



CD4098 CMOS Dual Monostable Multivibrator

1. General Description

1.1 Description

CD4098 dual monostable multivibrator provides stable retriggerable/resettable one shot operation for any fixed voltage timing application.

An external resistor (RX) and an external capacitor (CX) control the timing for the circuit. Adjustment of RX and CX provides a wide range of output pulse widths from the Q and $\bar{Q}$ terminals. The time delay from trigger input to output transition (trigger propagation delay) and the time delay from reset input to output transition (reset propagation delay) are independent of RX and CX.

Leading edge triggering (+TR) and trailing edge triggering(-TR) inputs are provided for triggering from either edge of an input pulse. An unused +TR input should be tied to VSS. An unused -TR input should be tied to VDD. A RESET (on low level) is provided for immediate termination of the output pulse or to prevent output pulses when power is turned on. An unused RESET input should be tied to VDD. However, if an entire section of the CD4098 is not used, its RESET should be tied to VSS. See Figure 2.3.

In normal operation the circuit triggers (extends the output pulse one period) on the application of each new trigger pulse. For operation in the non-retriggerable mode, $\bar{Q}$ is connected to -TR when leading edge triggering (+TR) is used or Q is connected to +TR when trailing edge triggering (-TR) is used.

The time period (T) for this multivibrator can be approximated by: $TX = \frac{1}{2}RxCx$ for $Cx \geq 0.01 \mu F$. Values of T vary from unit to unit and as a function of voltage, temperature, and RXCX.

The minimum value of external resistance, RX, is 5k Ω . The maximum value of external capacitance, CX, is 100 μF .

1.2 Features

- High Voltage Type (18V Rating)
- Retriggerable/Resettable Capability
- Trigger and Reset Propagation Delays Independent of RX, CX
- Triggering from Leading or Trailing Edge Q and $\bar{Q}$ Buffered Outputs Available
- Separate Resets
- Wide Range of Output Pulse Widths
- Standardized Symmetrical Output Characteristics
- Maximum input current of 1 μA at 18V
- 100% Tested for Quiescent Current at 18V
- 5V, 10V, and 15V parametric ratings

