



Quad 2-Input Data Selector/Multiplexer With 3-State Inverted Outputs

**ELECTRICALLY TESTED PER:
MIL-M-38510/33907**

The 54F258A 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 complemented (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 the bus oriented systems.

- Multiplexer Expansion By Tying Outputs Together
- Inverting 3-State Outputs

Military 54F258A



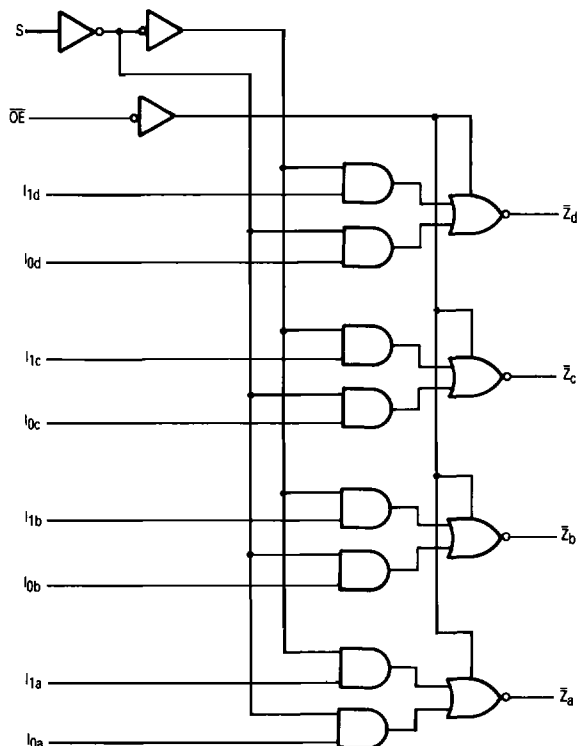
AVAILABLE AS:

- 1) JAN: JM38510/33907BXA
- 2) SMD: *
- 3) 883C: 54F258A/BXAJC

**X = CASE OUTLINE AS FOLLOWS:
PACKAGE: CERDIP: E
CERFLAT: F
LCC: 2**

***Call Factory for latest update**

LOGIC DIAGRAM



PIN ASSIGNMENTS

FUNCTION	DIL	FLATS	LCC	BURN-IN (CONDITION A)
S	1	1	2	VCC
I0a	2	2	3	VCC
I1a	3	3	4	VCC
Z_a	4	4	5	OPEN
I0b	5	5	7	VCC
I1b	6	6	8	VCC
Z_b	7	7	9	OPEN
GND	8	8	10	GND
Z_d	9	9	12	OPEN
I1d	10	10	13	VCC
I0d	11	11	14	VCC
Z_c	12	12	15	OPEN
I1c	13	13	17	VCC
I0c	14	14	18	VCC
OE	15	15	19	VCC
VCC	16	16	20	VCC

**BURN-IN CONDITIONS:
VCC = 5.0 V MIN/6.0 V MAX**

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FUNCTIONAL DESCRIPTION

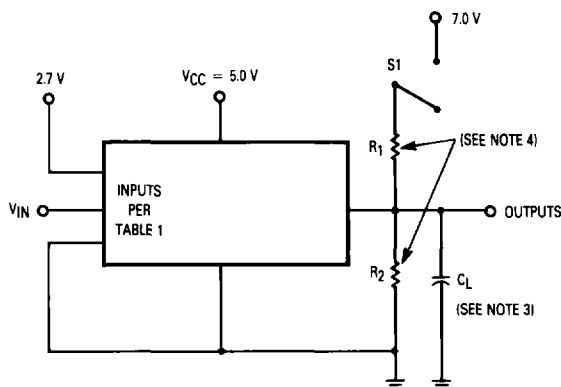
The F258A is a quad 2-input multiplexer with 3-state outputs. It selects four bits of data from two sources under the control of a Common Data Select input (S). When the Select input is LOW, the I_0X inputs are selected and when Select is HIGH, I_1X inputs are selected. The data on the selected inputs appears at the outputs in inverted form. The F258A 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:

$$Z_a = \overline{OE} \cdot (I_{1a} \cdot S + I_{0a} \cdot \overline{S}) \quad Z_b = \overline{OE} \cdot (I_{1b} \cdot S + I_{0b} \cdot \overline{S})$$

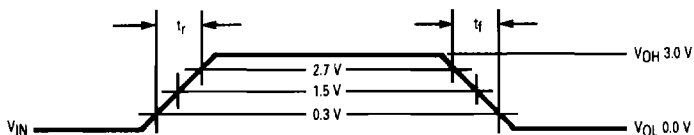
$$Z_c = \overline{OE} \cdot (I_{1c} \cdot S + I_{0c} \cdot \overline{S}) \quad Z_d = \overline{OE} \cdot (I_{1d} \cdot S + I_{0d} \cdot \overline{S})$$

When the Output Enable input (\overline{OE}) is HIGH, the outputs are forced to a high impedance OFF state. If the outputs 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.

