

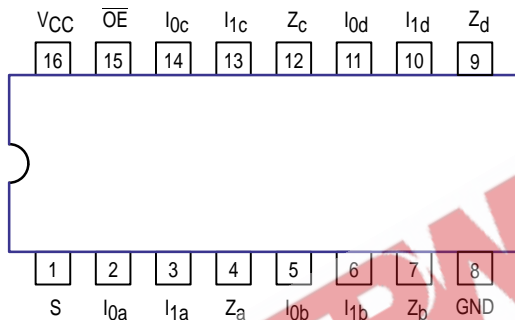


# QUAD 2-INPUT MULTIPLEXER WITH 3-STATE OUTPUTS

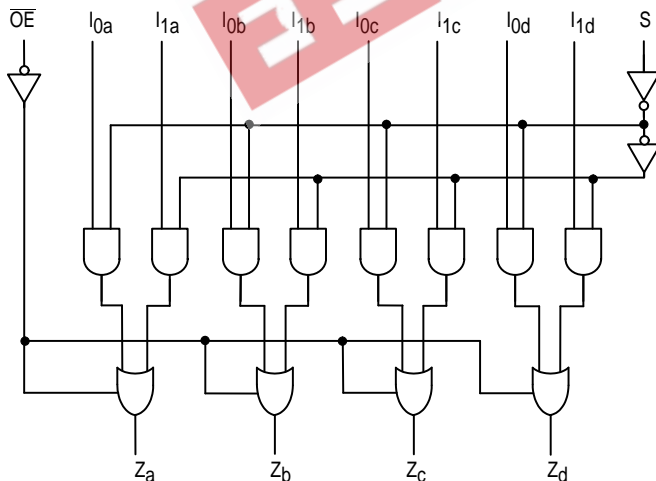
The MC74F257 is a quad 2-input multiplexer with 3-state outputs. Four bits of data from two sources can be selected using a common Data Select input. The four outputs present the selected data in true (non-inverted) form. The outputs may be switched to a high impedance state with a HIGH on the common Output Enable ( $\overline{OE}$ ) input, allowing the outputs to interface directly with bus oriented systems.

- Multiplexer Expansion by Tying Outputs Together
- Non-Inverting 3-State Outputs
- Input Clamp Diodes Limit High-Speed Termination Effects
- AC Enhanced Version of the F257

### CONNECTION DIAGRAM



### LOGIC DIAGRAM



### FUNCTION TABLE

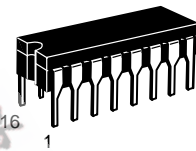
Output Enable	Select Input	Data Inputs		Outputs
$\overline{OE}$	S	I <sub>0</sub>	I <sub>1</sub>	Z
H	X	X	X	Z
L	H	X	L	L
L	H	X	H	H
L	L	L	X	L
L	L	H	X	H

