

SN74LS279A

QUADRUPLE S-R LATCHES

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

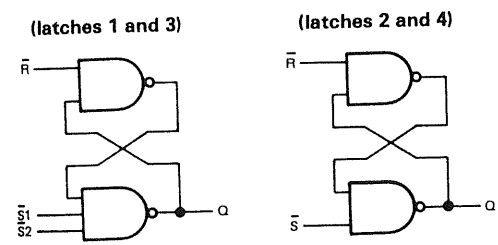
The '279 offers 4 basic  $\overline{S}$ - $\overline{R}$  flip-flop latches in one 16-pin, 300-mil package. Under conventional operation, the  $\overline{S}$ - $\overline{R}$  inputs are normally held high. When the  $\overline{S}$  input is pulsed low, the Q output will be set high. When  $\overline{R}$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

FUNCTION TABLE (each latch)

INPUTS		OUTPUT
$\overline{S}$ †	$\overline{R}$	Q
H	H	Q <sub>0</sub>
L	H	H
H	L	L
L	L	H‡

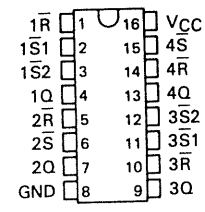
H = high level L = low level  
 †For latches with double S inputs:  
 Q<sub>0</sub> = the level of Q before the indicated input conditions were established.  
 ‡This configuration is unstable: that is, it may not persist when the  $\overline{S}$  and  $\overline{R}$  inputs return to their inactive (high) level.  
 H = both  $\overline{S}$  inputs high  
 L = one or both  $\overline{S}$  inputs low

logic diagram (positive logic)

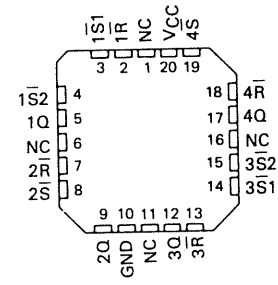


SN54279, SN54LS279A ... J OR W PACKAGE  
 SN74279 ... N PACKAGE  
 SN74LS279A ... D OR N PACKAGE

(TOP VIEW)

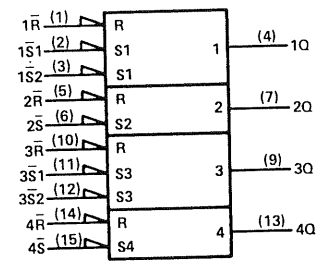


SN54LS279A ... FK PACKAGE (TOP VIEW)



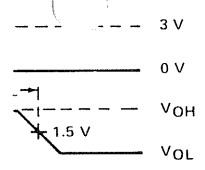
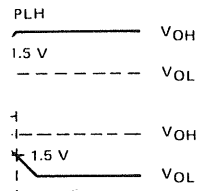
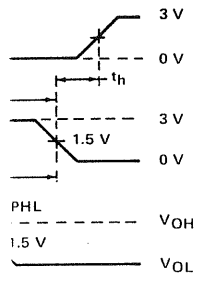
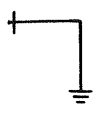
NC - No internal connection

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.

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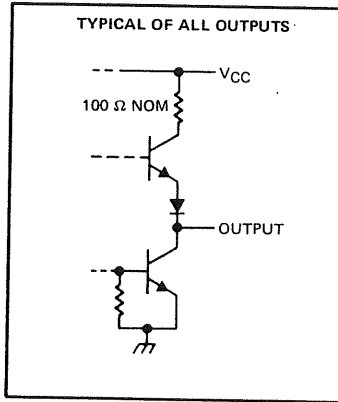
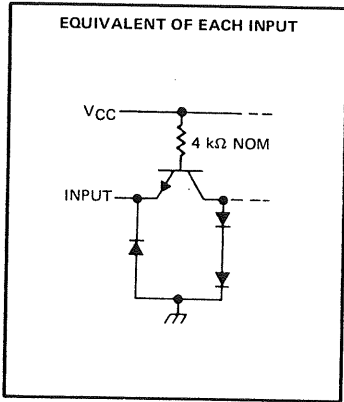
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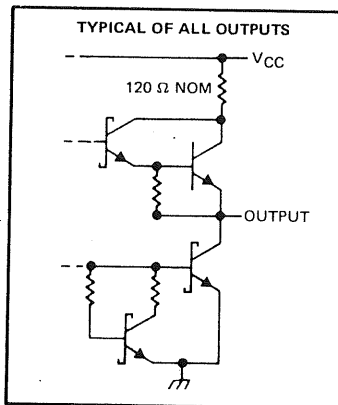
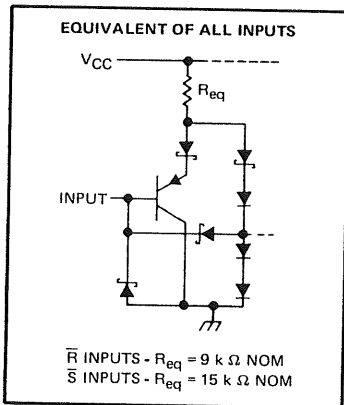
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 TTL Devices

schematics of inputs and outputs

'279 CIRCUITS



'LS279A CIRCUITS



recommended operating conditions

V <sub>CC</sub>	Supply voltage
V <sub>IH</sub>	High-level input voltage
V <sub>IL</sub>	Low-level input voltage
I <sub>OH</sub>	High-level output current
I <sub>OL</sub>	Low-level output current
t <sub>w</sub>	Pulse duration, low
T <sub>A</sub>	Operating free-air temperature

electrical characteristics over recommend

PARAMETER	TEST CONDITIO
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V,
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V,
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V
I <sub>OS</sub> <sup>§</sup>	V <sub>CC</sub> = MAX
I <sub>CC</sub>	V <sub>CC</sub> = MAX, See Note 2

† For conditions shown as MIN or MAX, use the appropriate value.  
 ‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.  
 § Not more than one output should be shorted at a time.  
 NOTE 2: I<sub>CC</sub> is measured with all R inputs grounded.

switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub>

PARAMETER	FROM (INPUT)	TO (OUTPUT)
t <sub>PLH</sub>	$\bar{S}$	Q
t <sub>PHL</sub>	$\bar{R}$	Q

NOTE 3: Load circuits and voltage waveforms are shown in Figure 10.

