

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

## 1 Features

- Buffered inputs
- High current bus driver outputs
- 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,  $I_I \leq 1 \mu A$  at  $V_{OL}$ ,  $V_{OH}$

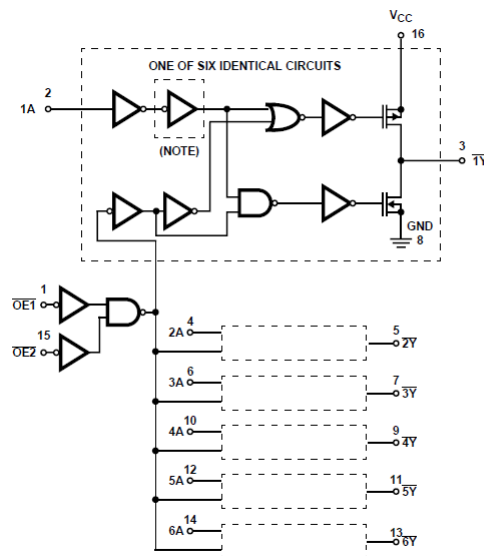
## Device Information

| PART NUMBER | PACKAGE <sup>(1)</sup> | BODY SIZE (NOM) |
|-------------|------------------------|-----------------|
| CD54HC365   | J (CERDIP, 16)         | 19.56 x 6.92 mm |
| CD54HC366   | J (CERDIP, 16)         | 19.56 x 6.92 mm |
| CD54HCT365  | J (CERDIP, 16)         | 19.56 x 6.92 mm |
| CD74HC365   | N (PDIP, 16)           | 19.30 x 6.35 mm |
|             | D (SOIC, 16)           | 9.90 x 3.90 mm  |
|             | D (SOIC, 16)           | 9.90 x 3.90 mm  |
|             | D (SOIC, 16)           | 9.90 x 3.90 mm  |
| CD74HC366   | N (PDIP, 16)           | 19.30 x 6.35 mm |
|             | D (SOIC, 16)           | 9.90 x 3.90 mm  |
|             | D (SOIC, 16)           | 9.90 x 3.90 mm  |
| CD74HCT365  | N (PDIP, 16)           | 19.30 x 6.35 mm |
|             | D (SOIC, 16)           | 9.90 x 3.90 mm  |
|             | D (SOIC, 16)           | 9.90 x 3.90 mm  |
|             | D (SOIC, 16)           | 9.90 x 3.90 mm  |

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

## 2 Description

The 'HC365, 'HCT365, and 'HC366 silicon gate CMOS three-state buffers are general purpose high-speed non-inverting and inverting buffers.



**Logic Diagram for the HC/HCT365 and HC366 (Outputs for HC/HCT365 are Complements of Those Shown, i.e., 1Y, 2Y, etc.)**

A. Inverter not included in HC/HCT 365.



An IMPORTANT NOTICE at the end of this data sheet addresses availability, warranty, changes, use in safety-critical applications, intellectual property matters and other important disclaimers. PRODUCTION DATA.

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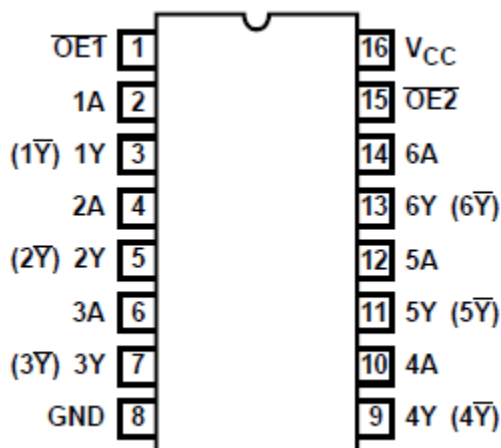
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## 3 Revision History

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

| Changes from Revision C (October 2003) to Revision D (July 2022)                                                                               | Page     |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| • Updated the numbering, formatting, tables, figures, and cross-references throughout the document to reflect modern data sheet standards..... | <b>1</b> |

## 4 Pin Configuration and Functions



**Figure 4-1. CD54HC365, CD54HCT365, CD54HC366 (CERDIP) CD74HC365, CD74HCT365, CD74HC366 (PDIP, SOIC) Top View**

**Table 4-1. Pin Functions**

| PIN |                  | TYPE <sup>(1)</sup> | DESCRIPTION                 |
|-----|------------------|---------------------|-----------------------------|
| NO. | NAME             |                     |                             |
| 1   | $\overline{OE1}$ | I                   | Output Enable 1, Active Low |
| 2   | 1A               | I                   | 1A Input                    |
| 3   | 1Y               | O                   | 1Y Output                   |
| 4   | 2A               | I                   | 2A Input                    |
| 5   | 2Y               | O                   | 2Y Output                   |
| 6   | 3A               | I                   | 3A Input                    |
| 7   | 3Y               | O                   | 3Y Output                   |
| 8   | GND              | —                   | Ground Pin                  |
| 9   | 4Y               | O                   | 4Y Output                   |
| 10  | 4A               | I                   | 4A Input                    |
| 11  | 5Y               | O                   | 5Y Output                   |
| 12  | 5A               | I                   | 5A Input                    |
| 13  | 6Y               | O                   | 6Y Output                   |
| 14  | 6A               | I                   | 6A Input                    |
| 15  | $\overline{OE2}$ | I                   | Output Enable 2, Active Low |
| 16  | V <sub>CC</sub>  | —                   | Power Pin                   |

(1) Signal Types: I = Input, O = Output, I/O = Input or Output.

