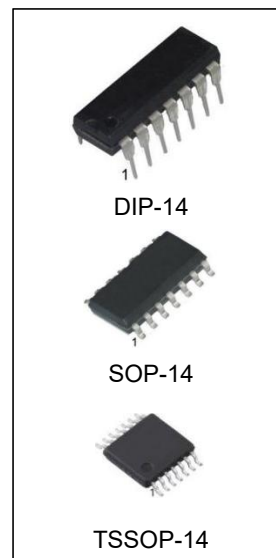


## Features

- Wide supply voltage range from 5V to 15V
- Fully static operation
- 5V, 10V, and 15V parametric ratings
- Standardized symmetrical output characteristics
- Inputs and outputs are protected against electrostatic effects
- Specified from -40°C to +85°C
- Packaging information: DIP14/SOP14/TSSOP14



## Ordering Information

| DEVICE                | Package Type | MARKING | Packing | Packing Qty  |
|-----------------------|--------------|---------|---------|--------------|
| CD4075BE/<br>CD4075BN | DIP-14       | CD4075B | TUBE    | 1000pcs/Box  |
| CD4075BM/TR           | SOP-14       | CD4075B | REEL    | 2500pcs/Reel |
| CD4075BMT/TR          | TSSOP-14     | CD4075B | REEL    | 2500pcs/Reel |

## General Description

The CD4075B provides the positive triple 3-input OR function. The outputs are fully buffered for highest noise immunity and pattern insensitivity of output impedance.

It operates over a recommended  $V_{DD}$  power supply range of 5V to 15V referenced to GND (usually ground). Unused inputs must be connected to  $V_{DD}$ , GND, or another input.

## Block Diagram

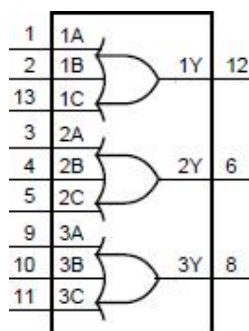


Figure 1. Functional diagram

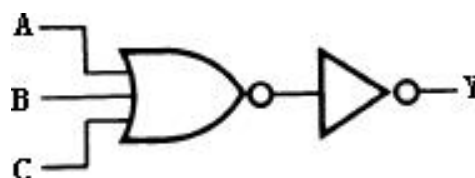
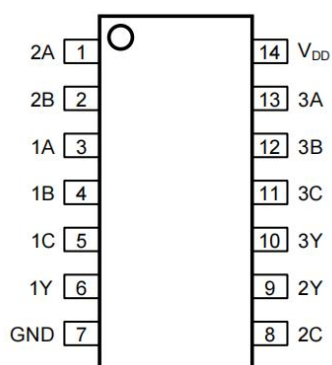


Figure 2. Logic diagram (one gate)

## Pin Configurations



DIP-14,SOP-14,TSSOP-14

## Pin Description

| Pin No. | Pin Name | Description    |
|---------|----------|----------------|
| 1       | 2A       | data input     |
| 2       | 2B       | data input     |
| 3       | 1A       | data input     |
| 4       | 1B       | data input     |
| 5       | 1C       | data input     |
| 6       | 1Y       | data output    |
| 7       | GND      | ground (0V)    |
| 8       | 2C       | data input     |
| 9       | 2Y       | data output    |
| 10      | 3Y       | data output    |
| 11      | 3C       | data input     |
| 12      | 3B       | data input     |
| 13      | 3A       | data input     |
| 14      | VDD      | supply voltage |

## Function Table

| Input |    |    | Output |
|-------|----|----|--------|
| nA    | nB | nC | nY     |
| L     | L  | L  | L      |
| X     | X  | H  | H      |
| X     | H  | X  | H      |
| H     | X  | X  | H      |

Note: H=HIGH voltage level; L=LOW voltage level; X=don't care.