1.3 Device Information

PART NUMBER	PACKAGE
CD4098	DIP
	SOP
	TSSOP

2. Pin Description and Functional Diagram

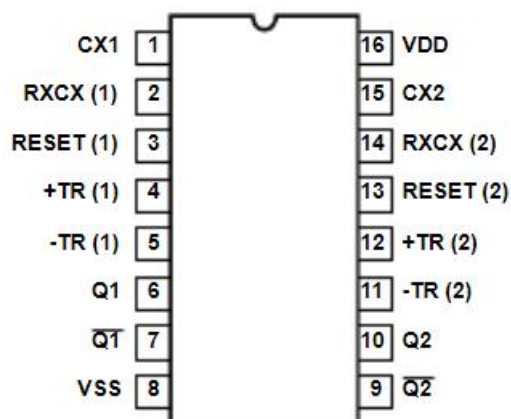


Figure 2.1 Top View

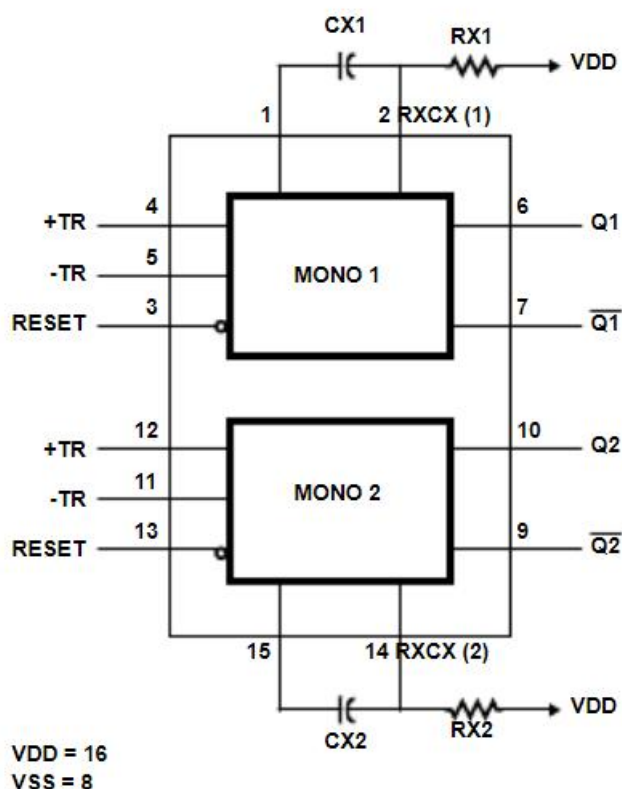


Figure 2.2 Functional Diagram

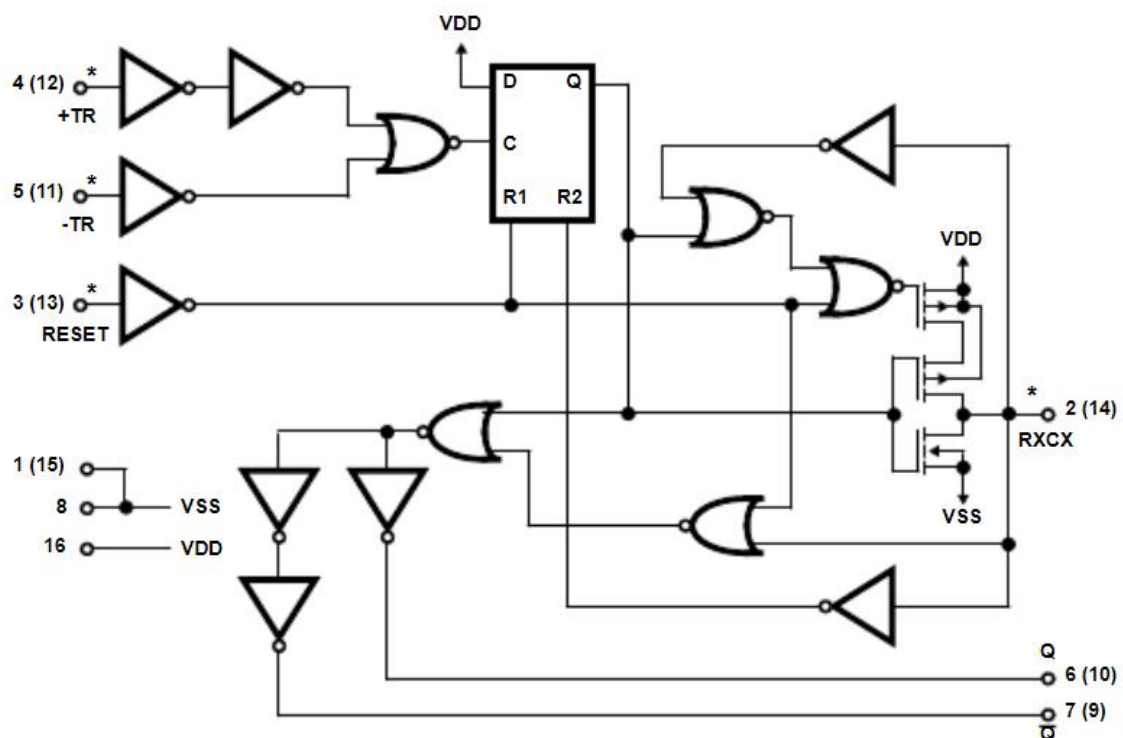
FUNCTION	VDD TO TERM. NO.		VSS TO TERM. NO.		INPUT PULSE TO TERM. NO.		OTHER CONNECTIONS	
	MONO 1	MONO 2	MONO 1	MONO 2	MONO 1	MONO 2	MONO 1	MONO 2
Leading Edge Trigger/ Retriggerable	3, 5	11, 13			4	12		
Leading Edge Trigger/ Non-Retriggerable	3	13			4	12	5-7	11-9
Trailing Edge Trigger/ Retriggerable	3	13	4	12	5	11		
Trailing Edge Trigger/ Non-Retriggerable	3	13			5	11	4-6	12-10
Unused Section	5	11	3, 4	12, 13				

