

# Dual monostable multivibrator

## BU4528B / BU4528BF

The BU4528B and BU4528BF are monostable multivibrators with trigger and reset functions that can be activated. Each chip has two built-in circuits.

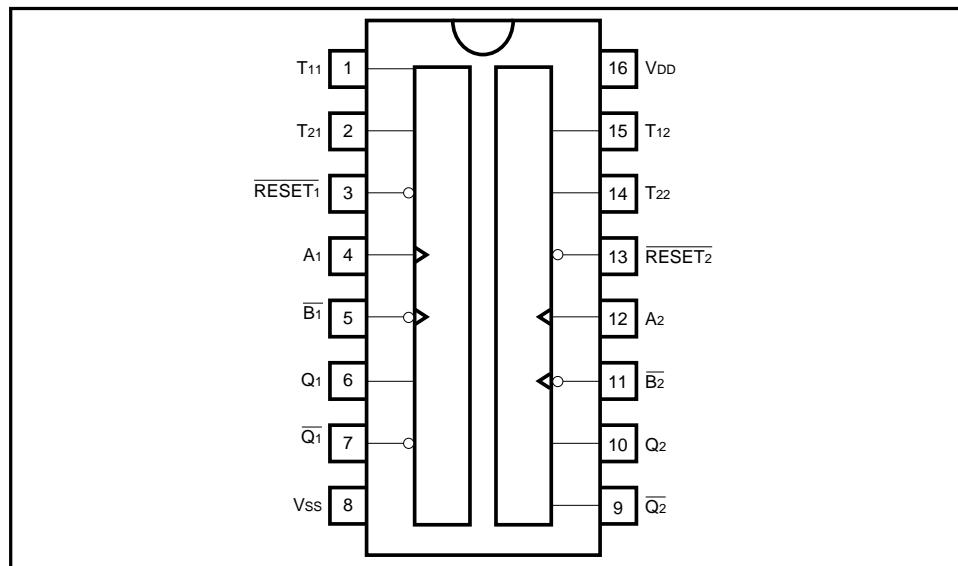
Triggers can initiate both rising and falling in response to Input A and Input B. As the output monostable pulse width is determined by the time constant of the external resistance ( $R_x$ ) and the capacitor ( $C_x$ ), a wide range of output pulse widths can be set.

Setting the  $\overline{\text{RESET}}$  input to "L" enables external asynchronous resetting and this  $\overline{\text{RESET}}$  input can be utilized to reduce the time from the trigger disable input or the power on until the BU4528B and BU4528BF are ready for monostable operation.

●Features

- 1) Low power dissipation.
- 2) Wide range of operating power supply voltages.
- 3) High input impedance.
- 4) High fan-out.
- 5) Direct drive of 2 L-TTL inputs and 1 LS-TTL input.

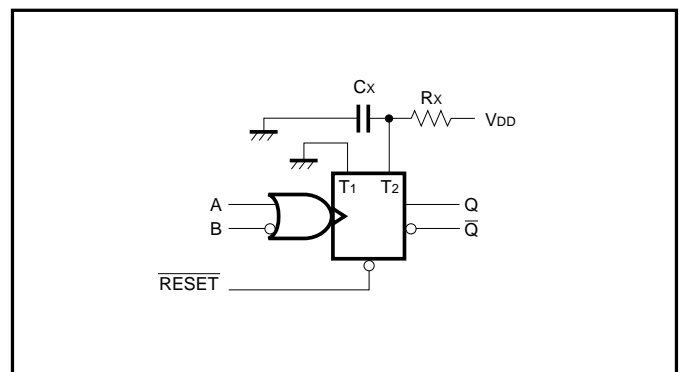
●Block diagram



●Truth table

| INPUT                     |       |       | OUTPUT        |                |
|---------------------------|-------|-------|---------------|----------------|
| $\overline{\text{RESET}}$ | A     | B     | Q             | $\overline{Q}$ |
| H                         |       | H     |               |                |
| H                         | L     |       |               |                |
| H                         |       | L     | Not Triggered |                |
| H                         | H     |       | Not Triggered |                |
| H                         | L, H, | H     | Not Triggered |                |
| H                         | L     | L, H, | Not Triggered |                |
| L                         | X     | X     | L             | H              |
|                           | X     | X     | Not Triggered |                |

