- **Designed for Digital Data Transmission Over 50-Ω to 500-Ω Coaxial Cable, Strip Line, or Twisted Pair**
- **High Speed**
  t_{pd} = 20 ns Maximum at C_L = 15 pF
- **TTL Compatible With Single 5-V Supply**
- **2.4-V Output at I_{OH} = −75 mA**
- **Uncommitted Emitter-Follower Output Structure for Party-Line Operation**
- **Short-Circuit Protection**
- **AND-OR Logic Configuration**
- **Designed for Use With Triple Line Receivers SN55122, SN75122**
- **Designed to Be Interchangeable With Signetics N8T13**

SN55121 . . . J PACKAGE
SN75121 . . . D OR N PACKAGE
(TOP VIEW)

1A	1	16	V_{CC}
1B	2	15	2F
1C	3	14	2E
1D	4	13	2D
1E	5	12	2C
1F	6	11	2B
1Y	7	10	2A
GND	8	9	2Y

SN55121 . . . FK PACKAGE
(TOP VIEW)

Top pins: 1B, 1A, NC, VCC, 2F (pins 3, 2, 1, 20, 19)

1C	4	18	2E
1D	5	17	2D
NC	6	16	NC
1E	7	15	2C
1F	8	14	2B

Bottom pins: 1Y, GND, NC, 2Y, 2A (pins 9, 10, 11, 12, 13)

NC – No internal connection
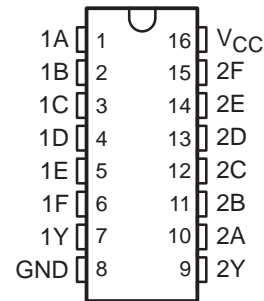
THE SN75121 IS NOT RECOMMENDED FOR NEW DESIGNS

description

The SN55121 and SN75121 dual line drivers are designed for digital data transmission over lines having impedances from 50 to 500 Ω. They are also compatible with standard TTL logic and supply-voltage levels.
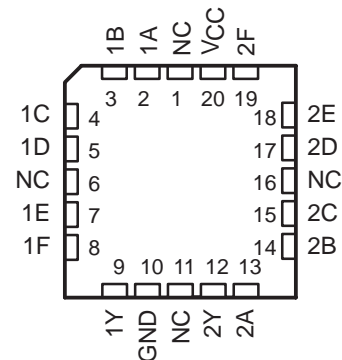
The low-impedance emitter-follower outputs of the SN55121 and SN75121 can drive terminated lines such as coaxial cable or twisted pair. Having the outputs uncommitted allows wired-OR logic to be performed in party-line applications. Output short-circuit protection is provided by an internal clamping network that turns on when the output voltage drops below approximately 1.5 V. All of the inputs are in conventional TTL configuration and the gating can be used during power-up and power-down sequences to ensure that no noise is introduced to the line.

The SN55121 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN75121 is characterized for operation from 0°C to 70°C.

TEXAS INSTRUMENTS

SN55121, SN75121
DUAL LINE DRIVERS

FUNCTION TABLE

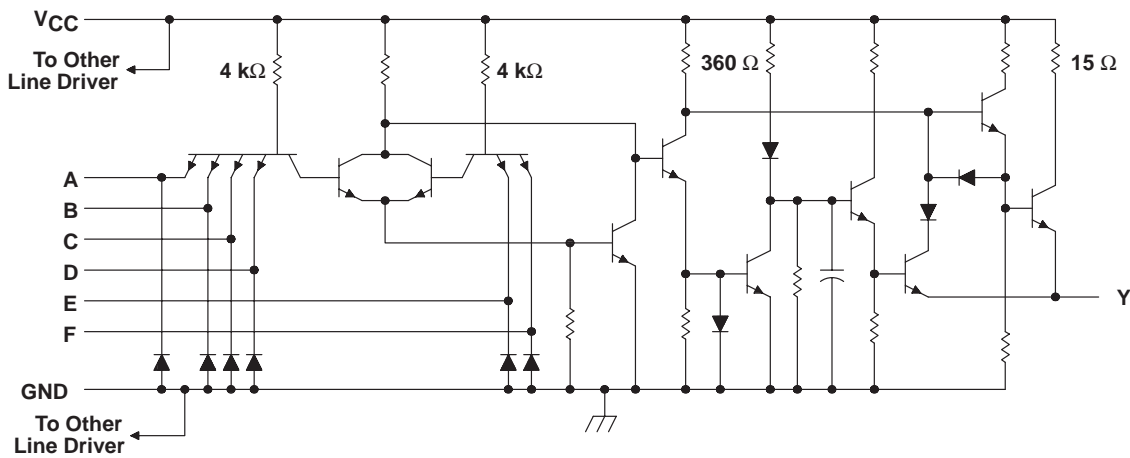| INPUTS | | | | | | OUTPUT |
A	B	C	D	E	F	Y
H	H	H	H	X	X	H
X	X	X	X	H	H	H
All other input combinations						L

H = high level, L = low level, X = irrelevant

logic symbol†

† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for the D, J, and N packages.

logic diagram (positive logic)

schematic (each driver)

All resistor values shown are nominal.

