

Am54S/74S157 • Am54S/74S158 • Am93S22

Quadruple 2-Line To 1-Line Data Selectors/Multiplexers

Distinctive Characteristics

- Schottky clamp provides improved A-C performance.
- Selects four of eight data inputs with single select line and over-riding strobe.

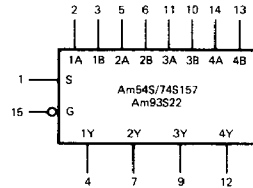
- Inverting or non-inverting data output configuration
- 100% reliability assurance testing in compliance with MIL-STD-883

FUNCTIONAL DESCRIPTION

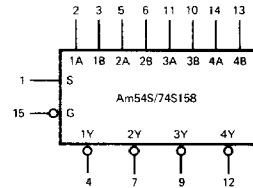
These data selectors/multiplexers are used to select a 4-bit word from one of two sources. The four outputs at the Am54S/74S157 • Am93S22 present true data with respect to the input data. The four outputs of the Am54S/74S158 present inverted data with respect to the inputs and also minimize propagation delay. A common active-HIGH strobe (active-LOW enable) is provided on all devices.

A single select line, S, is used to select one of the two multiplexer input words. When the select is LOW, the A input word is present at the output. When the select is HIGH, the B input word is present at the output.

LOGIC SYMBOLS



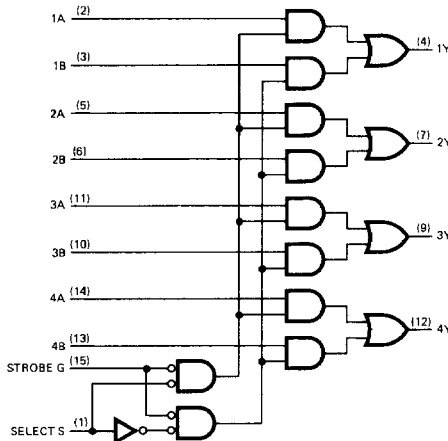
V_{CC} = Pin 16
GND = Pin 8



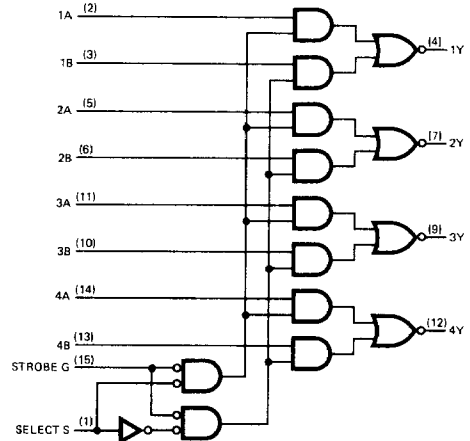
V_{CC} = Pin 16
GND = Pin 8

LOGIC DIAGRAMS

Am54S/74S157 • Am93S22



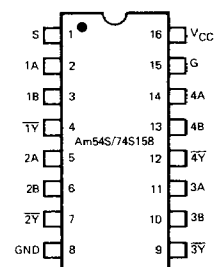
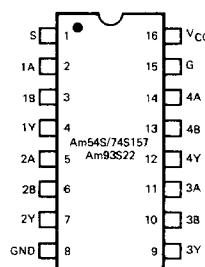
Am54S/74S158



ORDERING INFORMATION

Part Number	Package Type	Temperature Range	Order Number
Am54S/74S157	Molded DIP	0°C to +70°C	SN74S157N
	Hermetic DIP	0°C to +70°C	SN74S157J
	Dice	0°C to +70°C	SN74S157X
	Hermetic DIP	-55°C to +125°C	SN54S157J
	Hermetic Flat Pak	-55°C to +125°C	SN54S157W
Am54S/74S158	Molded DIP	0°C to +70°C	SN74S158N
	Hermetic DIP	0°C to +70°C	SN74S158J
	Dice	0°C to +70°C	SN74S158X
	Hermetic DIP	-55°C to +125°C	SN54S158J
	Hermetic Flat Pak	-55°C to +125°C	SN54S158W
Am93S22	Molded DIP	0°C to +70°C	93S22PC
	Hermetic DIP	0°C to +70°C	93S22DC
	Dice	0°C to +70°C	93S22XC
	Hermetic DIP	-55°C to +125°C	93S22DM
	Hermetic Flat Pak	-55°C to +125°C	93S22FM
Dice	-55°C to +125°C	93S22XM	

CONNECTIONS DIAGRAMS Top Views



Note: Pin 1 is marked for orientation.

