

SN55182, SN75182 DUAL DIFFERENTIAL LINE RECEIVERS

SLLS092D – OCTOBER 1972 – REVISED APRIL 1998

- Single 5-V Supply
- Differential Line Operation
- Dual Channels
- TTL Compatibility
- ± 15 -V Common-Mode Input Voltage Range
- ± 15 -V Differential Input Voltage Range
- Individual Channel Strobes
- Built-In Optional Line-Termination Resistor
- Individual Frequency Response Controls
- Designed for Use With Dual Differential Drivers SN55183 and SN75183
- Designed to Be Interchangeable With National Semiconductor DS7820A and DS8820A

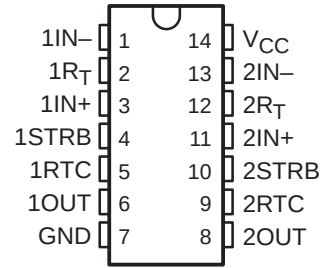
description

The SN55182 and SN75182 dual differential line receivers are designed to sense small differential signals in the presence of large common-mode noise. These devices give TTL-compatible output signals as a function of the polarity of the differential input voltage. The frequency response of each channel can be easily controlled by a single external capacitor to provide immunity to differential noise spikes. The output goes to a high level when the inputs are open circuited. A strobe input (STRB) is provided that, when in the low level, disables the receiver and forces the output to a high level.

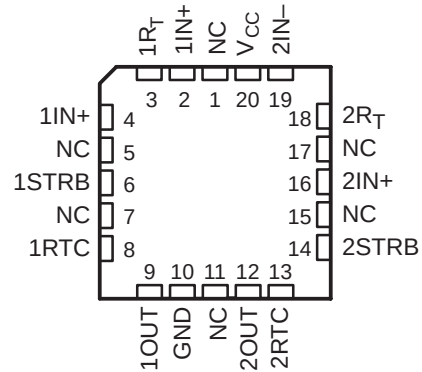
The receiver is of monolithic single-chip construction, and both halves of the dual circuits use common power-supply and ground terminals.

The SN55182 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN75182 is characterized for operation from 0°C to 70°C .

SN55182 . . . J OR W PACKAGE
SN75182 . . . N PACKAGE
(TOP VIEW)



SN55182 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

**THE SN55182 IS NOT RECOMMENDED
FOR NEW DESIGNS**

FUNCTION TABLE

INPUTS		OUTPUT OUT
STRB	V _{ID}	
L	X	H
H	H	H
H	L	L

H = $V_I \geq V_{IH}$ min or V_{ID} more positive than V_{TH} max
L = $V_I \leq V_{IL}$ max or V_{ID} more negative than V_{TL} max
X = irrelevant



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS
INSTRUMENTS**

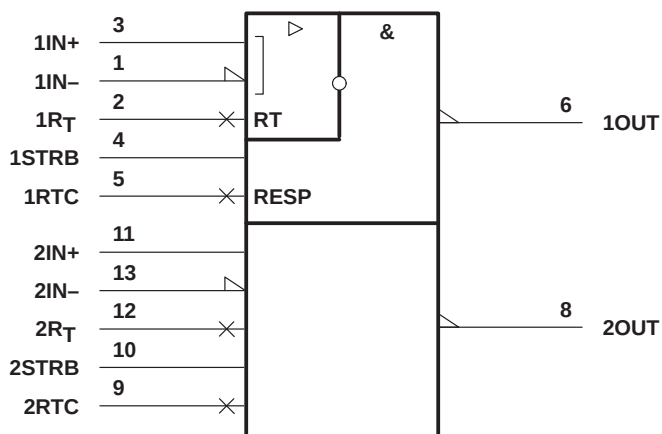
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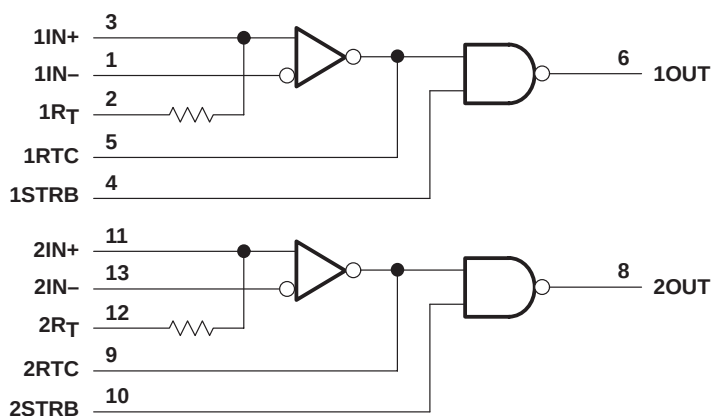
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logic symbol†



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

logic diagram (positive logic)

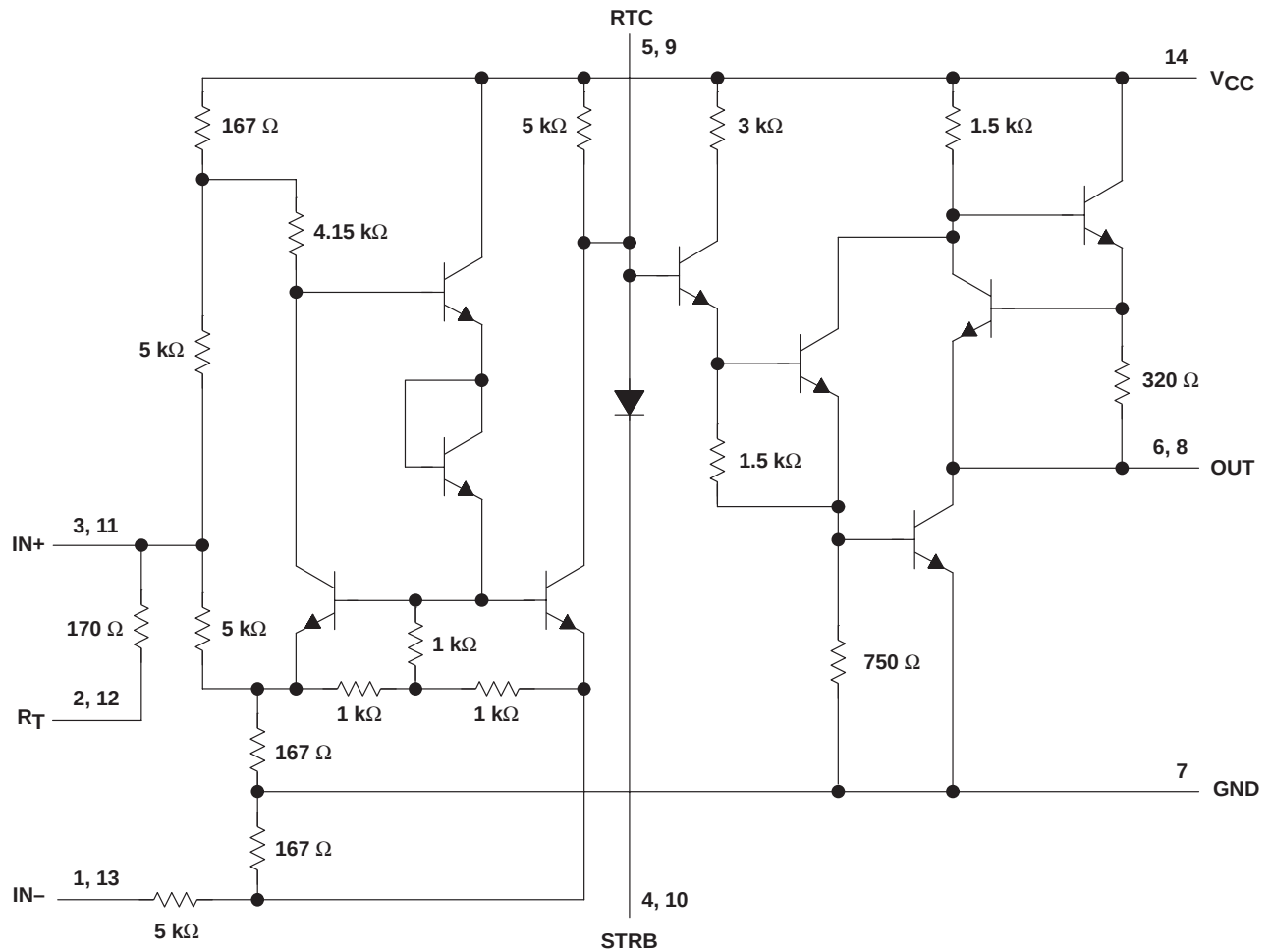


Pin numbers shown are for the J, N, and W packages.

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schematic (each receiver)



Resistor values shown are nominal.
Pin numbers shown are for the J, N, and W packages.

SN55182, SN75182

DUAL DIFFERENTIAL LINE RECEIVERS

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

Supply voltage, V_{CC} (see Note 1)	8 V
Common-mode input voltage, V_{IC}	± 20 V
Differential input voltage, V_{ID} (see Note 2)	± 20 V
Strobe input voltage, $V_{I(STRB)}$	8 V
Output sink current	50 mA
Continuous total power dissipation	See Dissipation Rating Table
Storage temperature range, T_{stg}	-65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: N package	260°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J or W package	300°C
Case temperature for 60 seconds, T_C : FK 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.