TEXAS
INSTRUMENTS
POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

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

Supply voltage, V_{CC} (see Note 1) . . . . 6 V
Input voltage . . . . 6 V
Output voltage . . . . 6 V
Continuous total power dissipation . . . . See Dissipation Rating Table
Storage temperature range, T_{stg} . . . . –65°C to 150°C
Case temperature for 60 seconds: FK package . . . . 260°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J package . . . . 300°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: D or N package . . . . 260°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and
  functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not
  implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
NOTE 1:   All voltage values are with respect to both ground terminals connected together.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING	$T_A = 125°C$ POWER RATING
D	950 mW	7.6 mW/°C	608 mW	—
FK‡	1375 mW	11.0 mW/°C	880 mW	275 mW
J‡	1375 mW	11.0 mW/°C	880 mW	275 mW
N	1150 mW	9.2 mW/°C	736 mW	—

‡ In the FK and J packages, SN55121 chips are either silver glass or alloy mounted.

recommended operating conditions

	SN55121			SN75121			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.75	5	5.25	4.75	5	5.25	V
High-level input voltage, V_{IH}	2			2			V
Low-level input voltage, V_{IL}			0.8			0.8	V
High-level output current, I_{OH}			−75			−75	mA
Operating free-air temperature, T_A	−55		125	0		70	°C

SN55121, SN75121
DUAL LINE DRIVERS

electrical characteristics over recommended ranges of supply voltage and operating free-air temperature range (unless otherwise noted)

|	PARAMETER	TEST CONDITIONS			MIN	MAX	UNIT
V_{IK}	Input clamp voltage	$V_{CC} = 5$ V,	$I_I = -12$ mA			-1.5	V
$V_{(BR)}$	Breakdown voltage	$V_{CC} = 5$ V,	$I_I = 10$ mA		5.5		V
V_{OH}	High-level output voltage	$V_{IH} = 2$ V,	$I_{OH} = -75$ mA,	See Note 2	2.4		V
I_{OH}	High-level output current	$V_{CC} = 5$ V, $T_A = 25°C$,	$V_{IH} = 4.5$ V, See Note 2	$V_{OH} = 2$ V,	-100	-250	mA
I_{OL}	Low-level output current	$V_{IL} = 0.8$ V,	$V_{OL} = 0.4$ V,	See Note 2		-800	μA
$I_{O(off)}$	Off-state output current	$V_{CC} = 3$ V,	$V_O = 3$ V			500	μA
I_{IH}	High-level output current	$V_I = 4.5$ V				40	μA
I_{IL}	Low-level output current	$V_I = 0.4$ V			-0.1	-1.6	mA
I_{OS}	Short-circuit output current†	$V_{CC} = 5$ V,	$T_A = 25°C$			-30	mA
I_{CCH}	Supply current, outputs high	$V_{CC} = 5.25$ V,	All inputs at 2 V,	Outputs open		28	mA
I_{CCL}	Supply current, outputs low	$V_{CC} = 5.25$ V,	All inputs at 0.8 V,	Outputs open		60	mA

† Not more than one output should be shorted at a time.
NOTE 2: The output voltage and current limits are valid for any appropriate combination of high and low inputs specified by the function table for the desired output.

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

	PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high level output	$R_L = 37$ Ω, $C_L = 15$ pF,	See Figure 1		11	20	ns
t_{PHL}	Propagation delay time, high-to-low level output				8	20	
t_{PLH}	Propagation delay time, low-to-high level output	$R_L = 37$ Ω, $C_L = 1000$ pF,	See Figure 1		22	50	ns
t_{PHL}	Propagation delay time, high-to-low level output				20	50	

