

MC74F257A

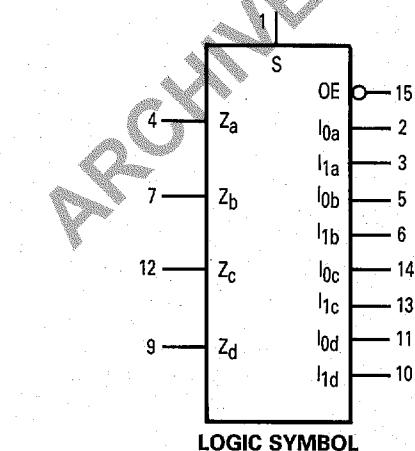
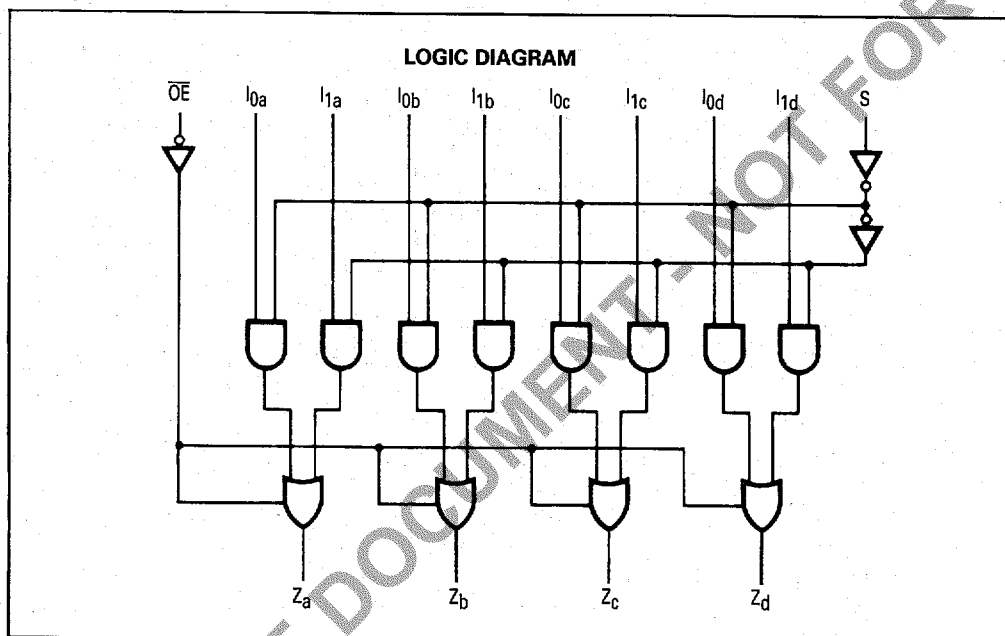
**QUAD 2-INPUT
 MULTIPLEXER
 (WITH 3-STATE OUTPUTS)
 FAST™ SCHOTTKY TTL**

Advance Information

Quad 2-Input Multiplexer (With 3-State Outputs)

The MC74F257A 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 the 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

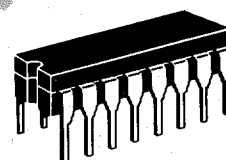


TRUTH TABLE

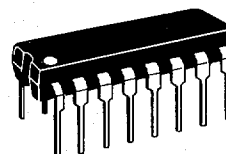
OUTPUT ENABLE	SELECT INPUT	DATA INPUTS		OUTPUTS
\overline{OE}	S	I ₀	I ₁	Z
H	X	X	X	(Z)
L	H	X	L	L
L	H	X	H	H
L	L	L	X	L
L	L	H	X	H

H = HIGH Voltage Level
 L = LOW Voltage Level
 X = Immaterial
 (Z) = High Impedance

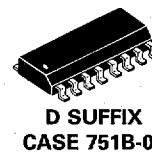
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**J SUFFIX
 CASE 620-09
 CERAMIC**

