

# CDx4HC00 四路 2 输入与非门

## 1 特性

- 缓冲输入
- 宽工作电压范围：2V 至 6V
- 宽工作温度范围：  
- 55°C 至 +125°C
- 支持多达 10 个 LSTTL 负载的扇出
- 与 LSTTL 逻辑 IC 相比，可显著降低功耗

## 2 应用

- 警报/篡改检测电路
- S-R 锁存器

## 3 说明

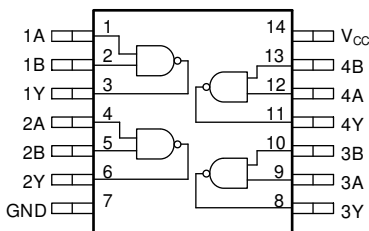
此器件包含四个独立的 2 输入与非门。每个逻辑门以正逻辑执行布尔函数

$$Y = A \bullet B。$$

### 器件信息

| 器件型号      | 封装 <sup>(1)</sup> | 封装尺寸 (标称值)         |
|-----------|-------------------|--------------------|
| CD74HC00D | SOIC (14)         | 8.65mm × 3.90mm    |
| CD74HC00N | PDIP (14)         | 19.30mm × 6.40mm   |
| CD54HC00J | CDIP (14)         | 19.94 mm × 7.62 mm |

(1) 如需了解所有可用封装，请参阅数据表末尾的可订购产品附录。



器件功能引脚排列



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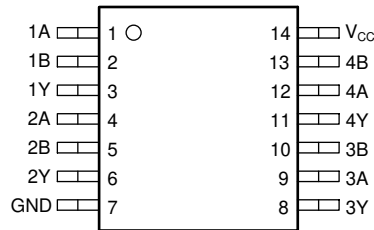
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## 4 Revision History

注：以前版本的页码可能与当前版本的页码不同

| <b>Changes from Revision C (September 2003) to Revision D (January 2021)</b>  | <b>Page</b> |
|---|-------------|
| • 更新至全新的数据表格式.....  | 1           |
| • HCT 器件移至新数据表 (SCHS398).....   | 1           |
| • $R_{\theta JA}$ increased for the D package from 86 to 133.6 °C/W and decreased for the N package from 80 to 69.5 °C/W..... | 5           |

## 5 Pin Configuration and Functions



**图 5-1. D, N, or J Package  
14-Pin SOIC, PDIP, or CDIP  
Top View**

## Pin Functions

| PIN             |     | I/O    | DESCRIPTION         |
|-----------------|-----|--------|---------------------|
| NAME            | NO. |        |                     |
| 1A              | 1   | Input  | Channel 1, Input A  |
| 1B              | 2   | Input  | Channel 1, Input B  |
| 1Y              | 3   | Output | Channel 1, Output Y |
| 2A              | 4   | Input  | Channel 2, Input A  |
| 2B              | 5   | Input  | Channel 2, Input B  |
| 2Y              | 6   | Output | Channel 2, Output Y |
| GND             | 7   | —      | Ground              |
| 3Y              | 8   | Output | Channel 3, Output Y |
| 3A              | 9   | Input  | Channel 3, Input A  |
| 3B              | 10  | Input  | Channel 3, Input B  |
| 4Y              | 11  | Output | Channel 4, Output Y |
| 4A              | 12  | Input  | Channel 4, Input A  |
| 4B              | 13  | Input  | Channel 4, Input B  |
| V <sub>CC</sub> | 14  | —      | Positive Supply     |

## 6 Specifications

### 6.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

|                  |   | MIN  | MAX  | UNIT |    |
|------------------|---|--|------|------|----|
| V <sub>CC</sub>  | Supply voltage                                    | - 0.5  | 7    | V    |    |
| I <sub>IK</sub>  | Input clamp current <sup>(2)</sup>                | 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>  | Output clamp current <sup>(2)</sup>               | 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>   | Continuous output current                         | V <sub>O</sub> > - 0.5 V or V <sub>O</sub> < V <sub>CC</sub> + 0.5 V | ±25  | mA   |    |
|                  | Continuous current through V <sub>CC</sub> or GND |  | ±50  | mA   |    |
| T <sub>J</sub>   | Junction temperature <sup>(3)</sup>               | Plastic package  | 150  | °C   |    |
|                  |   | Hermetic package or die  | 175  |      |    |
|                  | Lead temperature (soldering 10s)                  | SOIC - lead tips only  | 300  | °C   |    |
| T <sub>stg</sub> | Storage temperature                               |  | - 65 | 150  | °C |

- (1) Stresses beyond those listed under *Absolute Maximum Rating* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Condition*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) Guaranteed by design.

