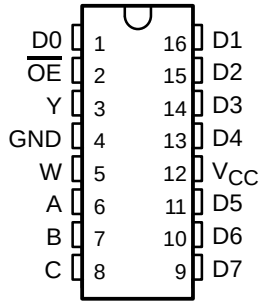
SCAS066A – JUNE 1989 – REVISED APRIL 1993

- **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-μm Process**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Package Options Include Plastic Small-Outline Packages and Standard Plastic 300-mil DIPs**

D OR N PACKAGE
(TOP VIEW)



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.

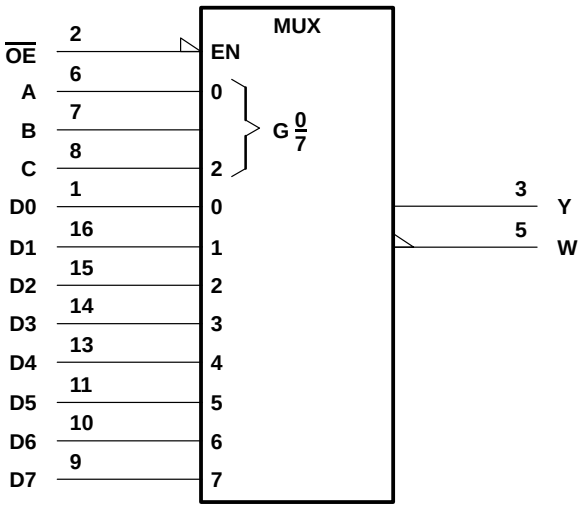
The 74AC11151 is characterized for operation from –40°C to 85°C.

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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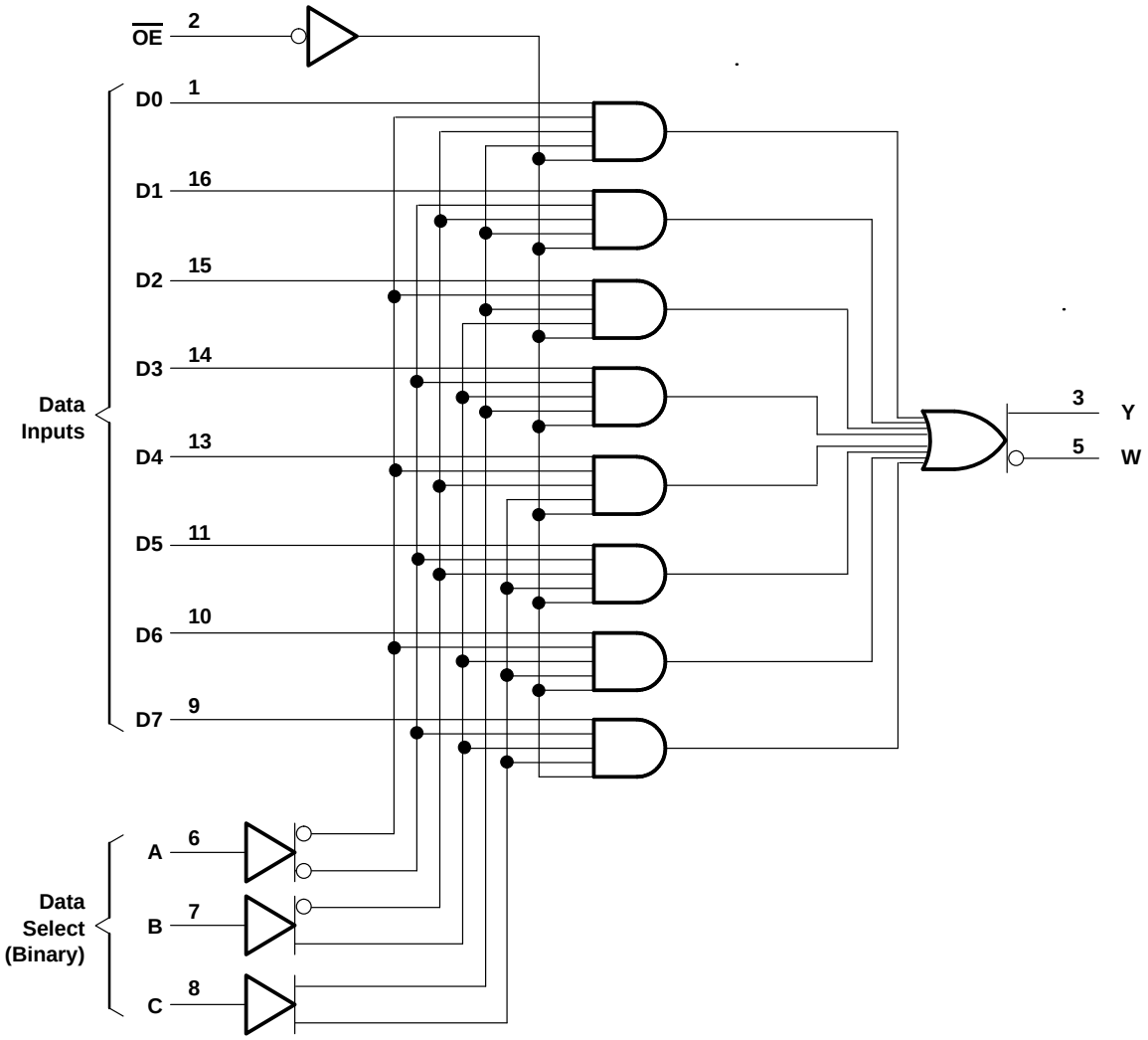
logic diagram (positive logic)