NOTES: 1. All voltage values, except differential voltages, are with respect to network ground terminal.
2. Differential voltage values are at the noninverting terminal with respect to the inverting terminal.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25^{\circ}\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^{\circ}\text{C}$	$T_A = 70^{\circ}\text{C}$ POWER RATING	$T_A = 125^{\circ}\text{C}$ POWER RATING
FK [‡]	1375 mW	11.0 mW/ $^{\circ}\text{C}$	880 mW	275 mW
J [‡]	1375 mW	11.0 mW/ $^{\circ}\text{C}$	880 mW	275 mW
N	1150 mW	9.2 mW/ $^{\circ}\text{C}$	736 mW	—
W [‡]	1000 mW	8.0 mW/ $^{\circ}\text{C}$	640 mW	200 mW

[‡] In the FK, J, and W packages, SN55182 chips are alloy mounted.

recommended operating conditions

	SN55182			SN75182			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.5	5	5.5	V
Common-mode input voltage, V_{IC}			± 15			± 15	V
High-level strobe input voltage, $V_{IH(STRB)}$	2.1		5.5	2.1		5.5	V
Low-level strobe input voltage, $V_{IL(STRB)}$	0		0.9	0		0.9	V
High-level output current, I_{OH}			–400			–400	μA
Low-level output current, I_{OL}			16			16	mA
Operating free-air temperature, T_A	–55		125	0		70	$^{\circ}\text{C}$



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electrical characteristics over recommended ranges of V_{CC} , V_{IC} , and operating free-air temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS [†]		MIN	TYP [‡]	MAX	UNIT
V_{IT+}	Positive-going input threshold voltage	$V_O = 2.5\text{ V}$, $I_{OH} = -400\text{ }\mu\text{A}$	$V_{IC} = -3\text{ V to }3\text{ V}$ $V_{IC} = -15\text{ V to }15\text{ V}$		0.5 1		V
V_{IT-}	Negative-going input threshold voltage	$V_O = 0.4\text{ V}$, $I_{OL} = 16\text{ mA}$	$V_{IC} = -3\text{ V to }3\text{ V}$ $V_{IC} = -15\text{ V to }15\text{ V}$		-0.5 -1		V
V_{OH}	High-level output voltage	$V_{ID} = 1\text{ V}$, $V(\text{STRB}) = 2.1\text{ V}$, $I_{OH} = -400\text{ }\mu\text{A}$ $V_{ID} = -1\text{ V}$, $V(\text{STRB}) = 0.4\text{ V}$, $I_{OH} = -400\text{ }\mu\text{A}$		2.5 2.5	4.2 4.2	5.5 5.5	V
V_{OL}	Low-level output voltage	$V_{ID} = -1\text{ V}$, $V(\text{STRB}) = 2.1\text{ V}$, $I_{OL} = 16\text{ mA}$		0.25	0.4		V
I_I	Inverting input	$V_{IC} = 15\text{ V}$		3	4.2		mA
		$V_{IC} = 0$		0	-0.5		
		$V_{IC} = -15\text{ V}$		-3	-4.2		
	Noninverting input	$V_{IC} = 15\text{ V}$		5	7		
		$V_{IC} = 0$		-1	-1.4		
		$V_{IC} = -15\text{ V}$		-7	-9.8		
$I_{IH}(\text{STRB})$	High-level strobe input current	$V(\text{STRB}) = 5.5\text{ V}$			5		μA
$I_{IL}(\text{STRB})$	Low-level strobe input current	$V(\text{STRB}) = 0$		-1	-1.4		mA
r_i	Input resistance	Inverting input		3.6	5		k Ω
		Noninverting input		1.8	2.5		
	Line-terminating resistance	$T_A = 25^\circ\text{C}$		120	170	250	Ω
I_{OS}	Short-circuit output current	$V_{CC} = 5.5\text{ V}$, $V_O = 0$		-2.8	-4.5	-6.7	mA
I_{CC}	Supply current (average per receiver)	$V_{IC} = 15\text{ V}$, $V_{ID} = -1\text{ V}$		4.2	6		mA
		$V_{IC} = 0$, $V_{ID} = -0.5\text{ V}$		6.8	10.2		
		$V_{IC} = -15\text{ V}$, $V_{ID} = -1\text{ V}$		9.4	14		

[†] Unless otherwise noted, $V(\text{STRB}) \geq 2.1\text{ V}$ or open.

[‡] All typical values are at $V_{CC} = 5\text{ V}$, $V_{IC} = 0$, and $T_A = 25^\circ\text{C}$.

switching characteristics, $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

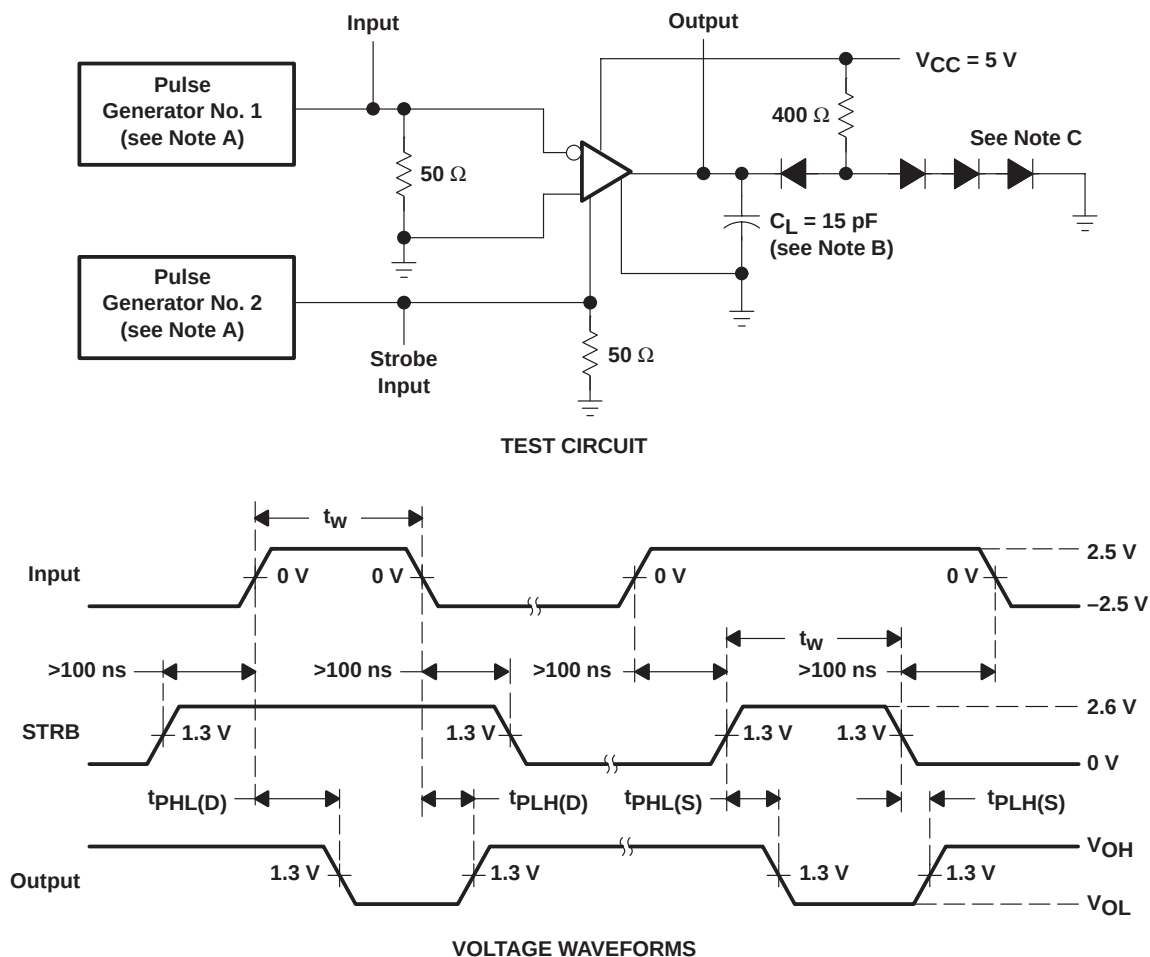
PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
$t_{PLH(D)}$	Propagation delay time, low- to high-level output from differential input	$R_L = 400\text{ }\Omega$, $C_L = 15\text{ pF}$	see Figure 1		18	40	ns
$t_{PHL(D)}$	Propagation delay time, high- to low-level output from differential input	$R_L = 400\text{ }\Omega$, $C_L = 15\text{ pF}$	see Figure 1		31	45	ns
$t_{PLH(S)}$	Propagation delay time, low- to high-level output from STRB input	$R_L = 400\text{ }\Omega$, $C_L = 15\text{ pF}$	see Figure 1		9	30	ns
$t_{PHL(S)}$	Propagation delay time, high- to low-level output from STRB input	$R_L = 400\text{ }\Omega$, $C_L = 15\text{ pF}$	see Figure 1		15	25	ns



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PARAMETER MEASUREMENT INFORMATION



- NOTES:
- A. The pulse generators have the following characteristics: $Z_O = 50 \Omega$, $t_r \leq 10 \text{ ns}$, $t_f \leq 10 \text{ ns}$, $t_w = 0.5 \pm 0.1 \mu\text{s}$, $\text{PRR} \leq 1 \text{ MHz}$.
 - B. C_L includes probe and jig capacitance.
 - C. All diodes are 1N3064 or equivalent.