Figure 2.3 Functional Terminal Connections

PIN No.	NAME	I/O	FUNCTION
1	CX1	I	Data Input
2	RXCX1	I	Data Input
3	RESET1	I	Data Input
4	+TR1	I	Data Input
5	-TR1	I	Data Input
6	Q1	O	Data Output
7	$\overline{Q1}$	O	Data Output
8	VSS		Ground
9	$\overline{Q2}$	O	Data Output
10	Q2	O	Data Output
11	-TR2	I	Data Input
12	+TR2	I	Data Input
13	RESET2	I	Data Input
14	RXCX2	I	Data Input
15	CX2	I	Data Input
16	VDD		Supply Voltage

3. System Diagram

3.1 Logic Diagram



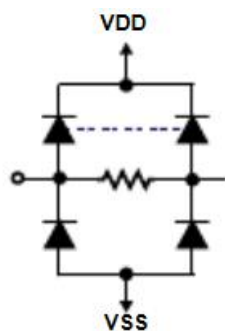


Figure 3.1: CD4098 Logic Diagram

3.2 Truth Table

Input			Output	
TR+	TR-	$\bar{R}$	Q	$\bar{Q}$
↑	1	1		
↑	0	1	Q	$\bar{Q}$
1	↓	1	Q	$\bar{Q}$
0	↓	1		
X	X	0	0	1

X = Don't Care, 1 = High State, 0 =Low State

4. Specifications

4.1 Absolute Maximum Ratings

Symbol	Parameter	MIN	MAX	Unit
V_{DD}	DC Supply Voltage Range (Voltage Referenced to VSS Terminals)	-0.5	20	V
V_I	Input Voltage Range, All Inputs	0.5	$V_{DD}+0.5$	V
P_D	Power Dissipation		500	mW
T_J	Junction Temperature		125	°C
T_{OP}	Operating Temperature	-40	85	°C

Absolute maximum ratings are those values beyond which the device could be permanently damaged, These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under normal operating conditions.

4.2 Electrical Characteristics

(T_a=25°C, voltages are referenced to VSS (ground=0V), unless otherwise specified)

Symbol	Parameter	Test Condition			MIN	TYP	MAX	Unit
		VO	VIN	VDD				
I _{DD}	Supply Current	--	0,5	5	--	0	1	uA
		--	0,10	10	--	0	1	uA
		--	0,18	18	--	0	1	uA
I _{OL}	Low Level Output Current	0.4	0,5	5	1	2	--	mA
		0.5	0,10	10	2	5	--	mA
		1.5	0,15	15	10	20	--	mA
I _{OH}	High Level Output Current	4.6	0,5	5	-0.51	-1	--	mA
		2.5	0,5	5	-2	-5	--	mA
		9.5	0,10	10	-1.3	-2.6	--	mA
		13.5	0,15	15	-4	-8	--	mA
V _{OL}	Low Level Output Voltage	--	0,5	5	--	0	0.05	V
		--	0,10	10	--	0	0.05	V
		--	0,15	15	--	0	0.05	V
V _{OH}	High Level Output Voltage	--	0,5	5	4.95	5	--	V
		--	0,10	10	9.95	10	--	V
		--	0,15	15	14.95	15	--	V
V _{IL}	Low Level Input Voltage	0.5,4.5	--	5	--	--	1.5	V
		1,9	--	10	--	--	3	V
		1.5,13.5	--	15	--	--	4	V
V _{IH}	High Level Input Voltage	0.5,4.5	--	5	3.5	--	--	V
		1,9	--	10	7	--	--	V
		1.5,13.5	--	15	11	--	--	V
I _{IN}	Input Leakage Current	--	0,18	18	--	0	±1	uA

