CD54HC367, CD74HC367, CD54HCT367
CD74HCT367, CD54HC368, CD74HC368, CD74HCT368
SCHS181E – NOVEMBER 1997 – REVISED FEBRUARY 2022

# CDx4HC367, CDx4HC368, CDx4HCT367, CD74HCT368 High-Speed CMOS Logic Hex Buffer/Line Driver, Three-State Non-Inverting and Inverting

## 1 Features

- Buffered inputs
- High current bus driver outputs
- Two independent three-state enable controls
- Typical propagation delay $t_{PLH}$, $t_{PHL}$ = 8 ns at $V_{CC}$ = 5 V, $C_L$ =15 pF, $T_A$ = 25°C
- Fanout (over temperature range)
  - Standard outputs: 10 LSTTL Loads
  - Bus driver outputs: 15 LSTTL Loads
- Wide operating temperature range: -55°C to 125°C
- Balanced propagation delay and transition times
- Significant power reduction compared to LSTTL Logic ICs
- HC Types
  - 2 V to 6 V operation
  - High noise immunity: $N_{IL}$ = 30%, $N_{IH}$ = 30% of $V_{CC}$ at $V_{CC}$ = 5 V
- HCT Types
  - 4.5 V to 5.5 V operation
  - Direct LSTTL input logic compatibility, $V_{IL}$ = 0.8 V (Max), $V_{IH}$ = 2 V (Min)
  - CMOS input compatibility, $I_I \leq 1$ µA at $V_{OL}$, $V_{OH}$

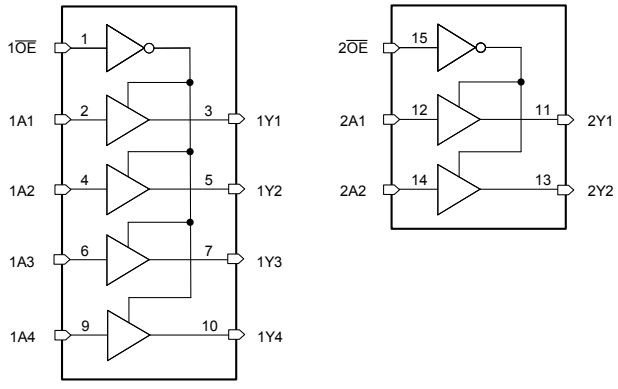
## 2 Description

The ’HC367, ’HCT367, ’HC368, and CD74HCT368 silicon gate CMOS three-state buffers are general purpose high-speed non-inverting and inverting buffers. The ’HC367 and ’HCT367 are non-inverting buffers, whereas the ’HC368 and CD74HCT368 are inverting buffers. They have high drive current outputs which enable high speed operation even when driving large bus capacitances. These circuits possess the low power dissipation of CMOS circuitry, yet have speeds comparable to low power Schottky TTL circuits. Both circuits are capable of driving up to 15 low power Schottky inputs.

**Device Information**

| PART NUMBER | PACKAGE(1) | BODY SIZE (NOM) |
|---|---|---|
| CD74HC367M | SOIC (16) | 9.90 mm × 3.90 mm |
| CD74HC368M | SOIC (16) | 9.90 mm × 3.90 mm |
| CD74HCT367M | SOIC (16) | 9.90 mm × 3.90 mm |
| CD74HCT368M | SOIC (16) | 9.90 mm × 3.90 mm |
| CD74HC367E | PDIP (16) | 19.31 mm × 6.35 mm |
| CD74HC368E | PDIP (16) | 19.31 mm × 6.35 mm |
| CD74HCT367E | PDIP (16) | 19.31 mm × 6.35 mm |
| CD74HCT368E | PDIP (16) | 19.31 mm × 6.35 mm |
| CD54HC367F3A | CDIP (16) | 24.38 mm × 6.92 mm |
| CD54HC368F3A | CDIP (16) | 24.38 mm × 6.92 mm |
| CD54HCT367F3A | CDIP (16) | 24.38 mm × 6.92 mm |

(1) For all available packages, see the orderable addendum at the end of the data sheet.




**Functional Block Diagram**

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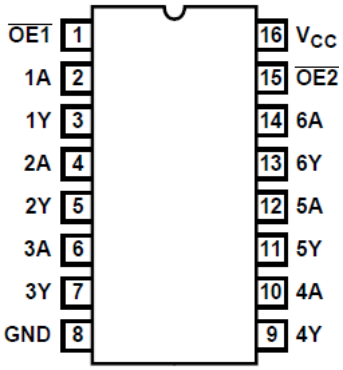
## 3 Revision History

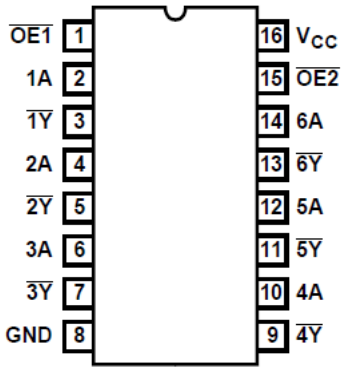
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

| Changes from Revision D (October 2003) to Revision E (February 2022) | Page |
|---|---|
| • Updated the numbering, formatting, tables, figures, and cross-references throughout the document to reflect modern data sheet standards | 1 |