Figure 1. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS†

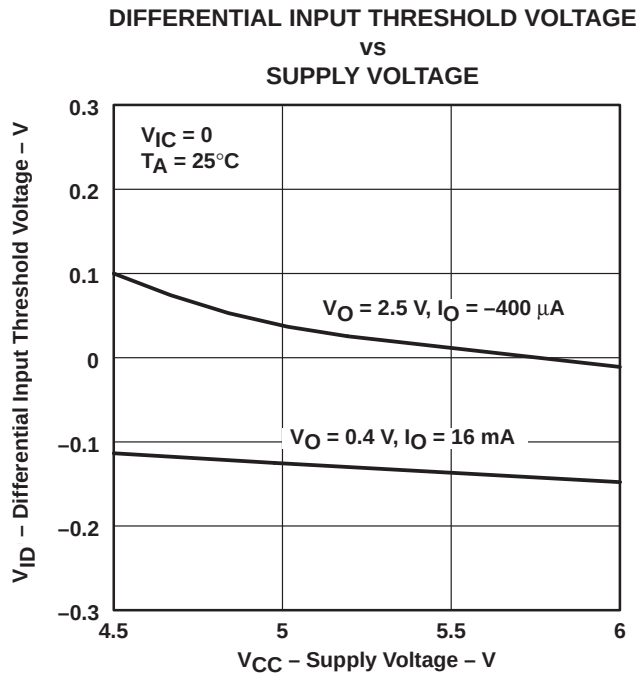


Figure 2

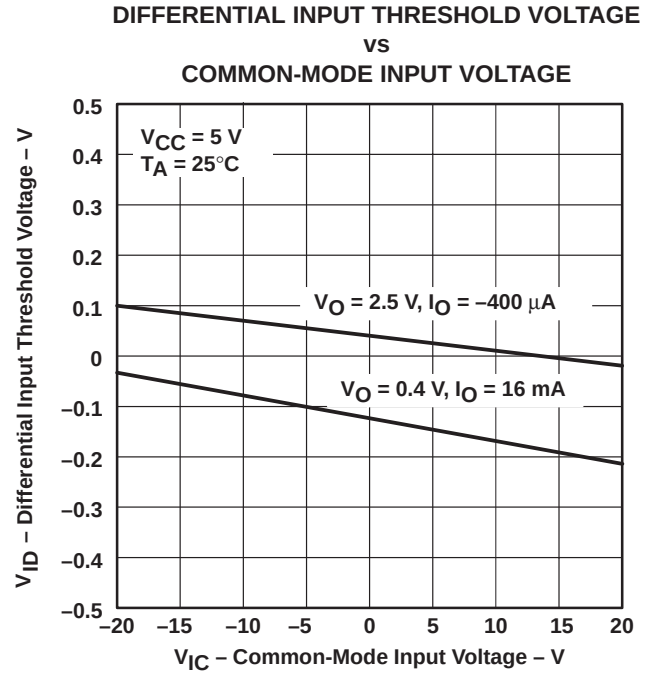


Figure 3

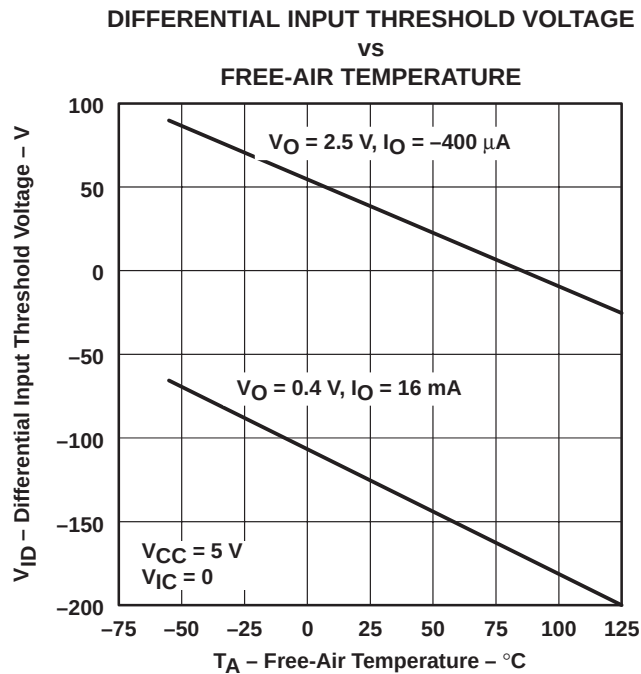


Figure 4

† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.

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TYPICAL CHARACTERISTICS†

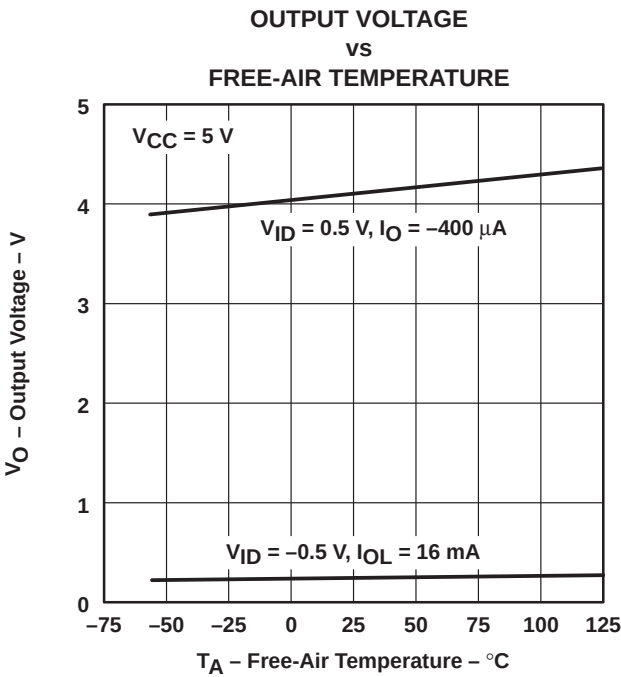


Figure 5

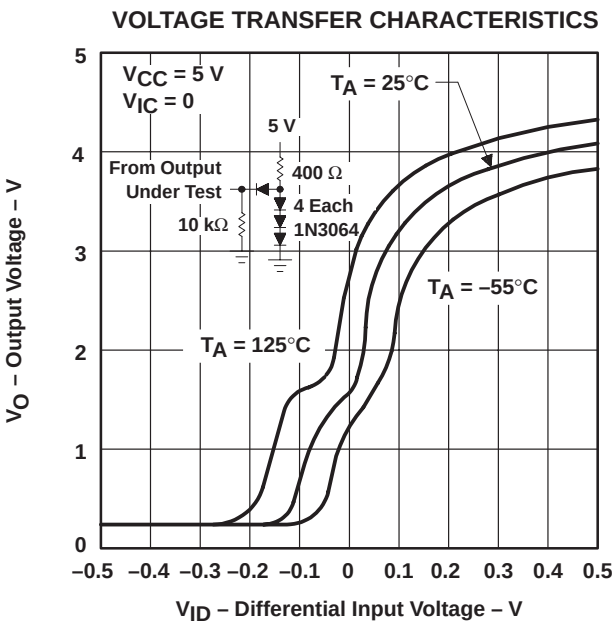


Figure 6

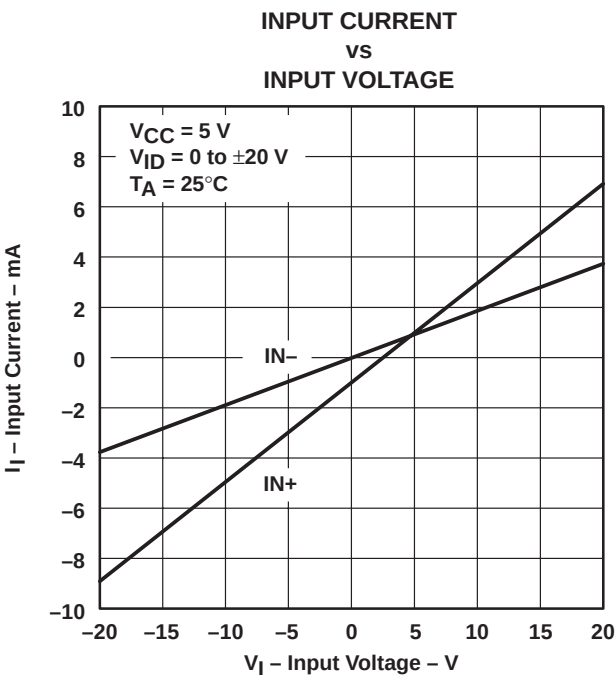


Figure 7

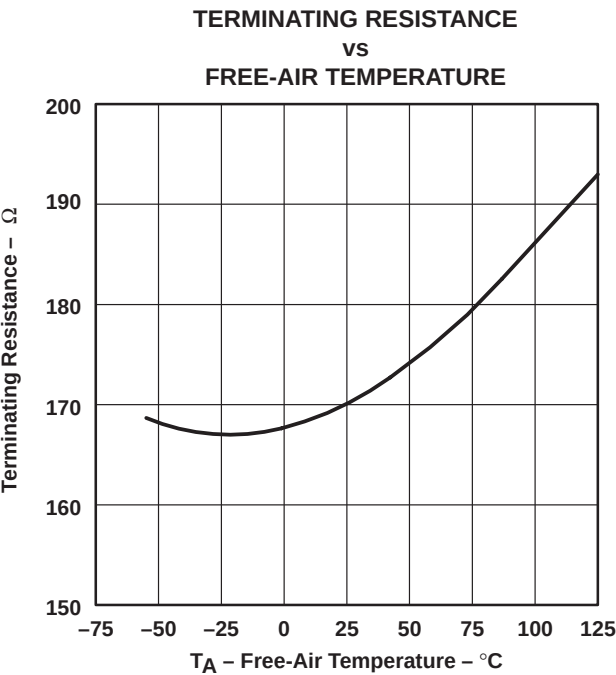


Figure 8

† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.

