

September 1997 - Revised June 2004

## High-Speed CMOS Logic 4- to 16-Line Decoder/Demultiplexer

### Features

- Two Enable Inputs to Facilitate Demultiplexing and Cascading Functions
- 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
  - 2V to 6V Operation
  - High Noise Immunity:  $N_{IL} = 30\%$ ,  $N_{IH} = 30\%$  of  $V_{CC}$  at  $V_{CC} = 5V$
- HCT Types
  - 4.5V to 5.5V Operation
  - Direct LSTTL Input Logic Compatibility,  $V_{IL} = 0.8V$  (Max),  $V_{IH} = 2V$  (Min)
  - CMOS Input Compatibility,  $I_I \leq 1\mu A$  at  $V_{OL}$ ,  $V_{OH}$

### Description

The 'HC154 and 'HCT154 are 4- to 16-line decoders/demultiplexers with two enable inputs, E1 and E2.

A High on either enable input forces the output into the High state. The demultiplexing function is performed by using the four input lines, A0 to A3, to select the output lines  $\overline{Y0}$  to  $\overline{Y15}$ , and using one enable as the data input while holding the other enable low.

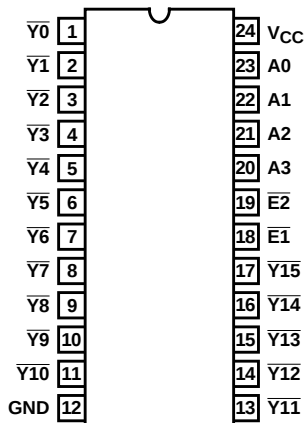
### Ordering Information

| PART NUMBER   | TEMP. RANGE (°C) | PACKAGE      |
|---------------|------------------|--------------|
| CD54HC154F3A  | -55 to 125       | 24 Ld CERDIP |
| CD54HCT154F3A | -55 to 125       | 24 Ld CERDIP |
| CD74HC154E    | -55 to 125       | 24 Ld PDIP   |
| CD74HC154EN   | -55 to 125       | 24 Ld PDIP   |
| CD74HC154M    | -55 to 125       | 24 Ld SOIC   |
| CD74HC154M96  | -55 to 125       | 24 Ld SOIC   |
| CD74HCT154E   | -55 to 125       | 24 Ld PDIP   |
| CD74HCT154EN  | -55 to 125       | 24 Ld PDIP   |
| CD74HCT154M   | -55 to 125       | 24 Ld SOIC   |
| CD74HCT154M96 | -55 to 125       | 24 Ld SOIC   |

NOTE: When ordering, use the entire part number. The suffix 96 denotes tape and reel.

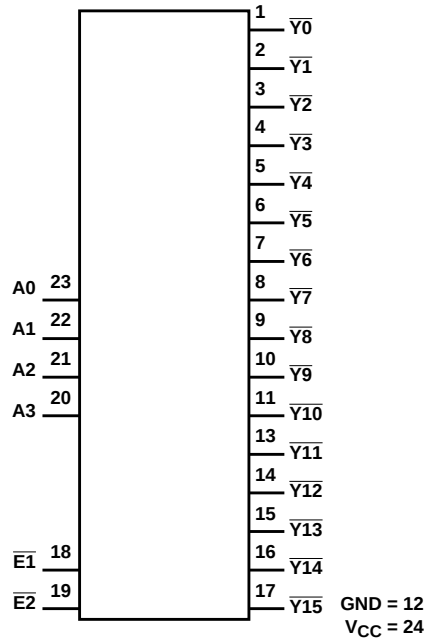
### Pinout

CD54HC154, CD54HCT154  
(CERDIP)  
CD74HC154, CD74HCT154  
(PDIP, SOIC)  
TOP VIEW



# CD54HC154, CD74HC154, CD54HCT154, CD74HCT154

## Functional Diagram



TRUTH TABLE

| INPUTS          |                 |    |    |    |    | OUTPUTS         |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |                  |                  |                  |                  |                  |
|-----------------|-----------------|----|----|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|
| $\overline{E1}$ | $\overline{E2}$ | A3 | A2 | A1 | A0 | $\overline{Y0}$ | $\overline{Y1}$ | $\overline{Y2}$ | $\overline{Y3}$ | $\overline{Y4}$ | $\overline{Y5}$ | $\overline{Y6}$ | $\overline{Y7}$ | $\overline{Y8}$ | $\overline{Y9}$ | $\overline{Y10}$ | $\overline{Y11}$ | $\overline{Y12}$ | $\overline{Y13}$ | $\overline{Y14}$ | $\overline{Y15}$ |
| L               | L               | L  | L  | L  | L  | L               | H               | H               | H               | H               | H               | H               | H               | H               | H               | H                | H                | H                | H                | H                | H                |
| L               | L               | L  | L  | L  | H  | H               | L               | H               | H               | H               | H               | H               | H               | H               | H               | H                | H                | H                | H                | H                | H                |
| L               | L               | L  | L  | H  | L  | H               | H               | L               | H               | H               | H               | H               | H               | H               | H               | H                | H                | H                | H                | H                | H                |
| L               | L               | L  | L  | H  | H  | H               | H               | H               | L               | H               | H               | H               | H               | H               | H               | H                | H                | H                | H                | H                | H                |
| L               | L               | L  | H  | L  | L  | H               | H               | H               | H               | L               | H               | H               | H               | H               | H               | H                | H                | H                | H                | H                | H                |
| L               | L               | L  | H  | L  | H  | H               | H               | H               | H               | H               | L               | H               | H               | H               | H               | H                | H                | H                | H                | H                | H                |
| L               | L               | L  | H  | H  | L  | H               | H               | H               | H               | H               | H               | L               | H               | H               | H               | H                | H                | H                | H                | H                | H                |
| L               | L               | L  | H  | H  | H  | H               | H               | H               | H               | H               | H               | H               | L               | H               | H               | H                | H                | H                | H                | H                | H                |
| L               | L               | H  | L  | L  | L  | H               | H               | H               | H               | H               | H               | H               | H               | L               | H               | H                | H                | H                | H                | H                | H                |
| L               | L               | H  | L  | L  | H  | H               | H               | H               | H               | H               | H               | H               | H               | H               | L               | H                | H                | H                | H                | H                | H                |
| L               | L               | H  | L  | H  | L  | H               | H               | H               | H               | H               | H               | H               | H               | H               | H               | L                | H                | H                | H                | H                | H                |
| L               | L               | H  | L  | H  | H  | H               | H               | H               | H               | H               | H               | H               | H               | H               | H               | H                | L                | H                | H                | H                | H                |
| L               | L               | H  | H  | L  | L  | H               | H               | H               | H               | H               | H               | H               | H               | H               | H               | H                | H                | L                | H                | H                | H                |
| L               | L               | H  | H  | L  | H  | H               | H               | H               | H               | H               | H               | H               | H               | H               | H               | H                | H                | H                | L                | H                | H                |
| L               | L               | H  | H  | H  | L  | H               | H               | H               | H               | H               | H               | H               | H               | H               | H               | H                | H                | H                | H                | L                | H                |
| L               | L               | H  | H  | H  | H  | H               | H               | H               | H               | H               | H               | H               | H               | H               | H               | H                | H                | H                | H                | H                | L                |
| L               | H               | X  | X  | X  | X  | H               | H               | H               | H               | H               | H               | H               | H               | H               | H               | H                | H                | H                | H                | H                | H                |
| H               | L               | X  | X  | X  | X  | H               | H               | H               | H               | H               | H               | H               | H               | H               | H               | H                | H                | H                | H                | H                | H                |
| H               | H               | X  | X  | X  | X  | H               | H               | H               | H               | H               | H               | H               | H               | H               | H               | H                | H                | H                | H                | H                | H                |

