

# 74150 Multiplexer

16-Input Multiplexer  
Product Specification

## Logic Products

### FEATURES

- Select data from 16 sources
- Demultiplexing capability
- Active-LOW enable or strobe
- Inverting data output

### DESCRIPTION

The '150 is a logical implementation of a single-pole, 16-position switch with the switch position controlled by the state of four Select inputs,  $S_0, S_1, S_2, S_3$ . The Multiplexer output ( $\bar{Y}$ ) inverts the selected data. The Enable input ( $\bar{E}$ ) is active-LOW. When  $\bar{E}$  is HIGH the  $\bar{Y}$  output is HIGH regardless of all other inputs. In one package the '150 provides the ability to select from 16 sources of data or control information.

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74150	17ns	40mA

### ORDERING CODE

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 5\%$ ; $T_A = 0^\circ C$ to $+70^\circ C$
Plastic DIP	N74150N

#### NOTE:

For information regarding devices processed to Military Specifications, see the Signetics Military Products Data Manual.

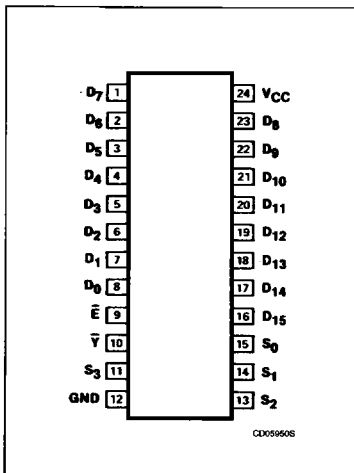
### INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74
All	Inputs	1ul
$\bar{Y}$	Output	10ul

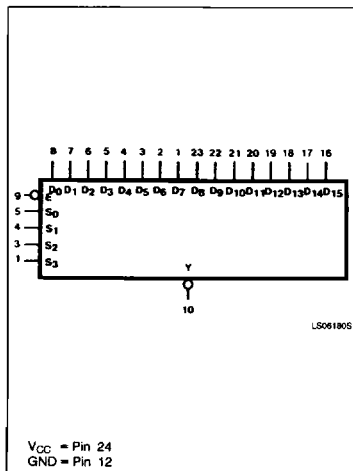
#### NOTE:

A 74 unit load (ul) is understood to be  $40\mu A I_{IH}$  and  $-1.6mA I_{IL}$ .

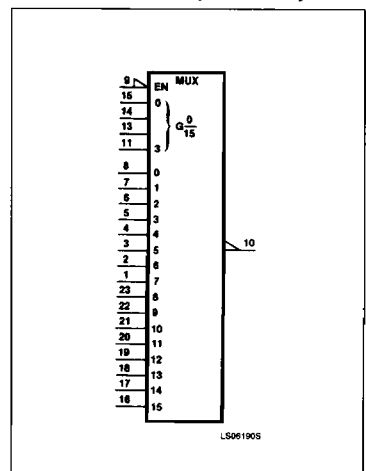
### PIN CONFIGURATION



### LOGIC SYMBOL



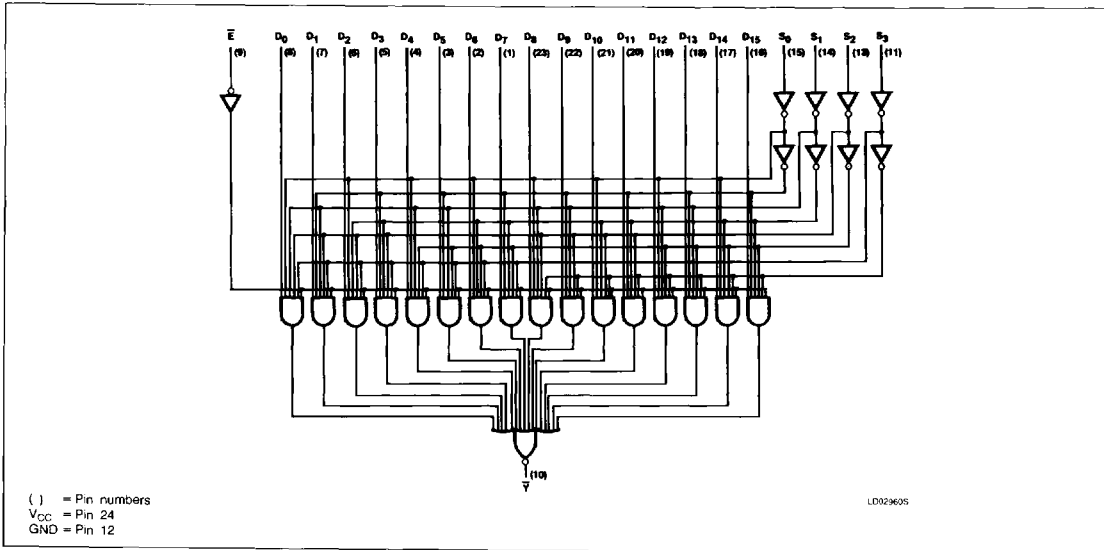
### LOGIC SYMBOL (IEEE/IEC)



