GD54/74LS14

HEX SCHMITT-TRIGGER INVERTERS

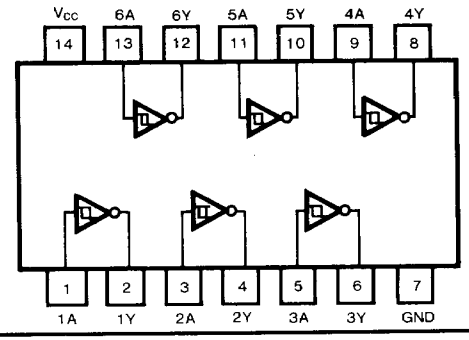
Description

This device contains six independent gates each of which performs the logic INVERT function. Each input has hysteresis which increases the noise immunity and transforms a slowly changing input signal to a fast changing, jitter free output.

Function Table (each inverter)

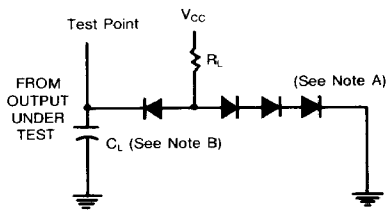
INPUT	OUTPUT
A	Y
L	H
H	L

Pin Configuration

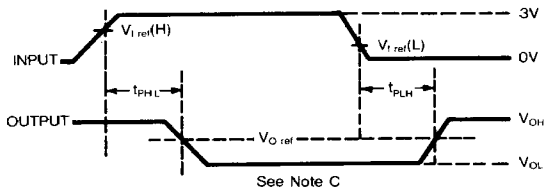


Suffix-Blank: Plastic Dual In Line Package
Suffix-J : Ceramic Dual In Line Package

Parameter Measurement Information



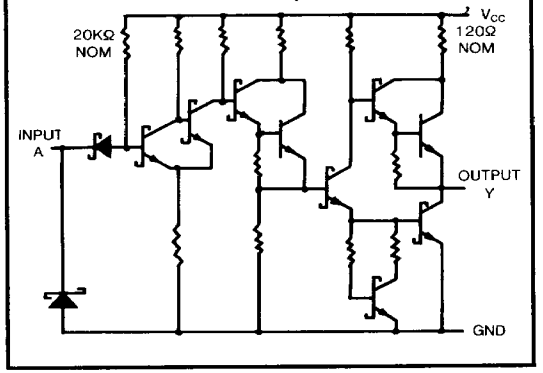
Load Circuit



VOLTAGE WAVEFORMS

Note: A. All diodes are IN916 or IN3064
B. C_L includes probe and jig capacitance

Circuit Schematics (each inverter)



Note C: Generator characteristics and reference voltage are

Generator Characteristics				Reference Voltage		
Z_{OUT}	PRR	tr	tf	V_I ref(H)	V_I ref(L)	V_O ref
50Ω	1MHz	15ns	6ns	1.6V	0.8V	1.3V

Absolute Maximum Ratings

- Supply voltage, Vcc 7V
- Input voltage 7V
- Operating free-air temperature range 54LS ..... −55°C to 125°C
  74LS ..... 0°C to 70°C
- Storage temperature range ..... −65°C to 150°C

Recommended Operating Conditions

SYMBOL	PARAMETER		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	54	4.5	5	5.5	V
		74	4.75	5	5.25	
I_{OH}	High-level output current	54,74			−400	μA
I_{OL}	Low-level output current	54			4	mA
		74			8	
T_A	Operating free-air temperature	54	−55		125	°C
		74	0		70	

Electrical Characteristics over recommended operating free-air temperature range (unless otherwise noted)

