MOTOROLA

MC74F574

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

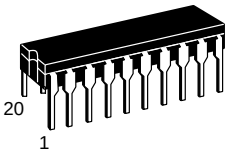
The MC74F574 is a high-speed, low-power octal D-type flip-flop featuring separate D-type inputs for each flip-flop and 3-state outputs for bus oriented applications. A buffered clock (CP) and Output Enable (OE) are common to all flip-flops.

This device is functionally identical to the F374 except for the pinouts.

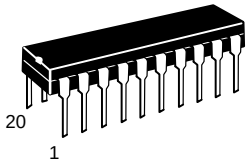
- Broadside Pinout Version of F374
- Edge-Triggered D-Type Inputs
- Buffered Positive Edge-Triggered Clock
- 3-State Outputs for Bus Oriented Applications
- ESD Protection > 4000 Volts

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

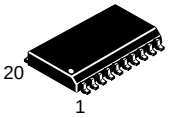
FAST™ SCHOTTKY TTL



J SUFFIX
CERAMIC
CASE 732-03



N SUFFIX
PLASTIC
CASE 738-03

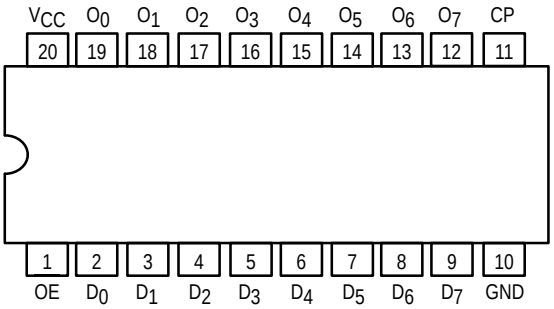


DW SUFFIX
SOIC
CASE 751D-03

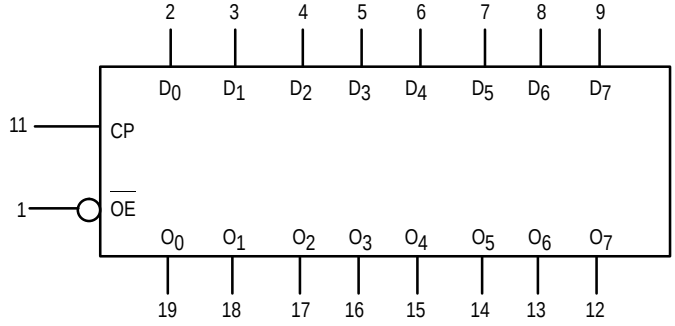
ORDERING INFORMATION

MC74FXXXJ	Ceramic
MC74FXXXN	Plastic
MC74FXXXDW	SOIC

PIN ASSIGNMENT



LOGIC SYMBOL



GUARANTEED OPERATING RANGES

Symbol	Parameter		Min	Typ	Max	Unit
V_{CC}	DC Supply Voltage	74	4.5	5.0	5.5	V
T_A	Operating Ambient Temperature Range	74	0	25	70	°C
I_{OH}	Output Current — High	74	—	—	3.0	mA
I_{OL}	Output Current — Low	74	—	—	24	mA

FUNCTION TABLE

Inputs			Internal Register	Outputs	Operating Mode
$\overline{OE}$	CP	D_n		Q_0–Q_7	
L L	↑ ↑	l h	L H	L H	Load and read register
L	↕	X	NC	NC	Hold
H H	↑ X	D_n X	D_n X	Z Z	Disable outputs

H = HIGH voltage level
h = HIGH voltage level one set-up time prior to the Low-to-High clock transition
L = LOW voltage level
l = LOW voltage level one set-up time prior to the Low-to-High clock transition
NC = No change
X = Don't care
Z = High impedance "off" state
↑ = Low-to-High clock transition
↕ = Not a Low-to-High clock transition

