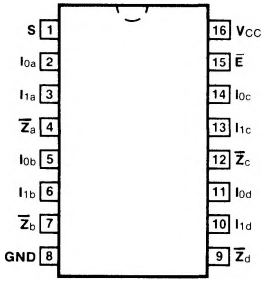
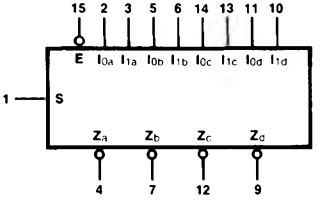
54S/74S158
54LS/74LS158
QUAD 2-INPUT MULTIPLEXER

DESCRIPTION — The '158 is a high speed quad 2-input multiplexer. It selects four bits of data from two sources using the common Select and Enable inputs. The four buffered outputs present the selected data in the inverted form. The '158 can also generate any four of the 16 different functions of two variables.

CONNECTION DIAGRAM
PINOUT A



LOGIC SYMBOL



VCC = Pin 16
GND = Pin 8

ORDERING CODE: See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE VCC = +5.0 V ±5%, TA = 0°C to +70°C	MILITARY GRADE VCC = +5.0 V ±10%, TA = -55°C to +125°C	PKG TYPE
Plastic DIP (P)	A	74S158PC, 74LS158PC		9B
Ceramic DIP (D)	A	74S158DC, 74LS158DC	54S158DM, 54LS158DM	6B
Flatpak (F)	A	74S158FC, 74LS158FC	54S158FM, 54LS158FM	4L

INPUT LOADING/FAN-OUT: See Section 3 for U.L. definitions

PIN NAMES	DESCRIPTION	54/74S (U.L.) HIGH/LOW	54/74LS (U.L.) HIGH/LOW
I_{0a} — I_{0d}	Source 0 Data Inputs	1.25/1.25	0.5/0.25
I_{1a} — I_{1d}	Source 1 Data Inputs	1.25/1.25	0.5/0.25
$\overline{E}$	Enable Input (Active LOW)	2.5/2.5	1.0/0.5
S	Select Input	2.5/2.5	1.0/0.5
$\overline{Z}_a$ — $\overline{Z}_d$	Inverted Outputs	25/12.5	10/5.0 (2.5)

TRUTH TABLE

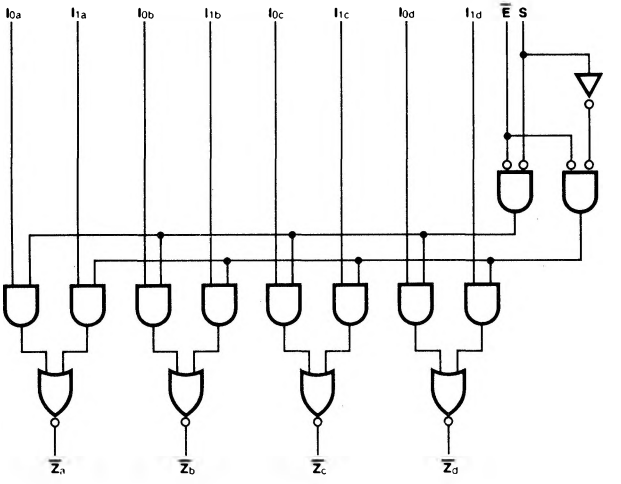
INPUTS				OUTPUTS
$\overline{E}$	S	I_0	I_1	$\overline{Z}$
H	X	X	X	H
L	L	L	X	H
L	L	H	X	L
L	H	X	L	H
L	H	X	H	L

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

FUNCTIONAL DESCRIPTION — The '158 is a quad 2-input multiplexer fabricated with the Schottky barrier diode process for high speed. It selects four bits of data from two sources under the control of a common Select input (S) and presents the data in inverted form at the four outputs. The Enable input ($\overline{E}$) is active LOW. When $\overline{E}$ is HIGH, all of the outputs ($\overline{Z}$) are forced HIGH regardless of all other inputs. The '158 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.

A common use of the '158 is the moving of data from two groups of registers to four common output busses. The particular register from which the data comes is determined by the state of the Select input. A less obvious use is as a function generator. The '158 can generate four functions of two variables with one variable common. This is useful for implementing gating functions.

LOGIC DIAGRAM



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER	54/74S		54/74LS		UNITS	CONDITIONS
		Min	Max	Min	Max		
I_{CC}	Power Supply Current		61		8.0	mA	V_{CC} = Max*

AC CHARACTERISTICS: V_{CC} = +5.0 V, T_A = +25°C (See Section 3 for waveforms and load configurations)

SYMBOL	PARAMETER	54/74S		54/74LS		UNITS	CONDITIONS
		C_L = 15 pF, R_L = 280 Ω		C_L = 15 pF			
		Min	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation Delay, S to $\overline{Z}$		12 12		20 24	ns	Figs. 3-1, 3-20
t_{PLH} t_{PHL}	Propagation Delay, $\overline{E}$ to $\overline{Z}$		11.5 12		16 16	ns	Figs. 3-1, 3-5
t_{PLH} t_{PHL}	Propagation Delay, I_n to $\overline{Z}$		6.0 6.0		13 11	ns	Figs. 3-1, 3-4

*I_{CC} measured with outputs open and 4.5 V applied to all inputs.