## 4 Pin Configuration and Functions




**'HC367, 'HCT367**
**J, D, or N package**
**16-Pin CDIP, SOIC, PDIP**
**Top View**




**'HC368, CD74HCT368**
**J, D, or N package**
**16-Pin CDIP, SOIC, PDIP**
**Top View**

# 5 Specifications

## 5.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)(1)

| | | | MIN | MAX | UNIT |
|---|---|---|---|---|---|
| $V_{CC}$ | Supply voltage range | | -0.5 | 7 | V |
| $I_{IK}$ | Input clamp current | ($V_I$ < -0.5 V or $V_I$ > $V_{CC}$ + 0.5 V) | | ±20 | mA |
| $I_{OK}$ | Output clamp current | ($V_O$ < -0.5 V or $V_O$ > $V_{CC}$ + 0.5 V) | | ±20 | mA |
| $I_O$ | Continuous output current | (-0.5 V < $V_O$ < $V_{CC}$ + 0.5 V) | | ±35 | mA |
| | Continuous current through $V_{CC}$ or GND | | | ±50 | mA |
| $T_J$ | Junction temperature | | | 150 | °C |
| $T_{stg}$ | Storage temperature | | -65 | 150 | °C |
| | Lead Temperature (Soldering 10s) | | | 300 | °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.

## 5.2 Recommended Operating Conditions

| | | | MIN | MAX | UNIT |
|---|---|---|---|---|---|
| $T_A$ | Temperature range | | –55 | 125 | ℃ |
| $V_{CC}$ | Supply voltage range | HC Types | 2 | 6 | V |
| | | HCT Types | 4.5 | 5.5 | V |
| $V_I$,$V_O$ | Input or output voltage | | 0 | $V_{CC}$ | V |
| $t_t$ | Input rise and fall time | 2 V | | 1000 | ns |
| | | 4.5 V | | 500 | ns |
| | | 6 V | | 400 | ns |

## 5.3 Thermal Information

| THERMAL METRIC | | D (SOIC) 16 PINS | N (PDIP) 16 PINS | UNIT |
|---|---|---|---|---|
| $R_{\theta JA}$ | Junction-to-ambient thermal resistance(1) | 73 | 67 | °C/W |

(1) For more information about traditional and new thermal metrics, see the *Semiconductor and IC package thermal metrics* application report.

## 5.4 Electrical Characteristics

| PARAMETER | | TEST CONDITIONS (2) | $V_{CC}$ (V) | 25℃ | | | -40℃ to 85℃ | | -55℃ to 125℃ | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| **HC TYPES** | | | | | | | | | | | |
| $V_{IH}$ | High level input voltage | | 2 | 1.5 | | | 1.5 | | 1.5 | | V |
| | | | 4.5 | 3.15 | | | 3.15 | | 3.15 | | V |
| | | | 6 | 4.2 | | | 4.2 | | 4.2 | | V |
| $V_{IL}$ | Low level input voltage | | 2 | | | 0.5 | | 0.5 | | 0.5 | V |
| | | | 4.5 | | | 1.35 | | 1.35 | | 1.35 | V |
| | | | 6 | | | 1.8 | | 1.8 | | 1.8 | V |
| $V_{OH}$ | High level output voltage | $I_{OH}$ = – 20 μA | 2 | 1.9 | | | 1.9 | | 1.9 | | V |
| | | $I_{OH}$ = – 20 μA | 4.5 | 4.4 | | | 4.4 | | 4.4 | | V |
| | | $I_{OH}$ = – 20 μA | 6 | 5.9 | | | 5.9 | | 5.9 | | V |
| | High level output voltage | $I_{OH}$ = – 6 mA | 4.5 | 3.98 | | | 3.84 | | 3.7 | | V |
| | | $I_{OH}$ = – 7.8 mA | 6 | 5.48 | | | 5.34 | | 5.2 | | V |
| $V_{OL}$ | Low level output voltage | $I_{OL}$ = 20 μA | 2 | | | 0.1 | | 0.1 | | 0.1 | V |
| | | $I_{OL}$ = 20 μA | 4.5 | | | 0.1 | | 0.1 | | 0.1 | V |
| | | $I_{OL}$ = 20 μA | 6 | | | 0.1 | | 0.1 | | 0.1 | V |
| | Low level output voltage | $I_{OL}$ = 6 mA | 4.5 | | | 0.26 | | 0.33 | | 0.4 | V |
| | | $I_{OL}$ = 7.8 mA | 6 | | | 0.26 | | 0.33 | | 0.4 | V |
| $I_I$ | Input leakage current | | 6 | | | ±0.1 | | ±1 | | ±1 | μA |
| $I_{CC}$ | Supply current | 0 | 6 | | | 8 | | 80 | | 160 | μA |
| $I_{OZ}$ | Three-state leakage current | $V_O$ = $V_{CC}$ or GND | 6 | | | ±0.5 | | ±5.0 | | ±10 | μA |
| **HCT TYPES** | | | | | | | | | | | |
| $V_{IH}$ | High level input voltage | | 4.5 to 5.5 | 2 | | | 2 | | 2 | | V |
| $V_{IL}$ | Low level input voltage | | 4.5 to 5.5 | | | 0.8 | | 0.8 | | 0.8 | V |
| $V_{OH}$ | High level output voltage | $I_{OH}$ = – 20 μA | 4.5 | 4.4 | | | 4.4 | | 4.4 | | V |
| | High level output voltage | $I_{OH}$ = – 4 mA | 4.5 | 3.98 | | | 3.84 | | 3.7 | | V |
| $V_{OL}$ | Low level output voltage | $I_{OL}$ = 20 μA | 4.5 | | | 0.1 | | 0.1 | | 0.1 | V |
| | Low level output voltage | $I_{OL}$ = 4 mA | 4.5 | | | 0.26 | | 0.33 | | 0.4 | V |
| $I_I$ | Input leakage current | $V_I$ = $V_{CC}$ to GND | 5.5 | | | ±0.1 | | ±1 | | ±1 | μA |
| $I_{CC}$ | Supply current | $V_I$ = $V_{CC}$ to GND | 5.5 | | | 8 | | 80 | | 160 | μA |
| $\Delta I_{CC}$ (1) | Additional supply current per input pin | $\overline{OE1}$ input held at $V_{CC}$ – 2.1 | 4.5 to 5.5 | | 100 | 216 | | 270 | | 294 | μA |
| | | All other inputs held at $V_{CC}$ – 2.1 | 4.5 to 5.5 | | 100 | 198 | | 247.5 | | 269.5 | |
| $I_{OZ}$ | Three-state leakage current | $V_O$ = $V_{CC}$ or GND | 5.5 | | | ±0.5 | | ±5.0 | | ±10 | μA |

