



Data sheet acquired from Harris Semiconductor  
SCHS201C

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查询CD74HC4020M96供应商

捷多邦 专业PCB打样工厂, 24小时加急出货

# CD54HC4020, CD74HC4020, CD54HCT4020, CD74HCT4020

## High-Speed CMOS Logic 14-Stage Binary Counter

### Features

- Fully Static Operation
- Buffered Inputs
- Common Reset
- Negative Edge Clocking
- 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 'HC4020 and 'HCT4020 are 14-stage ripple-carry binary counters. All counter stages are master-slave flip-flops. The state of the stage advances one count on the negative clock transition of each input pulse; a high voltage level on the MR line resets all counters to their zero state. All inputs and outputs are buffered.

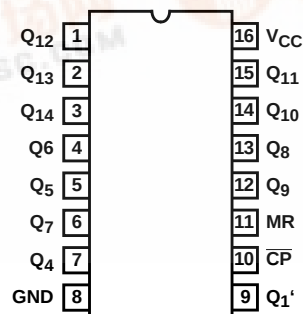
### Ordering Information

| PART NUMBER    | TEMP. RANGE (°C) | PACKAGE      |
|----------------|------------------|--------------|
| CD54HC4020F3A  | -55 to 125       | 16 Ld CERDIP |
| CD54HCT4020F3A | -55 to 125       | 16 Ld CERDIP |
| CD74HC4020E    | -55 to 125       | 16 Ld PDIP   |
| CD74HC4020M    | -55 to 125       | 16 Ld SOIC   |
| CD74HC4020MT   | -55 to 125       | 16 Ld SOIC   |
| CD74HC4020M96  | -55 to 125       | 16 Ld SOIC   |
| CD74HCT4020E   | -55 to 125       | 16 Ld PDIP   |
| CD74HCT4020M   | -55 to 125       | 16 Ld SOIC   |
| CD74HCT4020MT  | -55 to 125       | 16 Ld SOIC   |
| CD74HCT4020M96 | -55 to 125       | 16 Ld SOIC   |

NOTE: When ordering, use the entire part number. The suffix 96 denotes tape and reel. The suffix T denotes a small-quantity reel of 250.

