

# 74AC11158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER

SCAS071 – JULY 1989 – REVISED APRIL 1993

- Flow-Through Architecture Optimizes PCB Layout
- Center-Pin  $V_{CC}$  and GND Pin 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

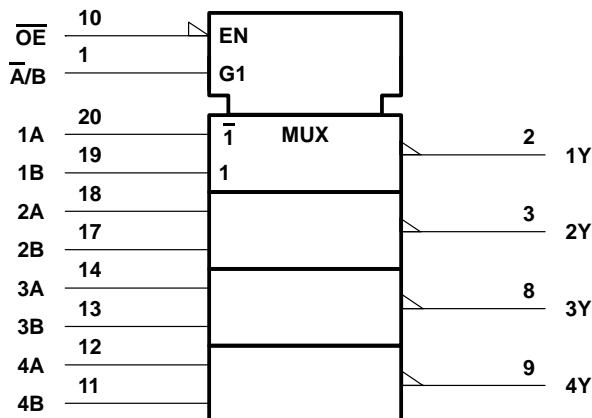
This data selector/multiplexer contains inverters and drivers to supply full data selection to the four output gates. A separate output-enable ( $\overline{OE}$ ) input is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The 74AC11158 provides true data.

The 74AC11158 is characterized for operation from -40°C to 85°C.

FUNCTION TABLE

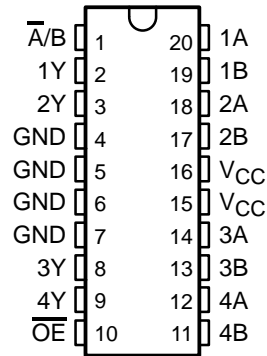
OE	INPUTS			OUTPUT Y
	A/B	A	B	
H	X	X	X	H
L	L	L	X	H
L	L	H	X	L
L	H	X	L	H
L	H	X	H	L

## logic symbol†

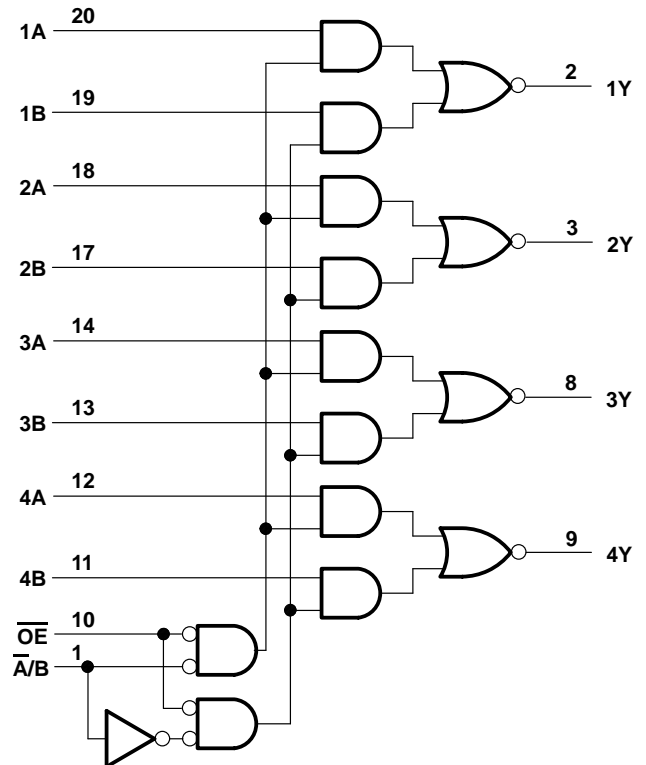


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

DW OR N PACKAGE  
(TOP VIEW)



## logic diagram (positive logic)



EPIC is a trademark of Texas Instruments Incorporated.

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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# 74AC11158

## QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER

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

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

<sup>†</sup> 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 (see Note 2)

		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	$\overline{A}/B$	0	5	ns/V
		Except $\overline{A}/B$	0	10	
$T_A$	Operating free-air temperature	–40		85	°C

NOTE 2: Unused or floating inputs must be held high or low.