(1) For dual-supply systems theoretical worst case ($V_I$ = 2.4 V, $V_{CC}$ = 5.5 V) specification is 1.8 mA.
(2) $V_I$ = $V_{IH}$ or $V_{IL}$, unless otherwise noted.

## 5.5 Switching Characteristics

Input $t_r$, $t_f$ = 6 ns. Unless otherwise specified, $C_L$ = 50pF

| PARAMETER | | $V_{CC}$ (V) | 25℃ | | -40℃ to 85℃ | -55℃ to 125℃ | UNIT |
|---|---|---|---|---|---|---|---|
| | | | TYP | MAX | MAX | MAX | |
| **HC TYPES** | | | | | | | |
| $t_{pd}$ | Data to outputs HC/HCT367 | 2 | | 105 | 130 | 160 | ns |
| | | 4.5 | | 21 | 26 | 32 | ns |
| | | 6 | 8(3) | 18 | 24 | 27 | ns |
| | Data to outputs HC/HCT368 | 2 | | 105 | 130 | 160 | ns |
| | | 4.5 | | 21 | 26 | 32 | ns |
| | | 6 | 9(3) | 18 | 24 | 27 | ns |
| | Output enable and disable to outputs | 2 | | 150 | 190 | 225 | ns |
| | | 4.5 | | 30 | 38 | 45 | ns |
| | | 6 | 12(3) | 26 | 33 | 38 | ns |
| $t_t$ | Output transition time | 2 | | 60 | 75 | 90 | ns |
| | | 4.5 | | 12 | 15 | 18 | ns |
| | | 6 | | 10 | 13 | 15 | ns |
| $C_I$ | Input capacitance | | | 10 | 10 | 10 | pF |
| $C_O$ | Three-state output capacitance | | | 20 | 20 | 20 | pF |
| $C_{PD}$ | Power dissipation capacitance(1) (2) | 5 | 40 | | | | pF |
| **HCT TYPES** | | | | | | | |
| $t_{pd}$ | Data to outputs HC/HCT367 | 4.5 | 9(3) | 25 | 31 | 38 | ns |
| | Data to outputs HC/HCT368 | 4.5 | 11(3) | 30 | 38 | 45 | ns |
| | Output enable and disable to outputs | 4.5 | 14(3) | 35 | 44 | 53 | ns |
| $t_t$ | Output transition time | 4.5 | | 12 | 15 | 18 | ns |
| $C_{IN}$ | Input capacitance | | | 10 | 10 | 10 | pF |
| $C_O$ | Three-state capacitance | | | 20 | 20 | 20 | pF |
| $C_{PD}$ | Power dissipation capacitance(1) (2) | 5 | 42 | | | | pF |

(1) $C_{PD}$ is used to determine the dynamic power consumption, per buffer.
(2) $P_D = V_{CC}{}^2 f_i (C_{PD} + C_L)$ where $f_i$ = input frequency, $C_L$ = output load capacitance, $V_{CC}$ = supply voltage.
(3) $C_L$ = 15 pF and $V_{CC}$ = 5 V.

