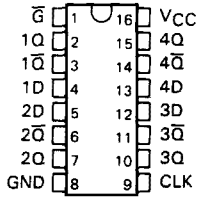
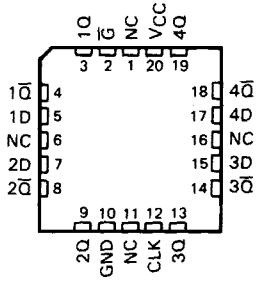
D2932, MARCH 1987—REVISED JANUARY 1989

- Contains Four D-Type Flip-Flops with Double-Rail Outputs
- Buffered Common Enable Input
- Applications Include:
  Buffer/Storage Registers
  Pattern Generators
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

SN54F379 . . . J PACKAGE
SN74F379 . . . D OR N PACKAGE
(TOP VIEW)




SN54F379 . . . FK PACKAGE
(TOP VIEW)




NC—No internal connection

## description

The SN54F379 and SN74F379 are monolithic, positive-edge-triggered D-type flip-flops with a clock enable input. The 'F379 is similar to the 'F175, but features a common clock enable instead of a common clear.

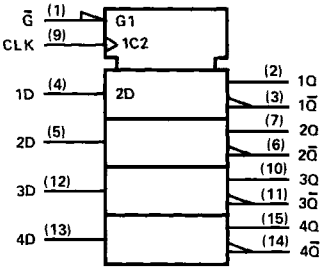
Information at the D inputs meeting the setup time requirements is transferred to the Q outputs on the positive-going edge of the clock pulse if the clock enable input $\overline{G}$ is low. Clock triggering occurs at a particular voltage level and is not directly related to the transition time of the positive-going pulse. When the clock input is at either the high or low level, the D input signal has no effect at the output.

The SN54F379 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74F379 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE (EACH FLIP-FLOP)

| INPUTS | | | OUTPUT | |
|---|---|---|---|---|
| $\overline{G}$ | CLOCK | DATA | Q | $\overline{Q}$ |
| H | X | X | $Q_0$ | $\overline{Q}_0$ |
| L | ↑ | H | H | L |
| L | ↑ | L | L | H |
| X | L | X | $Q_0$ | $\overline{Q}_0$ |

## 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, and N packages.



PRODUCT PREVIEW

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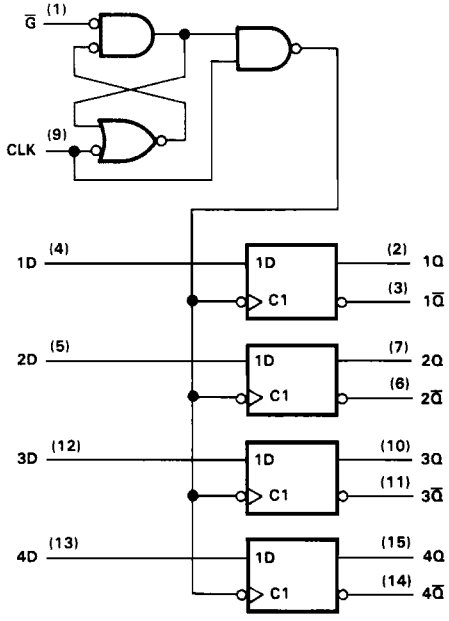
**logic diagram (positive logic)**




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

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

Supply voltage, $V_{CC}$ . . . . . −0.5 V to 7 V
Input voltage† . . . . . −1.2 V to 7 V
Input current . . . . . −30 mA to 5 mA
Voltage applied to any output in the high state . . . . . −0.5 V to $V_{CC}$
Current into any output in the low state . . . . . 40 mA
Operating free-air temperature range: SN54F379 . . . . . −55°C to 125°C
SN74F379 . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

† The input voltage ratings may be exceeded provided the input current ratings are observed.