FUNCTIONAL DESCRIPTION

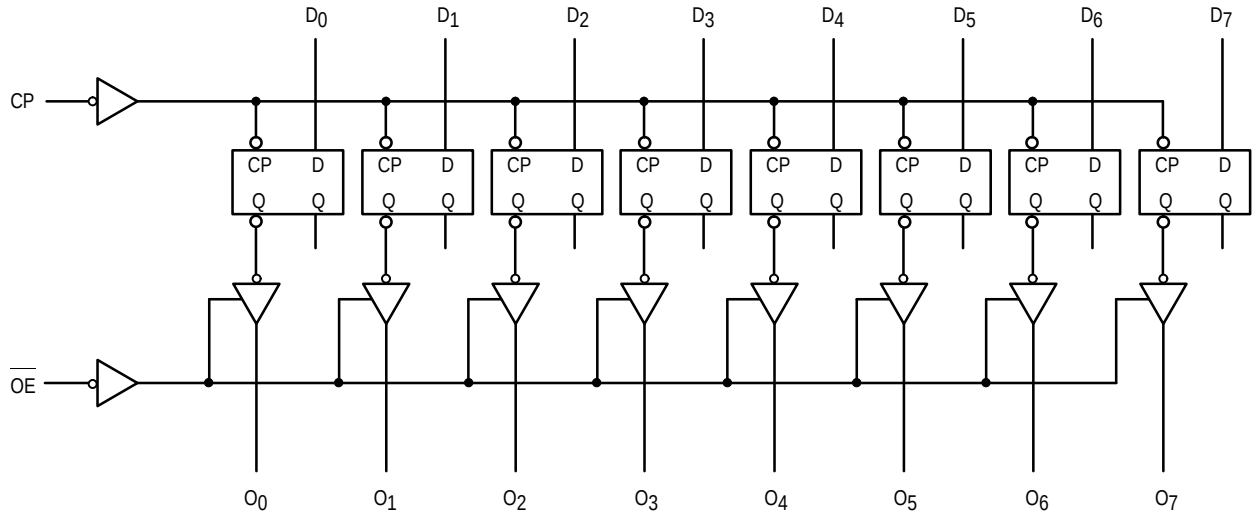
The MC74F574 consists of eight edge-triggered flip-flops with individual D-type inputs and 3-state true outputs. The buffered clock and buffered Output Enable are common to all flip-flops. The eight flip-flops will store the state of their individual D inputs that meet the setup and hold times requirements on the LOW-to-HIGH Clock (CP) transition. With the Output Enable (OE) LOW, the contents of the eight flip-flops are available at the outputs. When the OE is HIGH, the outputs go to the high impedance state. Operation of the 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 (Note 1)	
		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	2.4	—	—	V	I_{OH} = –3.0 mA	V_{CC} = MIN
		2.7	—	—	V		V_{CC} = 4.75 V
V_{OL}	Output LOW Voltage	—	—	0.5	V	I_{OL} = 24 mA	V_{CC} = MIN
I_{IH}	Input HIGH Current	—	—	20	μA	V_{CC} = MAX, V_{IN} = 2.7 V	
		—	—	100		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_{OZH}	Output Off Current — HIGH	—	—	50	μA	V_{CC} = MAX, V_{OUT} = 2.7 V	
I_{OZL}	Output Off Current — LOW	—	—	–50	μA	V_{CC} = MAX, V_{OUT} = 0.5 V	
I_{OS}	Output Short Circuit Current (Note 2)	–60	—	–150	mA	V_{CC} = MAX, V_{OUT} = 0 V	
I_{CCZ}	Power Supply Current (All Outputs OFF)	—	55	86	mA	V_{CC} = MAX	D_n – GND; OE = 4.5 V

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

LOGIC DIAGRAM



AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	54/74F T_A = +25°C, V_{CC} = +5.0 V, C_L = 50 pF			74F T_A = 0°C to +70°C, V_{CC} = +5.0 V ±10%, C_L = 50 pF		Unit
		Min	Typ	Max	Min	Max	
f_{MAX}	Maximum Clock Frequency	100	—	—	70	—	MHz
t_{PLH} t_{PHL}	Propagation Delay CP to O_n	2.5 2.5	— —	8.5 8.5	2.5 2.5	8.5 8.5	ns
t_{PZH} t_{PZL}	Output Enable Time	3.0 3.0	— —	9.0 9.0	2.5 2.5	10.0 10.0	ns
t_{PHZ} t_{PLZ}	Output Disable Time	1.5 1.0	— —	5.5 5.5	1.5 1.0	6.5 6.5	ns

AC OPERATING CHARACTERISTICS

Symbol	Parameter	54/74F T_A = +25°C, V_{CC} = +5.0 V, C_L = 50 pF			74F T_A = 0°C to +70°C, V_{CC} = +5.0 V ±10%, C_L = 50 pF			Unit
		Min	Typ	Max	Min	Typ	Max	
$t_{s(H)}$ $t_{s(L)}$	Setup Time, HIGH or LOW D_n to CP	2.5 2.0	— —	— —	2.5 3.0	— —	— —	ns
$t_{h(H)}$ $t_{h(L)}$	Hold Time, HIGH to LOW D_n to CP	2.0 2.0	— —	— —	2.0 2.0	— —	— —	ns
$t_{w(H)}$ $t_{w(L)}$	CP Pulse Width HIGH or LOW	5.0 5.0	— —	— —	5.0 5.0	— —	— —	ns

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