## 6 Parameter Measurement Information

$t_{pd}$ is the maximum between $t_{PLH}$ and $t_{PHL}$

$t_t$ is the maximum between $t_{TLH}$ and $t_{THL}$

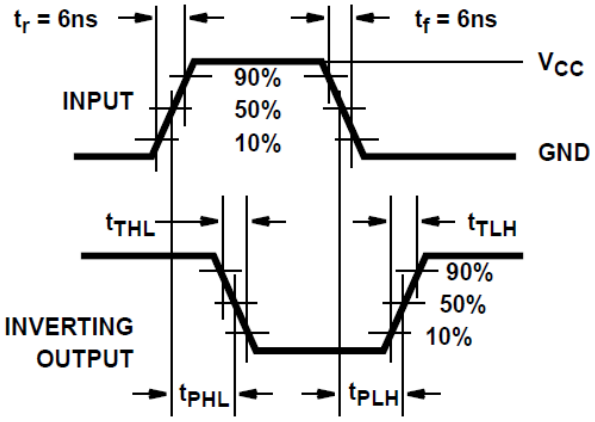



**Figure 6-1. HC Transition Times and Propagation Delay Times, Combination Logic**

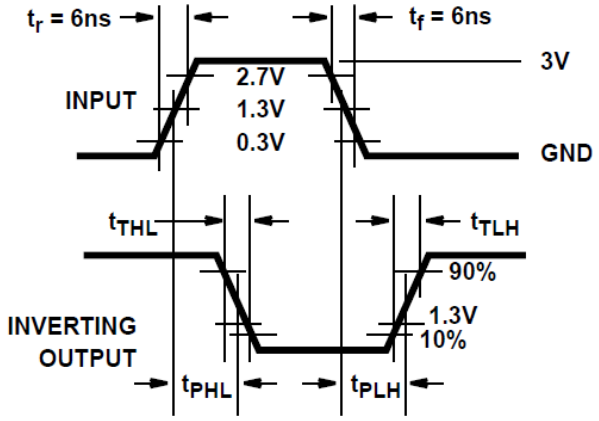



**Figure 6-2. HCT Transition Times and Propagation Delay Times, Combination Logic**

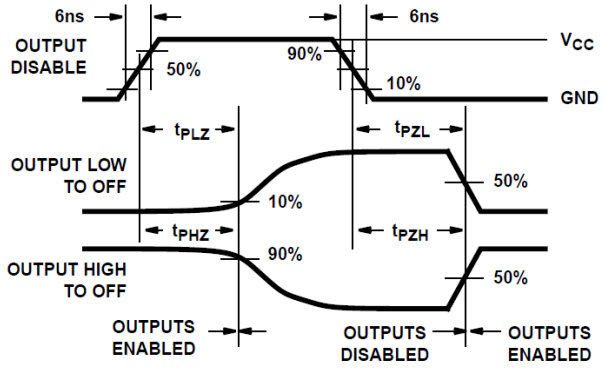



**Figure 6-3. HC Three-State Propagation Delay Waveform**

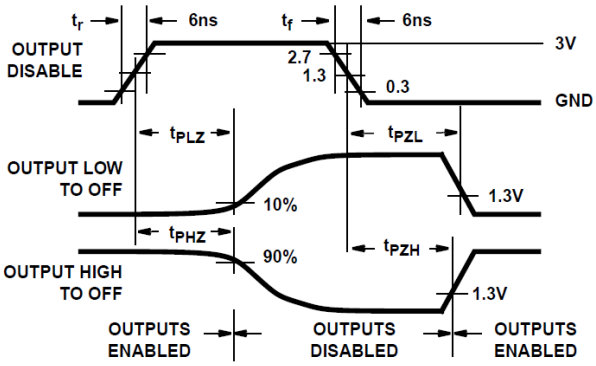
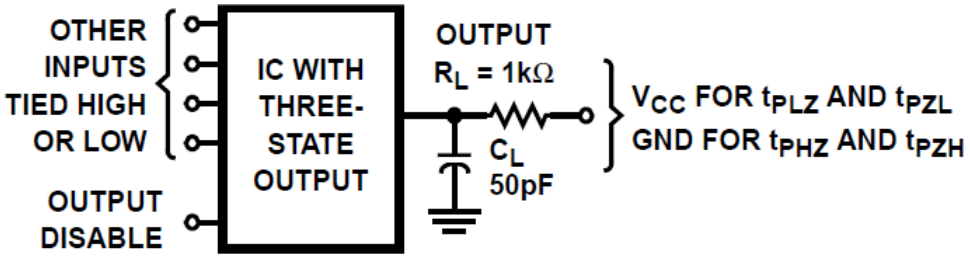



**Figure 6-4. HCT Three-State Propagation Delay Waveform**




**Note**

Open drain waveforms $t_{PLZ}$ and $t_{PZL}$ are the same as those for three-state shown on the left. The test circuit is Output $R_L$ = 1 kΩ to $V_{CC}$, $C_L$ = 50 pF.

**Figure 6-5. HC and HCT Three-State Propagation Delay Test Circuit**

# 7 Detailed Description

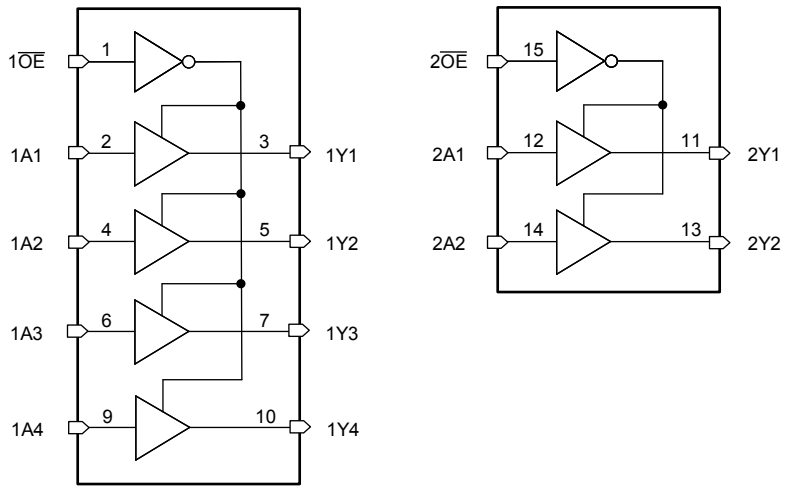
## 7.1 Overview

The ’HC367, ’HCT367, ’HC368, and CD74HCT368 silicon gate CMOS three-state buffers are general purpose high-speed non-inverting and inverting buffers. They have high drive current outputs which enable high speed operation even when driving large bus capacitances. These circuits possess the low power dissipation of CMOS circuitry, yet have speeds comparable to low power Schottky TTL circuits. Both circuits are capable of driving up to 15 low power Schottky inputs.

The ’HC367 and ’HCT367 are non-inverting buffers, whereas the ’HC368 and CD74HCT368 are inverting buffers. These devices have two output enables, one enable ($\overline{OE1}$) controls 4 gates and the other ($\overline{OE2}$) controls the remaining 2 gates.

The ’HCT367 and CD74HCT368 logic families are speed, function and pin compatible with the standard LS logic family.

