

Two Multivibrators (flip-flop) High-Voltage Silicon-Gate CMOS

IW4098B

The IW4098B was especially designed for high-performance computing machinery with low power consumption, portable measuring equipment, communication systems with power supply from phone network, devices with power supply from solar battery, thermocouple etc.

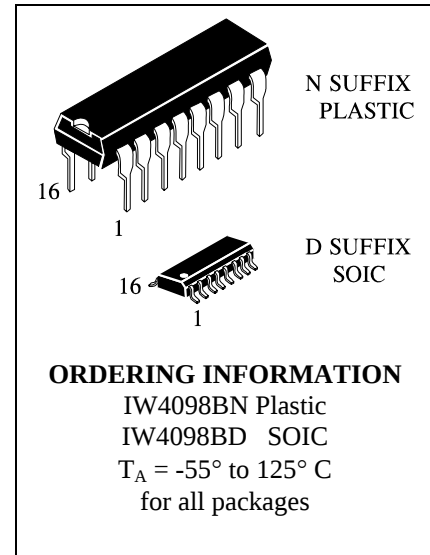
- Standard symmetric output features
- Wide range of supply voltage 3.0 to 18 V.
- 100%-control of DC characteristics at supply voltage 20V
- Maximum input current of 1 μ A at 18 V over full package-temperature range; 100 nA at 18 V and 25°C
- Noise margin (over full package temperature range):
1.0 V min @ 5.0 V supply
2.0 V min @ 10.0 V supply
2.5 V min @ 15.0 V supply

Pin description

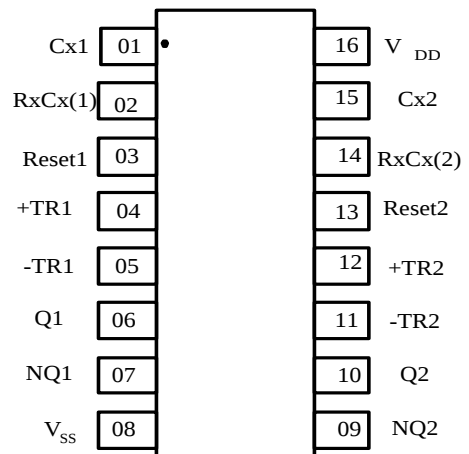
Pin number	Symbol	Description
01	Cx1	For capacitor connection
02	RxCx(1)	For resistor & capacitor connection
03	RES1	Reset
04	+TR1	Data input
05	-TR1	Data input
06	Q1	Data output
07	NQ1	Data output
08	GND	Common
09	NQ2	Data output
10	Q2	Data output
11	-TR2	Data input
12	+TR2	Data input
13	RES2	Reset
14	RxCx(2)	For resistor & capacitor connection
15	Cx2	For capacitor connection
16	V _{DD}	Supply input

TRUTH TABLE (serial input)