### 6.2 ESD Ratings

|                                     |                         | VALUE  | UNIT  |   |
|-------------------------------------|-------------------------|--|-------|---|
| <b>CD74HC00 IN D (SOIC) PACKAGE</b> |                         |  |       |   |
| V <sub>(ESD)</sub>                  | Electrostatic discharge | Human-body model (HBM), per ANSI/ESDA/ JEDEC JS-001 <sup>(1)</sup>             | ±2000 | V |
|                                     |                         | Charged-device model (CDM), per JEDEC specification JESD22-C101 <sup>(2)</sup> | ±1000 |   |

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

### 6.3 Recommended Operating Conditions

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

|                 |                          | MIN                     | NOM  | MAX             | UNIT |
|-----------------|--------------------------|-------------------------|------|-----------------|------|
| V <sub>CC</sub> | Supply voltage           | 2                       |      | 6               | V    |
| V <sub>IH</sub> | High-level input voltage | V <sub>CC</sub> = 2 V   | 1.5  |                 |      |
|                 |                          | V <sub>CC</sub> = 4.5 V | 3.15 |                 |      |
|                 |                          | V <sub>CC</sub> = 6 V   | 4.2  |                 |      |
| V <sub>IL</sub> | Low-level input voltage  | V <sub>CC</sub> = 2 V   |      | 0.5             |      |
|                 |                          | V <sub>CC</sub> = 4.5 V |      | 1.35            |      |
|                 |                          | V <sub>CC</sub> = 6 V   |      | 1.8             |      |
| V <sub>I</sub>  | Input voltage            | 0                       |      | V <sub>CC</sub> | V    |
| V <sub>O</sub>  | Output voltage           | 0                       |      | V <sub>CC</sub> | V    |
| t <sub>t</sub>  | Input transition time    | V <sub>CC</sub> = 2 V   |      | 1000            | ns   |
|                 |                          | V <sub>CC</sub> = 4.5 V |      | 500             |      |
|                 |                          | V <sub>CC</sub> = 6 V   |      | 400             |      |

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

|                |                                | MIN  | NOM | MAX | UNIT |
|----------------|--------------------------------|------|-----|-----|------|
| T <sub>A</sub> | Operating free-air temperature | - 55 |     | 125 | °C   |

## 6.4 Thermal Information

| THERMAL METRIC <sup>(1)</sup> |  | CD74HC00 |          | UNIT |
|-------------------------------|--|----------|----------|------|
|                               |  | N (PDIP) | D (SOIC) |      |
|                               |  | 14 PINS  | 14 PINS  |      |
| R <sub>θJA</sub>              | Junction-to-ambient thermal resistance       | 69.5     | 133.6    | °C/W |
| R <sub>θJC(top)</sub>         | Junction-to-case (top) thermal resistance    | 57.6     | 89.0     | °C/W |
| R <sub>θJB</sub>              | Junction-to-board thermal resistance         | 49.3     | 89.5     | °C/W |
| Ψ <sub>JT</sub>               | Junction-to-top characterization parameter   | 37.6     | 45.5     | °C/W |
| Ψ <sub>JB</sub>               | Junction-to-board characterization parameter | 49.1     | 89.1     | °C/W |
| R <sub>θJC(bot)</sub>         | Junction-to-case (bottom) thermal resistance | N/A      | N/A      | °C/W |

- (1) For more information about traditional and new thermal metrics, see the [Semiconductor and IC Package Thermal Metrics](#) application report.

## 6.5 Electrical Characteristics

over operating free-air temperature range; typical values measured at T<sub>A</sub> = 25°C (unless otherwise noted).

