

MITSUBISHI LSTTLs
M74LS14P

HEX SCHMITT TRIGGER INVERTERS

DESCRIPTION

The M74LS14P is a semiconductor integrated circuit containing 6 Schmitt trigger inverter circuits.

FEATURES

- Suitable for waveform shaping applications
- Wide hysteresis width (0.8V typical) and high noise margin
- High breakdown input voltage ($V_I \geq 15V$)
- Low power dissipation ($P_D = 51mW$ typical)
- High speed ($t_{pd} = 12ns$ typical)
- Wide operating temperature range ($T_a = -20 \sim +75^\circ C$)

APPLICATION

General purpose, for use in industrial and consumer equipment.

FUNCTIONAL DESCRIPTION

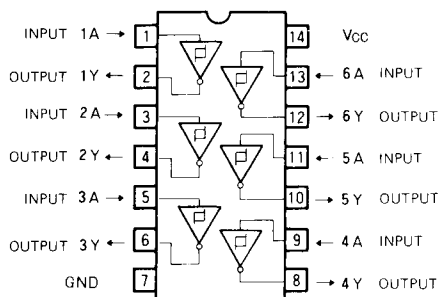
The use Schottly TTL technology has enabled the achievement of high input voltage, high speed, low power dissipation, and high fan-out. With positive feedback applied in the circuit, the hysteresis width is 0.8V (typical). Accordingly, noise margin is high. Even slow changing input signals result in a shaped waveform output without causing oscillation.

When input A is high, output Y is low, and when A is low, Y is high.

FUNCTION TABLE

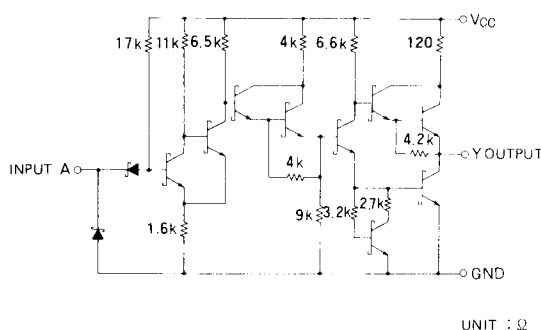
A	Y
L	H
H	L

PIN CONFIGURATION (TOP VIEW)



Outline 14P4

CIRCUIT SCHEMATIC (EACH CIRCUIT)



ABSOLUTE MAXIMUM RATINGS ($T_a = -20 \sim +75^\circ C$, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		-0.5 ~ +7	V
V_I	Input voltage		-0.5 ~ +15	V
V_O	Output voltage	High-level state	-0.5 ~ V_{CC}	V
T_{opr}	Operating free-air ambient temperature range		-20 ~ +75	$^\circ C$
T_{stg}	Storage temperature range		-65 ~ +150	$^\circ C$

RECOMMENDED OPERATING CONDITIONS ($T_a = -20 \sim +75^\circ C$, unless otherwise noted)

Symbol	Parameter		Limits			Unit
			Min	Nom	Max	
V_{CC}	Supply voltage		4.75	5	5.25	V
I_{OH}	High-level output current	$V_{OH} \geq 2.7V$	0		-400	μA
I_{OL}	Low-level output current	$V_{OL} \leq 0.4V$	0		4	mA
		$V_{OL} \leq 0.5V$	0		8	mA

HEX SCHMITT TRIGGER INVERTERS

ELECTRICAL CHARACTERISTICS (Ta = -20 ~ +75°C, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ*	Max	
V _{T+}	Positive-going threshold voltage	V _{CC} = 5V	1.4	1.6	1.9	V
V _{T-}	Negative-going threshold voltage	V _{CC} = 5V	0.5	0.8	1	V
V _{T+} - V _{T-}	Hysteresis	V _{CC} = 5V	0.4	0.8		V
V _{IC}	Input clamp voltage	V _{CC} = 4.75V, I _{IC} = -18mA			-1.5	V
V _{OH}	High-level output voltage	V _{CC} = 4.75V, V _I = 0.5V I _{OH} = -400μA	2.7	3.4		V
V _{OL}	Low-level output voltage	V _{CC} = 4.75V V _I = 1.9V	I _{OL} = 4mA	0.25	0.4	V
			I _{OL} = 8mA	0.35	0.5	V
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 _{IH}	High-level input current	V _{CC} = 5.25V, V _I = 2.7V			20	μA
		V _{CC} = 5.25V, V _I = 10V			0.1	mA
I _{IL}	Low-level input current	V _{CC} = 5.25V, V _I = 0.4V			-0.4	mA
I _{OS}	Short-circuit output current (Note 1)	V _{CC} = 5.25V, V _O = 0V	-20		-100	mA
I _{COH}	Supply current, all outputs high	V _{CC} = 5.25V, V _I = 0V		8.6	16	mA
I _{COL}	Supply current, all outputs low	V _{CC} = 5.25V, V _I = 4.5V		12	21	mA

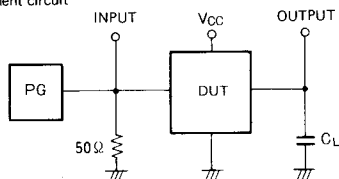
* : All typical values are at V_{CC} = 5V, Ta = 25°C.