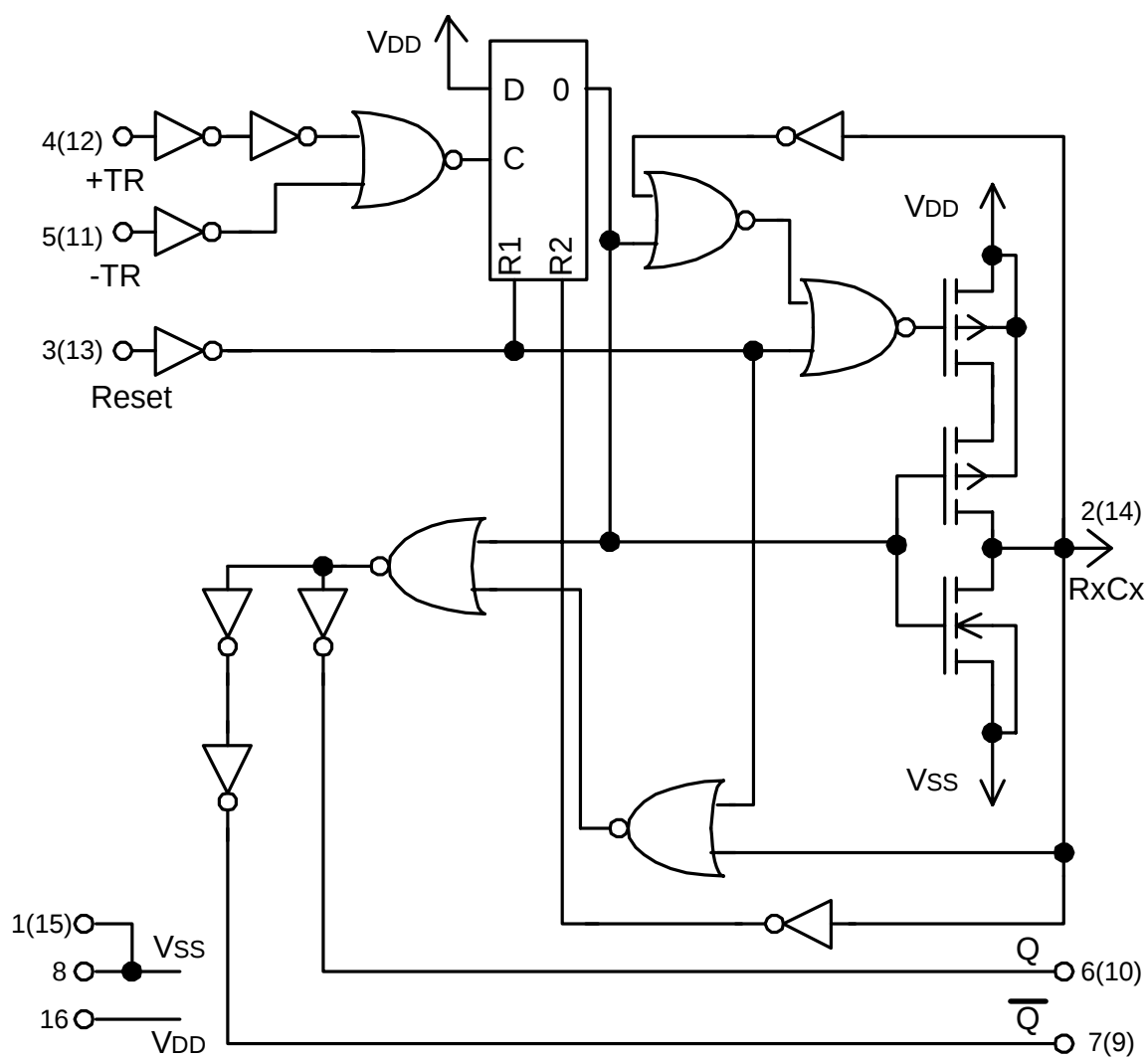
Input			Output	
RES	+TR	-TR	Q	Q
L	X	X	L	H
H	$\int$	H	$\int$	$\overline{\int}$
H	L	$\int$	$\int$	$\overline{\int}$
H	$\int, \int$	0	No switching	
H	H	$\int, \int$	No switching	
H	$\int$	H	No switching	
H	L	$\int$	No switching	



PIN ASSIGNMENT



Logic diagram



V_{DD} = pin 16

V_{SS} = pin 8

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	-0.5 to +20	V
V_{IN}	DC Input Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
V_{OUT}	DC Output Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
I_{IN}	DC Input Current, per Pin	± 10	mA
P_D	Power Dissipation in Still Air, Plastic DIP+ SOIC Package+	750 500	mW
P_D	Dissipation per Output Transistor	100	mW
T_{stg}	Storage Temperature	-65 to +150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds (Plastic DIP or SOIC Package)	260	°C

*Maximum Ratings are those values beyond which damage to the device may occur.
Functional operation should be restricted to the Recommended Operating Conditions.

+Derating - Plastic DIP: - 10 mW/°C from 65° to 125°C
SOIC Package: : - 7 mW/°C from 65° to 125°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	3.0	18	V
V_{IN}, V_{OUT}	DC Input Voltage, Output Voltage (Referenced to GND)	0	V_{CC}	V
T_A	Operating Temperature, All Package Types	-55	+125	°C

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation, V_{IN} and V_{OUT} should be constrained to the range $GND \leq (V_{IN} \text{ or } V_{OUT}) \leq V_{CC}$.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or V_{CC}).
Unused outputs must be left open.

