



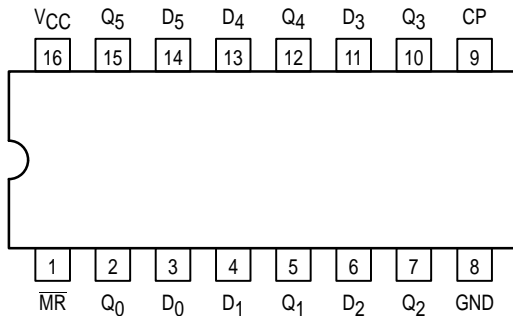
HEX D FLIP-FLOP WITH MASTER RESET

The MC54/74F174 is a high-speed hex D flip-flop. The device is used primarily as a 6-bit edge-triggered storage register. The device has a Master Reset to simultaneously clear all flip-flops.

The F174 consists of six edge-triggered D flip-flops with individual D inputs and Q outputs. The Clock (CP) and Master Reset (\overline{MR}) are common to all flip-flops. The state of each D input, one setup time before low-to-high clock transition, is transferred to the corresponding flip-flop's Q output. A LOW input to the Master Reset (\overline{MR}) will force all outputs LOW independent of Clock or Data inputs. The F174 is useful for applications where only the true output is required and the Clock and Master Reset are common to all storage elements.

- Six Edge-triggered D-type Inputs
- Buffered Positive Edge-triggered Common Clock
- Buffered, Asynchronous Common Reset

CONNECTION DIAGRAM DIP (TOP VIEW)



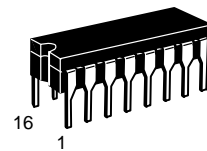
FUNCTION TABLE

| Inputs | Outputs |
|-------------------------------|-------------|
| @ t_n , $\overline{MR} = H$ | @ $t_n + 1$ |
| D_n | Q_n |
| H | H |
| L | L |

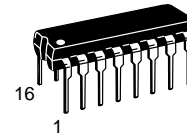
t_n = Bit time before clock pulse
 $t_n + 1$ = Bit time after clock pulse
 H = HIGH Voltage Level
 L = LOW Voltage Level

MC54/74F174

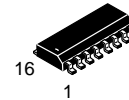
HEX D FLIP-FLOP WITH MASTER RESET
FAST™ SCHOTTKY TTL



J SUFFIX
 CERAMIC
 CASE 620-09



N SUFFIX
 PLASTIC
 CASE 648-08

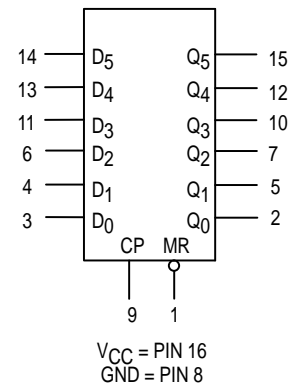


D SUFFIX
 SOIC
 CASE 751B-03

ORDERING INFORMATION

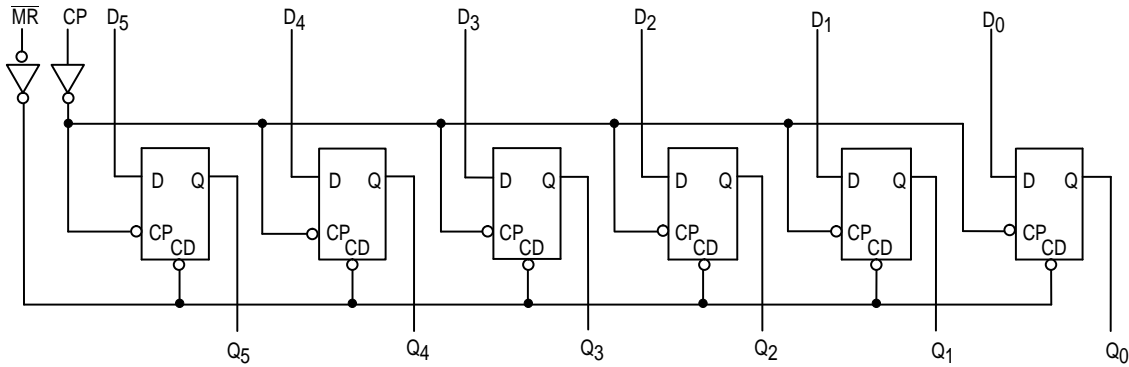
MC54FXXXJ Ceramic
 MC74FXXXN Plastic
 MC74FXXXD SOIC