SYMBOL	PARAMETER	TEST CONDITIONS			MIN	TYP (Note 1)	MAX	UNIT
V_{T+}	Positive-Going Input Threshold Voltage (Note 1)	V_{CC}=5V			1.4	1.6	1.9	V
V_{T-}	Negative-Going Input Threshold Voltage (Note 1)	V_{CC}=5V			0.5	0.8	1	V
V_{IK}	Input clamp voltage	V_{CC}=Min, I_I=−18mA					−1.5	V
$V_{T+}-V_{T-}$	Input Hysteresis (Note 1)	V_{CC}=5V			0.4	0.8		V
V_{OH}	High-level output voltage	V_{CC}=Min, I_{OH}=Max	V_I=V_{T-}Min	54	2.5	3.4		V
				74	2.7	3.4		
V_{OL}	Low-level output voltage	V_{CC}=Min, V_I=V_{T+}Max	I_{OL}=4mA	54,74		0.25	0.4	V
			I_{OL}=8mA	74		0.35	0.5	
I_{T+}	Input Current at Positive-Going Threshold	V_{CC}=5V, V_I=V_{T+}				−0.14		mA
I_{T-}	Input Current at Negative-Going Threshold	V_{CC}=5V, V_I=V_{T-}				−0.18		mA
I_I	Input current at maximum input voltage	V_{CC}=Max, V_I=7V					0.1	mA
I_{IH}	High-level input current	V_{CC}=Max, V_I=2.7V					20	μA
I_{IL}	Low-level input current	V_{CC}=Max, V_I=0.4V					−0.4	mA
I_{OS}	Short-circuit output current	V_{CC}=Max (Note 2)			−20		−100	mA
I_{CCH}	Supply current, Total with outputs high	V_{CC}=Max				8.6	16	mA
I_{CCL}	Supply current, Total with outputs low	V_{CC}=Max				12	21	mA

Note 1: All typical values are at V_{CC}=5V, T_A=25°C.
Note 2: Note more than one output should be shorted at a time, and the duration should not exceed one second.

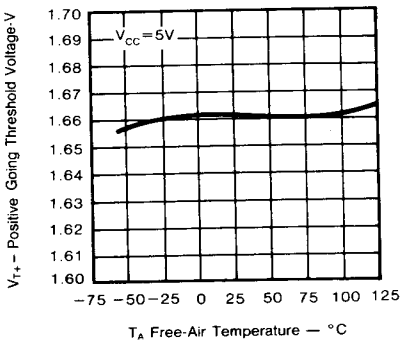
Switching Characteristics, V_{CC}=5V, T_A=25°C

SYMBOL	PARAMETER	TEST CONDITION#	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L=15pF, R_L=2kΩ		15	22	ns
t_{PHL}	Propagation delay time, high-to-low-level output			15	22	ns

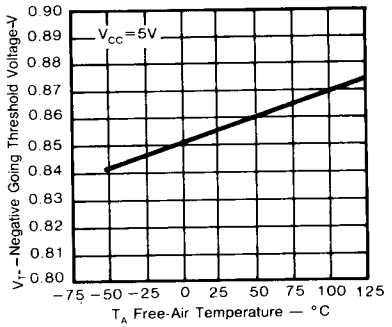
#For load circuit and voltage waveforms, see page 3-11.

