

74F258A Quad 2-Input Multiplexer with 3-STATE Outputs

General Description

The 74F258A 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 complement (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.

Features

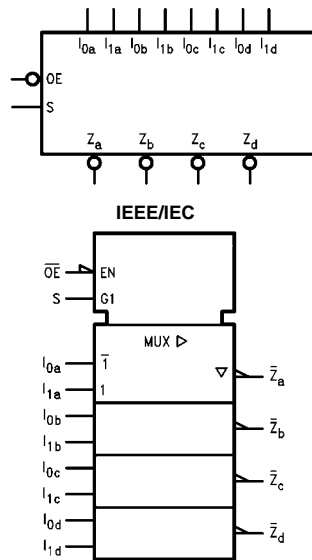
- Multiplexer expansion by tying outputs together
- Inverting 3-STATE outputs

Ordering Code:

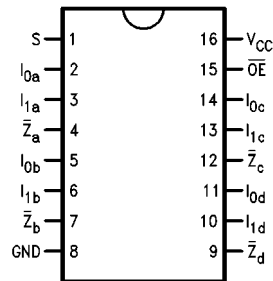
Order Number	Package Number	Package Description
74F258ASC	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
74F258ASJ	M16D	16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74F258APC	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Logic Symbols



Connection Diagram



74F258A Quad 2-Input Multiplexer with 3-STATE Outputs

Unit Loading/Fan Out

Pin Names	Description	U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
S	Common Data Select Input	1.0/1.0	20 μ A/-0.6 mA
\overline{OE}	3-STATE Output Enable Input (Active LOW)	1.0/1.0	20 μ A/-0.6 mA
$I_{0a}-I_{0d}$	Data Inputs from Source 0	1.0/1.0	20 μ A/-0.6 mA
$I_{1a}-I_{1d}$	Data Inputs from Source 1	1.0/1.0	20 μ A/-0.6 mA
$\overline{Z}_a-\overline{Z}_d$	3-STATE Inverting Data Outputs	150/40 (33.3)	-3 mA/24 mA (20 mA)

Truth Table

Output Enable	Select Input	Data Inputs		Output
\overline{OE}	S	I_0	I_1	\overline{Z}
H	X	X	X	Z
L	H	X	L	H
L	H	X	H	L
L	L	L	X	H
L	L	H	X	L

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

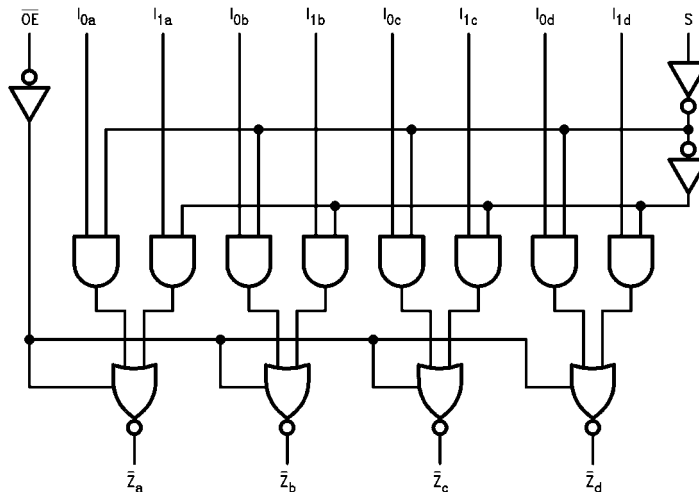
Functional Description

The 74F258A is a quad 2-input multiplexer with 3-STATE outputs. It selects four bits of data from two sources under control of a common Select input (S). 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 inverted form. The 74F258A 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 equation for the outputs is shown below:

$$\overline{Z}_n = \overline{OE} \cdot (I_{1n} \cdot S + I_{0n} \cdot \overline{S})$$

When the Output Enable input (\overline{OE}) is HIGH, the outputs are forced to a high impedance OFF state. If the outputs of the 3-STATE devices 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 that Output Enable signals to 3-STATE devices whose outputs are tied together are designed so there is no overlap.

Logic Diagram



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

Absolute Maximum Ratings(Note 1)

Storage Temperature	-65°C to +150°C
Ambient Temperature under Bias	-55°C to +125°C
Junction Temperature under Bias	-55°C to +150°C
V _{CC} Pin Potential to Ground Pin	-0.5V to +7.0V
Input Voltage (Note 2)	-0.5V to +7.0V
Input Current (Note 2)	-30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V _{CC} = 0V)	
Standard Output	-0.5V to V _{CC}
3-STATE Output	-0.5V to +5.5V
Current Applied to Output in LOW State (Max)	twice the rated I _{OL} (mA)
ESD Last Passing Voltage (Min)	4000V

Recommended Operating Conditions

Free Air Ambient Temperature	0°C to +70°C
Supply Voltage	+4.5V to +5.5V

Note 1: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: Either voltage limit or current limit is sufficient to protect inputs.

