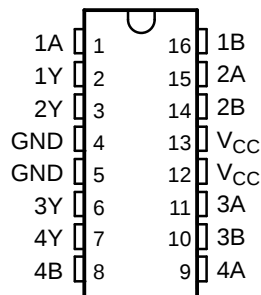


## FEATURES

- Center-Pin  $V_{CC}$  and GND Configurations Minimize High-Speed Switching Noise
- EPIC™ (Enhanced-Performance Implanted CMOS) 1- $\mu$ m Process
- 500-mA Typ Latch-Up Immunity at 125°C
- Package Options Include Plastic Small-Outline (D) Packages and Standard Plastic 300-mil DIPs (N)

**D OR N PACKAGE  
(TOP VIEW)**



## DESCRIPTION

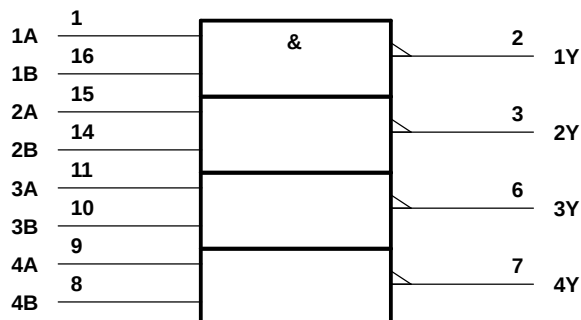
This device contains four independent 2-input NAND gates. It performs the Boolean function  $Y = \overline{A \bullet B}$  or  $Y = \overline{A} + \overline{B}$  in positive logic.

The 74AC11000 is characterized for operation from –40°C to 85°C.

**FUNCTION TABLE  
(EACH GATE)**

| INPUTS |   | OUTPUT<br>Y |
|--------|---|-------------|
| A      | B |             |
| H      | H | L           |
| L      | X | H           |
| X      | L | H           |

**LOGIC SYMBOL<sup>(1)</sup>**



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



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

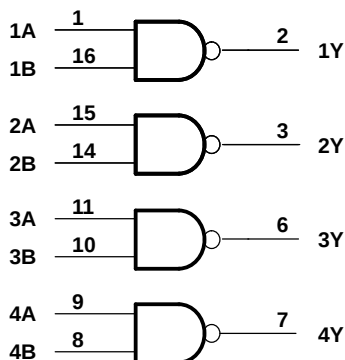
EPIC is a trademark of Texas Instruments.

# 74AC11000

## QUADRUPL 2-INPUT POSITIVE-NAND GATE

SCLS054B–APRIL 1987–REVISED JUNE 2005

### LOGIC DIAGRAM (POSITIVE LOGIC)



### Absolute Maximum Ratings<sup>(1)</sup>

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

|                                                                                  |                                     |                                                        | MIN  | MAX                   | UNIT |
|----------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------|------|-----------------------|------|
| V <sub>CC</sub>                                                                  | Supply voltage range                |                                                        | −0.5 | 7                     | V    |
| V <sub>I</sub>                                                                   | Input voltage range <sup>(2)</sup>  |                                                        | −0.5 | V <sub>CC</sub> + 0.5 | V    |
| V <sub>O</sub>                                                                   | Output voltage range <sup>(2)</sup> |                                                        | −0.5 | V <sub>CC</sub> + 0.5 | V    |
| I <sub>IK</sub>                                                                  | Input clamp current                 | V <sub>I</sub> < 0 or V <sub>I</sub> > V <sub>CC</sub> | ±20  |                       | mA   |
| I <sub>OK</sub>                                                                  | Output clamp current                | V <sub>O</sub> < 0 or V <sub>O</sub> > V <sub>CC</sub> | ±50  |                       | mA   |
| I <sub>O</sub>                                                                   | Continuous output current           | V <sub>O</sub> = 0 to V <sub>CC</sub>                  | ±50  |                       | mA   |
| Continuous current through V <sub>CC</sub> or GND                                |                                     |                                                        | ±100 |                       | mA   |
| Maximum power dissipation at T <sub>A</sub> = 55°C (in still air) <sup>(3)</sup> |                                     | D package                                              | 1.3  |                       | W    |
|                                                                                  |                                     | N package                                              | 1.1  |                       |      |
| T <sub>stg</sub>                                                                 | Storage temperature range           |                                                        | −65  | 150                   | °C   |

- (1) 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.
- (2) The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The maximum package power dissipation is calculated using a junction temperature of  $150^\circ\text{C}$  and a board trace length of 750 mils, except for the N package, which has a trace length of zero.

