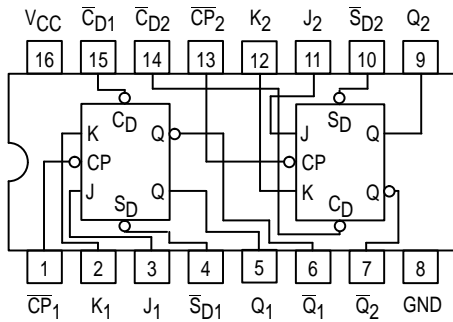




# DUAL JK NEGATIVE EDGE-TRIGGERED FLIP-FLOP

The MC74F112 contains two independent, high-speed JK flip-flops with Direct Set and Clear inputs. Synchronous state changes are initiated by the falling edge of the clock. Triggering occurs at a voltage level of the clock and is not directly related to the transition time. The J and K inputs can change when the clock is in either state without affecting the flip-flop, provided that they are in the desired state during the recommended setup and hold times relative to the falling edge of the clock. A LOW signal on  $\bar{S}_D$  or  $\bar{C}_D$  prevents clocking and forces Q or  $\bar{Q}$  HIGH, respectively. Simultaneous LOW signals on  $\bar{S}_D$  and  $\bar{C}_D$  force both Q and  $\bar{Q}$  HIGH.

### CONNECTION DIAGRAM



### FUNCTION TABLE (Each Half)

Inputs		Output
@ $t_n$		@ $t_n + 1$
J	K	Q
L	L	$Q_n$
L	H	L
H	L	H
H	H	$\bar{Q}_n$

#### Asynchronous Inputs:

- LOW Input to  $\bar{S}_D$  sets Q to HIGH level
- LOW Input to  $\bar{C}_D$  sets Q to LOW level
- Clear and Set are independent of clock
- Simultaneous LOW on  $\bar{C}_D$  and  $\bar{S}_D$  makes both Q and  $\bar{Q}$  HIGH

H = HIGH Voltage Level

L = LOW Voltage Level

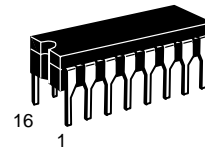
$t_n$  = Bit time before clock pulse

$t_n + 1$  = Bit time after clock pulse

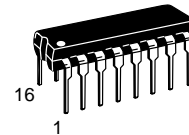
## MC74F112

### DUAL JK NEGATIVE EDGE-TRIGGERED FLIP-FLOP

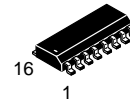
FAST™ SCHOTTKY TTL



**J SUFFIX**  
CERAMIC  
CASE 620-09



**N SUFFIX**  
PLASTIC  
CASE 648-08

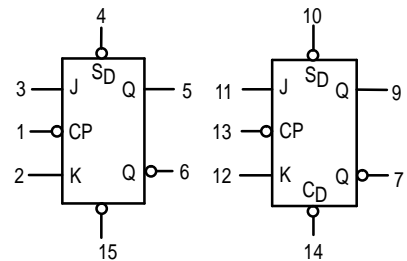


**D SUFFIX**  
SOIC  
CASE 751B-03

### ORDERING INFORMATION

MC74FXXXJ Ceramic  
MC74FXXXN Plastic  
MC74FXXXD SOIC

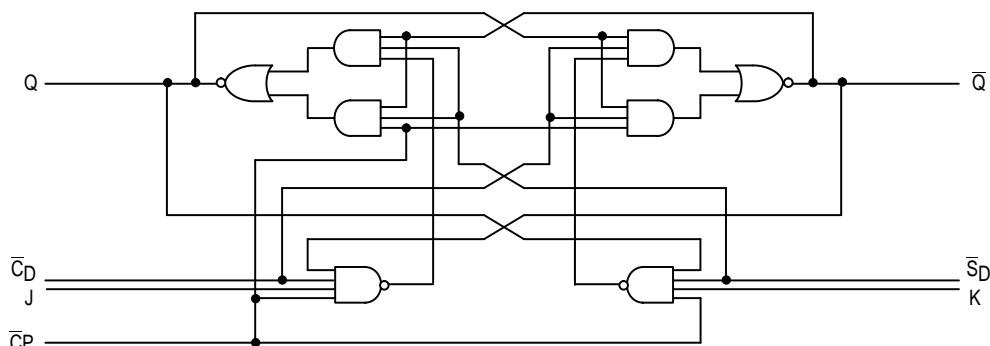
### LOGIC SYMBOL



VCC = PIN 16  
GND = PIN 8

# MC74F112

LOGIC DIAGRAM (one half shown)



