

HD14566B

Industrial Time Base Generator

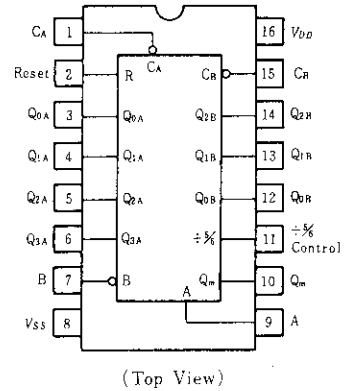
The HD14566B industrial time base generator consists of a divide-by-10 ripple counter and a divide-by-5 or divide-by-6 ripple counter to permit stable time generation from a 50 or 60Hz line. By cascading this device as divide-by-60 counter to permit stable time generation from a 50 or 60Hz line. By cascading 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.

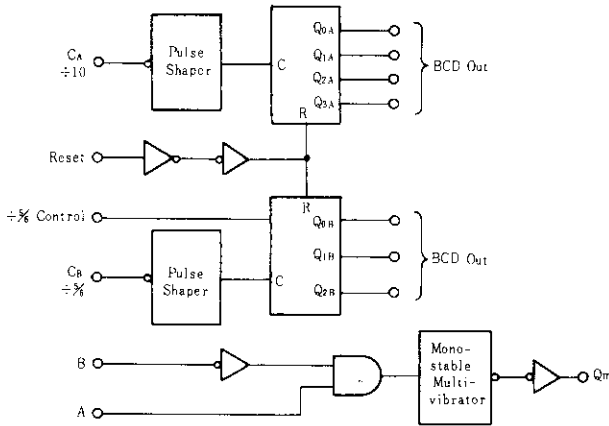
FEATURES

- 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

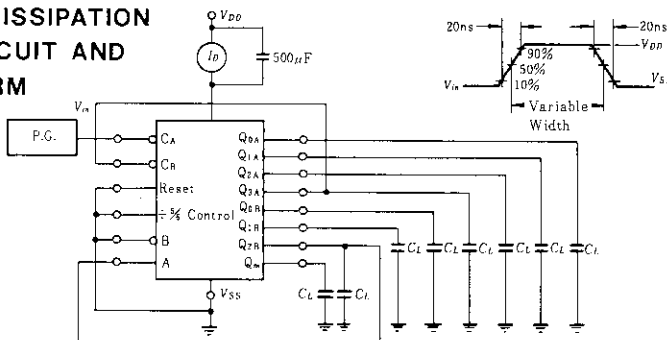
PIN ARRANGEMENT



BLOCK DIAGRAM



POWER DISSIPATION TEST CIRCUIT AND WAVEFORM

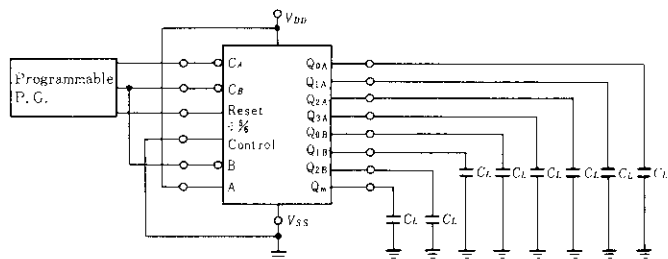


ELECTRICAL CHARACTERISTICS

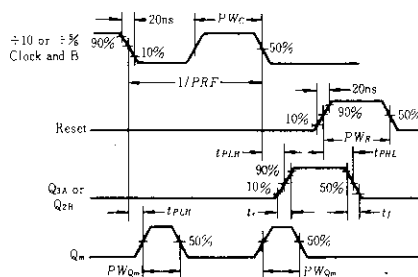
| Characteristic | Symbol | Test Conditions | -40°C | | 25°C | | | 85°C | | Unit |
|-----------------------|-----------------|-----------------|-------|------|-------|---------|------|-------|------|------|
| | | | min | max | min | typ | max | min | max | |
| Output Voltage | V _{OL} | 5.0 | — | 0.05 | — | 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 | 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 | — | 1.5 | — | 2.25 | 1.5 | — | 1.5 | V |
| | | 10 | — | 3.0 | — | 4.50 | 3.0 | — | 3.0 | |
| | | 15 | — | 4.0 | — | 6.75 | 4.0 | — | 4.0 | |
| | V _{IH} | 5.0 | 3.5 | — | 3.5 | 2.75 | — | 3.5 | — | V |
| | | 10 | 7.0 | — | 7.0 | 5.50 | — | 7.0 | — | |
| | | 15 | 11.0 | — | 11.0 | 8.25 | — | 11.0 | — | |
| Output Drive Current | I _{OH} | 5.0 | -1.0 | — | 0.8 | -1.7 | — | -0.6 | — | mA |
| | | 5.0 | -0.2 | — | -0.16 | -0.36 | — | -0.12 | — | |
| | | 10 | -0.5 | — | -0.4 | -0.9 | — | -0.3 | — | |
| | I _{OL} | 5.0 | 0.52 | — | 0.44 | 0.88 | — | 0.36 | — | mA |
| | | 10 | 1.3 | — | 1.1 | 2.25 | — | 0.9 | — | |
| | | 15 | 3.6 | — | 3.0 | 8.8 | — | 2.4 | — | |
| Input Current | I _{in} | 15 | — | ±0.3 | — | ±0.0001 | ±0.3 | — | ±1.0 | μA |
| Input Capacitance | C _{in} | | — | — | — | 5.0 | 7.5 | — | — | pF |
| Quiescent Current | I _{DD} | 5.0 | — | 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 | — | — | — | 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 μA/kHz)f + I_{DD}. @V_{DD} = 10V I_T = (2.0 μA/kHz)f + I_{DD}. @V_{DD} = 15V I_T = (3.0 μA/kHz)f + I_{DD}