## Recommended Operating Conditions

|                     |                                 | MIN                     | NOM  | MAX      | UNIT |
|---------------------|---------------------------------|-------------------------|------|----------|------|
| $V_{CC}$            | Supply voltage                  | 3                       | 5    | 5.5      | V    |
| $V_{IH}$            | High-level input voltage        | $V_{CC} = 3\text{ V}$   | 2.1  |          | V    |
|                     |                                 | $V_{CC} = 4.5\text{ V}$ | 3.15 |          |      |
|                     |                                 | $V_{CC} = 5.5\text{ V}$ | 3.85 |          |      |
| $V_{IL}$            | Low-level input voltage         | $V_{CC} = 3\text{ V}$   |      | 0.9      | V    |
|                     |                                 | $V_{CC} = 4.5\text{ V}$ |      | 1.35     |      |
|                     |                                 | $V_{CC} = 5.5\text{ V}$ |      | 1.65     |      |
| $V_I$               | Input voltage                   | 0                       |      | $V_{CC}$ | V    |
| $V_O$               | Output voltage                  | 0                       |      | $V_{CC}$ | V    |
| $I_{OH}$            | High-level output current       | $V_{CC} = 3\text{ V}$   |      | –4       | mA   |
|                     |                                 | $V_{CC} = 4.5\text{ V}$ |      | –24      |      |
|                     |                                 | $V_{CC} = 5.5\text{ V}$ |      | –24      |      |
| $I_{OL}$            | Low-level output current        | $V_{CC} = 3\text{ V}$   |      | 12       | mA   |
|                     |                                 | $V_{CC} = 4.5\text{ V}$ |      | 24       |      |
|                     |                                 | $V_{CC} = 5.5\text{ V}$ |      | 24       |      |
| $\Delta t/\Delta v$ | Input transition rise fall rate | 0                       |      | 10       | ns/V |
| $T_A$               | Operating free-air temperature  | –40                     |      | 85       | °C   |

## Electrical Characteristics

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

| PARAMETER | TEST CONDITIONS                   | $V_{CC}$ | $T_A = 25^\circ\text{C}$ |      |           | MIN  | MAX     | UNIT          |
|-----------|-----------------------------------|----------|--------------------------|------|-----------|------|---------|---------------|
|           |                                   |          | MIN                      | TYP  | MAX       |      |         |               |
| $V_{OH}$  | $I_{OH} = -50\text{ }\mu\text{A}$ | 3 V      | 2.9                      |      |           | 2.9  |         | V             |
|           |                                   | 4.5 V    | 4.4                      |      |           | 4.4  |         |               |
|           |                                   | 5.5 V    | 5.4                      |      |           | 5.4  |         |               |
|           | $I_{OH} = -4\text{ mA}$           | 3 V      | 2.58                     |      |           | 2.48 |         |               |
|           |                                   | 4.5 V    | 3.94                     |      |           | 3.8  |         |               |
|           |                                   | 5.5 V    | 4.94                     |      |           | 4.8  |         |               |
| $V_{OL}$  | $I_{OL} = 50\text{ }\mu\text{A}$  | 3 V      |                          | 0.1  |           |      | 0.1     | V             |
|           |                                   | 4.5 V    |                          | 0.1  |           |      | 0.1     |               |
|           |                                   | 5.5 V    |                          | 0.1  |           |      | 0.1     |               |
|           | $I_{OL} = 12\text{ mA}$           | 3 V      |                          | 0.36 |           |      | 0.44    |               |
|           |                                   | 4.5 V    |                          | 0.36 |           |      | 0.44    |               |
|           |                                   | 5.5 V    |                          | 0.36 |           |      | 0.44    |               |
| $I_I$     | $V_I = V_{CC}$ or GND             | 5.5 V    |                          |      | $\pm 0.1$ |      | $\pm 1$ | $\mu\text{A}$ |
|           |                                   | 5.5 V    |                          |      | 4         |      | 40      | $\mu\text{A}$ |
| $C_i$     | $V_I = V_{CC}$ or GND             | 5 V      |                          | 3.5  |           |      |         | pF            |