PARAMETER MEASUREMENT INFORMATION

TEST CIRCUIT
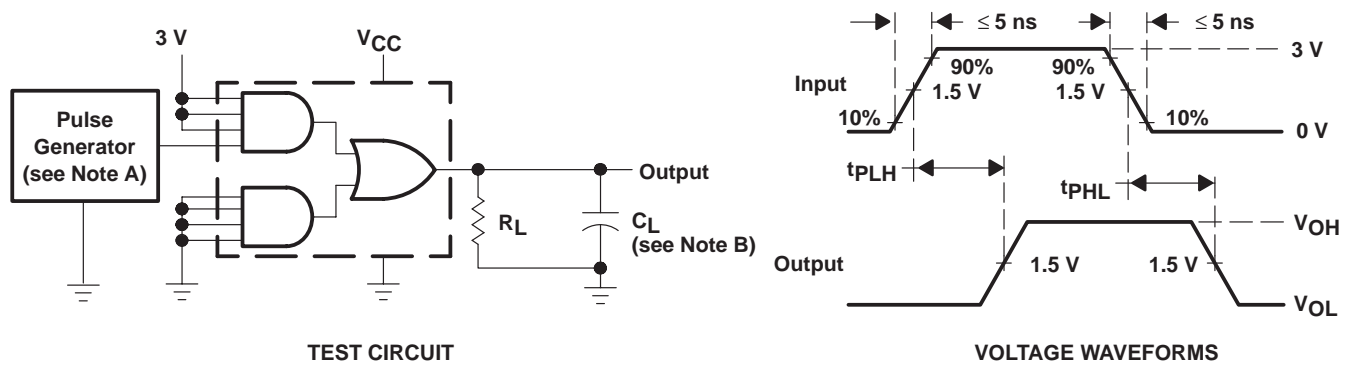
VOLTAGE WAVEFORMS

NOTES: A. The pulse generator has the following characteristics: $Z_O \approx 50$ Ω, $t_w = 200$ ns, duty cycle ≤ 50%, PRR ≤ 500 kHz.
B. C_L includes probe and jig capacitance.

Figure 1. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS
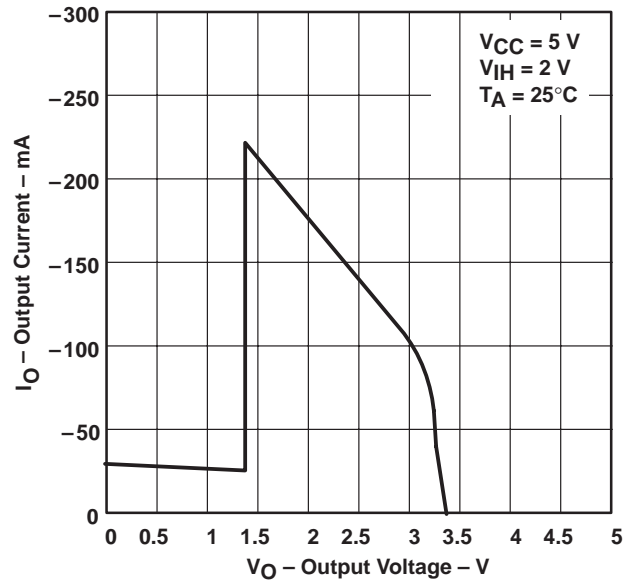
OUTPUT CURRENT vs OUTPUT VOLTAGE