## Electrical Parameter

### Absolute Maximum Ratings

(Voltages are referenced to GND (ground=0V), unless otherwise specified.)

| Parameter               | Symbol    | Conditions            | Min. | Max.         | Unit |
|-------------------------|-----------|-----------------------|------|--------------|------|
| supply voltage          | $V_{DD}$  | -                     | -0.5 | +18          | V    |
| DC input current        | $I_{IK}$  | any one input         | -    | $\pm 10$     | mA   |
| input voltage           | $V_I$     | all inputs            | -0.5 | $V_{DD}+0.5$ | V    |
| storage temperature     | $T_{stg}$ | -                     | -65  | +150         | °C   |
| total power dissipation | $P_{tot}$ | -                     | -    | 500          | mW   |
| device dissipation      | P         | per output transistor | -    | 100          | mW   |
| Soldering temperature   | $T_L$     | 10s                   | 260  |              | °C   |

Note:(1)Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but specific performance is not ensured.

(2)For DIP14 packages: above 70°C the value of  $P_{tot}$  derates linearly with 12mW/K.

(3)For SOP14 packages: above 70°C the value of  $P_{tot}$  derates linearly with 8mW/K.

(4)For (T)SSOP14 packages: above 60°C the value of  $P_{tot}$  derates linearly with 5.5mW/K.

## Recommended Operating Conditions

| Parameter           | Symbol    | Conditions  | Min. | Typ. | Max. | Unit |
|---------------------|-----------|-------------|------|------|------|------|
| supply voltage      | $V_{DD}$  | -           | 5    | -    | 15   | V    |
| Ambient temperature | $T_{amb}$ | in free air | -40  | -    | +85  | °C   |

## Electrical Characteristics

### DC Characteristics 1

(T<sub>amb</sub>=25°C, voltages are referenced to GND (ground=0V), unless otherwise specified.)

| Parameter                 | Symbol          | Conditions (V) |                 |                 | T <sub>amb</sub> =25°C |                   |      | Unit |
|---------------------------|-----------------|----------------|-----------------|-----------------|------------------------|-------------------|------|------|
|                           |                 | V <sub>O</sub> | V <sub>IN</sub> | V <sub>DD</sub> | Min.                   | Typ.              | Max. |      |
| supply current            | I <sub>DD</sub> | -              | 0, 5            | 5               | -                      | 0.01              | 0.25 | uA   |
|                           |                 | -              | 0, 10           | 10              | -                      | 0.01              | 0.5  | uA   |
|                           |                 | -              | 0, 15           | 15              | -                      | 0.01              | 1    | uA   |
| LOW-level output current  | I <sub>OL</sub> | 0.4            | 0, 5            | 5               | 0.51                   | 1                 | -    | mA   |
|                           |                 | 0.5            | 0, 10           | 10              | 1.1                    | 2.6               | -    | mA   |
|                           |                 | 1.5            | 0, 15           | 15              | 3.4                    | 6.8               | -    | mA   |
| HIGH-level output current | I <sub>OH</sub> | 4.6            | 0, 5            | 5               | -0.51                  | -1                | -    | mA   |
|                           |                 | 2.5            | 0, 5            | 5               | -1.6                   | -3.2              | -    | mA   |
|                           |                 | 9.5            | 0, 10           | 10              | -1.3                   | -2.6              | -    | mA   |
|                           |                 | 13.5           | 0, 15           | 15              | -3.4                   | -6.8              | -    | mA   |
| LOW-level output voltage  | V <sub>OL</sub> | -              | 0, 5            | 5               | -                      | 0                 | 0.05 | V    |
|                           |                 | -              | 0, 10           | 10              | -                      | 0                 | 0.05 | V    |
|                           |                 | -              | 0, 15           | 15              | -                      | 0                 | 0.05 | V    |
| HIGH-level output voltage | V <sub>OH</sub> | -              | 0, 5            | 5               | 4.95                   | 5                 | -    | V    |
|                           |                 | -              | 0, 10           | 10              | 9.95                   | 10                | -    | V    |
|                           |                 | -              | 0, 15           | 15              | 14.95                  | 15                | -    | V    |
| LOW-level input voltage   | V <sub>IL</sub> | 0.5, 4.5       | -               | 5               | -                      | -                 | 1.5  | V    |
|                           |                 | 1, 9           | -               | 10              | -                      | -                 | 3    | V    |
|                           |                 | 1.5, 13.5      | -               | 15              | -                      | -                 | 4    | V    |
| HIGH-level input voltage  | V <sub>IH</sub> | 4.5            | -               | 5               | 3.5                    | -                 | -    | V    |
|                           |                 | 9              | -               | 10              | 7                      | -                 | -    | V    |
|                           |                 | 13.5           | -               | 15              | 11                     | -                 | -    | V    |
| input leakage current     | I <sub>I</sub>  | -              | 0, 15           | 15              | -                      | ±10 <sup>-5</sup> | ±0.1 | uA   |