(1) Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

# 74AC11000

## QUADRUPLE 2-INPUT POSITIVE-NAND GATE

SCLS054B–APRIL 1987–REVISED JUNE 2005

### Switching Characteristics

over recommended operating free-air temperature range,  $V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$  (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM<br>(INPUT) | TO<br>(OUTPUT) | $T_A = 25^\circ\text{C}$ |     |     | MIN | MAX  | UNIT |
|-----------|-----------------|----------------|--------------------------|-----|-----|-----|------|------|
|           |                 |                | MIN                      | TYP | MAX |     |      |      |
| $t_{PLH}$ | A or B          | Y              | 1.5                      | 7.2 | 9.8 | 1.5 | 11.1 | ns   |
| $t_{PHL}$ |                 |                | 1.5                      | 5.8 | 8.6 | 1.5 | 9.6  |      |

### Switching Characteristics

over recommended operating free-air temperature range,  $V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$  (unless otherwise noted) (see Figure 1)

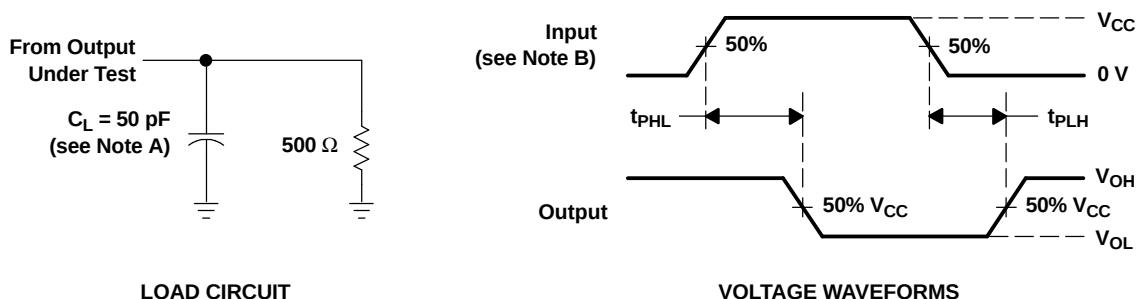
| PARAMETER | FROM<br>(INPUT) | TO<br>(OUTPUT) | $T_A = 25^\circ\text{C}$ |     |     | MIN | MAX | UNIT |
|-----------|-----------------|----------------|--------------------------|-----|-----|-----|-----|------|
|           |                 |                | MIN                      | TYP | MAX |     |     |      |
| $t_{PLH}$ | A or B          | Y              | 1.5                      | 5   | 6.5 | 1.5 | 7.4 | ns   |
| $t_{PHL}$ |                 |                | 1.5                      | 4.4 | 6.1 | 1.5 | 6.8 |      |

### Operating Characteristics

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

| PARAMETER                                       | TEST CONDITIONS                             | TYP | UNIT |
|-------------------------------------------------|---------------------------------------------|-----|------|
| $C_{pd}$ Power dissipation capacitance per gate | $C_L = 50 \text{ pF}$ , $f = 1 \text{ MHz}$ | 33  | pF   |

### PARAMETER MEASUREMENT INFORMATION



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
B. Input pulses are supplied by generators having the following characteristics:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r = 3 \text{ ns}$ ,  $t_f = 3 \text{ ns}$ .  
C. The outputs are measured one at a time with one input transition per measurement.

