

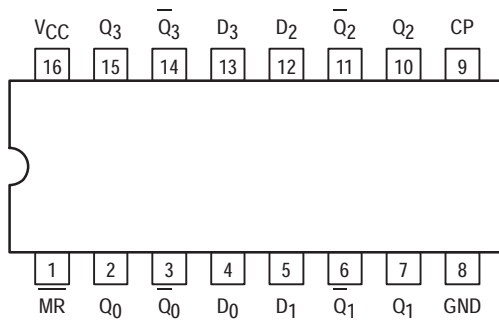


QUAD D FLIP-FLOP

The MC54/74F175 is a high-speed quad D flip-flop. The device is useful for general flip-flop requirements where both true and complementary outputs are required and clock and clear inputs are common to all flip-flops. The information on the D inputs is stored during the LOW-to-HIGH clock transition. Both true and complemented outputs of each flip-flop are provided. A Master Reset input resets all flip-flops, independent of the Clock or D inputs when LOW.

- Four Edge-triggered D-type Inputs
- Buffered Positive Edge-triggered Common Clock
- Buffered Asynchronous Common Reset
- True and Complementary Outputs
- ESD > 4000 Volts

CONNECTION DIAGRAM DIP (TOP VIEW)



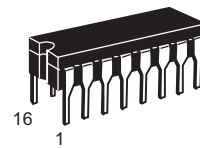
FUNCTION TABLE

Inputs	Outputs	
@ t_n , MR = H	@ $t_n + 1$	
D_n	Q_n	\bar{Q}_n
L	L	H
H	H	L

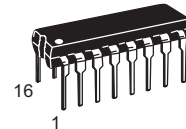
t_n = Bit time before clock positive-going transition
 $t_n + 1$ = Bit time after clock positive-going transition
 H = HIGH Voltage Level
 L = LOW Voltage Level

MC54/74F175

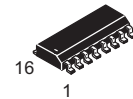
QUAD D FLIP-FLOP
FAST™ SCHOTTKY TTL



J SUFFIX
 CERAMIC
 CASE 620-09



N SUFFIX
 PLASTIC
 CASE 648-08

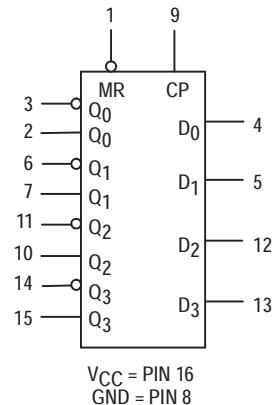


D SUFFIX
 SOIC
 CASE 751B-03

ORDERING INFORMATION

MC54FXXXJ Ceramic
 MC74FXXXN Plastic
 MC74FXXXD SOIC

LOGIC SYMBOL

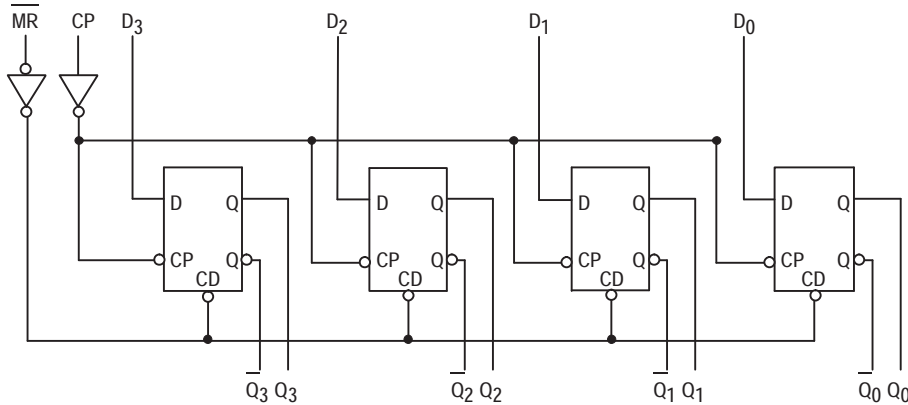


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MC54/74F175

LOGIC DIAGRAM



NOTE:

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

FUNCTIONAL DESCRIPTION

The F175 consists of four edge-triggered D flip-flops with individual D inputs and Q and Q outputs. The Clock and Master Reset are common. The four flip-flops will store the state of their individual D inputs, one setup time before, on the LOW-to-HIGH clock (CP) transition, causing individual Q and

\bar{Q} outputs to follow. A LOW input on the Master Reset (MR) will force all Q outputs LOW and \bar{Q} outputs HIGH independent of Clock or Data inputs. The F175 is useful for general logic applications where a common Master Reset and Clock are acceptable.