## 5 Specifications

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

|                  |                                                               |                                                                         | MIN  | MAX | UNIT |
|------------------|---------------------------------------------------------------|-------------------------------------------------------------------------|------|-----|------|
| V <sub>CC</sub>  | DC supply voltage                                             |                                                                         | -0.5 | 7   | V    |
| I <sub>IK</sub>  | DC input diode current                                        | For V <sub>I</sub> < -0.5 V or V <sub>I</sub> > V <sub>CC</sub> + 0.5 V |      | ±20 | mA   |
| I <sub>OK</sub>  | DC output diode current                                       | For V <sub>O</sub> < -0.5 V or V <sub>O</sub> > V <sub>CC</sub> + 0.5 V |      | ±20 | mA   |
| I <sub>O</sub>   | DC drain current, per output                                  | For -0.5 V < V <sub>O</sub> < V <sub>CC</sub> + 0.5 V                   |      | ±35 | mA   |
| I <sub>O</sub>   | DC output source or sink current per output pin               | For V <sub>O</sub> > -0.5 V or V <sub>O</sub> < V <sub>CC</sub> + 0.5 V |      | ±25 | mA   |
| I <sub>CC</sub>  | DC V <sub>CC</sub> or ground current                          |                                                                         |      | ±50 | mA   |
| T <sub>J</sub>   | Maximum junction temperature                                  |                                                                         |      | 150 | °C   |
| T <sub>stg</sub> | Maximum storage temperature range                             |                                                                         | -65  | 150 | °C   |
|                  | Maximum lead temperature (soldering 10s)SOIC - lead tips only |                                                                         |      | 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 Operating Conditions

|                                 |                            |           | MIN | MAX             | UNIT |
|---------------------------------|----------------------------|-----------|-----|-----------------|------|
| V <sub>CC</sub>                 | Supply voltage range       | HC Types  | 2   | 6               | V    |
|                                 |                            | HCT Types | 4.5 | 5.5             | V    |
| V <sub>I</sub> , V <sub>O</sub> | DC input or output voltage |           | 0   | V <sub>CC</sub> | V    |
|                                 | Input rise and fall time   | 2 V       |     | 1000            | ns   |
|                                 |                            | 4.5 V     |     | 500             |      |
|                                 |                            | 6 V       |     | 400             |      |
| T <sub>A</sub>                  | Temperature range          |           | -55 | 125             | °C   |

### 5.3 Thermal Information

| THERMAL METRIC   |                                                       | N (PDIP) | D (SOIC) | UNIT |
|------------------|-------------------------------------------------------|----------|----------|------|
|                  |                                                       | 16 PINS  | 16 PINS  |      |
| R <sub>θJA</sub> | Junction-to-ambient thermal resistance <sup>(1)</sup> | 67       | 73       | °C/W |