**Figure 1. Load Circuit and Voltage Waveforms**

## PACKAGING INFORMATION

| Orderable part number       | Status<br>(1) | Material type<br>(2) | Package   Pins | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6) |
|-----------------------------|---------------|----------------------|----------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| <a href="#">74AC11000D</a>  | Obsolete      | Production           | SOIC (D)   16  | -                     | -           | Call TI                              | Call TI                           | -40 to 85    | AC11000             |
| <a href="#">74AC11000DR</a> | Active        | Production           | SOIC (D)   16  | 2500   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 85    | AC11000             |
| 74AC11000DR.A               | Active        | Production           | SOIC (D)   16  | 2500   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -40 to 85    | AC11000             |
| <a href="#">74AC11000N</a>  | Active        | Production           | PDIP (N)   16  | 25   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | -40 to 85    | 74AC11000N          |
| 74AC11000N.A                | Active        | Production           | PDIP (N)   16  | 25   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | -40 to 85    | 74AC11000N          |

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

<sup>(2)</sup> **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.

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

<sup>(4)</sup> **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.

<sup>(5)</sup> **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.

<sup>(6)</sup> **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.

**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.

## 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 |
|-------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| 74AC11000DR | SOIC         | D               | 16   | 2500 | 330.0              | 16.4               | 6.5     | 10.3    | 2.1     | 8.0     | 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) |
|-------------|--------------|-----------------|------|------|-------------|------------|-------------|
| 74AC11000DR | SOIC         | D               | 16   | 2500 | 340.5       | 336.1      | 32.0        |