MAXIMUM RATINGS (Above which the useful life may be impaired)

Storage Temperature	-65°C to +150°C
Temperature (Ambient) Under Bias	-55°C to +125°C
Supply Voltage to Ground Potential (Pin 16 to Pin 8) Continuous	-0.5V to +7V
DC Voltage Applied to Outputs for HIGH Output State	-0.5V to +V _{CC} max.
DC Input Voltage	-0.5V to +5.5V
DC Output Current, Into Outputs	30mA
DC Input Current	-30mA to +5.0mA

ELECTRICAL CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (Unless Otherwise Noted)

Am74S157, Am74S158, Am93S22XC T_A = 0°C to +70°C V_{CC} = 5.0V ± 5% (COM'L) MIN. = 4.75V MAX. = 5.25V
 Am54S157, Am54S158, Am93S22XM T_A = -55°C to +125°C V_{CC} = 5.0V ± 10% (MIL) MIN. = 4.5V MAX. = 5.5V

Parameters	Description	Test Conditions (Note 1)	Min.	Typ. (Note 2)	Max.	Units
V _{OH}	Output HIGH Voltage	V _{CC} = MIN., I _{OH} = -1mA	MIL	2.5	3.4	Volts
		V _{IN} = V _{IH} or V _{IL}	COM'L	2.7	3.4	
V _{OL}	Output LOW Voltage	V _{CC} = MIN., I _{OL} = 20mA V _{IN} = V _{IH} or V _{IL}			0.5	Volts
V _{IH}	Input HIGH Level	Guaranteed input logical HIGH voltage for all inputs	2			Volts
V _{IL}	Input LOW Level	Guaranteed input logical LOW voltage for all inputs			0.8	Volts
V _I	Input Clamp Voltage	V _{CC} = MIN., I _{IN} = -18mA			-1.2	Volts
I _{IL} (Note 3)	Input LOW Current	S or G A or B	V _{CC} = MAX., V _{IN} = 0.5V		-4	mA
					-2	
I _{IH} (Note 3)	Input HIGH Current	S or G A or B	V _{CC} = MAX., V _{IN} = 2.7V		100	μA
					50	
I _I	Input HIGH Current	V _{CC} = MAX., V _{IN} = 5.5V			1	mA
I _{SC}	Output Short Circuit Current (Note 4)	V _{CC} = MAX., V _{OUT} = 0.0V	-40		-100	mA
I _{CC}	Power Supply Current	V _{CC} = MAX. (Note 5)	S157	50	78	mA
			S158	39	61	

- Notes: 1. For conditions shown as MIN. or MAX., use the appropriate value specified under Electrical Characteristics for the applicable device type.
 2. Typical limits are at V_{CC} = 5.0V, 25°C ambient and maximum loading.
 3. Actual input currents = Unit Load Current × Input Load Factor (See Loading Rules).
 4. Not more than one output should be shorted at a time. Duration of the short circuit test should not exceed one second.
 5. I_{CC} is measured with all outputs open and 4.5V applied to all inputs.

Switching Characteristics (T_A = +25°C)

Parameters	Description	Test Conditions	Min.	Typ.	Max.	Units
t _{PLH}	Data to Output	V _{CC} = 5.0V, C _L = 15pF, R _L = 280Ω	S157	5	7.5	ns
			S158	4	6	
t _{PHL}	Data to Output		S157	4.5	6.5	ns
			S158	4	6	
t _{PLH}	Strobe to Output		S157	8.5	12.5	ns
			S158	6.5	11.5	
t _{PHL}	Strobe to Output		S157	7.5	12	ns
			S158	7	12	
t _{PLH}	Select to Output		S157	9.5	15	ns
			S158	8	12	
t _{PHL}	Select to Output	S157	9.5	15	ns	
		S158	8	12		

FUNCTION TABLE

INPUTS				OUTPUTS	
Strobe G	Select S	Data A	Data B	S157 Y	S158 Y
H	X	X	X	L	H
L	L	L	X	L	H
L	L	H	X	H	L
L	H	X	L	L	H
L	H	X	H	H	L

H = HIGH
L = LOW
X = Don't Care

LOADING RULES (In Unit Loads)

Input/Output	Pin No.'s	Input Unit Load	Fan-out	
			Output HIGH	Output LOW
S	1	2	—	—
1A	2	1	—	—
1B	3	1	—	—
1Y	4	—	20	10
2A	5	1	—	—
2B	6	1	—	—
2Y	7	—	20	10
GND	8	—	—	—
3Y	9	—	20	10
3B	10	1	—	—
3A	11	1	—	—
4Y	12	—	20	10
4B	13	1	—	—
4A	14	1	—	—
G	15	2	—	—
V _{CC}	16	—	—	—

A Schottky TTL Unit Load is defined as 50 μ A measured at 2.7V HIGH and -2.0mA measured at 0.5V LOW.

