

# 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.

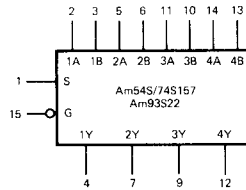
- Inverting or non-inverting data output configuration
- 100% reliability assurance testing in compliance with MIL-STD-883

### FUNCTIONAL DESCRIPTION

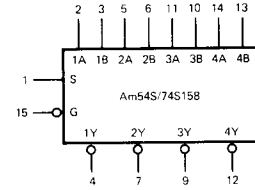
These data selectors/multiplexers are used to select a 4-bit word from one of two sources. The four outputs at the Am54S/74S157 • Am93S22 present true data with respect to the input data. The four outputs of the Am54S/74S158 present inverted data with respect to the inputs and also minimize propagation 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



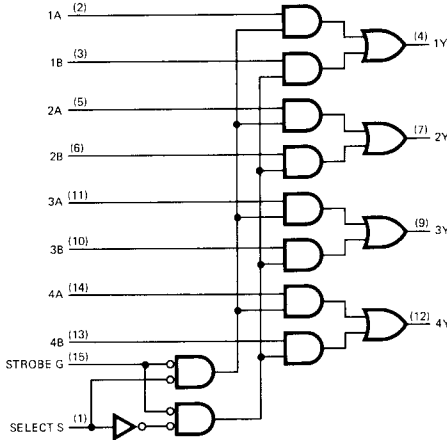
V<sub>CC</sub> = Pin 16  
GND = Pin 8



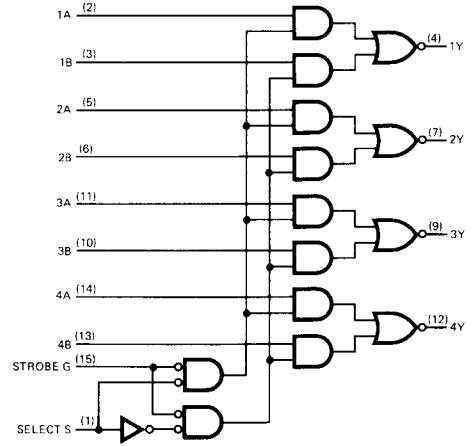
V<sub>CC</sub> = Pin 16  
GND = Pin 8

### LOGIC DIAGRAMS

Am54S/74S157 • Am93S22



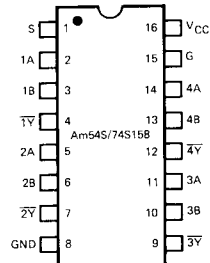
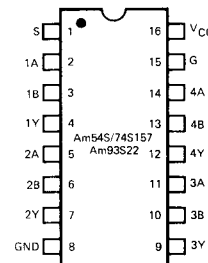
Am54S/74S158



### 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
Am54S/ 74S158	Hermetic Flat Pak	-55°C to +125°C	SN54S157W
	Dice	-55°C to +125°C	SN54S157X
	Molded DIP	0°C to +70°C	SN74S158N
	Hermetic DIP	0°C to +70°C	SN74S158J
Am93S22	Dice	0°C to +70°C	SN74S158X
	Hermetic DIP	-55°C to +125°C	SN54S158J
	Hermetic Flat Pak	-55°C to +125°C	SN54S158W
	Dice	-55°C to +125°C	SN54S158X
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
Am93S22	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 <sub>CC</sub> 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<sub>A</sub> = 0°C to +70°C    V<sub>CC</sub> = 5.0V ± 5% (COM'L)    MIN. = 4.75V    MAX. = 5.25V  
 Am54S157, Am54S158, Am93S22XM    T<sub>A</sub> = -55°C to +125°C    V<sub>CC</sub> = 5.0V ± 10% (MIL)    MIN. = 4.5V    MAX. = 5.5V

Parameters	Description	Test Conditions (Note 1)	Min.	Typ. (Note 2)	Max.	Units
V <sub>OH</sub>	Output HIGH Voltage	V <sub>CC</sub> = MIN., I <sub>OH</sub> = -1mA V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	MIL 2.5 COM'L 2.7	3.4 3.4		Volts
V <sub>OL</sub>	Output LOW Voltage	V <sub>CC</sub> = MIN., I <sub>OL</sub> = 20mA V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>			0.5	Volts
V <sub>IH</sub>	Input HIGH Level	Guaranteed input logical HIGH voltage for all inputs	2			Volts
V <sub>IL</sub>	Input LOW Level	Guaranteed input logical LOW voltage for all inputs			0.8	Volts
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = MIN., I <sub>IN</sub> = -18mA			-1.2	Volts
I <sub>IL</sub> (Note 3)	Input LOW Current	V <sub>CC</sub> = MAX., V <sub>IN</sub> = 0.5V			-4	mA
	S or G A or B				-2	
I <sub>IH</sub> (Note 3)	Input HIGH Current	V <sub>CC</sub> = MAX., V <sub>IN</sub> = 2.7V			100	μA
	S or G A or B				50	
I <sub>I</sub>	Input HIGH Current	V <sub>CC</sub> = MAX., V <sub>IN</sub> = 5.5V			1	mA
I <sub>SC</sub>	Output Short Circuit Current (Note 4)	V <sub>CC</sub> = MAX., V <sub>OUT</sub> = 0.0V	-40		-100	mA
I <sub>CC</sub>	Power Supply Current	V <sub>CC</sub> = MAX. (Note 5)			50	mA
					S157	
					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<sub>CC</sub> = 5.0V, 25°C ambient and maximum loading.  
 3. Actual input currents = Unit Load Current x 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<sub>CC</sub> is measured with all outputs open and 4.5V applied to all inputs.