## DC Characteristics 2

(Tamb=-40℃ to +85, voltages are referenced to GND (ground=0V), unless otherwise specified.)

| Parameter                 | Symbol | Conditions (V) |       |     | Tamb=-40℃ |      | Tamb=+85℃ |      | Unit |
|---------------------------|--------|----------------|-------|-----|-----------|------|-----------|------|------|
|                           |        | VO             | VIN   | VDD | Min.      | Max. | Min.      | Max. |      |
| supply current            | IDD    | -              | 0, 5  | 5   | -         | 0.25 | -         | 7.5  | uA   |
|                           |        | -              | 0, 10 | 10  | -         | 0.5  | -         | 15   | uA   |
|                           |        | -              | 0, 15 | 15  | -         | 1    | -         | 30   | uA   |
| LOW-level output current  | IOL    | 0.4            | 0, 5  | 5   | 0.61      | -    | 0.42      | -    | mA   |
|                           |        | 0.5            | 0, 10 | 10  | 1.5       | -    | 1.1       | -    | mA   |
|                           |        | 1.5            | 0, 15 | 15  | 4         | -    | 2.8       | -    | mA   |
| HIGH-level output current | IOH    | 4.6            | 0, 5  | 5   | -0.61     | -    | -0.42     | -    | mA   |
|                           |        | 2.5            | 0, 5  | 5   | -1.8      | -    | -1.1      | -    | mA   |
|                           |        | 9.5            | 0, 10 | 10  | -1.5      | -    | -1.1      | -    | mA   |
|                           |        | 13.5           | 0, 15 | 15  | -4        | -    | -2.8      | -    | mA   |
| LOW-level output voltage  | VOL    | -              | 0, 5  | 5   | -         | 0.05 | -         | 0.05 | V    |
|                           |        | -              | 0, 10 | 10  | -         | 0.05 | -         | 0.05 | V    |
|                           |        | -              | 0, 15 | 15  | -         | 0.05 | -         | 0.05 | V    |
| HIGH-level output voltage | VOH    | -              | 0, 5  | 5   | 4.95      | -    | 4.95      | -    | V    |
|                           |        | -              | 0, 10 | 10  | 9.95      | -    | 9.95      | -    | V    |
|                           |        | -              | 0, 15 | 15  | 14.95     | -    | 14.95     | -    | V    |
| LOW-level input voltage   | VIL    | 0.5, 4.5       | -     | 5   | -         | 1.5  | -         | 1.5  | V    |
|                           |        | 1, 9           | -     | 10  | -         | 3    | -         | 3    | V    |
|                           |        | 1.5, 13.5      | -     | 15  | -         | 4    | -         | 4    | V    |
| HIGH-level input voltage  | VIH    | 4.5            | -     | 5   | 3.5       | -    | 3.5       | -    | V    |
|                           |        | 9              | -     | 10  | 7         | -    | 7         | -    | V    |
|                           |        | 13.5           | -     | 15  | 11        | -    | 11        | -    | V    |
| input leakage current     | II     | -              | 0, 15 | 15  | -         | ±0.1 | -         | ±1   | uA   |

## AC Characteristics

(Tamb=25℃, GND=0V, tr, tf=20ns, CL=50pF, RL=200kΩ, unless otherwise specified.)