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

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	T <sub>A</sub> = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
V <sub>OH</sub>	I <sub>OH</sub> = – 50 µA	3 V	2.9			2.9		V
		4.5 V	4.4			4.4		
		5.5 V	5.4			5.4		
	I <sub>OH</sub> = – 4 mA	3 V	2.58			2.48		
		4.5 V	3.94			3.8		
	I <sub>OL</sub> = – 24 mA	5.5 V	4.94			4.8		
	I <sub>OH</sub> = – 75 mA†	5.5 V				3.85		
V <sub>OL</sub>	I <sub>OL</sub> = 50 µA	3 V			0.1		0.1	V
		4.5 V			0.1		0.1	
		5.5 V			0.1		0.1	
	I <sub>OL</sub> = 12 mA	3 V			0.36		0.44	
		4.5 V			0.36		0.44	
	I <sub>OL</sub> = 24 mA	5.5 V			0.36		0.44	
	I <sub>OL</sub> = 75 mA†	5.5 V					1.65	
I <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5.5 V			±0.1		±1	µA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	5.5 V			8		80	µA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5 V		4				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<sub>CC</sub> = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T <sub>A</sub> = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t <sub>PLH</sub>	A or B	Y	1.5	5.8	8.3	1.5	9	ns
t <sub>PHL</sub>			1.5	5.9	8.6	1.5	9.4	
t <sub>PLH</sub>	$\overline{A}/B$	Y	1.5	6.5	9	1.5	9.8	ns
t <sub>PHL</sub>			1.5	6.8	9.4	1.5	10.3	
t <sub>PLH</sub>	$\overline{OE}$	Y	1.5	5.7	8.1	1.5	9	ns
t <sub>PHL</sub>			1.5	6.3	8.8	1.5	9.7	

**switching characteristics over recommended operating free-air temperature range, V<sub>CC</sub> = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T <sub>A</sub> = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t <sub>PLH</sub>	A or B	Y	1.5	3.6	6.4	1.5	6.8	ns
t <sub>PHL</sub>			1.5	3.9	6.6	1.5	7.4	
t <sub>PLH</sub>	$\overline{A}/B$	Y	1.5	4.1	6.9	1.5	7.4	ns
t <sub>PHL</sub>			1.5	4.9	7.2	1.5	7.9	
t <sub>PLH</sub>	$\overline{OE}$	Y	1.5	3.7	6.4	1.5	6.9	ns
t <sub>PHL</sub>			1.5	4.2	6.9	1.5	7.5	

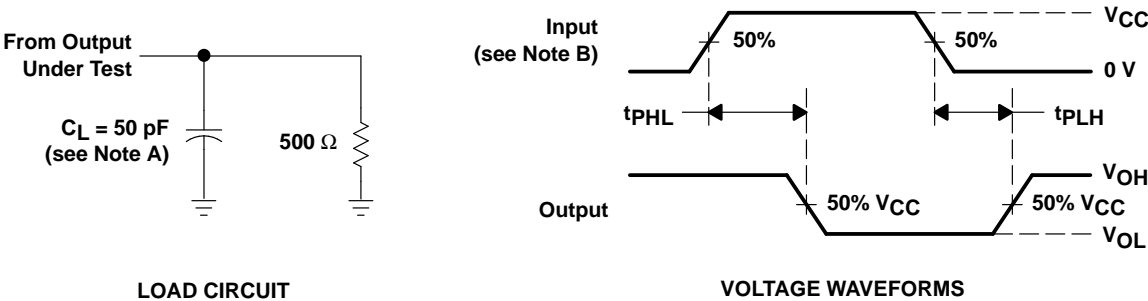
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operating characteristics,  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	TYP	UNIT
$C_{pd}$	Power dissipation capacitance	$C_L = 50\text{ pF}$ , $f = 1\text{ MHz}$	33	pF

PARAMETER MEASUREMENT INFORMATION



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
B. Input pulses are supplied by generators having the following characteristics:  $PRR \leq 10\text{ MHz}$ ,  $Z_O = 50\text{ }\Omega$ ,  $t_r = 3\text{ ns}$ ,  $t_f = 3\text{ ns}$ .  
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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