M74LS279P

QUADRUPLE R-S LATCH

DESCRIPTION

The M74LS279P is a semiconductor integrated circuit containing 4 R-S flip-flop circuits.

FEATURES

- High breakdown input voltage ($V_I \geqq 15V$)
- High breakdown output voltage ($V_O \geqq 7V$)
- Low power dissipation (P_d = 19mW typical)
- Low output impedance
- Wide operating temperature range (T_a = −20 ~ +75°C)

APPLICATION

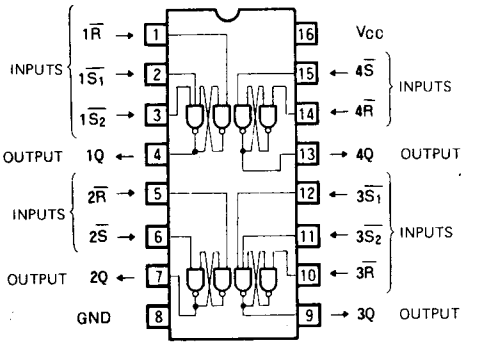
General purpose, for use in industrial and consumer equipment.

FUNCTIONAL DESCRIPTION

Two of the 4 circuits have set inputs $\overline{S}_1$ and $\overline{S}_2$ and reset input $\overline{R}$ and the other 2 circuits have $\overline{S}$ and $\overline{R}$ inputs.

When $\overline{S}_1$ or $\overline{S}_2$ or both are low or $\overline{S}$ is low, high appears in output Q, and when R is low, low appears in output Q. When $\overline{S}_1$ or $\overline{S}_2$ or both are low and $\overline{R}$ is low, high appears in the output but when each of the inputs is set high at the same time, the status of Q cannot be anticipated.

PIN CONFIGURATION (TOP VIEW)



Outline 16P4

FUNCTION TABLE (Note 1)

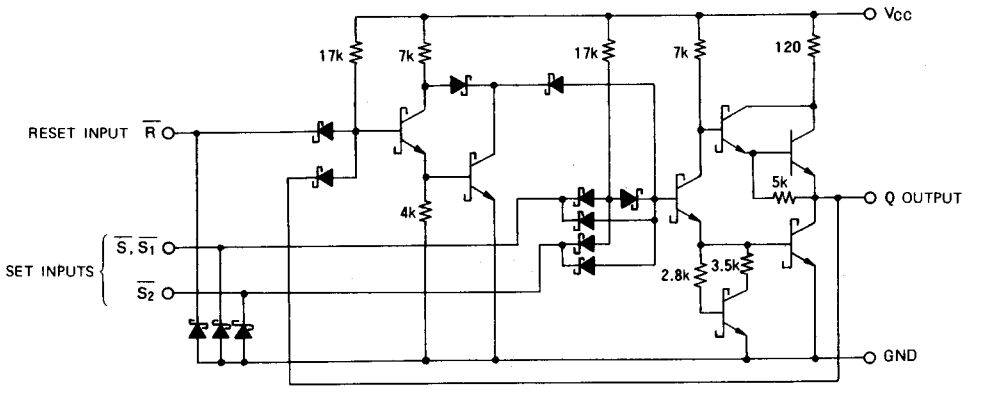
$\overline{S}_1$	$\overline{S}_2$	$\overline{R}$	Q
L	X	L	H*
X	L	L	H*
L	X	H	H
X	L	H	H
H	H	L	L
H	H	H	Q^0

Note 1 Q^0 : Level of Q before the indicated steady-state input conditions were established

X : Irrelevant

* : Nonstable, it will not persist when $\overline{R}$, $\overline{S}_1$ and $\overline{S}_2$ return to their inactive (high) level

CIRCUIT SCHEMATIC (EACH LATCH)



UNIT: Ω

QUADRUPLE R-S LATCH

ABSOLUTE MAXIMUM RATINGS (Ta = −20 ~ +75℃, 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	℃
T_{stg}	Storage temperature range		−65 ~ +150	℃

RECOMMENDED OPERATING CONDITIONS (Ta = −20 ~ +75℃, 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	$V_{OH} \geqq 2.7V$	0		−400	μA
I_{OL}	Low-level output current	$V_{OL} \leqq 0.4V$	0		4	mA
		$V_{OL} \leqq 0.5V$	0		8	mA

ELECTRICAL CHARACTERISTICS (Ta = −20 ~ +75℃, unless otherwise noted)

Symbol	Parameter	Test conditions		Limits			Unit
				Min	Typ *	Max	
V_{IH}	High-level input voltage			2			V
V_{IL}	Low-level input voltage					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=0.8V V_I=2V, I_{OH}=−400μA		2.7	3.4		V
V_{OL}	Low-level output voltage	V_{CC}=4.75V	I_{OL}=4mA		0.25	0.4	V
		V_I=0.8V, V_I=2V	I_{OL}=8mA		0.35	0.5	V
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 2)	V_{CC}=5.25V, V_O=0V		−20		−100	mA
I_{CC}	Supply current	V_{CC}=5.25V (Note 3)			3.8	7	mA

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

Note 2: All measurements should be done quickly and not more than one output should be shorted at a time.