TYPICAL CHARACTERISTICS†

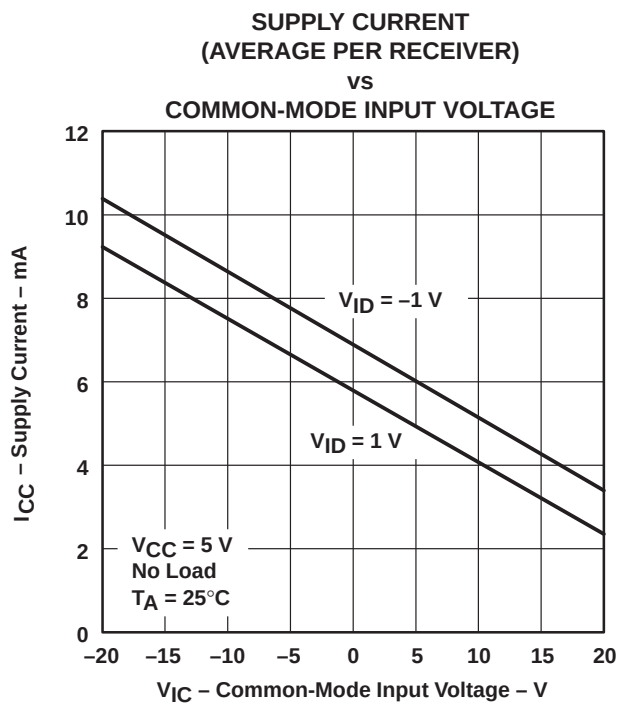


Figure 9

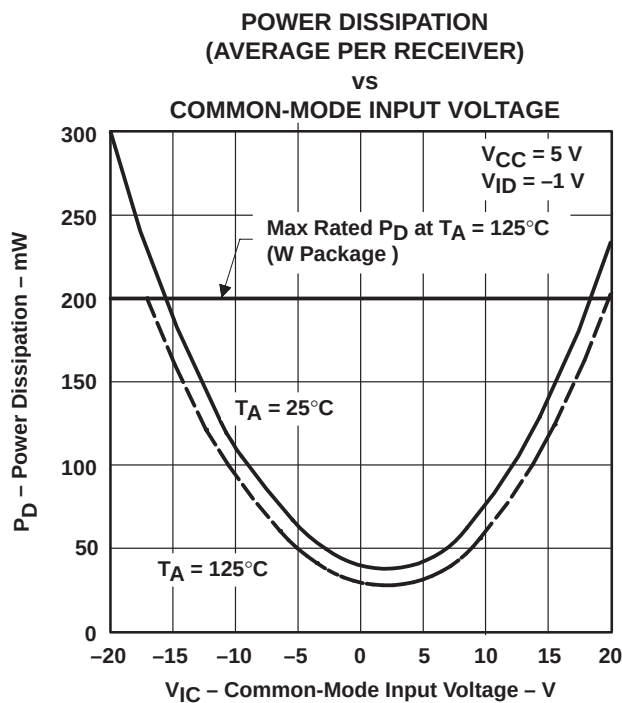


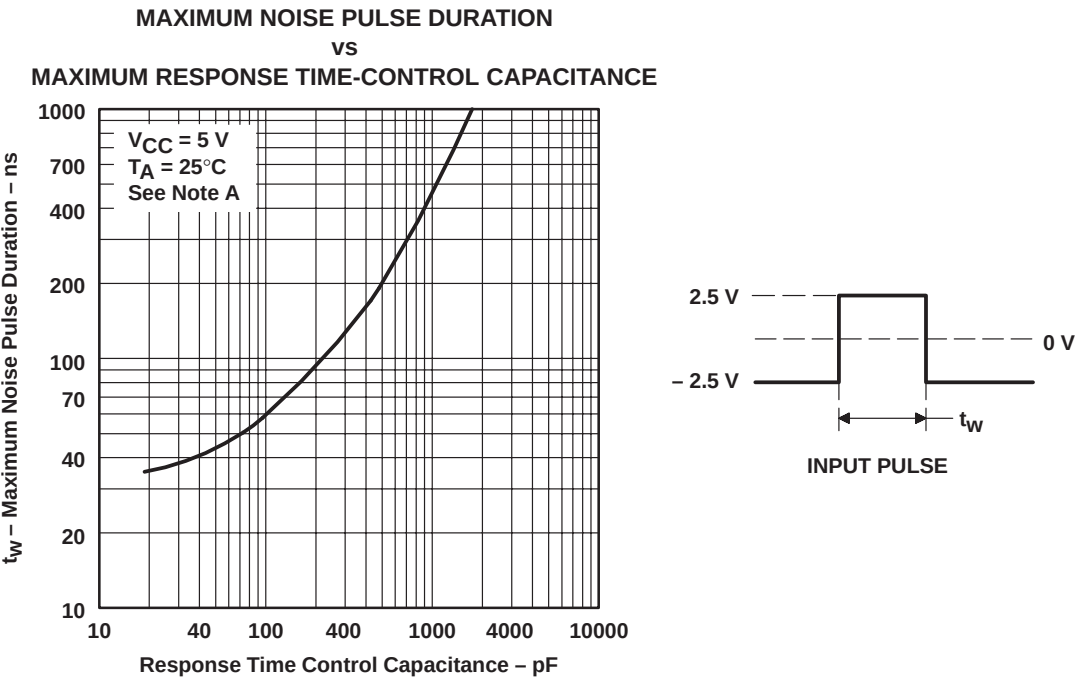
Figure 10

† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.

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TYPICAL CHARACTERISTICS†



NOTE A: Figure 11 shows the maximum duration of the illustrated pulse that can be applied differently without the output changing from the low to high level.

Figure 11

† Operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied.

TYPICAL CHARACTERISTICS†

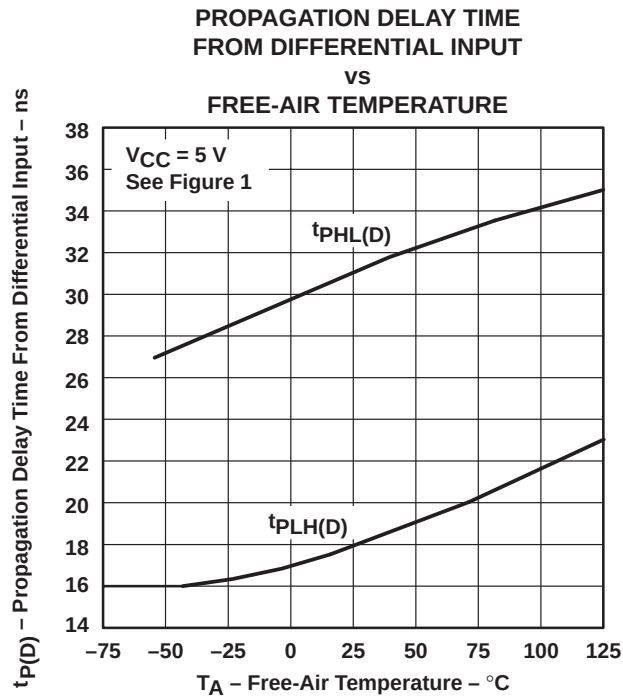


Figure 12

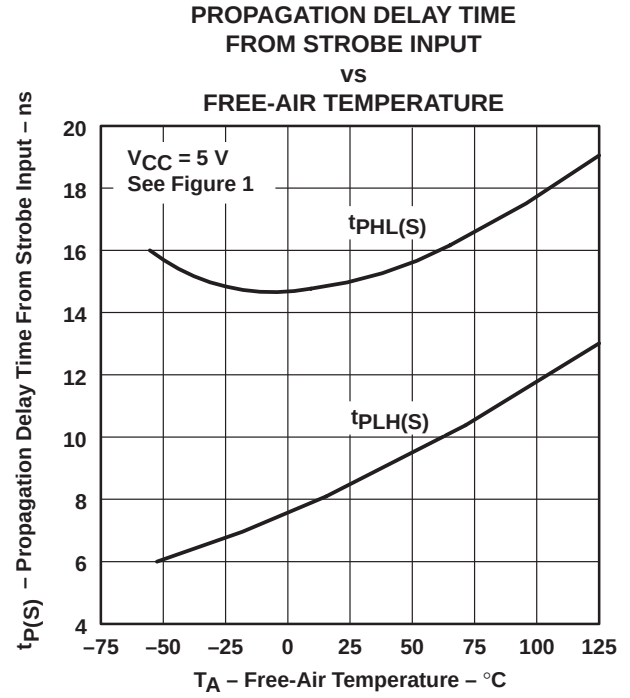


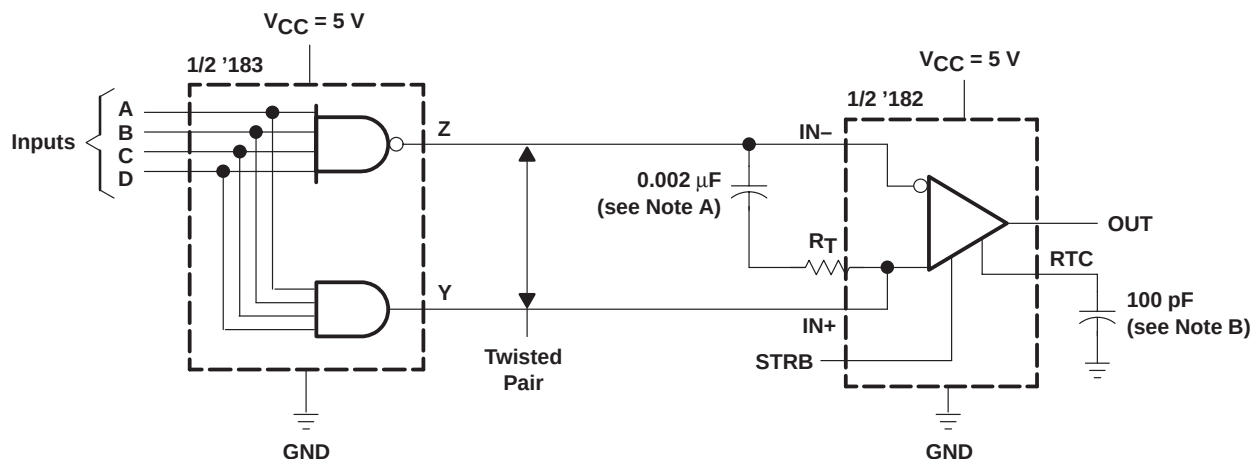
Figure 13

† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.