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

# CD54HC154, CD74HC154, CD54HCT154, CD74HCT154

## Absolute Maximum Ratings

|                                                        |             |
|--------------------------------------------------------|-------------|
| DC Supply Voltage, $V_{CC}$                            | -0.5V to 7V |
| DC Input Diode Current, $I_{IK}$                       |             |
| For $V_I < -0.5V$ or $V_I > V_{CC} + 0.5V$             | $\pm 20mA$  |
| DC Output Diode Current, $I_{OK}$                      |             |
| For $V_O < -0.5V$ or $V_O > V_{CC} + 0.5V$             | $\pm 20mA$  |
| DC Output Source or Sink Current per Output Pin, $I_O$ |             |
| For $V_O > -0.5V$ or $V_O < V_{CC} + 0.5V$             | $\pm 25mA$  |
| DC $V_{CC}$ or Ground Current, $I_{CC}$ or $I_{GND}$   | $\pm 50mA$  |

## Thermal Information

|                                          |                                    |
|------------------------------------------|------------------------------------|
| Thermal Resistance (Typical)             | $\theta_{JA}$ ( $^{\circ}C/W$ )    |
| E (PDIP) Package (.600) (Note 1)         | 67                                 |
| EN (PDIP) Package (.300) (Note 1)        | 67                                 |
| M (SOIC) Package (Note 2)                | 46                                 |
| Maximum Junction Temperature             | 150 $^{\circ}C$                    |
| Maximum Storage Temperature Range        | -65 $^{\circ}C$ to 150 $^{\circ}C$ |
| Maximum Lead Temperature (Soldering 10s) | 300 $^{\circ}C$                    |
| (SOIC - Lead Tips Only)                  |                                    |

## Operating Conditions

|                                           |                                    |
|-------------------------------------------|------------------------------------|
| Temperature Range ( $T_A$ )               | -55 $^{\circ}C$ to 125 $^{\circ}C$ |
| Supply Voltage Range, $V_{CC}$            |                                    |
| HC Types                                  | .2V to 6V                          |
| HCT Types                                 | 4.5V to 5.5V                       |
| DC Input or Output Voltage, $V_I$ , $V_O$ | 0V to $V_{CC}$                     |
| Input Rise and Fall Time                  |                                    |
| 2V                                        | 1000ns (Max)                       |
| 4.5V                                      | 500ns (Max)                        |
| 6V                                        | 400ns (Max)                        |

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

## NOTES:

1. The package thermal impedance is calculated in accordance with JESD 51-3.
2. The package thermal impedance is calculated in accordance with JESD 51-7.

## DC Electrical Specifications

| PARAMETER                               | SYMBOL          | TEST CONDITIONS                    |                     | V <sub>CC</sub> (V) | 25°C |     |      | -40°C TO 85°C |      | -55°C TO 125°C |      | UNITS |
|-----------------------------------------|-----------------|------------------------------------|---------------------|---------------------|------|-----|------|---------------|------|----------------|------|-------|
|                                         |                 | V <sub>I</sub> (V)                 | I <sub>O</sub> (mA) |                     | MIN  | TYP | MAX  | MIN           | MAX  | MIN            | MAX  |       |
| HC TYPES                                |                 |                                    |                     |                     |      |     |      |               |      |                |      |       |
| High Level Input Voltage                | V <sub>IH</sub> | -                                  | -                   | 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     |
| Low Level Input Voltage                 | V <sub>IL</sub> | -                                  | -                   | 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     |
| High Level Output Voltage<br>CMOS Loads | V <sub>OH</sub> | 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            | -    | V     |
|                                         |                 |                                    | -0.02               | 6                   | 5.9  | -   | -    | 5.9           | -    | 5.9            | -    | V     |
| High Level Output Voltage<br>TTL Loads  |                 |                                    | -                   | -                   | -    | -   | -    | -             | -    | -              | -    | V     |
|                                         |                 |                                    | -4                  | 4.5                 | 3.98 | -   | -    | 3.84          | -    | 3.7            | -    | V     |
|                                         |                 |                                    | -5.2                | 6                   | 5.48 | -   | -    | 5.34          | -    | 5.2            | -    | V     |
| Low Level Output Voltage<br>CMOS Loads  | V <sub>OL</sub> | 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  | V     |
|                                         |                 |                                    | 0.02                | 6                   | -    | -   | 0.1  | -             | 0.1  | -              | 0.1  | V     |
| Low Level Output Voltage<br>TTL Loads   |                 |                                    | -                   | -                   | -    | -   | -    | -             | -    | -              | -    | V     |
|                                         |                 |                                    | 4                   | 4.5                 | -    | -   | 0.26 | -             | 0.33 | -              | 0.4  | V     |
|                                         |                 |                                    | 5.2                 | 6                   | -    | -   | 0.26 | -             | 0.33 | -              | 0.4  | V     |
| Input Leakage Current                   | I <sub>I</sub>  | V <sub>CC</sub> or GND             | -                   | 6                   | -    | -   | ±0.1 | -             | ±1   | -              | ±1   | μA    |
| Quiescent Device Current                | I <sub>CC</sub> | V <sub>CC</sub> or GND             | 0                   | 6                   | -    | -   | 8    | -             | 80   | -              | 160  | μA    |

