

# MITSUBISHI LSTTLs 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 ( $V_I \geq 15V$ )
- High breakdown output voltage ( $V_O \geq 7V$ )
- Low power dissipation ( $P_D = 19mW$  typical)
- Low output impedance
- Wide operating temperature range ( $T_a = -20 \sim +75^\circ C$ )

### APPLICATION

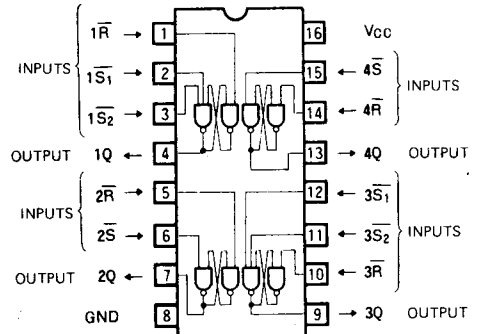
General purpose, for use in industrial and consumer equipment.

### FUNCTIONAL DESCRIPTION

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

When  $\bar{S}_1$  or  $\bar{S}_2$  or both are low or  $\bar{S}$  is low, high appears in output Q, and when R is low, low appears in output Q. When  $\bar{S}_1$  or  $\bar{S}_2$  or both are low and  $\bar{R}$  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)

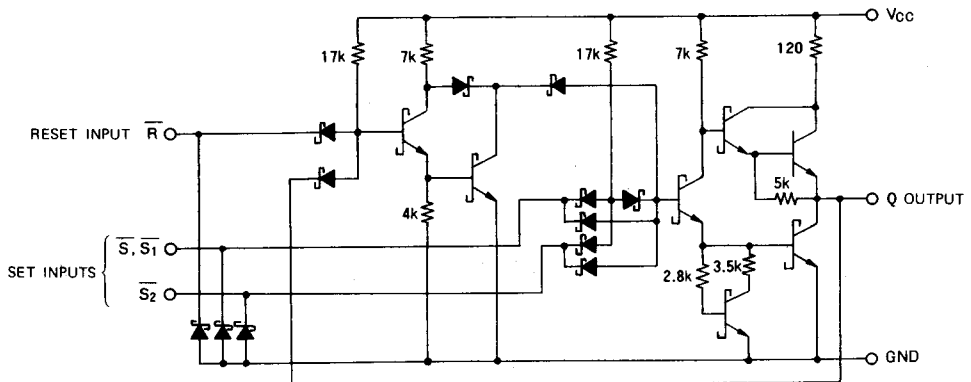
$\bar{S}_1$	$\bar{S}_2$	$\bar{R}$	Q
L	X	L	H*
X	L	L	H*
L	X	H	H
X	L	H	H
H	H	L	L
H	H	H	$Q^0$

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

X: Irrelevant

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

### CIRCUIT SCHEMATIC (EACH LATCH)



UNIT: Q

**QUADRUPLE R-S LATCH**

**ABSOLUTE MAXIMUM RATINGS** (Ta = -20 ~ +75°C, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V <sub>CC</sub>	Supply voltage		-0.5 ~ +7	V
V <sub>I</sub>	Input voltage		-0.5 ~ +15	V
V <sub>O</sub>	Output voltage	High-level state	-0.5 ~ V <sub>CC</sub>	V
T <sub>opr</sub>	Operating free-air ambient temperature range		-20 ~ +75	°C
T <sub>stg</sub>	Storage temperature range		-65 ~ +150	°C

**RECOMMENDED OPERATING CONDITIONS** (Ta = -20 ~ +75°C, unless otherwise noted)

Symbol	Parameter		Limits			Unit
			Min	Typ	Max	
V <sub>CC</sub>	Supply voltage		4.75	5	5.25	V
I <sub>OH</sub>	High-level output current	V <sub>OH</sub> ≥ 2.7V	0		-400	μA
I <sub>OL</sub>	Low-level output current	V <sub>OL</sub> ≤ 0.4V	0		4	mA
		V <sub>OL</sub> ≤ 0.5V	0		8	mA

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

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ *	Max	
V <sub>IH</sub>	High-level input voltage		2			V
V <sub>IL</sub>	Low-level input voltage				0.8	V
V <sub>IC</sub>	Input clamp voltage	V <sub>CC</sub> = 4.75V, I <sub>IC</sub> = -18mA			-1.5	V
V <sub>OH</sub>	High-level output voltage	V <sub>CC</sub> = 4.75V, V <sub>I</sub> = 0.8V V <sub>I</sub> = 2V, I <sub>OH</sub> = -400μA	2.7	3.4		V
V <sub>OL</sub>	Low-level output voltage	V <sub>CC</sub> = 4.75V		0.25	0.4	V
		V <sub>I</sub> = 0.8V, V <sub>I</sub> = 2V		0.35	0.5	V
I <sub>IH</sub>	High-level input current	V <sub>CC</sub> = 5.25V			20	μA
		V <sub>I</sub> = 2.7V				
		V <sub>CC</sub> = 5.25V			0.1	mA
I <sub>IL</sub>	Low-level input current	V <sub>CC</sub> = 5.25V			-0.4	mA
		V <sub>I</sub> = 0.4V				
I <sub>OS</sub>	Short-circuit output current (Note 2)	V <sub>CC</sub> = 5.25V, V <sub>O</sub> = 0V	-20		-100	mA
I <sub>CC</sub>	Supply current	V <sub>CC</sub> = 5.25V (Note 3)		3.8	7	mA

\* : All typical values are at V<sub>CC</sub> = 5V, Ta = 25°C

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

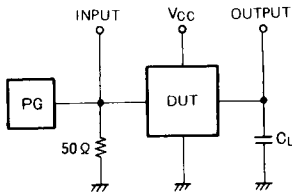
Note 3: I<sub>CC</sub> is measured with all R inputs at 0V and all S inputs at 4.5V.

