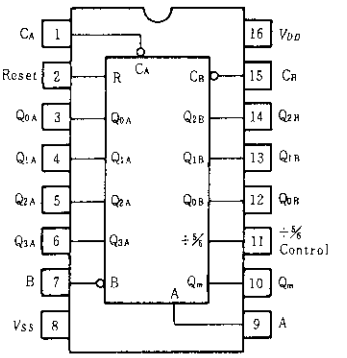
HD14566B

Industrial Time Base Generator

The HD14566B industrial time base generator consists of a divide-by-10 ripple counter and a divide-by-5 or divide-by-6 ripple counter to permit stable time generation from a 50 or 60Hz line. By cascading this device as divide-by-60 counter to permit stable time generation from a 50 or 60Hz line. By cascading this device as divide-by-60 counters, seconds and minutes can be counted and are available in BCD format at the circuit outputs

An internal monostable multivibrator is included whose output can be used as a reset or clock pulse providing additional frequency flexibility. Also a pin has been included to allow divide-by-5 counting for generating 1.0Hz from European 50Hz line.

■ PIN ARRANGEMENT

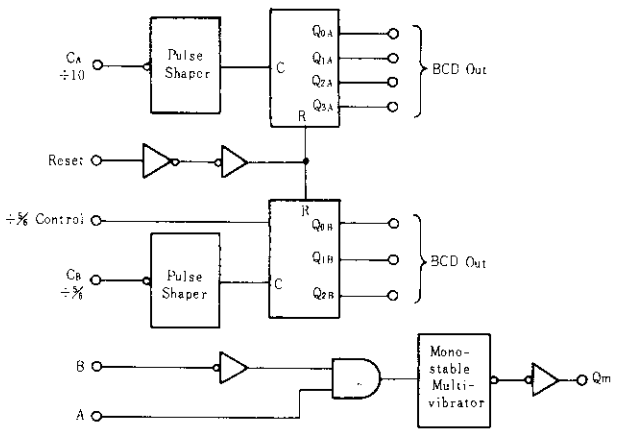


(Top View)

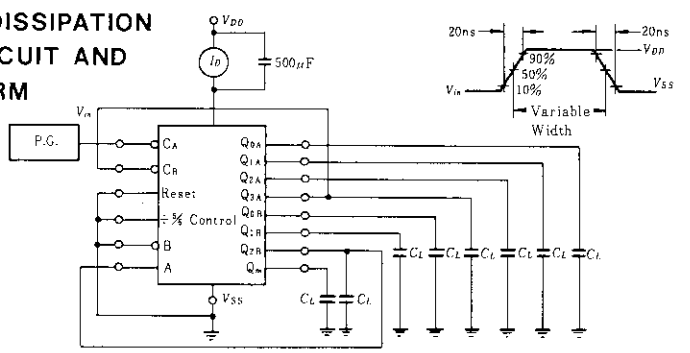
■ FEATURES

- Negative Edge Triggered Counters for Ease of Cascading
- Pulse Shapers on Counter Inputs Accept Slow Input Rise Times
- Monostable Multivibrator Positive or Negative Edge Triggered
- Noise Immunity = 45% of V_{DD} typ.
- Quiescent Current = 5nA/pkg typ. @5V
- Supply Voltage Range = 3 to 18V
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range

