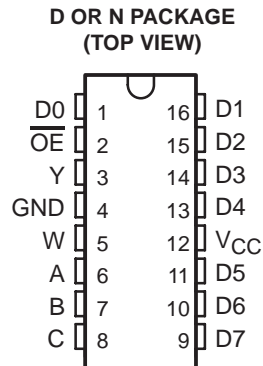


# 74AC11151 1-OF-8 DATA SELECTOR/MULTIPLEXER

SCAS066A – JUNE 1989 – REVISED APRIL 1993

- 8-Line to 1-Line Multiplexers Can Perform as Boolean Function Generators, Parallel-to-Serial Converters, or Data Source Selectors
- Flow-Through Architecture Optimizes PCB Layout
- Center-Pin  $V_{CC}$  and GND Configurations Minimize High-Speed Switching Noise
- EPIC™ (Enhanced-Performance Implanted CMOS) 1- $\mu$ m Process
- 500-mA Typical Latch-Up Immunity at 125°C
- Package Options Include Plastic Small-Outline Packages and Standard Plastic 300-mil DIPs



## description

This monolithic data selector/multiplexer provides full binary decoding to select one-of-eight data sources. The strobe output-enable ( $\overline{OE}$ ) input must be at a low logic level to enable the inputs. A high level at the strobe terminal forces the W output high and the Y output low.

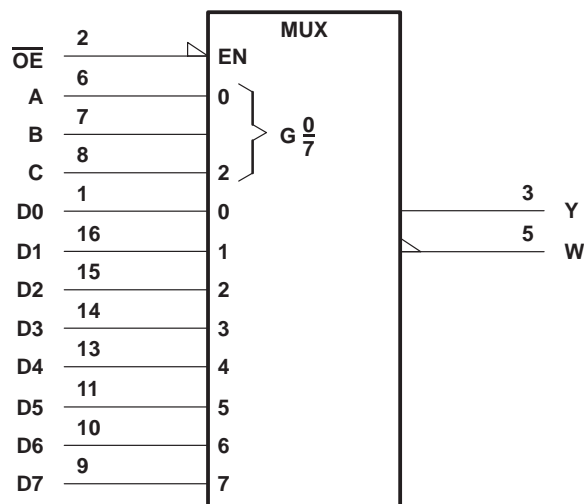
The 74AC11151 is characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .

FUNCTION TABLE

INPUTS				OUTPUTS	
SELECT			STROBE $\overline{OE}$	Y	W
C	B	A			
X	X	X	H	L	H
L	L	L	L	D0	$\overline{D0}$
L	L	H	L	D1	$\overline{D1}$
L	H	L	L	D2	$\overline{D2}$
L	H	H	L	D3	$\overline{D3}$
H	L	L	L	D4	$\overline{D4}$
H	L	H	L	D5	$\overline{D5}$
H	H	L	L	D6	$\overline{D6}$
H	H	H	L	D7	$\overline{D7}$

H = high level, L = low level, X = irrelevant  
D0, D1, . . . D7 = the level of the respective D input

## logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS  
INSTRUMENTS**

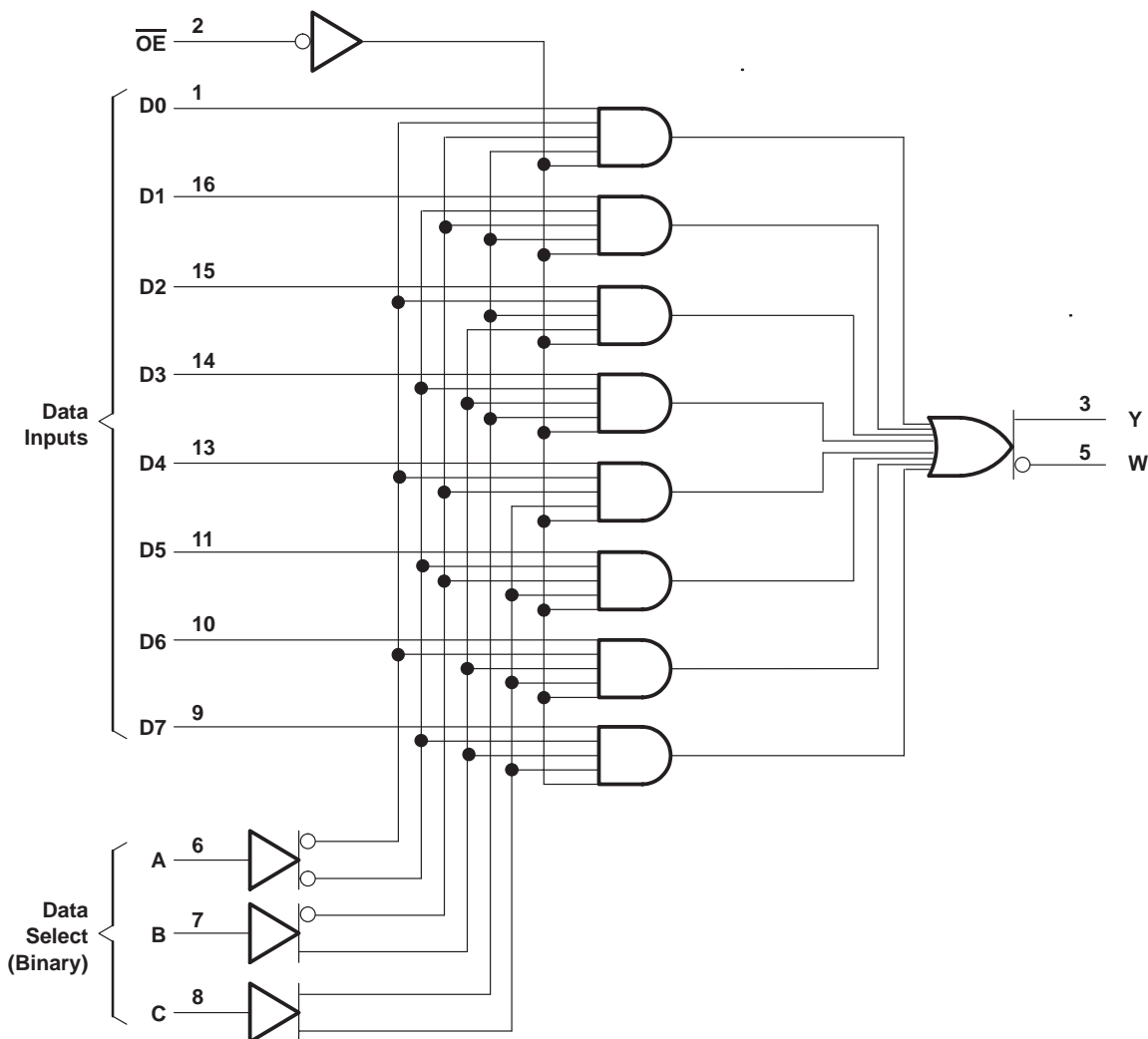
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# 74AC1151 1-OF-8 DATA SELECTOR/MULTIPLEXER

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## logic diagram (positive logic)



## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, $V_{CC}$ .....	-0.5 V to 7 V
Input voltage range, $V_I$ (see Note 1) .....	-0.5 V to $V_{CC} + 0.5$ V
Output voltage range, $V_O$ (see Note 1) .....	-0.5 V to $V_{CC} + 0.5$ V
Input clamp current, $I_{IK}$ ( $V_I < 0$ or $V_I > V_{CC}$ ) .....	$\pm 20$ mA
Output clamp current, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{CC}$ ) .....	$\pm 50$ mA
Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ ) .....	$\pm 50$ mA
Continuous current through $V_{CC}$ or GND .....	$\pm 100$ mA
Storage temperature range .....	-65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

# 74AC1151

## 1-OF-8 DATA SELECTOR/MULTIPLEXER

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### recommended operating conditions

		MIN	NOM	MAX	UNIT
$V_{CC}$	Supply voltage	3	5	5.5	V
$V_{IH}$	High-level input voltage	$V_{CC} = 3\text{ V}$	2.1		V
		$V_{CC} = 4.5\text{ V}$	3.15		
		$V_{CC} = 5.5\text{ V}$	3.85		
$V_{IL}$	Low-level input voltage	$V_{CC} = 3\text{ V}$		0.9	V
		$V_{CC} = 4.5\text{ V}$		1.35	
		$V_{CC} = 5.5\text{ V}$		1.65	
$V_I$	Input voltage	0		$V_{CC}$	V
$V_O$	Output voltage	0		$V_{CC}$	V
$I_{OH}$	High-level output current	$V_{CC} = 3\text{ V}$		-4	mA
		$V_{CC} = 4.5\text{ V}$		-24	
		$V_{CC} = 5.5\text{ V}$		-24	
$I_{OL}$	Low-level output current	$V_{CC} = 3\text{ V}$		12	mA
		$V_{CC} = 4.5\text{ V}$		24	
		$V_{CC} = 5.5\text{ V}$		24	
$\Delta t/\Delta v$	Input transition rise or fall rate	0		10	ns/V
$T_A$	Operating free-air temperature	-40		85	°C

### electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	$V_{CC}$	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
$V_{OH}$	$I_{OH} = -50\ \mu\text{A}$	3 V	2.9		2.9	V		
		4.5 V	4.4		4.4			
		5.5 V	5.4		5.4			
	$I_{OH} = -4\ \text{mA}$	3 V	2.58		2.48			
		4.5 V	3.94		3.8			
		5.5 V	4.94		4.8			
	$I_{OH} = -75\ \text{mA}^\dagger$	5.5 V			3.85			
$V_{OL}$	$I_{OL} = 50\ \mu\text{A}$	3 V			0.1	0.1	V	
		4.5 V			0.1	0.1		
		5.5 V			0.1	0.1		
	$I_{OL} = 12\ \text{mA}$	3 V			0.36	0.44		
		4.5 V			0.36	0.44		
		5.5 V			0.36	0.44		
	$I_{OL} = 75\ \text{mA}^\dagger$	5.5 V			1.65			
$I_I$	$V_I = V_{CC}$ or GND	5.5 V			$\pm 0.1$	$\pm 1$	$\mu\text{A}$	
$I_{CC}$	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			8	80	$\mu\text{A}$	
$C_i$	$V_I = V_{CC}$ or GND	5 V		3.5			pF	

$^\dagger$  Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.