| PARAMETER                  | TEST CONDITIONS           | V <sub>CC</sub>                                     | Operating free-air temperature (T <sub>A</sub> ) |       |      |                |      |      |                 |     |     | UNIT |
|----------------------------|---------------------------|---|--|-------|------|----------------|------|------|-----------------|-----|-----|------|
|                            |                           |   | 25°C   |       |      | - 40°C to 85°C |      |      | - 55°C to 125°C |     |     |      |
|                            |                           |   | MIN  | TYP   | MAX  | MIN            | TYP  | MAX  | MIN             | TYP | MAX |      |
| V <sub>OH</sub>            | High-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> | I <sub>OH</sub> = - 20 μA                        | 2 V   | 1.9  |                | 1.9  |      | 1.9             |     |     | V    |
|                            |                           |   |  | 4.5 V | 4.4  |                | 4.4  |      | 4.4             |     |     |      |
|                            |                           |   | 6 V  | 5.9   |      | 5.9            |      | 5.9  |                 |     |     |      |
|                            |                           |   | I <sub>OH</sub> = - 4 mA                         | 4.5 V | 3.98 |                | 3.84 |      | 3.7             |     |     |      |
| I <sub>OH</sub> = - 5.2 mA | 6 V                       | 5.48  |  | 5.34  |      | 5.2            |      |      |                 |     |     |      |
| V <sub>OL</sub>            | Low-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> | I <sub>OL</sub> = 20 μA                          | 2 V   |      | 0.1            |      | 0.1  |                 | 0.1 | V   |      |
|                            |                           |   |  | 4.5 V |      | 0.1            |      | 0.1  |                 |     |     |      |
|                            |                           |   |  | 6 V   |      | 0.1            |      | 0.1  |                 |     |     |      |
|                            |                           |   | I <sub>OL</sub> = 4 mA                           | 4.5 V |      | 0.26           |      | 0.33 | 0.4             |     |     |      |
|                            |                           |   | I <sub>OL</sub> = 5.2 mA                         | 6 V   |      | 0.26           |      | 0.33 | 0.4             |     |     |      |
| I <sub>I</sub>             | Input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND             | 6 V  |       | ±0.1 |                | ±1   |      | ±1              | μA  |     |      |
| I <sub>CC</sub>            | Supply current            | V <sub>I</sub> = V <sub>CC</sub> or GND             | I <sub>O</sub> = 0                               | 6 V   |      | 2              |      | 20   |                 | 40  | μA  |      |
| C <sub>i</sub>             | Input capacitance         |   | 5 V  |       | 10   |                | 10   |      | 10              | pF  |     |      |

### 6.6 Switching Characteristics

over operating free-air temperature range; typical values measured at  $T_A = 25^\circ\text{C}$  (unless otherwise noted).

| PARAMETER | FROM              | TO     | TEST CONDITIONS | $V_{CC}$             | Operating free-air temperature ( $T_A$ ) |     |     |                |     |     | UNIT |                 |     |     |    |
|-----------|-------------------|--------|-----------------|----------------------|--|-----|-----|----------------|-----|-----|------|-----------------|-----|-----|----|
|           |                   |        |                 |                      | 25°C                                     |     |     | - 40°C to 85°C |     |     |      | - 55°C to 125°C |     |     |    |
|           |                   |        |                 |                      | MIN                                      | TYP | MAX | MIN            | TYP | MAX |      | MIN             | TYP | MAX |    |
| $t_{pd}$  | Propagation delay | A or B | Y               | $C_L = 50\text{ pF}$ | 2 V                                      | 90  |     |                | 115 |     |      | 135             |     |     | ns |
|           |                   |        |                 |                      | 4.5 V                                    | 18  |     |                | 23  |     |      | 27              |     |     |    |
|           |                   |        |                 |                      | 6 V                                      | 15  |     |                | 20  |     |      | 23              |     |     |    |
|           |                   | A or B | Y               | $C_L = 15\text{ pF}$ | 5 V                                      | 7   |     |                |     |     |      |                 |     |     |    |
| $t_t$     | Transition-time   |        | Y               | $C_L = 50\text{ pF}$ | 2 V                                      | 75  |     |                | 95  |     |      | 110             |     |     | ns |
|           |                   |        |                 |                      | 4.5 V                                    | 15  |     |                | 19  |     |      | 22              |     |     |    |
|           |                   |        |                 |                      | 6 V                                      | 13  |     |                | 16  |     |      | 19              |     |     |    |