## 7.2 Functional Block Diagram




## 7.3 Device Functional Modes

**Table 7-1. Truth Table**(1)

| INPUTS | | OUTPUTS (Y) | |
|---|---|---|---|
| $\overline{OE}$ | A | HC/HCT367 | HC/HCT368 |
| L | L | L | H |
| L | H | H | L |
| H | X | (Z) | (Z) |

(1) H = High Voltage Level, L = Low Voltage Level, X = Don’t Care, Z = High Impedance (OFF) State

# 8 Power Supply Recommendations

The power supply can be any voltage between the minimum and maximum supply voltage rating located in the *Recommended Operating Conditions*. Each $V_{CC}$ terminal should have a good bypass capacitor to prevent power disturbance. A 0.1-µF capacitor is recommended for this device. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. The 0.1-µF and 1-µF capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results.

# 9 Layout

## 9.1 Layout Guidelines

When using multiple-input and multiple-channel logic devices inputs must not ever be left floating. In many cases, functions or parts of functions of digital logic devices are unused; for example, when only two inputs of a triple-input AND gate are used or only 3 of the 4 buffer gates are used. Such unused input pins must not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. All unused inputs of digital logic devices must be connected to a logic high or logic low voltage, as defined by the input voltage specifications, to prevent them from floating. The logic level that must be applied to any particular unused input depends on the function of the device. Generally, the inputs are tied to GND or $V_{CC}$, whichever makes more sense for the logic function or is more convenient.

# 10 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

## 10.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Subscribe to updates* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

## 10.2 Support Resources

TI E2E™ support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

## 10.3 Trademarks

TI E2E™ is a trademark of Texas Instruments.
All trademarks are the property of their respective owners.

## 10.4 Electrostatic Discharge Caution

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

## 10.5 Glossary

| | |
|---|---|
| TI Glossary | This glossary lists and explains terms, acronyms, and definitions. |

# 11 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

## 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) |
|---|---|---|---|---|---|---|---|---|---|
| 5962-9070601MEA | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9070601MEA CD54HCT367F3A |
| CD54HC367F3A | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8500201EA CD54HC367F3A |
| CD54HC367F3A.A | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8500201EA CD54HC367F3A |
| CD54HC368F3A | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-8681201EA CD54HC368F3A |
| CD54HC368F3A.A | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-8681201EA CD54HC368F3A |
| CD54HCT367F3A | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9070601MEA CD54HCT367F3A |
| CD54HCT367F3A.A | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9070601MEA CD54HCT367F3A |
| CD74HC367E | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -55 to 125 | CD74HC367E |
| CD74HC367E.A | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -55 to 125 | CD74HC367E |
| CD74HC367M | Obsolete | Production | SOIC (D) \| 16 | - | - | Call TI | Call TI | -55 to 125 | HC367M |
| CD74HC367M96 | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU \| SN | Level-1-260C-UNLIM | -55 to 125 | HC367M |
| CD74HC367M96.A | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -55 to 125 | HC367M |
| CD74HC367M96G4 | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -55 to 125 | HC367M |
| CD74HC367M96G4.A | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -55 to 125 | HC367M |
| CD74HC367MT | Obsolete | Production | SOIC (D) \| 16 | - | - | Call TI | Call TI | -55 to 125 | HC367M |
| CD74HC368E | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -55 to 125 | CD74HC368E |
| CD74HC368E.A | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -55 to 125 | CD74HC368E |
| CD74HC368M | Active | Production | SOIC (D) \| 16 | 40 \| TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | -55 to 125 | HC368M |
| CD74HC368M.A | Active | Production | SOIC (D) \| 16 | 40 \| TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | -55 to 125 | HC368M |
| CD74HCT367E | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -55 to 125 | CD74HCT367E |
| CD74HCT367E.A | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -55 to 125 | CD74HCT367E |
| CD74HCT367M | Obsolete | Production | SOIC (D) \| 16 | - | - | Call TI | Call TI | -55 to 125 | HCT367M |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| CD74HCT367M96 | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU \| SN | Level-1-260C-UNLIM | -55 to 125 | HCT367M |
| CD74HCT367M96.A | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -55 to 125 | HCT367M |
| CD74HCT367MT | Obsolete | Production | SOIC (D) \| 16 | - | - | Call TI | Call TI | -55 to 125 | HCT367M |
| CD74HCT368E | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -55 to 125 | CD74HCT368E |
| CD74HCT368E.A | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -55 to 125 | CD74HCT368E |
| CD74HCT368M | Obsolete | Production | SOIC (D) \| 16 | - | - | Call TI | Call TI | -55 to 125 | HCT368M |
| CD74HCT368M96 | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -55 to 125 | HCT368M |
| CD74HCT368M96.A | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -55 to 125 | HCT368M |
| CD74HCT368MT | Obsolete | Production | SOIC (D) \| 16 | - | - | Call TI | Call TI | -55 to 125 | HCT368M |

(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.