●Logic circuit diagram



● Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ ,  $V_{SS} = 0\text{V}$ )

| Parameter             | Symbol    | Limits                 | Unit             |
|-----------------------|-----------|------------------------|------------------|
| Power supply voltage  | $V_{DD}$  | - 0.3 ~ + 18           | V                |
| Power dissipation     | $P_d$     | 1000 (DIP), 500 (SOP)  | mW               |
| Operating temperature | $T_{opr}$ | - 40 ~ + 85            | $^\circ\text{C}$ |
| Storage temperature   | $T_{stg}$ | - 55 ~ + 150           | $^\circ\text{C}$ |
| Input voltage         | $V_{IN}$  | - 0.3 ~ $V_{DD} + 0.3$ | V                |

## ● Electrical characteristics

DC characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$ ,  $V_{SS} = 0\text{V}$ )

| Parameter                  | Symbol   | Min.   | Typ. | Max.  | Unit          | Conditions   |                         |
|----------------------------|----------|--------|------|-------|---------------|--------------|-------------------------|
|                            |          |        |      |       |               | $V_{DD}$ (V) |                         |
| Input high level voltage   | $V_{IH}$ | 3.5    | —    | —     | V             | 5            | —                       |
|                            |          | 7.0    | —    | —     |               | 10           |                         |
|                            |          | 11.0   | —    | —     |               | 15           |                         |
| Input low level voltage    | $V_{IL}$ | —      | —    | 1.5   | V             | 5            | —                       |
|                            |          | —      | —    | 3.0   |               | 10           |                         |
|                            |          | —      | —    | 4.0   |               | 15           |                         |
| Input high level current   | $I_{IH}$ | —      | —    | 0.3   | $\mu\text{A}$ | 15           | $V_{IH} = 15\text{V}$   |
| Input low level current    | $I_{IL}$ | —      | —    | - 0.3 | $\mu\text{A}$ | 15           | $V_{IL} = 0\text{V}$    |
| Output high level voltage  | $V_{OH}$ | 4.95   | —    | —     | V             | 5            | $I_o = 0\text{mA}$      |
|                            |          | 9.95   | —    | —     |               | 10           |                         |
|                            |          | 14.95  | —    | —     |               | 15           |                         |
| Output low level voltage   | $V_{OL}$ | —      | —    | 0.05  | V             | 5            | $I_o = 0\text{mA}$      |
|                            |          | —      | —    | 0.05  |               | 10           |                         |
|                            |          | —      | —    | 0.05  |               | 15           |                         |
| Output high level current  | $I_{OH}$ | - 0.16 | —    | —     | mA            | 5            | $V_{OH} = 4.6\text{V}$  |
|                            |          | - 0.4  | —    | —     |               | 10           | $V_{OH} = 9.5\text{V}$  |
|                            |          | - 1.2  | —    | —     |               | 15           | $V_{OH} = 13.5\text{V}$ |
| Output low level current   | $I_{OL}$ | 0.44   | —    | —     | mA            | 5            | $V_{OL} = 0.4\text{V}$  |
|                            |          | 1.1    | —    | —     |               | 10           | $V_{OL} = 0.5\text{V}$  |
|                            |          | 3.0    | —    | —     |               | 15           | $V_{OL} = 1.5\text{V}$  |
| Static current dissipation | $I_{DD}$ | —      | —    | 20    | $\mu\text{A}$ | 5            | $V_i = V_{DD}$ or GND   |
|                            |          | —      | —    | 40    |               | 10           |                         |
|                            |          | —      | —    | 80    |               | 15           |                         |