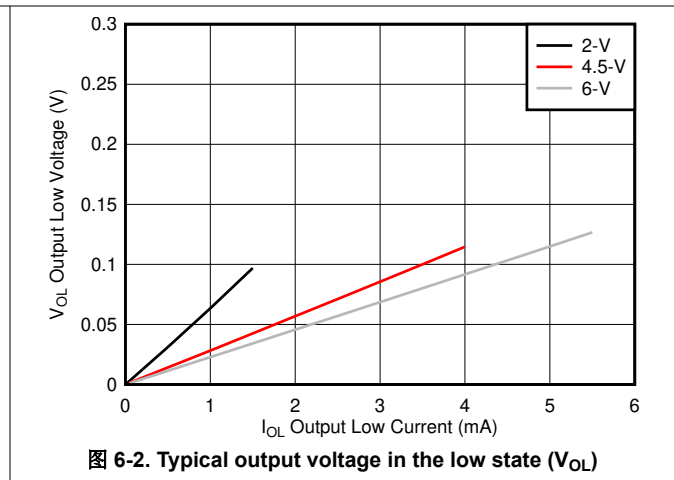
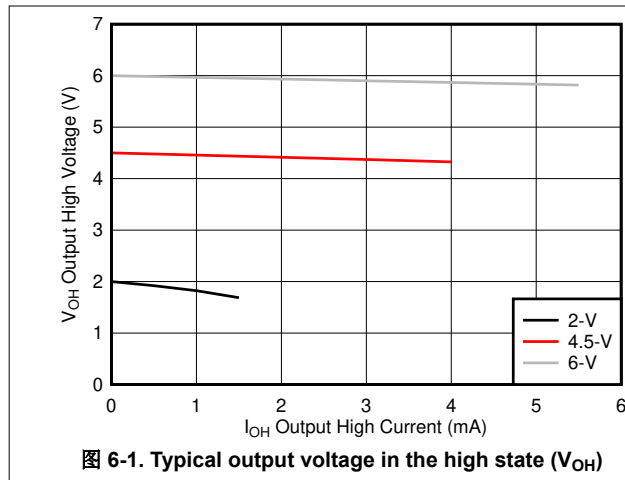
### 6.7 Operating Characteristics

over operating free-air temperature range; typical values measured at  $T_A = 25^\circ\text{C}$  (unless otherwise noted).

| PARAMETER | TEST CONDITIONS                                   | $V_{CC}$ | MIN | TYP | MAX | UNIT |
|-----------|---|----------|-----|-----|-----|------|
| $C_{pd}$  | Power dissipation capacitance per gate<br>No load | 5 V      |     | 25  |     | pF   |

### 6.8 Typical Characteristics

$T_A = 25^\circ\text{C}$

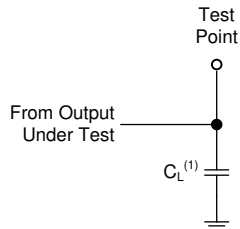


## 7 Parameter Measurement Information

Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_t < 6 \text{ ns}$ .

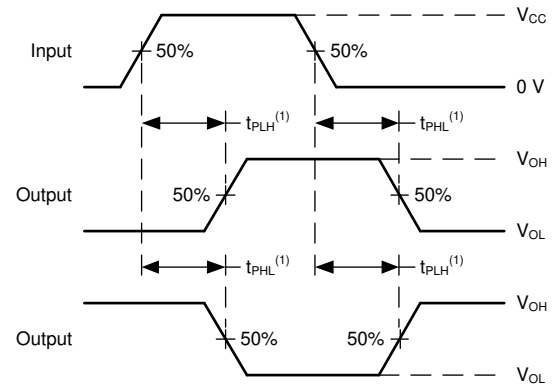
For clock inputs,  $f_{\text{max}}$  is measured when the input duty cycle is 50%.

The outputs are measured one at a time with one input transition per measurement.



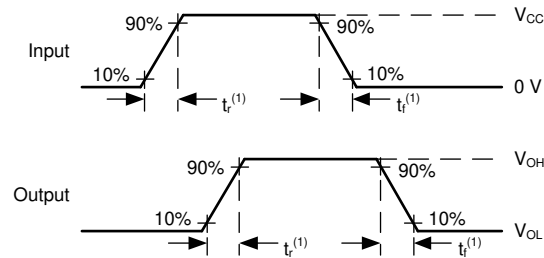
(1)  $C_L$  includes probe and test-fixture capacitance.

**图 7-1. Load Circuit for Push-Pull Outputs**



(1) The greater between  $t_{PLH}$  and  $t_{PHL}$  is the same as  $t_{pd}$ .

**图 7-2. Voltage Waveforms, Propagation Delays**



(1) The greater between  $t_r$  and  $t_f$  is the same as  $t_t$ .

**图 7-3. Voltage Waveforms, Input and Output Transition Times**

## 8 Detailed Description

### 8.1 Overview

This device contains four independent 2-input NAND gates. Each gate performs the Boolean function  $Y = A \bullet B$  in positive logic.