Note 3: I_{CC} is measured with all $\overline{R}$ inputs at 0V and all $\overline{S}$ inputs at 4.5V.

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

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
t_{PLH}	Low-to-high-level, high-to-low-level output propagation time, from input $\overline{S}$ to output Q	C_L=15pF (Note 4)		6	22	ns
t_{PHL}				12	21	ns
t_{PHL}	High-to-low-level output propagation time, from input $\overline{R}$ to output Q			12	27	ns

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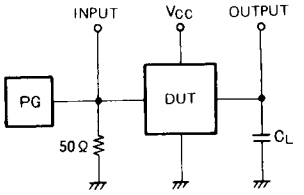
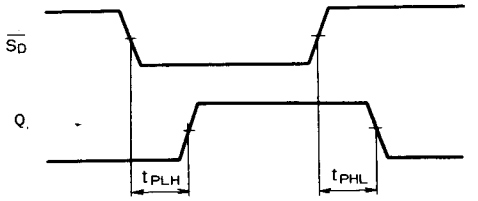
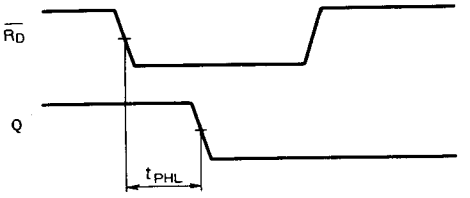
Note 4: Measurement circuit



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

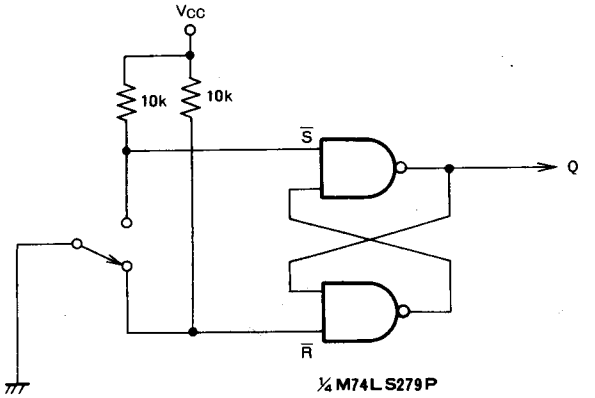
TIMING DIAGRAM (Reference level = 1.3V)





APPLICATION EXAMPLE

Chattering prevention circuit



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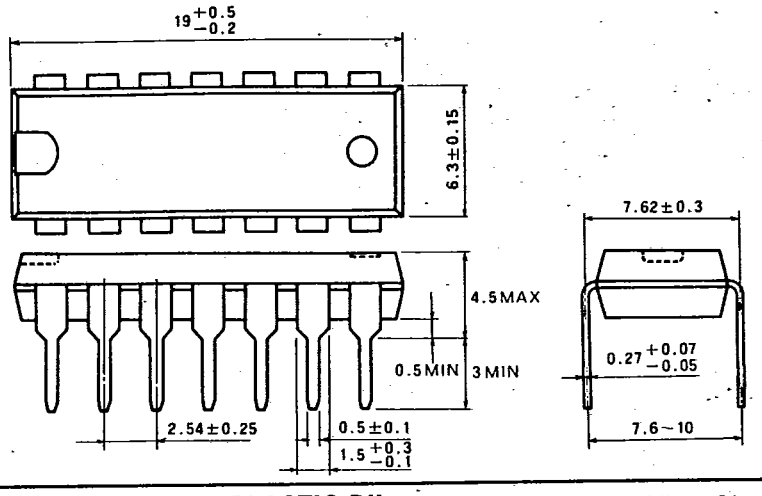
T-90-20

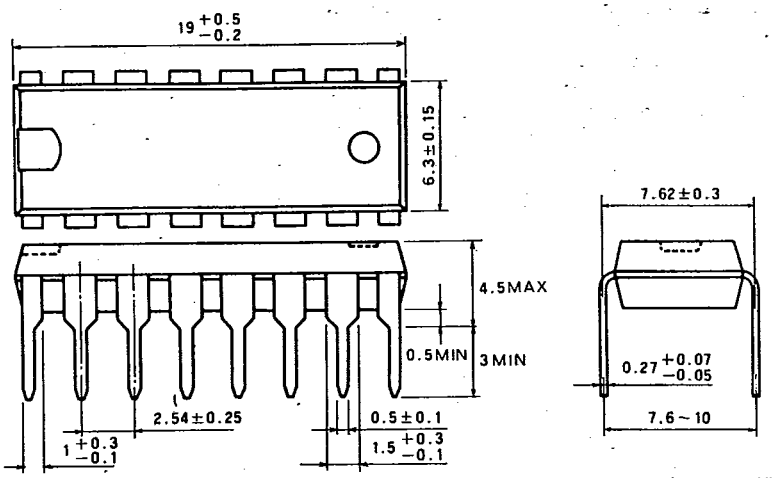
TYPE 14P4 14-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 16P4 16-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 20P4 20-PIN MOLDED PLASTIC DIL

Dimension in mm