LOGIC SYMBOL



MC54/74F174

LOGIC DIAGRAM



GUARANTEED OPERATING RANGES

| Symbol | Parameter | | Min | Typ | Max | Unit |
|-----------------|-------------------------------------|--------|-----|-----|------|------|
| V _{CC} | Supply Voltage | 54, 74 | 4.5 | 5.0 | 5.5 | V |
| T _A | Operating Ambient Temperature Range | 54 | -55 | 25 | 125 | °C |
| | | 74 | 0 | 25 | 70 | |
| I _{OH} | Output Current — High | 54, 74 | | | -1.0 | mA |
| I _{OL} | Output Current — Low | 54, 74 | | | 20 | mA |

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

| Symbol | Parameter | Limits | | | Unit | Test Conditions |
|-----------------|---------------------------------------|--------|-----|------|------|--|
| | | Min | Typ | Max | | |
| V _{IH} | Input HIGH Voltage | 2.0 | | | V | Guaranteed Input HIGH Voltage |
| V _{IL} | Input LOW Voltage | | | 0.8 | V | Guaranteed Input LOW Voltage |
| V _{IK} | Input Clamp Diode Voltage | | | -1.2 | V | V _{CC} = MIN, I _{IN} = -18 mA |
| V _{OH} | Output HIGH Voltage | 54, 74 | 2.5 | | V | I _{OL} = -1.0 mA, V _{CC} = 4.50 V |
| | | 74 | 2.7 | | V | I _{OL} = -1.0 mA, V _{CC} = 4.75 V |
| V _{OL} | Output LOW Voltage | | | 0.5 | V | I _{OL} = 20 mA, V _{CC} = MIN |
| I _{IH} | Input HIGH Current | | | 20 | μA | V _{CC} = MAX, V _{IN} = 2.7 V |
| | | | | 0.1 | mA | V _{CC} = MAX, V _{IN} = 7.0 V |
| I _{IL} | Input LOW Current | | | -0.6 | mA | V _{CC} = MAX, V _{IN} = 0.5 V |
| I _{OS} | Output Short Circuit Current (Note 2) | -60 | | -150 | mA | V _{CC} = MAX, V _{OUT} = 0 V |
| I _{CC} | Power Supply Current | | 30 | 45 | mA | V _{CC} = MAX, D _n = MR = 4.5 V, CP = |

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.
- Not more than one output should be shorted at a time, nor for more than 1 second.

MC54/74F174

AC CHARACTERISTICS

| Symbol | Parameter | 54/74F | | | 54F | | 74F | | Unit |
|------------------|---|--|-----|-----|---|------|--|------|------|
| | | T _A = +25°C V _{CC} = +5.0 V C _L = 50 pF | | | T _A = -55°C to +125°C V _{CC} = 5.0 V ± 10% C _L = 50 pF | | T _A = 0°C to +70°C V _{CC} = 5.0 V ± 10% C _L = 50 pF | | |
| | | Min | Typ | Max | Min | Max | Min | Max | |
| f _{max} | Maximum Clock Frequency | 100 | 140 | | 80 | | 80 | | MHz |
| t _{PLH} | Propagation Delay | 3.5 | 5.5 | 8.0 | 3.5 | 10.0 | 3.5 | 9.0 | ns |
| t _{PHL} | CP to Q _n | 4.5 | 7.0 | 10 | 4.5 | 12.0 | 4.5 | 11.0 | |
| t _{PHL} | Propagation Delay MR to Q _n | 5.0 | 10 | 14 | 5.0 | 16.0 | 5.0 | 15.0 | ns |

AC OPERATING REQUIREMENTS

| Symbol | Parameter | 54/74F | | | 54F | | 74F | | Unit |
|--------------------|--|--|-----|-----|---|-----|--|-----|------|
| | | T _A = +25°C V _{CC} = +5.0 V | | | T _A = -55°C to +125°C V _{CC} = 5.0 V ± 10% | | T _A = 0°C to +70°C V _{CC} = 5.0 V ± 10% | | |
| | | Min | Typ | Max | Min | max | Min | Max | |
| t _S (H) | Setup Time, HIGH or LOW | 4.0 | | | 4.0 | | 4.0 | | ns |
| t _S (L) | D _n to CP | 4.0 | | | 4.0 | | 4.0 | | |
| t _H (H) | Hold Time, HIGH or LOW | 0 | | | 1.0 | | 0 | | |
| t _H (L) | D _n to CP | 0 | | | 1.0 | | 0 | | |
| t _w (H) | CP Pulse Width, HIGH | 4.0 | | | 4.0 | | 4.0 | | ns |
| t _w (L) | or LOW | 6.0 | | | 6.0 | | 6.0 | | |
| t _w (L) | $\overline{\text{MR}}$ Pulse Width LOW | 5.0 | | | 5.0 | | 5.0 | | ns |
| t _{rec} | Recovery Time $\overline{\text{MR}}$ to CP | 5.0 | | | 5.0 | | 5.0 | | ns |