### 8.2 Functional Block Diagram

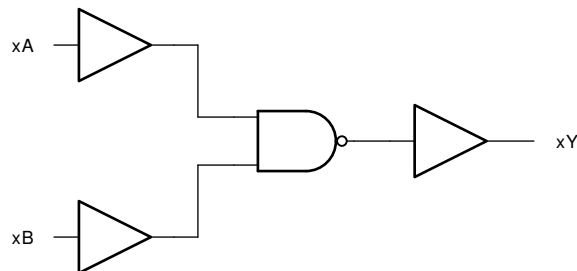


图 8-1. Logic Diagram (Positive Logic) for the CD74HC00

### 8.3 Balanced CMOS Push-Pull Outputs

This device includes balanced CMOS push-pull outputs. The term "balanced" indicates that the device can sink and source similar currents. The drive capability of this device may create fast edges into light loads so routing and load conditions should be considered to prevent ringing. Additionally, the outputs of this device are capable of driving larger currents than the device can sustain without being damaged. It is important for the output power of the device to be limited to avoid damage due to overcurrent. The electrical and thermal limits defined in the *Absolute Maximum Ratings* must be followed at all times.

Unused push-pull CMOS outputs should be left disconnected.

### 8.4 Standard CMOS Inputs

This device includes standard CMOS inputs. Standard CMOS inputs are high impedance and are typically modeled as a resistor in parallel with the input capacitance given in the *Electrical Characteristics*. The worst case resistance is calculated with the maximum input voltage, given in the *Absolute Maximum Ratings*, and the maximum input leakage current, given in the *Electrical Characteristics*, using Ohm's law ( $R = V \div I$ ).

Standard CMOS inputs require that input signals transition between valid logic states quickly, as defined by the input transition time or rate in the *Recommended Operating Conditions* table. Failing to meet this specification will result in excessive power consumption and could cause oscillations. More details can be found in [Implications of Slow or Floating CMOS Inputs](#).

Do not leave standard CMOS inputs floating at any time during operation. Unused inputs must be terminated at  $V_{CC}$  or GND. If a system will not be actively driving an input at all times, a pull-up or pull-down resistor can be added to provide a valid input voltage during these times. The resistor value will depend on multiple factors, however a 10-k $\Omega$  resistor is recommended and will typically meet all requirements.

### 8.5 Clamp Diode Structure

The inputs and outputs to this device have both positive and negative clamping diodes as depicted in [Electrical Placement of Clamping Diodes for Each Input and Output](#).

#### CAUTION

Voltages beyond the values specified in the *Absolute Maximum Ratings* table can cause damage to the device. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.



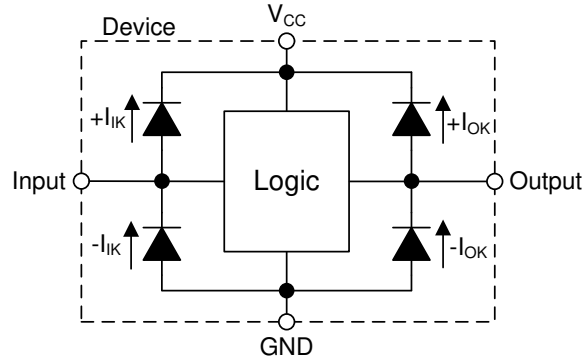


图 8-2. Electrical Placement of Clamping Diodes for Each Input and Output

### 8.6 Device Functional Modes

表 8-1. Function Table

| INPUTS |   | OUTPUT |
|--------|---|--------|
| A      | B | Y      |
| H      | H | L      |
| L      | X | H      |
| X      | L | H      |

## 9 Application and Implementation

### 备注

以下应用部分中的信息不属于 TI 器件规格的范围，TI 不担保其准确性和完整性。TI 的客户应负责确定器件是否适用于其应用。客户应验证并测试其设计，以确保系统功能。

### 9.1 Application Information

In this application, the CD74HC00 用于创建 SR 锁存器。可以对第二个低电平有效的 SR 锁存器使用两个额外的逻辑门，将它们分别用于各自的逻辑函数，或者可将输入接地且两个通道均未使用。该器件用于驱动篡改指示灯 LED 并为系统控制器提供一位数据。当防拆开关输出低电平时，输出 Q 变为高电平。此输出保持高电平，直到系统控制器处理该事件并向 R 输入发送低电平信号，使 Q 输出恢复至低电平。