5. Application

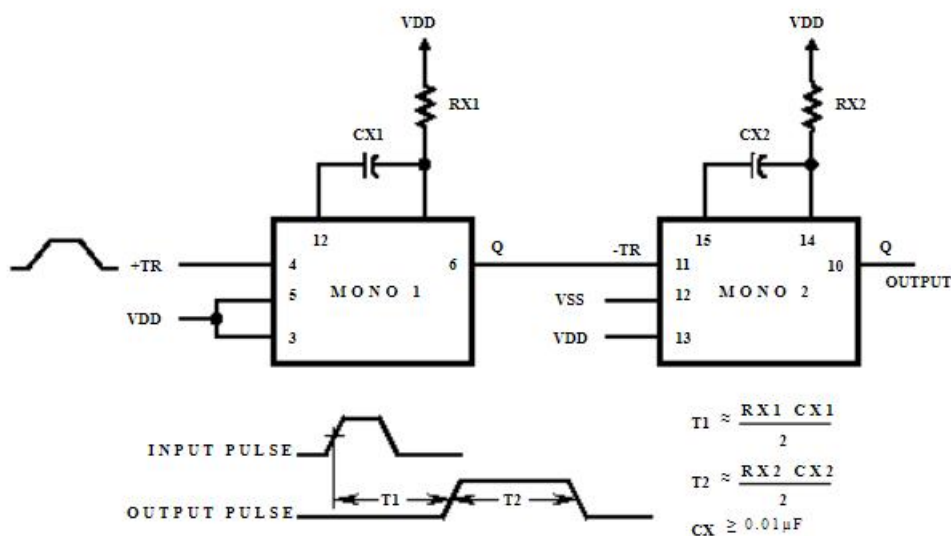


Figure 5.1 Pulse Delay



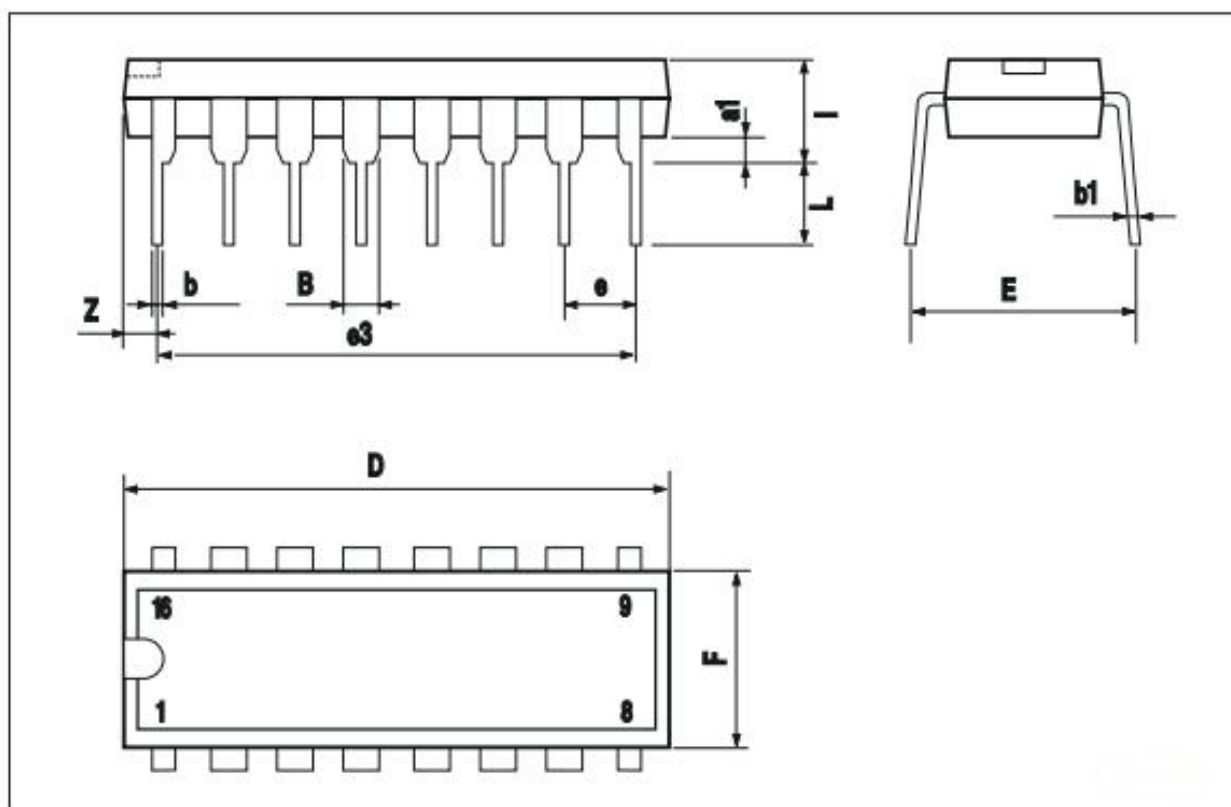
6. Ordering Information

Orderable Device	Package Type	Pins	Packing	Package Qty
CD4098ND16ATBE	DIP	16	Tube	25
CD4098NS16ARDQ	SOP	16	Tape & Reel	4000
CD4098TS16ARDQ	TSSOP	16	Tape & Reel	4000

