Monostable Multivibrator

Military 10598

ELECTRICALLY TESTED PER:
5962-8777301

The 10598 is a retriggerable monostable multivibrator. Two enable inputs permit triggering on any combination of positive or negative edges as shown in the accompanying table. The trigger input is buffered by Schmitt triggers making it insensitive to input rise and fall times.

The pulse width is controlled by external capacitor and resistor. The resistor sets a current which is the linear discharge rate of the capacitor. Also, the pulse width can be controlled by the external current source or voltage

For high-speed response with minimum delay, a hi-speed input is also provided. This input bypasses the internal Schmitt triggers and the output responds within 2.0 nanoseconds typically.Output logic and threshold levels are standard MECL 10,000. Test conditions are per table 2. Each "Precondition" referred to in table 2 is per the sequence of table 1.

- 580 mW Max/Pkg (No Load)
- t_{pd} = 4.0 ns typ Trigger Input to Q
  = 2.0 ns typ Hi-Speed Input to Q

Min Timing Pulse Width	PW_{Qmin}	10 ns typ[1]
Max Timing Pulse Width	PW_{Qmax}	>10 ns typ[2]
Min Trigger Pulse Width	PW_T	2.0 ns typ
Min Hi-Speed Trigger Pulse Width	PW_{HS}	3.0 ns typ
Enable Setup Time	t_{set}	1.0 ns typ
Enable Hold Time	t_{hold}	1.0 ns typ

[1] C_{Ext} = 0 (Pin 4 open), R_{Ext} = 0 (Pin 6 to V_{EE})
[2] C_{Ext} = 10 µF, R_{Ext} = 2.7 kΩ

PIN ASSIGNMENTS

FUNCTION	DIL	FLATS	LCC	BURN-IN (CONDITION C)
V_{CC1}	1	5	2	GND
$\overline{Q}$	2	6	3	51 Ω to V_{TT}
Q	3	7	4	51 Ω to V_{TT}
C_{EXT}	4	8	5	OPEN
$\overline{E_{Pos.}}$	5	9	7	OPEN
R_{EXT}	6	10	8	V_{EE}
Ext. Pulse Width Control	7	11	9	OPEN
V_{EE}	8	12	10	V_{EE}
N.C.	9	13	12	OPEN
$\overline{E_{Neg.}}$	10	14	13	OPEN
N.C.	11	15	14	OPEN
N.C.	12	16	15	OPEN
Trigger Input	13	1	17	OPEN
N.C.	14	2	18	OPEN
Hi-Speed Input	15	3	19	OPEN
V_{CC2}	16	4	20	GND

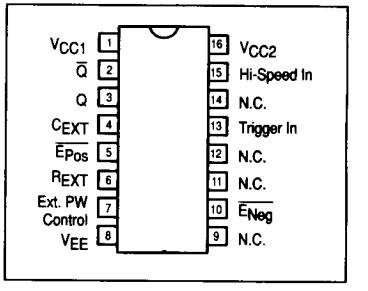
BURN - IN CONDITIONS:
V_{TT} = - 2.2 V MIN/ - 2.0 V MAX
V_{EE} = - 5.7 V MAX/ - 5.2 V MIN

AVAILABLE AS

1) JAN: N/A
2) SMD: 5962-8777301
3) 883: 10598/BXAJC
X = CASE OUTLINE AS FOLLOWS:

