

DIGITAL 8000 SERIES TTL/MSI

DESCRIPTION

The Bidirectional One Shot is intended for applications where high speed low level signal processing is required.

The 8T20 is a Monolithic Building Block, consisting of a high speed analog comparator, digital control circuitry, and a precision monostable multivibrator. The differential input threshold voltage is between $\pm 4\text{mV}$ with respect to the input reference level which may range from -3.2V to $+4.2\text{V}$. For input frequencies up to 8MHz , the device may be conditioned to act as a frequency doubler since it can trigger on both positive and negative input transitions.

Timing pins permit using this device in a variety of applications where external control over pulse width is desirable. Pulse width (t_w) is defined by the relationship $t_w = C_X R_X \text{Log}_2$. Pulse width stability is internally compensated and virtually independent of temperature and V_{CC} variations, thus only limited by the accuracy of external timing components.

An internal resistive divider is available on the chip to provide a voltage of 1.4V (typ.). This output can be connected directly to either of the comparator inputs as a reference voltage when interfacing with TTL outputs.

ABSOLUTE MAX RATINGS

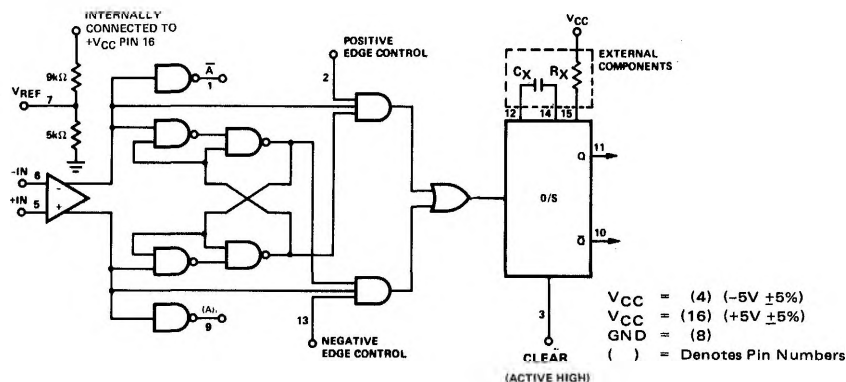
Input Voltage

V_{CC} : $+7\text{V}$

V_{EE} : -7V

MAX DIFF. INPUT VOLTAGE $\pm 5\text{V}$

LOGIC DIAGRAM



APPLICATIONS

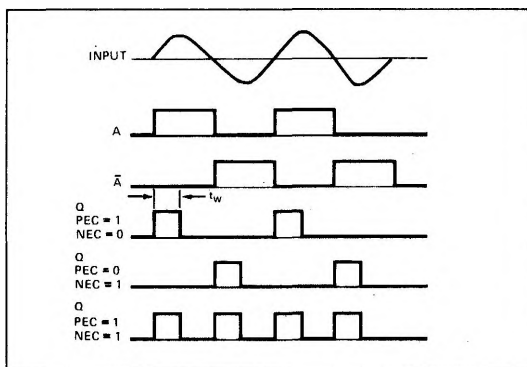
DISC, TAPE AND DRUM READERS

DIGITAL COMMUNICATIONS RECEIVERS

SIGNAL CONDITIONERS

TRANSITION DETECTORS

INPUT/OUTPUT WAVEFORMS



FEATURES

- DIFFERENTIAL INPUT THRESHOLD = $\pm 4\text{mV}$
- PULSE POSITION ERROR = TYPICALLY $< 3\text{ns}$
- MAX. INPUT FREQUENCY = 8MHz
- TRIGGERS ON POSITIVE AND/OR NEGATIVE TRANSITIONS

ELECTRICAL CHARACTERISTICS (Over Recommended Temperature Range and Voltage)

