

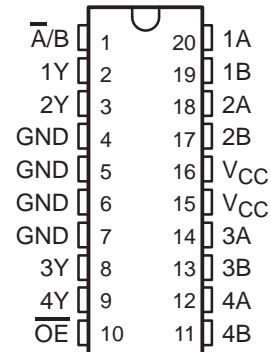
# 74AC11257

## QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER WITH 3-STATE OUTPUTS

SCAS049B – MARCH 1989 – REVISED JUNE 1996

- 3-State Outputs Interface Directly With System Bus
- 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
- Provides Bus Interface From Multiple Sources in High-Performance Systems
- Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic 300-mil DIPs (N)

DW OR N PACKAGE  
(TOP VIEW)



### description

This device is designed to multiplex signals from 4-bit data sources to four output data lines in bus-organized systems. The 3-state outputs do not load the data lines when the output-enable ( $\overline{OE}$ ) input is at a high logic level.

The 74AC11257 is characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .

FUNCTION TABLE

OE	INPUTS			OUTPUT Y
	SELECT $\overline{A/B}$	DATA		
		A	B	
H	X	X	X	Z
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H



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**TEXAS  
INSTRUMENTS**

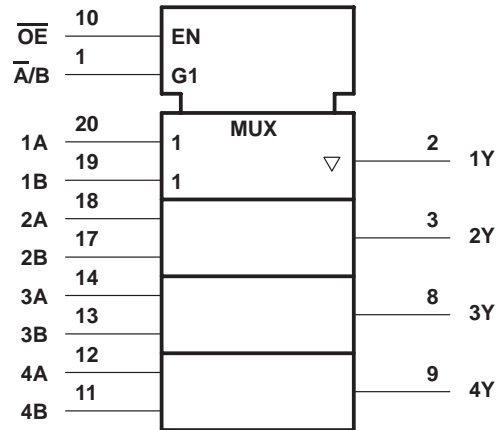
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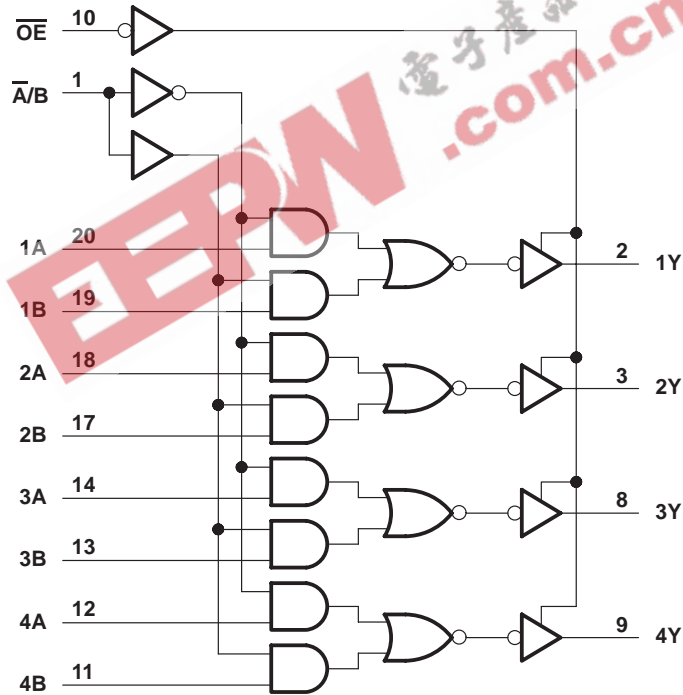
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## logic symbol†



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

## logic diagram (positive logic)



# 74AC11257

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SCAS049B – MARCH 1989 – REVISED JUNE 1996

### 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
Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2): DW package .....	1.6 W
N package .....	1.3 W
Storage temperature range, $T_{stg}$ .....	–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.

- NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
 2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils, except for the N package, which has a trace length of zero.

### recommended operating conditions

		MIN	NOM	MAX	UNIT
VCC	Supply voltage	3	5	5.5	V
V <sub>IH</sub>	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 <sub>IL</sub>	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 <sub>I</sub>	Input voltage	0		$V_{CC}$	V
V <sub>O</sub>	Output voltage	0		$V_{CC}$	V
I <sub>OH</sub>	High-level output current	$V_{CC} = 3$ V		–4	mA
		$V_{CC} = 4.5$ V		–24	
		$V_{CC} = 5.5$ V		–24	
I <sub>OL</sub>	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 <sub>A</sub>	Operating free-air temperature	–40		85	°C