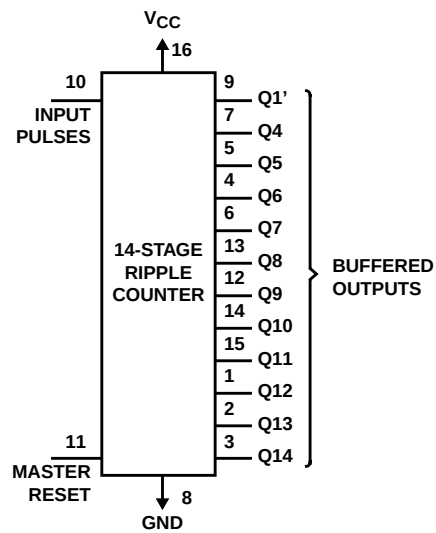
### Pinout

CD54HC4020, CD54HCT4020  
(CERDIP)  
CD74HC4020, CD74HCT4020  
(PDIP, SOIC)  
TOP VIEW



**CD54HC4020, CD74HC4020, CD54HCT4020, CD74HCT4020**

**Functional Diagram**

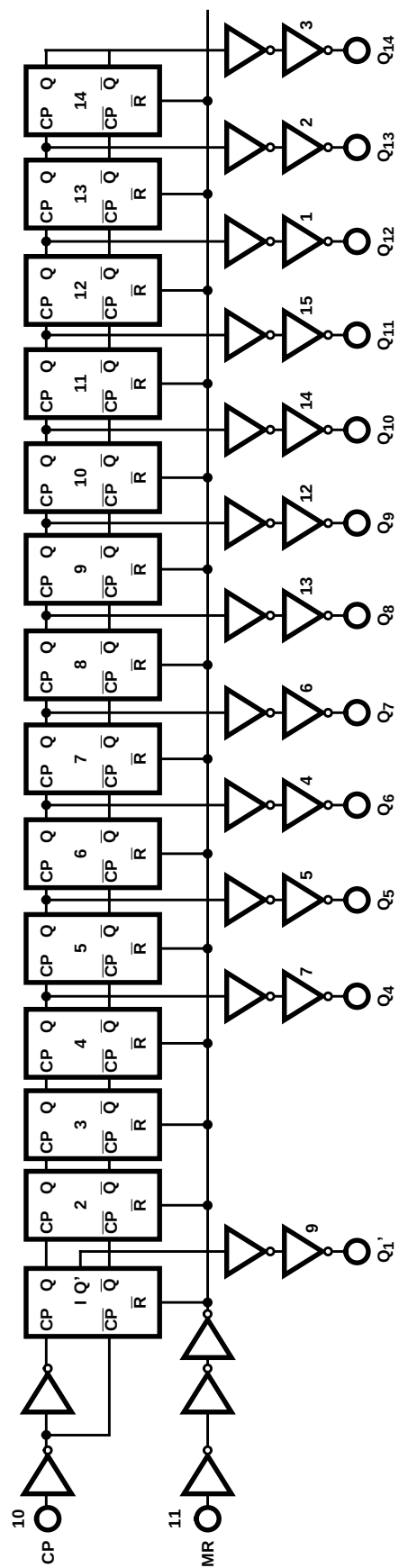


**TRUTH TABLE**

| CP COUNT | MR | OUTPUT STATE          |
|----------|----|-----------------------|
| ↑        | L  | No Change             |
| ↓        | L  | Advance to Next State |
| X        | H  | All Outputs Are Low   |

H = High Voltage Level, L = Low Voltage Level, X = Don't Care,  
 ↑ = Transition from Low to High Level, ↓ = Transition from High to Low.

### Logic Diagram



## CD54HC4020, CD74HC4020, CD54HCT4020, CD74HCT4020

### 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, Note 1)     | $\theta_{JA}$ ( $^{\circ}C/W$ )           |
| E (PDIP) Package                         | 67                                        |
| M (SOIC) Package                         | 73                                        |
| Maximum Junction Temperature             | $150^{\circ}C$                            |
| Maximum Storage Temperature Range        | $-65^{\circ}C$ to $150^{\circ}C$          |
| Maximum Lead Temperature (Soldering 10s) | $300^{\circ}C$<br>(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.

#### NOTE:

1. 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    |

**CD54HC4020, CD74HC4020, CD54HCT4020, CD74HCT4020**

**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 2) | 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 |
|-------|------------|
| MR    | 0.65       |
| CP    | 0.5        |

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

**Prerequisite for Switching Specifications**

| PARAMETER                     | SYMBOL           | V <sub>CC</sub> (V) | 25°C |     | -40°C TO 85°C |     | -55°C TO 125°C |     | UNITS |
|-------------------------------|------------------|---------------------|------|-----|---------------|-----|----------------|-----|-------|
|                               |                  |                     | MIN  | MAX | MIN           | MAX | MIN            | MAX |       |
| HC TYPES                      |                  |                     |      |     |               |     |                |     |       |
| Maximum Input Pulse Frequency | f <sub>MAX</sub> | 2                   | 6    | -   | 5             | -   | 4              | -   | MHz   |
|                               |                  | 4.5                 | 30   | -   | 25            | -   | 20             | -   | MHz   |
|                               |                  | 6                   | 35   | -   | 29            | -   | 24             | -   | MHz   |
| Input Pulse Width             | t <sub>W</sub>   | 2                   | 80   | -   | 100           | -   | 120            | -   | ns    |
|                               |                  | 4.5                 | 16   | -   | 20            | -   | 24             | -   | ns    |
|                               |                  | 6                   | 14   | -   | 17            | -   | 20             | -   | ns    |