## GUARANTEED OPERATING RANGES

Symbol	Parameter		Min	Typ	Max	Unit
V <sub>CC</sub>	Supply Voltage	74	4.5	5.0	5.5	V
T <sub>A</sub>	Operating Ambient Temperature Range	74	0	25	70	°C
I <sub>OH</sub>	Output Current — High	74			-1.0	mA
I <sub>OL</sub>	Output Current — Low	74			20	mA

## DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter	Limits			Unit	Test Conditions	
		Min	Typ	Max			
V <sub>IH</sub>	Input HIGH Voltage	2.0			V	Guaranteed Input HIGH Voltage	
V <sub>IL</sub>	Input LOW Voltage			0.8	V	Guaranteed Input LOW Voltage	
V <sub>IK</sub>	Input Clamp Diode Voltage			-1.2	V	I <sub>IN</sub> = -18 mA	V <sub>CC</sub> = MIN
V <sub>OH</sub>	Output HIGH Voltage	74	2.5	3.4	V	I <sub>OH</sub> = -1.0 mA	V <sub>CC</sub> = 4.50 V
		74	2.7	3.4	V	I <sub>OH</sub> = -1.0 mA	V <sub>CC</sub> = 4.75 V
V <sub>OL</sub>	Output LOW Voltage		0.35	0.5	V	I <sub>OL</sub> = 20 mA	V <sub>CC</sub> = MIN
I <sub>IH</sub>	Input HIGH Current			20	μA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7 V	
				100	μA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0 V	
I <sub>IL</sub>	Input LOW Current (J and K Inputs)			-0.6	mA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.5 V	
	(C <sub>P</sub> Inputs)			-2.4	mA		
	(C <sub>D</sub> and S <sub>D</sub> Inputs)			-3.0	mA		
I <sub>OS</sub>	Output Short Circuit Current (Note 2)	-60		-150	mA	V <sub>CC</sub> = MAX, V <sub>OUT</sub> = 0 V	
I <sub>CC</sub>	Power Supply Current		12	19	mA	V <sub>CC</sub> = MAX, V <sub>CP</sub> = 0 V	

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.

# MC74F112

## AC CHARACTERISTICS

Symbol	Parameter	74F		74F		Unit
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0 V C <sub>L</sub> = 50 pF		T <sub>A</sub> = 0°C to +70°C V <sub>CC</sub> = 5.0 V ± 10% C <sub>L</sub> = 50 pF		
		Min	Max	Min	Max	
f <sub>max</sub>	Maximum Clock Frequency	110				MHz
t <sub>PLH</sub>	Propagation Delay	2.0	6.5	2.0	7.5	ns
t <sub>PHL</sub>	$\overline{CP}_n$ to Q <sub>n</sub> or $\overline{Q}_n$	2.0	6.5	2.0	7.5	
t <sub>PLH</sub>	Propagation Delay	2.0	6.5	2.0	7.5	ns
t <sub>PHL</sub>	$\overline{CD}_n$ or $\overline{SD}_n$ to Q <sub>n</sub> or $\overline{Q}_n$	2.0	6.5	2.0	7.5	

## AC OPERATING REQUIREMENTS

Symbol	Parameter	74F			74F		Unit
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0 V			T <sub>A</sub> = 0°C to +70°C V <sub>CC</sub> = 5.0 V ± 10%		
		Min	Typ	Max	Min	Max	
t <sub>S</sub> (H)	Setup Time, HIGH or LOW	4.0			4.0	ns	
t <sub>S</sub> (L)	J <sub>n</sub> or K <sub>n</sub> to $\overline{CP}_n$	3.0			3.0		
t <sub>H</sub> (H)	Hold Time, HIGH or LOW	0			0	ns	
t <sub>H</sub> (L)	J <sub>n</sub> or K <sub>n</sub> to $\overline{CP}_n$	0			0		
t <sub>W</sub> (H)	$\overline{CP}_n$ Pulse Width, HIGH	4.5			4.5	ns	
t <sub>W</sub> (L)	or LOW	4.5			4.5		
t <sub>W</sub> (L)	$\overline{CD}_n$ or $\overline{SD}_n$ Pulse Width, LOW	4.5			4.5	ns	
t <sub>rec</sub>	Recovery Time $\overline{CD}_n$ or $\overline{SD}_n$ to CP	4.0			5.0	ns	