7. Package Information

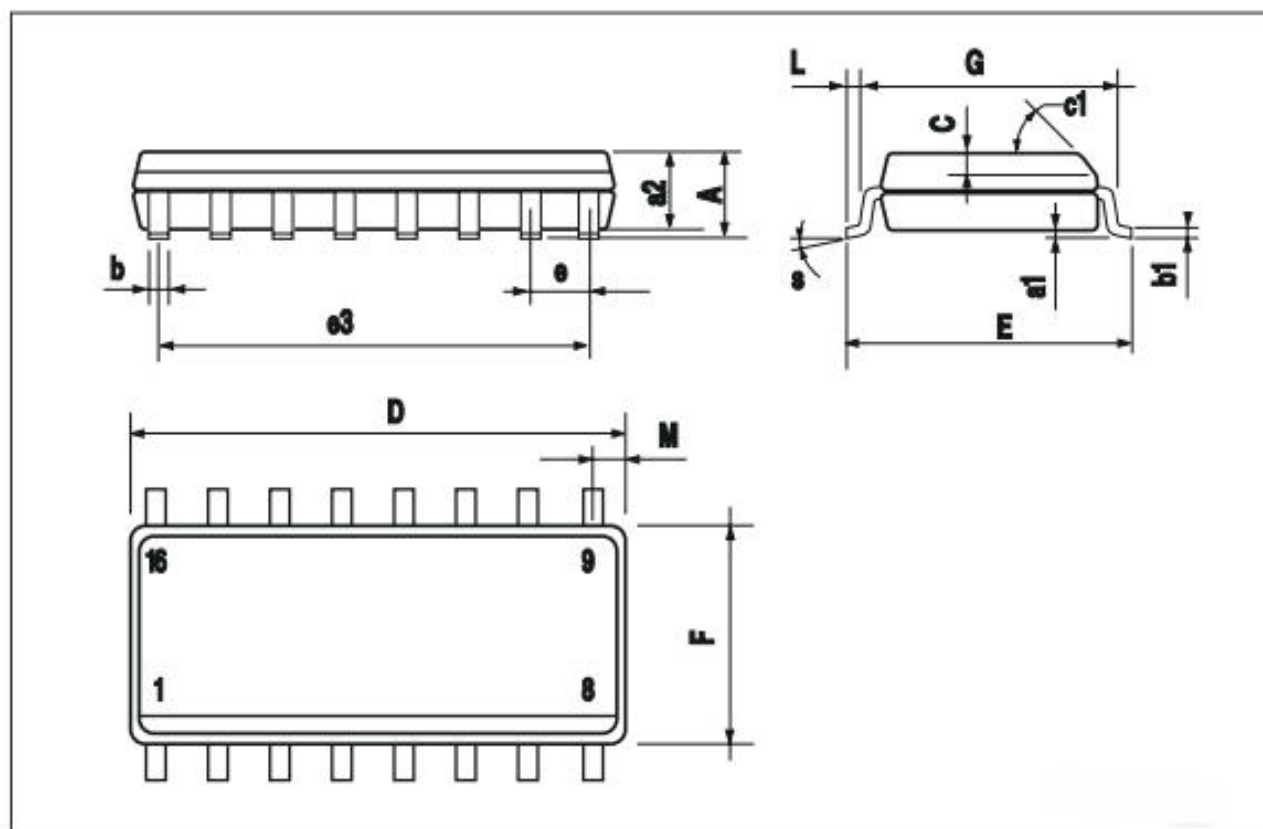
7.1 DIP16

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050



7.2 SOP16

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.068
a1	0.1		0.25	0.004		0.010
a2			1.64			0.063
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.62			0.024
S	8° (max.)					



7.3 TSSOP16

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0079
D	4.9	5	5.1	0.193	0.197	0.201
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030