CHARACTERISTICS	LIMITS				TEST CONDITIONS	NOTES
	MIN.	TYP.	MAX.	UNITS		
"1" Output Voltage (All Outputs)	2.6			V	$I_{out} = -800\mu A$	7
"0" Output Voltage (All Outputs)			0.4	V	$I_{out} = +16mA$	8
DIFFERENTIAL INPUTS						
Input Threshold Voltage (V_T)			± 4	mV		10
Input Bias Current			125	μA	Figure 5	
Input Offset Current		2		μA		
Common Mode Input Volt, Range	-3.2		+4.2	V		12
DIGITAL INPUTS						
"1" Input Current			40	μA	$V_{in} = 4.5V$	
"0" Input Current						
PEC. NEC	-0.1		-2.4	mA	$V_{in} = 0.4V$	
Clear	-0.1		-1.6	mA	$V_{in} = 0.4V$	
Input Voltage Rating (Logic Inputs)	5.5			V	$I_{in} = 10mA$	
Reference Voltage (V_{REF})	0.8	1.4	2.0	V	Pin 7 tied to Pin 6	
Output Pulse Width, Fig. 1	10		40	ns	$R_x = 10K, C_x = \text{Open}$	11
Output Pulse Width, Fig. 3	600		800	ns	$R_x = 10K, C_x = 100pf$	11
Power Supply Current						
I_{CC}		37	55	mA	$V_{cc} = +5.25V$	
I_{EE}		-12	-20	mA	$V_{cc} = -5.25V$	
Short Circuit Current (I_{SO})	-20		-70	mA		9

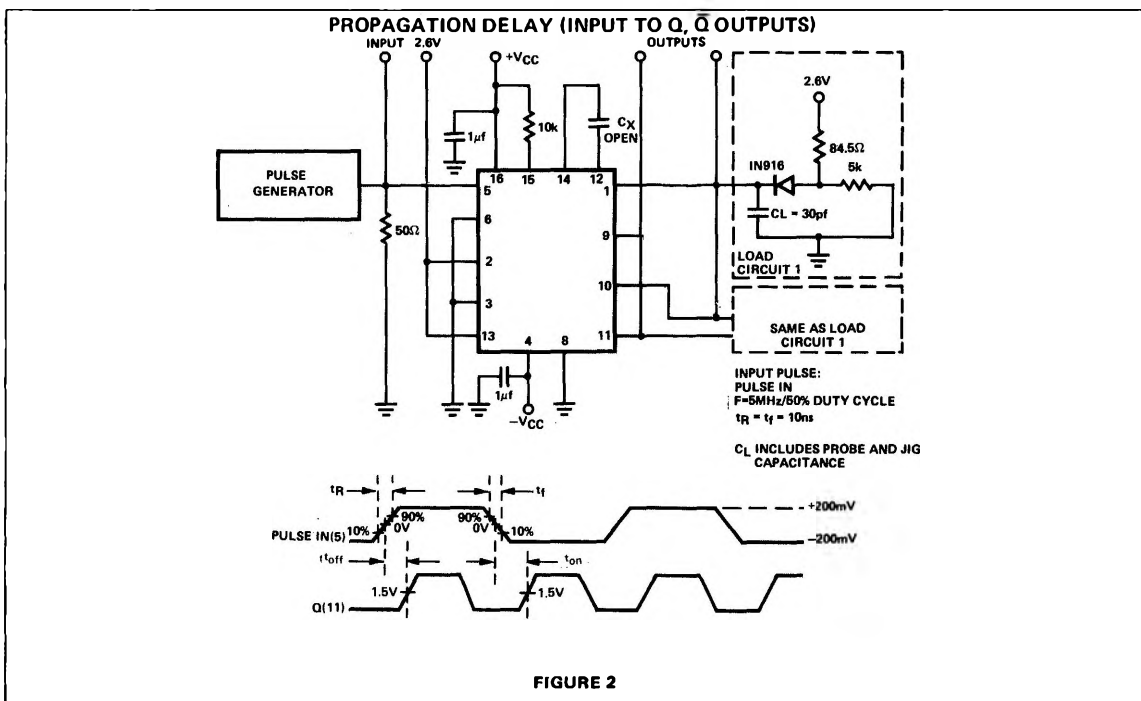
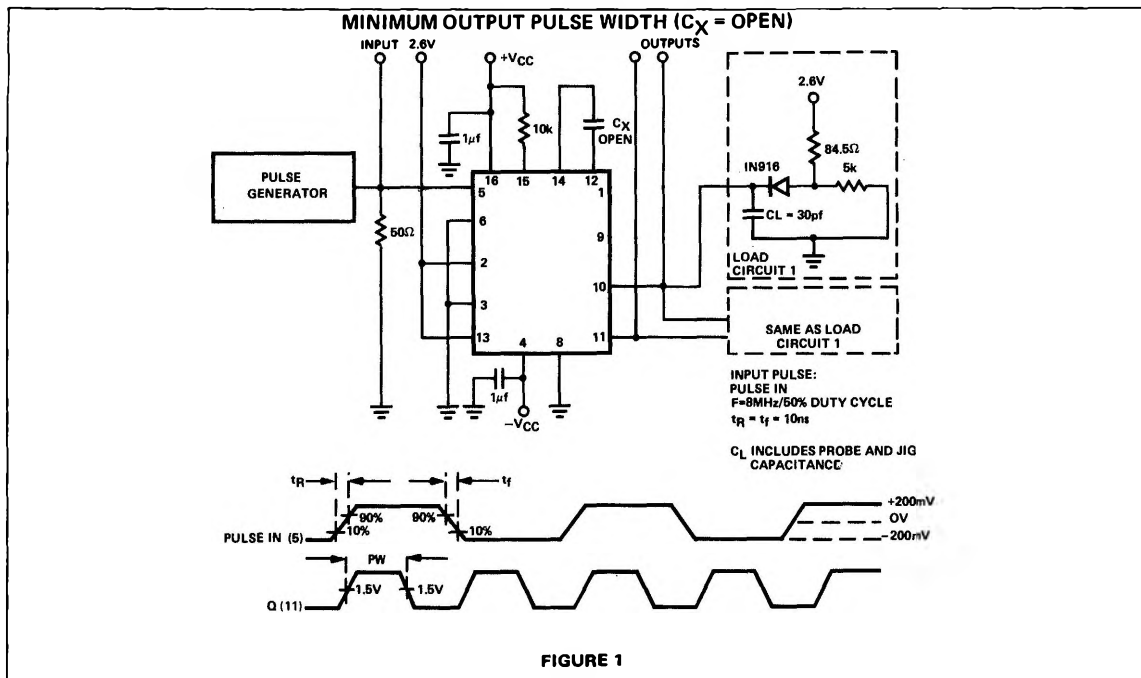
$T_A = 25^\circ C$, $V_{CC} = +5.00V$, $V_{EE} = -5.00V$

