SN54279, SN54LS279A, SN74279, SN74LS279A
QUADRUPLE $\overline{S}$-$\overline{R}$ 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_0
L	H	H
H	L	L
L	L	H‡

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.

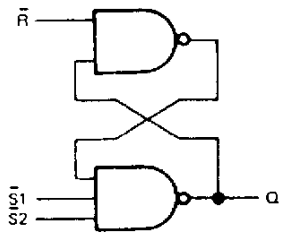
‡This configuration is nonstable: that is, it may not persist when the $\overline{S}$ and $\overline{R}$ inputs return to their inactive (high) level.

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

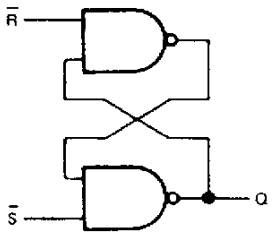
L = one or both $\overline{S}$ inputs low

logic diagram (positive logic)

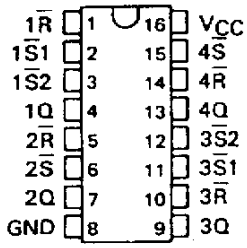
(latches 1 and 3)



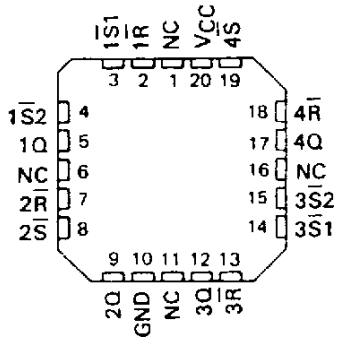
(latches 2 and 4)



SN54279, SN54LS279A . . . J OR W PACKAGE
SN74279 . . . N PACKAGE
SN74LS279A . . . D OR N PACKAGE
(TOP VIEW)

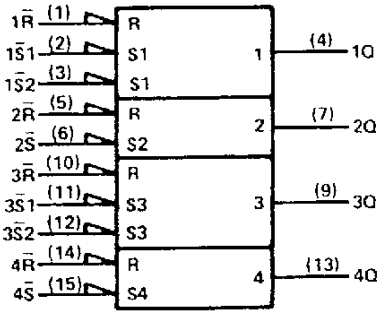


SN54LS279A . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

logic symbol§

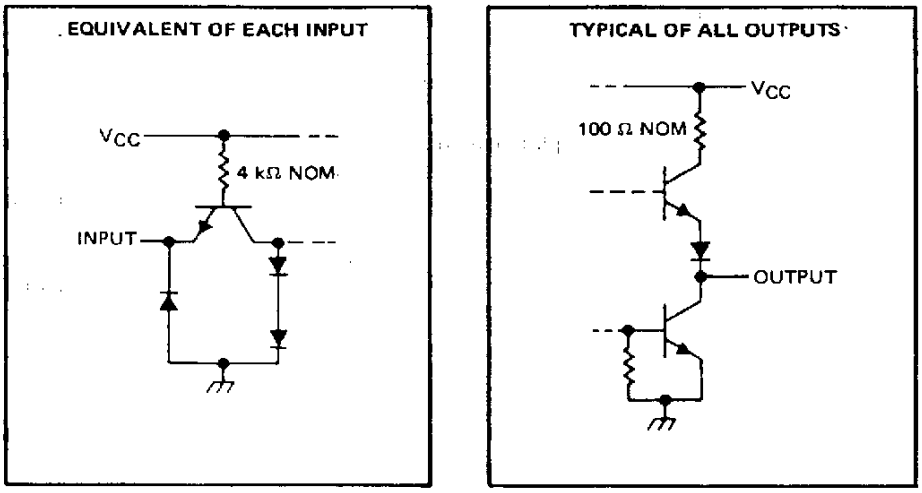


§This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

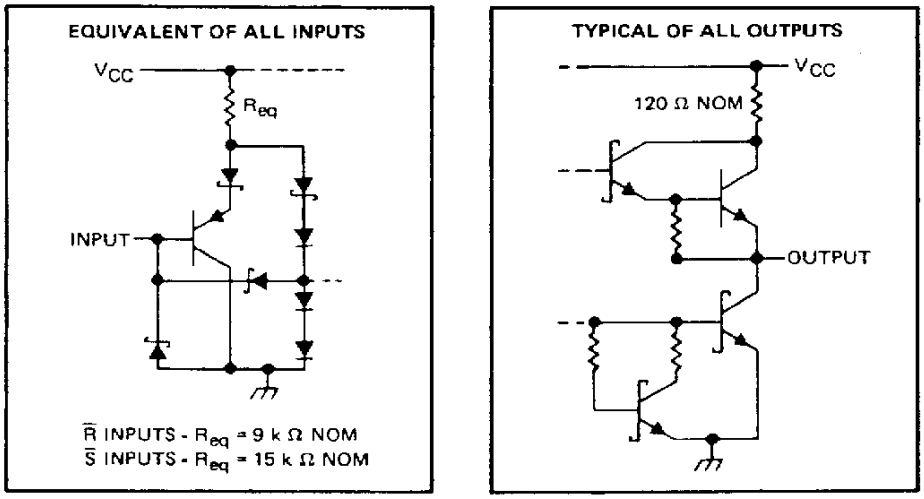
Pin numbers shown are for D, J, N, and W packages.

