Dual precision monostable multivibrator

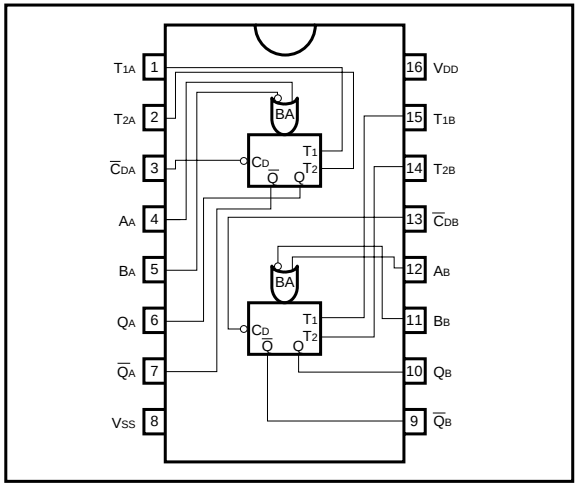
BU4538B

The BU4538B is a monostable multivibrator that can be reset and retriggered. It is triggered from either edge of an input pulse. As the output pulse width and accuracy are determined by the external timing constants Cx and Rx, a wide range of accurate output pulse widths is available. Linear CMOS technology makes it possible to control the output pulse width with greater accuracy. Determination is made based on $t_{WOUT} = Rx \cdot Cx$ throughout the entire power supply voltage range, eliminating the necessity for other coefficients.

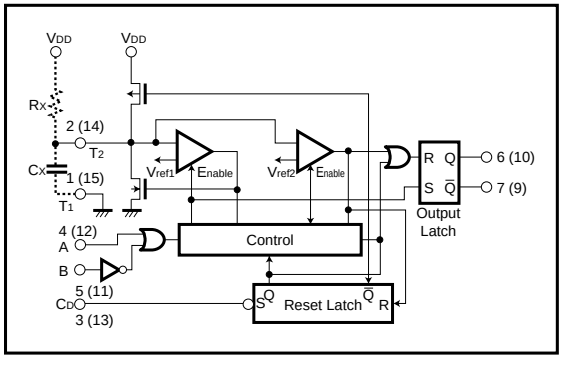
●Features

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



●Logic circuit diagram



●Truth table

INPUT			OUTPUT	
A	B	C_D	Q	$\overline{Q}$
↑	H	H	⊓	⊔
↑	L	H	L	H
H	↓	H	L	H
L	↓	H	⊓	⊔
X	X	L	L	H

●Absolute maximum ratings (Ta = 25°C, V_{SS} = 0V)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{DD}	– 0.3 ~ + 18	V
Power dissipation	Pd	1000 (DIP)	mW
Operating temperature	Topr	– 40 ~ + 85	°C
Storage temperature	Tstg	– 55 ~ + 150	°C
Input voltage	V_{IN}	– 0.3 ~ V_{DD} + 0.3	V

●Electrical characteristics

DC characteristics (unless otherwise noted, Ta = 25°C, V_{SS} = 0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	V_{DD} (V)	Conditions
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	µA	15	V_{IH} = 15V
Input low level current	I_{IL}	—	—	– 0.3	µA	15	V_{IL} = 0V
Output high level voltage	V_{OH}	4.95	—	—	V	5	I_O = 0mA
		9.95	—	—		10	
		14.95	—	—		15	
Output low level voltage	V_{OL}	—	—	0.05	V	5	I_O = 0mA
		—	—	0.05		10	
		—	—	0.05		15	
Output high level current	I_{OH}	– 0.16	—	—	mA	5	V_{OH} = 4.6V
		– 0.4	—	—		10	V_{OH} = 9.5V
		– 1.2	—	—		15	V_{OH} = 13.5V
Output low level current	I_{OL}	0.44	—	—	mA	5	V_{OL} = 0.4V
		1.1	—	—		10	V_{OL} = 0.5V
		3.0	—	—		15	V_{OL} = 1.5V
Static current dissipation	I_{DD}	—	—	20	µA	5	V_I = V_{DD} or GND
		—	—	40		10	
		—	—	80		15	