Switching characteristics (Ta = 25°C, CL = 50pF, VSS = 0V)

| Parameter   | Symbol                               | Min. | Typ. | Max. | Unit | V <sub>DD</sub> (V) | Conditions  |
|---|--------------------------------------|------|------|------|------|---------------------|---|
|   |                                      |      |      |      |      |                     |   |
| Output rise time  | t <sub>TLH</sub>                     | —    | 100  | —    | ns   | 5                   | —   |
|   |                                      | —    | 50   | —    | ns   | 10                  |   |
|   |                                      | —    | 40   | —    | ns   | 15                  |   |
| Output fall time  | t <sub>THL</sub>                     | —    | 100  | —    | ns   | 5                   | —   |
|   |                                      | —    | 50   | —    | ns   | 10                  |   |
|   |                                      | —    | 40   | —    | ns   | 15                  |   |
| Propagation delay time,<br>A or B to Q or $\bar{Q}$               | t <sub>PLH</sub><br>t <sub>PHL</sub> | —    | 325  | —    | ns   | 5                   | C <sub>x</sub> = 15pF, R <sub>x</sub> = 5kΩ   |
|   |                                      | —    | 120  | —    | ns   | 10                  |   |
|   |                                      | —    | 90   | —    | ns   | 15                  |   |
| Propagation delay time,<br>A or B to Q or $\bar{Q}$               | t <sub>PLH</sub><br>t <sub>PHL</sub> | —    | 705  | —    | ns   | 5                   | C <sub>x</sub> = 1000pF, R <sub>x</sub> = 10kΩ  |
|   |                                      | —    | 290  | —    | ns   | 10                  |   |
|   |                                      | —    | 210  | —    | ns   | 15                  |   |
| Propagation delay,<br>$\overline{\text{Reset}}$ to Q or $\bar{Q}$ | t <sub>PLH</sub><br>t <sub>PHL</sub> | —    | 325  | —    | ns   | 5                   | C <sub>x</sub> = 15pF, R <sub>x</sub> = 5kΩ   |
|   |                                      | —    | 90   | —    | ns   | 10                  |   |
|   |                                      | —    | 60   | —    | ns   | 15                  |   |
|   |                                      | —    | 1000 | —    | ns   | 5                   | C <sub>x</sub> = 1000pF, R <sub>x</sub> = 10kΩ  |
|   |                                      | —    | 300  | —    | ns   | 10                  |   |
|   |                                      | —    | 250  | —    | ns   | 15                  |   |
| Minimum input<br>pulse width                                      | t <sub>WIN</sub>                     | —    | 70   | —    | ns   | 5                   | C <sub>x</sub> = 1000pF, R <sub>x</sub> = 10kΩ<br>C <sub>x</sub> = 15pF, R <sub>x</sub> = 5kΩ |
|   |                                      | —    | 30   | —    | ns   | 10                  |   |
|   |                                      | —    | 30   | —    | ns   | 15                  |   |
| Output pulse width  | t <sub>WOUT1</sub>                   | —    | 550  | —    | ns   | 5                   | C <sub>x</sub> = 15pF, R <sub>x</sub> = 5kΩ   |
|   |                                      | —    | 350  | —    | ns   | 10                  |   |
|   |                                      | —    | 300  | —    | ns   | 15                  |   |
| Output pulse width  | t <sub>WOUT2</sub>                   | 25   | 40   | 55   | μs   | 5                   | C <sub>x</sub> = 1000pF, R <sub>x</sub> = 10kΩ  |
|   |                                      | 10   | 50   | 90   | μs   | 10                  |   |
|   |                                      | 15   | 55   | 95   | μs   | 15                  |   |
| Minimum trigger time  | t <sub>rr</sub>                      | —    | 0    | —    | ns   | 5                   | C <sub>x</sub> = 1000pF, R <sub>x</sub> = 10kΩ<br>C <sub>x</sub> = 15pF, R <sub>x</sub> = 5kΩ |
|   |                                      | —    | 0    | —    | ns   | 10                  |   |
|   |                                      | —    | 0    | —    | ns   | 15                  |   |
| Input capacitance   | C <sub>IN</sub>                      | —    | 5    | —    | pF   | —                   | —   |