# **CD54HC154, CD74HC154, CD54HCT154, CD74HCT154**

## **DC Electrical Specifications (Continued)**

| PARAMETER                                                      | SYMBOL                    | TEST CONDITIONS                    |                     | V <sub>CC</sub> (V) | 25°C |     |      | -40°C TO 85°C |      | -55°C TO 125°C |     | UNITS |
|----------------------------------------------------------------|---------------------------|------------------------------------|---------------------|---------------------|------|-----|------|---------------|------|----------------|-----|-------|
|                                                                |                           | V <sub>I</sub> (V)                 | I <sub>O</sub> (mA) |                     | MIN  | TYP | MAX  | MIN           | MAX  | MIN            | MAX |       |
| HCT TYPES                                                      |                           |                                    |                     |                     |      |     |      |               |      |                |     |       |
| High Level Input Voltage                                       | V <sub>IH</sub>           | -                                  | -                   | 4.5 to 5.5          | 2    | -   | -    | 2             | -    | 2              | -   | V     |
| Low Level Input Voltage                                        | V <sub>IL</sub>           | -                                  | -                   | 4.5 to 5.5          | -    | -   | 0.8  | -             | 0.8  | -              | 0.8 | V     |
| High Level Output Voltage<br>CMOS Loads                        | V <sub>OH</sub>           | V <sub>IH</sub> or V <sub>IL</sub> | -0.02               | 4.5                 | 4.4  | -   | -    | 4.4           | -    | 4.4            | -   | V     |
| High Level Output Voltage<br>TTL Loads                         |                           |                                    | -4                  | 4.5                 | 3.98 | -   | -    | 3.84          | -    | 3.7            | -   | V     |
| Low Level Output Voltage<br>CMOS Loads                         | V <sub>OL</sub>           | V <sub>IH</sub> or V <sub>IL</sub> | 0.02                | 4.5                 | -    | -   | 0.1  | -             | 0.1  | -              | 0.1 | V     |
| Low Level Output Voltage<br>TTL Loads                          |                           |                                    | 4                   | 4.5                 | -    | -   | 0.26 | -             | 0.33 | -              | 0.4 | V     |
| Input Leakage Current                                          | I <sub>I</sub>            | V <sub>CC</sub> and GND            | 0                   | 5.5                 | -    |     | ±0.1 | -             | ±1   | -              | ±1  | μA    |
| Quiescent Device Current                                       | I <sub>CC</sub>           | V <sub>CC</sub> or GND             | 0                   | 5.5                 | -    | -   | 8    | -             | 80   | -              | 160 | μA    |
| Additional Quiescent Device Current Per Input Pin: 1 Unit Load | ΔI <sub>CC</sub> (Note 3) | V <sub>CC</sub> -2.1               | -                   | 4.5 to 5.5          | -    | 100 | 360  | -             | 450  | -              | 490 | μA    |

NOTE:

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

## **HCT Input Loading Table**

| INPUT   | UNIT LOADS |
|---------|------------|
| A0 - A3 | 1.4        |
| E1, E2  | 1.3        |

NOTE: Unit Load is ΔI<sub>CC</sub> limit specified in DC Electrical Table, e.g., 360μA max at 25°C.

## **Switching Specifications** Input t<sub>r</sub>, t<sub>f</sub> = 6ns

| PARAMETER                                             | SYMBOL                              | TEST CONDITIONS       | V <sub>CC</sub> (V) | 25°C |     |     | -40°C TO 85°C |     | -55°C TO 125°C |     | UNITS |
|-------------------------------------------------------|-------------------------------------|-----------------------|---------------------|------|-----|-----|---------------|-----|----------------|-----|-------|
|                                                       |                                     |                       |                     | MIN  | TYP | MAX | MIN           | MAX | MIN            | MAX |       |
| HC TYPES                                              |                                     |                       |                     |      |     |     |               |     |                |     |       |
| Propagation Delay (Figure 1)<br><br>Address to Output | t <sub>PLH</sub> , t <sub>PHL</sub> | C <sub>L</sub> = 50pF | 2                   | -    | -   | 175 | -             | 220 | -              | 265 | ns    |
|                                                       |                                     |                       | 4.5                 | -    | -   | 35  | -             | 44  | -              | 53  | ns    |
|                                                       |                                     | C <sub>L</sub> =15pF  | 5                   | -    | 14  | -   | -             | -   | -              | -   | ns    |
|                                                       |                                     | C <sub>L</sub> = 50pF | 6                   | -    | -   | 30  | -             | 37  | -              | 45  | ns    |