■ BLOCK DIAGRAM



■ POWER DISSIPATION TEST CIRCUIT AND WAVEFORM

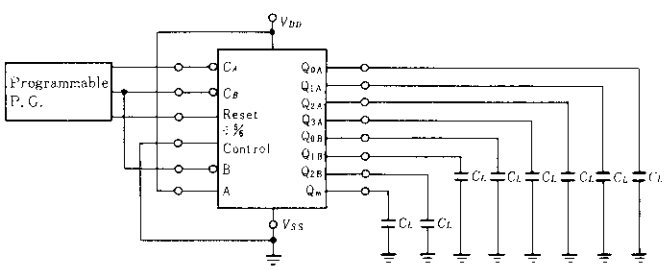


■ ELECTRICAL CHARACTERISTICS

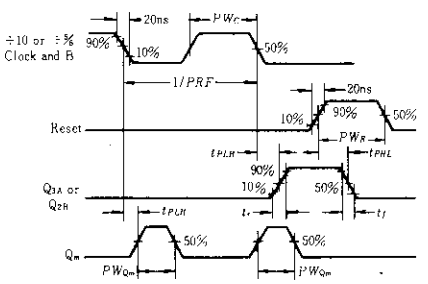
Characteristic	Symbol	V_{DD}(V)	Test Conditions	−40°C min	−40°C max	25°C min	25°C typ	25°C max	85°C min	85°C max	Unit
Output Voltage	V_{OL}	5.0	$V_{in}=V_{DD}$ or 0	—	0.05	—	0	0.05	—	0.05	V
		10		—	0.05	—	0	0.05	—	0.05	
		15		—	0.05	—	0	0.05	—	0.05	
	V_{OH}	5.0	$V_{in}=0$ or V_{DD}	4.95	—	4.95	5.0	—	4.95	—	V
		10		9.95	—	9.95	10	—	9.95	—	
		15		14.95	—	14.95	15	—	14.95	—	
Input Voltage	V_{IL}	5.0	$V_{out}=4.5$ or 0.5V	—	1.5	—	2.25	1.5	—	1.5	V
		10	$V_{out}=9.0$ or 1.0V	—	3.0	—	4.50	3.0	—	3.0	
		15	$V_{out}=13.5$ or 1.5V	—	4.0	—	6.75	4.0	—	4.0	
	V_{IH}	5.0	$V_{out}=0.5$ or 4.5V	3.5	—	3.5	2.75	—	3.5	—	V
		10	$V_{out}=1.0$ or 9.0V	7.0	—	7.0	5.50	—	7.0	—	
		15	$V_{out}=1.5$ or 13.5V	11.0	—	11.0	8.25	—	11.0	—	
Output Drive Current	I_{OH}	5.0	$V_{OH}=2.5$V	−1.0	—	−0.8	−1.7	—	−0.6	—	mA
		5.0	$V_{OH}=4.6$V	−0.2	—	−0.16	−0.36	—	−0.12	—	
		10	$V_{OH}=9.5$V	−0.5	—	−0.4	−0.9	—	−0.3	—	
		15	$V_{OH}=13.5$V	−1.4	—	−1.2	−3.5	—	−1.0	—	
	I_{OL}	5.0	$V_{OL}=0.4$V	0.52	—	0.44	0.88	—	0.36	—	mA
		10	$V_{OL}=0.5$V	1.3	—	1.1	2.25	—	0.9	—	
		15	$V_{OL}=1.5$V	3.6	—	3.0	8.8	—	2.4	—	
Input Current	I_{in}	15		—	±0.3	—	±0.00001	±0.3	—	±1.0	μA
Input Capacitance	C_{in}		$V_{in}=0$	—	—	—	5.0	7.5	—	—	pF
Quiescent Current	I_{DD}	5.0	Zero Signal, per Package	—	20	—	0.005	20	—	150	μA
		10		—	40	—	0.010	40	—	300	
		15		—	80	—	0.015	80	—	600	
Total Supply Current*	I_T	5.0	Dynamic+I_{DD}, per Gate C_L=50pF, f=1kHz	—	—	—	1.0	—	—	—	μA
		10		—	—	—	2.0	—	—	—	
		15		—	—	—	3.0	—	—	—	

* To calculate total supply current at frequency other than 1kHz.
@V_{DD}=5.0V $I_T=(1.0\,\mu A/kHz)f+I_{DD}$, @$V_{DD}$=10V $I_T=(2.0\,\mu A/kHz)f+I_{DD}$, @$V_{DD}$=15V $I_T=(3.0\,\mu A/kHz)f+I_{DD}$

■ SWITCHING TIME TEST CIRCUIT



Note) Assume÷10 Counter at "6" and÷5/6 Counter at "2" at bigining of sequence.