Typical Characteristics

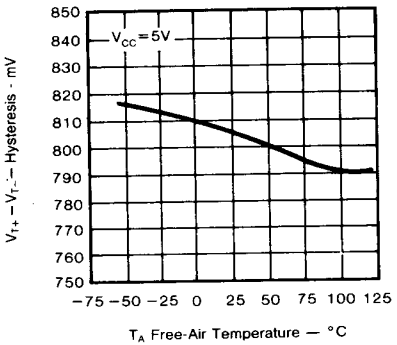
POSITIVE-GOING THRESHOLD VOLTAGE
V_S
FREE-AIR TEMPERATURE



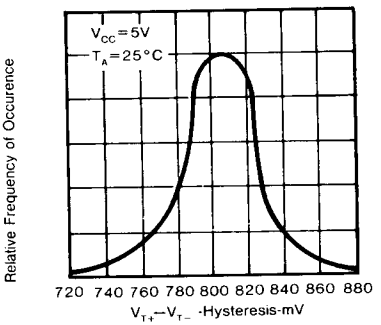
NEGATIVE-GOING THRESHOLD VOLTAGE
V_S
FREE-AIR TEMPERATURE



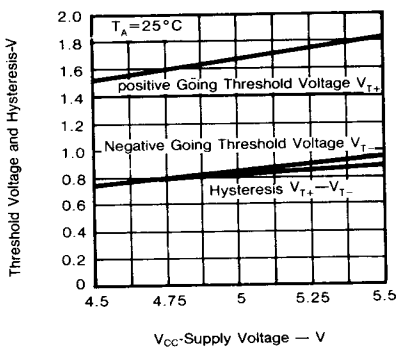
HYSTERESIS
V_S
FREE-AIR TEMPERATURE



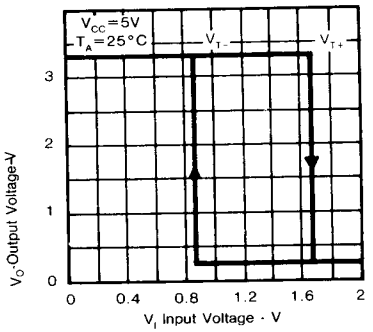
DISTRIBUTION OF UNIT
V_S
FOR HYSTERESIS



THRESHOLD VOLTAGE AND HYSTERESIS
V_S
SUPPLY VOLTAGE

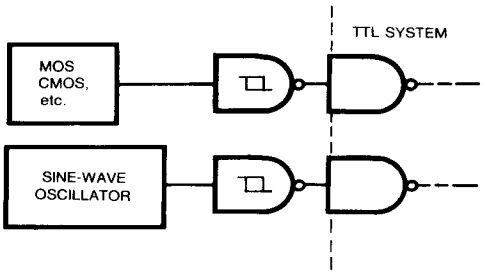


OUTPUT VOLTAGE
V_S
INPUT VOLTAGE

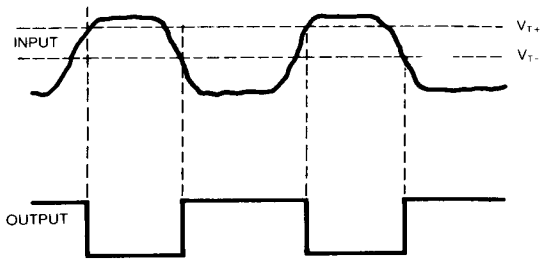


Typical Application Data

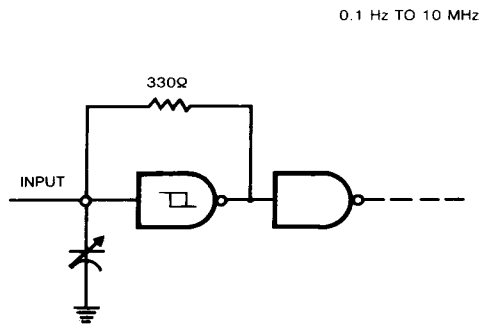
TYPICAL APPLICATION DATA



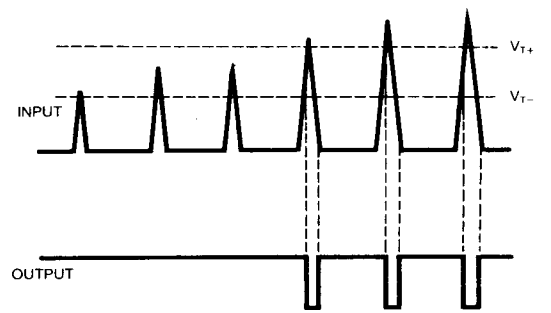
TTL SYSTEM INTERFACE
FOR SLOW INPUT WAVEFORMS



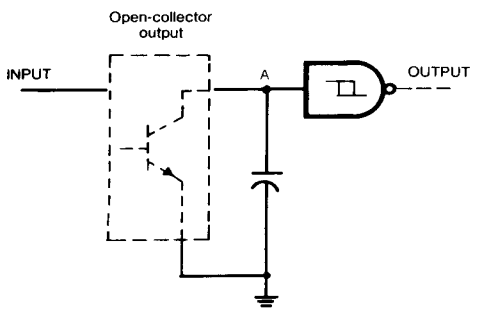
PULSE SHAPER

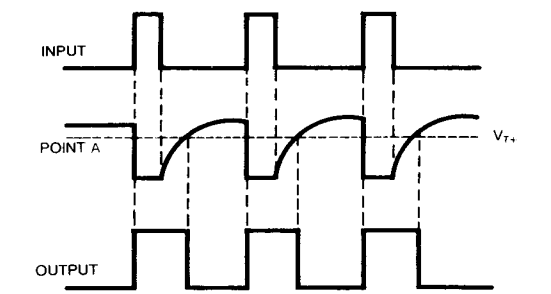


MULTIVIBRATOR



THRESHOLD DETECTOR





PULSE STRETCHER