

DM96LS02 Dual Retriggerable Resettable Monostable Multivibrator

General Description

The DM96LS02 is a dual retriggerable and resettable monostable multivibrator. The one-shot provides exceptionally wide delay range, pulse width stability, predictable accuracy and immunity to noise. The pulse width is set by an external resistor and capacitor. Resistor values up to 1.0 MΩ reduce required capacitor values. Hysteresis is provided on both trigger inputs of the DM96LS02 for increased noise immunity.

Features

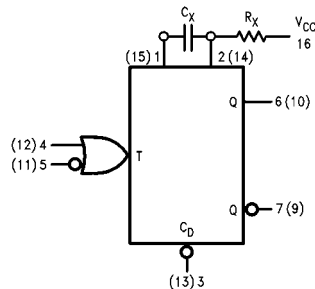
- Required timing capacitance reduced by factors of 10 to 100 over conventional designs
- Broad timing resistor range—1.0 kΩ to 2.0 MΩ
- Output Pulse Width is variable over a 2000:1 range by resistor control
- Propagation delay of 35 ns
- 0.3V hysteresis on trigger inputs
- Output pulse width independent of duty cycle
- 35 ns to ∞ output pulse width range

Ordering Code:

Order Number	Package Number	Package Description
DM96LS02M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM96LS02N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

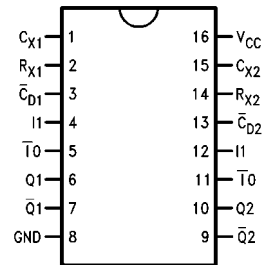
Logic Symbol



V_{CC} = Pin 16

GND = Pin 8

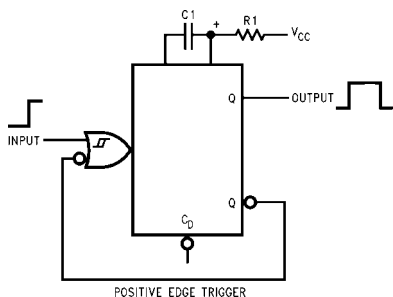
Connection Diagram



Pin Descriptions

Pin Names	Description
T̄	Trigger Input (Active Falling Edge)
Ī	Schmitt Trigger Input (Active Falling Edge)
I1	Schmitt Trigger Input (Active Rising Edge)
C̄ _D	Direct Clear Input (Active LOW)
Q	True Pulse Output
Q̄	Complementary Pulse Output

Operation Notes (continued)

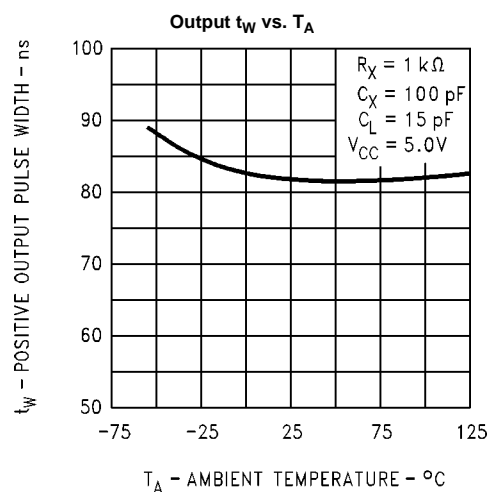
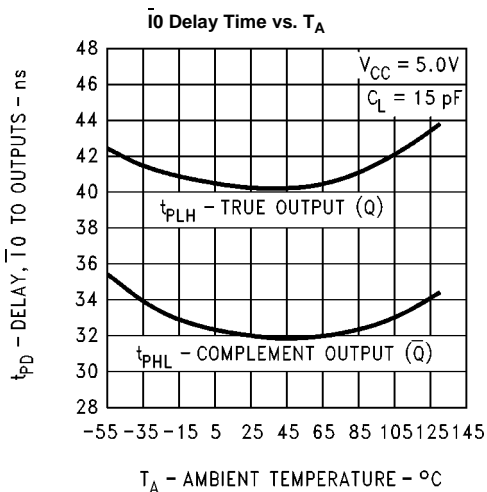
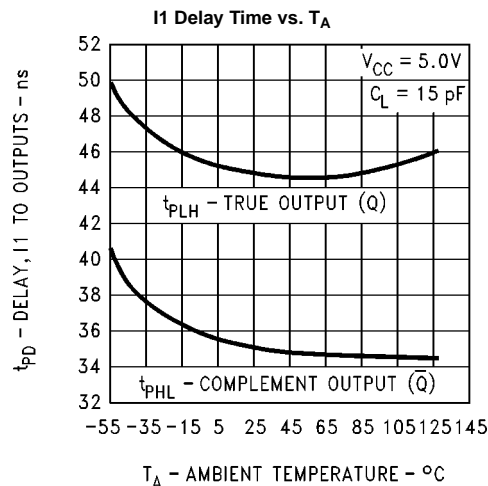
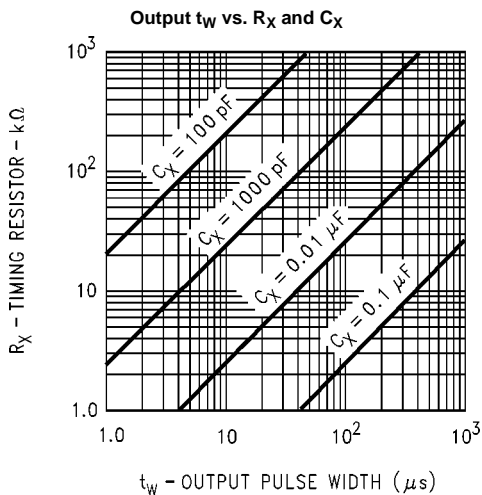


