

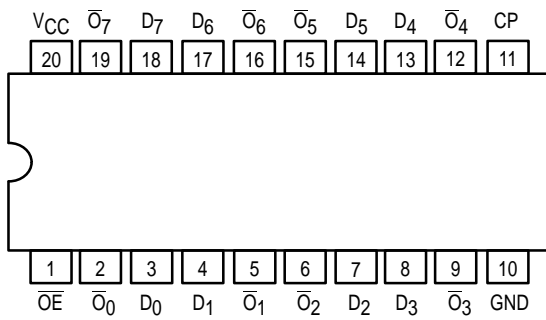


# OCTAL D-TYPE FLIP-FLOP WITH 3-STATE OUTPUTS

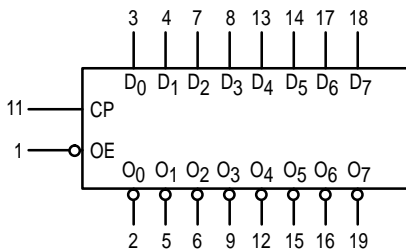
The MC54/74F534 is a high-speed, low-power octal D-type flip-flop featuring separate D-type inputs for each flip-flop and 3-state outputs for bus oriented applications. A buffered Clock (CP) and Output Enable ( $\overline{OE}$ ) are common to all flip-flops. The F534 is the same as the F374 except that the outputs are inverted.

- Edge-Triggered D-Type Inputs
- Buffered Positive Edge-Triggered Clock
- 3-State Outputs for Bus Oriented Applications

### CONNECTION DIAGRAM



### LOGIC SYMBOL

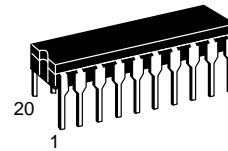


$V_{CC}$  = PIN 20  
GND = PIN 10

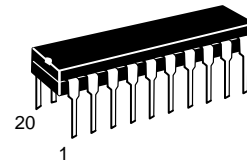
## MC54/74F534

### OCTAL D-TYPE FLIP-FLOP WITH 3-STATE OUTPUTS

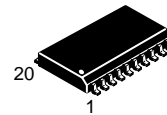
FAST™ SCHOTTKY TTL



**J SUFFIX**  
CERAMIC  
CASE 732-03



**N SUFFIX**  
PLASTIC  
CASE 738-03



**DW SUFFIX**  
SOIC  
CASE 751D-03

### ORDERING INFORMATION

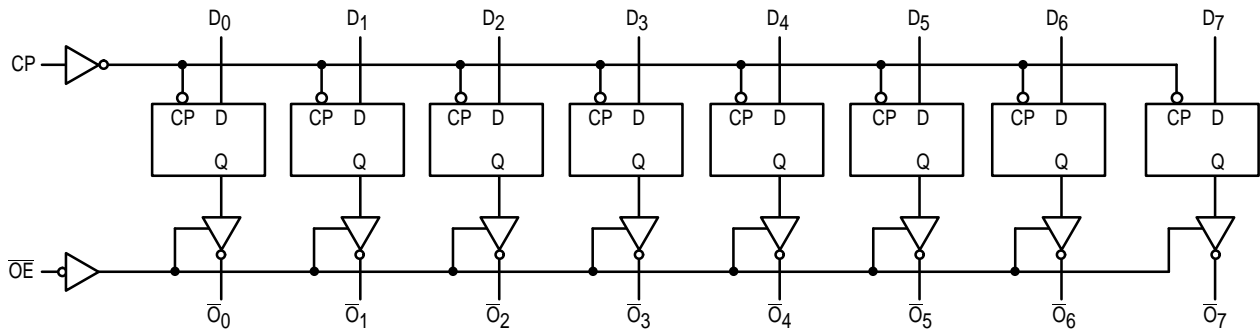
MC54FXXXJ Ceramic  
MC74FXXXN Plastic  
MC74FXXXDW SOIC

### 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 |     | -3.0 | mA   |    |
| $I_{OL}$ | Output Current — Low                | 54, 74 |     | 24   | mA   |    |

# MC54/74F534

## LOGIC DIAGRAM



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

## FUNCTIONAL DESCRIPTION

The F534 consists of eight edge-triggered flip-flops with individual D-type inputs and 3-state true outputs. The buffered clock and buffered Output Enable are common to all flip-flops. The eight flip-flops will store the state of their individual D inputs that meet the setup and hold times requirements on the

LOW-to-HIGH Clock (CP) transition. With the Output Enable ( $\overline{OE}$ ) LOW, the contents of the eight flip-flops are available at the outputs. When the  $\overline{OE}$  is HIGH, the outputs go to the high impedance state. Operation of the  $\overline{OE}$  input does not affect the state of the flip-flops.