- (1) The package thermal impedance is calculated in accordance with JESD 51 - 7

## 5.4 Electrical Characteristics

| PARAMETER                                |                                                                     | TEST CONDITIONS                    |                                         | V <sub>CC</sub><br>(V) | 25°C       |     |      | –40°C to 85°C |     | –55°C to 125°C |     | UNIT |
|------------------------------------------|---------------------------------------------------------------------|------------------------------------|-----------------------------------------|------------------------|------------|-----|------|---------------|-----|----------------|-----|------|
|                                          |                                                                     | V <sub>I</sub> (V)                 | I <sub>O</sub> (mA)                     |                        | MIN        | TYP | MAX  | MIN           | MAX | MIN            | MAX |      |
| HC TYPES                                 |                                                                     |                                    |                                         |                        |            |     |      |               |     |                |     |      |
| V <sub>IH</sub> High level input voltage |                                                                     |                                    |                                         | 2                      | 1.5        |     |      | 1.5           |     | 1.5            |     | V    |
|                                          |                                                                     |                                    |                                         | 4.5                    | 3.15       |     |      | 3.15          |     | 3.15           |     |      |
|                                          |                                                                     |                                    |                                         | 6                      | 4.2        |     |      | 4.2           |     | 4.2            |     |      |
| V <sub>IL</sub> Low level input voltage  |                                                                     |                                    |                                         | 2                      | 0.5        |     |      | 0.5           |     | 0.5            |     | V    |
|                                          |                                                                     |                                    |                                         | 4.5                    | 1.35       |     |      | 1.35          |     | 1.35           |     |      |
|                                          |                                                                     |                                    |                                         | 6                      | 1.8        |     |      | 1.8           |     | 1.8            |     |      |
| V <sub>OH</sub>                          | High level output voltage CMOS loads                                | V <sub>IH</sub> or V <sub>IL</sub> | –0.02                                   | 2                      | 1.9        |     |      | 1.9           |     | 1.9            |     | V    |
|                                          |                                                                     |                                    | –0.02                                   | 4.5                    | 4.4        |     |      | 4.4           |     | 4.4            |     |      |
|                                          |                                                                     |                                    | –0.02                                   | 6                      | 5.9        |     |      | 5.9           |     | 5.9            |     |      |
|                                          | High level output voltage TTL loads                                 |                                    | –6                                      | 4.5                    | 3.98       |     |      | 3.84          |     | 3.7            |     |      |
|                                          |                                                                     |                                    | –7.8                                    | 6                      | 5.48       |     |      | 5.34          |     | 5.2            |     |      |
| V <sub>OL</sub>                          | Low level output voltage CMOS loads                                 | V <sub>IH</sub> or V <sub>IL</sub> | 0.02                                    | 2                      | 0.1        |     |      | 0.1           |     | 0.1            |     | V    |
|                                          |                                                                     |                                    | 0.02                                    | 4.5                    | 0.1        |     |      | 0.1           |     | 0.1            |     |      |
|                                          |                                                                     |                                    | 0.02                                    | 6                      | 0.1        |     |      | 0.1           |     | 0.1            |     |      |
|                                          | Low level output voltage TTL loads                                  | 6                                  | 4.5                                     | 0.26                   |            |     | 0.33 |               | 0.4 |                |     |      |
|                                          |                                                                     | 7.8                                | 6                                       | 0.26                   |            |     | 0.33 |               | 0.4 |                |     |      |
| I <sub>I</sub>                           | Input leakage current                                               | V <sub>CC</sub> or GND             |                                         | 6                      | ±0.1       |     |      | ±1            |     | ±1             |     | µA   |
| I <sub>CC</sub>                          | Quiescent device current                                            | V <sub>CC</sub> or GND             | 0                                       | 6                      | 8          |     |      | 80            |     | 160            |     | µA   |
| I <sub>OZ</sub>                          | Three-state leakage current                                         | V <sub>IH</sub> or V <sub>IL</sub> | V <sub>O</sub> = V <sub>CC</sub> or GND | 6                      | ±0.5       |     |      | ±5            |     | ±10            |     | µA   |
| HCT TYPES                                |                                                                     |                                    |                                         |                        |            |     |      |               |     |                |     |      |
| V <sub>IH</sub> High level input voltage |                                                                     |                                    |                                         | 4.5 to 5.5             | 2          |     |      | 2             |     | 2              |     | V    |
| V <sub>IL</sub> Low level input voltage  |                                                                     |                                    |                                         | 4.5 to 5.5             | 0.8        |     |      | 0.8           |     | 0.8            |     | V    |
| V <sub>OH</sub>                          | High level output voltage CMOS loads                                | V <sub>IH</sub> or V <sub>IL</sub> | –0.02                                   | 4.5                    | 4.4        |     |      | 4.4           |     | 4.4            |     | V    |
|                                          | High level output voltage TTL loads                                 |                                    | –4                                      | 4.5                    | 3.98       |     |      | 3.84          |     | 3.7            |     |      |
| V <sub>OL</sub>                          | Low level output voltage CMOS loads                                 | V <sub>IH</sub> or V <sub>IL</sub> | 0.02                                    | 4.5                    | 0.1        |     |      | 0.1           |     | 0.1            |     | V    |
|                                          | Low level output voltage TTL loads                                  |                                    | 4                                       | 4.5                    | 0.26       |     |      | 0.33          |     | 0.4            |     |      |
| I <sub>I</sub>                           | Input leakage current                                               | V <sub>CC</sub> or GND             | 0                                       | 5.5                    | ±0.1       |     |      | ±1            |     | ±1             |     | µA   |
| I <sub>CC</sub>                          | Quiescent device current                                            | V <sub>CC</sub> or GND             | 0                                       | 5.5                    | 8          |     |      | 80            |     | 160            |     | µA   |
| ΔI <sub>CC</sub>                         | Additional supply current per input pin: 1 Unit Load <sup>(1)</sup> | V <sub>CC</sub> – 2.1              |                                         | 4.5 to 5.5             | 100    360 |     |      | 450           |     | 490            |     | µA   |
| I <sub>OZ</sub>                          | Three-state leakage current                                         | V <sub>IL</sub> or V <sub>IH</sub> | V <sub>O</sub> = V <sub>CC</sub> or GND | 5.5                    | ±0.5       |     |      | ±5            |     | ±10            |     | µA   |

(1) For dual-supply systems theoretical worst case (V<sub>I</sub> = 2.4 V, V<sub>CC</sub> = 5.5 V) specification is 1.8 mA

## 5.5 HCT Input Loading Table

| Input            | Unit Loads <sup>(1)</sup> |
|------------------|---------------------------|
| $\overline{OE}1$ | 0.6                       |
| All others       | 0.55                      |

(1) Unit Load is  $\Delta I_{CC}$  limit specified in [Section 5.4](#), e.g., 360  $\mu$ A max at 25°C.

