

QUADRUPLE 2-INPUT POSITIVE NAND SCHMITT TRIGGER

DESCRIPTION

The M74LS132P is a semiconductor integrated circuit containing four 2-input positive-logic NAND gates having a Schmitt trigger function and negative-logic NOR gates.

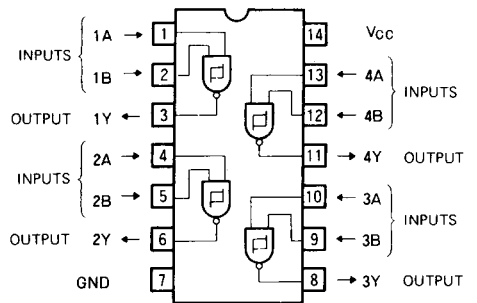
FEATURES

- 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 ($P_D = 35.2mW$ typical)
- High speed ($t_{pd} = 13ns$ typical)
- Wide operating temperature range ($T_a = -20 \sim +75^\circ C$)

APPLICATION

General purpose, for use in industrial and consumer equipment.

PIN CONFIGURATION (TOP VIEW)



Outline 14P4

FUNCTIONAL DESCRIPTION

The use of Schottky TTL technology has enabled the achievement of input high breakdown 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, the noise margin is high. Even slow changing input signals result in a shaped waveform output without causing oscillation.

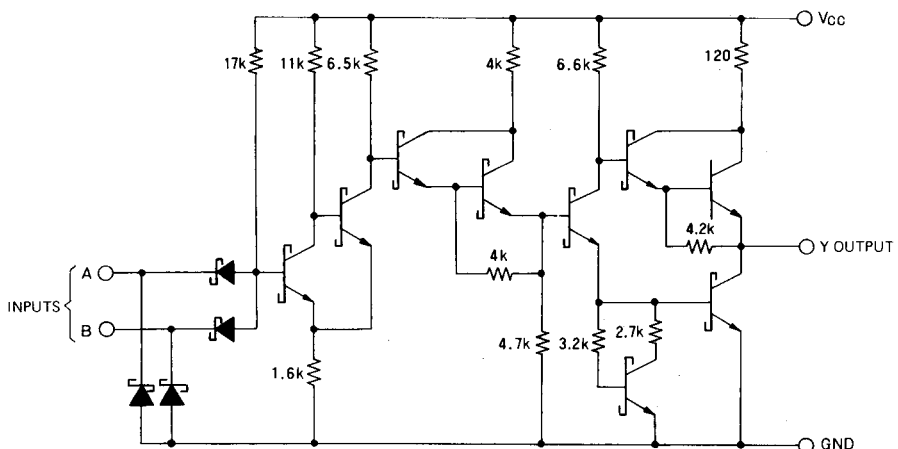
When inputs A and B are high, output Y is low, and when either or both inputs are low, Y is high.

Refer to M74LS14P for the typical characteristics.

FUNCTION TABLE

A	B	Y
L	L	H
H	L	H
L	H	H
H	H	L

CIRCUIT SCHEMATIC (EACH SCHMITT TRIGGER)



UNIT : Ω

QUADRUPLE 2-INPUT POSITIVE NAND SCHMITT TRIGGER
ABSOLUTE MAXIMUM RATINGS ($T_a = -20 \sim +75^\circ\text{C}$, unless otherwise noted)

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

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

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

ELECTRICAL CHARACTERISTICS ($T_a = -20 \sim +75^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ *	Max	
V_{T+}	Positive-going threshold voltage	$V_{CC} = 5\text{V}$	1.4	1.6	1.9	V
V_{T-}	Negative-going threshold voltage	$V_{CC} = 5\text{V}$	0.5	0.8	1	V
$V_{T+} - V_{T-}$	Hysteresis width	$V_{CC} = 5\text{V}$	0.4	0.8		V
V_{IC}	Input clamp voltage	$V_{CC} = 4.75\text{V}$, $I_{IC} = -18\text{mA}$			-1.5	V
V_{OH}	High-level output voltage	$V_{CC} = 4.75\text{V}$, $V_I = 0.5\text{V}$ $I_{OH} = -400\mu\text{A}$	2.7	3.4		V
V_{OL}	Low-level output voltage	$V_{CC} = 4.75\text{V}$, $I_{OL} = 4\text{mA}$		0.25	0.4	V
		$V_I = 1.9\text{V}$, $I_{OL} = 8\text{mA}$		0.35	0.5	V
I_{T+}	Input current at positive-going threshold	$V_{CC} = 5\text{V}$, $V_I = V_{T+}$		-0.14		mA
I_{T-}	Input current at negative-going threshold	$V_{CC} = 5\text{V}$, $V_I = V_{T-}$		-0.18		mA
I_{IH}	High-level input current	$V_{CC} = 5.25\text{V}$, $V_I = 2.7\text{V}$			20	μA
		$V_{CC} = 5.25\text{V}$, $V_I = 10\text{V}$			0.1	mA
I_{IL}	Low-level input current	$V_{CC} = 5.25\text{V}$, $V_I = 0.4\text{V}$			-0.4	mA
I_{OS}	Short-circuit output current (Note 1)	$V_{CC} = 5.25\text{V}$, $V_O = 0\text{V}$		-20	-100	mA
I_{CCH}	Supply current, all outputs high	$V_{CC} = 5.25\text{V}$, $V_I = 0\text{V}$		5.9	11	mA
I_{CCL}	Supply current, all outputs low	$V_{CC} = 5.25\text{V}$, $V_I = 4.5\text{V}$		8.2	14	mA