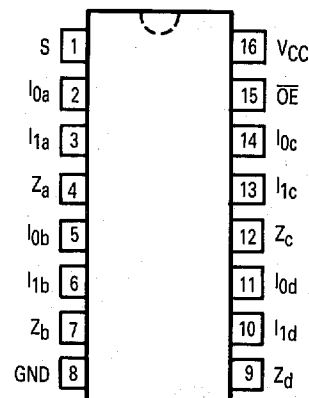


**N SUFFIX
 CASE 648-06
 PLASTIC**



**D SUFFIX
 CASE 751B-03
 PLASTIC
 SO-16**

CONNECTION DIAGRAM



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GUARANTEED OPERATING RANGES

Symbol	Parameter		Min	Typ	Max	Unit
V _{CC}	Supply Voltage	74	4.5	5	5.5	V
T _A	Operating Ambient Temperature Range	74	0	25	70	°C
I _{OH}	Output Current — High	74			−3	mA
I _{OL}	Output Current — Low	74			24	mA

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter	Limits			Units	Test Conditions
		Min	Typ	Max		
V _{IH}	Input HIGH Voltage	2			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} = MIN
V _{OH}	Output HIGH Voltage	74	2.7	3.3	V	I _{OH} = −3 mA V _{CC} = 4.75 V
		74	2.4			V _{CC} = MIN
V _{OL}	Output LOW Voltage		0.35	0.5	V	I _{OL} = 24 mA V _{CC} = MIN
I _{OZH}	Output OFF Current — HIGH			50	μA	V _{OUT} = 2.7 V V _{CC} = MAX
I _{OZL}	Output OFF Current — LOW			−50	μA	V _{OUT} = 0.5 V V _{CC} = MAX
I _{IH}	Input HIGH Current			20	μA	V _{IN} = 2.7 V V _{CC} = MAX
				100	μA	V _{IN} = 7 V V _{CC} = MAX
I _{IL}	Input LOW Current			−0.6	mA	V _{IN} = 0.5 V V _{CC} = MAX
I _{OS}	Output Short Circuit Current (Note 2)	−60		−150	mA	V _{OUT} = 0 V V _{CC} = MAX
I _{CCH}	Power Supply Current		9	15	mA	S, I _{1x} = 4.5 V OE, I _{0x} = Gnd V _{CC} = MAX
I _{CCL}			14.5	22		I _{1x} = 4.5 V OE, I _{0x} , S = Gnd
I _{CCZ}			15	23		S, I _{0x} = Gnd OE, I _{1x} = 4.5 V

NOTES: 1. For conditions such 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.

AC CHARACTERISTICS

Symbol	Parameter	74F T _A = +25°C V _{CC} = +5 V C _L = 50 pF		74F T _A = 0°C to 70°C V _{CC} = 5 V ± 10% C _L = 50 pF		Units
		Min	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation Delay I _n to Z _n	1.5 2	5.5 5.5	1.5 2	6 6	ns
t _{PLH} t _{PHL}	Propagation Delay S to Z _n	3 2.5	9.5 7	3 2.5	10.5 8	ns
t _{PZH} t _{PZL}	Output Enable Time	2 2.5	6.5 7	2 2.5	7 8	ns
t _{PHZ} t _{PLZ}	Output Disable Time	2 2	6 6	2 2	7 7	ns

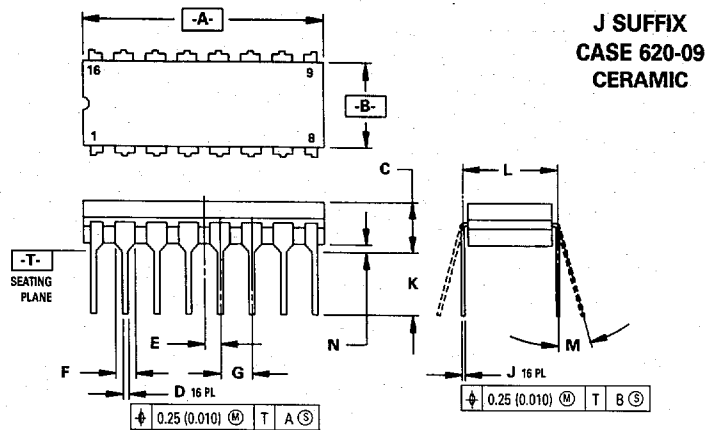
FUNCTIONAL DESCRIPTION

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_{0x} inputs are selected and when Select is HIGH, the I_{1x} 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:

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

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.

