

SN54279, SN54LS279A, SN74279, SN74LS279A QUADRUPLE S-R LATCHES

SDLS093 - DECEMBER 1983 - REVISED MARCH 1988

- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs
 - Dependable Texas Instruments Quality and Reliability
- description**

The '279 offers 4 basic \bar{S} - \bar{R} flip-flop latches in one 16-pin, 300-mil package. Under conventional operation, the \bar{S} - \bar{R} inputs are normally held high. When the \bar{S} input is pulsed low, the Q output will be set high. When \bar{R} is pulsed low, the Q output will be reset low. Normally, the \bar{S} - \bar{R} inputs should not be taken low simultaneously. The Q output will be unpredictable in this condition.

**FUNCTION TABLE
(each latch)**

INPUTS		OUTPUT
\bar{S}^\dagger	\bar{R}	Q
H	H	Q_0
L	H	H
H	L	L
L	L	H^\ddagger

H = high level L = low level

† For latches with double S inputs:

Q_0 = the level of Q before the indicated input conditions were established.

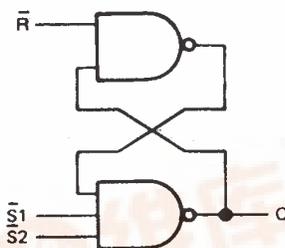
‡ This configuration is nonstable: that is, it may not persist when the \bar{S} and \bar{R} inputs return to their inactive (high) level.

H = both \bar{S} inputs high

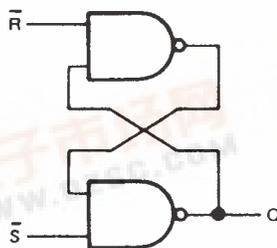
L = one or both \bar{S} inputs low

logic diagram (positive logic)

(latches 1 and 3)

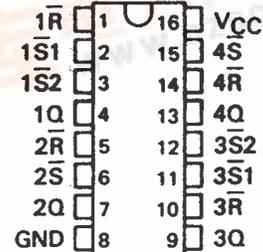


(latches 2 and 4)



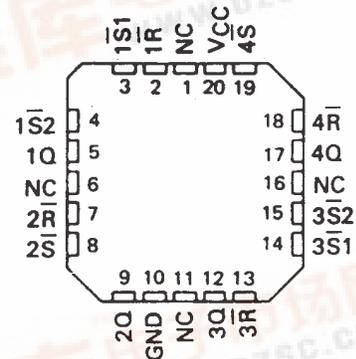
SN54279, SN54LS279A . . . J OR W PACKAGE
SN74279 . . . N PACKAGE
SN74LS279A . . . D OR N PACKAGE

(TOP VIEW)



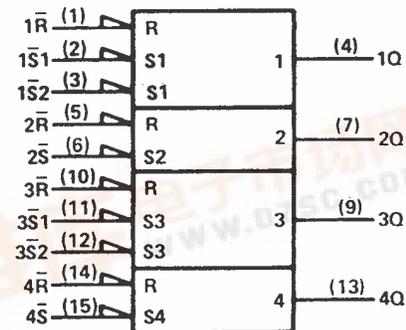
SN54LS279A . . . FK PACKAGE

(TOP VIEW)



NC - No internal connection

logic symbol[§]



[§]This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

Pin numbers shown are for D, J, N, and W packages.

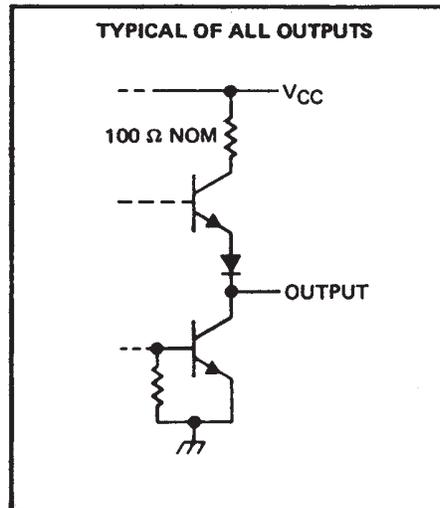
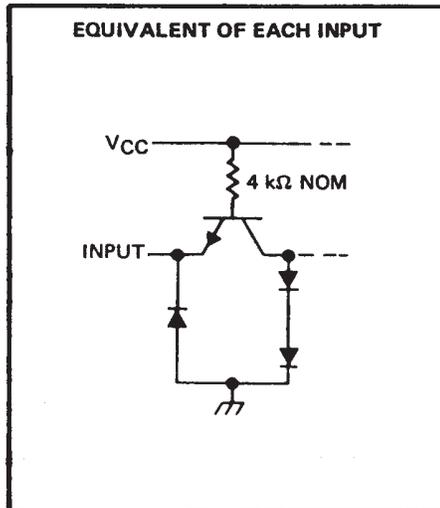


