

# 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

$^\dagger$ For latches with double S inputs:

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

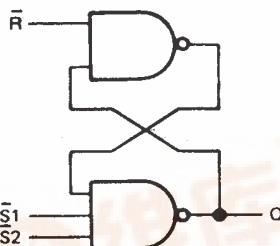
$^\ddagger$  This configuration is nonstable: that is, it may not persist when the  $\bar{S}$  and  $\bar{R}$  inputs return to their inactive (high) level.

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

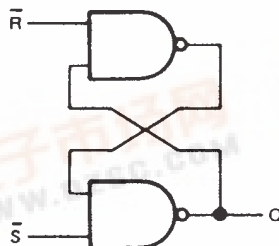
L = one or both  $\bar{S}$  inputs low

## logic diagram (positive logic)

(latches 1 and 3)

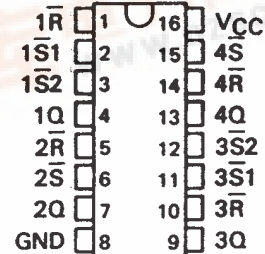


(latches 2 and 4)



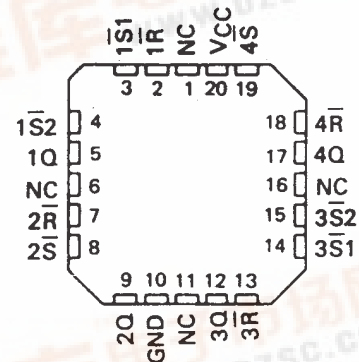
SN54279, SN54LS279A . . . J OR W PACKAGE  
SN74279 . . . N PACKAGE  
SN74LS279A . . . D OR N PACKAGE

(TOP VIEW)



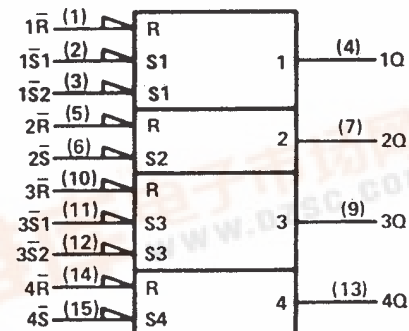
SN54LS279A . . . FK PACKAGE

(TOP VIEW)



NC - No internal connection

## logic symbol<sup>§</sup>



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

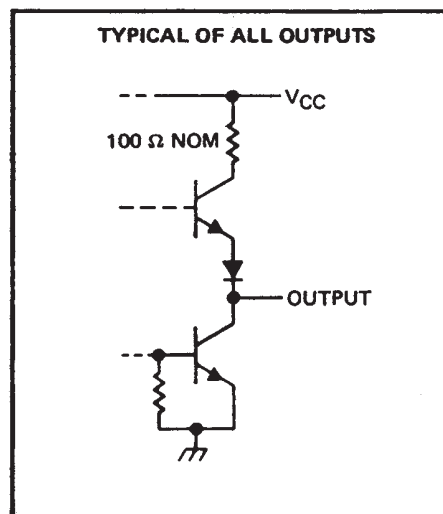
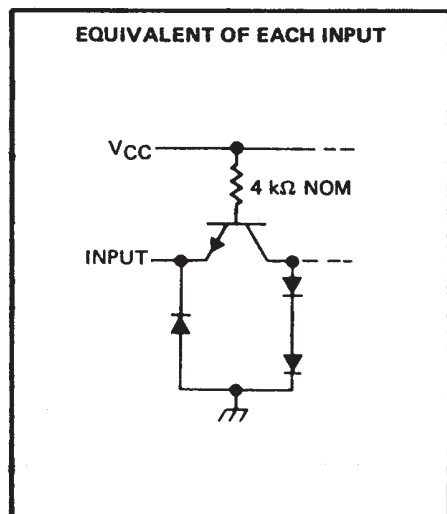
Pin numbers shown are for D, J, N, and W packages.

# SN54279, SN54LS279A, SN74279, SN74LS279A QUADRUPLE $\bar{S}$ - $\bar{R}$ LATCHES

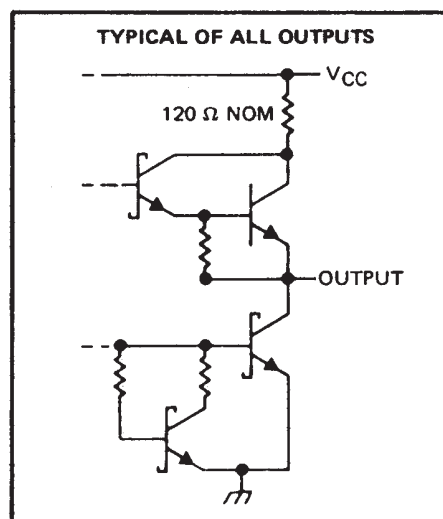
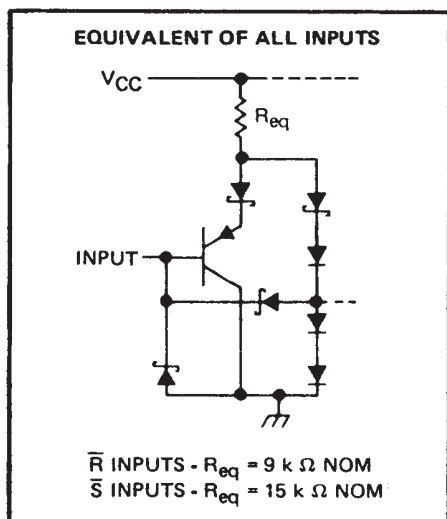
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## schematics of inputs and outputs

### '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 $\bar{S}$ - $\bar{R}$ LATCHES

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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 <sup>†</sup>	SN54279			SN74279			UNIT
		MIN	TYP <sup>‡</sup>	MAX	MIN	TYP <sup>‡</sup>	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
$I_{CC}$	$V_{CC} = \text{MAX}, \text{ See Note 2}$		18	30		18	30	mA

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

<sup>‡</sup> All typical values are at  $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ .

<sup>§</sup> 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 <sub>PLH</sub>	S	Q	R <sub>L</sub> = 400 Ω,                      C <sub>L</sub> = 15 pF	12	22	ns	
t <sub>PHL</sub>				9	15		
t <sub>PHL</sub>	R	Q		15	27	ns	

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

# SN54279, SN54LS279A, SN74279, SN74LS279A

## QUADRUPLE $\bar{S}$ - $\bar{R}$ LATCHES

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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	
$V_{IK}$	$V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$			-1.5			-1.5	V
$V_{OH}$	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}, I_{OH} = -0.4 \text{ mA}$	2.5	3.4		2.7	3.4		V
$V_{OL}$	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 4 \text{ mA}$		0.25	0.4		0.25	0.4	V
	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 8 \text{ mA}$					0.25	0.5	
$I_I$	$V_{CC} = \text{MAX}, V_I = 7 \text{ V}$			0.1			0.1	mA
$I_{IH}$	$V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$			20			20	µA
$I_{IL}$	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$			-0.2			-0.2	mA
$I_{OS}§$	$V_{CC} = \text{MAX}$	-20		-100	-20		-100	mA
$I_{CC}$	$V_{CC} = \text{MAX},$ 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  $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ .

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH}$	$\bar{S}$	Q	$R_L = 2 \text{ k}\Omega, C_L = 15 \text{ pF}$		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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