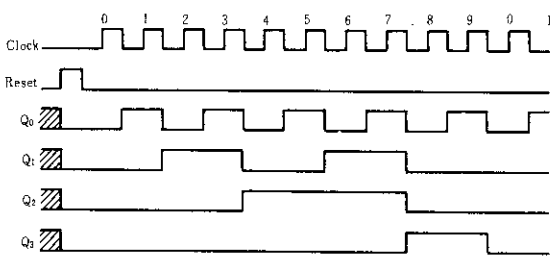


■ SWITCHING CHARACTERISTICS (C_L=50pF, Ta=25°C)

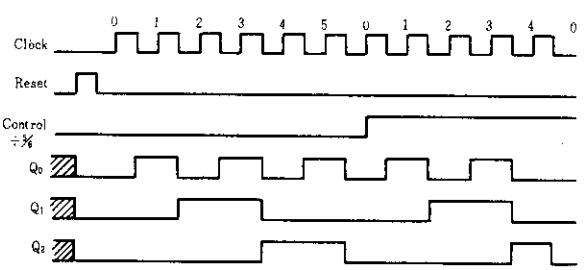
Characteristic		Symbol	V_{DD}(V)	min	typ	max	Unit
Output Rise Time		t_r	5.0	—	180	400	ns
			10	—	90	200	
			15	—	65	160	
Output Fall Time		t_f	5.0	—	120	250	ns
			10	—	60	125	
			15	—	40	100	
Propagation Delay Time	Clock to Q_{3A}	t_{PLH}, t_{PHL}	5.0	—	1450	4500	ns
			10	—	530	1500	
			15	—	320	1000	
	Reset to Q_{3A}	t_{PHL}	5.0	—	930	3000	ns
			10	—	315	1000	
			15	—	210	750	
Clock Pulse Width		PW_C	5.0	1200	400	—	ns
			10	400	125	—	
			15	270	90	—	
Reset Pulse Width		PW_R	5.0	1200	400	—	ns
			10	400	125	—	
			15	270	90	—	
Clock Frequency		PRF	5.0	—	1.0	0.3	MHz
			10	—	2.5	1.0	
			15	—	4.2	1.5	
Clock Pulse Rise and Fall Time		t_r, t_f	5.0	No Limit			
			10				
			15				
Monostable Multibivrator Pulse Width		PW_{Q_m}	5.0	1200	2800	—	ns
			10	400	900	—	
			15	300	600	—	

■ TIMING DIAGRAM

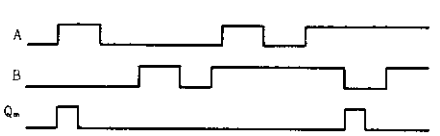
● Divide-by-10 Counter



● Divide-by-5/6 Counter

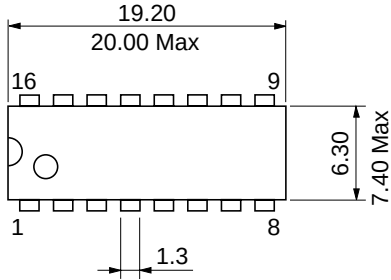


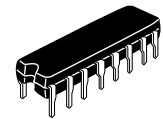
● Monostable Multivibrator

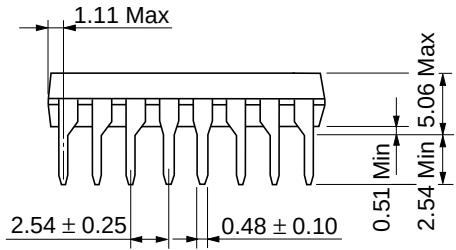


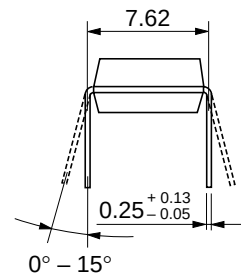
▨ = Don't Care

Unit: mm









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