# Multiplexer

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## LOGIC DIAGRAM



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## FUNCTION TABLE

				INPUTS																OUTPUT	
S <sub>3</sub>	S <sub>2</sub>	S <sub>1</sub>	S <sub>0</sub>	$\bar{E}$	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	D <sub>7</sub>	D <sub>8</sub>	D <sub>9</sub>	D <sub>10</sub>	D <sub>11</sub>	D <sub>12</sub>	D <sub>13</sub>	D <sub>14</sub>	D <sub>15</sub>	$\bar{Y}$
X	X	X	X	H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	H
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	H
L	L	L	L	L	H	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	H
L	L	L	L	L	L	X	L	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	L	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	H	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	L	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	H	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	L	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	H	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	L	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L
L	L	L	L	L	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	L

H = HIGH voltage level  
L = LOW voltage level  
X = Don't care

## Multiplexer

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**ABSOLUTE MAXIMUM RATINGS** (Over operating free-air temperature range unless otherwise noted.)

PARAMETER		74	UNIT
$V_{CC}$	Supply voltage	7.0	V
$V_{IN}$	Input voltage	-0.5 to +5.5	V
$I_{IN}$	Input current	-30 to +5	mA
$V_{OUT}$	Voltage applied to output in HIGH output state	-0.5 to $+V_{CC}$	V
$T_A$	Operating free-air temperature range	0 to 70	°C

**RECOMMENDED OPERATING CONDITIONS**

PARAMETER		74			UNIT
		Min	Nom	Max	
$V_{CC}$	Supply voltage	4.75	5.0	5.25	V
$V_{IH}$	HIGH-level input voltage	2.0			V
$V_{IL}$	LOW-level input voltage			+0.8	V
$I_{IK}$	Input clamp current			-12	mA
$I_{OH}$	HIGH-level output current			-800	$\mu$ A
$I_{OL}$	LOW-level output current			16	mA
$T_A$	Operating free-air temperature	0		70	°C

**DC ELECTRICAL CHARACTERISTICS** (Over recommended operating free-air temperature range unless otherwise noted.)

PARAMETER		TEST CONDITIONS <sup>1</sup>	74150			UNIT
			Min	Typ <sup>2</sup>	Max	
$V_{OH}$	HIGH-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = \text{MIN}, V_{IL} = \text{MAX}, I_{OH} = \text{MAX}$	2.4	3.4		V
$V_{OL}$	LOW-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = \text{MIN}, V_{IL} = \text{MAX}, I_{OL} = \text{MAX}$		0.2	0.4	V
$V_{IK}$	Input clamp voltage	$V_{CC} = \text{MIN}, I_I = I_{IK}$			-1.5	V
$I_I$	Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 5.5V$			1.0	mA
$I_{IH}$	HIGH-level input current	$V_{CC} = \text{MAX}, V_I = 2.4V$			40	$\mu$ A
$I_{IL}$	LOW-level input current	$V_{CC} = \text{MAX}, V_I = 0.4V$			-1.6	mA
$I_{OS}$	Short-circuit output current <sup>3</sup>	$V_{CC} = \text{MAX}$	-18		-55	mA
$I_{CC}$	Supply current <sup>4</sup> (total)	$V_{CC} = \text{MAX}$		40	68	mA

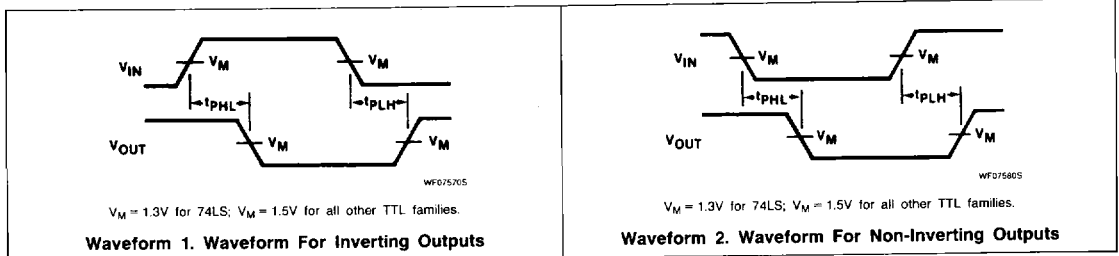
**NOTES:**

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at  $V_{CC} = 5V, T_A = 25^\circ\text{C}$ .
- $I_{OS}$  is tested with  $V_{OUT} = +0.5V$  and  $V_{CC} = V_{CC} \text{ MAX} + 0.5V$ . Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.
- Measure  $I_{CC}$  with  $\bar{E}, S_0 - S_3$  inputs at 4.5V, all other inputs and outputs open.

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## AC WAVEFORMS



## AC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ C, V_{CC} = 5.0V$

PARAMETER	TEST CONDITIONS	74		UNIT
		$C_L = 15pF, R_L = 400\Omega$		
		Min	Max	
$t_{PLH}$ $t_{PHL}$	Propagation delay Select to $\bar{Y}$ output	Waveform 1	35 33	ns
$t_{PLH}$ $t_{PHL}$	Propagation delay Enable to $\bar{Y}$ output	Waveform 2	24 30	ns
$t_{PLH}$ $t_{PHL}$	Propagation delay Data to $\bar{Y}$ output	Waveform 1	14 20	ns

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## TEST CIRCUITS AND WAVEFORMS