**CD54HC154, CD74HC154, CD54HCT154, CD74HCT154**

**Switching Specifications** Input  $t_r, t_f = 6\text{ns}$  (Continued)

| PARAMETER                                         | SYMBOL             | TEST CONDITIONS     | $V_{CC}$ (V) | 25°C |     |     | -40°C TO 85°C |     | -55°C TO 125°C |     | UNITS |
|---------------------------------------------------|--------------------|---------------------|--------------|------|-----|-----|---------------|-----|----------------|-----|-------|
|                                                   |                    |                     |              | MIN  | TYP | MAX | MIN           | MAX | MIN            | MAX |       |
| $\overline{E1}$ to Output                         | $t_{PLH}, t_{PHL}$ | $C_L = 50\text{pF}$ | 2            | -    | -   | 175 | -             | 220 | -              | 265 | ns    |
|                                                   |                    |                     | 4.5          | -    | -   | 35  | -             | 44  | -              | 53  | ns    |
|                                                   |                    | $C_L = 15\text{pF}$ | 5            | -    | 14  | -   | -             | -   | -              | -   | ns    |
|                                                   |                    | $C_L = 50\text{pF}$ | 6            | -    | -   | 30  | -             | 37  | -              | 45  | ns    |
| $\overline{E2}$ to Output                         | $t_{PLH}, t_{PHL}$ | $C_L = 50\text{pF}$ | 2            | -    | -   | 175 | -             | 220 | -              | 265 | ns    |
|                                                   |                    |                     | 4.5          | -    | -   | 35  | -             | 44  | -              | 53  | ns    |
|                                                   |                    | $C_L = 15\text{pF}$ | 5            | -    | 14  | -   | -             | -   | -              | -   | ns    |
|                                                   |                    | $C_L = 50\text{pF}$ | 6            | -    | -   | 30  | -             | 37  | -              | 45  | ns    |
| Output Transition Time<br>(Figure 1)              | $t_{TLH}, t_{THL}$ | $C_L = 50\text{pF}$ | 2            | -    | -   | 75  | -             | 95  | -              | 110 | ns    |
|                                                   |                    |                     | 4.5          | -    | -   | 15  | -             | 19  | -              | 22  | ns    |
|                                                   |                    |                     | 6            | -    | -   | 13  | -             | 16  | -              | 19  | ns    |
| Input Capacitance                                 | $C_{IN}$           | -                   | -            | -    | -   | 10  | -             | 10  | -              | 10  | pF    |
| Power Dissipation Capacitance<br>(Notes 4, 5)     | $C_{PD}$           | -                   | 5            | -    | 88  | -   | -             | -   | -              | -   | pF    |
| <b>HCT TYPES</b>                                  |                    |                     |              |      |     |     |               |     |                |     |       |
| Propagation Delay (Figure 2)<br>Address to Output | $t_{PLH}, t_{PHL}$ | $C_L = 50\text{pF}$ | 4.5          | -    | -   | 35  | -             | 44  | -              | 53  | ns    |
|                                                   |                    | $C_L = 15\text{pF}$ | 5            | -    | 14  | -   | -             | -   | -              | -   | ns    |
|                                                   |                    | $C_L = 50\text{pF}$ | 4.5          | -    | -   | 34  | -             | 43  | -              | 51  | ns    |
| $\overline{E1}$ to Output                         | $t_{PLH}, t_{PHL}$ | $C_L = 50\text{pF}$ | 4.5          | -    | -   | 34  | -             | 43  | -              | 51  | ns    |
|                                                   |                    | $C_L = 15\text{pF}$ | 5            | -    | 14  | -   | -             | -   | -              | -   | ns    |
| $\overline{E2}$ to Output                         | $t_{PLH}, t_{PHL}$ | $C_L = 50\text{pF}$ | 4.5          | -    | -   | 34  | -             | 43  | -              | 51  | ns    |
|                                                   |                    | $C_L = 15\text{pF}$ | 5            | -    | 14  | -   | -             | -   | -              | -   | ns    |
| Output Transition Time                            | $t_{TLH}, t_{THL}$ | $C_L = 50\text{pF}$ | 4.5          | -    | -   | 15  | -             | 19  | -              | 22  | ns    |
| Input Capacitance                                 | $C_{IN}$           | -                   | -            | -    | -   | 10  | -             | 10  | -              | 10  | pF    |
| Power Dissipation Capacitance<br>(Notes 4, 5)     | $C_{PD}$           | -                   | 5            | -    | 84  | -   | -             | -   | -              | -   | pF    |

NOTES:

- $C_{PD}$  is used to determine the dynamic power consumption, per gate.
- $P_D = V_{CC}^2 f_i (C_{PD} + C_L)$  where  $f_i$  = input frequency,  $C_L$  = output load capacitance,  $V_{CC}$  = supply voltage.

## Test Circuits and Waveforms

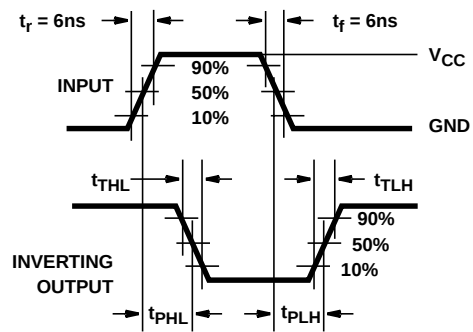


FIGURE 1. HC AND HCU TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

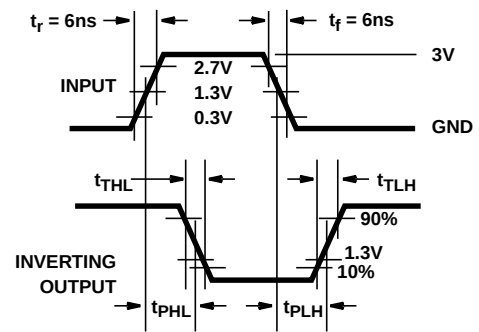


FIGURE 2. HCT TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

**PACKAGING INFORMATION**

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-8670101JA   | ACTIVE                | CDIP         | J               | 24   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| 5962-8682201JA   | ACTIVE                | CDIP         | J               | 24   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| CD54HC154F3A     | ACTIVE                | CDIP         | J               | 24   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| CD54HCT154F3A    | ACTIVE                | CDIP         | J               | 24   | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| CD74HC154E       | ACTIVE                | PDIP         | N               | 24   | 15          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| CD74HC154EE4     | ACTIVE                | PDIP         | N               | 24   | 15          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| CD74HC154EN      | ACTIVE                | PDIP         | NT              | 24   | 15          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| CD74HC154ENE4    | ACTIVE                | PDIP         | NT              | 24   | 15          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| CD74HC154M       | ACTIVE                | SOIC         | DW              | 24   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HC154M96     | ACTIVE                | SOIC         | DW              | 24   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HC154M96E4   | ACTIVE                | SOIC         | DW              | 24   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HC154M96G4   | ACTIVE                | SOIC         | DW              | 24   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HC154ME4     | ACTIVE                | SOIC         | DW              | 24   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HC154MG4     | ACTIVE                | SOIC         | DW              | 24   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HCT154E      | ACTIVE                | PDIP         | N               | 24   | 15          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| CD74HCT154EE4    | ACTIVE                | PDIP         | N               | 24   | 15          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| CD74HCT154EN     | ACTIVE                | PDIP         | NT              | 24   | 15          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| CD74HCT154ENE4   | ACTIVE                | PDIP         | NT              | 24   | 15          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| CD74HCT154M      | ACTIVE                | SOIC         | DW              | 24   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HCT154M96    | ACTIVE                | SOIC         | DW              | 24   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HCT154M96E4  | ACTIVE                | SOIC         | DW              | 24   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HCT154M96G4  | ACTIVE                | SOIC         | DW              | 24   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HCT154ME4    | ACTIVE                | SOIC         | DW              | 24   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| CD74HCT154MG4    | ACTIVE                | SOIC         | DW              | 24   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