● Measurement circuits

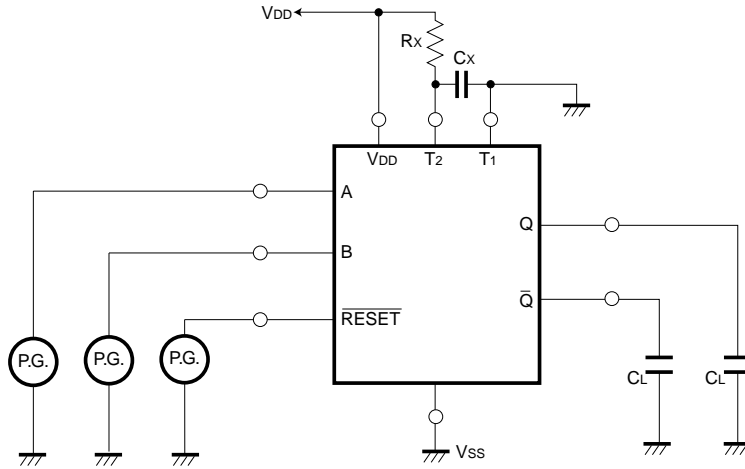


Fig. 1 Switching time measurement circuit

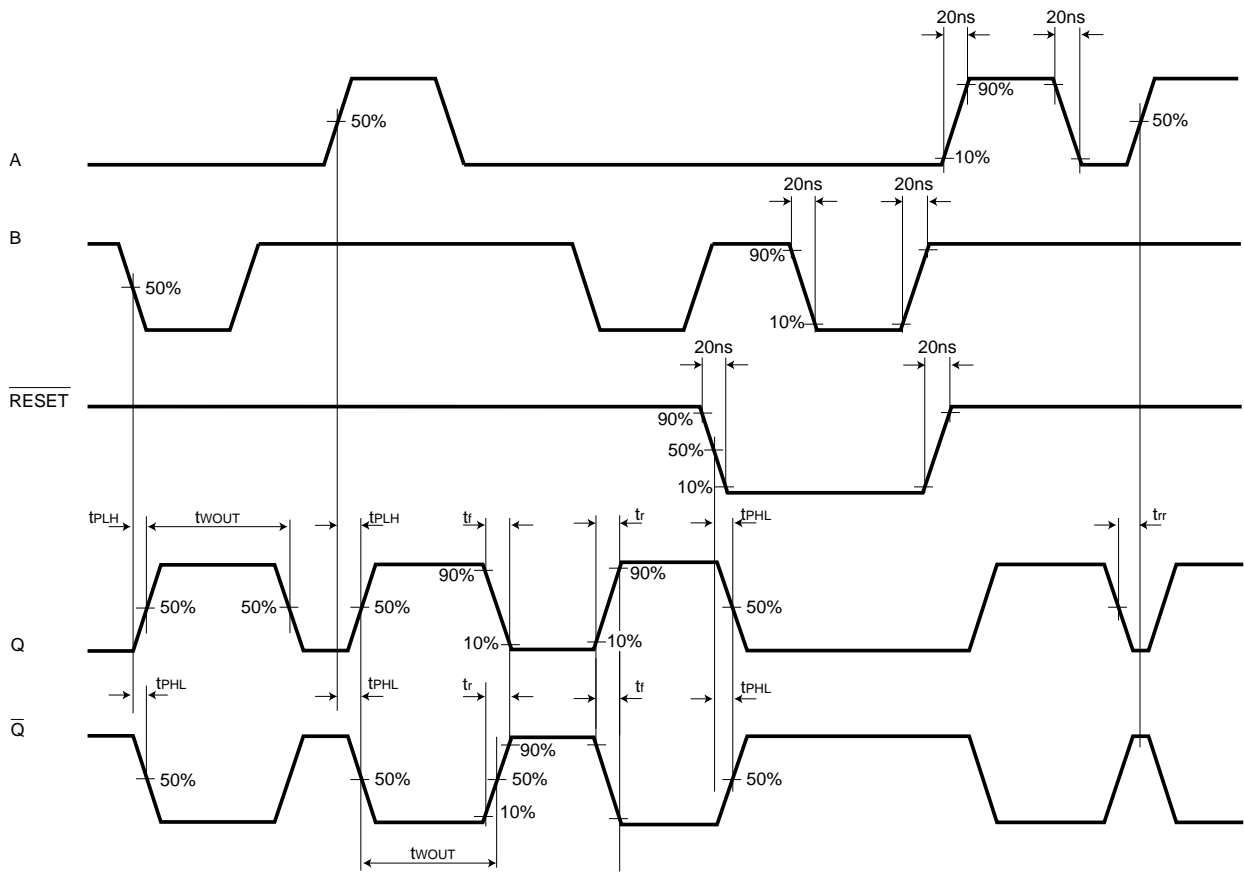


Fig. 2 Switching time waveform

●Timing chart