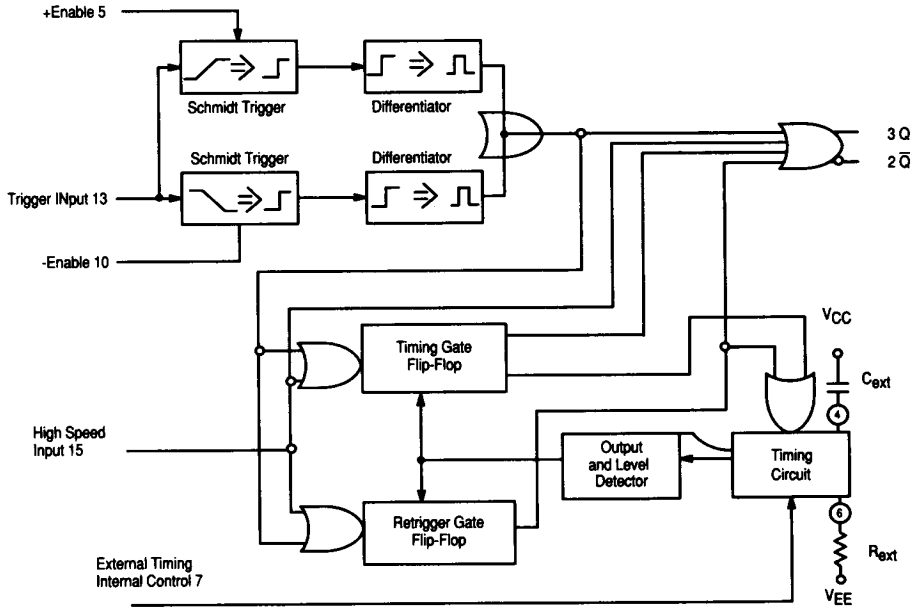
PACKAGE: CERDIP: E
CERFLAT: F
LCC: 2

The letter "M" appears before the slash on LCC.

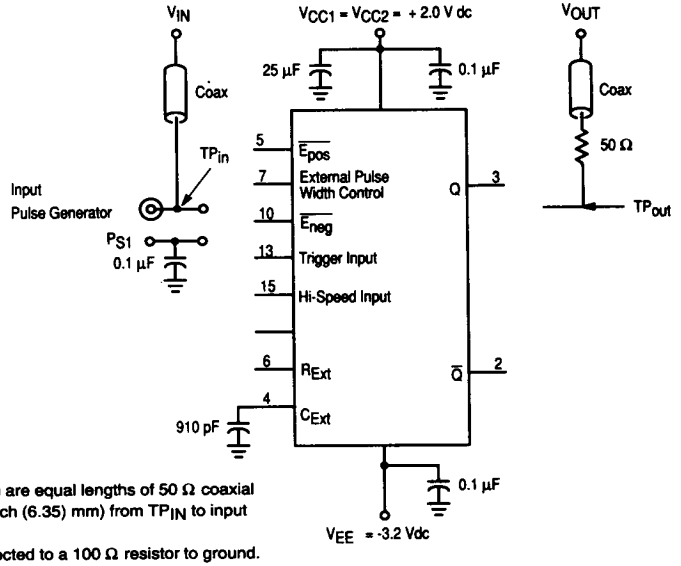


TRUTH TABLE

Inputs $\overline{E_{pos}}$	Inputs $\overline{E_{neg}}$	Output
L	L	Triggers on both positive and negative input slopes
L	H	Triggers on the positive input slope
H	L	Triggers on the negative input slope
H	H	Trigger disabled



Block Diagram

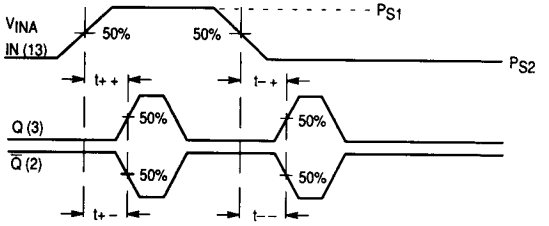


NOTES

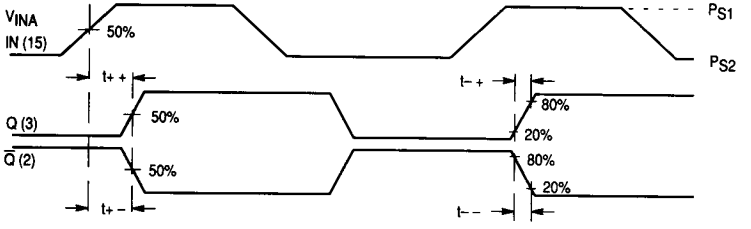
1. All input and output cables to the scope are equal lengths of 50 Ω coaxial cable. Wire length should be ≥ 0.250 inch (6.35) mm) from TP_{IN} to input pin and TP_{OUT} to output pin.
2. Outputs not under test should be connected to a 100 Ω resistor to ground.
3. $t_{THL} = t_{TLH} = 2.0 \pm$ ns (20% - 80%).
4. 50 Ω termination to ground located in each scope probe.