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 CD54HC367, CD54HC368, CD54HCT367, CD74HC367, CD74HC368, CD74HCT367 :**

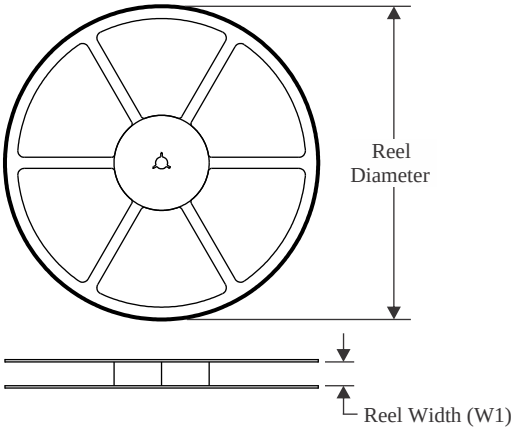
- Catalog : CD74HC367, CD74HC368, CD74HCT367
- Military : CD54HC367, CD54HC368, CD54HCT367

NOTE: Qualified Version Definitions:

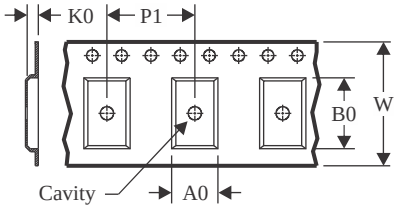
- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**

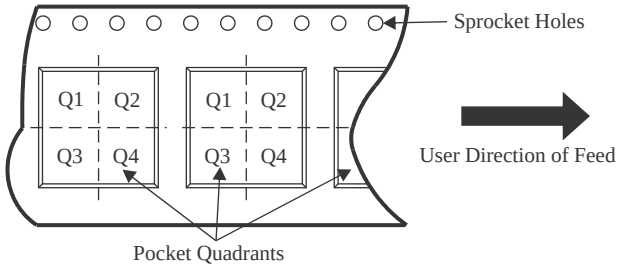



**TAPE DIMENSIONS**




| | |
|---|---|
| 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 |

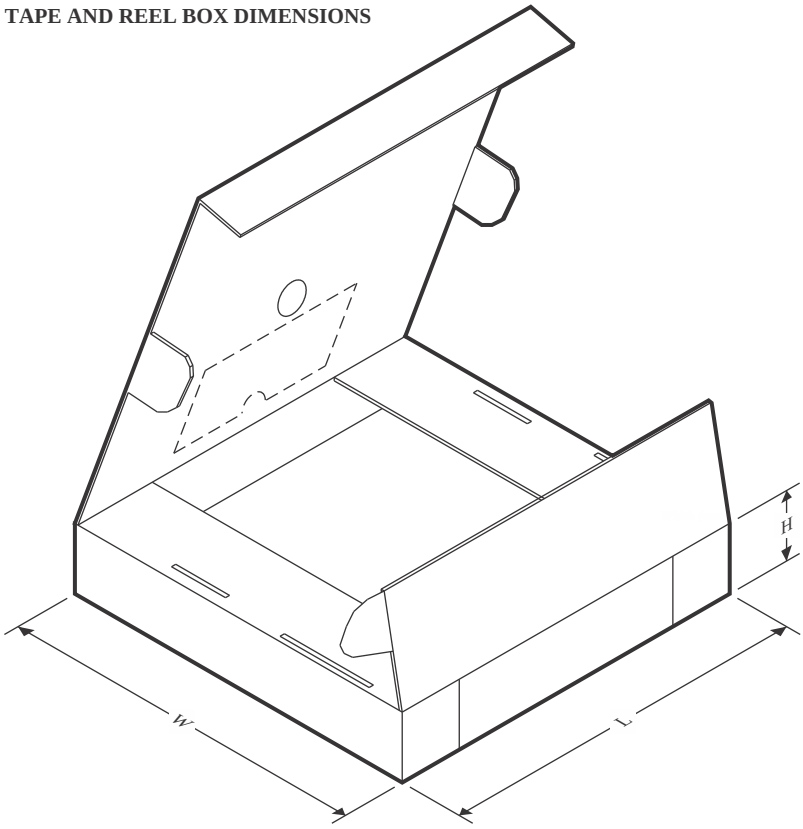
**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**




*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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD74HC367M96 | SOIC | D | 16 | 2500 | 330.0 | 16.4 | 6.5 | 10.3 | 2.1 | 8.0 | 16.0 | Q1 |
| CD74HC367M96G4 | SOIC | D | 16 | 2500 | 330.0 | 16.4 | 6.5 | 10.3 | 2.1 | 8.0 | 16.0 | Q1 |
| CD74HCT367M96 | SOIC | D | 16 | 2500 | 330.0 | 16.4 | 6.5 | 10.3 | 2.1 | 8.0 | 16.0 | Q1 |
| CD74HCT368M96 | SOIC | D | 16 | 2500 | 330.0 | 16.4 | 6.5 | 10.3 | 2.1 | 8.0 | 16.0 | Q1 |

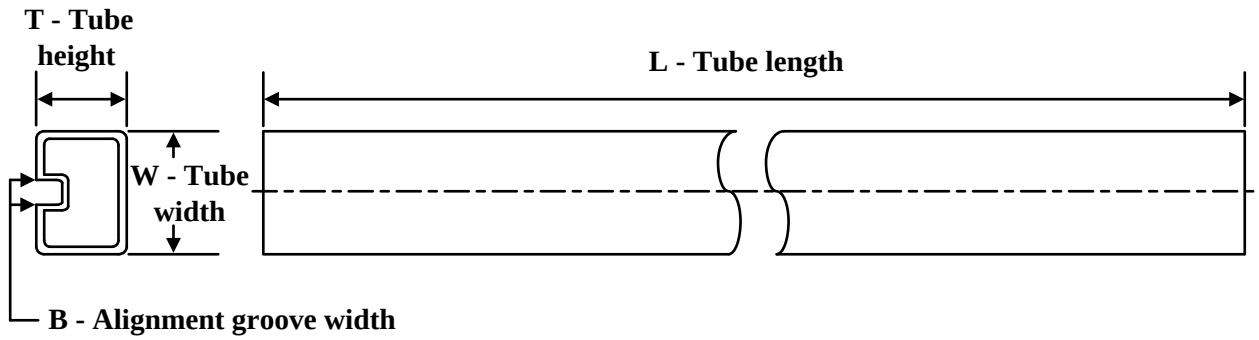
TAPE AND REEL BOX DIMENSIONS




*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| CD74HC367M96 | SOIC | D | 16 | 2500 | 356.0 | 356.0 | 35.0 |
| CD74HC367M96G4 | SOIC | D | 16 | 2500 | 356.0 | 356.0 | 35.0 |
| CD74HCT367M96 | SOIC | D | 16 | 2500 | 356.0 | 356.0 | 35.0 |
| CD74HCT368M96 | SOIC | D | 16 | 2500 | 353.0 | 353.0 | 32.0 |