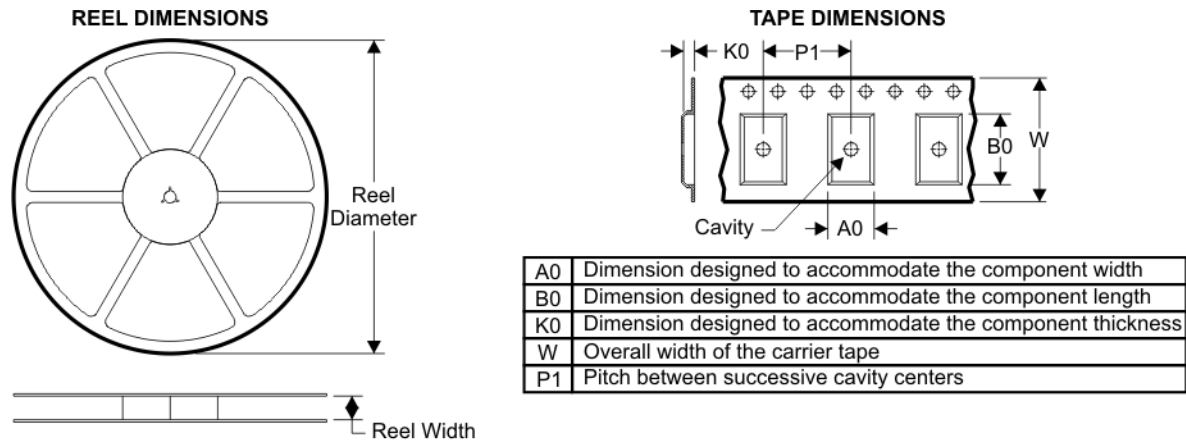
**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

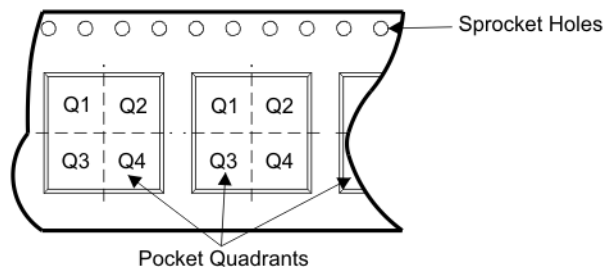
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**TAPE AND REEL BOX INFORMATION**



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



| Device        | Package | Pins | Site    | Reel Diameter (mm) | Reel Width (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---------------|---------|------|---------|--------------------|-----------------|---------|---------|---------|---------|--------|---------------|
| CD74HC154M96  | DW      | 24   | SITE 60 | 330                | 24              | 10.75   | 15.7    | 2.7     | 12      | 24     | Q1            |
| CD74HCT154M96 | DW      | 24   | SITE 60 | 330                | 24              | 10.75   | 15.7    | 2.7     | 12      | 24     | Q1            |