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APPLICATION INFORMATION



NOTES: A. When the inputs are open circuited, the output is high. A capacitor may be used for dc isolation of the line-terminating resistor. At the frequency of operation, the impedance of the capacitor should be relatively small.

Example: let $f = 5 \text{ MHz}$
 $C = 0.002 \mu\text{F}$

$$Z_{(C)} = \frac{1}{2\pi f C} = \frac{1}{2\pi(5 \times 10^6)(0.002 \times 10^{-6})}$$

$$Z_{(C)} \approx 16\Omega$$

B. Use of a capacitor to control response time is optional.

Figure 14. Transmission of Digital Data Over Twisted-Pair Line

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)
5962-7900801VCA	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-7900801VC A SNV55182J
5962-7900801VCA.A	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-7900801VC A SNV55182J
5962-7900801VDA	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-7900801VD A SNV55182W
5962-7900801VDA.A	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-7900801VD A SNV55182W
SN75182D	Active	Production	SOIC (D) 14	50 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	SN75182
SN75182D.A	Active	Production	SOIC (D) 14	50 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	SN75182
SN75182DR	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	SN75182
SN75182DR.A	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	SN75182
SN75182N	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN75182N
SN75182N.A	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN75182N
SN75182NSR	Active	Production	SOP (NS) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	SN75182
SN75182NSR.A	Active	Production	SOP (NS) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	SN75182

⁽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.

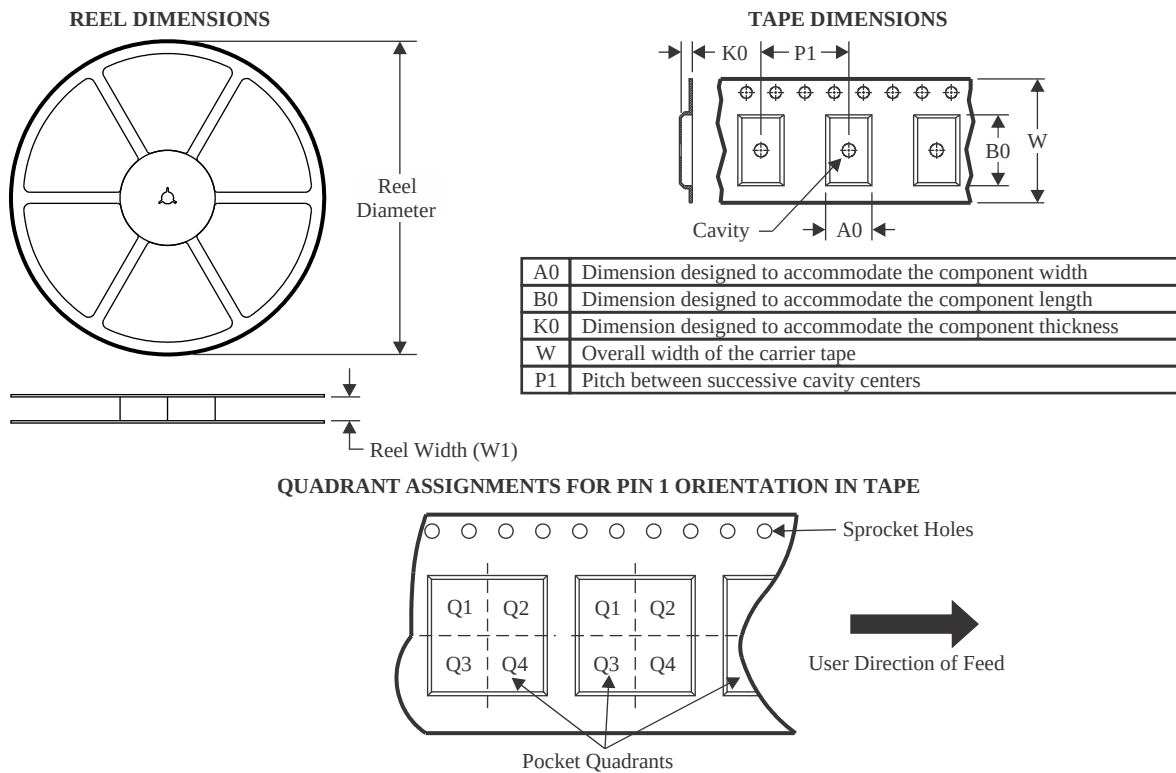
⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

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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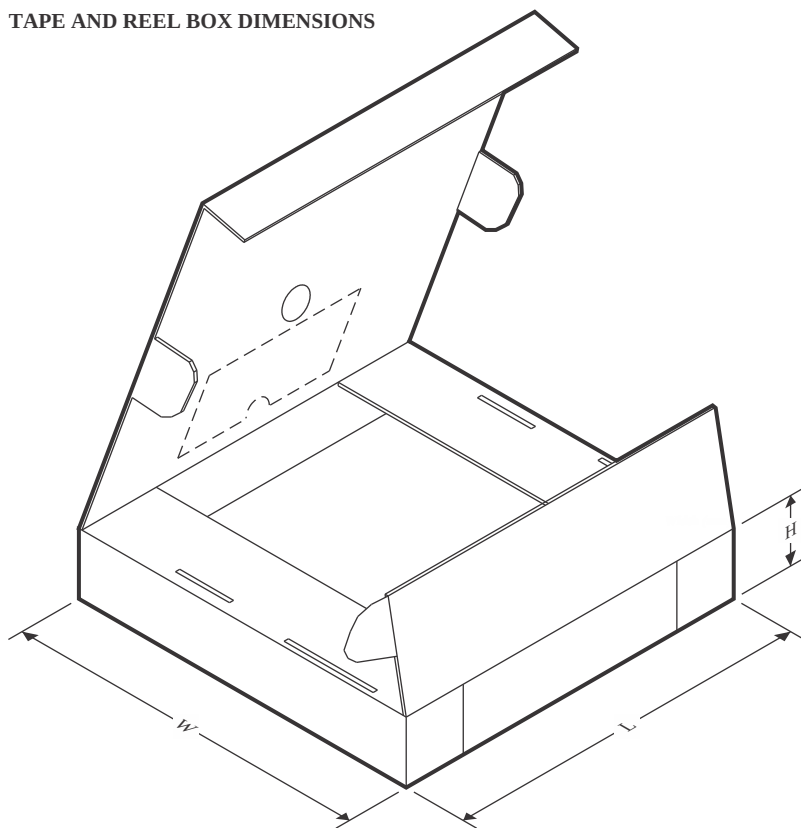
TAPE AND REEL INFORMATION



*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
SN75182DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN75182NSR	SOP	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1

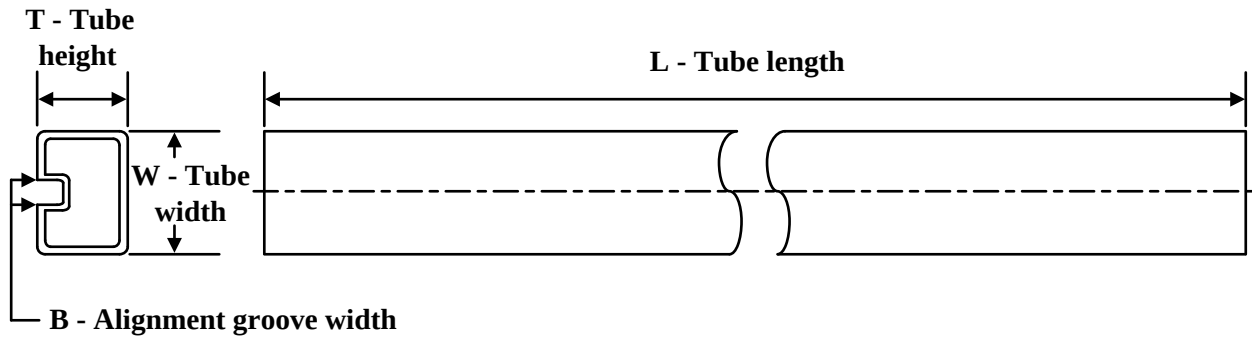
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN75182DR	SOIC	D	14	2500	356.0	356.0	35.0
SN75182NSR	SOP	NS	14	2000	356.0	356.0	35.0

