

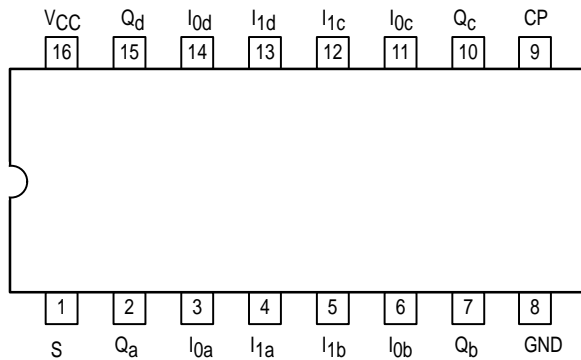


# QUAD 2-PORT REGISTER

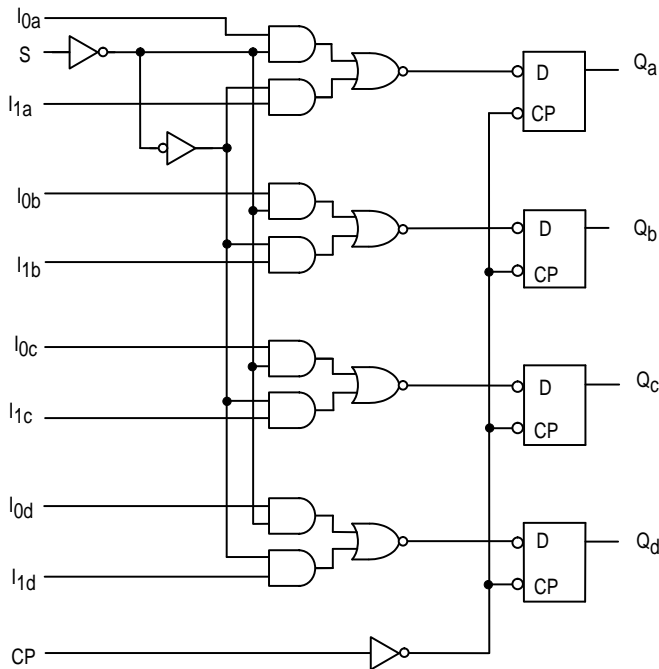
The MC54/74F399 is the logical equivalent of a quad 2-input multiplexer feeding into four edge-triggered flip flops. A common Select input determines which of the two 4-bit words is accepted. The selected data enters the flip-flops on the rising edge of the clock. The MC54/74F399 is the 16-pin version of the MC54/74F398, with only the Q outputs of the flip-flops available.

- Select Inputs from Two Data Sources
- Fully Positive Edge-Triggered Operation

**CONNECTION DIAGRAM (TOP VIEW)**



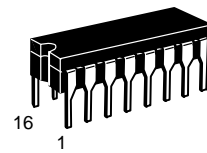
**LOGIC DIAGRAM**



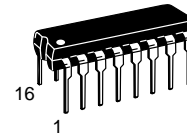
**NOTE:**  
This diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

## MC54/74F399

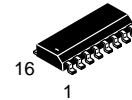
**QUAD 2-PORT REGISTER**  
**FAST™ SCHOTTKY TTL**



**J SUFFIX**  
CERAMIC  
CASE 620-09



**N SUFFIX**  
PLASTIC  
CASE 648-08

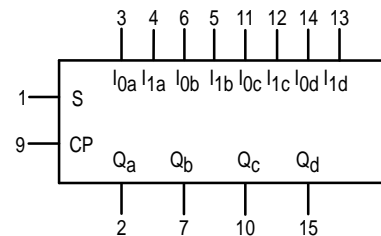


**D SUFFIX**  
SOIC  
CASE 751B-03

**ORDERING INFORMATION**

MC54FXXXJ	Ceramic
MC74FXXXN	Plastic
MC74FXXXD	SOIC

**LOGIC SYMBOL**



VCC = PIN 16  
GND = PIN 8

# MC54/74F399

## FUNCTIONAL DESCRIPTION

The MC54/74F398 is a high-speed quad 2-port register. It will select four bits of data from either of two sources (Ports) under control of a common Select input (S). The selected data is transferred to a 4-bit output register synchronous with the LOW-to-HIGH transition of the Clock input (CP). The 4-bit D-

type output register is fully edge-triggered. The Data inputs ( $I_{0X}$ ,  $I_{1X}$ ) and Select input (S) must be stable only a setup time prior to and hold time after the LOW-to-HIGH transition of the Clock input for predictable operation.