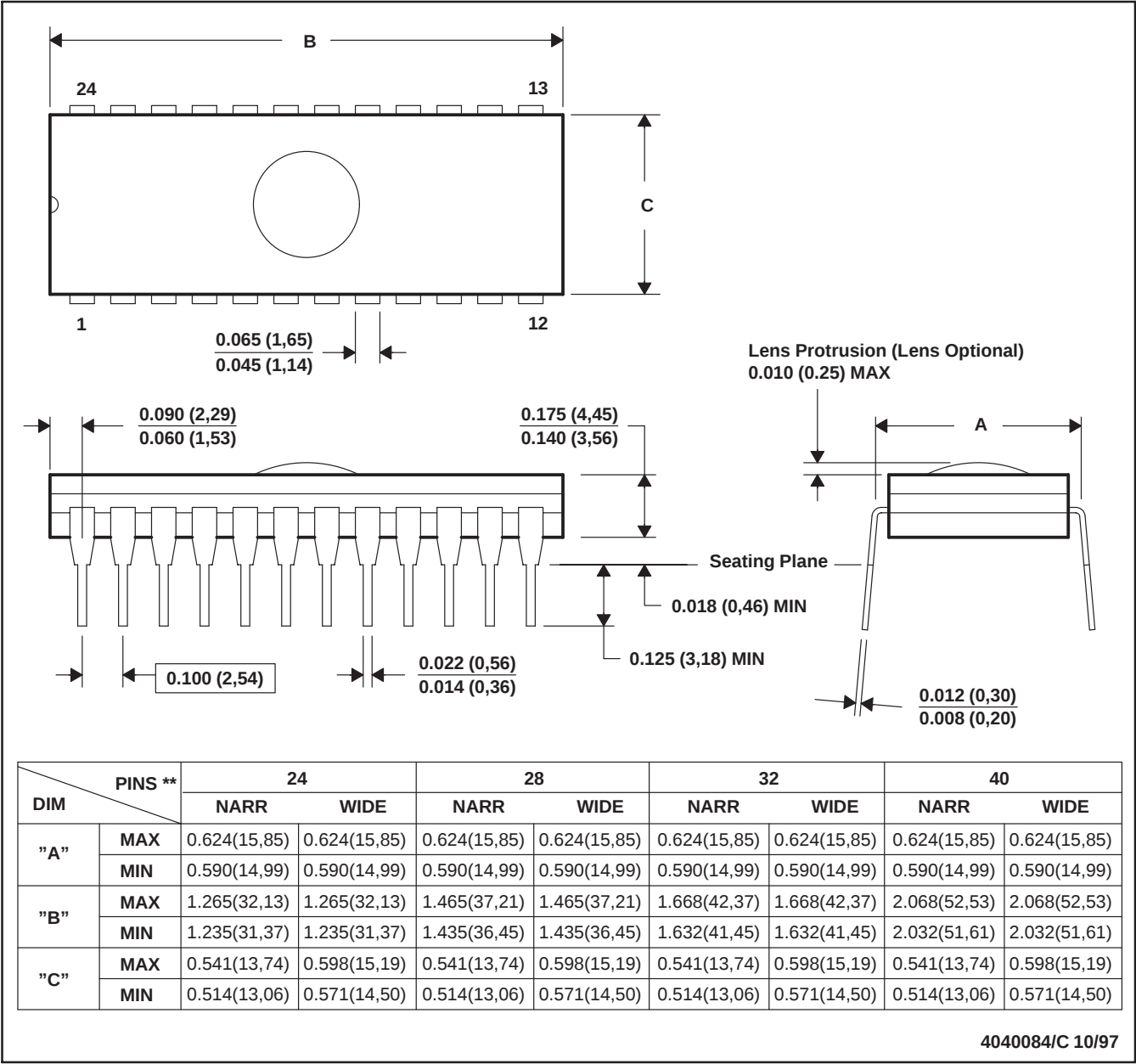
## TAPE AND REEL BOX DIMENSIONS



| Device        | Package | Pins | Site    | Length (mm) | Width (mm) | Height (mm) |
|---------------|---------|------|---------|-------------|------------|-------------|
| CD74HC154M96  | DW      | 24   | SITE 60 | 346.0       | 346.0      | 41.0        |
| CD74HCT154M96 | DW      | 24   | SITE 60 | 346.0       | 346.0      | 41.0        |

J (R-GDIP-T\*\*)
24 PINS SHOWN

CERAMIC DUAL-IN-LINE PACKAGE

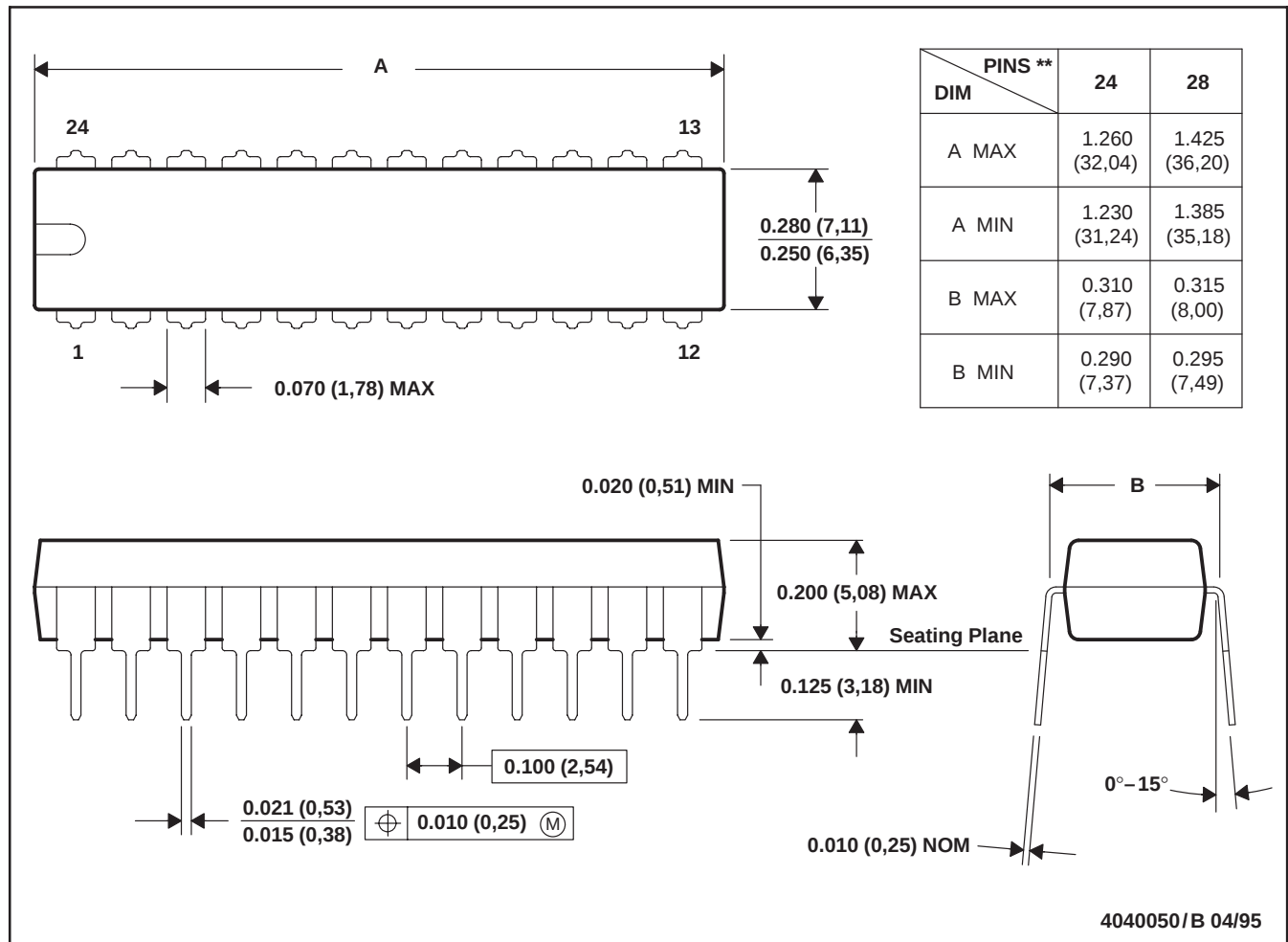


- NOTES: A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Window (lens) added to this group of packages (24-, 28-, 32-, 40-pin).
- D. This package can be hermetically sealed with a ceramic lid using glass frit.
- E. Index point is provided on cap for terminal identification.