## 5.6 Switching Characteristics

$t_r, t_f = 6$  ns

| PARAMETER                           |                                                              | TEST<br>CONDITIONS     | V <sub>CC</sub> (V) | 25°C |     | 40°C to 85°C | 55°C to 125°C | UNIT |
|-------------------------------------|--------------------------------------------------------------|------------------------|---------------------|------|-----|--------------|---------------|------|
|                                     |                                                              |                        |                     | TYP  | MAX | MAX          | MAX           |      |
| HC TYPES                            |                                                              |                        |                     |      |     |              |               |      |
| t <sub>PLH</sub> , t <sub>PHL</sub> | Propagation delay, data to outputs<br>HC/HCT 365             | C <sub>L</sub> = 50 pF | 2                   | 105  | 130 | 160          | ns            |      |
|                                     |                                                              |                        | 4.5                 | 21   | 26  | 32           | ns            |      |
|                                     |                                                              |                        | 6                   | 18   | 22  | 27           | ns            |      |
|                                     |                                                              | C <sub>L</sub> = 15 pF | 5                   | 8    |     |              | ns            |      |
| t <sub>PLH</sub> , t <sub>PHL</sub> | Propagation delay, data to outputs<br>HC 366                 | C <sub>L</sub> = 50 pF | 2                   | 110  | 140 | 165          | ns            |      |
|                                     |                                                              |                        | 4.5                 | 22   | 28  | 33           | ns            |      |
|                                     |                                                              |                        | 6                   | 19   | 24  | 28           | ns            |      |
|                                     |                                                              | C <sub>L</sub> = 15 pF | 5                   | 9    |     |              | ns            |      |
| t <sub>PLH</sub> , t <sub>PHL</sub> | Propagation delay time, output enable and disable to outputs | C <sub>L</sub> = 50 pF | 2                   | 150  | 190 | 225          | ns            |      |
|                                     |                                                              |                        | 4.5                 | 30   | 38  | 45           | ns            |      |
|                                     |                                                              |                        | 6                   | 26   | 33  | 38           | ns            |      |
|                                     |                                                              | C <sub>L</sub> = 15 pF | 5                   | 12   |     |              | ns            |      |
| t <sub>TLH</sub> , t <sub>THL</sub> | Output transition time                                       | C <sub>L</sub> = 50 pF | 2                   | 60   | 75  | 90           | ns            |      |
|                                     |                                                              |                        | 4.5                 | 12   | 15  | 18           | ns            |      |
|                                     |                                                              |                        | 6                   | 10   | 13  | 15           | ns            |      |
| C <sub>I</sub>                      | Input capacitance                                            |                        |                     | 10   | 10  | 10           | pF            |      |
| C <sub>O</sub>                      | Three-state ouput capacitance                                |                        |                     | 20   | 20  | 20           | pF            |      |
| C <sub>PD</sub>                     | Power dissipation capacitance <sup>(1)(2)</sup>              |                        | 5                   | 40   |     |              | pF            |      |
| HCT TYPES                           |                                                              |                        |                     |      |     |              |               |      |
| t <sub>PLH</sub> , t <sub>PHL</sub> | Propagation delay, data to outputs<br>HC/HCT 365             | C <sub>L</sub> = 50 pF | 4.5                 | 25   | 31  | 38           | ns            |      |
|                                     |                                                              |                        |                     |      |     |              | ns            |      |
|                                     |                                                              | C <sub>L</sub> = 15 pF | 5                   | 9    |     |              |               | ns   |
|                                     |                                                              |                        |                     |      |     |              |               | ns   |
| t <sub>PLH</sub> , t <sub>PHL</sub> | Propagation delay, data to outputs<br>HC 366                 | C <sub>L</sub> = 50 pF | 4.5                 | 27   | 34  | 41           | ns            |      |
|                                     |                                                              | C <sub>L</sub> = 15 pF | 5                   | 11   |     |              | ns            |      |
| t <sub>PLH</sub> , t <sub>PHL</sub> | Propagation delay time, output enable and disable to ouputs  | C <sub>L</sub> = 50 pF | 4.5                 | 35   | 44  | 53           | ns            |      |
|                                     |                                                              | C <sub>L</sub> = 15 pF | 5                   | 14   |     |              | ns            |      |
| t <sub>TLH</sub> , t <sub>THL</sub> | Output transition time                                       | C <sub>L</sub> = 50 pF | 4.5                 | 12   | 15  | 18           | ns            |      |
| C <sub>IN</sub>                     | Input capacitance                                            |                        |                     | 10   | 10  | 10           | pF            |      |
| C <sub>O</sub>                      | Three-stage capacitance                                      |                        |                     | 20   | 20  | 20           | pF            |      |
| C <sub>PD</sub>                     | Power dissipation capacitance <sup>(1)(2)</sup>              |                        | 5                   | 42   |     |              | pF            |      |

(1)  $C_{PD}$  is used to determine the dynamic power consumption, per buffer.

(2)  $P_D = V_{CC}^2 f_i (C_{PD} + C_I)$  where  $f_i$  = input frequency,  $C_L$  = output load capacitance,  $V_{CC}$  = supply voltage.