| Parameter              | Symbol                           | Conditions   |                            | Min. | Typ. | Max. | Unit |
|------------------------|----------------------------------|--------------|----------------------------|------|------|------|------|
| propagation delay time | $t_{\text{PHL}}, t_{\text{PLH}}$ | see Figure 4 | $V_{\text{DD}}=5\text{V}$  | -    | 125  | 250  | ns   |
|                        |                                  |              | $V_{\text{DD}}=10\text{V}$ | -    | 60   | 120  | ns   |
|                        |                                  |              | $V_{\text{DD}}=15\text{V}$ | -    | 45   | 90   | ns   |
| transition time        | $t_{\text{THL}}, t_{\text{TLH}}$ | see Figure 4 | $V_{\text{DD}}=5\text{V}$  | -    | 100  | 200  | ns   |
|                        |                                  |              | $V_{\text{DD}}=10\text{V}$ | -    | 50   | 100  | ns   |
|                        |                                  |              | $V_{\text{DD}}=15\text{V}$ | -    | 40   | 80   | ns   |
| input capacitance      | $C_{\text{I}}$                   | any input    |                            | -    | 5    | 7.5  | pF   |

## AC Testing Circuit

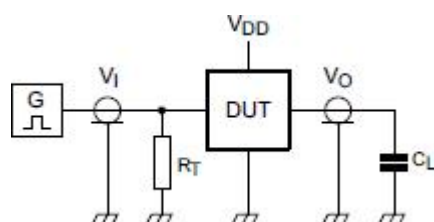


Figure 3. Test circuit for switching times

Definitions for test circuit:

DUT=Device Under Test.

$C_L$ =Load capacitance including jig and probe capacitance.

$R_T$ =Termination resistance should be equal to the output impedance  $Z_o$  of the pulse generator.

## AC Testing Waveforms

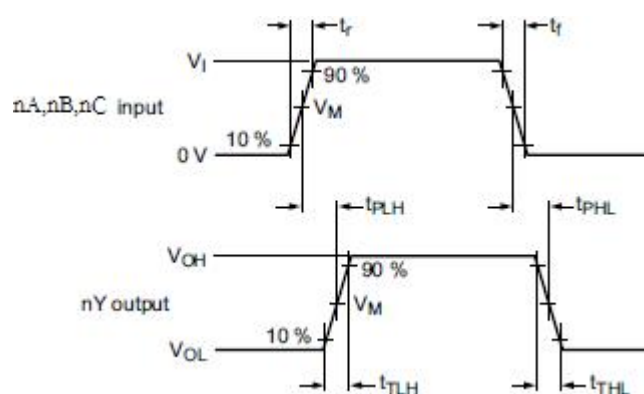


Figure 4. Propagation delay, output transition time

## Measurement Points

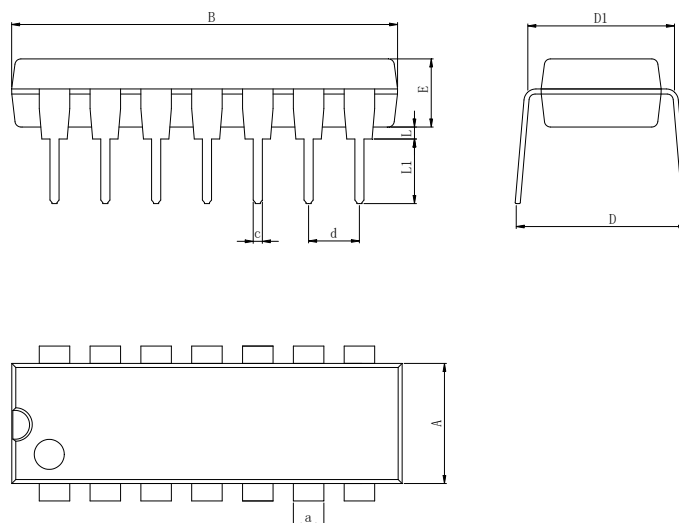
| Supply voltage | Input               | Output              |
|----------------|---------------------|---------------------|
| VDD            | VM                  | VM                  |
| 5V to 15V      | $0.5 \times V_{DD}$ | $0.5 \times V_{DD}$ |

## Test Data

| Supply voltage | Input      |                    | Load |
|----------------|------------|--------------------|------|
| VDD            | VI         | $t_r, t_f$         | CL   |
| 5V to 15V      | GND or VDD | $\leq 20\text{ns}$ | 50pF |