## 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             | $I_{IN} = -18 \text{ mA}$                             | $V_{CC} = \text{MIN}$     |
| $V_{OH}$  | Output HIGH Voltage                   | 54, 74 | 2.4  | 3.3  | V             | $I_{OH} = -3.0 \text{ mA}$                            | $V_{CC} = 4.5 \text{ V}$  |
|           |                                       | 74     | 2.7  | 3.3  | V             | $I_{OH} = -3.0 \text{ mA}$                            | $V_{CC} = 4.75 \text{ V}$ |
| $V_{OL}$  | Output LOW Voltage                    |        | 0.35 | 0.5  | V             | $I_{OL} = 24 \text{ mA}$                              | $V_{CC} = \text{MIN}$     |
| $I_{OZH}$ | Output OFF Current — HIGH             |        |      | 50   | $\mu\text{A}$ | $V_{OUT} = 2.7 \text{ V}$                             | $V_{CC} = \text{MAX}$     |
| $I_{OZL}$ | Output OFF Current — LOW              |        |      | -50  | $\mu\text{A}$ | $V_{OUT} = 0.5 \text{ V}$                             | $V_{CC} = \text{MAX}$     |
| $I_{IH}$  | Input HIGH Current                    |        |      | 20   | $\mu\text{A}$ | $V_{IN} = 2.7 \text{ V}$                              | $V_{CC} = \text{MAX}$     |
|           |                                       |        |      | 100  |               | $V_{IN} = 7.0 \text{ V}$                              |                           |
| $I_{IL}$  | Input LOW Current                     |        |      | -0.6 | mA            | $V_{IN} = 0.5 \text{ V}$                              | $V_{CC} = \text{MAX}$     |
| $I_{OS}$  | Output Short Circuit Current (Note 2) | -60    |      | -150 | mA            | $V_{OUT} = 0 \text{ V}$                               | $V_{CC} = \text{MAX}$     |
| $I_{CCZ}$ | Power Supply Current                  |        | 55   | 86   | mA            | $D_n = \text{Gnd}$<br>$\overline{OE} = 4.5 \text{ V}$ | $V_{CC} = \text{MAX}$     |

### NOTES:

1. For conditions such as MIN or MAX, use the appropriate value specified under guaranteed operating ranges.
2. Not more than one output should be shorted at a time, nor for more than 1 second.

# MC54/74F534

## AC CHARACTERISTICS

| Symbol                               | Parameter                              | 54/74F   |            |             | 54F  |            | 74F   |             | Unit |
|--------------------------------------|--|--|------------|-------------|--|------------|---|-------------|------|
|                                      |  | T <sub>A</sub> = +25°C<br>V <sub>CC</sub> = +5.0 V<br>C <sub>L</sub> = 50 pF |            |             | T <sub>A</sub> = -55 to +125°C<br>V <sub>CC</sub> = 5.0 V ±10%<br>C <sub>L</sub> = 50 pF |            | T <sub>A</sub> = 0 to +70°C<br>V <sub>CC</sub> = 5.0 V ±10%<br>C <sub>L</sub> = 50 pF |             |      |
|                                      |  | Min  | Typ        | Max         | Min  | Max        | Min   | Max         |      |
| f <sub>max</sub>                     | Maximum Clock Frequency                | 100  |            |             | 60   |            | 70  |             | MHz  |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay<br>CP to $\bar{O}_n$ | 4.0<br>4.0   | 6.5<br>6.5 | 8.5<br>8.5  | 4.0<br>4.0   | 10.5<br>11 | 4.0<br>4.0  | 10<br>10    | ns   |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output Enable Time                     | 2.0<br>2.0   | 9.0<br>5.8 | 11.5<br>7.5 | 2.0<br>2.0   | 14<br>10   | 2.0<br>2.0  | 12.5<br>8.5 | ns   |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output Disable Time                    | 2.0<br>2.0   | 5.3<br>4.3 | 7.0<br>5.5  | 2.0<br>2.0   | 8.0<br>7.5 | 2.0<br>2.0  | 8.0<br>6.5  |      |

## AC OPERATING REQUIREMENTS

| Symbol                                   | Parameter                                       | 54/74F   |     |     | 54F  |     | 74F   |     | Unit |
|--|---|--|-----|-----|--|-----|---|-----|------|
|  |   | T <sub>A</sub> = +25°C<br>V <sub>CC</sub> = +5.0 V |     |     | T <sub>A</sub> = -55 to +125°C<br>V <sub>CC</sub> = 5.0 V ±10% |     | T <sub>A</sub> = 0 to +70°C<br>V <sub>CC</sub> = 5.0 V ±10% |     |      |
|  |   | Min  | Typ | Max | Min  | Max | Min   | Max |      |
| t <sub>S</sub> (H)<br>t <sub>S</sub> (L) | Setup Time, HIGH or LOW<br>D <sub>n</sub> to CP | 2.0<br>2.0   |     |     | 2.5<br>2.0   |     | 2.0<br>2.0  |     | ns   |
| t <sub>H</sub> (H)<br>t <sub>H</sub> (L) | Hold Time, HIGH or LOW<br>D <sub>n</sub> to CP  | 2.0<br>2.0   |     |     | 2.0<br>2.5   |     | 2.0<br>2.0  |     |      |
| t <sub>w</sub> (H)<br>t <sub>w</sub> (L) | CP Pulse Width<br>HIGH or LOW                   | 7.0<br>6.0   |     |     | 7.0<br>6.0   |     | 7.0<br>6.0  |     | ns   |