CONNECTION DIAGRAM
PINOUT A

9313
8-INPUT MULTIPLEXER
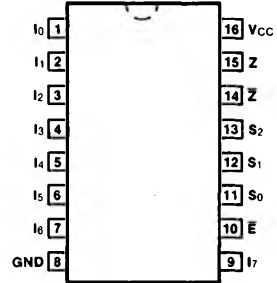### (With Open-Collector Output)

DESCRIPTION — The '13 is an 8-input multiplexer with open-collector output. It has the same pinning and logic configuration as the '12, but with an open-collector $\overline{Z}$ output which allows for easy expansion of input terms. The device can select one bit of data from up to eight sources. The '13 has an active LOW enable and internal select decoding.

- PIN FOR PIN REPLACEMENT FOR THE SIGNETICS 8231
- SAME PINNING AND LOGIC CONFIGURATION AS THE 9312 BUT WITH OPEN-COLLECTOR OUTPUT
- OPEN-COLLECTOR OUTPUT $\overline{Z}$ FOR EASY EXPANSION OF INPUT TERMS (WIRED-OR APPLICATIONS)
- MULTIFUNCTION CAPABILITY
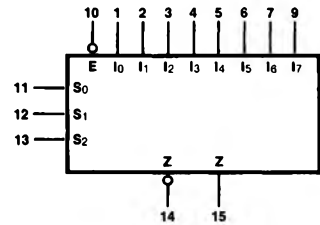- ON-CHIP SELECT LOGIC DECODING
- FULLY BUFFERED Z OUTPUT

LOGIC SYMBOL

V_{CC} = Pin 16
GND = Pin 8

ORDERING CODE: See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE V_{CC} = +5.0 V ±5%, T_A = 0°C to +70°C	MILITARY GRADE V_{CC} = +5.0 V ±10%, T_A = -55°C to +125°C	PKG TYPE
Plastic DIP (P)	A	9313PC		9B
Ceramic DIP (D)	A	9313DC	9313DM	6B
Flatpak (F)	A	9313FC	9313FM	4L

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

PIN NAMES	DESCRIPTION	93XX (U.L.) HIGH/LOW
$S_0 — S_2$	Select Inputs	1.0/1.0
$\overline{E}$	Enable Input (Active LOW)	1.0/1.0
$I_0 — I_7$	Multiplexer Inputs	1.0/1.0
Z	Multiplexer Output	20/10
$\overline{Z}$*	Complementary Multiplexer Output	OC**/10

*An external pull-up resistor is needed to provide HIGH level drive capability. This output will sink a maximum of 16 mA at V_{OUT} = 0.4 V.
**OC — Open Collector

FUNCTIONAL DESCRIPTION — The '13 is a logical implementation of a single pole, eight-position switch with the switch position controlled by the state of three Select inputs, S_0, S_1, S_2. An open-collector output $\overline{Z}$ is provided for easy expansion of input terms. Also a fully buffered Z output is available. The Enable Input ($\overline{E}$) is active LOW. When it is not activated the negation output is HIGH and the assertion output is LOW regardless of all other inputs. The logic function provided at the output is:

$$Z = \overline{E} \bullet (I_0 \bullet \overline{S}_0 \bullet \overline{S}_1 \bullet \overline{S}_2 + I_1 \bullet S_0 \bullet \overline{S}_1 \bullet \overline{S}_2 + I_2 \bullet \overline{S}_0 \bullet S_1 \bullet \overline{S}_2 + I_3 \bullet S_0 \bullet S_1 \bullet \overline{S}_2 + I_4 \bullet \overline{S}_0 \bullet \overline{S}_1 \bullet S_2 + I_5$$
$$\bullet S_0 \bullet \overline{S}_1 \bullet S_2 + I_6 \bullet \overline{S}_0 \bullet S_1 \bullet S_2 + I_7 \bullet S_0 \bullet S_1 \bullet S_2)$$

The '13 provides the ability, in one package, to select from eight sources of data or control information. By proper manipulation of the inputs, the '13 can provide any logic functions of four variables and its negation.