AC TEST CIRCUIT



Test Type	S1
tPLH	open
tPHL	open
tPHZ	open
tPZH	open
tPLZ	closed
tPZL	closed



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

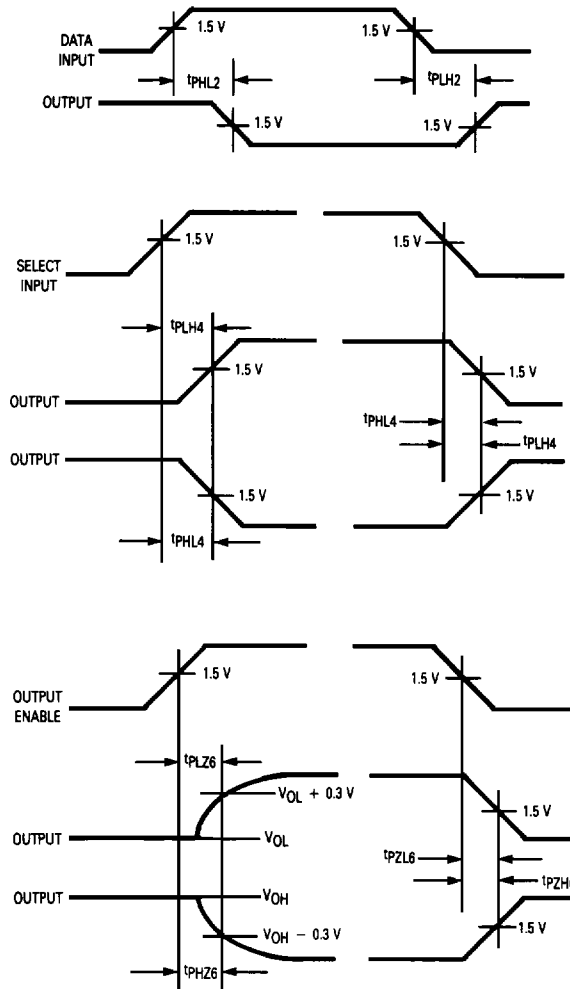
H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
(Z) = High Impedance

NOTES:

- V_{IN} = input pulse has the following characteristics:
PRR \leq 1.0 MHz, $t_r = t_f \leq$ 2.5 ns, $Z_{out} \approx$ 50 Ω .
- Terminal conditions (pins not designated may be high \geq 2.0 V, low \leq 0.8 V, or open).
- $C_L =$ 50 pF \pm 10%, including scope probe, wiring and stray capacitance without package in test fixture.
- $R_1 = R_2 =$ 499 $\Omega \pm$ 5.0%.
- Voltage measurements are to be made with respect to network ground terminal.