## Physical Dimensions

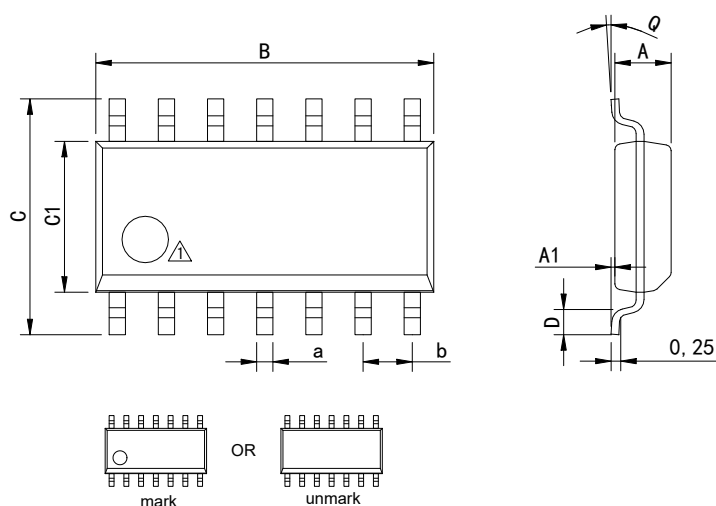
### DIP-14



Dimensions In Millimeters(DIP-14)

| Symbol: | A    | B     | D    | D1   | E    | L    | L1   | a    | c    | d        |
|---------|------|-------|------|------|------|------|------|------|------|----------|
| Min:    | 6.10 | 18.94 | 8.10 | 7.42 | 3.10 | 0.50 | 3.00 | 1.50 | 0.40 | 2.54 BSC |
| Max:    | 6.68 | 19.56 | 10.9 | 7.82 | 3.55 | 0.70 | 3.60 | 1.55 | 0.50 |          |

### SOP-14



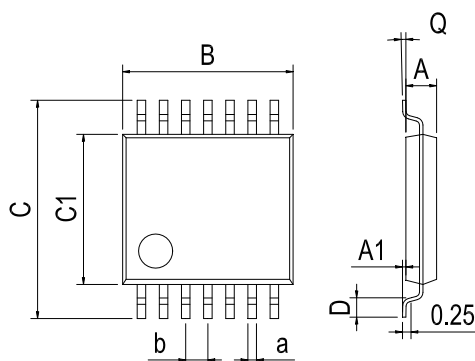
△ Package top mark may be in lower left corner or unmark

Dimensions In Millimeters(SOP-14)

| Symbol: | A    | A1   | B    | C    | C1   | D    | Q  | a    | b        |
|---------|------|------|------|------|------|------|----|------|----------|
| Min:    | 1.35 | 0.05 | 8.55 | 5.80 | 3.80 | 0.40 | 0° | 0.35 | 1.27 BSC |
| Max:    | 1.55 | 0.20 | 8.75 | 6.20 | 4.00 | 0.80 | 8° | 0.45 |          |

## Physical Dimensions

TSSOP-14



| Dimensions In Millimeters(TSSOP14) |      |      |      |      |      |      |    |      |          |
|------------------------------------|------|------|------|------|------|------|----|------|----------|
| Symbol:                            | A    | A1   | B    | C    | C1   | D    | Q  | a    | b        |
| Min:                               | 0.85 | 0.05 | 4.90 | 6.20 | 4.30 | 0.40 | 0° | 0.20 | 0.65 BSC |
| Max:                               | 0.95 | 0.20 | 5.10 | 6.60 | 4.50 | 0.80 | 8° | 0.25 |          |

## Revision History

| REVISION NUMBER | DATE    | REVISION                                                                          | PAGE  |
|-----------------|---------|-----------------------------------------------------------------------------------|-------|
| V1.0            | 2012-3  | New                                                                               | 1-10  |
| V1.1            | 2017-6  | Updated Ambient temperature and supply voltage range、Update DIP Package New Model | 1、 3  |
| V1.2            | 2022-9  | Updated DIP-14 dimension                                                          | 7     |
| V1.3            | 2024-11 | Update Lead Temperature                                                           | 3     |
| V1.4            | 2025-11 | Update important statements、Update SOP-14 Dimension drawing                       | 7、 10 |

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