**SWITCHING CHARACTERISTICS** (V<sub>CC</sub> = 5V, Ta = 25°C, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
t <sub>PLH</sub>	Low-to-high-level, high-to-low-level output propagation time, from input S to output Q	C <sub>L</sub> = 15pF (Note 4)		6	22	ns
t <sub>PHL</sub>				12	21	ns
t <sub>PHL</sub>	High-to-low-level output propagation time, from input R to output Q			12	27	ns

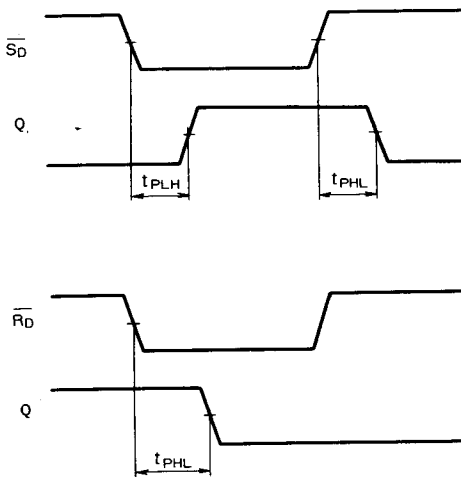
QUADRUPLE R-S LATCH

Note 4: Measurement circuit



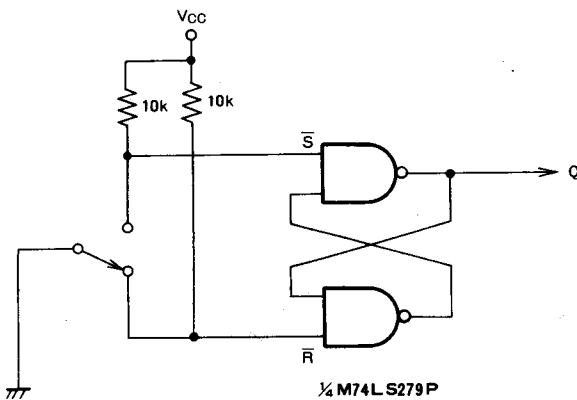
- (1) The pulse generator (PG) has the following characteristics:  
 PRR = 1MHz,  $t_r = 6ns$ ,  $t_f = 6ns$ ,  $t_w = 500ns$ ,  
 $V_p = 3V_{p-p}$ ,  $Z_0 = 50\Omega$ .
- (2).  $C_L$  includes probe and jig capacitance

TIMING DIAGRAM (Reference level = 1.3V)



APPLICATION EXAMPLE

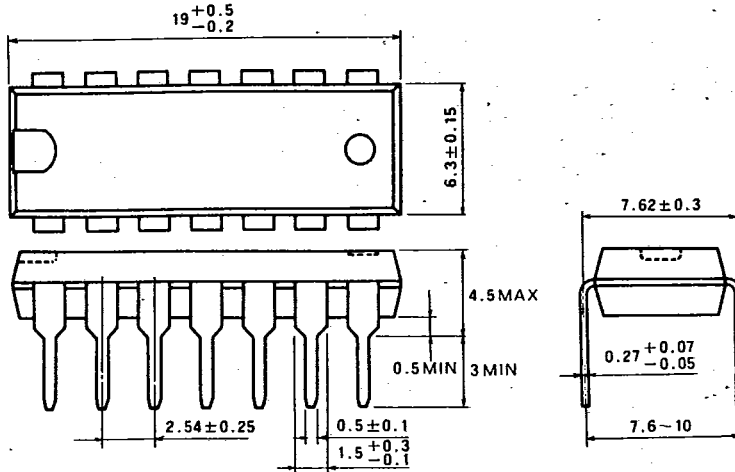
Chattering prevention circuit



T-90-20

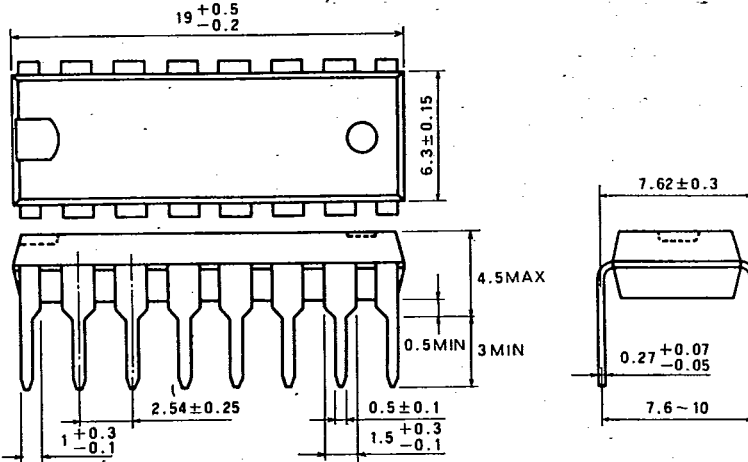
**TYPE 14P4 14-PIN MOLDED PLASTIC DIL**

Dimension in mm



**TYPE 16P4 16-PIN MOLDED PLASTIC DIL**

Dimension in mm



**TYPE 20P4 20-PIN MOLDED PLASTIC DIL**

Dimension in mm

