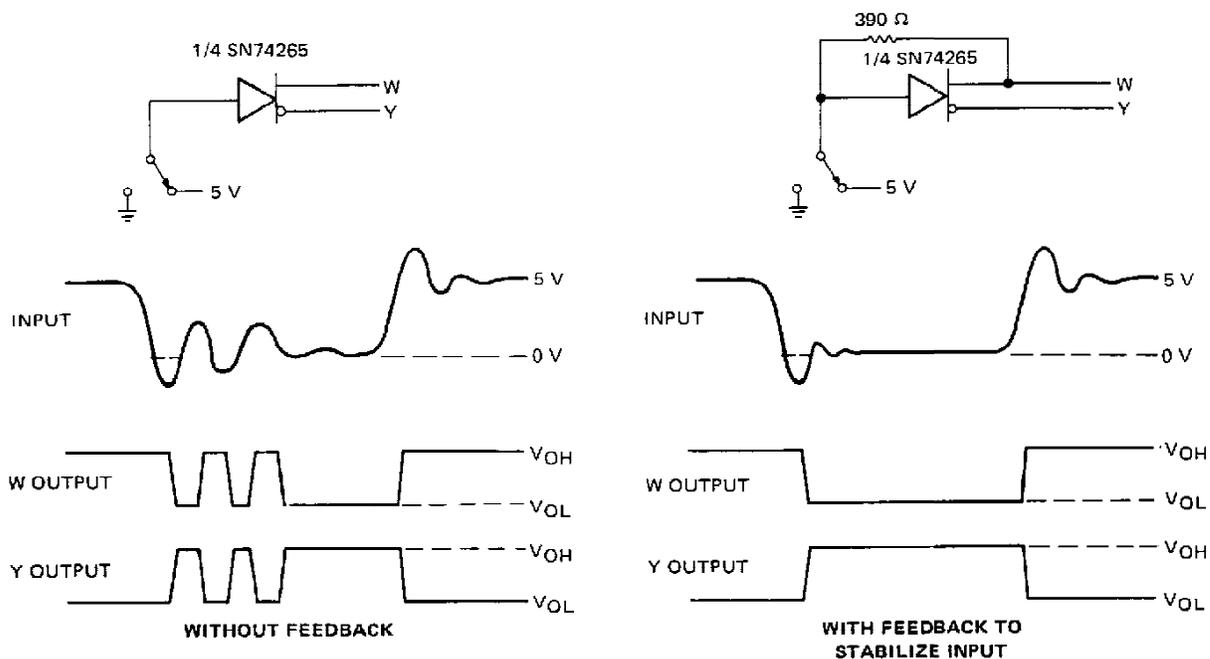
FIGURE E – SWITCH DEBOUNCER

V+

1/4 SN74265

DIFFERENTIAL LINE RECEIVER

DATA IN

DATA OUT

Noise immunity typically 3 V
for either high level or low level data
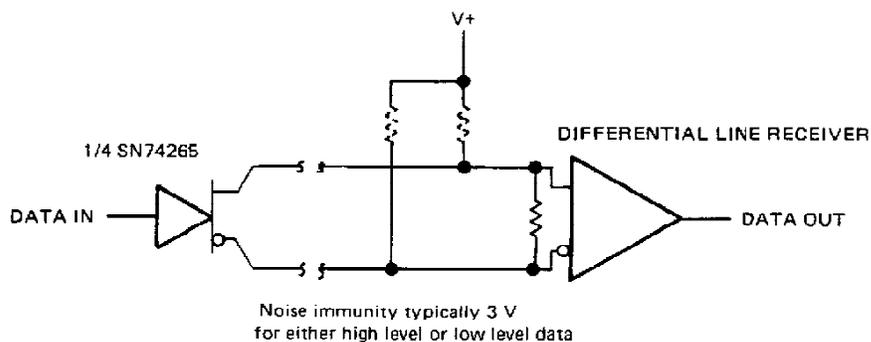
FIGURE F – DIFFERENTIAL LINE DRIVER

PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/ Ball Finish	MSL Peak Temp [3]	Samples (Requires Login)
SN54265J	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI	Samples Not Available
SN74265N	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI	Samples Not Available
SN74265N3	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI	Samples Not Available
SNJ54265J	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI	Samples Not Available

[1] The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

[2] Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

[3] MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN54265, SN74265 :

● Catalog: SN74265

● Military: SN54265

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product

- Military - QML certified for Military and Defense Applications

B

14   8

1   7

0.065 (1,65)
0.045 (1,14)

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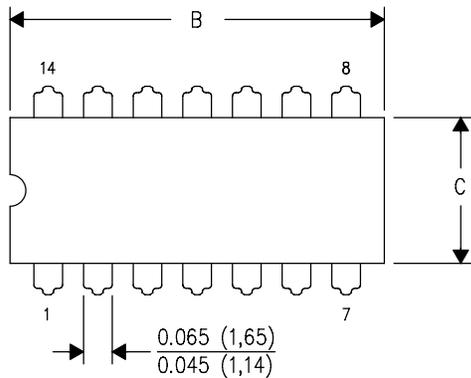
| | PINS ** | 14 | 16 | 18 | 20 |
DIM					
A		0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B	MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B	MIN	—	—	—	—
C	MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C	MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)

0.005 (0,13) MIN

0.060 (1,52)
0.015 (0,38)

0.200 (5,08) MAX

Seating Plane

0.130 (3,30) MIN

0.026 (0,66)
0.014 (0,36)

0.100 (2,54)

A

0°-15°

0.014 (0,36)
0.008 (0,20)
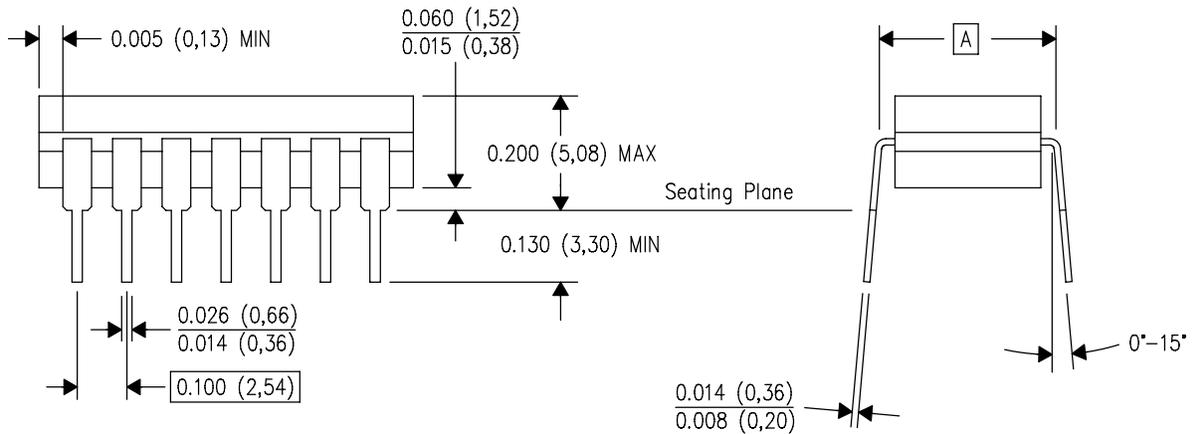
4040083/F 03/03

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**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN

DIM \ PINS **	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

0.260 (6,60) / 0.240 (6,10)

0.070 (1,78) / 0.045 (1,14) /D\

0.045 (1,14) / 0.030 (0,76) /D\

0.020 (0,51) MIN

0.200 (5,08) MAX

Seating Plane

0.125 (3,18) MIN

0.100 (2,54)

0.021 (0,53) / 0.015 (0,38)

⊕ 0.010 (0,25) Ⓜ

14/18 Pin Only
20 Pin vendor option /D\

0.325 (8,26) / 0.300 (7,62)

0.015 (0,38)

Gauge Plane

0.010 (0,25) NOM

0.430 (10,92) MAX

/C\

4040049/E   12/2002

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

TEXAS
INSTRUMENTS
www.ti.com

IMPORTANT NOTICE