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

## PLASTIC DUAL-IN-LINE PACKAGE

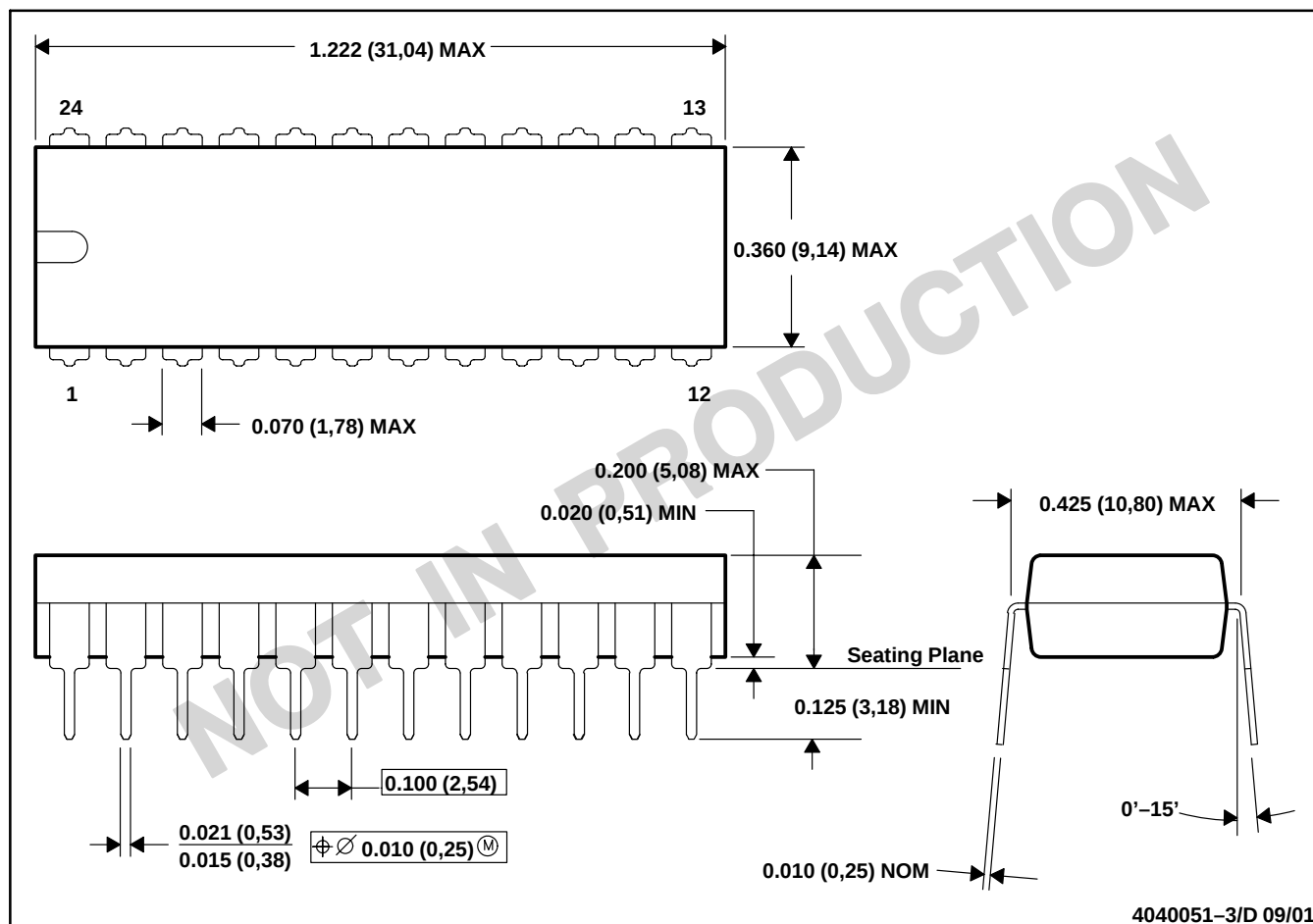
24 PINS SHOWN



- NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.

N (R-PDIP-T24)