SWITCHING TIME TEST CIRCUIT



Note: Assume ÷10 Counter at "6" and ÷5/6 Counter at "2" at beginning of sequence.

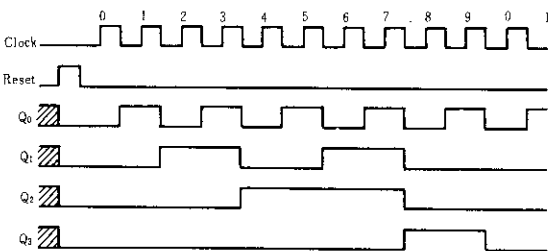


■ SWITCHING CHARACTERISTICS ($C_L=50\text{pF}$, $T_a=25^\circ\text{C}$)

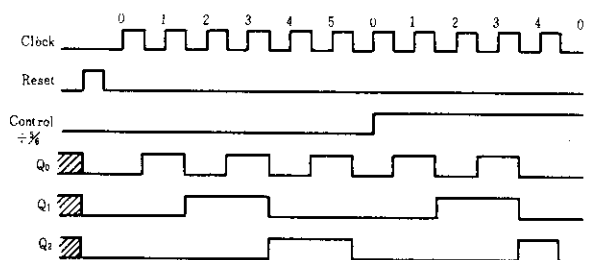
| Characteristic | | Symbol | $V_{DD}(\text{V})$ | min | typ | max | Unit |
|--------------------------------------|-------------------|------------------------|--------------------|----------|------|------|------|
| Output Rise Time | | t_r | 5.0 | — | 180 | 400 | ns |
| | | | 10 | — | 90 | 200 | |
| | | | 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 Multivibrator Pulse Width | | PW_{Q_0} | 5.0 | 1200 | 2800 | — | ns |
| | | | 10 | 400 | 900 | — | |
| | | | 15 | 300 | 600 | — | |

■ TIMING DIAGRAM

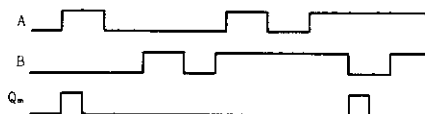
● Divide-by-10 Counter



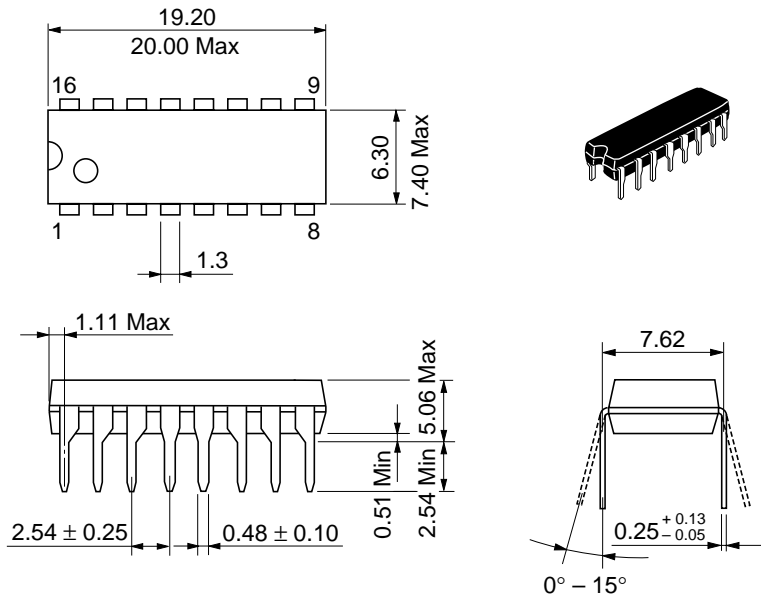
● Divide-by-5/6 Counter



● Monostable Multivibrator



▨ = Don't Care



| | |
|--------------------------|----------|
| Hitachi Code | DP-16 |
| JEDEC | Conforms |
| EIAJ | Conforms |
| Weight (reference value) | 1.07 g |

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