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	I _{IN} = -18 mA	V _{CC} = MIN
V _{OH}	Output HIGH Voltage	54, 74	2.5	3.4	V	I _{OH} = -1.0 mA	V _{CC} = 4.50 V
		74	2.7	3.4	V	I _{OH} = -1.0 mA	V _{CC} = 4.75 V
V _{OL}	Output LOW Voltage		0.35	0.5	V	I _{OL} = 20 mA	V _{CC} = MIN
I _{IH}	Input HIGH Current			20	μA	V _{IN} = 2.7 V	V _{CC} = MAX
				100	μA	V _{IN} = 7.0 V	V _{CC} = MAX
I _{IL}	Input LOW Current			-0.6	mA	V _{IN} = 0.5 V	V _{CC} = MAX
I _{OS}	Output Short Circuit Current (Note 2)	-60		-150	mA	V _{OUT} = 0 V	V _{CC} = MAX
I _{CC}	Power Supply Current		22.5	34	mA	D _n = MR = 4.5 V CP =	V _{CC} = MAX

NOTES:

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

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AC CHARACTERISTICS

Symbol	Parameter	54/74F			54F		74F		Unit
		$T_A = +25^\circ\text{C}$ $V_{CC} = +5.0\text{ V}$ $C_L = 50\text{ pF}$			$T_A = -55^\circ\text{C to } +125^\circ\text{C}$ $V_{CC} = 5.0\text{ V} \pm 10\%$ $C_L = 50\text{ pF}$		$T_A = 0^\circ\text{C to } +70^\circ\text{C}$ $V_{CC} = 5.0\text{ V} \pm 10\%$ $C_L = 50\text{ pF}$		
		Min	Typ	Max	Min	Max	Min	Max	
f_{max}	Maximum Clock Frequency	100	140		100		100		MHz
t_{PLH}	Propagation Delay	3.5	5.0	6.5	3.5	8.5	3.5	7.5	ns
t_{PHL}	CP to Q_n or \overline{Q}_n	4.0	6.5	8.5	4.0	10.5	4.0	9.5	
t_{PHL}	Propagation Delay MR to Q_n	4.5	9.0	11.5	4.5	15	4.5	13	ns
t_{PLH}	Propagation Delay MR to Q_n	4.0	6.5	8.5	4.0	10	4.0	9.0	ns

AC OPERATING REQUIREMENTS

Symbol	Parameter	54/74F			54F		74F		Unit
		$T_A = +25^\circ\text{C}$ $V_{CC} = +5.0\text{ V}$			$T_A = -55^\circ\text{C to } +125^\circ\text{C}$ $V_{CC} = 5.0\text{ V} \pm 10\%$		$T_A = 0^\circ\text{C to } +70^\circ\text{C}$ $V_{CC} = 5.0\text{ V} \pm 10\%$		
		Min	Typ	Max	Min	Max	Min	Max	
$t_{\text{s(H)}}$	Setup Time, HIGH or LOW	3.0			3.0		3.0		ns
$t_{\text{s(L)}}$	D_n to CP	3.0			3.0		3.0		
$t_{\text{h(H)}}$	Hold Time, HIGH or LOW	1.0			1.0		1.0		
$t_{\text{h(L)}}$	D_n to CP	1.0			1.0		1.0		
$t_{\text{w(H)}}$	CP Pulse Width, HIGH	4.0			4.0		4.0		ns
$t_{\text{w(L)}}$	or LOW	5.0			5.0		5.0		
$t_{\text{w(L)}}$	MR Pulse Width, LOW	5.0			5.0		5.0		ns
t_{rec}	Recovery Time, MR to CP	5.0			5.0		5.0		ns


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