Triggering Truth Table

Pin Numbers			Operation
5(11)	4(12)	3(13)	
H→L	L	H	Trigger
H	L→H	H	Trigger
X	X	L	Reset

H = HIGH Voltage Level $\geq V_{IH}$
 L = LOW Voltage Level $\leq V_{IL}$
 X = Immaterial (either H or L)
 H→L = HIGH-to-LOW Voltage Level Transition
 L→H = LOW-to-HIGH Voltage Level Transition

Typical Performance Characteristics



Typical Performance Characteristics (continued)

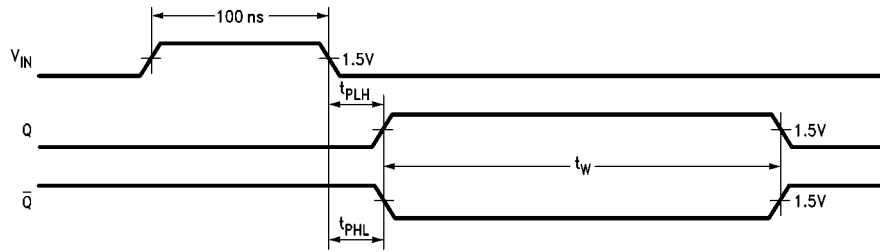
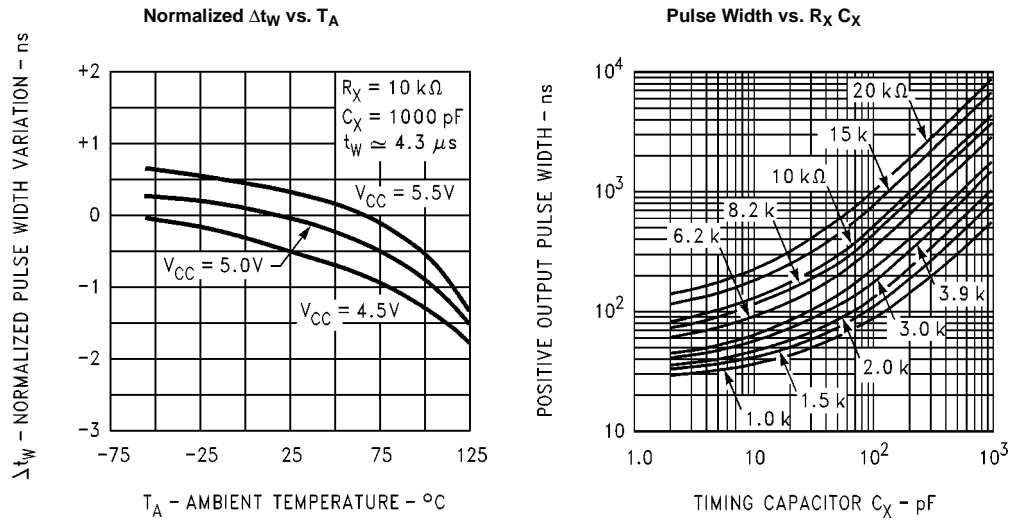


FIGURE 1.

Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	-65°C to +150°C

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Recommended Operating Conditions

Symbol	Parameter	Min	Nom	Max	Units
V_{CC}	Supply Voltage	4.75	5	5.25	V
V_{IH}	HIGH Level Input Voltage	2			V
V_{IL}	LOW Level Input Voltage			0.8	V
I_{OH}	HIGH Level Output Current			-0.4	mA
I_{OL}	LOW Level Output Current			8	mA
T_A	Free Air Operating Temperature	0		70	°C

Electrical Characteristics

Over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V_I	Input Clamp Voltage	$V_{CC} = \text{Min}, I_I = -18 \text{ mA}$			-1.5	V
V_{OH}	HIGH Level Output Voltage	$V_{CC} = \text{Min}, I_{OH} = \text{Max}, V_{IL} = \text{Max}$	2.7	3.4		V
V_{OL}	LOW Level Output Voltage	$V_{CC} = \text{Min}, I_{OL} = \text{Max}, V_{IH} = \text{Min}$		0.35	0.5	V
		$I_{OL} = 4 \text{ mA}, V_{CC} = \text{Min}$		0.25	0.4	
I_I	Input Current @ Max Input Voltage	$V_{CC} = \text{Max}, V_I = 7V, V_I = 10V$			0.1	mA
I_{IH}	HIGH Level Input Current	$V_{CC} = \text{Max}, V_I = 2.7V$			20	μA
I_{IL}	LOW Level Input Current	$V_{CC} = \text{Max}, V_I = 0.4V$			-0.4	mA
I_{OS}	Short Circuit Output Current	$V_{CC} = \text{Max}$ (Note 3)	-20		-100	mA
I_{CC}	Supply Current	$V_{CC} = \text{Max}$			36	mA
V_{T+}	Positive-Going Threshold Voltage, \bar{I}_0, I_1				2.0	V
V_{T-}	Negative-Going Threshold Voltage, \bar{I}_0, I_1		0.8			V

Note 2: All typicals are at $V_{CC} = 5V, T_A = 25^\circ\text{C}$.

Note 3: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Switching Characteristics

$V_{CC} = +5.0V$, $T_A = +25^\circ C$

Symbol	Parameter	$C_L = 15 \text{ pF}$		Units
		Min	Max	
t_{PLH}	Propagation Delay $\overline{I0}$ to Q		55	ns
t_{PHL}	Propagation Delay I0 to \overline{Q}		50	ns
t_{PLH}	Propagation Delay I1 to Q		60	ns
t_{PHL}	Propagation Delay I1 to \overline{Q}		55	ns
t_{PHL}	Propagation Delay $\overline{C_D}$ to Q		30	ns
t_{PLH}	Propagation Delay $\overline{C_D}$ to \overline{Q}		35	ns
$t_W(L)$	$\overline{I0}$ Pulse Width LOW	15		ns
$t_W(H)$	I1 Pulse Width HIGH	30		ns
$t_W(L)$	$\overline{C_D}$ Pulse Width LOW	22		ns
$t_W(H)$	Minimum Q Pulse Width HIGH	25	55	ns
t_W	Q Pulse Width	4.1	4.5	μs
R_X	Timing Resistor Range (Note 4)	1	1000	k Ω
t	Change in Q Pulse Width over Temperature		1.0	%
t	Change in Q Pulse Width over V_{CC} Range		0.8 1.5	%

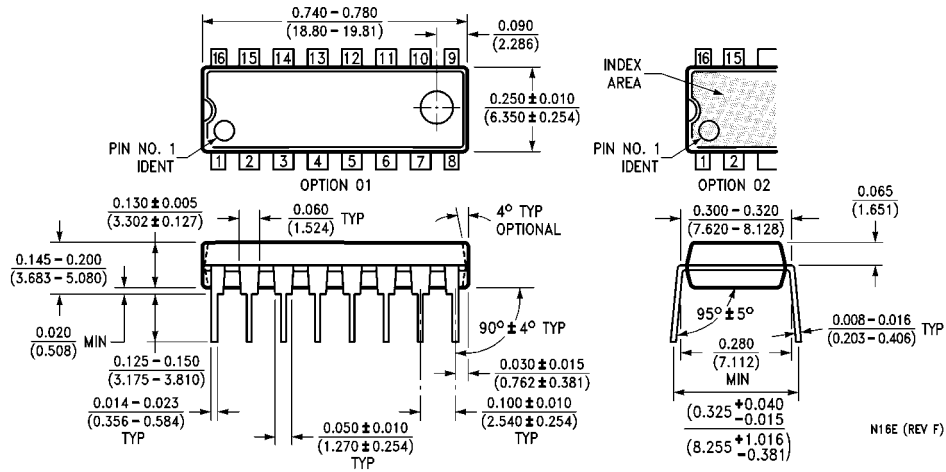
Note 4: Applies only over commercial V_{CC} and T_A range for 96S02.

Physical Dimensions inches (millimeters) unless otherwise noted



16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow Package Number M16A

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N16E

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