DC ELECTRICAL CHARACTERISTICS(Voltages Referenced to GND)

Parameter, unit	Sym- bol	Test conditions							Guaranteed Limit					
		U_I	U_I	U_{OL}	U_{OH}	I_{OL}	I_{OH}	U_{DD}	$T_A = -55^{\circ}\text{C}$		$T_A = 125^{\circ}\text{C}$		$T_A = 25^{\circ}\text{C}$	
		U_L V	U_H V	V	V	μA	μA	V	min	max	min	max	min	max
Low level output voltage,V	U_{OL}	0	3.0	-	-	1.0	-	3.0	-	0.1	-	0.1	-	0.1
		0	5.0	-	-	1.0	-	5.0	-	0.05	-	0.05	-	0.05
		0	10	-	-	1.0	-	10	-	0.05	-	0.05	-	0.05
		0	15	-	-	1.0	-	15	-	0.05	-	0.05	-	0.05
		0	18	-	-	1.0	-	18	-	0.1	-	0.1	-	0.1
		1.5	3.5	-	-	1.0	-	5.0	-	0.5	-	0.5	-	0.5
		3.0	7.0	-	-	1.0	-	10	-	1.0	-	1.0	-	1.0
		4.0	11	-	-	1.0	-	15	-	1.5	-	1.5	-	1.5
High level output voltage,V	U_{OH}	0	3.0	-	-	-	-1.0	3.0	2.9	-	2.9	-	2.9	-
		0	5.0	-	-	-	-1.0	5.0	4.95	-	4.95	-	4.95	-
		0	10	-	-	-	-1.0	10	9.95	-	9.95	-	9.95	-
		0	15	-	-	-	-1.0	15	14.95	-	14.95	-	14.95	-
		0	18	-	-	-	-1.0	18	17.9	-	17.9	-	17.9	-
		1.5	3.5	-	-	-	-1.0	5.0	4.5	-	4.5	-	4.5	-
		3.0	7.0	-	-	-	-1.0	10	9.0	-	9.0	-	9.0	-
		4.0	11	-	-	-	-1.0	15	13.5	-	13.5	-	13.5	-
Low level input current, μA	I_{IL}	0	18	-	-	-	-	18	-	-0.1	-	-1.0	-	-0.1
High level input current, μA	I_{IH}	0	18	-	-	-	-	18	-	0.1	-	1.0	-	0.1
Consumption current, μA	I_{DD}	0	5.0	-	-	-	-	5.0	-	1.0	-	30	-	1.0
		0	10	-	-	-	-	10	-	2.0	-	60	-	2.0
		0	15	-	-	-	-	15	-	4.0	-	120	-	4.0
		0	20	-	-	-	-	20	-	20	-	600	-	20
Low level output current, mA	I_{OL}	0	5.0	0.4	-	-	-	5.0	0.64	-	0.36	-	0.51	-
		0	10	0.5	-	-	-	10	1.6	-	0.9	-	1.3	-
		0	15	1.5	-	-	-	15	4.2	-	2.4	-	3.4	-
High level output current, mA	I_{OH}	0	5.0	-	4.6	-	-	5.0	-0.64	-	-0.36	-	-0.51	-
		0	5.0	-	2.5	-	-	5.0	-2.0	-	-1.15	-	-1.6	-
		0	10	-	9.5	-	-	10	-1.6	-	-0.9	-	-1.3	-
		0	15	-	13.5	-	-	15	-4.2	-	-2.4	-	-3.4	-
Output leakage current, μA	I_{OUT}	0	18	$U_O = 0.5\text{ V}$				18		± 0.4		± 12		± 0.4