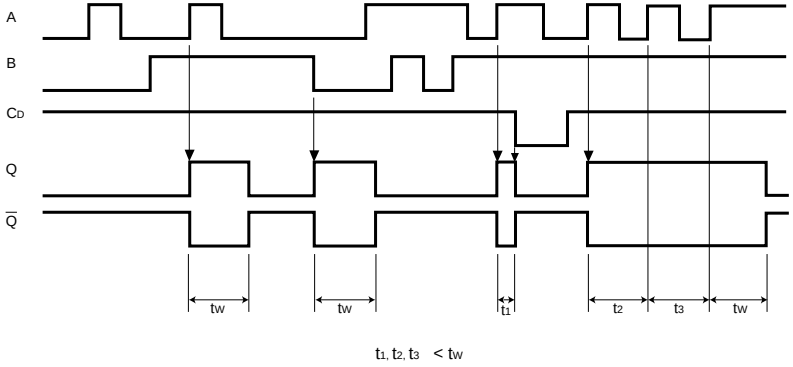
Switching characteristics (unless otherwise noted, Ta = 25°C, C_L = 50pF, V_{SS} = 0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	V_{DD} (V)	Conditions
Output rise time	t_{TLH}	—	100	—	ns	5	—
		—	50	—		10	
		—	40	—		15	
Output fall time	t_{THL}	—	100	—	ns	5	—
		—	50	—		10	
		—	40	—		15	
Propagation delay time A, B to Q, $\overline{Q}$	t_{PLH} t_{PHL}	—	300	—	ns	5	—
		—	150	—		10	
		—	100	—		15	
Propagation delay time C_D to Q, $\overline{Q}$	t_{PLH} t_{PHL}	—	250	—	ns	5	—
		—	125	—		10	
		—	95	—		15	
Minimum input pulse width	t_{WIN}	—	50	—	ns	5	—
		—	30	—		10	
		—	25	—		15	
Output pulse width 1	t_{WOUT1}	185	200	215	µs	5	C_X = 2000pF, R_X = 100kΩ
		185	200	215		10	
		185	200	215		15	
Output pulse width 2	t_{WOUT2}	8.8	9.4	10.0	ms	5	C_X = 0.1µF, R_X = 100kΩ
		8.8	9.4	10.0		10	
		8.8	9.4	10.0		15	
Minimum retrigger time	t_{rr}	—	0	—	ns	5	—
		—	0	—		10	
		—	0	—		15	
Input capacitance	C_{IN}	—	5	—	pF	—	—

●Recommended operating conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
External timing resistance	R_X	5	—	1000	kΩ	—
External timing capacitance	C_X	No Limit			pF	—

●Timing chart



$t_1, t_2, t_3 < t_W$

●Measurement circuits

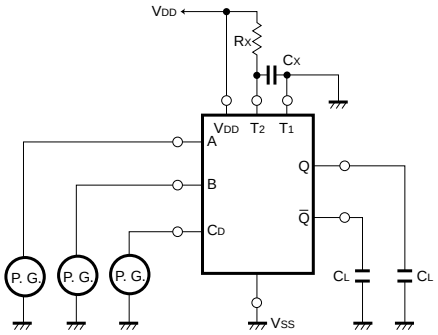


Fig. 1 (a) Switching time

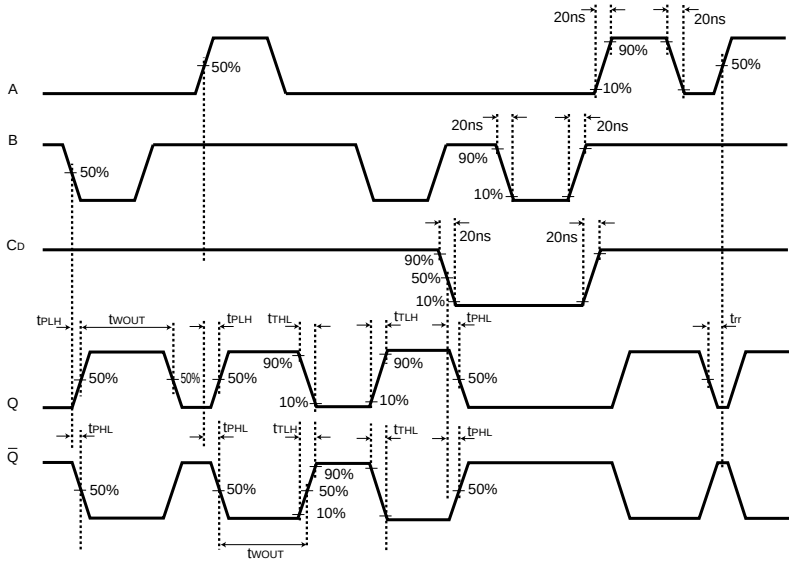


Fig. 1 (b) Switching time measurement waveforms

●Electrical characteristic curve

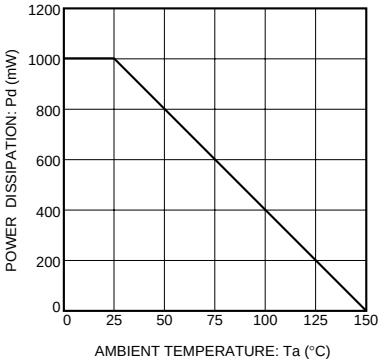
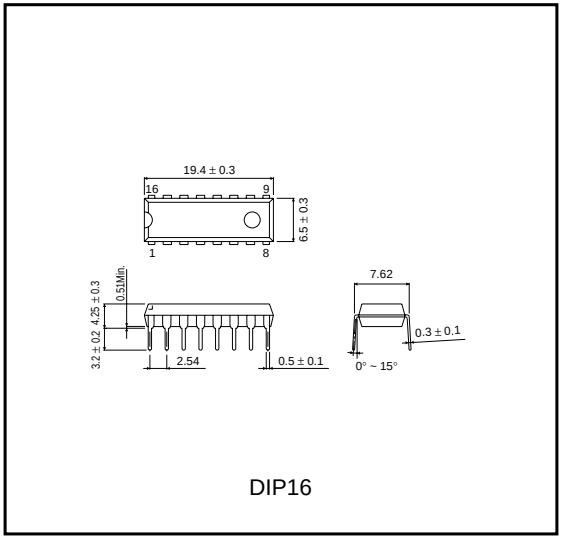


Fig. 2 Power dissipation vs. Ta

●External dimensions (Units: mm)



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