## 6 Parameter Measurement Information

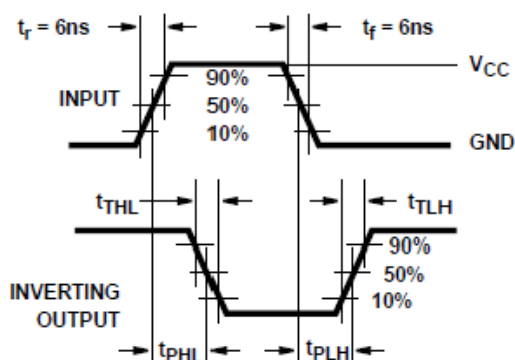


Figure 6-1. HC Transition Times and Propagation Delay Times, Combination Logic

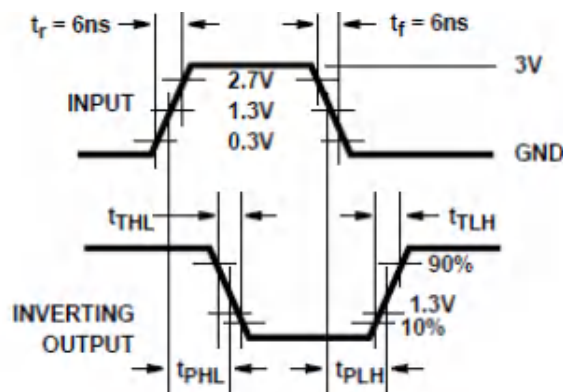


Figure 6-2. HCT Transition Times and Propagation Delay Times, Combination Logic

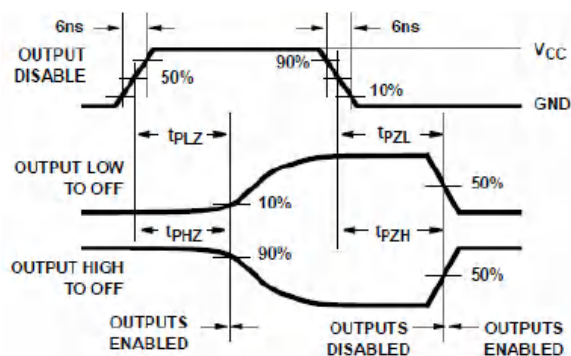


Figure 6-3. HC Three-State Propagation Delay Waveform

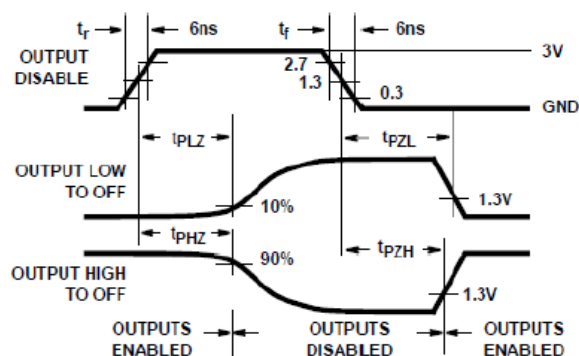
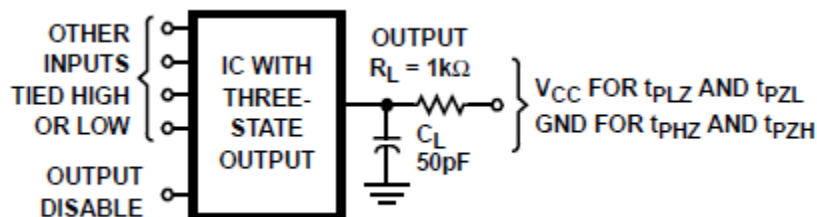


Figure 6-4. HCT Three-State Propagation Delay Waveform



- A. 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  $R_L = 1\text{ k}\Omega$  to  $V_{CC}$ ,  $C_L = 50\text{ pF}$ .

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

## 7 Detailed Description

### 7.1 Overview

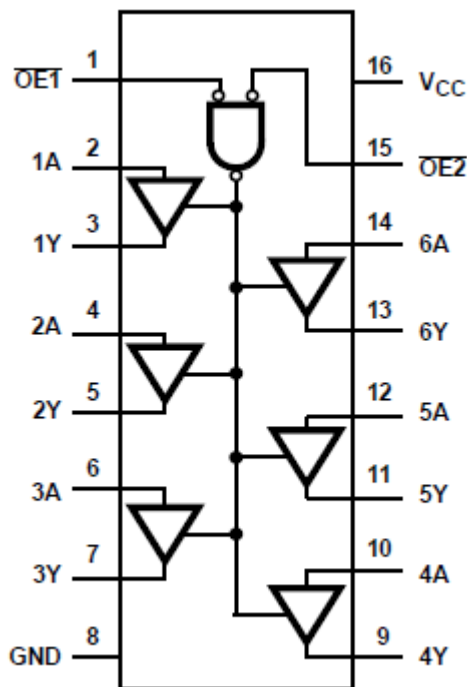
The 'HC365, 'HCT365, and 'HC366 silicon gate CMOS three-state buffers are general purpose high-speed non-inverting and inverting buffers. They have high drive current outputs which enable high speed operation even when driving large bus capacitances. These circuits possess the low power dissipation of 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 'HC365 and 'HCT365 are non-inverting buffers, whereas the 'HC366 is an inverting buffer. These devices have two three-state control inputs ( $\overline{OE1}$  and  $\overline{OE2}$ ) which are NORed together to control all six gates.

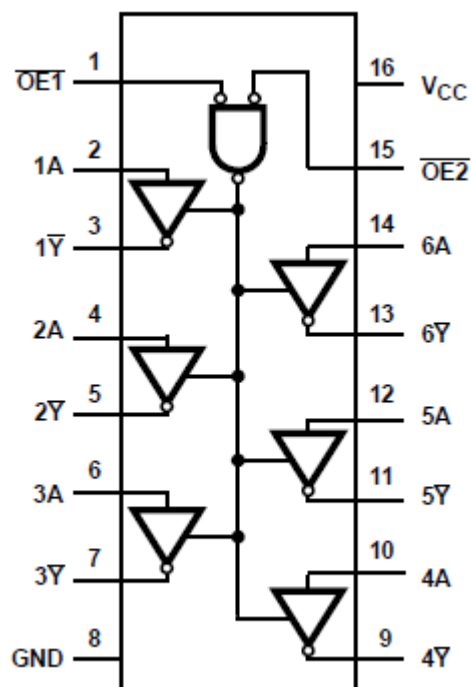
The 'HCT365 logic families are speed, function and pin compatible with the standard LS logic family.