Figure 1. Switching Test Circuit

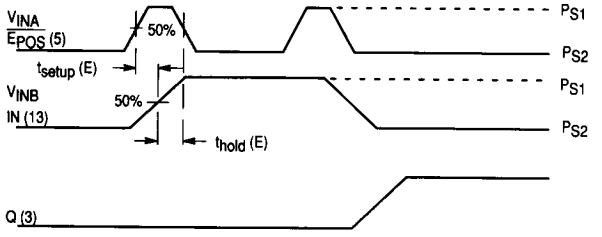
Trigger Delay Test



High Speed Trigger



t_{Setup} / t_{Hold} Tests



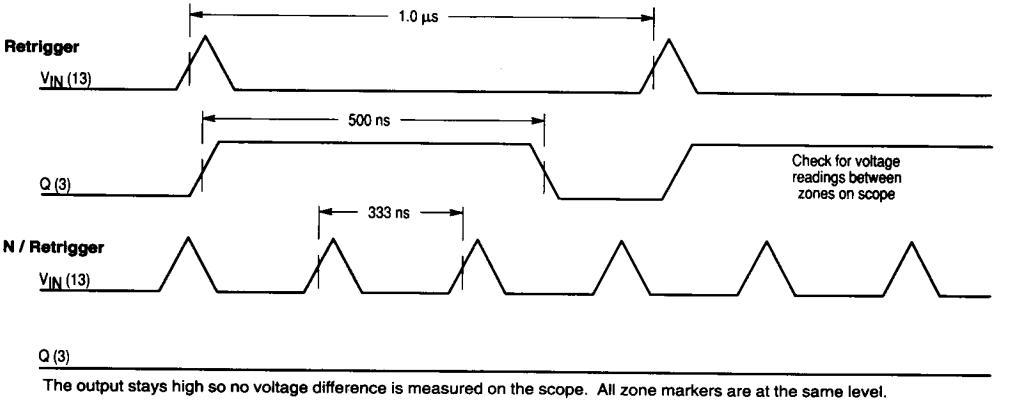
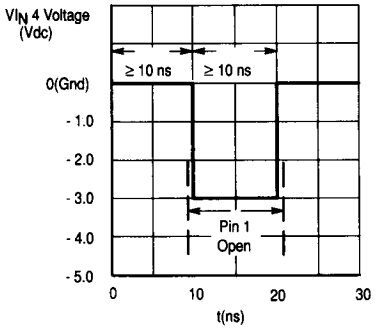


Figure 2. Switching Test Circuit Waveforms

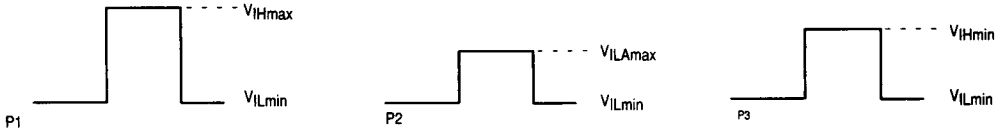
Table 1. Precondition Sequence



1. At t = 0
   a) Apply V_{IHmax} to Pin 5 and 10.
   b) Apply V_{ILmin} to Pin 15.
   c) Ground Pin 4.
2. At t ≥ 10 ns
   a) Open Pin 1.
   b) Apply - 3.0 Vdc to Pin 4.
   Hold these conditions for ≥ 10 ns.
3. Return Pin 4 to Ground and preform test as indicated in Table 2.