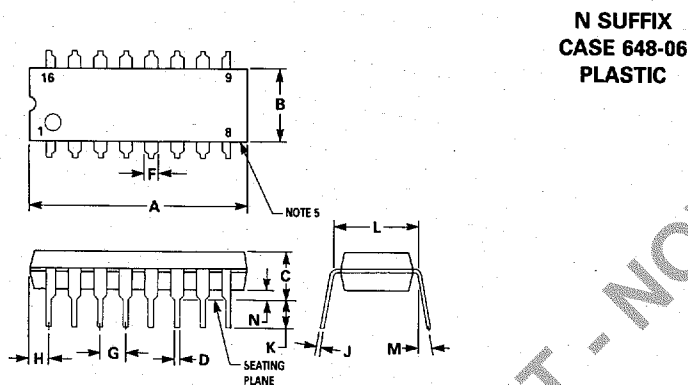
OUTLINE DIMENSIONS



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIM F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.

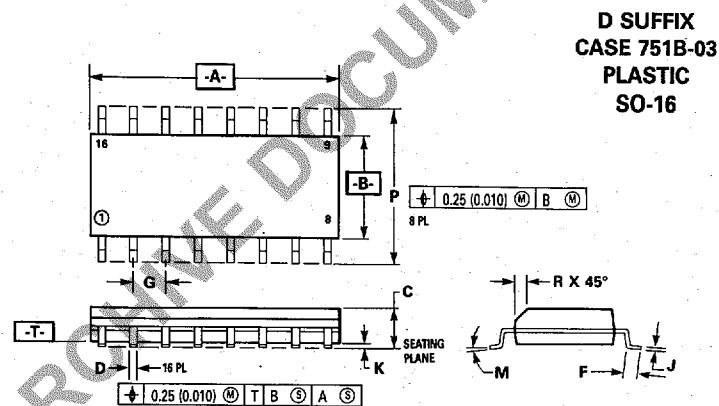
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	19.05	19.55	0.750	0.770
B	6.10	7.36	0.240	0.290
C	—	4.19	—	0.165
D	0.39	0.53	0.015	0.021
E	1.27 BSC	—	0.050 BSC	—
F	1.40	1.77	0.055	0.070
G	2.54 BSC	—	0.100 BSC	—
J	0.23	0.27	0.009	0.011
K	—	5.08	—	0.200
L	7.62 BSC	—	0.300 BSC	—
M	0°	15°	0°	15°
N	0.39	0.88	0.015	0.035



NOTES:

1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE AT MAXIMUM MATERIAL CONDITION.
2. DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.
3. DIMENSION "B" DOES NOT INCLUDE MOLD FLASH.
4. "F" DIMENSION IS FOR FULL LEADS.
5. ROUNDED CORNERS OPTIONAL.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	18.80	21.34	0.740	0.840
B	6.10	6.60	0.240	0.260
C	3.69	4.69	0.145	0.185
D	0.38	0.53	0.015	0.021
F	1.02	1.78	0.040	0.070
G	2.54 BSC	—	0.100 BSC	—
H	0.38	2.41	0.015	0.095
J	0.20	0.38	0.008	0.015
K	2.92	3.43	0.115	0.135
L	7.62 BSC	—	0.300 BSC	—
M	0°	10°	0°	10°
N	0.39	1.01	0.015	0.040



NOTES:

1. DIMENSIONS A AND B ARE DATUMS AND T IS A DATUM SURFACE.
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
3. CONTROLLING DIMENSION: MILLIMETER.
4. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
5. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.80	10.00	0.386	0.393
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC	—	0.050 BSC	—
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

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