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WAVEFORMS



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Symbol	Parameter	Limits						Units	Test Condition (Unless Otherwise Specified)
		+25°C		+125°C		-55°C			
		Subgroup 1		Subgroup 2		Subgroup 3			
		Min	Max	Min	Max	Min	Max		
V _{OH}	Logical "1" Output Voltage	2.4		2.4		2.4		V	V _{CC} = 4.5 V, I _{OH} = -3.0 mA, V _{IH} = 2.0 V, S = 0.8 V or 2.0 V, V _{IL} = 0.8 V, \overline{OE} = 0.8 V, other inputs are open.
V _{OL}	Logical "0" Output Voltage		0.5		0.5		0.5	V	V _{CC} = 4.5 V, I _{OL} = 20 mA, V _{IL} = 0.8 V, S = 0.8 V or 2.0 V, V _{IH} = 2.0 V, \overline{OE} = 0.8 V, other inputs are open.
V _{IC}	Input Clamping Voltage		-1.2					V	V _{CC} = 4.5 V, I _{IN} = -18 mA, other inputs are open.
I _{IH}	Logical "1" Input Current		20		20		20	μA	V _{CC} = 5.5 V, V _{IH} = 2.7 V, other inputs are open, \overline{OE} = 4.5 V, or (2.7 V), S = 0 V, 4.5 V or (2.7 V).
I _{IHH}	Logical "1" Input Current		100		100		100	μA	V _{CC} = 5.5 V, V _{IHH} = 7.0 V, other inputs are open, \overline{OE} = 4.5 V, or (7.0 V), S = 0 V, 4.5 V or (7.0 V).
I _{IL}	Logical "0" Input Current	-0.03	-0.6	-0.03	-0.6	-0.03	-0.6	mA	V _{CC} = 5.5 V, V _{IN} = 0.5 V, other inputs are open, \overline{OE} = GND or (0.5 V), S = 4.5 V, 0 V or (0.5 V).
I _{OD}	Diode Current	35		35		35		mA	V _{CC} = 4.5 V, V _{IN} = 5.5 V or open, S = 0 V, V _{OUT} = 2.5 V, \overline{OE} = 0 V, other inputs are open.
I _{OS}	Output Short Circuit Current	-60	-150	-60	-150	-60	-150	mA	V _{CC} = 5.5 V, V _{IN} = 4.5 V or 0 V, all other inputs are open, V _{OUT} = 0 V, S = 0 V, \overline{OE} = 0 V.
I _{OZH}	Output Off Current High		50		50		50	μA	V _{CC} = 5.5 V, V _{IN} = 4.5 V, all other inputs are open, V _{OUT} = 2.4 V, S = 0 V, \overline{OE} = 2.0 V.
I _{OZL}	Output Off Current Low		-50		-50		-50	μA	V _{CC} = 5.5 V, V _{IH} = 4.5 V, V _{IL} = 0 V, V _{OUT} = 0.5 V, S = 4.5 V, \overline{OE} = 2.0 V.
I _{CCH}	Power Supply Current		9.5		9.5		9.5	mA	V _{CC} = 5.5 V, V _{IN} = 0 V (all inputs).
I _{CCL}	Power Supply Current		23		23		23	mA	V _{CC} = 5.5 V, V _{IH} = 4.5 V, V _{IL} = 0 V, S = 4.5 V, \overline{OE} = 0 V.
I _{CCZ}	Power Supply Current		17		17		17	mA	V _{CC} = 5.5 V, V _{IN} = 0 V (all inputs), \overline{OE} = 4.5 V.
V _{IH}	Logical "1" Input Voltage	2.0		2.0		2.0		V	V _{CC} = 4.5 V.
V _{IL}	Logical "0" Input Voltage		0.8		0.8		0.8	V	V _{CC} = 4.5 V.
	Functional Tests	Subgroup 7		Subgroup 8A		Subgroup 8B			per Truth Table with V _{CC} = 4.5 V, (Repeat at), V _{CC} = 5.5 V, V _{INL} = 0.5 V, and V _{INH} = 2.4 V.

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Symbol	Parameter	Limits						Units	Test Condition (Unless Otherwise Specified)
		+25°C		+125°C		-55°C			
		Subgroup 9		Subgroup 10		Subgroup 11			
		Min	Max	Min	Max	Min	Max		
t _{PHL2}	Propagation Delay :Data-Output I _N to \bar{Z}	1.0	4.0	1.0	6.0	1.0	6.0	ns	V _{CC} = 5.0 V, C _L = 50 pF, R ₁ = R ₂ = 499 Ω.
t _{PLH2}	Propagation Delay :Data-Output I _N to \bar{Z}	2.5	5.3	2.0	7.5	2.0	7.5	ns	V _{CC} = 5.0 V, C _L = 50 pF, R ₁ = R ₂ = 499 Ω.
t _{PHL4}	Propagation Delay :Data-Output S to \bar{Z}	2.5	7.0	2.5	9.0	2.5	9.0	ns	V _{CC} = 5.0 V, C _L = 50 pF, R ₁ = R ₂ = 499 Ω.
t _{PLH4}	Propagation Delay :Data-Output S to \bar{Z}	3.0	7.5	3.0	9.5	3.0	9.5	ns	V _{CC} = 5.0 V, C _L = 50 pF, R ₁ = R ₂ = 499 Ω.
t _{PZH6}	Propagation Delay :Data-Output I _N or S to \bar{Z}	2.0	6.0	2.0	8.0	2.0	8.0	ns	V _{CC} = 5.0 V, C _L = 50 pF, R ₁ = R ₂ = 499 Ω.
t _{PZL6}	Propagation Delay :Data-Output I _N or S to \bar{Z}	2.5	7.0	2.5	9.0	2.5	9.0	ns	V _{CC} = 5.0 V, C _L = 50 pF, R ₁ = R ₂ = 499 Ω.
t _{PHZ6}	Propagation Delay :Data-Output I _N or S to \bar{Z}	2.0	6.0	1.5	7.0	1.5	7.0	ns	V _{CC} = 5.0 V, C _L = 50 pF, R ₁ = R ₂ = 499 Ω.
t _{PLZ6}	Propagation Delay :Data-Output I _N or S to \bar{Z}	2.0	6.0	2.0	8.5	2.0	8.5	ns	V _{CC} = 5.0 V, C _L = 50 pF, R ₁ = R ₂ = 499 Ω.