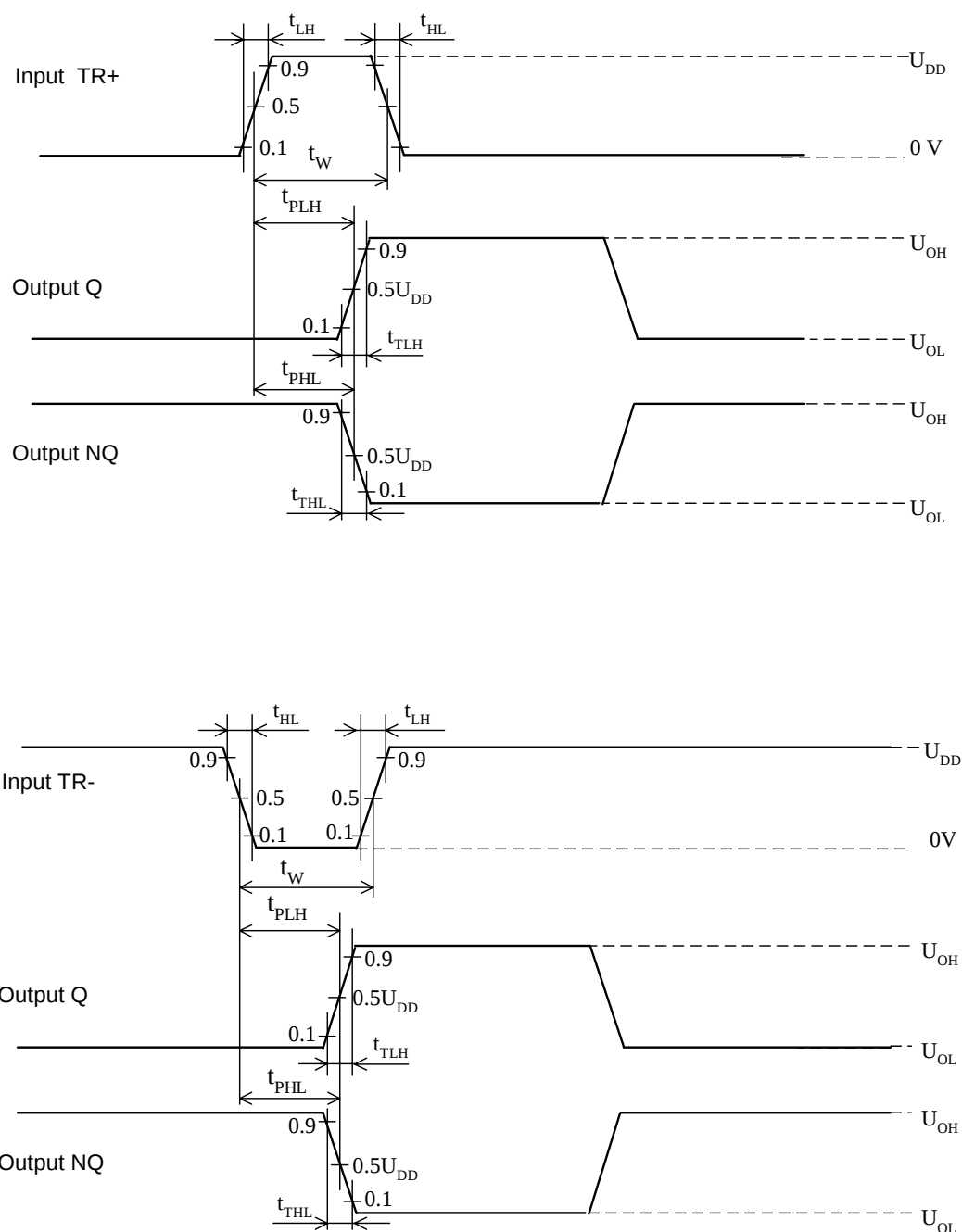
AC ELECTRICAL CHARACTERISTICS($C_L=50\text{pF}$, $R_L=200\text{k}\Omega$, Input $t_r=t_f=20\text{ ns}$)