DEFINITION OF FUNCTIONAL TERMS

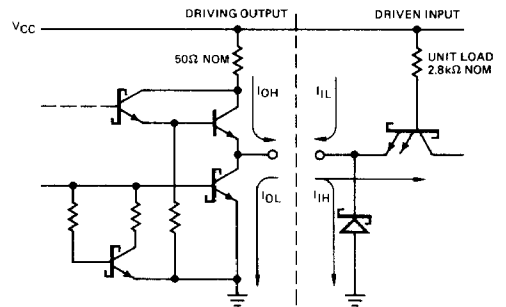
1A, 2A, 3A, 4A The data inputs for the 4-bits of the A word.

1B, 2B, 3B, 4B The data inputs for the 4-bits of the B word.

1Y, 2Y 3Y, 4Y The four outputs of the multiplexer.

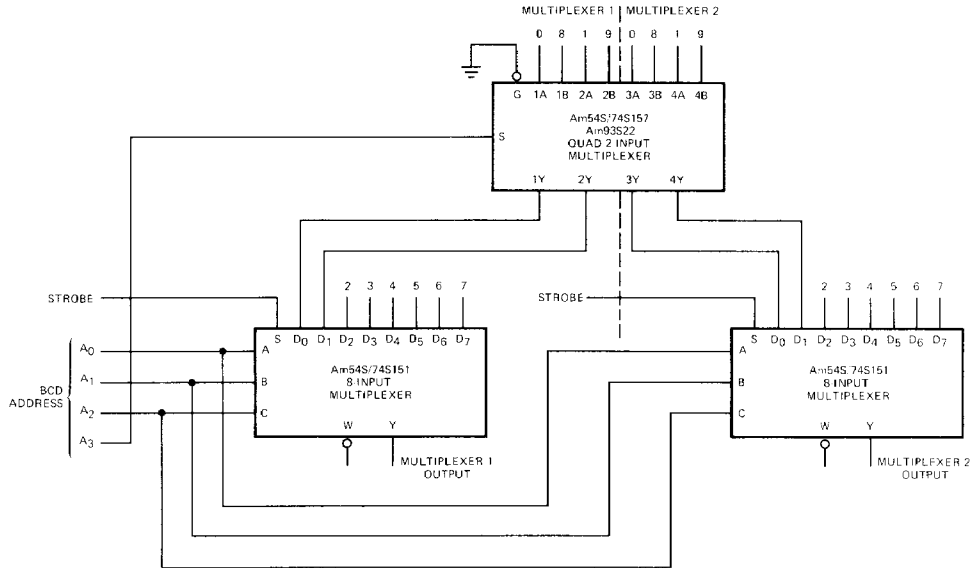
G Strobe When the strobe is HIGH, the four outputs of the Am54S/74S157 (Am93S22) are LOW and the outputs of the Am54S/74S158 are HIGH. When the strobe is LOW, the devices are enable to pass data.

S Select When the select input is LOW, the A word is present at the output. When the select input is HIGH, the B word is present at the output.

SCHOTTKY INPUT/OUTPUT
CURRENT INTERFACE CONDITIONS

Note: Actual current flow direction shown.

APPLICATION

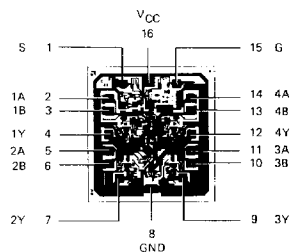


Dual 10-Input Multiplexer

Two 10-input multiplexers are shown above with the select lines common to the two multiplexers. Inputs are selected by an 8421 BCD Address.

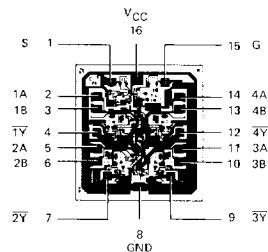
Metallization and Pad Layouts

Am54S/74S157



DIE SIZE 0.065" X 0.069"

Am54S/74S158



DIE SIZE 0.065" X 0.069"