**CD54HC4020, CD74HC4020, CD54HCT4020, CD74HCT4020**

**Prerequisite for Switching Specifications (Continued)**

| PARAMETER                     | SYMBOL           | V <sub>CC</sub> (V) | 25°C |     | -40°C TO 85°C |     | -55°C TO 125°C |     | UNITS |
|-------------------------------|------------------|---------------------|------|-----|---------------|-----|----------------|-----|-------|
|                               |                  |                     | MIN  | MAX | MIN           | MAX | MIN            | MAX |       |
| Reset Removal Time            | t <sub>REM</sub> | 2                   | 50   | -   | 65            | -   | 75             | -   | ns    |
|                               |                  | 4.5                 | 10   | -   | 13            | -   | 15             | -   | ns    |
|                               |                  | 6                   | 9    | -   | 11            | -   | 13             | -   | ns    |
| Reset Pulse Width             | t <sub>W</sub>   | 2                   | 80   | -   | 100           | -   | 120            | -   | ns    |
|                               |                  | 4.5                 | 16   | -   | 20            | -   | 24             | -   | ns    |
|                               |                  | 6                   | 14   | -   | 17            | -   | 20             | -   | ns    |
| HCT TYPES                     |                  |                     |      |     |               |     |                |     |       |
| Maximum Input Pulse Frequency | f <sub>MAX</sub> | 4.5                 | 25   | -   | 20            | -   | 16             | -   | MHz   |
| Input Pulse Width             | t <sub>W</sub>   | 4.5                 | 20   | -   | 25            | -   | 30             | -   | ns    |
| Reset Recovery Time           | t <sub>REC</sub> | 4.5                 | 10   | -   | 13            | -   | 15             | -   | ns    |
| Reset Pulse Width             | t <sub>W</sub>   | 4.5                 | 20   | -   | 25            | -   | 30             | -   | ns    |

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

| PARAMETER                                                    | SYMBOL                                 | TEST CONDITIONS       | V <sub>CC</sub><br>(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 Time<br>(Figure 1)<br><br>CP to Q1' Output | t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | C <sub>L</sub> = 50pF | 2                      | -    | -   | 140 | -             | 175 | -              | 210 | ns    |
|                                                              |                                        |                       | 4.5                    | -    | -   | 28  | -             | 35  | -              | 42  | ns    |
|                                                              |                                        | C <sub>L</sub> =15pF  | 5                      | -    | 11  | -   | -             | -   | -              | -   | ns    |
|                                                              |                                        | C <sub>L</sub> = 50pF | 6                      | -    | -   | 24  | -             | 30  | -              | 36  | ns    |
| Q <sub>n</sub> to Q <sub>n</sub> + 1                         | t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | C <sub>L</sub> = 50pF | 2                      | -    | -   | 75  | -             | 95  | -              | 110 | ns    |
|                                                              |                                        |                       | 4.5                    | -    | -   | 15  | -             | 19  | -              | 22  | ns    |
|                                                              |                                        | C <sub>L</sub> =15pF  | 5                      | -    | 6   | -   | -             | -   | -              | -   | ns    |
|                                                              |                                        | C <sub>L</sub> = 50pF | 6                      | -    | -   | 13  | -             | 16  | -              | 19  | ns    |
| MR to Q <sub>n</sub>                                         | t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | C <sub>L</sub> = 50pF | 2                      | -    | -   | 170 | -             | 215 | -              | 255 | ns    |
|                                                              |                                        |                       | 4.5                    | -    | -   | 34  | -             | 43  | -              | 51  | ns    |
|                                                              |                                        |                       | 5                      | -    | 14  | -   | -             | -   | -              | -   | ns    |
|                                                              |                                        |                       | 6                      | -    | -   | 29  | -             | 37  | -              | 43  | ns    |
| Output Transition Time<br>(Figure 1)                         | t <sub>TLH</sub> , t <sub>THL</sub>    | C <sub>L</sub> = 50pF | 2                      | -    | -   | 75  | -             | 95  | -              | 110 | ns    |
|                                                              |                                        |                       | 4.5                    | -    | -   | 15  | -             | 19  | -              | 22  | ns    |
|                                                              |                                        |                       | 6                      | -    | -   | 13  | -             | 16  | -              | 19  | ns    |
| Input Capacitance                                            | C <sub>IN</sub>                        | C <sub>L</sub> = 50pF | -                      | -    | -   | 10  | -             | 10  | -              | 10  | pF    |
| Power Dissipation Capacitance<br>(Notes 3, 4)                | C <sub>PD</sub>                        | C <sub>L</sub> =15pF  | 5                      | -    | 30  | -   | -             | -   | -              | -   | pF    |