### 7.2 Functional Block Diagram

#### Functional Diagrams



HC365, HCT365



HC366

### 7.3 Device Functional Modes

Table 7-1. Function Table

| INPUTS <sup>(1)</sup> |      |   | OUTPUTS (Y) <sup>(2)</sup> |         |
|-----------------------|------|---|----------------------------|---------|
| OE 1                  | OE 2 | A | HC/HCT 365                 | HCT 366 |
| L                     | L    | L | L                          | H       |
| L                     | L    | H | H                          | L       |
| X                     | H    | X | Z                          | Z       |
| H                     | X    | X | Z                          | Z       |

(1) H = High Voltage Level, L = Low Voltage Level, X = Don't Care

(2) H = Driving High, L = Driving Low, Z = High Impedance 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- $\mu$ F capacitor is recommended for this device. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. The 0.1- $\mu$ F and 1- $\mu$ F 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](http://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<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="#">CD54HC365F3A</a>  | Active        | Production           | CDIP (J)   16  | 25   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | 8500101EA<br>CD54HC365F3A      |
| CD54HC365F3A.A                | Active        | Production           | CDIP (J)   16  | 25   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | 8500101EA<br>CD54HC365F3A      |
| <a href="#">CD54HC366F3A</a>  | Active        | Production           | CDIP (J)   16  | 25   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | 5962-8682801EA<br>CD54HC366F3A |
| CD54HC366F3A.A                | Active        | Production           | CDIP (J)   16  | 25   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | 5962-8682801EA<br>CD54HC366F3A |
| <a href="#">CD54HCT365F3A</a> | Active        | Production           | CDIP (J)   16  | 25   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | CD54HCT365F3A                  |
| CD54HCT365F3A.A               | Active        | Production           | CDIP (J)   16  | 25   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | CD54HCT365F3A                  |
| <a href="#">CD74HC365E</a>    | Active        | Production           | PDIP (N)   16  | 25   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | -55 to 125   | CD74HC365E                     |
| CD74HC365E.A                  | Active        | Production           | PDIP (N)   16  | 25   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | -55 to 125   | CD74HC365E                     |
| <a href="#">CD74HC365M</a>    | Obsolete      | Production           | SOIC (D)   16  | -                     | -           | Call TI                              | Call TI                           | -55 to 125   | HC365M                         |
| <a href="#">CD74HC365M96</a>  | Active        | Production           | SOIC (D)   16  | 2500   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -55 to 125   | HC365M                         |
| CD74HC365M96.A                | Active        | Production           | SOIC (D)   16  | 2500   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -55 to 125   | HC365M                         |
| <a href="#">CD74HC365MT</a>   | Obsolete      | Production           | SOIC (D)   16  | -                     | -           | Call TI                              | Call TI                           | -55 to 125   | HC365M                         |
| <a href="#">CD74HC366E</a>    | Active        | Production           | PDIP (N)   16  | 25   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | -55 to 125   | CD74HC366E                     |
| CD74HC366E.A                  | Active        | Production           | PDIP (N)   16  | 25   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | -55 to 125   | CD74HC366E                     |
| <a href="#">CD74HC366M</a>    | Obsolete      | Production           | SOIC (D)   16  | -                     | -           | Call TI                              | Call TI                           | -55 to 125   | HC366M                         |
| <a href="#">CD74HC366M96</a>  | Active        | Production           | SOIC (D)   16  | 2500   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -55 to 125   | HC366M                         |
| CD74HC366M96.A                | Active        | Production           | SOIC (D)   16  | 2500   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -55 to 125   | HC366M                         |
| <a href="#">CD74HCT365E</a>   | Active        | Production           | PDIP (N)   16  | 25   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | -55 to 125   | CD74HCT365E                    |
| CD74HCT365E.A                 | Active        | Production           | PDIP (N)   16  | 25   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | -55 to 125   | CD74HCT365E                    |
| <a href="#">CD74HCT365M</a>   | Obsolete      | Production           | SOIC (D)   16  | -                     | -           | Call TI                              | Call TI                           | -55 to 125   | HCT365M                        |
| <a href="#">CD74HCT365M96</a> | Active        | Production           | SOIC (D)   16  | 2500   LARGE T&R      | Yes         | NIPDAU   SN                          | Level-1-260C-UNLIM                | -55 to 125   | HCT365M                        |
| CD74HCT365M96.A               | Active        | Production           | SOIC (D)   16  | 2500   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | -55 to 125   | HCT365M                        |

<sup>(1)</sup> **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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**OTHER QUALIFIED VERSIONS OF CD54HC365, CD54HC366, CD54HCT365, CD74HC365, CD74HC366, CD74HCT365 :**

- Catalog : [CD74HC365](#), [CD74HC366](#), [CD74HCT365](#)
- Automotive : [CD74HC366-Q1](#), [CD74HC366-Q1](#)
- Military : [CD54HC365](#), [CD54HC366](#), [CD54HCT365](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

- Military - QML certified for Military and Defense Applications

## 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 |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| CD74HC365M96  | SOIC         | D               | 16   | 2500 | 330.0              | 16.4               | 6.5     | 10.3    | 2.1     | 8.0     | 16.0   | Q1            |
| CD74HC366M96  | SOIC         | D               | 16   | 2500 | 330.0              | 16.4               | 6.5     | 10.3    | 2.1     | 8.0     | 16.0   | Q1            |
| CD74HCT365M96 | SOIC         | D               | 16   | 2500 | 330.0              | 16.4               | 6.5     | 10.3    | 2.1     | 8.0     | 16.0   | Q1            |