# 74AC11257

## QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER WITH 3-STATE OUTPUTS

SCAS049B – MARCH 1989 – REVISED JUNE 1996

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		
		5.5 V	4.94			4.8		
I <sub>OH</sub> = -75 mA <sup>†</sup>	5.5 V				3.85			
V <sub>OL</sub>	I <sub>OL</sub> = 50 μA	3 V				0.1		V
		4.5 V				0.1		
		5.5 V				0.1		
	I <sub>OL</sub> = 12 mA	3 V				0.36		
		4.5 V				0.36		
		5.5 V				0.36		
I <sub>OL</sub> = 24 mA	5.5 V				1.65			
I <sub>OL</sub> = 75 mA <sup>†</sup>	5.5 V							
I <sub>OZ</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	5.5 V	±0.5			±5		μA
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	3.5					pF
C <sub>o</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	5.5 V	8					pF

<sup>†</sup> 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	5.6	8.1	1.5	8.9	ns
t <sub>PHL</sub>			1.5	6.2	9	1.5	10.1	
t <sub>PLH</sub>	A/B	Any Y	1.5	6.1	9.2	1.5	10.2	ns
t <sub>PHL</sub>			1.5	6.6	10	1.5	11.2	
t <sub>PZH</sub>	OE	Any Y	1.5	5.6	8.2	1.5	9.1	ns
t <sub>PZL</sub>			1.5	7.5	10.4	1.5	11.8	
t <sub>PHZ</sub>	OE	Any Y	1.5	5.6	7.6	1.5	8.3	ns
t <sub>PLZ</sub>			1.5	6.2	8.8	1.5	9.6	

**74AC11257**  
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**WITH 3-STATE OUTPUTS**

SCAS049B – MARCH 1989 – REVISED JUNE 1996

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 or B	Y	1.5	3.6	5.8	1.5	6.4	ns
$t_{PHL}$			1.5	4.1	6.5	1.5	7.2	
$t_{PLH}$	$\bar{A}/B$	Any Y	1.5	4	6.5	1.5	7.2	ns
$t_{PHL}$			1.5	4.4	7.1	1.5	7.9	
$t_{PZH}$	$\overline{OE}$	Any Y	1.5	3.8	5.9	1.5	6.5	ns
$t_{PZL}$			1.5	5	7.6	1.5	8.6	
$t_{PHZ}$	$\overline{OE}$	Any Y	1.5	4.5	6.4	1.5	7.6	ns
$t_{PLZ}$			1.5	4.8	6.9	1.5	7.6	

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

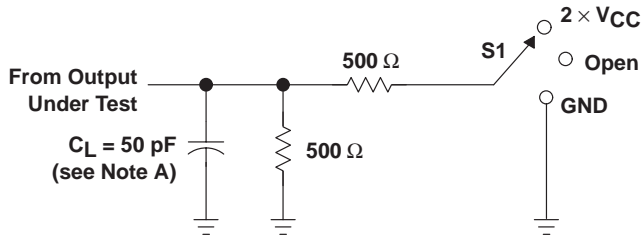
PARAMETER		TEST CONDITIONS	TYP	UNIT
$C_{pd}$	Power dissipation capacitance	$C_L = 50\text{ pF}$ , $f = 1\text{ MHz}$	37	pF
			11	



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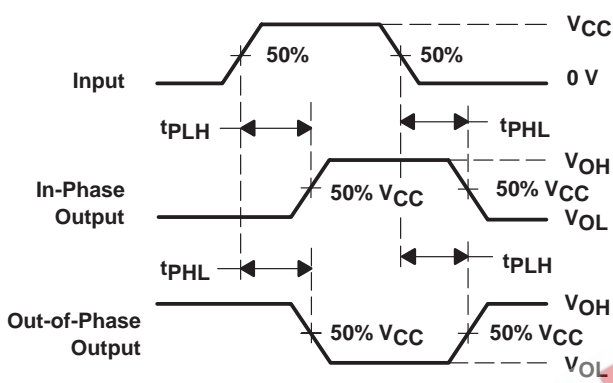
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**PARAMETER MEASUREMENT INFORMATION**

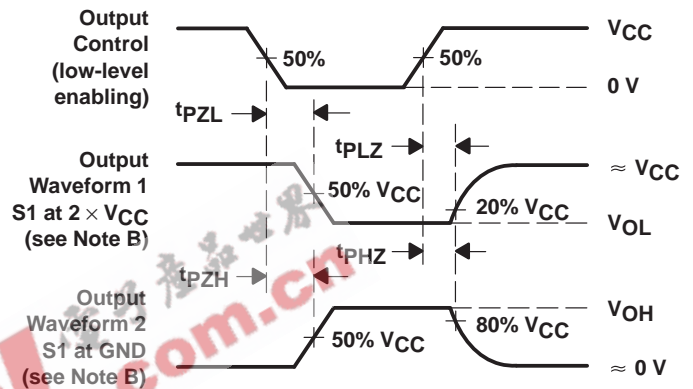


TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$2 \times V_{CC}$
$t_{PHZ}/t_{PZH}$	GND

**LOAD CIRCUIT**



**VOLTAGE WAVEFORMS**



**VOLTAGE WAVEFORMS**

- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.  
 C. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r = 3 \text{ ns}$ ,  $t_f = 3 \text{ ns}$ .  
 D. 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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