

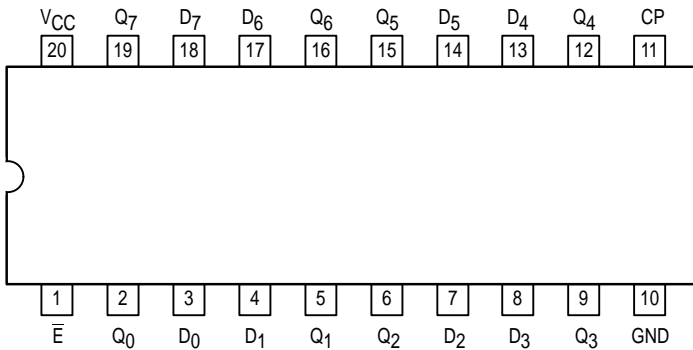


# OCTAL D FLIP-FLOP WITH ENABLE

The MC74F377 is a high-speed 8-Bit Register. The register consists of eight D-Type Flip-Flops with individual D inputs and Q outputs. The common buffered clock (CP) input loads all flip-flops simultaneously when the Enable (E) is LOW. This device is supplied in a 20-pin package.

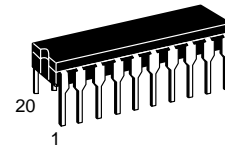
- High Impedance NPN Base Inputs for Reduced Loading (20  $\mu$ A in HIGH and LOW States)
- Ideal for Addressable Register Applications
- Enable for Address and Data Synchronization Applications
- Eight Edge-Triggered D Flip-Flops
- Buffered Common Clock
- See: MC74F373 for Transparent Latch Version  
MC74F374 for 3-State Version

**CONNECTION DIAGRAM (TOP VIEW)**

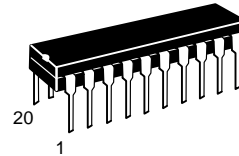


**MC74F377**

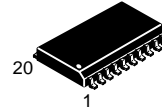
**OCTAL D FLIP-FLOP  
WITH ENABLE  
FAST™ SCHOTTKY TTL**



**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

**FUNCTION TABLE**

Operating Mode	Inputs			Outputs
	CP	E-bar	D <sub>n</sub>	Q <sub>n</sub>
Load "1"	↑	L	h	H
Load "0"	↑	L	L	L
Hold (do nothing)	↑	h	X	No Change
	X	H	X	No Change

H = HIGH voltage level steady state; h = HIGH voltage level one setup time prior to the LOW-to-HIGH Clock transition; L = LOW voltage level steady state; l = LOW voltage level one setup time prior to the LOW-to-HIGH clock transition; X = Don't Care; ↑ = LOW-to-HIGH clock transition

# MC74F377

## FUNCTIONAL DESCRIPTION

The MC74F377 has eight edge-triggered D-type flip-flops with individual D inputs and Q outputs. The common buffered Clock (CP) input loads all flip-flops simultaneously, when the Enable ( $\bar{E}$ ) is LOW.

The register is fully edge-triggered. The state of each D input, one setup time before the LOW-to-HIGH clock transition, is transferred to the corresponding flip-flop's Q output.

The  $\bar{E}$  input must be stable one setup time prior to the LOW-to-HIGH clock transition for predictable operation.

## 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	2.5	2.5		V	I <sub>OH</sub> = -1.0 mA	V <sub>CC</sub> = 4.5 V
		2.7	2.7				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>IN</sub> = 2.7 V	V <sub>CC</sub> = MAX
I <sub>IL</sub>	Input LOW Current			-20	μA	V <sub>IN</sub> = 0.5 V	V <sub>CC</sub> = MAX
I <sub>OS</sub>	Output Short Circuit Current (Note 2)	-60		-150	mA	V <sub>OUT</sub> = 0 V	V <sub>CC</sub> = MAX
I <sub>CC</sub>	Total Supply Current	I <sub>CC</sub> H	55	72	mA	D <sub>n</sub> = 4.5 V, CP = ↑, $\bar{E}$ = GND	V <sub>CC</sub> = MAX
		I <sub>CC</sub> L	70	90	mA		

