

DATA SHEET

For a complete data sheet, please also download:

- The IC04 LOCMOS HE4000B Logic Family Specifications HEF, HEC
- The IC04 LOCMOS HE4000B Logic Package Outlines/Information HEF, HEC

HEF4538B

MSI

Dual precision monostable multivibrator

Product specification
File under Integrated Circuits, IC04

January 1995

Dual precision monostable multivibrator

HEF4538B MSI

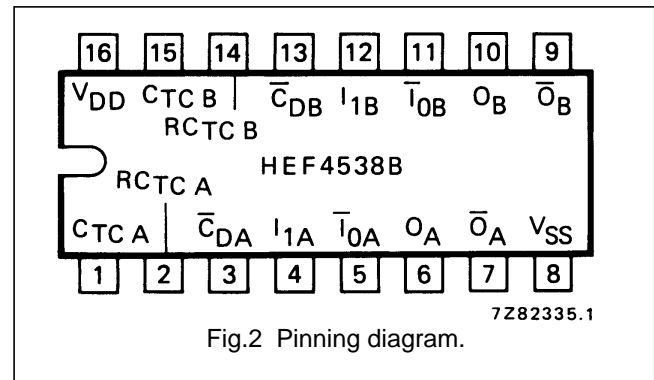
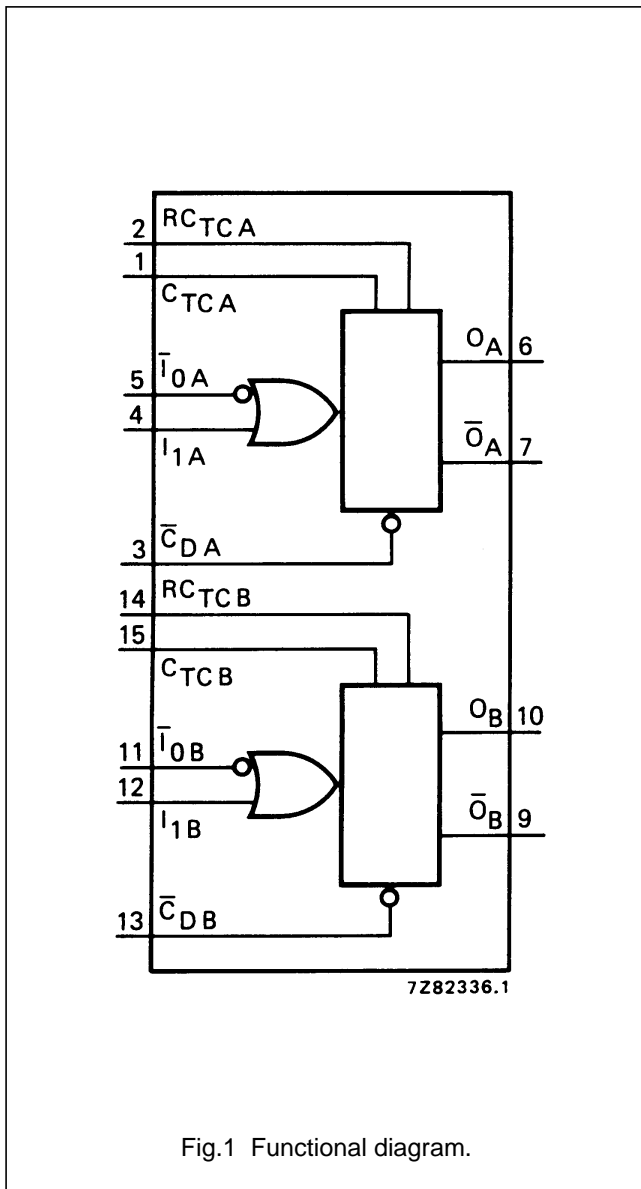
DESCRIPTION

The HEF4538B is a dual retriggerable-resettable monostable multivibrator. Each multivibrator has an active LOW trigger/retrigger input (\bar{I}_0), an active HIGH trigger/retrigger input (I_1), an overriding active LOW direct reset input (\bar{C}_D), an output (O) and its complement (\bar{O}), and two pins (C_{TC} ,⁽¹⁾ R_{TC}) for connecting the external timing components C_t and R_t . Typical pulse width variation over temperature range is $\pm 0,2\%$.