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

Supply voltage, V <sub>CC</sub> (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.

recommended operating conditions

	SN54279			SN74279			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage			0.8			0.8	V
I <sub>OH</sub> High-level output current			-0.8			-0.8	mA
I <sub>OL</sub> Low-level output current			16			16	mA
t <sub>w</sub> Pulse duration, low	20			20			ns
T <sub>A</sub> 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>
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA			-1.5		-1.5	V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = -0.8 mA	2.4	3.4		2.4	3.4	V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 16 mA	0.2	0.4		0.2	0.4	V
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V			1		1	mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V			40		40	μA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V			-1.6		-1.6	mA
I <sub>OS</sub> <sup>§</sup>	V <sub>CC</sub> = MAX	-18		-55	-18	-57	mA
I <sub>CC</sub>	V <sub>CC</sub> = MAX, 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<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

<sup>§</sup> Not more than one output should be shorted at a time.

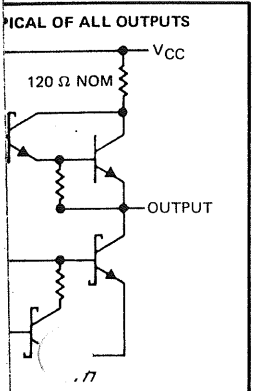
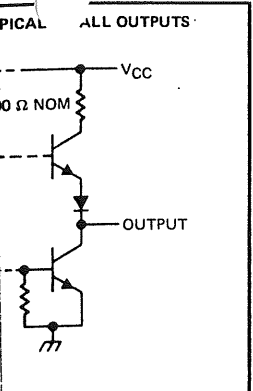
NOTE 2: I<sub>CC</sub> is measured with all R inputs grounded, all S inputs at 4.5 V, and all outputs open.

switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°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>	R	Q			9	15	
t <sub>PHL</sub>	R	Q			15	27	

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

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- ..... 7 V
- ..... 5.5 V
- ..... 7 V
- ..... -55°C to 125°C
- ..... 0°C to 70°C
- ..... -65°C to 150°C

Recommended operating conditions

	SN54LS279A			SN74LS279A			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage			0.7			0.8	V
I <sub>OH</sub> High-level output current			-0.4			-0.4	mA
I <sub>OL</sub> Low-level output current			4			8	mA
t <sub>p</sub> Pulse duration, low	20			20			ns
T <sub>OP</sub> 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‡	MIN	TYP‡		MAX
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA		-1.5		-1.5	V	
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, I <sub>OH</sub> = -0.4 mA	2.5	3.4	2.7	3.4	V	
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 4 mA	0.25	0.4	0.25	0.4	V	
	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, I <sub>OL</sub> = 8 mA			0.25	0.5		
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V		0.1		0.1	mA	
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V		20		20	µA	
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V		-0.2		-0.2	mA	
I <sub>OS</sub> §	V <sub>CC</sub> = MAX	-20	-100	-20	-100	mA	
I <sub>CC</sub>	V <sub>CC</sub> = MAX, See note 2		3.8	7	3.8	7	mA

† Conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.  
 ‡ Typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.  
 § More than one output should be shorted at a time, and the duration of the short-circuit should be less than one second.  
 ¶ I<sub>CC</sub> is measured with all R inputs grounded, all S inputs at 4.5 V, and all outputs open.

Switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°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> = 2 kΩ, C <sub>L</sub> = 15 pF		12	22	ns
t <sub>PHL</sub>	R	Q		13	21		
t <sub>PHL</sub>	R	Q		15	27		

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

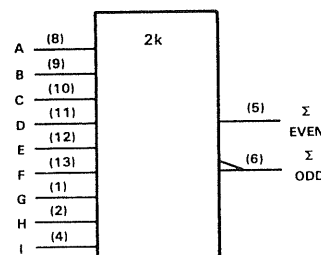
- Generates Either Odd or Even Parity for Nine Data Lines
- Cascadable for n-Bits
- Can Be Used to Upgrade Existing Systems using MSI Parity Circuits
- Typical Data-to-Output Delay of Only 14 ns for 'S280 and 33 ns for 'LS280
- Typical Power Dissipation:  
 'LS280 . . . 80 mW  
 'S280 . . . 335 mW

FUNCTION TABLE

NUMBER OF INPUTS A THRU I THAT ARE HIGH	OUTPUTS	
	Σ EVEN	Σ ODD
0, 2, 4, 6, 8	H	L
1, 3, 5, 7, 9	L	H

H = high level, L = low level

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.

Description

These universal, monolithic, nine-bit parity generators feature odd/even outputs to facilitate operation of either odd or even parity by cascading as shown under typical application data.

Series 54LS/74LS and Series 54S/74S parity generators offer low power consumption and high performance. These devices can be used as a parity generator/checker. Although the 'LS280 and 'S280 function is provided by the availability of an input at pin 4 and the 'LS280 and 'S280 to be substituted for the '180 in existing 'S280's are mixed with existing '180's.

These devices are fully compatible with most other TTL circuit requirements to one Series 54LS/74LS or Series 54S/74S.

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