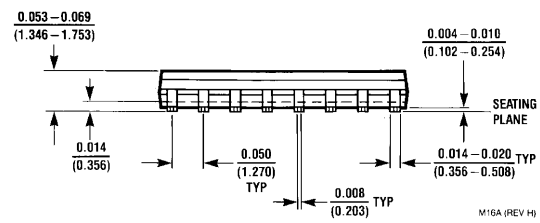
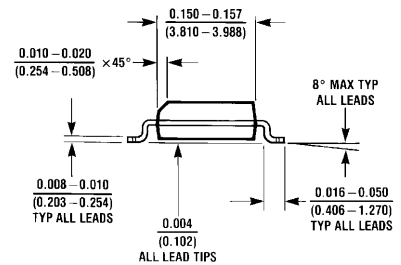
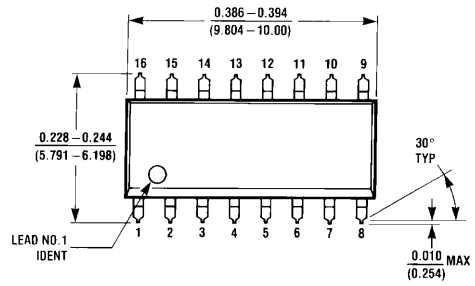
DC Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Units	V _{CC}	Conditions
V _{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V _{IL}	Input LOW Voltage			0.8	V		Recognized as a LOW Signal
V _{CD}	Input Clamp Diode Voltage			-1.2	V	Min	I _{IN} = -18 mA
V _{OH}	Output HIGH Voltage	10% V _{CC}	2.5		V	Min	I _{OH} = -1 mA
		10% V _{CC}	2.4	I _{OH} = -3 mA			
		5% V _{CC}	2.7	I _{OH} = -1 mA			
		5% V _{CC}	2.7	I _{OH} = -3 mA			
V _{OL}	Output LOW Voltage			0.5	V	Min	I _{OL} = 24 mA
I _{IH}	Input HIGH Current			5.0	μA	Max	V _{IN} = 2.7V
I _{BVI}	Input HIGH Current Breakdown Test			7.0	μA	Max	V _{IN} = 7.0V
I _{CEx}	Output HIGH Leakage Current			50	μA	Max	V _{OUT} = V _{CC}
V _{ID}	Input Leakage Test	4.75			V	0.0	I _{ID} = 1.9 μA All Other Pins Grounded
I _{OD}	Output Leakage Circuit Current			3.75	μA	0.0	V _{ID} = 150 mV All Other Pins Grounded
I _{IL}	Input LOW Current			-0.6	mA	Max	V _{IN} = 0.5V
I _{OZH}	Output Leakage Current			50	μA	Max	V _{OUT} = 2.7V
I _{OZL}	Output Leakage Current			-50	μA	Max	V _{OUT} = 0.5V
I _{OS}	Output Short-Circuit Current	-60		-150	mA	Max	V _{OUT} = 0V
I _{ZZ}	Bus Drainage Test			500	μA	0.0V	V _{OUT} = V _{CC}
I _{CCH}	Power Supply Current		6.2	9.5	mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current		15.1	23	mA	Max	V _O = LOW
I _{CCZ}	Power Supply Current		11.3	17	mA	Max	V _O = HIGH Z

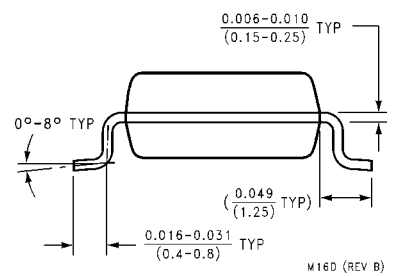
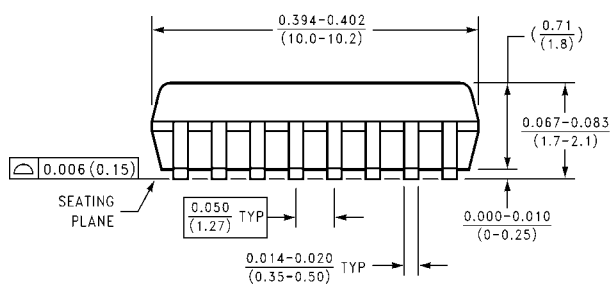
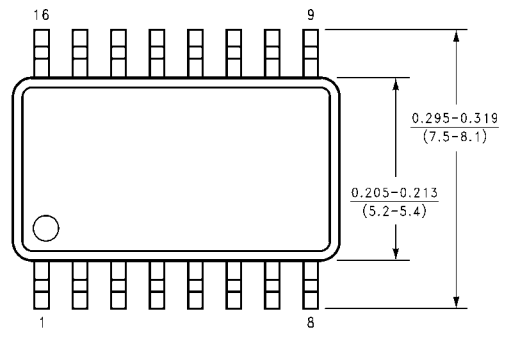
AC Electrical Characteristics