The HEF4538B may be triggered by either the positive or the negative edges of the input pulse and will produce an

accurate output pulse with a pulse width range of 10 μ s to infinity. The duration and accuracy of the output pulse are determined by the external timing components C_t and R_t . The output pulse width (T) is equal to $R_t \times C_t$. The linear design techniques in LOC MOS guarantee precise control of the output pulse width.

A LOW level at \bar{C}_D terminates the output pulse immediately. Schmitt-trigger action in the trigger inputs makes the circuit highly tolerant to slower rise and fall times.



- HEF4538BP(N): 16-lead DIL; plastic (SOT38-1)
- HEF4538BD(F): 16-lead DIL; ceramic (cerdip) (SOT74)
- HEF4538BT(D): 16-lead SO; plastic (SOT109-1)
- (): Package Designator North America

PINNING

- $\bar{I}_{0A}, \bar{I}_{0B}$ input (HIGH to LOW triggered)
- I_{1A}, I_{1B} input (LOW to HIGH triggered)
- $\bar{C}_{DA}, \bar{C}_{DB}$ direct reset input (active LOW)
- O_A, O_B output
- \bar{O}_A, \bar{O}_B complementary output (active LOW)
- $C_{TC A}, C_{TC B}$ external capacitor connections⁽¹⁾
- $R_{TC A}, R_{TC B}$ external capacitor/ resistor connections

Note

1. Always connected to ground.

FAMILY DATA, I_{DD} LIMITS category MSI

See Family specifications.

Dual precision monostable multivibrator

HEF4538B
MSI

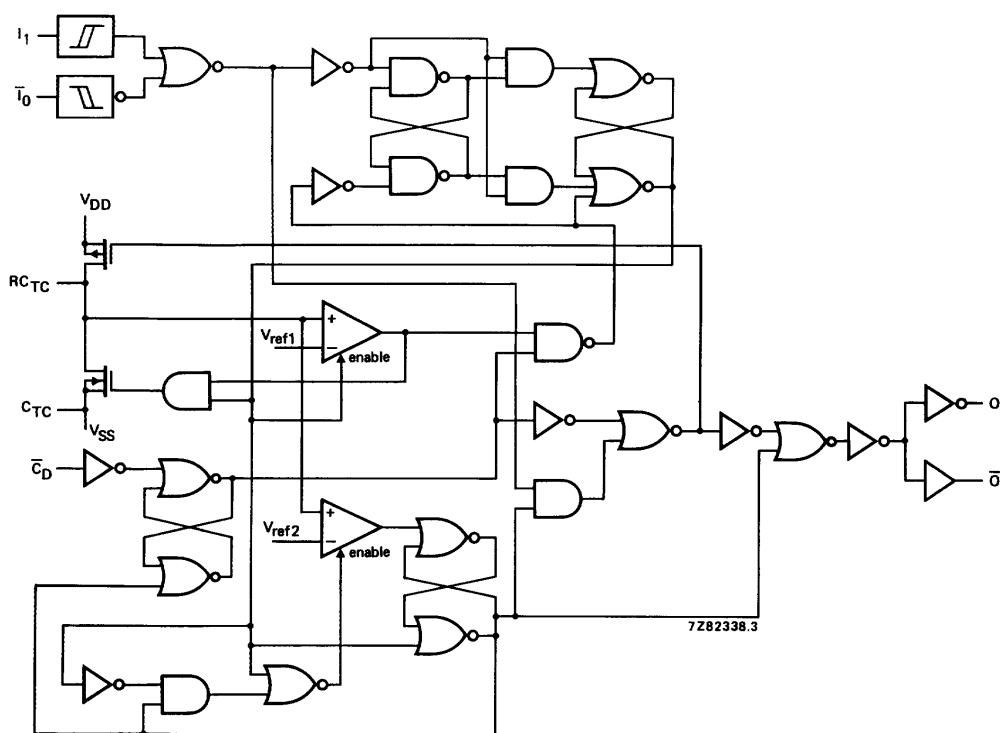


Fig.3 Logic diagram.