### 9.2 Typical Application

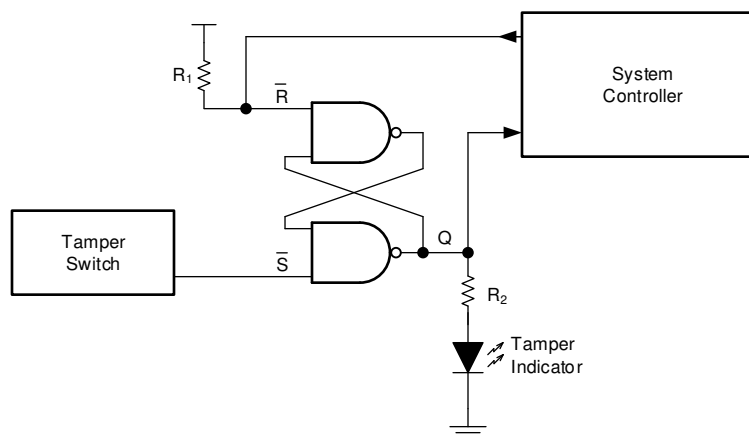


图 9-1. Typical application diagram

#### 9.2.1 Design Requirements

##### 9.2.1.1 Power Considerations

Ensure the desired supply voltage is within the range specified in the *Recommended Operating Conditions*. The supply voltage sets the device's electrical characteristics as described in the *Electrical Characteristics*.

The positive voltage supply must be capable of sourcing current equal to the total current to be sourced by all outputs of the CD74HC00 plus the maximum static supply current,  $I_{CC}$ , listed in *Electrical Characteristics* and any transient current required for switching. The logic device can only source as much current as is provided by the positive supply source. Be sure not to exceed the maximum total current through  $V_{CC}$  listed in the *Absolute Maximum Ratings*.

The ground must be capable of sinking current equal to the total current to be sunk by all outputs of the CD74HC00 plus the maximum supply current,  $I_{CC}$ , listed in *Electrical Characteristics*, and any transient current required for switching. The logic device can only sink as much current as can be sunk into its ground connection. Be sure not to exceed the maximum total current through GND listed in the *Absolute Maximum Ratings*.

The CD74HC00 can drive a load with a total capacitance less than or equal to 50pF while still meeting all of the datasheet specifications. Larger capacitive loads can be applied, however it is not recommended to exceed 50pF.

The CD74HC00 can drive a load with total resistance described by  $R_L \geq V_O / I_O$ , with the output voltage and current defined in the *Electrical Characteristics* table with  $V_{OH}$  and  $V_{OL}$ . When outputting in the high state, the output voltage in the equation is defined as the difference between the measured output voltage and the supply voltage at the  $V_{CC}$  pin.

Total power consumption can be calculated using the information provided in [CMOS Power Consumption and Cpd Calculation](#).

Thermal increase can be calculated using the information provided in [Thermal Characteristics of Standard Linear and Logic \(SLL\) Packages and Devices](#).

#### CAUTION

The maximum junction temperature,  $T_{J(max)}$  listed in the *Absolute Maximum Ratings*, is an additional limitation to prevent damage to the device. Do not violate any values listed in the *Absolute Maximum Ratings*. These limits are provided to prevent damage to the device.

#### 9.2.1.2 Input Considerations

Input signals must cross  $V_{IL(max)}$  to be considered a logic LOW, and  $V_{IH(min)}$  to be considered a logic HIGH. Do not exceed the maximum input voltage range found in the *Absolute Maximum Ratings*.

Unused inputs must be terminated to either  $V_{CC}$  or ground. These can be directly terminated if the input is completely unused, or they can be connected with a pull-up or pull-down resistor if the input is to be used sometimes, but not always. A pull-up resistor is used for a default state of HIGH, and a pull-down resistor is used for a default state of LOW. The resistor size is limited by drive current of the controller, leakage current into the CD74HC00, as specified in the *Electrical Characteristics*, and the desired input transition rate. A 10-k $\Omega$  resistor value is often used due to these factors.

The CD74HC00 has CMOS inputs and thus requires fast input transitions to operate correctly, as defined in the *Recommended Operating Conditions* table. Slow input transitions can cause oscillations, additional power consumption, and reduction in device reliability.

Refer to the *Feature Description* section for additional information regarding the inputs for this device.