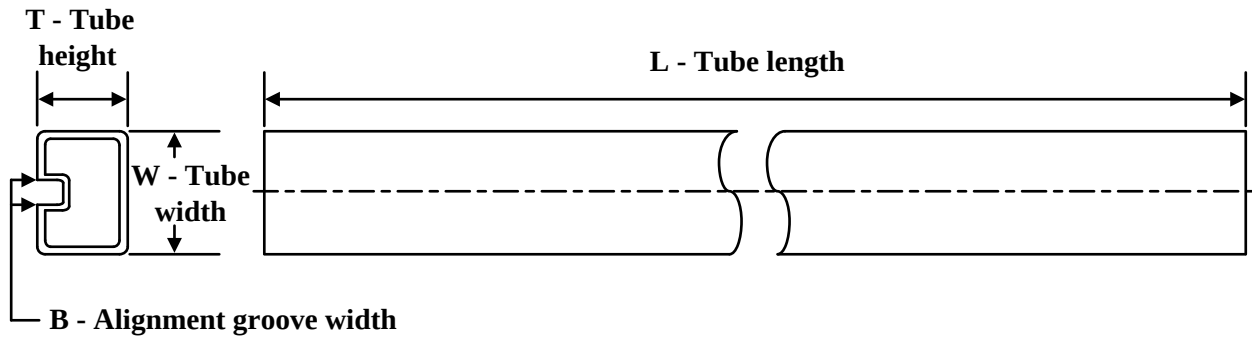
## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

| Device        | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| CD74HC365M96  | SOIC         | D               | 16   | 2500 | 353.0       | 353.0      | 32.0        |
| CD74HC366M96  | SOIC         | D               | 16   | 2500 | 353.0       | 353.0      | 32.0        |
| CD74HCT365M96 | SOIC         | D               | 16   | 2500 | 353.0       | 353.0      | 32.0        |

## TUBE



\*All dimensions are nominal

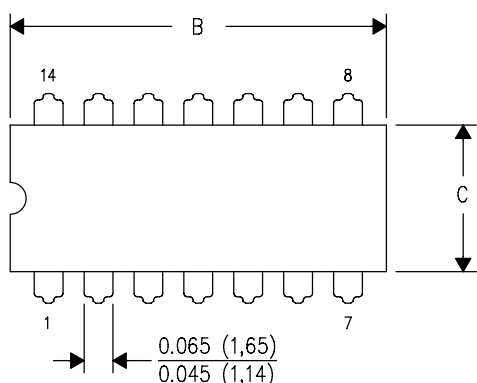
| Device        | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|---------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| CD74HC365E    | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HC365E    | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HC365E.A  | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HC365E.A  | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HC366E    | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HC366E    | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HC366E.A  | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HC366E.A  | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HCT365E   | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HCT365E   | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HCT365E.A | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HCT365E.A | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |



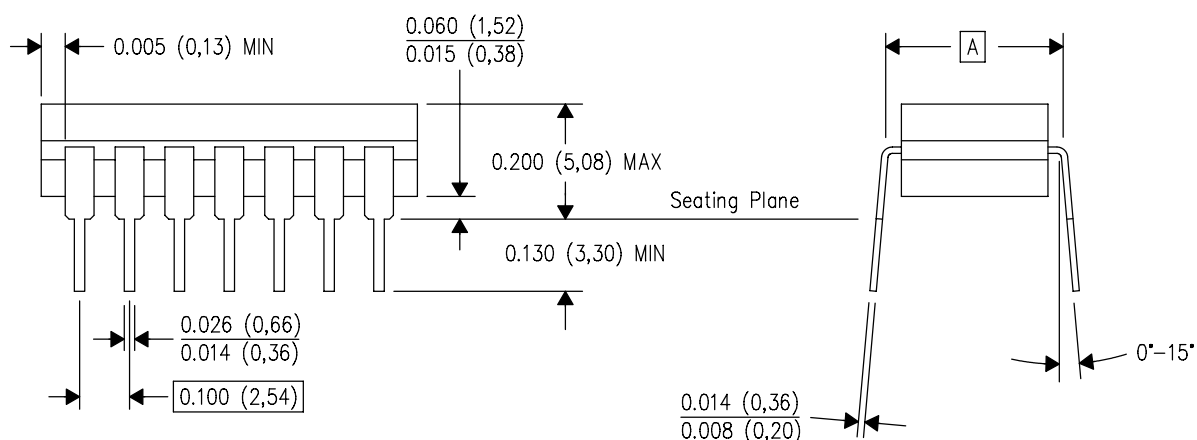
J (R-GDIP-T\*\*)

14 LEADS SHOWN

# CERAMIC DUAL IN-LINE PACKAGE



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



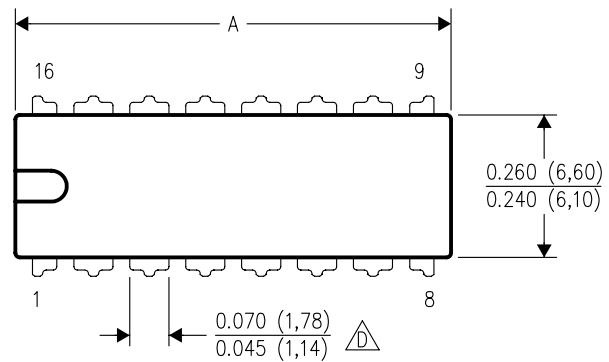
4040083/F 03/03

- 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.