Dual precision monostable multivibrator

HEF4538B
MSI

FUNCTION TABLE

INPUTS			OUTPUTS	
\bar{I}_0	I_1	\bar{C}_D	O	\bar{O}
\searrow	L	H	\square	\sqcup
H	\swarrow	H	\square	\sqcup
X	X	L	L	H

Notes

- 1. H = HIGH state (the more positive voltage)
- L = LOW state (the less positive voltage)
- X = state is immaterial
- \square = positive output pulse
- \sqcup = negative output pulse
- \swarrow = positive-going transition
- \searrow = negative-going transition

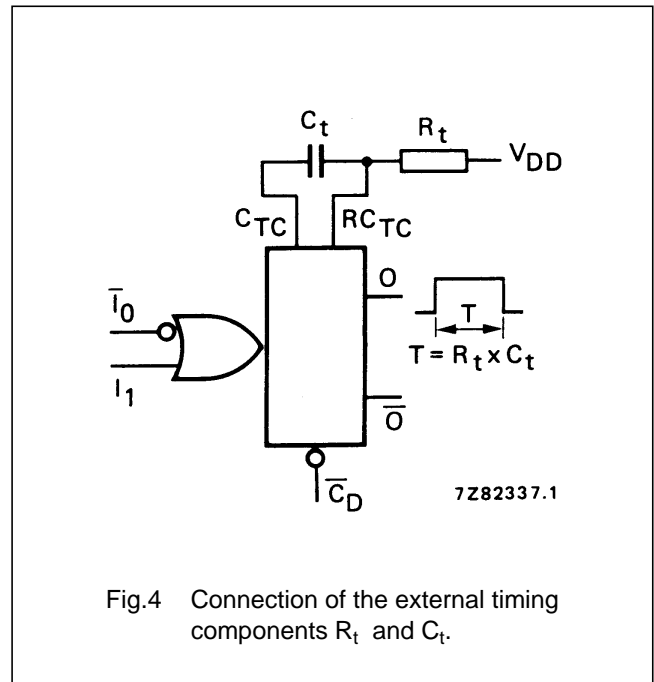


Fig.4 Connection of the external timing components R_t and C_t .

DC CHARACTERISTICS

$V_{SS} = 0\text{ V}$

	V_{DD} V	SYMBOL	$T_{amb} (\text{°C})$					
			- 40		+ 25		+ 85	
			TYP.	MAX.	TYP.	MAX.	TYP.	MAX.
Supply current	5							
active state	10	I_D			55			μA
(see note)	15				150			μA
					220			μA
Input leakage								
current	15	$\pm I_{IN}$			300		1000	nA
(pins 2 and 14)								

Note

- 1. Only one monostable is switching: current present during output pulse (output O is HIGH).

Dual precision monostable multivibrator

HEF4538B
MSI

AC CHARACTERISTICS

 $V_{SS} = 0$ V; $T_{amb} = 25$ °C; $C_L = 50$ pF; input transition times ≤ 20 ns

	V_{DD} V	SYMBOL	MIN.	TYP.	MAX.	TYPICAL EXTRAPOLATION FORMULA					
Propagation delays	5	t_{PHL}									
							10	90	180	ns	79 ns + (0,23 ns/pF) C_L
	5	t_{PLH}									
						10	85	190	ns	74 ns + (0,23 ns/pF) C_L	
											15
	5	t_{PHL}									
						10	55	110	ns	44 ns + (0,23 ns/pF) C_L	
											15
5	t_{PLH}										
					10	55	110	ns	44 ns + (0,23 ns/pF) C_L		
										15	40
5	t_{RCD}										
					10	10	20	ns			
										15	5
5	t_{RO}										
					10	0		ns			
										15	0
5	t_{WI0L}										
					10	30	15	ns			
										15	24
5	t_{WI1H}										
					10	24	12	ns			
										15	20
5	t_{WCDL}										
					10	25	12	ns			
										15	20
5	t_{WO}										
					10	218	230	242	μ s		
										15	213
5	t_{WO}										
					10	10,3	10,8	11,3	ms		
										15	10,2
5	t_{WO}										
					10	10,1	10,6	11,1	ms		
										15	0,99
5	t_{WO}										
					10	0,99	1,04	1,09	s		
										15	0,99

Dual precision monostable multivibrator

HEF4538B
MSI

AC CHARACTERISTICS

$V_{SS} = 0\text{ V}$; $T_{amb} = 25\text{ }^\circ\text{C}$; $C_L = 50\text{ pF}$; input transition times $\leq 20\text{ ns}$