Table 2. Conditions for Testing Output Levels

(See Table 1 for Precondition Sequence)



Test P.U.T	Pin Condition 5	10	13	15
Precondition				
V_{OH} 2			V_{ILmin}	
V_{OH} 3			P1	
Precondition				
V_{OL} 3			V_{ILmin}	
V_{OL} 2			P1	
Precondition				
V_{OHA} 2				V_{ILAmax}
V_{OHA} 3				V_{IHAmin}
Precondition				
V_{OHA} 2			V_{ILmin}	
V_{OHA} 3			P3	
Precondition				
V_{OHA} 2			P2	
V_{OHA} 3			P3	
Precondition				
V_{OHA} 2		V_{IHmax}	P2	
V_{OHA} 3		V_{IHmax}	P3	
Precondition				
V_{OHA} 2		V_{IHmax}	P1	
V_{OHA} 3		V_{IHmax}	P1	

Test P.U.T	Pin Condition 5	10	13	15
Precondition				
V_{OHA} 2		V_{IHAmin}	P1	
V_{OHA} 3		V_{ILAmax}	P1	
Precondition				
V_{OLA} 3				V_{ILAmax}
V_{OLA} 2				V_{IHAmin}
Precondition				
V_{OLA} 2			V_{ILmin}	
V_{OLA} 3			V_{ILmin}	
Precondition				
V_{OLA} 3			P2	
V_{OLA} 2			P3	
Precondition				
V_{OLA} 3		V_{IHmax}	P2	
V_{OLA} 2		V_{IHmax}	P3	
Precondition				
V_{OLA} 3	V_{IHAmin}	V_{IHmax}	P1	
V_{OLA} 2	V_{ILAmax}	V_{IHmax}	P1	
Precondition				
V_{OLA} 3	V_{IHmax}	V_{IHAmin}	P1	
V_{OLA} 2	V_{IHmax}	V_{ILAmax}	P1	

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QUIESCENT LIMIT TABLE *

Test Temperature	Test Voltage Values (Volts)										
	V_{IH}	V_{IL}	V_{IH1}	V_{IL1}	P_{S1}	P_{S2}	V_{EE}	V_{EEL}	V_{CC}	V_{T1}	V_{T2}
T_A = 25 °C	-0.78	-1.85	-1.105	-1.475	+1.11	+0.31	-5.2	-3.2	+2.0	-2.45	-3.0
T_A = 125 °C	-0.63	-1.82	-1.000	-1.400	+1.24	+0.36	-5.2	-3.2	+2.0	-2.35	-2.9
T_A = - 55 °C	-0.88	-1.92	-1.255	-1.510	+1.01	+0.28	-5.2	-3.2	+2.0	-2.55	-3.09

Symbol	Parameter	Limits						Units	TEST VOLTAGE APPLIED TO PINS BELOW									
	Functional Parameters:	+ 25 °C		+ 125 °C		- 55 °C			Pinouts referenced are for DIL package, check Pin Assignments V_{CC} = 0 V, Output Load = 100 Ω to – 2.0 V									
		Subgroup 1		Subgroup 2		Subgroup 3												
		Min	Max	Min	Max	Min	Max		V_{IH}	V_{IL}	V_{IHA}	V_{ILA}	V_{EE}	V_{CC}	P_{1-3}	$V_{T1,2}$	GND	P. U. T.
V_{OH}	High Output Voltage	– 0.93	– 0.78	– 0.825	– 0.63	– 1.08	– 0.88	V		13			6, 8	1, 4, 16	13		4	2, 3
V_{OL}	Low Output Voltage	– 1.85	– 1.62	– 1.82	– 1.545	– 1.92	– 1.665	V		13			6, 8	1, 4, 16	13		4	2, 3
V_{OLA}	Low Output Voltage	– 1.85	– 1.60	– 1.82	– 1.525	– 1.92	– 1.635	V	10	13	10	10	6, 8	1, 4, 16	13	4	4	2, 3
V_{OHA}	High Output Voltage	– 0.95	– 0.78	– 0.845	– 0.63	– 1.10	– 0.88	V	10	13	10	10	6, 8	1, 4, 16	13	4	4	2, 3
I_{IH1}	Input Current High		220		375		375	µA	13				6, 8	1, 4, 16			4	13
I_{IH2}	Input Current High		260		450		450	µA	5, 10				6, 8	1, 4, 16			4	5, 10
I_{IH3}	Input Current High		350		595		595	µA	15				6, 8	1, 4, 16			4	15
I_{IL}	Input Current Low	0.5		0.3		0.5		µA		5, 10, 13, 15			6, 8	1, 4, 16			4	5, 10, 13, 15
V_{R4}	Bias Voltage	-4.16	-3.4	-4.16	-3.4	-4.16	-3.4	V					6, 8	1, 4, 16			4	7
I_{EE}	Power Supply Drain Current	– 100		– 111		– 111		mA					6, 8	1, 4, 16			4	8