PLASTIC DUAL-IN-LINE

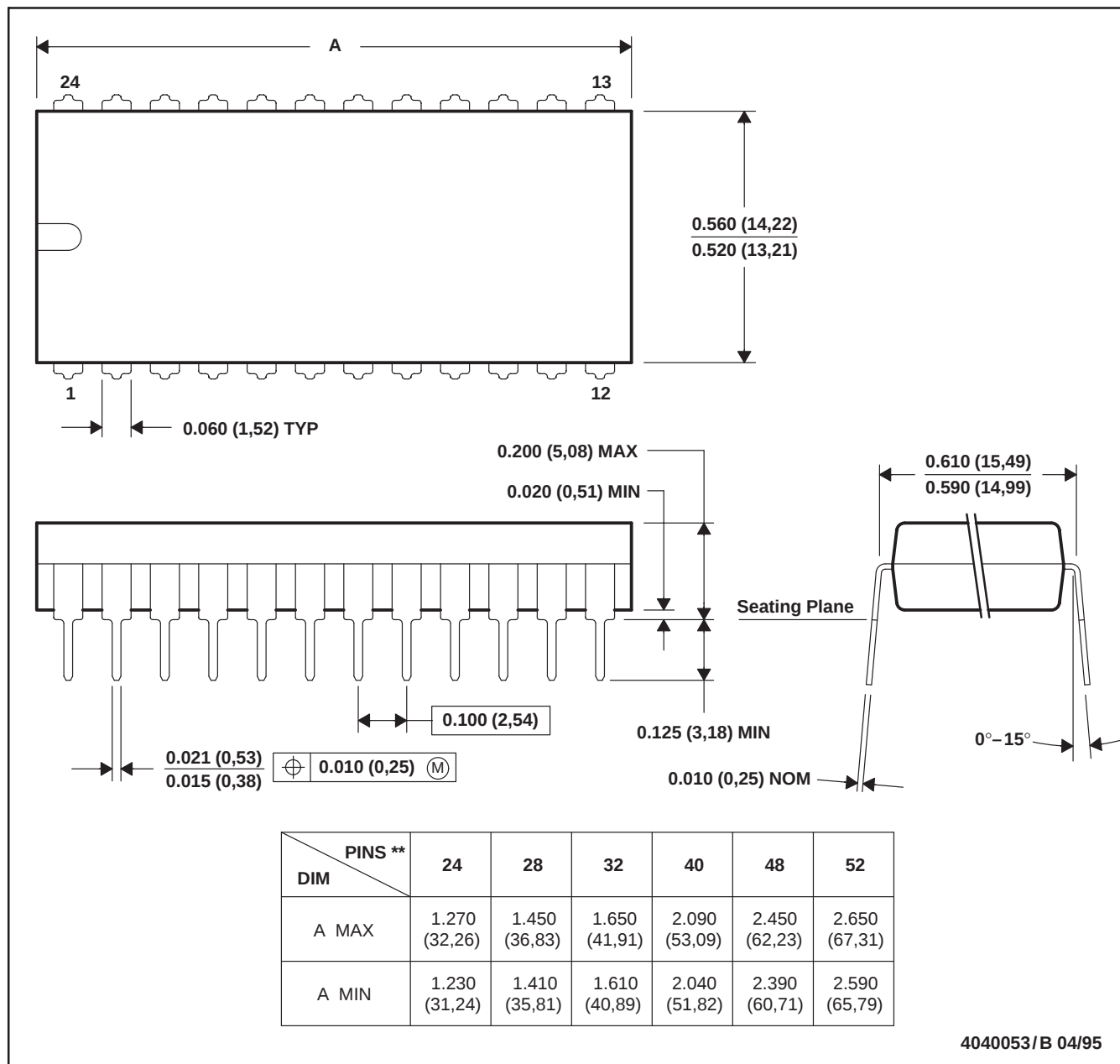


- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Falls within JEDEC MS-010

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

PLASTIC DUAL-IN-LINE PACKAGE

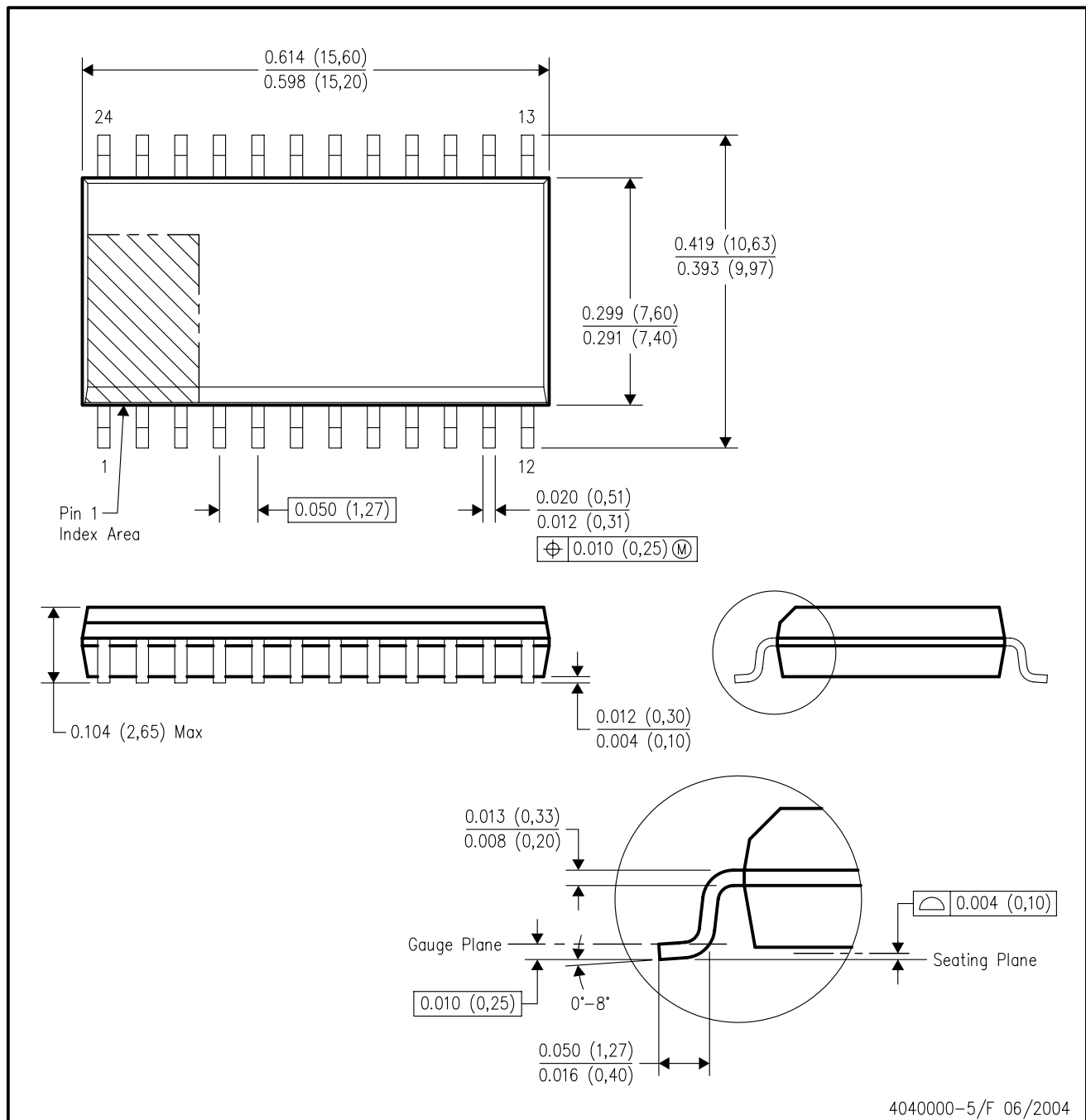
24 PIN SHOWN



- NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. Falls within JEDEC MS-011  
 D. Falls within JEDEC MS-015 (32 pin only)

## DW (R-PDSO-G24)

## PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - Falls within JEDEC MS-013 variation AD.

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