MOTOROLA

MC54/74F378

PARALLEL D REGISTER WITH ENABLE

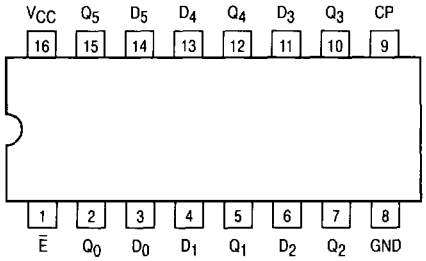
The MC54/74F378 is a 6-bit register with a buffered common enable. This device is similar to the F174 but with common Enable rather than common Master Reset.

The F378 consists of six edge-triggered D-type flip-flops with individual D inputs and Q outputs. The Clock (CP) and Enable ($\overline{E}$) inputs are common to all flip-flops.

When the $\overline{E}$ input is LOW, new data is entered into the register on the LOW-to-HIGH transition of the CP input. When the $\overline{E}$ input is HIGH the register will retain the present data independent of the CP input. This circuit is designed to prevent false clocking by transitions on the $\overline{E}$ input..

- 6-Bit High-Speed Parallel Register
- Positive Edge-Triggered D-Type Inputs
- Fully Buffered Common Clock and Enable Inputs
- Input Clamp Diodes Limit High-Speed Termination Effects

CONNECTION DIAGRAM (TOP VIEW)



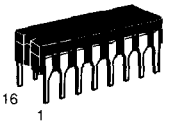
FUNCTION TABLE

Inputs			Output
$\overline{E}$	CP	D_n	Q_n
H	↓	X	No Change
L	↓	H	H
L	↓	L	L

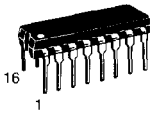
H = HIGH Voltage Level
L = LOW Voltage Level
X = Don't Care
Z = High Impedance

PARALLEL D REGISTER WITH ENABLE

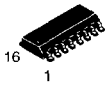
FAST™ SCHOTTKY TTL



J SUFFIX
CERAMIC
CASE 620-09



N SUFFIX
PLASTIC
CASE 648-08

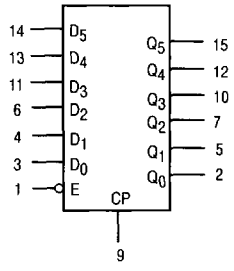


D SUFFIX
SOIC
CASE 751B-03

ORDERING INFORMATION

MC54FXXXJ	Ceramic
MC74FXXXN	Plastic
MC74FXXXD	SOIC

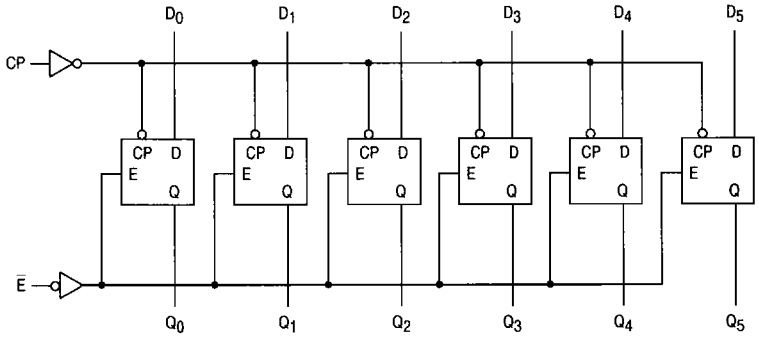
LOGIC SYMBOL



VCC = PIN 16
GND = PIN 8

4

LOGIC DIAGRAM



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 Min	Limits Typ	Limits Max	Unit	Test Conditions	
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	54, 74	2.5			V	I_{OL} = – 1.0 mA	V_{CC} = 4.50 V
		74	2.7			V	I_{OL} = – 1.0 mA	V_{CC} = 4.75 V
V_{OL}	Output LOW Voltage				0.5	V	I_{OL} = 20 mA	V_{CC} = MIN
I_{IH}	Input HIGH Current				20	µA	V_{CC} = MAX, V_{IN} = 2.7 V	
					0.1	mA	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_{OS}	Output Short Circuit Current (Note 2)		– 60		–150	mA	V_{CC} = MAX, V_{OUT} = 0 V	
I_{CC}	Power Supply Current			30	45	mA	V_{CC} = MAX, V_{CP} = 0 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.

AC CHARACTERISTICS

Symbol	Parameter	54/74F $T_A = +25°C$ $V_{CC} = 5.0\ V$ $C_L = 50\ pF$			54F $T_A = -55°C$ to $+125°C$ $V_{CC} = 5.0\ V \pm 10\%$ $C_L = 50\ pF$		74F $T_A = 0°C$ to $+70°C$ $V_{CC} = 5.0\ V \pm 10\%$ $C_L = 50\ pF$		Unit
		Min	Typ	Max	Min	Max	Min	Max	
f_{max}	Maximum Input Frequency	80	140		80		80		MHz
t_{PLH}	Propagation Delay	3.0	5.5	7.5	3.0	9.5	3.0	8.5	ns
t_{PHL}	CP to Q_n	3.5	6.0	8.5	3.5	10.5	3.5	9.5	

AC OPERATING REQUIREMENTS

Symbol	Parameter	54/74F $T_A = +25°C$ $V_{CC} = 5.0\ V$			54F $T_A = -55°C$ to $+125°C$ $V_{CC} = 5.0\ V \pm 10\%$		74F $T_A = 0°C$ to $+70°C$ $V_{CC} = 5.0\ V \pm 10\%$		Unit
		Min	Typ	Max	Min	max	Min	Max	
$t_s(H)$	Setup Time, HIGH or LOW	4.0			4.0		4.0		
$t_s(L)$	D_n to CP	4.0			4.0		4.0		ns
$t_h(H)$	Hold Time, HIGH or LOW	0			0		0		
$t_h(L)$	D_n to CP	0			0		0		
$t_s(H)$	Setup Time, HIGH or LOW	6.0			6.0		6.0		
$t_s(L)$	E to CP	6.0			6.0		6.0		ns
$t_h(H)$	Hold Time, HIGH or LOW	2.0			2.0		2.0		
$t_h(L)$	E to CP	2.0			2.0		2.0		
$t_w(H)$	CP Pulse Width,	4.0			4.0		4.0		ns
$t_w(L)$	HIGH or LOW	6.0			6.0		6.0		

4