V_{CC} = 5 V
V_{IH} = 2 V
T_A = 25°C

I_O – Output Current – mA

V_O – Output Voltage – V

Figure 2
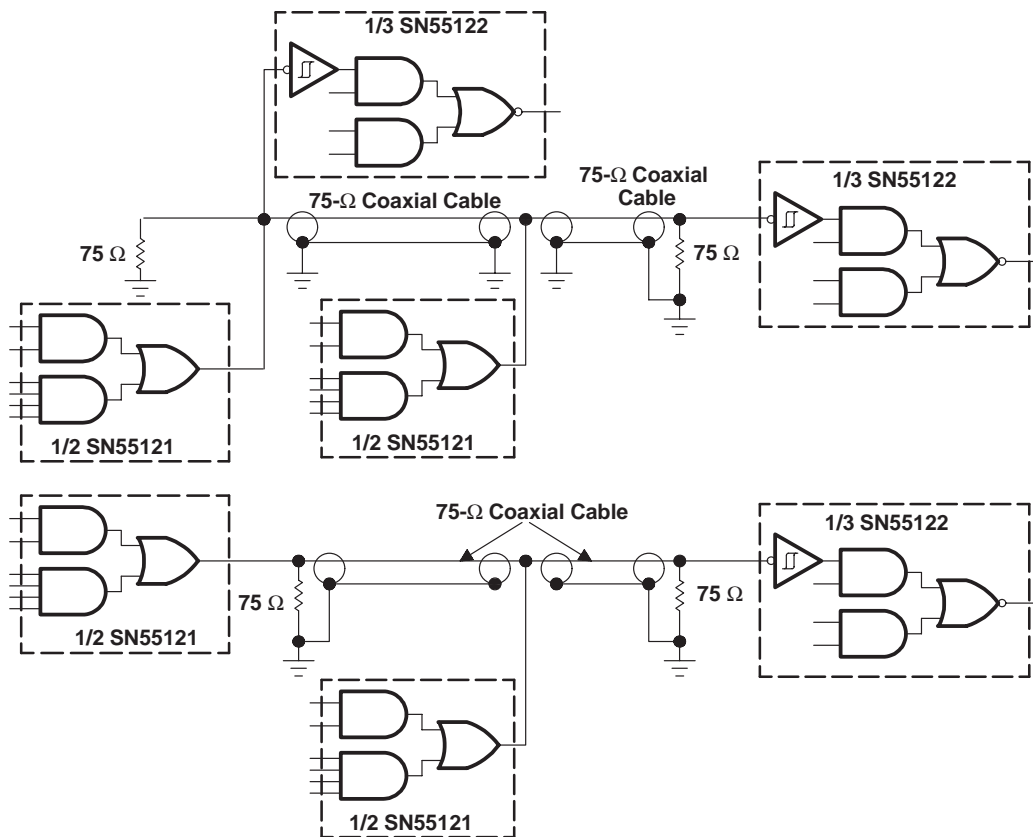
APPLICATION INFORMATION

Figure 3. Single-Ended Party-Line Circuits

PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
SN55121J	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI
SN75121D	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI
SN75121N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN75121NE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN75121NSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75121NSRE4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75121NSRG4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SNJ55121FK	OBSOLETE	LCCC	FK	20		TBD	Call TI	Call TI
SNJ55121J	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI

[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.

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TAPE AND REEL INFORMATION

REEL DIMENSIONS

Reel Diameter

Reel Width (W1)

TAPE DIMENSIONS

Cavity

A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

Sprocket Holes

User Direction of Feed

Pocket Quadrants

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN75121NSR	SO	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1

TAPE AND REEL BOX DIMENSIONS

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN75121NSR	SO	NS	16	2000	346.0	346.0	33.0

J (R—GDIP—T**)   CERAMIC DUAL IN—LINE PACKAGE
14 LEADS SHOWN

DIM \ PINS **	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)

B

14   8

1   7

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

C

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.

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN

DIM	PINS **	14	16	20	24
A	MAX	10,50	10,50	12,90	15,30
A	MIN	9,90	9,90	12,30	14,70

4040062/C 03/03

NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

FK (S-CQCC-N**)   **LEADLESS CERAMIC CHIP CARRIER**

28 TERMINAL SHOWN

NO. OF TERMINALS **	A		B	
	MIN	**MAX**	**MIN**	**MAX**
20	0.342 (8,69)	0.358 (9,09)	0.307 (7,80)	0.358 (9,09)
28	0.442 (11,23)	0.458 (11,63)	0.406 (10,31)	0.458 (11,63)
44	0.640 (16,26)	0.660 (16,76)	0.495 (12,58)	0.560 (14,22)
52	0.739 (18,78)	0.761 (19,32)	0.495 (12,58)	0.560 (14,22)
68	0.938 (23,83)	0.962 (24,43)	0.850 (21,6)	0.858 (21,8)
84	1.141 (28,99)	1.165 (29,59)	1.047 (26,6)	1.063 (27,0)

0.020 (0,51) / 0.010 (0,25)

0.020 (0,51) / 0.010 (0,25)

0.080 (2,03) / 0.064 (1,63)

0.055 (1,40) / 0.045 (1,14)

0.045 (1,14) / 0.035 (0,89)

0.028 (0,71) / 0.022 (0,54)

0.045 (1,14) / 0.035 (0,89)

0.050 (1,27)

4040140 / D 10/96

NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a metal lid.
D. The terminals are gold plated.
E. Falls within JEDEC MS-004