Parameter, unit	Symbol	Test conditions			Guaranteed Limit					
		R_X	C_X	U_{DD}	$T_A=-55^\circ\text{C}$		$T_A=125^\circ\text{C}$		$T_A=25^\circ\text{C}$	
		$\text{k}\Omega$	pF	V	min	max	min	max	min	max
Propagation delay at switch on & switch off, ns inputs +TR, -TR - outputs Q, Q	$t_{PHL1},$ t_{PLH1}	5-10000	≥ 15	$t_{LH}=t_{HL} \leq 20\text{ ns}, C_L=50\text{pF},$ $R_L=200\text{ k}\Omega$						
					5.0	500		1000		500
					10	250		500		250
input RES - outputs Q, Q	$t_{PHL2},$ t_{PLH2}	5-10000	≥ 15		15	200		400		200
					5.0	450		900		450
					10	250		500		250
					15	150		300		150
Pulse width of signals +TR, -TR, ns	$t_{WL},$ t_{WH}				5.0	140		280		140
					10	60		120		60
					15	40		80		40
Pulse width of signal RES, ns	t_{WR}	100	15		5.0	200		400		200
					10	80		160		80
					15	60		120		60
			1000		5.0	1200		2400		1200
					10	600		1200		600
					15	500		1000		500
			100000		5.0	50		100		50
					10	30		60		30
					15	20		40		20

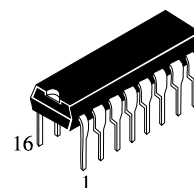
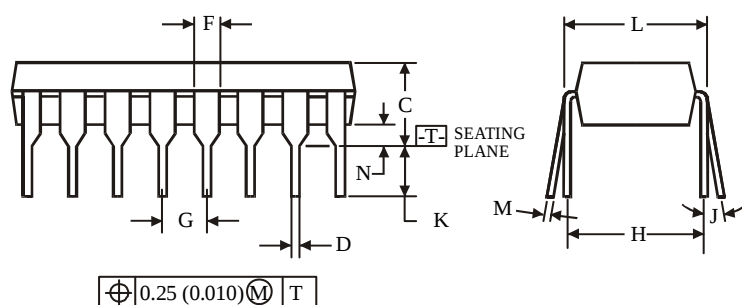
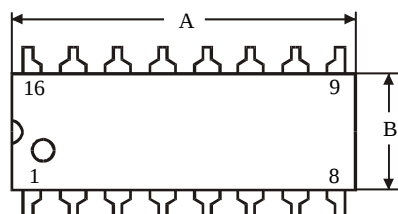
CAPACITY CHARACTERISTICS

Symbol	Parameter	$V_{DD},$ V	Value	Unit
C_{IN}	Input capacity		7.5	pF

Time Diagram



**N SUFFIX PLASTIC
(MS - 001BB)**

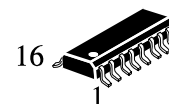
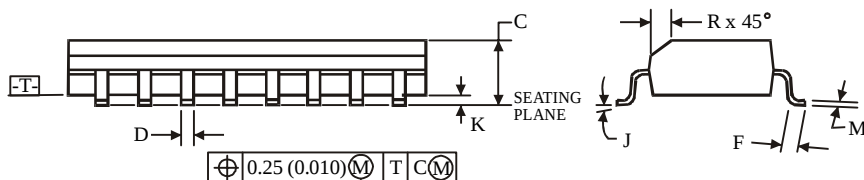
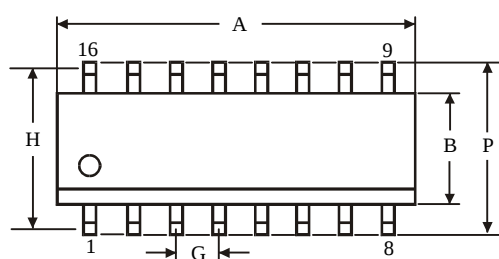


Symbol	Dimensions, mm	
	MIN	MAX
A	18.67	19.69
B	6.10	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.20	0.36
N	0.38	

NOTES:

- Dimensions "A", "B" do not include mold flash or protrusions.
Maximum mold flash or protrusions 0.25 mm (0.010) per side.

**D SUFFIX SOIC
(MS - 012AC)**



Symbol.	Dimensions, mm	
	MIN	MAX
A	9.80	10.0
B	3.80	4.00
C	1.35	1.75
D	0.33	0.51
F	0.40	1.27
G	1.27	
H	5.72	
J	0°	8°
K	0.10	0.25
M	0.19	0.25
P	5.80	6.20
R	0.25	0.50

NOTES:

- Dimensions A and B do not include mold flash or protrusion.
- Maximum mold flash or protrusion 0.15 mm (0.006) per side for A, for B - 0.25 mm (0.010) per side.