# **CD54HC4020, CD74HC4020, CD54HCT4020, CD74HCT4020**

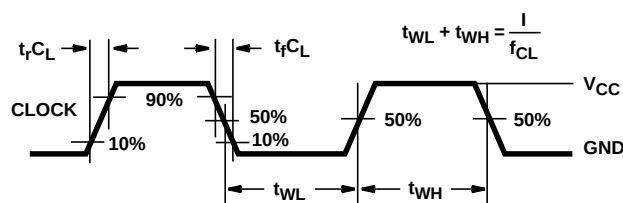
## **Switching Specifications** Input $t_r, t_f = 6\text{ns}$ (Continued)

| 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 |       |
| HCT TYPES                                     |                                        |                       |                     |      |     |     |               |     |                |     |       |
| Propagation Delay Time<br>(Figure 2)          | t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | C <sub>L</sub> = 50pF | 4.5                 | -    | -   | 40  | -             | 50  | -              | 60  | ns    |
|                                               |                                        | C <sub>L</sub> =15pF  | 5                   | -    | 17  | -   | -             | -   | -              | -   | ns    |
| Q <sub>n</sub> to Q <sub>n</sub> + 1          | t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | C <sub>L</sub> = 50pF | 4.5                 | -    | -   | 15  | -             | 19  | -              | 22  | ns    |
|                                               |                                        | C <sub>L</sub> =15pF  | 5                   | -    | 6   | -   | -             | -   | -              | -   | ns    |
| MR to Q <sub>n</sub>                          | t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | C <sub>L</sub> = 50pF | 4.5                 | -    | -   | 40  | -             | 50  | -              | 60  | ns    |
|                                               |                                        | C <sub>L</sub> =15pF  | 5                   | -    | 17  | -   | -             | -   | -              | -   | ns    |
| Output Transition                             | t <sub>TLH</sub> , t <sub>THL</sub>    | C <sub>L</sub> = 50pF | 4.5                 | -    | -   | 15  | -             | 19  | -              | 22  | ns    |
| Input Capacitance                             | C <sub>IN</sub>                        | C <sub>L</sub> =15pF  | -                   | -    | -   | 10  | -             | 10  | -              | 10  | pF    |
| Power Dissipation Capacitance<br>(Notes 3, 4) | C <sub>PD</sub>                        | C <sub>L</sub> =15pF  | 5                   | -    | 30  | -   | -             | -   | -              | -   | pF    |

### NOTES:

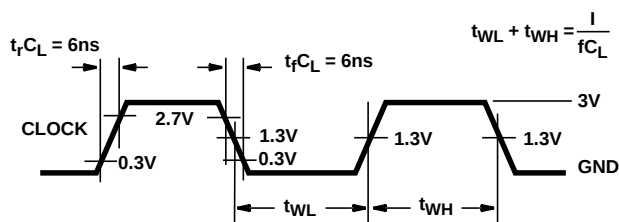
3.  $C_{PD}$  is used to determine the dynamic power consumption, per package.
4.  $P_D = V_{CC}^2 f_i (C_{PD} + C_L)$  where  $f_i$  = Input Frequency,  $C_L$  = Output Load Capacitance,  $V_{CC}$  = Supply Voltage.

## **Test Circuits and Waveforms**



NOTE: Outputs should be switching from 10%  $V_{CC}$  to 90%  $V_{CC}$  in accordance with device truth table. For  $f_{MAX}$ , input duty cycle = 50%.

**FIGURE 1. HC CLOCK PULSE RISE AND FALL TIMES AND PULSE WIDTH**



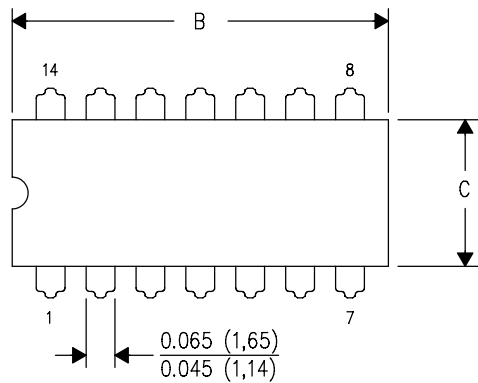
NOTE: Outputs should be switching from 10%  $V_{CC}$  to 90%  $V_{CC}$  in accordance with device truth table. For  $f_{MAX}$ , input duty cycle = 50%.