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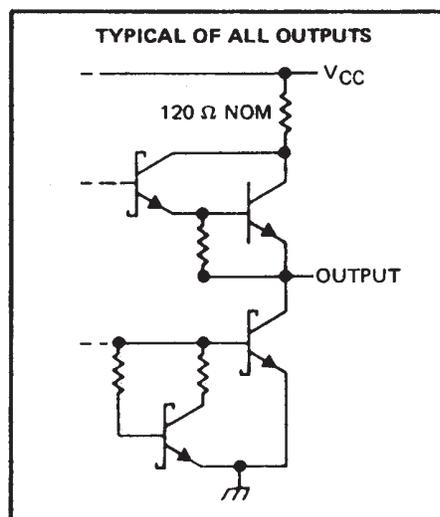
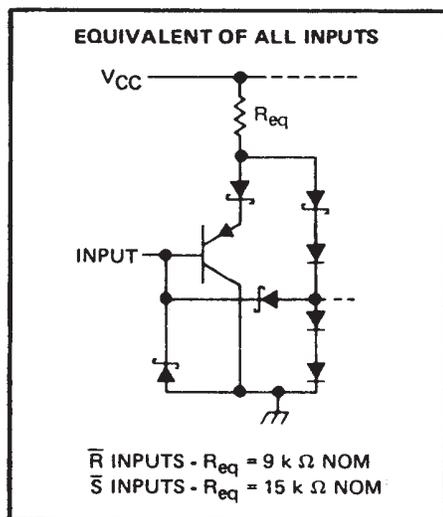
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schematics of inputs and outputs

'279 CIRCUITS



'LS279A CIRCUITS



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage: '279	5.5 V
'LS279A	7 V
Operating free-air temperature range: SN54' TYPES	- 55° C to 125° C
SN74' TYPES	0° C to 70° C
Storage temperature range	- 65° C to 150° C

NOTE 1: Voltage values are with respect to network ground terminal.

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recommended operating conditions

	SN54279			SN74279			UNIT		
	MIN	NOM	MAX	MIN	NOM	MAX			
V_{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V		
V_{IH} High-level input voltage	2			2			V		
V_{IL} Low-level input voltage	0.8			0.8			V		
I_{OH} High-level output current	-0.8			-0.8			mA		
I_{OL} Low-level output current	16			16			mA		
t_w Pulse duration, low	20			20			ns		
T_A Operating free-air temperature	-55			125			0	70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS [†]	SN54279			SN74279			UNIT
		MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IK}	$V_{CC} = \text{MIN}$, $I_I = -12 \text{ mA}$	-1.5			-1.5			V
V_{OH}	$V_{CC} = \text{MIN}$, $V_{IL} = 0.8 \text{ V}$, $I_{OH} = -0.8 \text{ mA}$	2.4	3.4		2.4	3.4		V
V_{OL}	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $I_{OL} = 16 \text{ mA}$	0.2	0.4		0.2	0.4		V
I_I	$V_{CC} = \text{MAX}$, $V_I = 5.5 \text{ V}$	1			1			mA
I_{IH}	$V_{CC} = \text{MAX}$, $V_I = 2.4 \text{ V}$	40			40			μA
I_{IL}	$V_{CC} = \text{MAX}$, $V_I = 0.4 \text{ V}$	-1.6			-1.6			mA
I_{OS}^{\S}	$V_{CC} = \text{MAX}$	-18		-55	-18		-57	mA
I_{CC}	$V_{CC} = \text{MAX}$, See Note 2	18		30	18		30	mA

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

[‡] All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

^{\S} Not more than one output should be shorted at a time.

NOTE 2: I_{CC} is measured with all R inputs grounded, all S inputs at 4.5 V, and all outputs open.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$ (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	\bar{S}	Q	$R_L = 400 \Omega$, $C_L = 15 \text{ pF}$	12		22	ns
t_{PHL}				9		15	
t_{PHL}	\bar{R}	Q		15		27	ns

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

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recommended operating conditions

	SN54LS279A			SN74LS279A			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage			0.7			0.8	V
I _{OH} High-level output current			-0.4			-0.4	mA
I _{OL} Low-level output current			4			8	mA
t _w Pulse duration, low	20			20			ns
T _A Operating free-air temperature	-55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	SN54LS279A			SN74LS279A			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V _{IK}	V _{CC} = MIN, I _I = -18 mA			-1.5			-1.5	V
V _{OH}	V _{CC} = MIN, V _{IL} = MAX, I _{OH} = -0.4 mA	2.5	3.4		2.7	3.4		V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 4 mA		0.25	0.4		0.25	0.4	V
	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 8 mA					0.25	0.5	
I _I	V _{CC} = MAX, V _I = 7 V			0.1			0.1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V			20			20	μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V			-0.2			-0.2	mA
I _{OS} §	V _{CC} = MAX	-20		-100	-20		-100	mA
I _{CC}	V _{CC} = MAX, See note 2		3.8	7		3.8	7	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

§ Not more than one output should be shorted at a time, and the duration of the short-circuit should be less than one second.

NOTE 2: I_{CC} is measured with all R inputs grounded, all S inputs at 4.5 V, and all outputs open.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	S	Q	R _L = 2 kΩ, C _L = 15 pF		12	22	ns
t _{PHL}					13	21	
t _{PHL}	R	Q				15	27

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

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