TUBE

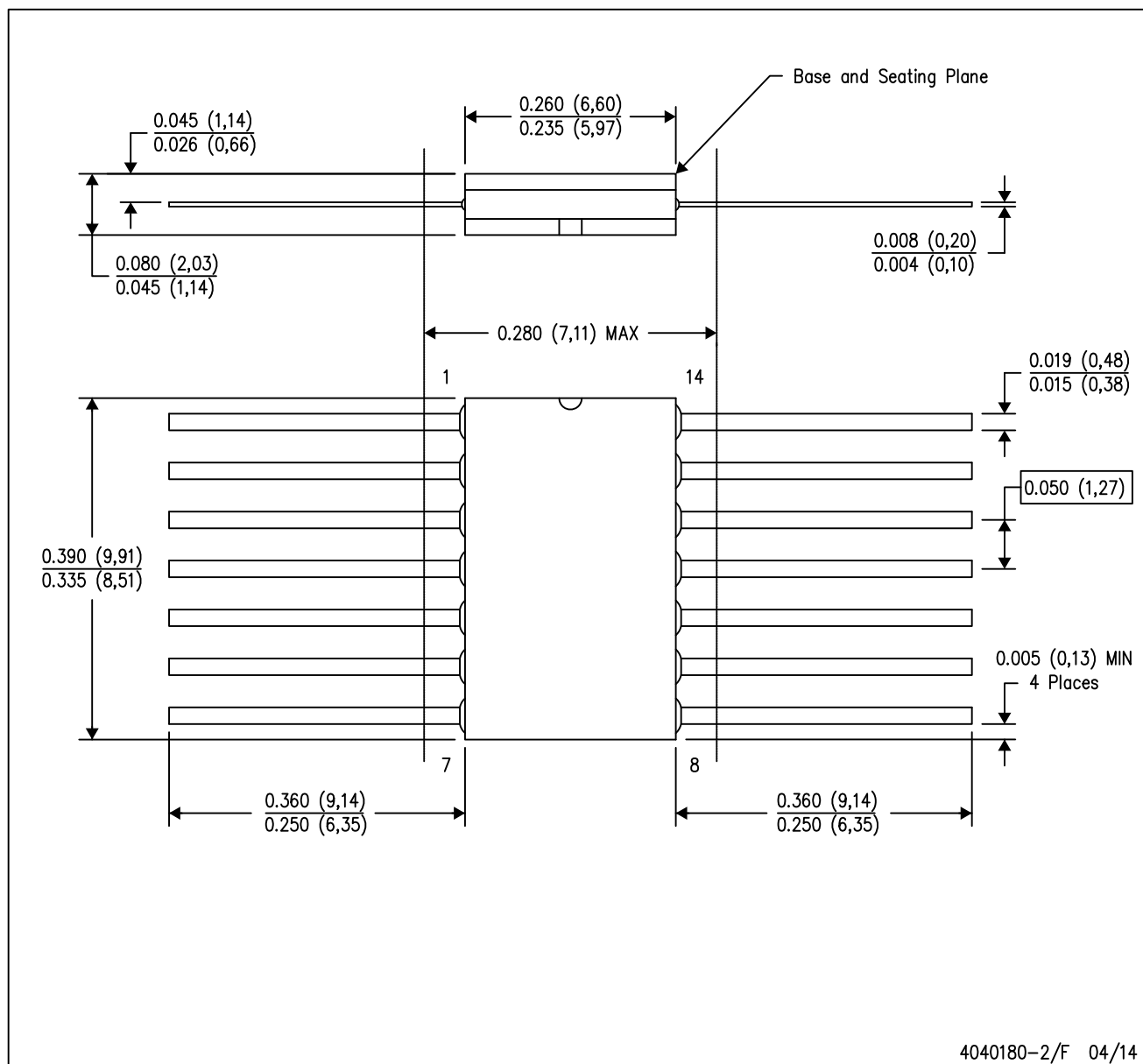


*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
5962-7900801VDA	W	CFP	14	25	506.98	26.16	6220	NA
5962-7900801VDA.A	W	CFP	14	25	506.98	26.16	6220	NA
SN75182D	D	SOIC	14	50	506.6	8	3940	4.32
SN75182D.A	D	SOIC	14	50	506.6	8	3940	4.32
SN75182N	N	PDIP	14	25	506	13.97	11230	4.32
SN75182N.A	N	PDIP	14	25	506	13.97	11230	4.32

W (R-GDFP-F14)

CERAMIC DUAL FLATPACK

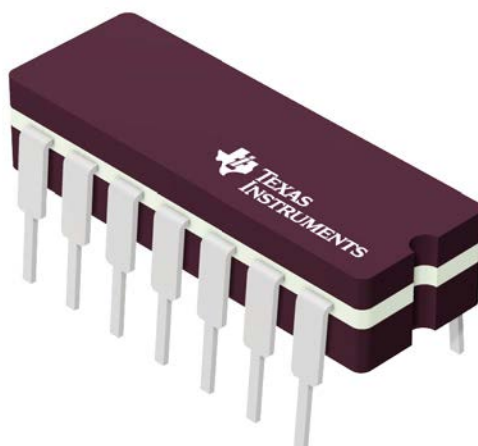


J 14

GENERIC PACKAGE VIEW

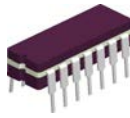
CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE

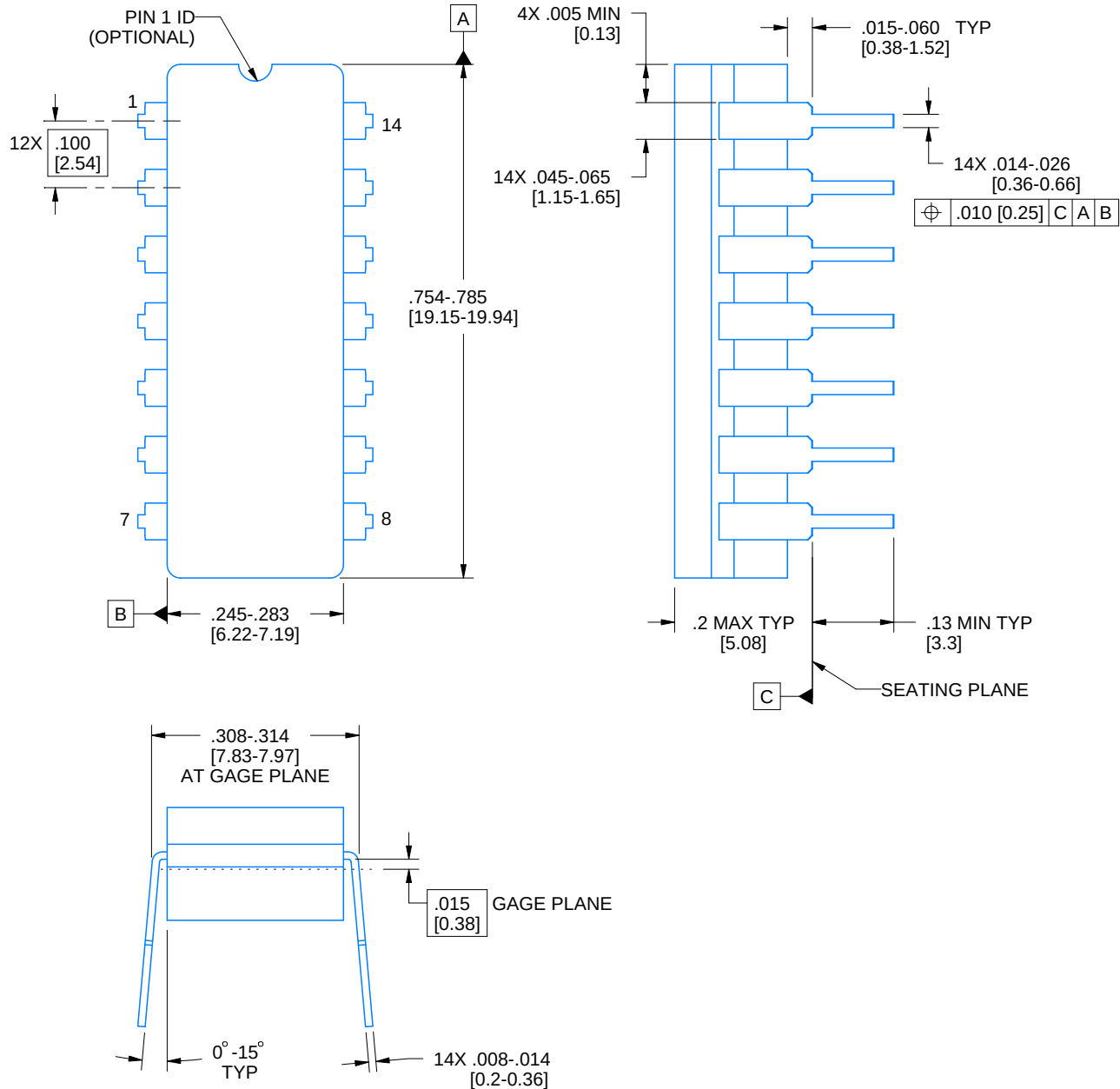


Images above are just a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.

4040083-5/G

J0014A**PACKAGE OUTLINE****CDIP - 5.08 mm max height**

CERAMIC DUAL IN LINE PACKAGE



4214771/A 05/2017

NOTES:

1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermetically sealed with a ceramic lid using glass frit.
4. Index point is provided on cap for terminal identification only and on press ceramic glass frit seal only.
5. Falls within MIL-STD-1835 and GDIP1-T14.