TEXAS INSTRUMENTS

D (R−PDSO−G16)   PLASTIC SMALL−OUTLINE PACKAGE
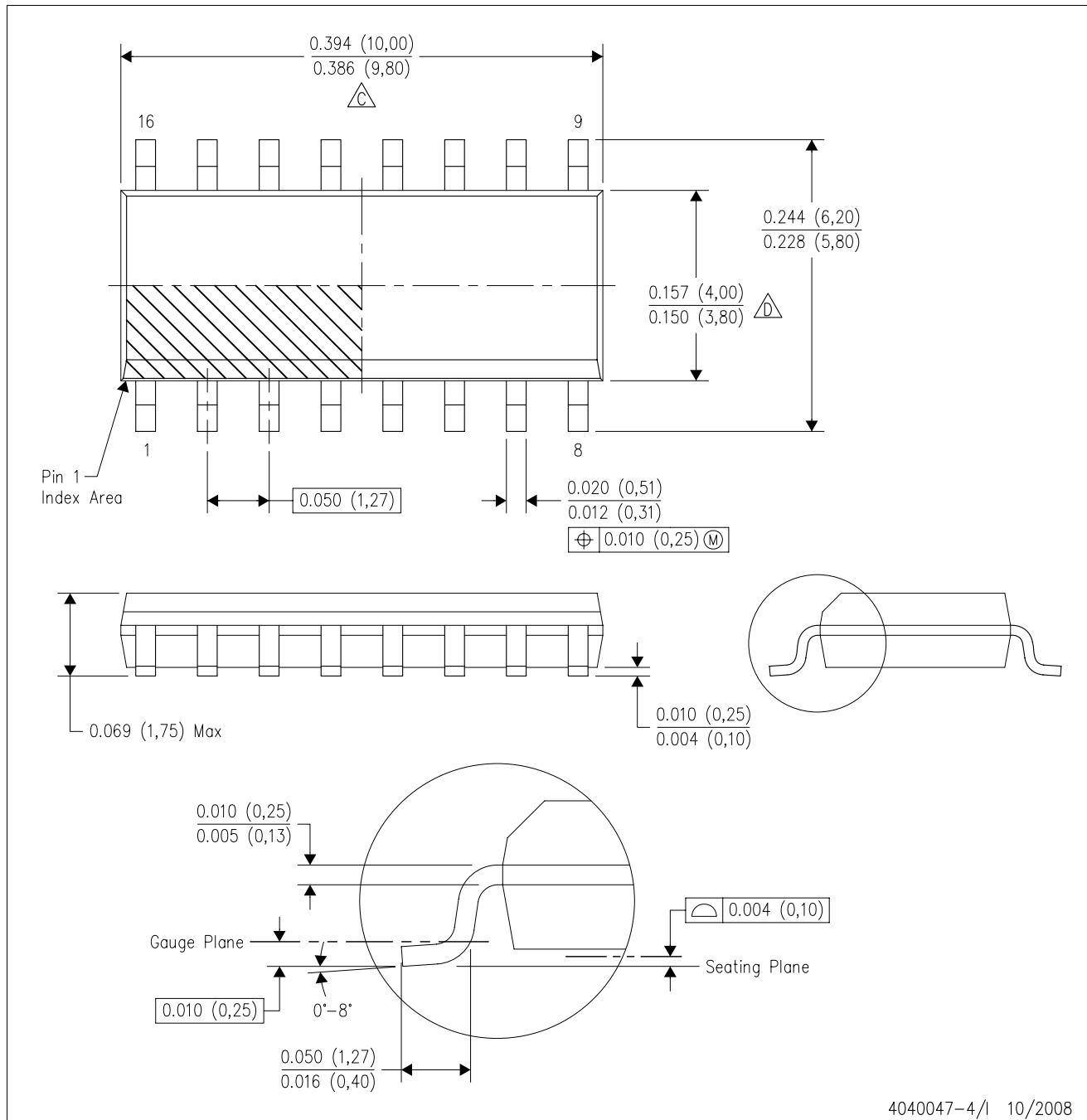
0.394 (10,00)
0.386 (9,80)
⟋C⟍

16   9

0.244 (6,20)
0.228 (5,80)

0.157 (4,00)
0.150 (3,80) ⟋D⟍

1   8

Pin 1
Index Area

0.050 (1,27)

0.020 (0,51)
0.012 (0,31)

⊕ 0.010 (0,25) Ⓜ

0.069 (1,75) Max

0.010 (0,25)
0.004 (0,10)

0.010 (0,25)
0.005 (0,13)

Gauge Plane

0.004 (0,10)

Seating Plane

0.010 (0,25)   0°–8°

0.050 (1,27)
0.016 (0,40)

4040047−4/I   10/2008

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 .006 (0,15) per end.
         ⟋D⟍ Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
         E. Reference JEDEC MS−012 variation AC.

TEXAS INSTRUMENTS
www.ti.com

N (R−PDIP−T**) PLASTIC DUAL−IN−LINE PACKAGE

16 PINS SHOWN

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

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

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

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

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) Ⓜ

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

0.015 (0,38)

Gauge Plane

0.010 (0,25) NOM

0.430 (10,92) MAX

14/18 Pin Only
20 Pin vendor option

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.

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IMPORTANT NOTICE