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}) . . . . . ±20 mA
Output clamp current, I_{OK} (V_O < 0 or V_O > V_{CC}) . . . . . ±50 mA
Continuous output current, I_O (V_O = 0 to V_{CC}) . . . . . ±50 mA
Continuous current through V_{CC} or GND . . . . . ±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.

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 V	2.1			V
		V_{CC} = 4.5 V	3.15			
		V_{CC} = 5.5 V	3.85			
V_{IL}	Low-level input voltage	V_{CC} = 3 V			0.9	V
		V_{CC} = 4.5 V			1.35	
		V_{CC} = 5.5 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 V			–4	mA
		V_{CC} = 4.5 V			–24	
		V_{CC} = 5.5 V			–24	
I_{OL}	Low-level output current	V_{CC} = 3 V			12	mA
		V_{CC} = 4.5 V			24	
		V_{CC} = 5.5 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°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
V_{OH}	I_{OH} = – 50 μA	3 V	2.9			2.9		V
		4.5 V	4.4			4.4		
		5.5 V	5.4			5.4		
	I_{OH} = – 4 mA	3 V	2.58			2.48		
	I_{OH} = – 24 mA	4.5 V	3.94			3.8		
		5.5 V	4.94			4.8		
	I_{OH} = –75 mA†	5.5 V				3.85		
V_{OL}	I_{OL} = 50 μA	3 V			0.1		0.1	V
		4.5 V			0.1		0.1	
		5.5 V			0.1		0.1	
	I_{OL} = 12 mA	3 V			0.36		0.44	
	I_{OL} = 24 mA	4.5 V			0.36		0.44	
		5.5 V			0.36		0.44	
	I_{OL} = 75 mA†	5.5 V					1.65	
I_I	V_I = V_{CC} or GND	5.5 V			±0.1		±1	μA
I_{CC}	V_I = V_{CC} or GND, I_O = 0	5.5 V			8		80	μA
C_i	V_I = V_{CC} or GND	5 V		3.5				pF

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

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°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	

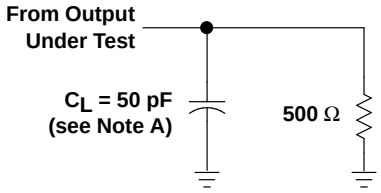
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°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	

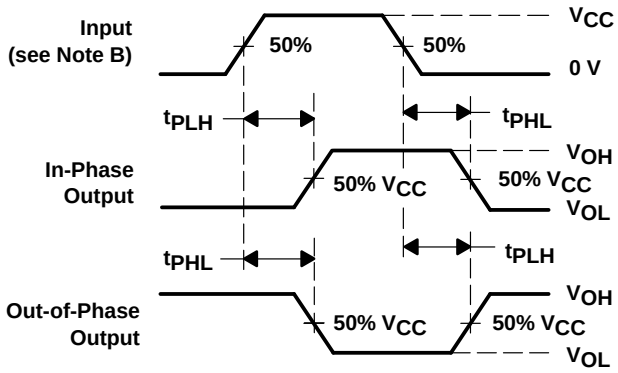
operating characteristics, V_{CC} = 5 V, T_A = 25°C

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

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT



VOLTAGE WAVEFORMS

NOTES: A. C_L includes probe and jig capacitance.
B. Input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 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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