	V_{DD} V	SYMBOL	MIN.	TYP.	MAX.	
Change in output O pulse width over temperature (T_{amb})	5	Δt_{WO}		$\pm 0,2$	%	$R_t = 100\text{ k}\Omega$ $C_t = 2\text{ nF to } 10\text{ }\mu\text{F}$
	10			$\pm 0,2$	%	
	15			$\pm 0,2$	%	
Change in output O pulse width over V_{DD} range 5 to 15 V		Δt_{WO}		$\pm 1,5$	%	
Pulse width variation between circuits in same package	5	Δt_{WO}		± 1	%	
	10			± 1	%	
	15			± 1	%	
External timing resistor		R_t	5	–	(1) $\text{k}\Omega$	
External timing capacitor		C_t	2000	–	no limits pF	
Input capacitance (pin 2 or 14)		C_{IN}		15	pF	

Note

1. The maximum permissible resistance R_t , which holds the specified accuracy of t_{WO} , depends on the leakage current of the capacitor C_t and the leakage of the HEF4538B.

Dual precision monostable multivibrator

HEF4538B
MSI

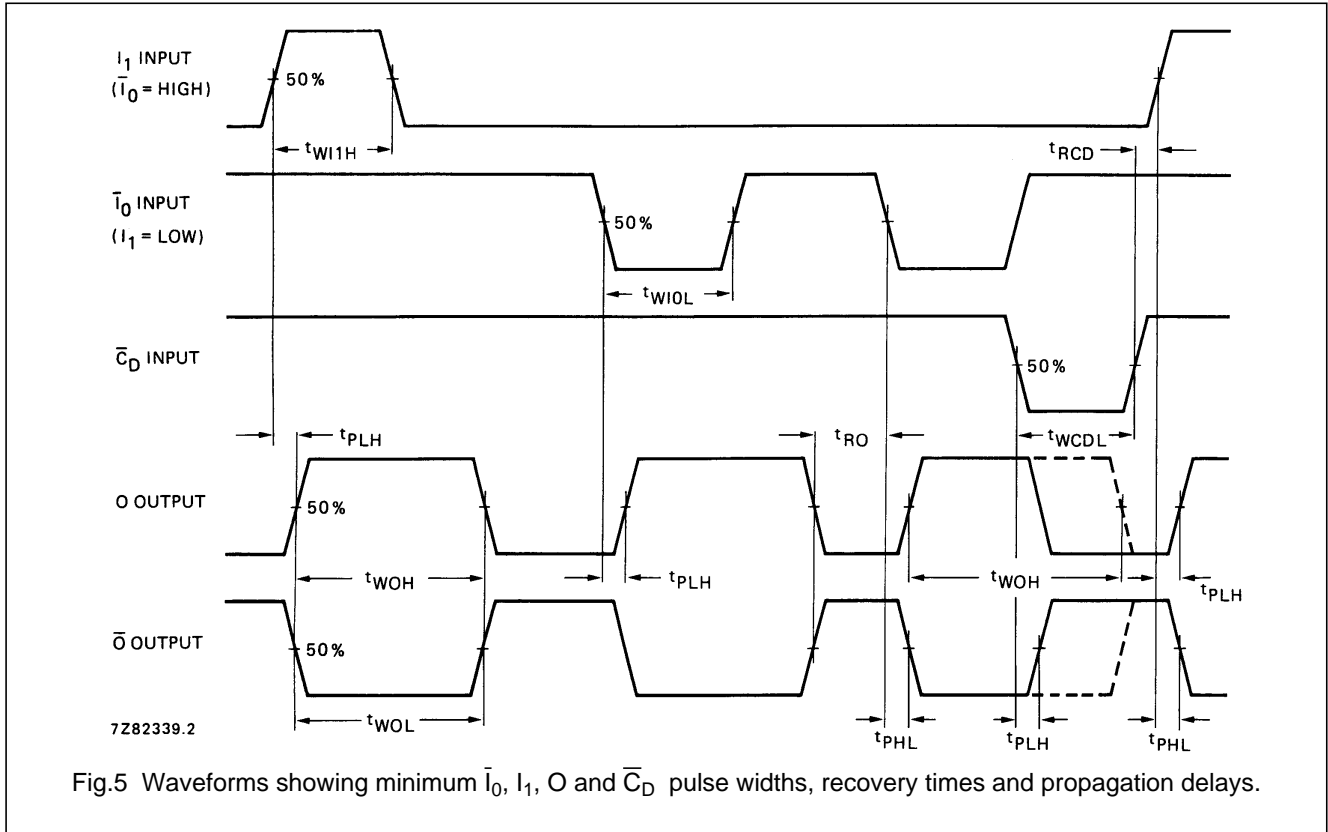


Fig.5 Waveforms showing minimum \bar{I}_0 , I_1 , O and \bar{C}_D pulse widths, recovery times and propagation delays.

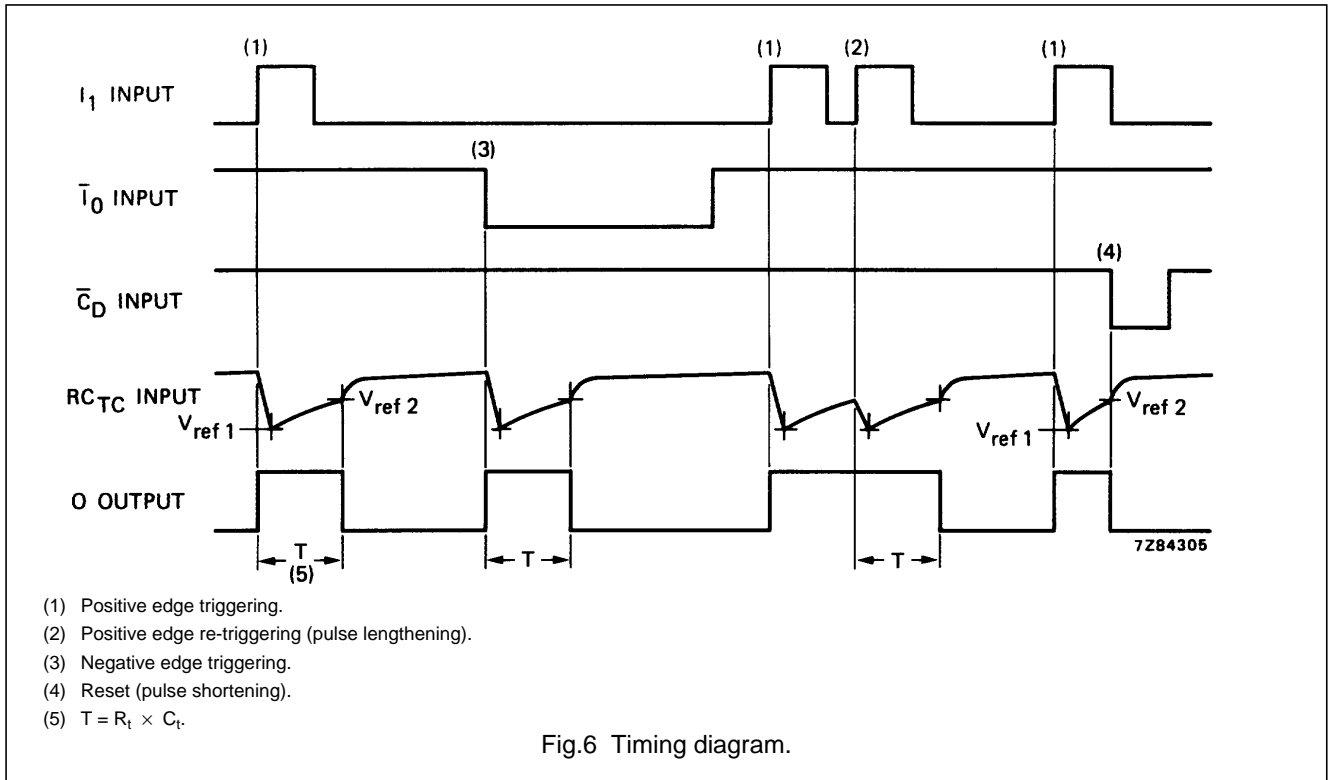


Fig.6 Timing diagram.

Dual precision monostable multivibrator

HEF4538B
MSI