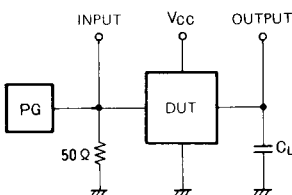
* : All typical values are at $V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$

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

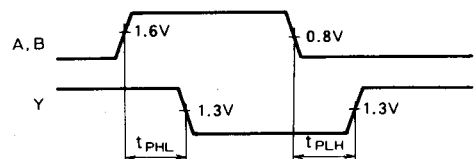
SWITCHING CHARACTERISTICS ($V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
t_{PLH}	Low-to-high-level output propagation time	$C_L = 15\text{pF}$ (Note 2)		12	22	ns
t_{PHL}	High-to-low-level output propagation time			14	22	ns

Note 2: Measurement circuit



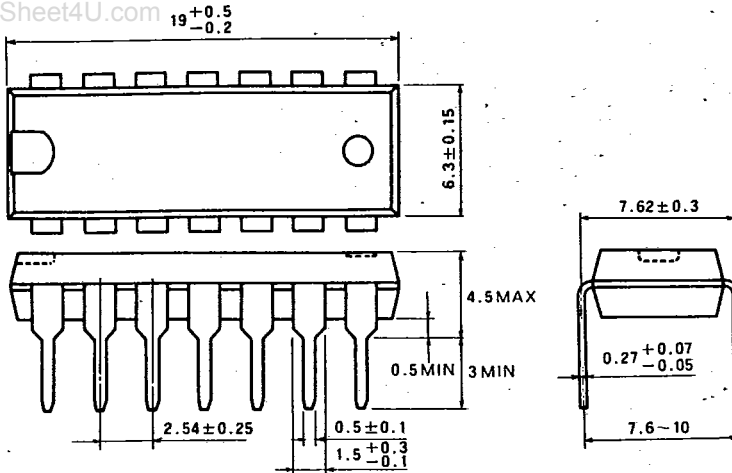
- (1) The pulse generator (PG) has the following characteristics:
 PRR = 1MHz, $t_r = 6\text{ns}$, $t_f = 6\text{ns}$, $t_w = 500\text{ns}$,
 $V_p = 3\text{V}_{p-p}$, $Z_0 = 50\Omega$.
- (2) C_L includes probe and jig capacitance.

TIMING DIAGRAM


TYPE 14P4 14-PIN MOLDED PLASTIC DIL

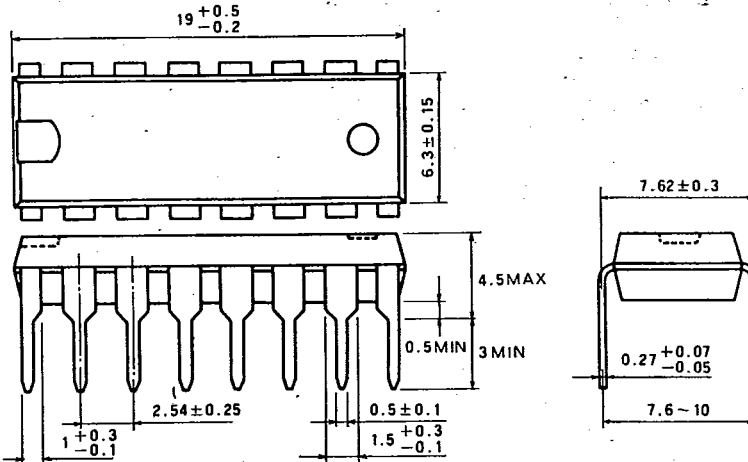
Dimension in mm

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TYPE 16P4 16-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 20P4 20-PIN MOLDED PLASTIC DIL

Dimension in mm