# 74AC1151

## 1-OF-8 DATA SELECTOR/MULTIPLEXER

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switching characteristics over recommended operating free-air temperature range,  
 $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$  (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
$t_{PLH}$	A, B, or C	Y	3.2	8.9	10.7	3.2	12	ns
$t_{PHL}$			3.4	8.9	10.8	3.4	12.1	
$t_{PLH}$	A, B, or C	W	3.2	8.6	10.3	3.2	11.6	ns
$t_{PHL}$			3.1	8.7	10.7	3.1	12	
$t_{PLH}$	Any D	Y	1.9	6.5	8.1	1.9	9.2	ns
$t_{PHL}$			1.9	6.4	8.1	1.9	8.9	
$t_{PLH}$	Any D	W	1.7	6.1	7.7	1.7	8.6	ns
$t_{PHL}$			1.9	6.4	8	1.9	8.8	
$t_{PLH}$	$\overline{OE}$	Y	1.3	4	5.5	1.3	6	ns
$t_{PHL}$			1.6	4.5	5.9	1.6	6.5	
$t_{PLH}$	$\overline{OE}$	W	2	5.2	6.7	2	7.4	ns
$t_{PHL}$			1.7	4.7	6.2	1.7	6.7	

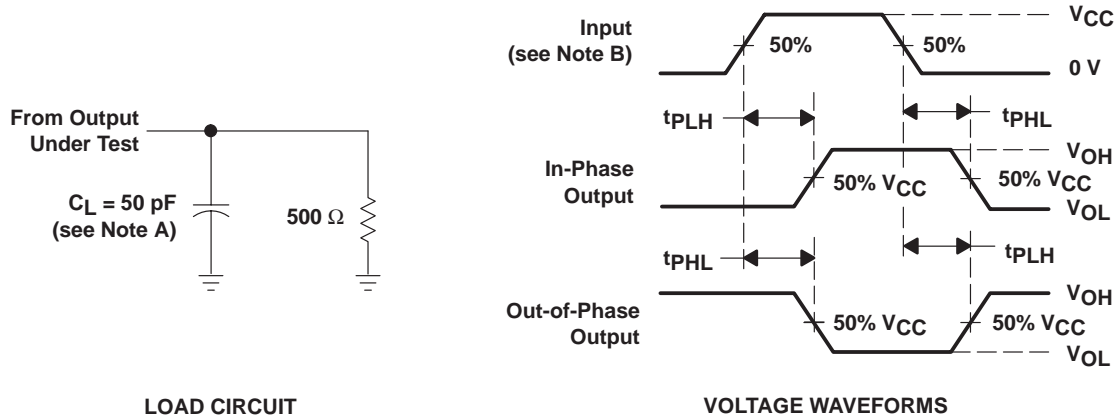
switching characteristics over recommended operating free-air temperature range,  
 $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$  (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
$t_{PLH}$	A, B, or C	Y	2.5	5.4	7.3	2.5	8.3	ns
$t_{PHL}$			2.7	5.6	7.5	2.7	8.5	
$t_{PLH}$	A, B, or C	W	2.6	5.3	7.2	2.6	8.1	ns
$t_{PHL}$			2.6	5.4	7.4	2.6	8.4	
$t_{PLH}$	Any D	Y	1.5	4.1	5.8	1.5	6.5	ns
$t_{PHL}$			1.5	4	5.7	1.5	6.4	
$t_{PLH}$	Any D	W	1.4	3.7	5.5	1.4	6	ns
$t_{PHL}$			1.6	4.1	5.8	1.6	6.4	
$t_{PLH}$	$\overline{OE}$	Y	1.1	2.7	4.2	1.1	4.6	ns
$t_{PHL}$			1.4	3.1	4.6	1.4	5	
$t_{PLH}$	$\overline{OE}$	W	1.7	3.5	5.1	1.7	5.6	ns
$t_{PHL}$			1.4	3.1	4.6	1.4	5	

operating characteristics,  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
$C_{pd}$ Power dissipation capacitance	$C_L = 50\text{ pF}$ , $f = 1\text{ MHz}$	52	pF

PARAMETER MEASUREMENT INFORMATION



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. Input pulses are supplied by generators having the following characteristics:  $PRR \leq 10 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r = 3 \text{ ns}$ ,  $t_f = 3 \text{ ns}$ .  
 C. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms



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