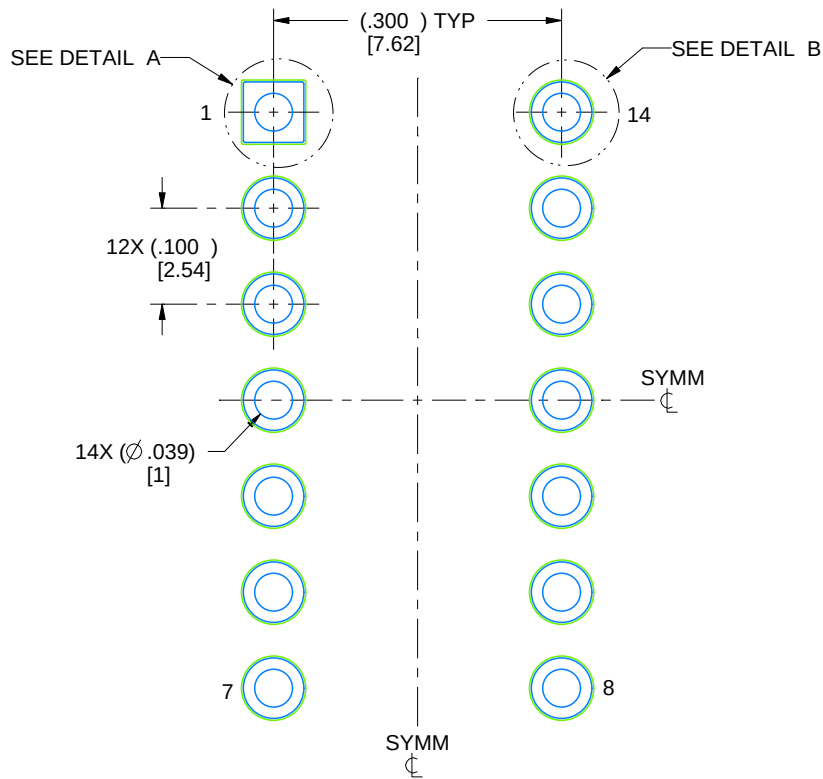
**TEXAS
INSTRUMENTS**
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EXAMPLE BOARD LAYOUT

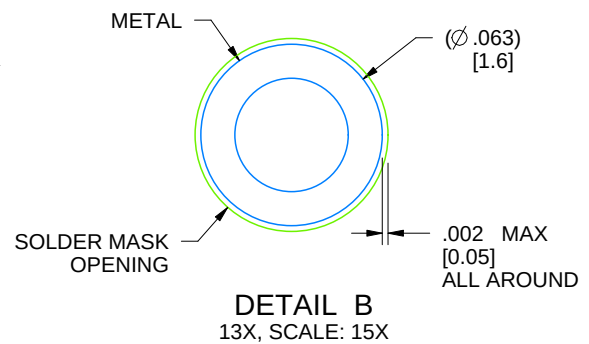
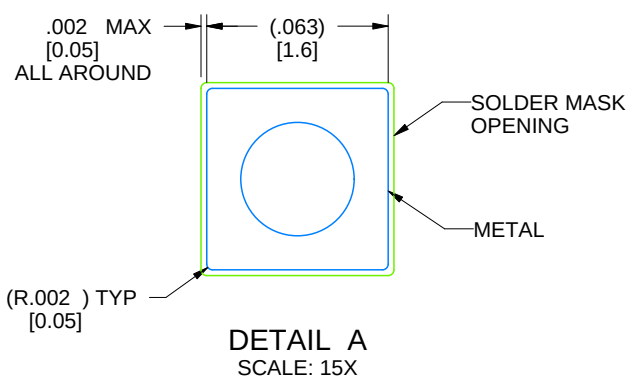
J0014A

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



LAND PATTERN EXAMPLE
NON-SOLDER MASK DEFINED
SCALE: 5X

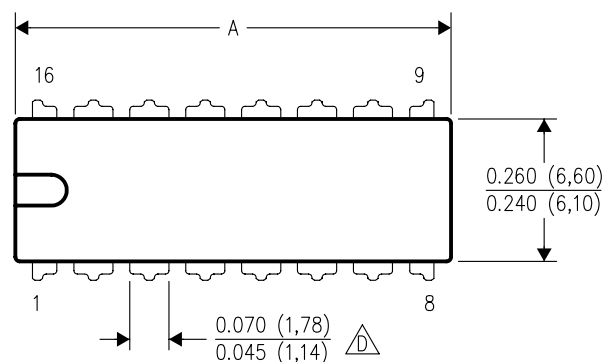


4214771/A 05/2017

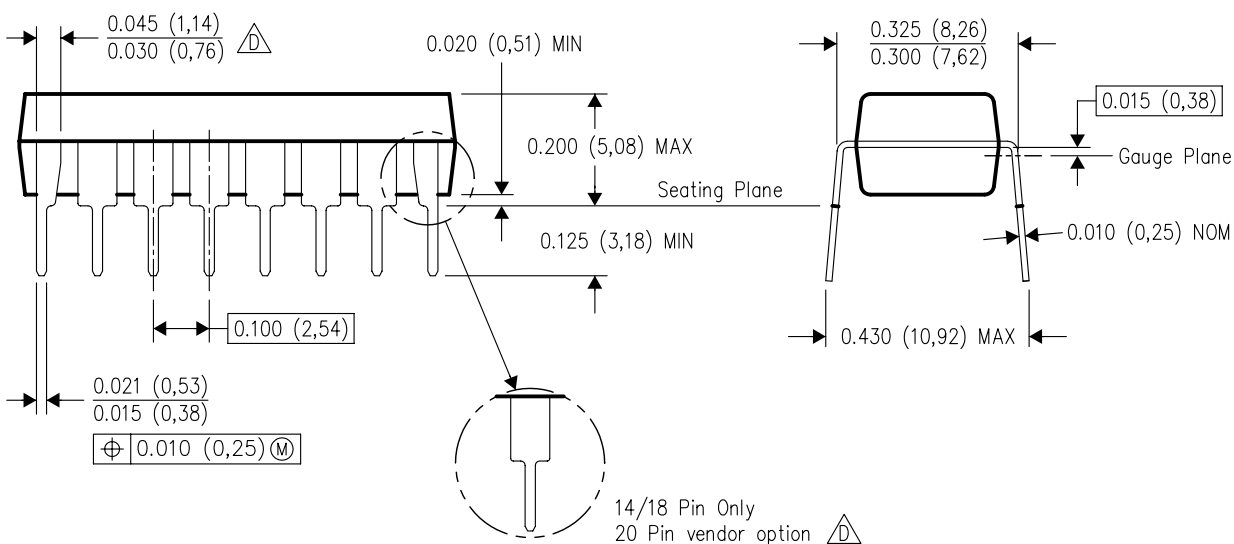
N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



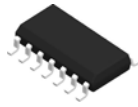
PINS ** DIM	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS-001 VARIATION	AA	BB	AC	AD



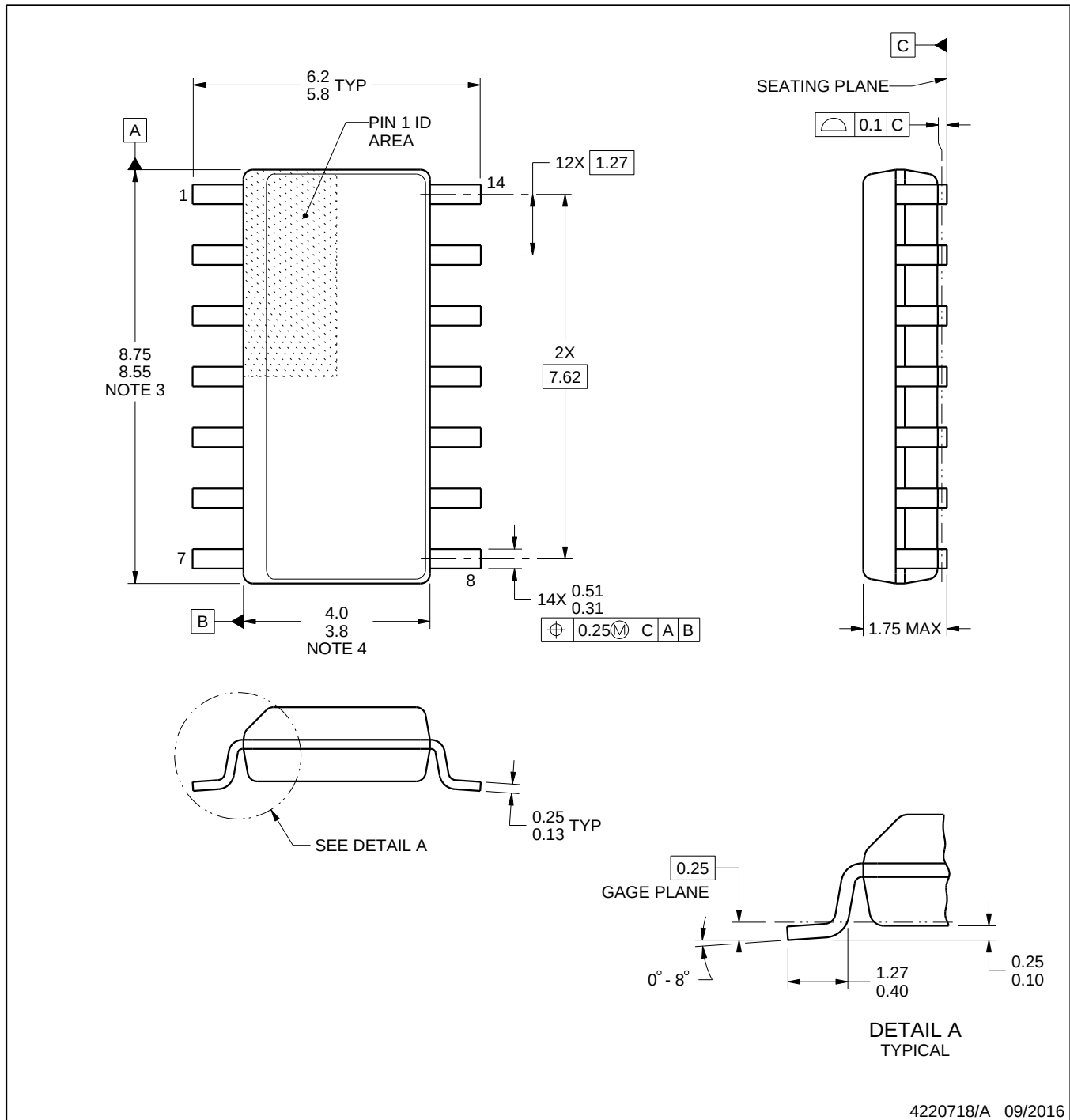
4040049/E 12/2002

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.

