

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.

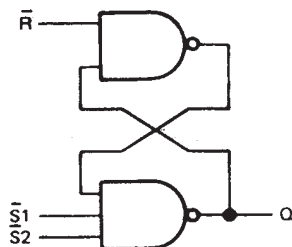
‡ This configuration is nonstable; that is, it may not persist when the $\bar{S}$ and $\bar{R}$ inputs return to their inactive (high) level.

H = both $\bar{S}$ inputs high

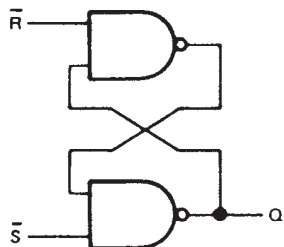
L = one or both $\bar{S}$ inputs low

logic diagram (positive logic)

(latches 1 and 3)



(latches 2 and 4)

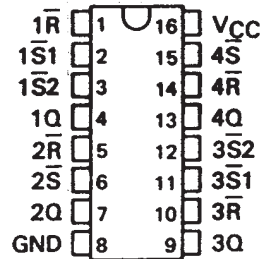


SN54279, SN54LS279A . . . J OR W PACKAGE

SN74279 . . . N PACKAGE

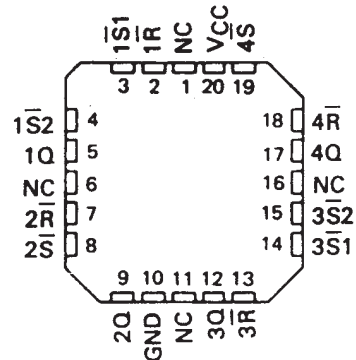
SN74LS279A . . . D OR N PACKAGE

(TOP VIEW)



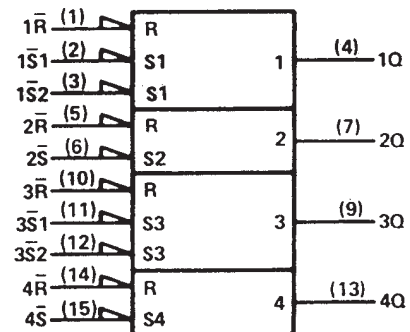
SN54LS279A . . . FK PACKAGE

(TOP VIEW)



NC - No internal connection

logic symbol[§]



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

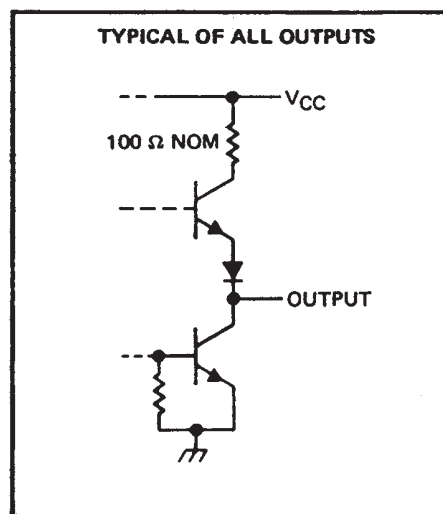
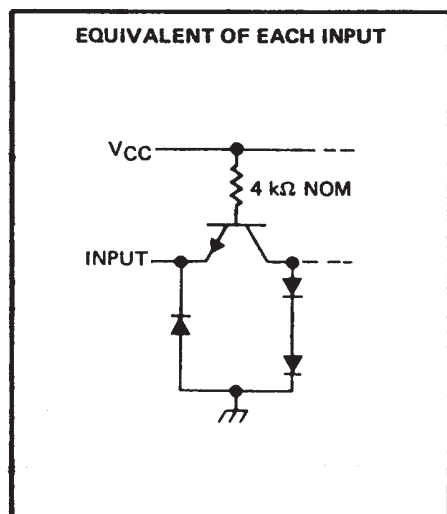
Pin numbers shown are for D, J, N, and W packages.

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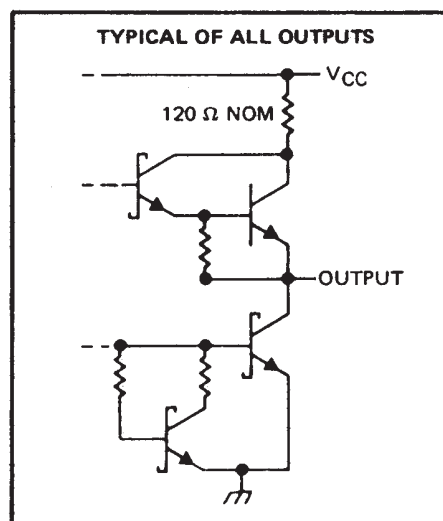
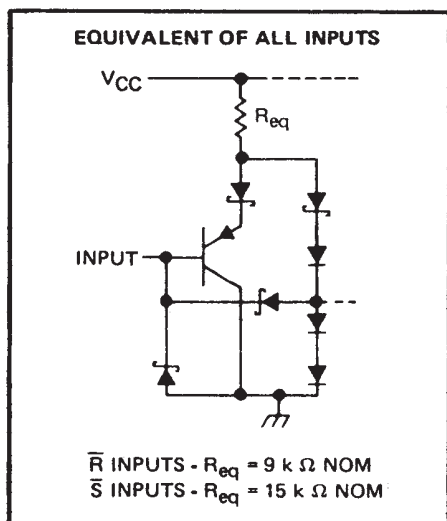
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schematics of inputs and outputs

'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.

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

SDLS093 – DECEMBER 1983 – REVISED MARCH 1988

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} = MIN, I _I = – 12 mA			– 1.5			– 1.5	V
V _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, I _{OH} = – 0.8 mA	2.4	3.4		2.4	3.4		V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 16 mA		0.2	0.4		0.2	0.4	V
I _I	V _{CC} = MAX, V _I = 5.5 V			1			1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.4 V			40			40	µA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V			– 1.6			– 1.6	mA
I _{OS} §	V _{CC} = MAX	– 18		– 55	– 18		– 57	mA
I _{CC}	V _{CC} = 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 V, T_A = 25°C.

§ 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 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 = 400 Ω, C _L = 15 pF	12	22		ns
t _{PHL}	S	Q		9	15		
t _{PHL}	R	Q		15	27		ns

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



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

SDLS093 – DECEMBER 1983 – REVISED MARCH 1988

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}	$\bar{S}$	Q	R _L = 2 kΩ, C _L = 15 pF		12	22	ns
t _{PHL}					13	21	
t _{PHL}	$\bar{R}$	Q			15	27	ns

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

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