TRUTH TABLE

INPUTS				OUTPUTS	
$\overline{E}$	S_2	S_1	S_0	$\overline{Z}$	Z
H	X	X	X	H	L
L	L	L	L	$\overline{I}_0$	I_0
L	L	L	H	$\overline{I}_1$	I_1
L	L	H	L	$\overline{I}_2$	I_2
L	L	H	H	$\overline{I}_3$	I_3
L	H	L	L	$\overline{I}_4$	I_4
L	H	L	H	$\overline{I}_5$	I_5
L	H	H	L	$\overline{I}_6$	I_6
L	H	H	H	$\overline{I}_7$	I_7

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

LOGIC DIAGRAM
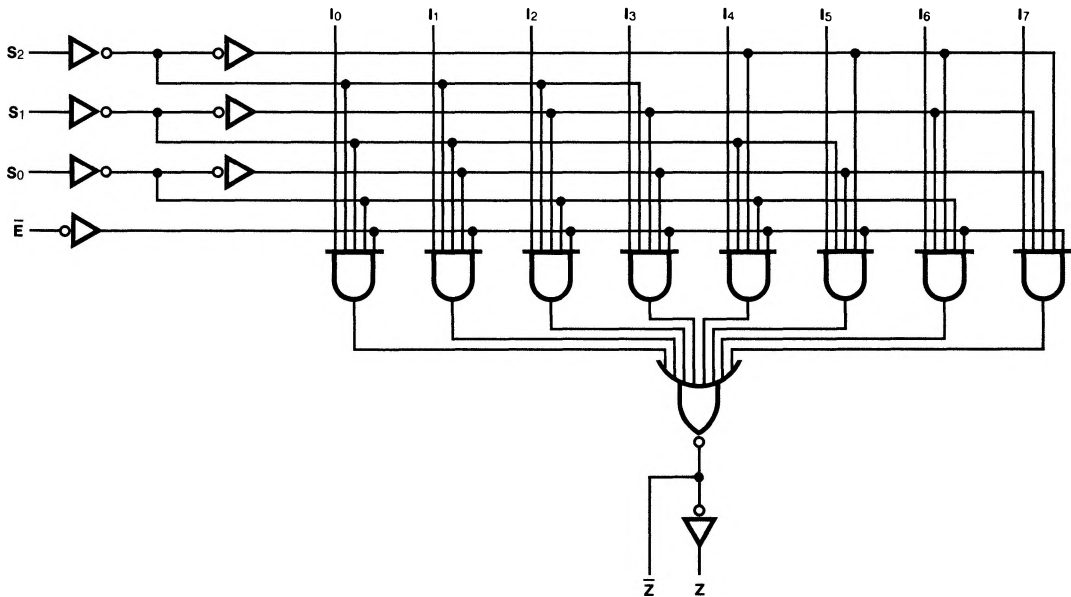
DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER	93XX		UNITS	CONDITIONS
		Min	Max		
I_{OH}	Output HIGH Current, $\overline{Z}$		150	μA	V_{CC} = 4.5 V, V_{OUT} = 4.5 V, V_{IN} = 0.6 V on Data Input, V_{IN} ($\overline{E}$ & S_n Inputs) = V_{IL} or V_{IH} per Truth Table
I_{OS}	Output Short Circuit Current, Z	-20	-70	mA	V_{CC} = Max, V_{OUT} = 0 V
I_{CC}	Power Supply Current		47	mA	V_{CC} = Max, $I_0 - I_7$ = Gnd

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

SYMBOL	PARAMETER	93XX C_L = 15 pF		UNITS	CONDITIONS
		Min	Max		
t_{PLH} t_{PHL}	Propagation Delay S_0 to Z		34 34	ns	Figs. 3-1, 3-20
t_{PLH} t_{PHL}	Propagation Delay S_0 to $\overline{Z}$		29 28	ns	Figs. 3-2, 3-20 R_L = 400 Ω
t_{PLH} t_{PHL}	Propagation Delay I_0 to Z		30 30	ns	Figs. 3-1, 3-5
t_{PLH} t_{PHL}	Propagation Delay I_0 to $\overline{Z}$		26 24	ns	Figs. 3-2, 3-4 R_L = 400 Ω
t_{PLH} t_{PHL}	Propagation Delay $\overline{E}$ to Z		34 36	ns	Figs. 3-1, 3-4
t_{PLH} t_{PHL}	Propagation Delay $\overline{E}$ to $\overline{Z}$		27 29	ns	Figs. 3-2, 3-5 R_L = 400 Ω