D0014A**PACKAGE OUTLINE****SOIC - 1.75 mm max height**

SMALL OUTLINE INTEGRATED CIRCUIT

**NOTES:**

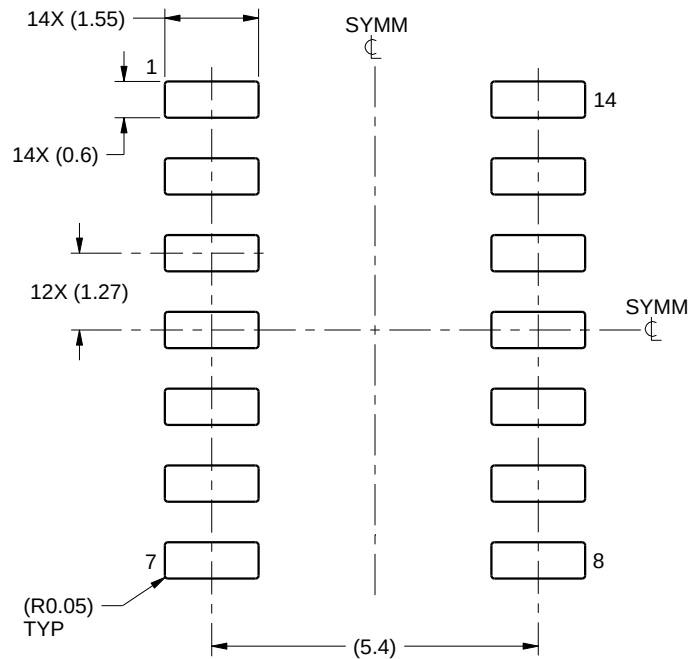
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm, per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm, per side.
5. Reference JEDEC registration MS-012, variation AB.

EXAMPLE BOARD LAYOUT

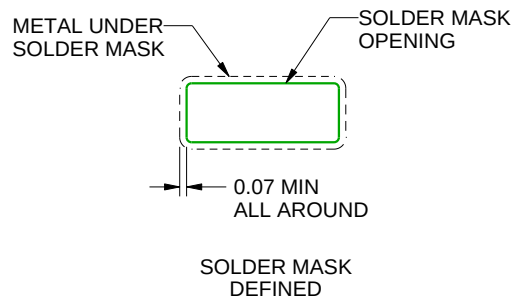
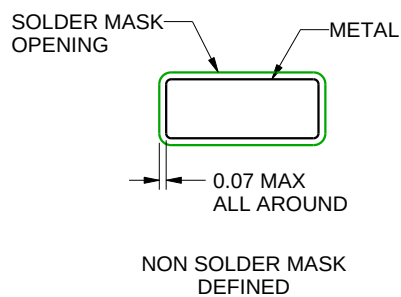
D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



LAND PATTERN EXAMPLE
SCALE:8X



SOLDER MASK DETAILS

4220718/A 09/2016

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

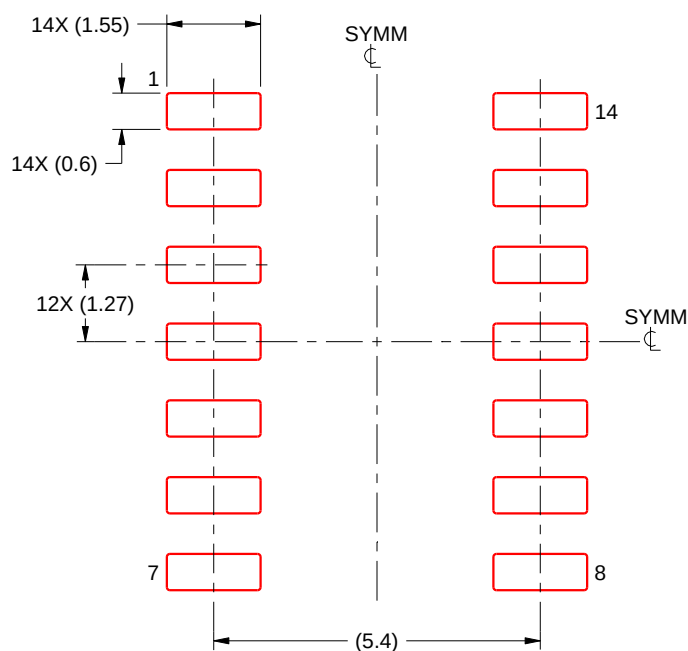
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:8X

4220718/A 09/2016

NOTES: (continued)

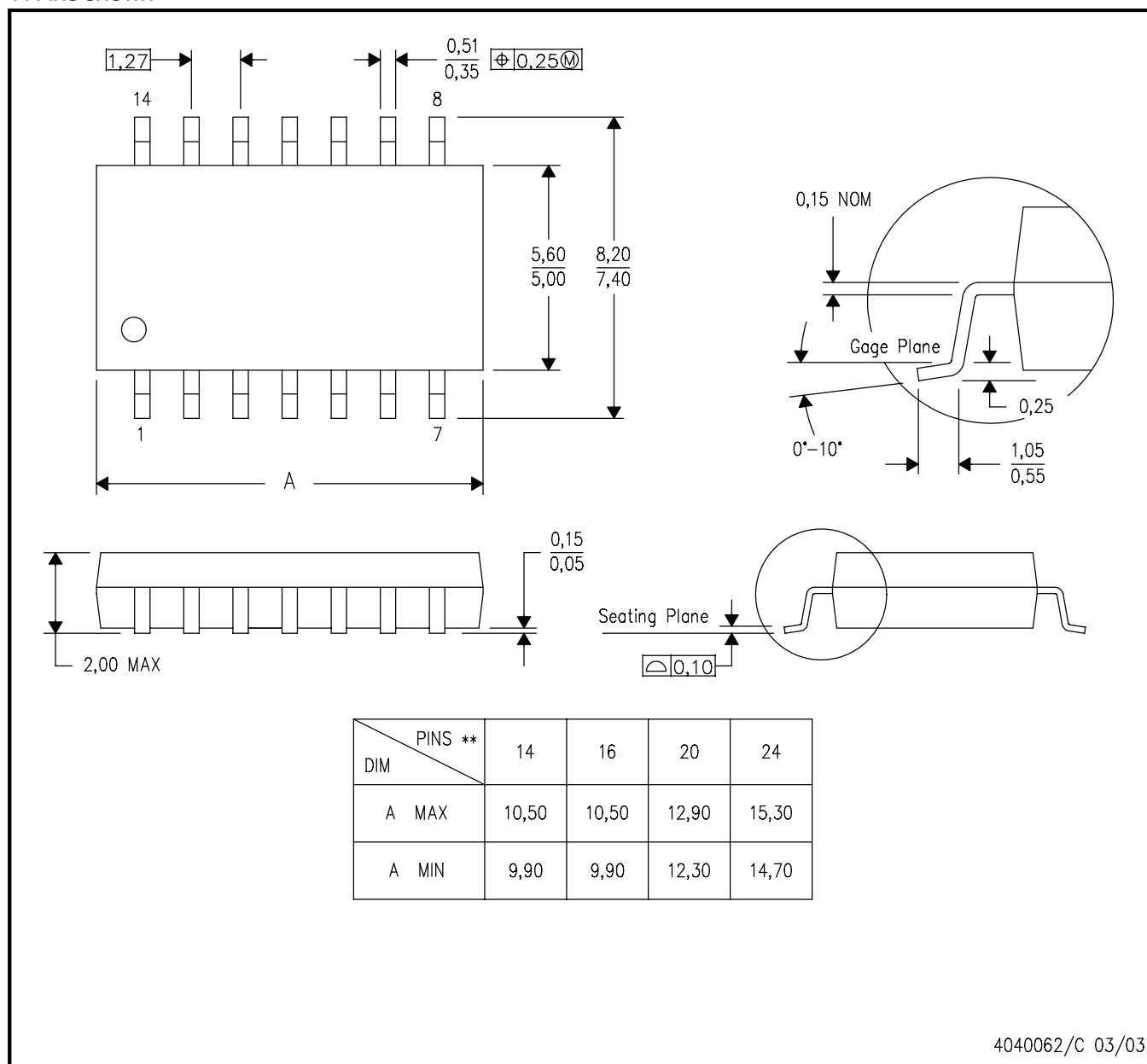
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- 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.

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