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## recommended operating conditions

| | | SN54F379 | | | SN74F379 | | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | MIN | NOM | MAX | MIN | NOM | MAX | |
| $V_{CC}$ | Supply voltage | 4.5 | 5 | 5.5 | 4.5 | 5 | 5.5 | V |
| $V_{IH}$ | High-level input voltage | 2 | | | 2 | | | V |
| $V_{IL}$ | Low-level input voltage | | | 0.8 | | | 0.8 | V |
| $I_{IK}$ | Input clamp current | | | −18 | | | −18 | mA |
| $I_{OH}$ | High-level output current | | | −1 | | | −1 | mA |
| $I_{OL}$ | Low-level output current | | | 20 | | | 20 | mA |
| $T_A$ | Operating free-air temperature | −55 | | 125 | 0 | | 70 | °C |

## electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER | TEST CONDITIONS | | SN54F379 | | | SN74F379 | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP† | MAX | MIN | TYP† | MAX | |
| $V_{IK}$ | $V_{CC}$ = 4.5 V, | $I_I$ = −18 mA | | | −1.2 | | | −1.2 | V |
| $V_{OH}$ | $V_{CC}$ = 4.5 V, | $I_{OH}$ = −1 mA | 2.5 | 3.4 | | 2.5 | 3.4 | | V |
| | $V_{CC}$ = 4.75 V, | $I_{OH}$ = −1 mA | | | | 2.7 | | | |
| $V_{OL}$ | $V_{CC}$ = 4.5 V, | $I_{OL}$ = 20 mA | | 0.3 | 0.5 | | 0.3 | 0.5 | V |
| $I_I$ | $V_{CC}$ = 5.5 V, | $V_I$ = 7 V | | | 0.1 | | | 0.1 | mA |
| $I_{IH}$ | $V_{CC}$ = 5.5 V, | $V_I$ = 2.7 V | | | 20 | | | 20 | μA |
| $I_{IL}$ | $V_{CC}$ = 5.5 V, | $V_I$ = 0.5 V | | | −0.6 | | | −0.6 | mA |
| $I_{OS}$‡ | $V_{CC}$ = 5.5 V, | $V_O$ = 0 | −60 | | −150 | −60 | | −150 | mA |
| $I_{CC}$ | $V_{CC}$ = 5.5 V, | See Note 1 | | 28 | 40 | | 28 | 40 | mA |

## timing requirements

| | | | $V_{CC}$ = 5 V, $T_A$ = 25°C | | $V_{CC}$ = 4.5 V to 5.5 V, $T_A$ = MIN to MAX§ | | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | 'F379 | | SN54F379 | | SN74F379 | | |
| | | | MIN | MAX | MIN | MAX | MIN | MAX | |
| $f_{clock}$ | Clock frequency | | 0 | 100 | | | 0 | 100 | MHz |
| $t_{su}$ | Setup time before CLK↑ | Data high or low | 3 | | | | 3 | | ns |
| $t_h$ | Hold time after CLK↑ | Data high or low | 1 | | | | 1 | | ns |
| $t_{su}$ | Setup time before CLK↑ | $\overline{G}$ high or low | 6 | | | | 6 | | ns |
| $t_h$ | Hold time after CLK↑ | $\overline{G}$ high or low | 0 | | | | 0 | | ns |
| $t_w$ | Pulse duration | CLK high | 4 | | | | 4 | | ns |
| | | CLK low | 5 | | | | 5 | | |

† 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 not exceed one second.
§ For conditions shown as MIN or MAX, use the appropriate value specified under Recommended Operating Conditions.
NOTE 1: $I_{CC}$ is measured with all outputs open, all data inputs and the enable input grounded, and the CLK input at 4.5 V after being momentarily grounded.

## switching characteristics (see Note 2)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ = 5 V, $C_L$ = 50 pF, $R_L$ = 500 Ω, $T_A$ = 25°C | | | $V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, $R_L$ = 500 Ω, $T_A$ = MIN to MAX† | | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 'F379 | | | SN54F379 | | SN74F379 | | |
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $f_{max}$ | | | 100 | 140 | | | | 100 | | MHz |
| $t_{PLH}$ | CLK | Q or $\overline{Q}$ | 3.2 | 4.6 | 6.5 | | | 3.2 | 7.5 | ns |
| $t_{PHL}$ | | | 4.2 | 6.1 | 8.5 | | | 4.2 | 9.5 | |

†For conditions shown as MIN or MAX, use the appropriate value specified under Recommended Operating Conditions.
NOTE 2: Load circuits and waveforms are shown in Section 1.





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