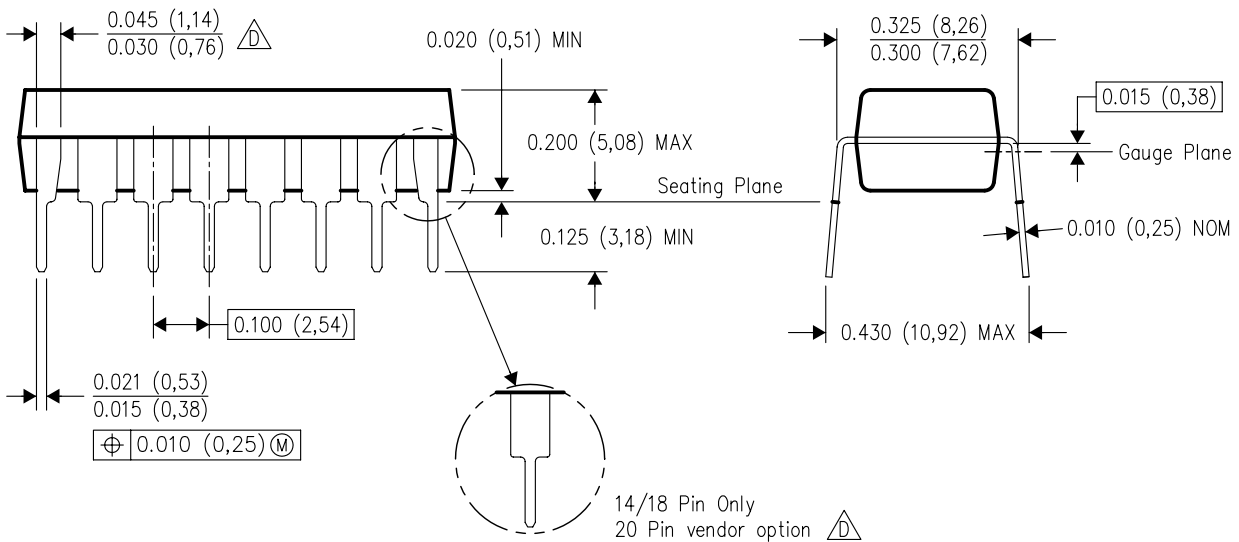
## N (R-PDIP-T\*\*)

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               |



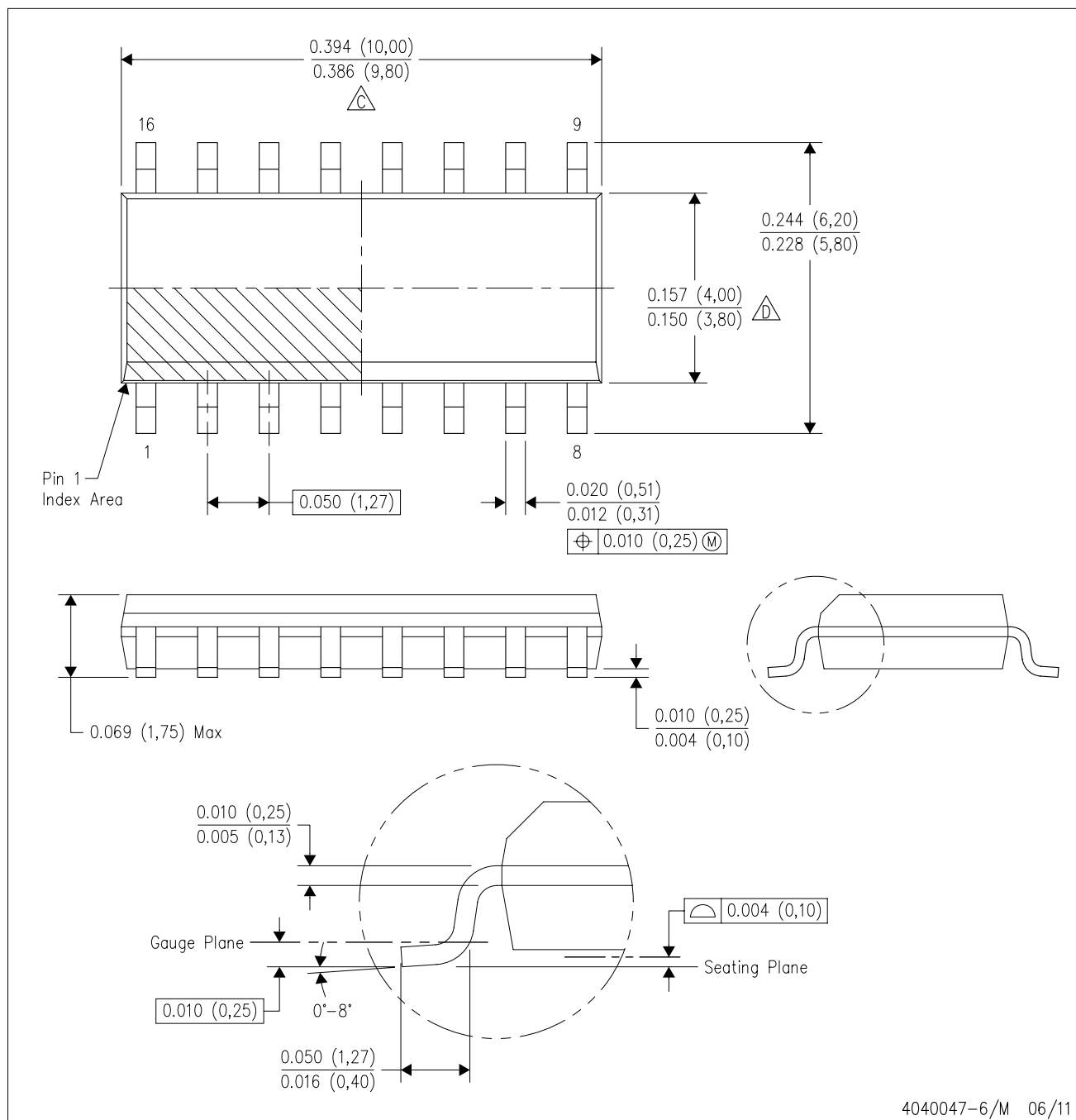
14/18 Pin Only  
20 Pin vendor option

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.

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.
  - $\triangle C$  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.
  - $\triangle D$  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.

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