Note 1: All measurements should be done quickly, and not more than one output should be shorted at a time.

SWITCHING CHARACTERISTICS (V_{CC} = 5V, Ta = 25°C, unless otherwise noted)

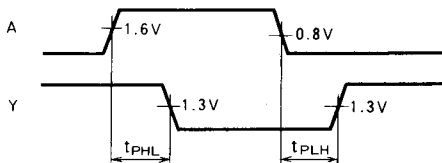
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
t _{PLH}	Low-to-high-level output propagation time	C _L = 15pF (Note 2)		12	22	ns
t _{PHL}	High-to-low-level output propagation time			12	22	ns

Note 2: Measurement circuit



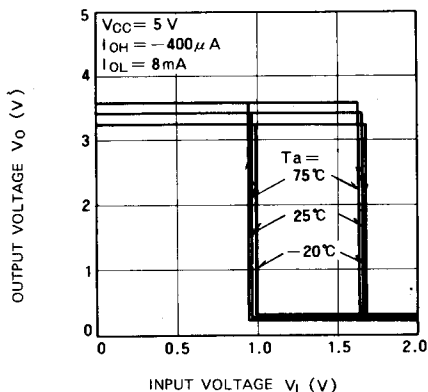
- (1) The pulse generator (PG) has the following characteristics:
 PRR = 1MHz, t_r = 6ns, t_f = 6ns, t_w = 500ns,
 V_p = 3V_{p-p}, Z₀ = 50Ω
- (2) C_L includes probe and jig capacitance.

TIMING DIAGRAM

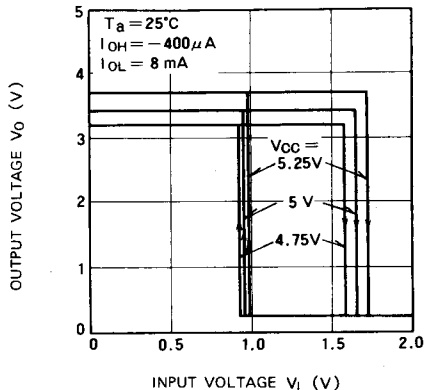


TYPICAL CHARACTERISTICS

OUTPUT VOLTAGE VS INPUT VOLTAGE



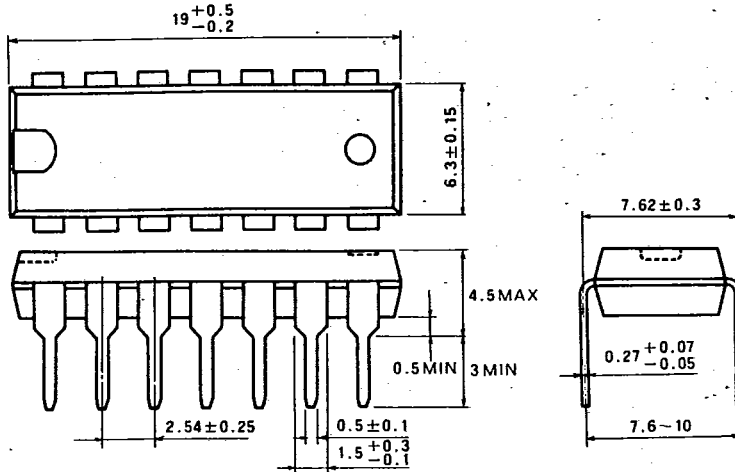
OUTPUT VOLTAGE VS INPUT VOLTAGE



T-90-20

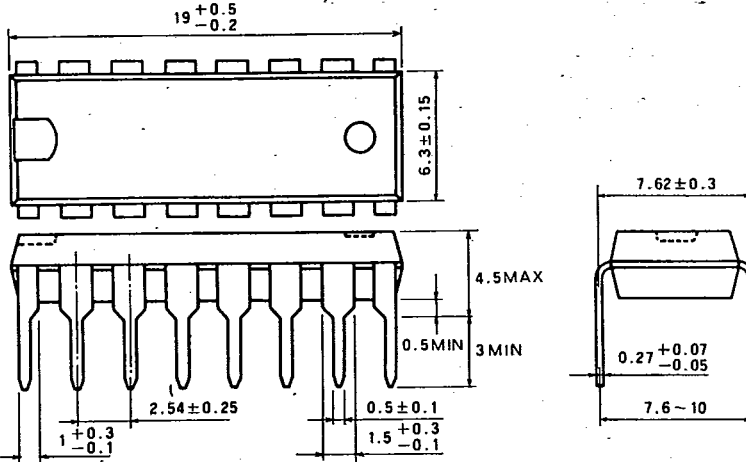
TYPE 14P4 14-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 16P4 16-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 20P4 20-PIN MOLDED PLASTIC DIL

Dimension in mm