**Switching Characteristics** (T<sub>A</sub> = +25°C)

Parameters	Description	Test Conditions	Min.	Typ.	Max.	Units	
t <sub>PLH</sub>	Data to Output	V <sub>CC</sub> = 5.0V, C <sub>L</sub> = 15pF, R <sub>L</sub> = 280Ω			5	7.5	
					S157	4	6
t <sub>PHL</sub>	Data to Output		S157			4.5	6.5
			S158			4	6
t <sub>PLH</sub>	Strobe to Output		S157			8.5	12.5
			S158			6.5	11.5
t <sub>PHL</sub>	Strobe to Output		S157			7.5	12
			S158			7	12
t <sub>PLH</sub>	Select to Output		S157			9.5	15
			S158			8	12
t <sub>PHL</sub>	Select to Output	S157			9.5	15	
		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	--	--
VCC	16	--	--	--

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

## DEFINITION OF FUNCTIONAL TERMS

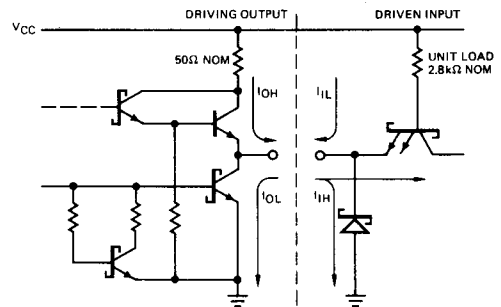
**1A, 2A, 3A, 4A** The data inputs for the 4-bits of the A word.

**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.

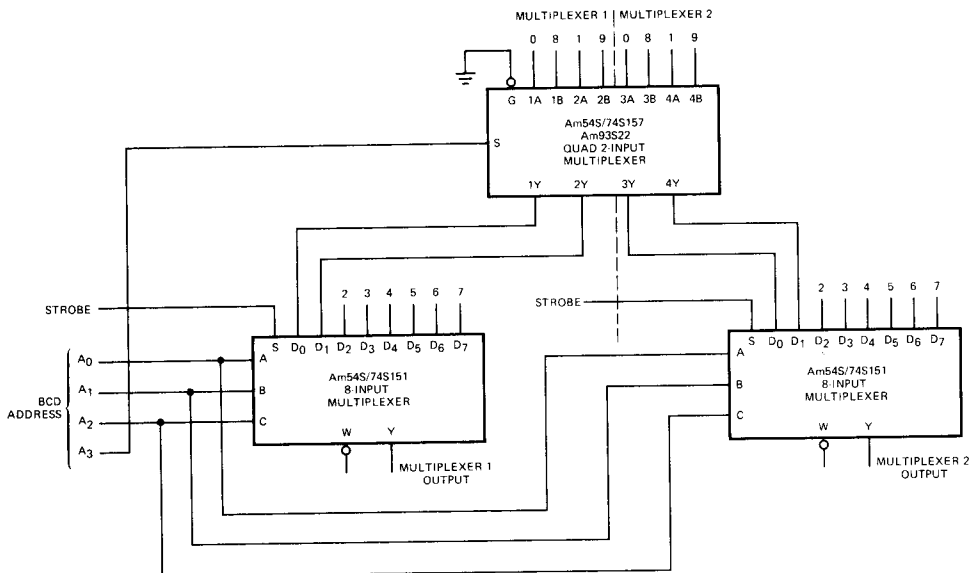
**G Strobe** When the strobe is HIGH, the four outputs of the Am54S/74S157 (Am93S22) are LOW and the outputs of the Am54S/74S158 are HIGH. When the strobe is LOW, the devices are enable to pass data.

**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

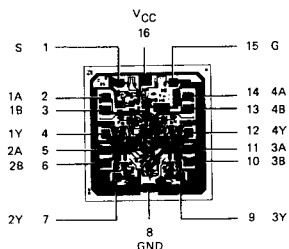


#### Dual 10-Input Multiplexer

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

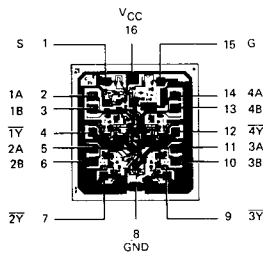
### Metallization and Pad Layouts

Am54S/74S157



DIE SIZE 0.065" X 0.069"

Am54S/74S158



DIE SIZE 0.065" X 0.069"