

SN54279, SN54LS279A, SN74279, SN74LS279A QUADRUPLE \bar{S} - \bar{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.

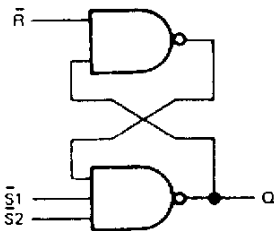
‡ This configuration is nonstable: that is, it may not persist when the \bar{S} and \bar{R} inputs return to their inactive (high) level.

H = both \bar{S} inputs high

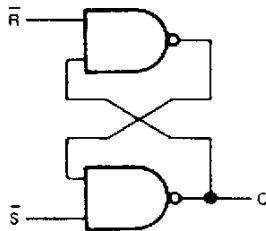
L = one or both \bar{S} inputs low

logic diagram (positive logic)

(latches 1 and 3)

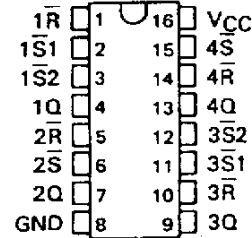


(latches 2 and 4)

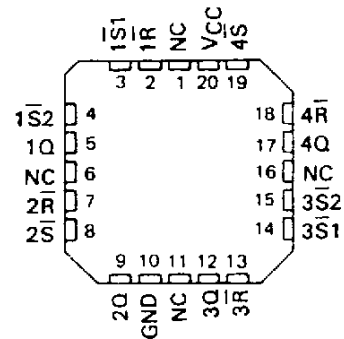


SN54279, SN54LS279A . . . J OR W PACKAGE
SN74279 . . . N PACKAGE
SN74LS279A . . . D OR N PACKAGE

(TOP VIEW)

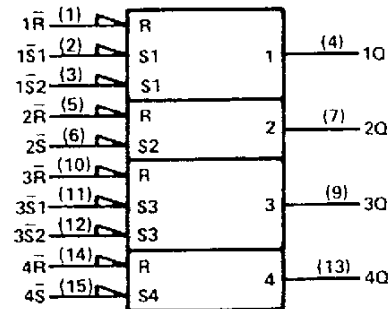


SN54LS279A . . . FK PACKAGE
(TOP VIEW)



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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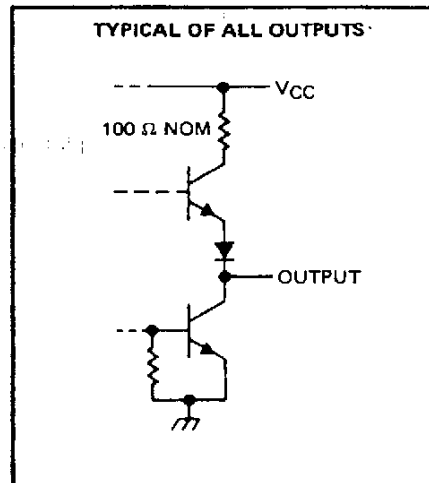
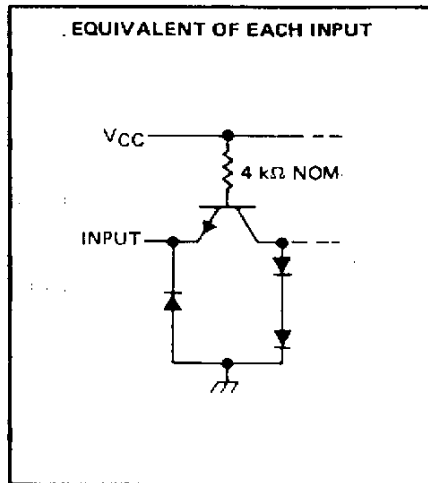
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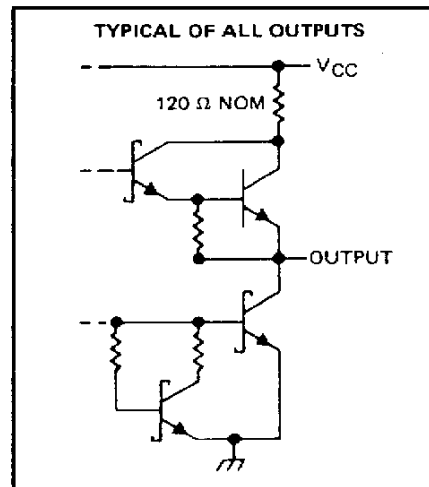
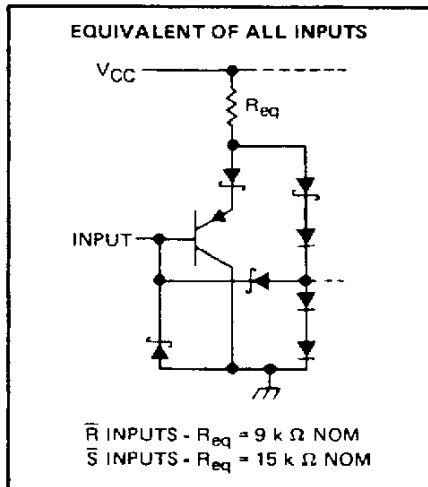
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schematics of inputs and outputs

'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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SN54279, SN74279 QUADRUPLE S-R LATCHES

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 | | | 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} | | | | 9 | 15 | | |
| t _{PHL} | R | Q | | 15 | 27 | ns | |

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


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SN54LS279A, SN74LS279A QUADRUPLE S-R LATCHES

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 | |
| 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 | | ns |

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

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