*** ELECTRICAL CHARACTERISTICS**

Each MECL 10K series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are terminated through a 100 Ω resistor to - 2.0 volts.

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QUIESCENT LIMIT TABLE *

Test Temperature	Test Voltage Values (Volts)													
	V_{IH}	V_{IL}	V_{IH1}	V_{IL1}	P_{S1}	P_{S2}	V_{EE}	V_{EEL}	V_{CC}	V_{T1}	V_{T2}	P_{S11}	P_{S12}	P_{S13}
T_A = 25 °C	-0.78	-1.85	-1.105	-1.475	+1.11	+0.31	-5.2	-3.2	+2.0	-2.45	-3.0	0.0	0.0	-3.2
T_A = 125 °C	-0.63	-1.82	-1.000	-1.400	+1.24	+0.36	-5.2	-3.2	+2.0	-2.35	-2.9	0.0	0.0	-3.2
T_A = - 55 °C	-0.88	-1.92	-1.255	-1.510	+1.01	+0.28	-5.2	-3.2	+2.0	-2.55	-3.09	0.0	0.0	-3.2

Symbol	Parameter	Limits						Units	TEST VOLTAGE APPLIED TO PINS BELOW						
	Functional Parameters:	+ 25 °C		+ 125 °C		- 55 °C			Pinouts referenced are for DIL package, check Pin Assignments V_{CC} = 2.0 V, Output Load = 100 Ω to GND						
		Subgroup 9		Subgroup 10		Subgroup 11									
		Min	Max	Min	Max	Min	Max		V_{IN}	V_{OUT}	V_{CC}	V_{EEL}	P_{S11}	P_{S12}	P. U. T.
t_{TLH}/t_{THL}	Rise Time/Fall Time High Speed Trigger Delay to Output	1.5	3.5	1.0	4.5	1.0	4.5	ns	13, 15	2, 3	1, 16	8	7		2, 3, 13, 15
t_{PHL}/t_{PLH}	Propagation Delay High Speed Trigger Delay to Output	1.5	2.8	1.0	4.0	1.0	4.0	ns	13, 15	2, 3	1, 16	8	7		2, 3, 13, 15
t_{PHL}/t_{PLH}	Propagation Delay Trigger Delay to Output	2.5	5.5	2.0	7.0	2.0	7.0	ns	13, 15	2, 3	1, 16	8	7		2, 3, 13, 15
t_{Setup} (E)	Enable Setup Time	3.5						ns	5, 13	3	1, 16	8	7		5, 13
t_{Hold} (E)	Enable Hold Time	3.5						ns	5, 13	3	1, 16	8	7		5, 13
$\overline{R_{Trig}}$	$\overline{\text{Retrigger}}$	–50	50					ns	5, 13	3	1, 16	8		7	3
R_{Trig}	Retrigger	0.15	1.0					ns	5, 13	3	1, 16	8		7	3

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Each MECL 10K series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are terminated through a 100 Ω resistor to 0.0 volts.