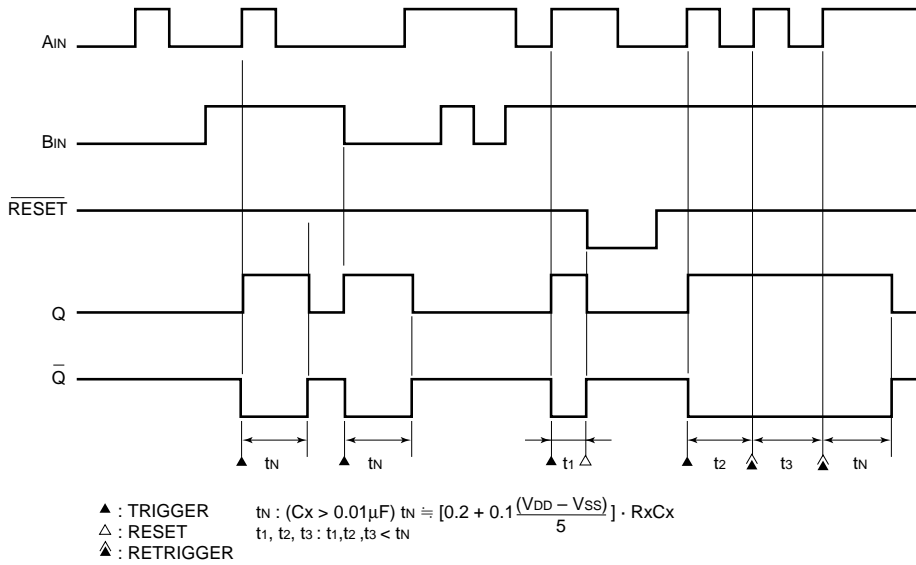


Fig. 3

●Electrical characteristic curve

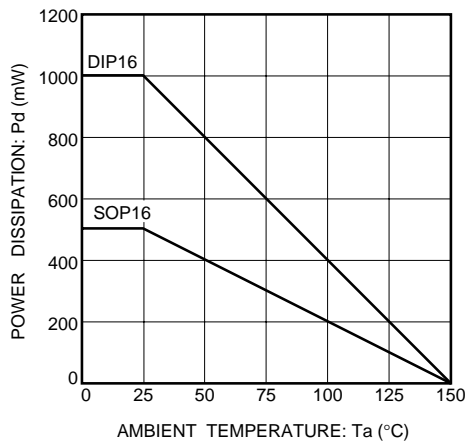


Fig. 4 Power dissipation vs. Ta

●External dimensions (Units: mm)