CHARACTERISTICS	LIMITS				TEST CONDITIONS	NOTES
	MIN.	TYP.	MAX.	UNITS		
Output Frequency	16			MHz	Fig. 1, $f_{in} = 8 \text{ MHz}$	11
Propagation Delay (t_{on}, t_{off})						
Input to Q, \bar{Q}		30	50	ns	Fig. 2	11
Input to A, \bar{A}		30	50	ns	Fig. 4	11
Clear to Q, \bar{Q}		20	30	ns		

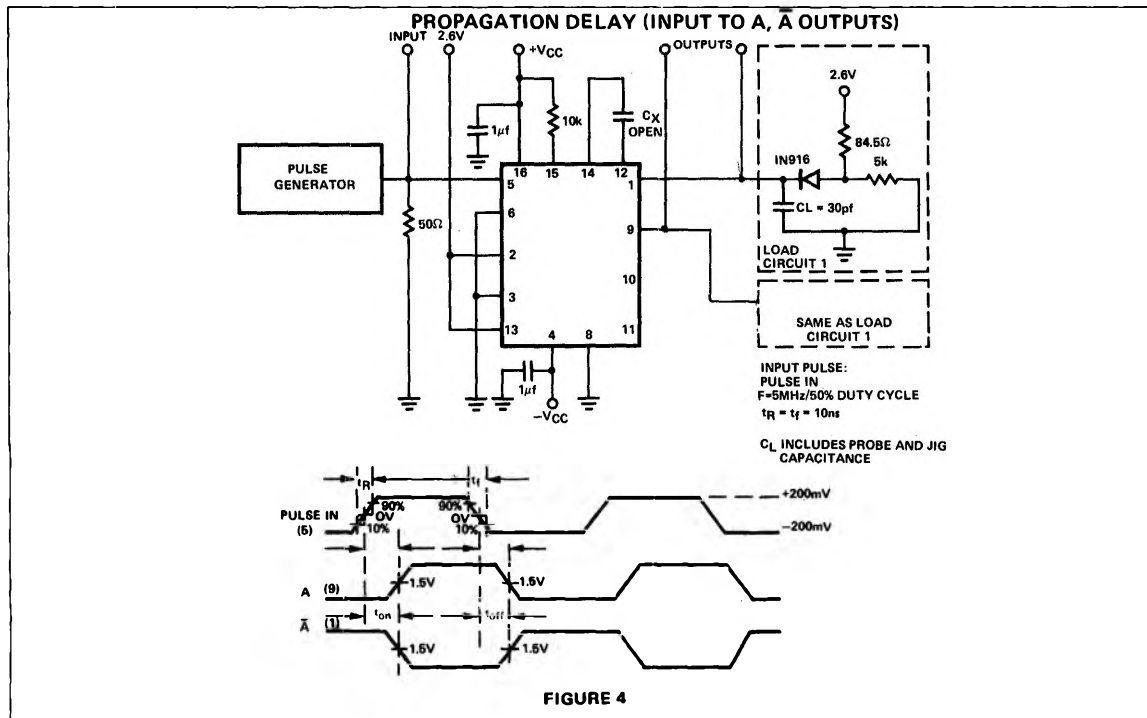
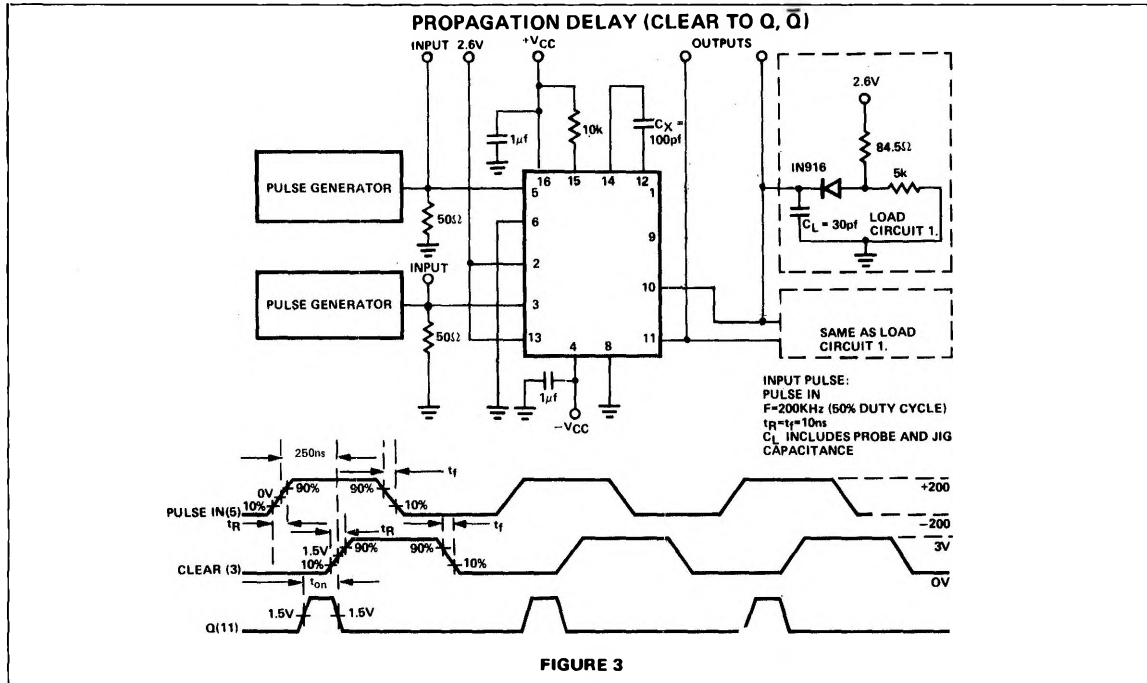
NOTE:

- All Voltage measurements are referenced to the ground terminal. Terminals not specifically referenced are left electrically open.
- All measurements are taken with ground pin tied to zero volts.
- Positive current is defined as into the terminal referenced.
- Positive logic definition: "UP" Level = "1", "DOWN" Level = "0".
- Precautionary measures should be taken to ensure current limiting in accordance with Absolute Maximum Ratings should the isolation diodes become forward biased.
- Manufacturer reserves the right to make design and process changes and improvements.
- Output source current is applied through a resistor to ground.
- Output sink current is supplied through a resistor to V_{cc} .
- Not more than one output should be shorted at a time.
- The differential input threshold voltage (V_T) is defined as the maximum DC voltage deviation from the reference level necessary to trigger the one-shot.
- Refer to AC test circuits.
- Common mode voltages that are confined within the dynamic range as specified will not cause false triggering of the one-shot.

AC TEST CIRCUITS



AC TEST CIRCUITS (Cont'd)



INPUT BIAS CURRENT TEST CIRCUIT

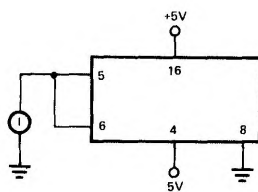


FIGURE 5