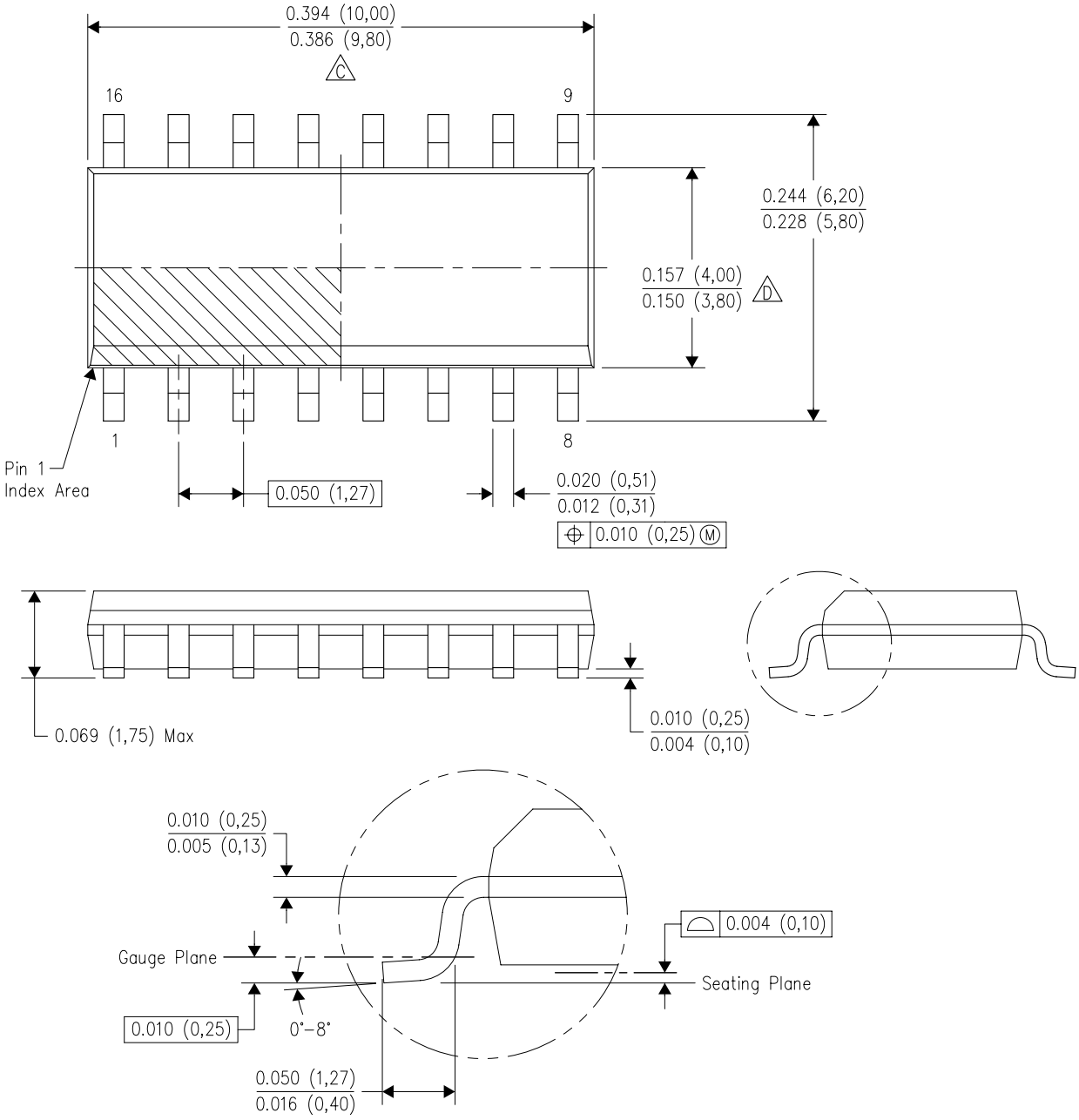
## TUBE




*All dimensions are nominal

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (µm) | B (mm) |
|---|---|---|---|---|---|---|---|---|
| CD74HC367E | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HC367E | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HC367E.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HC367E.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HC368E | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HC368E | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HC368E.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HC368E.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HC368M | D | SOIC | 16 | 40 | 507 | 8 | 3940 | 4.32 |
| CD74HC368M.A | D | SOIC | 16 | 40 | 507 | 8 | 3940 | 4.32 |
| CD74HCT367E | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HCT367E | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HCT367E.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HCT367E.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HCT368E | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HCT368E | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HCT368E.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| CD74HCT368E.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |

D (R–PDSO–G16) PLASTIC SMALL OUTLINE

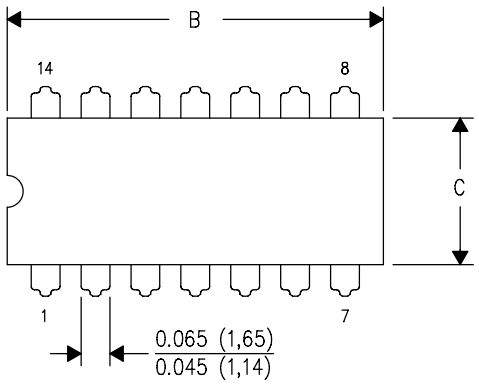



NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
D. Body width does not include interlead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

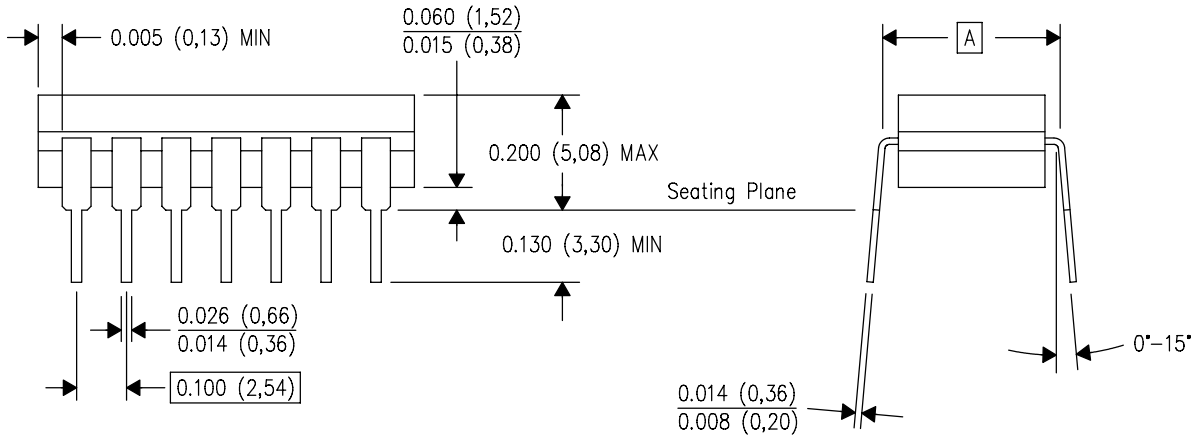
J (R–GDIP–T**)

14 LEADS SHOWN

# CERAMIC DUAL IN–LINE PACKAGE




| 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) |



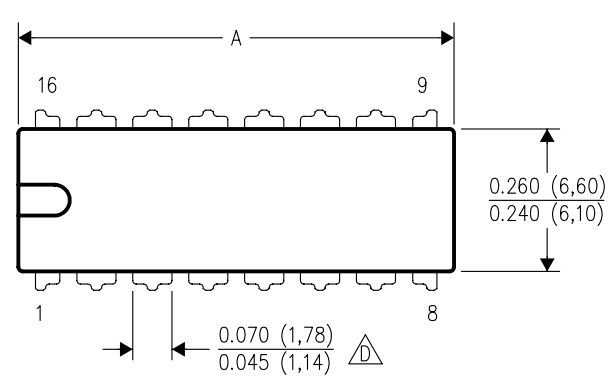

4040083/F 03/03

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.

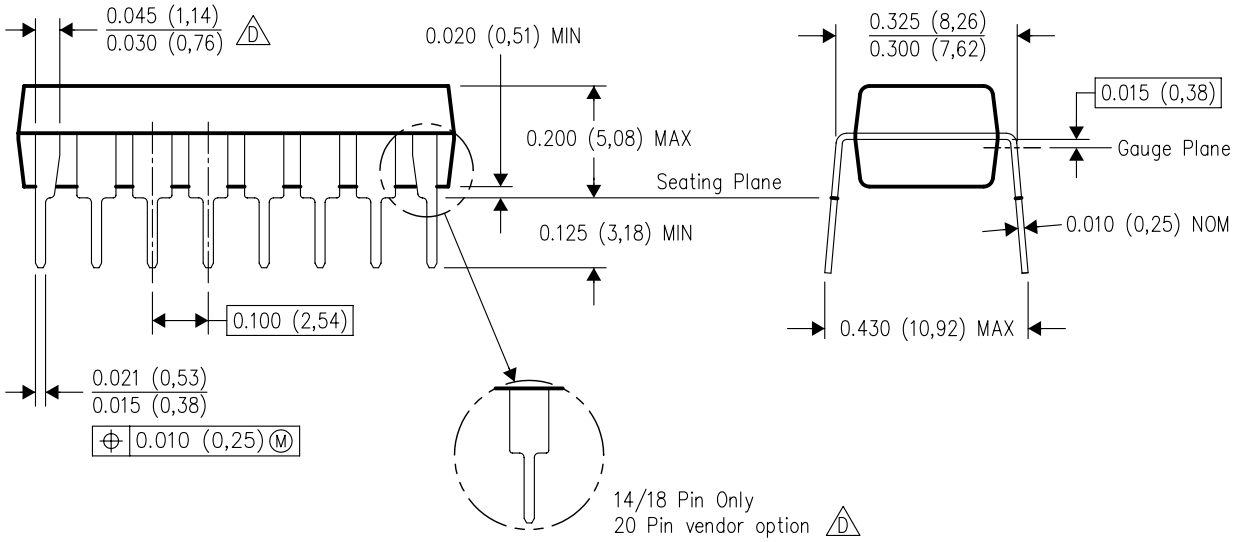
## N (R–PDIP–T**)

## 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 (C) | 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.
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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