#### 9.2.1.3 Output Considerations

The positive supply voltage is used to produce the output HIGH voltage. Drawing current from the output will decrease the output voltage as specified by the  $V_{OH}$  specification in the *Electrical Characteristics*. The ground voltage is used to produce the output LOW voltage. Sinking current into the output will increase the output voltage as specified by the  $V_{OL}$  specification in the *Electrical Characteristics*.

Push-pull outputs that could be in opposite states, even for a very short time period, should never be connected directly together. This can cause excessive current and damage to the device.

Two channels within the same device with the same input signals can be connected in parallel for additional output drive strength.

Unused outputs can be left floating. Do not connect outputs directly to  $V_{CC}$  or ground.

Refer to *Feature Description* section for additional information regarding the outputs for this device.

#### 9.2.2 Detailed Design Procedure

1. Add a decoupling capacitor from  $V_{CC}$  to GND. The capacitor needs to be placed physically close to the device and electrically close to both the  $V_{CC}$  and GND pins. An example layout is shown in the *Layout* section.
2. Ensure the capacitive load at the output is  $\leq 50$ pF. This is not a hard limit, however it will ensure optimal performance. This can be accomplished by providing short, appropriately sized traces from the CD74HC00 to the receiving device(s).
3. Ensure the resistive load at the output is larger than  $(V_{CC} / I_{O(max)}) \Omega$ . This will ensure that the maximum output current from the *Absolute Maximum Ratings* is not violated. Most CMOS inputs have a resistive load measured in megaohms; much larger than the minimum calculated above.
4. Thermal issues are rarely a concern for logic gates, however the power consumption and thermal increase can be calculated using the steps provided in the application report, [CMOS Power Consumption and Cpd Calculation](#).

### 9.2.3 Application Curve

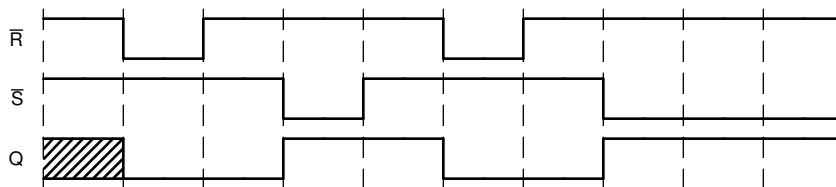


图 9-2. 应用时序图

## 10 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, as shown in given example layout image.

## 11 Layout

### 11.1 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.

### 11.2 Layout Example

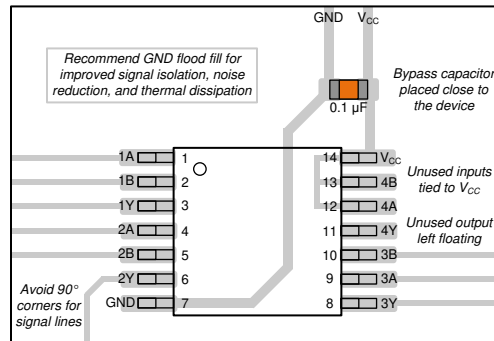


图 11-1. Example layout for the CD74HC00.

## 12 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.

### 12.1 Documentation Support

#### 12.2 接收文档更新通知

要接收文档更新通知，请导航至 [ti.com](http://ti.com) 上的器件产品文件夹。点击 [订阅更新](#) 进行注册，即可每周接收产品信息更改摘要。有关更改的详细信息，请查看任何已修订文档中包含的修订历史记录。

#### 12.3 支持资源

TI E2E™ [支持论坛](#) 是工程师的重要参考资料，可直接从专家获得快速、经过验证的解答和设计帮助。搜索现有解答或提出自己的问题可获得所需的快速设计帮助。