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

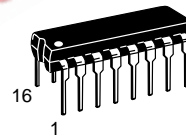
## MC74F257A

### QUAD 2-INPUT MULTIPLEXER WITH 3-STATE OUTPUTS

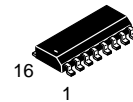
FAST™ SCHOTTKY TTL



J SUFFIX  
 CERAMIC  
 CASE 620-09



N SUFFIX  
 PLASTIC  
 CASE 648-08

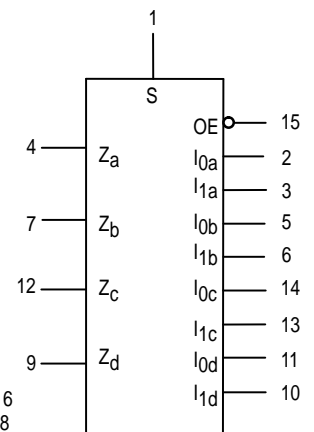


D SUFFIX  
 SOIC  
 CASE 751B-03

### ORDERING INFORMATION

MC54FXXXAJ Ceramic  
 MC74FXXXAN Plastic  
 MC74FXXXAD SOIC

### LOGIC SYMBOL



VCC = PIN 16  
 GND = PIN 8

# MC74F257A

## 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			-3.0	mA
I <sub>OL</sub>	Output Current — Low	74			24	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	2.4	3.3	V	I <sub>OH</sub> = -3.0 mA	V <sub>CC</sub> = 4.50 V
		74	2.7	3.3	V	I <sub>OH</sub> = -3.0 mA	V <sub>CC</sub> = 4.75 V
V <sub>OL</sub>	Output LOW Voltage		0.35	0.5	V	I <sub>OL</sub> = 24 mA	V <sub>CC</sub> = MIN
I <sub>OZH</sub>	Output OFF Current — HIGH			50	μA	V <sub>OUT</sub> = 2.7 V	V <sub>CC</sub> = MAX
I <sub>OZL</sub>	Output OFF Current — LOW			-50	μA	V <sub>OUT</sub> = 0.5 V	V <sub>CC</sub> = MAX
I <sub>IH</sub>	Input HIGH Current			20	μA	V <sub>IN</sub> = 2.7 V	V <sub>CC</sub> = MAX
				100	μA	V <sub>IN</sub> = 7.0 V	
I <sub>IL</sub>	Input LOW Current			-0.6	mA	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>CCH</sub>	Power Supply Current		9.0	15	mA	S, I <sub>1x</sub> = 4.5 V $\overline{OE}$ , I <sub>0x</sub> = GND	V <sub>CC</sub> = MAX
I <sub>CCL</sub>			14.5	22		I <sub>1x</sub> = 4.5 V $\overline{OE}$ , I <sub>0x</sub> , S = GND	
I <sub>CCZ</sub>			15	23		S, I <sub>0x</sub> = GND $\overline{OE}$ , I <sub>1x</sub> = 4.5 V	

### NOTES:

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

## FUNCTIONAL DESCRIPTION

The F257A is a quad 2-input multiplexer with 3-state outputs. It selects four bits of data from two sources under control of a Common Data Select input. When the Select input is LOW, the I<sub>0x</sub> inputs are selected and when Select is HIGH, the I<sub>1x</sub> inputs are selected. The data on the selected inputs appears at the outputs in true (non-inverted) form. The device is the logic implementation of a 4-pole, 2-position switch where the position of the switch is determined by the logic levels supplied to the Select input. The logic equations for the outputs are shown below:

$$\begin{aligned} Z_a &= \overline{OE} \cdot (I_{1a} \cdot S + I_{0a} \cdot \overline{S}) \\ Z_b &= \overline{OE} \cdot (I_{1b} \cdot S + I_{0b} \cdot \overline{S}) \\ Z_c &= \overline{OE} \cdot (I_{1c} \cdot S + I_{0c} \cdot \overline{S}) \\ Z_d &= \overline{OE} \cdot (I_{1d} \cdot S + I_{0d} \cdot \overline{S}) \end{aligned}$$

When the Output Enable input ( $\overline{OE}$ ) is HIGH, the outputs are forced to a high impedance OFF state. If the outputs are tied together, all but one device must be in the high impedance state to avoid high currents that would exceed the maximum ratings. Designers should ensure the Output Enable signals to 3-state devices whose outputs are tied together are designed so there is no overlap.

## MC74F257A

### 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	
t <sub>PLH</sub>	Propagation Delay	1.5	5.5	1.5	6.0	ns
t <sub>PHL</sub>	I <sub>n</sub> to Z <sub>n</sub>	2.0	5.5	2.0	6.0	
t <sub>PLH</sub>	Propagation Delay	3.0	9.5	3.0	10.5	ns
t <sub>PHL</sub>	S to Z <sub>n</sub>	2.5	7.0	2.5	8.0	
t <sub>PZH</sub>	Output Enable Time	2.0	6.5	2.0	7.0	ns
t <sub>PZL</sub>		2.5	7.0	2.5	8.0	
t <sub>PHZ</sub>	Output Disable Time	2.0	6.0	2.0	7.0	ns
t <sub>PLZ</sub>		2.0	6.0	2.0	7.0	

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