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.

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}	$\overline{S}$	Q	R_L = 400 Ω, C_L = 15 pF		12	22	ns
t_{PHL}					9	15	
t_{PHL}	$\overline{R}$	Q			15	27	ns

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

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}	$\overline{S}$	Q	R_L = 2 kΩ, C_L = 15 pF		12	22	ns
t_{PHL}					13	21	
t_{PHL}	$\overline{R}$	Q			15	27	ns

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

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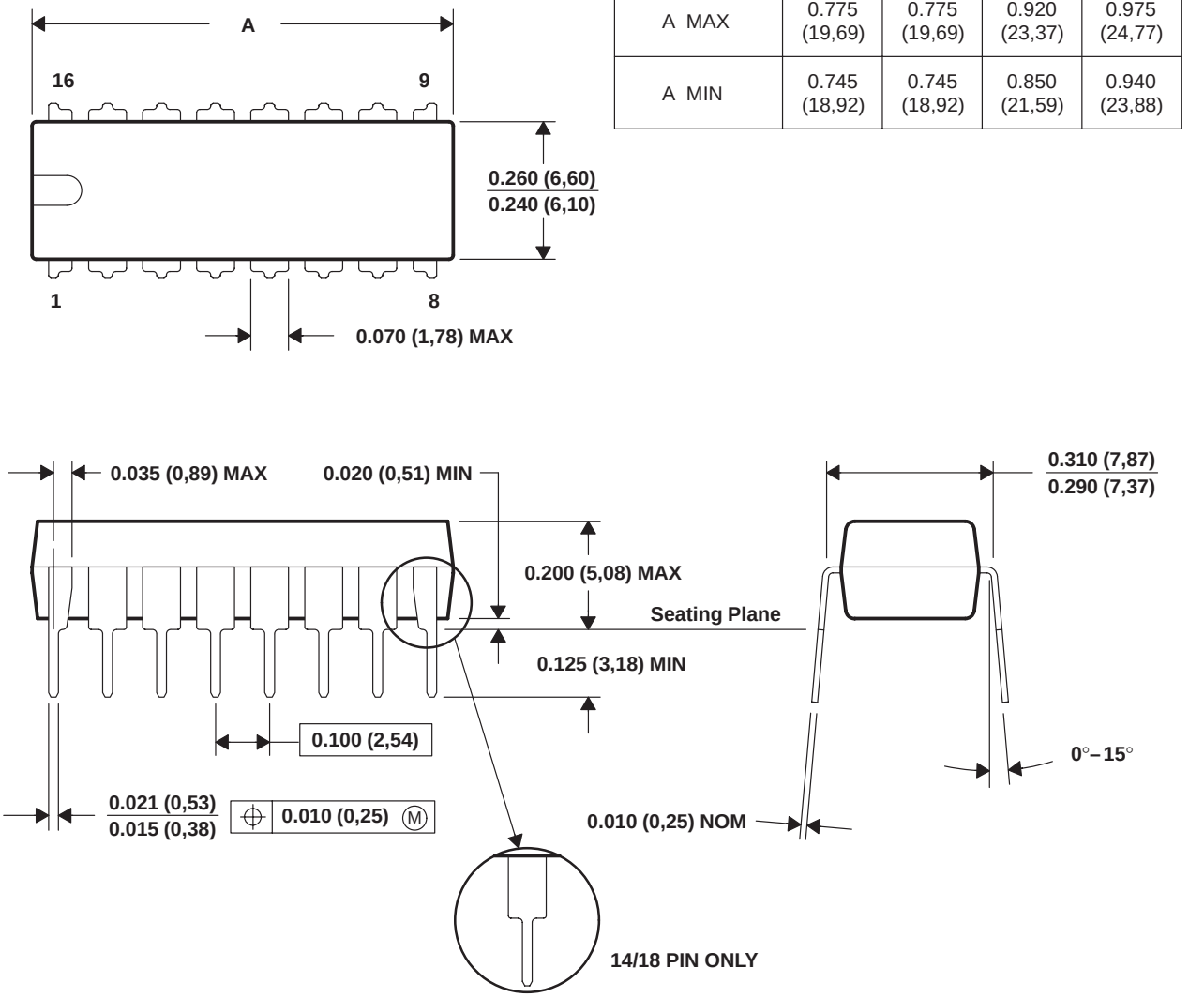
MPDI002A – JANUARY 1995 – REVISED OCTOBER 1995

N (R-PDIP-T)** **PLASTIC DUAL-IN-LINE PACKAGE**

16 PINS SHOWN

DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	0.975 (24,77)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)



NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS-001 (20-pin package is shorter than MS-001).