链接的内容由各个贡献者“按原样”提供。这些内容并不构成 TI 技术规范，并且不一定反映 TI 的观点；请参阅 TI 的 [《使用条款》](#)。

#### 12.4 Trademarks

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#### 12.5 静电放电警告



静电放电 (ESD) 会损坏这个集成电路。德州仪器 (TI) 建议通过适当的预防措施处理所有集成电路。如果不遵守正确的处理和安装程序，可能会损坏集成电路。

ESD 的损坏小至导致微小的性能降级，大至整个器件故障。精密的集成电路可能更容易受到损坏，这是因为非常细微的参数更改都可能会导致器件与其发布的规格不相符。

#### 12.6 术语表

[TI 术语表](#) 本术语表列出并解释了术语、首字母缩略词和定义。

## 13 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 Device | Status<br>(1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan<br>(2)  | Lead finish/<br>Ball material<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5)  | Samples                 |
|------------------|---------------|--------------|-----------------|------|-------------|------------------|--------------------------------------|----------------------|--------------|--------------------------|-------------------------|
| CD54HC00F        | ACTIVE        | CDIP         | J               | 14   | 25          | Non-RoHS & Green | SNPB                                 | N / A for Pkg Type   | -55 to 125   | CD54HC00F                | <a href="#">Samples</a> |
| CD54HC00F3A      | ACTIVE        | CDIP         | J               | 14   | 25          | Non-RoHS & Green | SNPB                                 | N / A for Pkg Type   | -55 to 125   | 8403701CA<br>CD54HC00F3A | <a href="#">Samples</a> |
| CD74HC00E        | ACTIVE        | PDIP         | N               | 14   | 25          | RoHS & Green     | NIPDAU                               | N / A for Pkg Type   | -55 to 125   | CD74HC00E                | <a href="#">Samples</a> |
| CD74HC00EE4      | ACTIVE        | PDIP         | N               | 14   | 25          | RoHS & Green     | NIPDAU                               | N / A for Pkg Type   | -55 to 125   | CD74HC00E                | <a href="#">Samples</a> |
| CD74HC00M        | OBSOLETE      | SOIC         | D               | 14   |             | TBD              | Call TI                              | Call TI              | -55 to 125   | HC00M                    |                         |
| CD74HC00M96      | ACTIVE        | SOIC         | D               | 14   | 2500        | RoHS & Green     | NIPDAU   SN                          | Level-1-260C-UNLIM   | -55 to 125   | HC00M                    | <a href="#">Samples</a> |
| CD74HC00MT       | OBSOLETE      | SOIC         | D               | 14   |             | TBD              | Call TI                              | Call TI              | -55 to 125   | HC00M                    |                         |

(1) 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.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.



(6) Lead finish/Ball material - Orderable Devices 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.

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**OTHER QUALIFIED VERSIONS OF CD54HC00, CD74HC00 :**

- Catalog : [CD74HC00](#)
- Military : [CD54HC00](#)

NOTE: Qualified Version Definitions:

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

**TAPE AND REEL INFORMATION**

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


\*All dimensions are nominal

| Device        | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| CD74HC00M96   | SOIC         | D               | 14   | 2500 | 330.0              | 16.4               | 6.5     | 9.0     | 2.1     | 8.0     | 16.0   | Q1            |
| CD74HC00M96G4 | SOIC         | D               | 14   | 2500 | 330.0              | 16.4               | 6.5     | 9.0     | 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) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| CD74HC00M96   | SOIC         | D               | 14   | 2500 | 367.0       | 367.0      | 38.0        |
| CD74HC00M96G4 | SOIC         | D               | 14   | 2500 | 367.0       | 367.0      | 38.0        |

**TUBE**


\*All dimensions are nominal

| Device      | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|-------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| CD74HC00E   | N            | PDIP         | 14   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HC00E   | N            | PDIP         | 14   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HC00EE4 | N            | PDIP         | 14   | 25  | 506    | 13.97  | 11230  | 4.32   |
| CD74HC00EE4 | N            | PDIP         | 14   | 25  | 506    | 13.97  | 11230  | 4.32   |

D0014A



# PACKAGE OUTLINE

## SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



4220718/A 09/2016

# EXAMPLE BOARD LAYOUT

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



LAND PATTERN EXAMPLE  
SCALE:8X



SOLDER MASK DETAILS

4220718/A 09/2016

NOTES: (continued)

- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:8X

4220718/A 09/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

J 14

**GENERIC PACKAGE VIEW**  
**CDIP - 5.08 mm max height**  
CERAMIC DUAL IN LINE PACKAGE



Images above are just a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.

4040083-5/G



J0014A



# PACKAGE OUTLINE

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



4214771/A 05/2017

NOTES:

1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermetically sealed with a ceramic lid using glass frit.
4. Index point is provided on cap for terminal identification only and on press ceramic glass frit seal only.
5. Falls within MIL-STD-1835 and GDIP1-T14.

# EXAMPLE BOARD LAYOUT

J0014A

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



LAND PATTERN EXAMPLE  
NON-SOLDER MASK DEFINED  
SCALE: 5X



4214771/A 05/2017

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

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- 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.

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