**FIGURE 2. HCT CLOCK PULSE RISE AND FALL TIMES AND PULSE WIDTH**

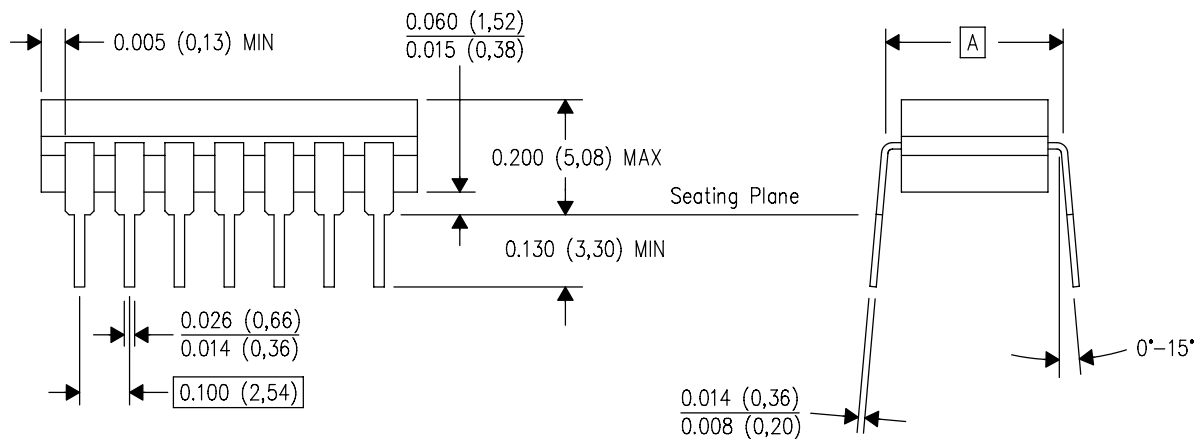
J (R-GDIP-T\*\*)

14 LEADS SHOWN

# CERAMIC DUAL IN-LINE PACKAGE



| DIM \ PINS ** | 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.

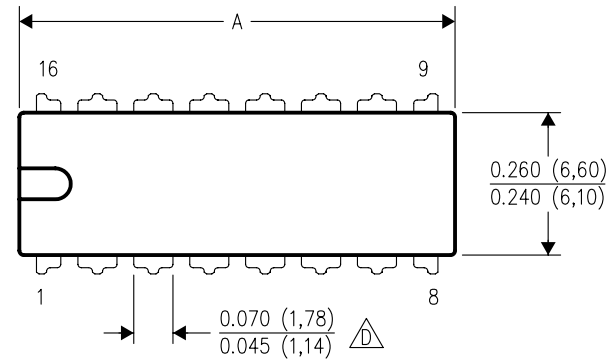


# MECHANICAL DATA

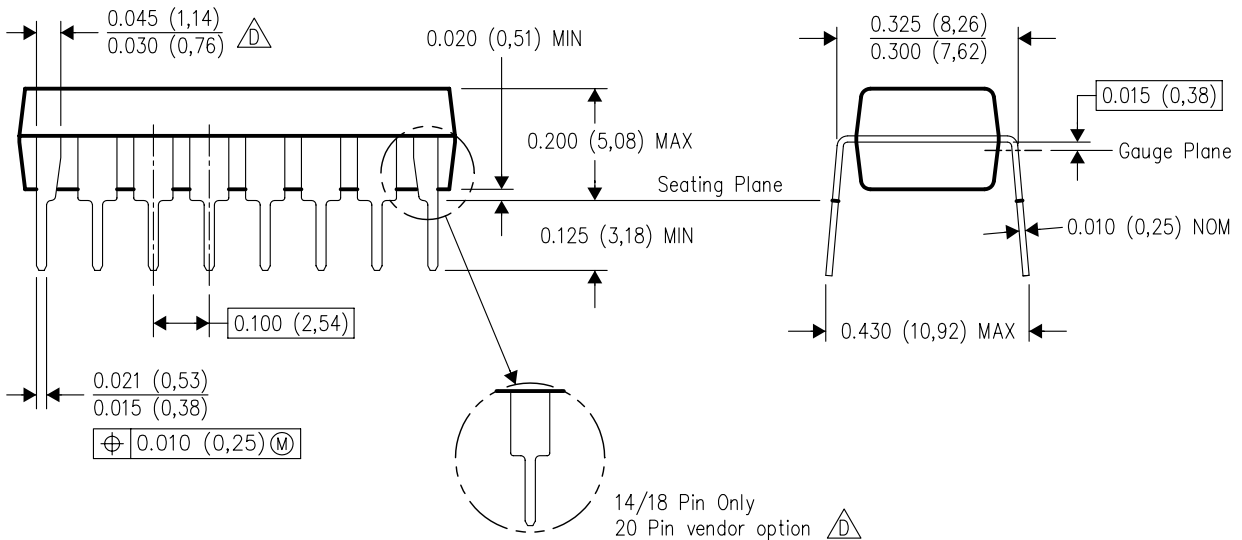
## N (R-PDIP-T\*\*)