### NOTES:

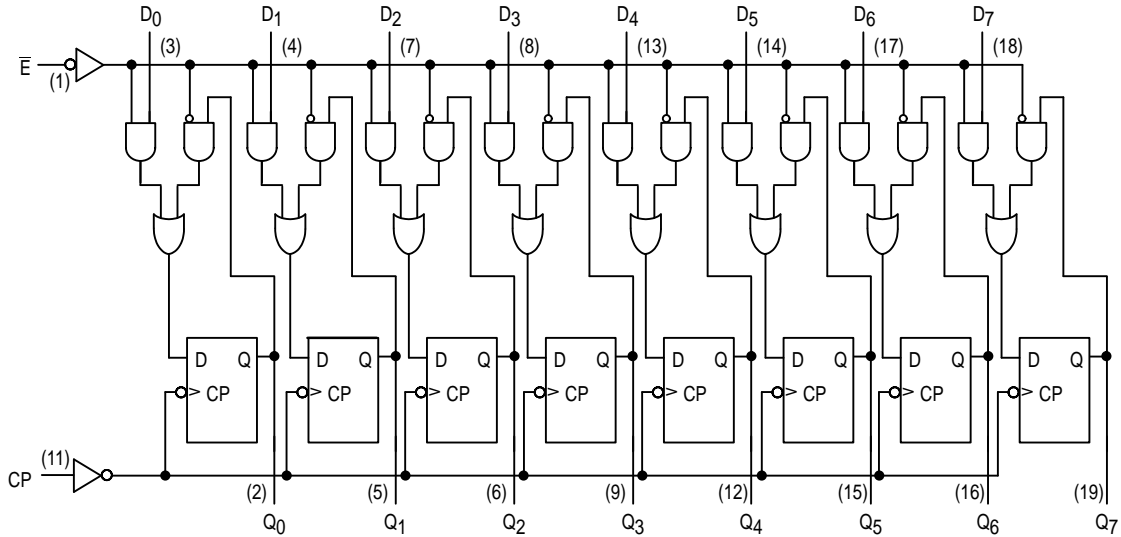
- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.
- Not more than one output should be shorted at a time, nor for more than 1 second.

## AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	74F			74F		Unit
		T <sub>A</sub> = +25°C			T <sub>A</sub> = 0 to +70°C		
		V <sub>CC</sub> = +5.0 V			V <sub>CC</sub> = 5.0 V ± 10%		
		C <sub>L</sub> = 50 pF			C <sub>L</sub> = 50 pF		
		Min	Typ	Max	Min	Max	
f <sub>MAX</sub>	Maximum Clock Frequency	110	120		100		MHz
t <sub>PLH</sub>	Propagation Delay	4.0	6.5	8.5	4.0	10	ns
t <sub>PHL</sub>	CP to Q <sub>n</sub>	4.0	7.0	9.0	4.0	10.5	

# MC74F377

## LOGIC DIAGRAM



V<sub>CC</sub> = PIN 20  
GND = PIN 10

### AC OPERATING REQUIREMENTS

Symbol	Parameter	74F			74F			Unit
		T <sub>A</sub> = +25°C			T <sub>A</sub> = 0°C to +70°C			
		V <sub>CC</sub> = 5.0 V			V <sub>CC</sub> = 5.0 V ± 10%			
		C <sub>L</sub> = 50 pF			C <sub>L</sub> = 50 pF			
Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
t <sub>s</sub> (H)	Setup Time, HIGH or LOW	3.0			3.0			ns
t <sub>s</sub> (L)	D <sub>n</sub> to CP	3.0			3.0			
t <sub>h</sub> (H)	Hold Time, HIGH or LOW	1.0			1.0			ns
t <sub>h</sub> (L)	D <sub>n</sub> to CP	1.0			1.0			
t <sub>s</sub> (H)	Setup Time, HIGH or LOW	2.5			2.5			ns
t <sub>s</sub> (L)	$\bar{E}$ to CP	4.0			4.0			
t <sub>h</sub> (H)	Hold Time, HIGH or LOW	0			0			ns
t <sub>h</sub> (L)	$\bar{E}$ to CP	0			0			
t <sub>w</sub> (H)	Clock Pulse Width	4.0			5.0			ns
t <sub>w</sub> (L)	HIGH or LOW	4.0			5.0			