## TUBE

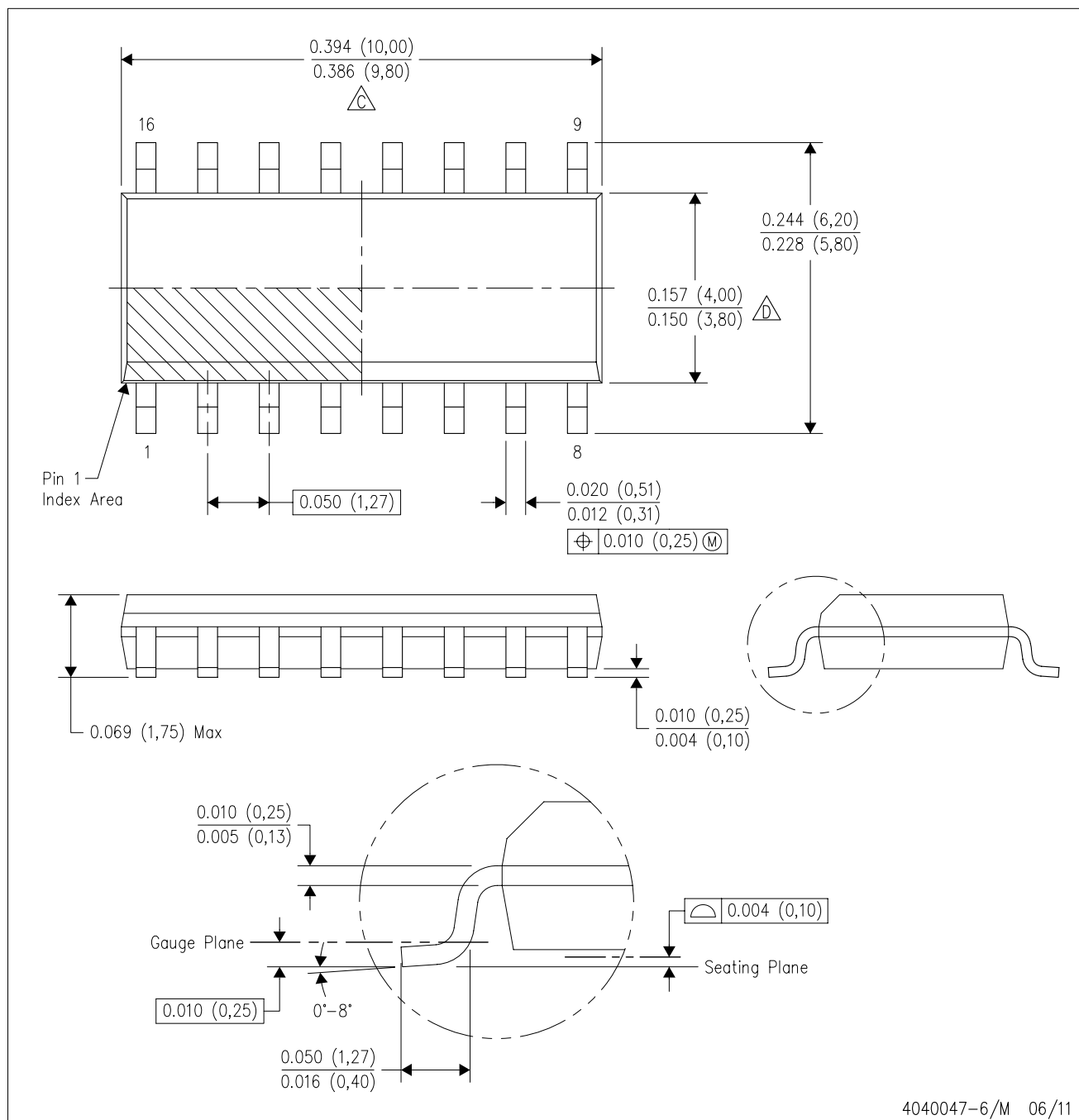


\*All dimensions are nominal

| Device       | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|--------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| 74AC11000N   | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| 74AC11000N   | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| 74AC11000N.A | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| 74AC11000N.A | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |

## D (R-PDSO-G16)

# PLASTIC SMALL OUTLINE



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.

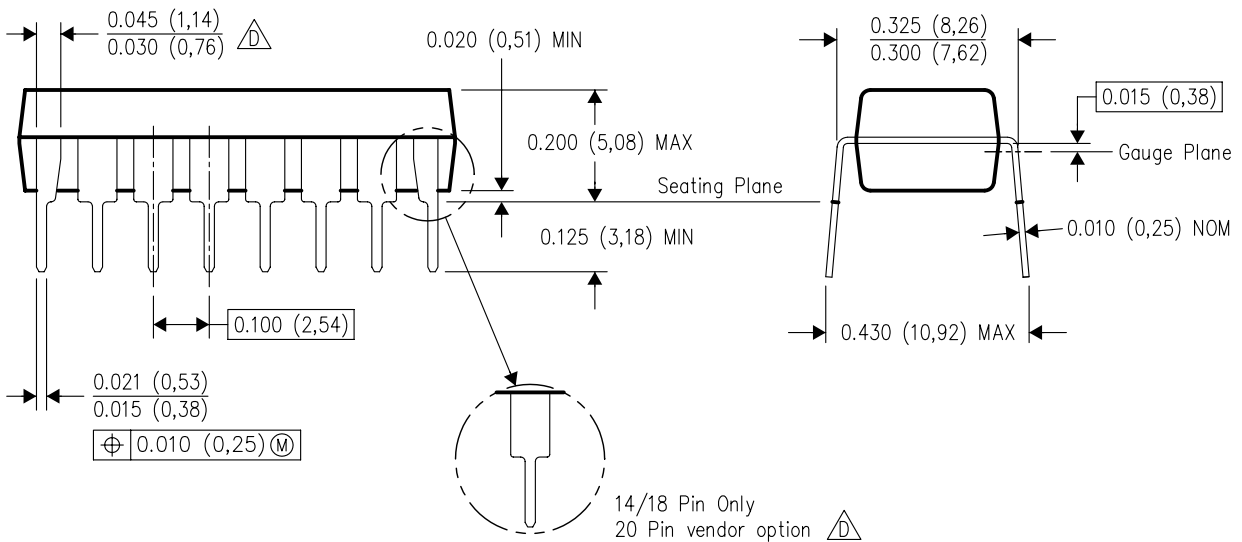
## N (R-PDIP-T\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



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



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.
  - 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.

## IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2025, Texas Instruments Incorporated