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               |



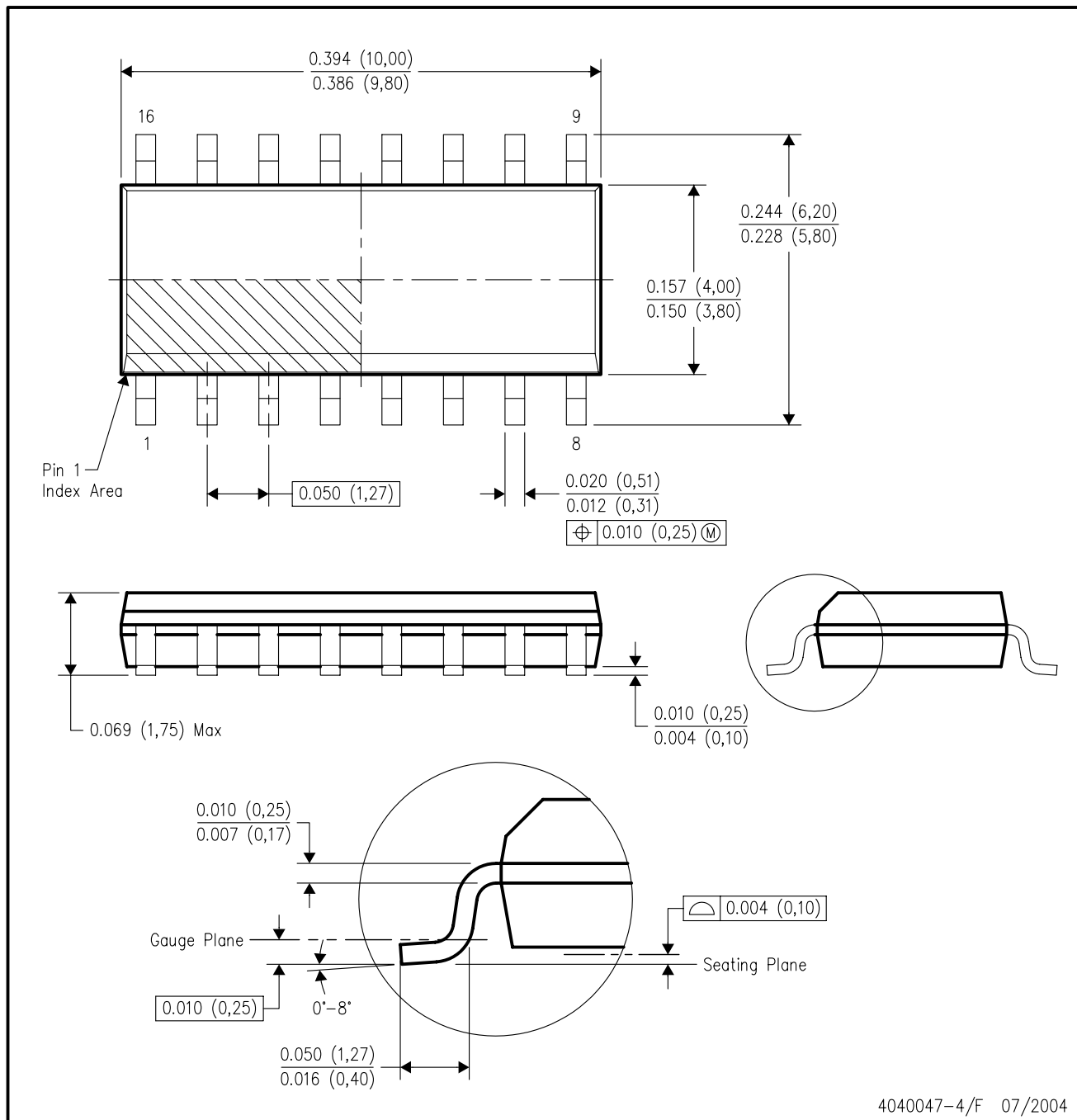
4040049/E 12/2002

- 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.

# MECHANICAL DATA

## D (R-PDSO-G16)

## PLASTIC SMALL-OUTLINE PACKAGE



4040047-4/F 07/2004

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Mailing Address: Texas Instruments  
Post Office Box 655303 Dallas, Texas 75265