Symbol	Parameter	$T_A = +25^\circ\text{C}$ $V_{CC} = +5.0\text{V}$ $C_L = 50\text{ pF}$			$T_A = -5^\circ\text{C to } +125^\circ\text{C}$ $V_{CC} = 5.0\text{V}$ $C_L = 50\text{ pF}$		$T_A = 0^\circ\text{C to } +70^\circ\text{C}$ $V_{CC} = 5.0\text{V}$ $C_L = 50\text{ pF}$		Units
		Min	Typ	Max	Min	Max	Min	Max	
t_{PLH}	Propagation Delay	2.5		5.3	2.0	7.5	2.0	6.0	ns
t_{PHL}	I_n to \bar{Z}_n	1.0		4.0	1.0	6.0	1.0	5.0	
t_{PLH}	Propagation Delay	3.0		7.5	3.0	9.5	3.0	8.5	ns
t_{PHL}	S to \bar{Z}_n	2.5		7.0	2.5	9.0	2.5	8.0	
t_{PZH}	Output Enable Time	2.0		6.0	2.0	8.0	2.0	7.0	ns
t_{PZL}		2.5		7.0	2.5	9.0	2.5	8.0	
t_{PHZ}	Output Disable Time	2.0		6.0	1.5	7.0	2.0	7.0	
t_{PLZ}		2.0		6.0	2.0	8.5	2.0	7.0	

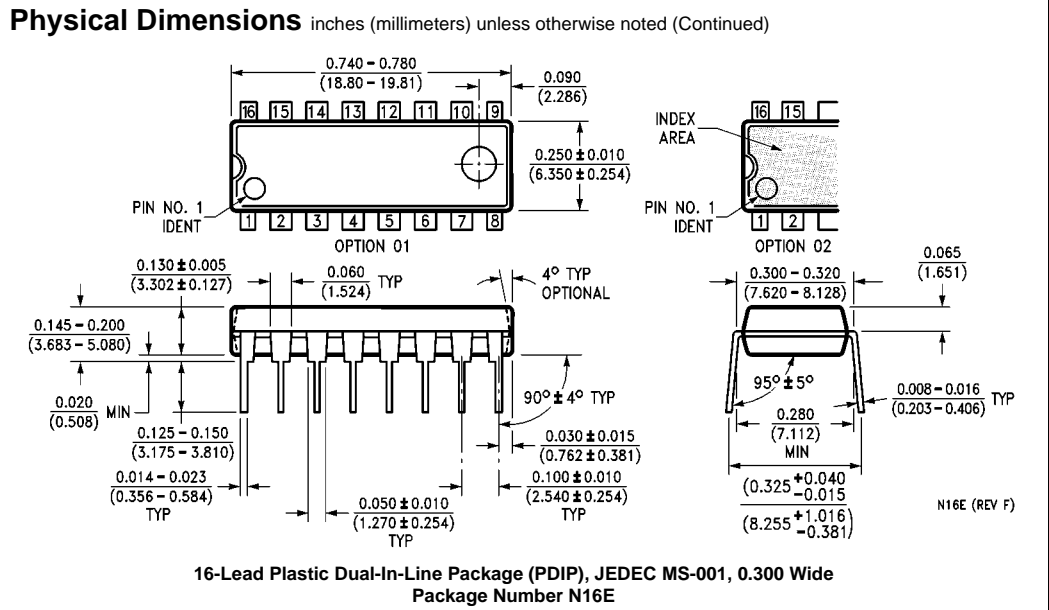
Physical Dimensions inches (millimeters) unless otherwise noted



16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow Package Number M16A



16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide Package Number M16D



Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

www.fairchildsemi.com

This datasheet has been downloaded from:

www.DatasheetCatalog.com

Datasheets for electronic components.



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.