### FUNCTION TABLE

Inputs			Output
S	$I_0$	$I_1$	Q
l	l	X	L
l	h	X	H
h	X	l	L
h	X	h	H

H = HIGH Voltage Level

L = LOW Voltage Level

h = HIGH Voltage Level one setup time prior to the LOW-to-HIGH clock transition

l = LOW Voltage Level one setup time prior to the LOW-to-HIGH clock transition

X = Don't Care

### 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	$V_{CC} = \text{MIN}$
$V_{OH}$	Output HIGH Voltage	54, 74	2.5	3.4	V	$I_{OH} = -1.0$ mA	$V_{CC} = 4.5$ 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	$V_{CC} = \text{MIN}$
$I_{IH}$	Input HIGH Current			20	μA	$V_{IN} = 2.7$ V	$V_{CC} = \text{MAX}$
				100	μA	$V_{IN} = 7.0$ V	
$I_{IL}$	Input LOW Current			-0.6	mA	$V_{IN} = 0.5$ V	$V_{CC} = \text{MAX}$
$I_{OS}$	Output Short Circuit Current (Note 2)	-60		-150	mA	$V_{OUT} = 0$ V	$V_{CC} = \text{MAX}$
$I_{CC}$	Power Supply Current		22	34	mA	$V_{CC} = \text{MAX}$	$V_{IN} = \text{GND}$ $CP = \sqrt{\quad}$

#### 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.

# MC54/74F399

## AC CHARACTERISTICS

Symbol	Parameter	54/74F			54F		74F		Unit
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50 pF			T <sub>A</sub> = -55°C to +125°C V <sub>CC</sub> = 5.0 V ± 10% 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	Typ	Max	Min	Max	Min	Max	
f <sub>max</sub>	Maximum Clock Frequency	100	140		80		100		MHz
t <sub>PLH</sub>	Propagation Delay	3.0	5.7	7.5	3.0	9.5	3.0	8.5	ns
t <sub>PHL</sub>	CP to Q	3.0	6.8	9.5	3.0	11.5	3.0	10.0	

## AC OPERATING REQUIREMENTS

Symbol	Parameter	54/74F			54F		74F		Unit
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0V			T <sub>A</sub> = -55°C to +125°C V <sub>CC</sub> = 5.0 V ± 10%		T <sub>A</sub> = 0°C to 70°C V <sub>CC</sub> = 5.0 V ± 10%		
		Min	Typ	Max	Min	Max	Min	Max	
t <sub>S</sub> (H)	Setup Time, HIGH or LOW	3.0			4.5		3.0		ns
t <sub>S</sub> (L)	I <sub>n</sub> to CP	3.0			4.5		3.0		
t <sub>H</sub> (H)	Hold Time, HIGH or LOW	1.0			1.5		1.0		ns
t <sub>H</sub> (L)	I <sub>n</sub> to CP	1.0			1.5		1.0		
t <sub>S</sub> (H)	Setup Time, HIGH or LOW	7.5			9.5		8.5		ns
t <sub>S</sub> (L)	S to CP	7.5			9.5		8.5		
t <sub>H</sub> (H)	Hold Time, HIGH or LOW	0			0		0		ns
t <sub>H</sub> (L)	S to CP	0			0		0		
t <sub>w</sub> (H)	CP Pulse Width	4.0			4.0		4.0		ns
t <sub>w</sub> (L)	HIGH or LOW	5.0			7.0		5.0		