

54ACT11257, 74ACT11257 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

SCAS053A - D3256, JANUARY 1989 - REVISED APRIL 1993

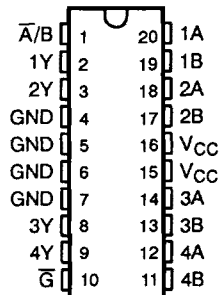
- Inputs Are TTL-Voltage Compatible
- 3-State Outputs Interface Directly With System Bus
- Flow-Through Architecture Optimizes PCB Layout
- Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise
- EPIC™ (Enhanced-Performance Implanted CMOS) 1- μ m Process
- 500-mA Typical Latch-Up Immunity at 125°C
- Provides Bus Interface From Multiple Sources In High-Performance Systems
- Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

description

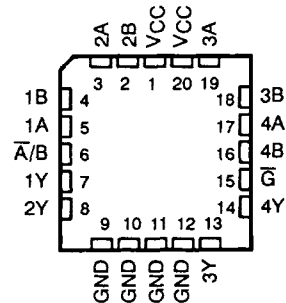
The ACT11257 is designed to multiplex signals from 4-bit data sources to four output data lines in bus-organized systems. The 3-state outputs will not load the data lines when the output control pin (\bar{G}) is at a high logic level.

The 54ACT11257 is characterized for operation over the full military temperature range of - 55°C to 125°C. The 74ACT11257 is characterized for operation from - 40°C to 85°C.

54ACT11257 . . . J PACKAGE
74ACT11257 . . . DW OR N PACKAGE
(TOP VIEW)



54ACT11257 . . . FK PACKAGE
(TOP VIEW)



FUNCTION TABLE

OUTPUT CONTROL \bar{G}	INPUTS		OUTPUT Y	
	SELECT \bar{A}/\bar{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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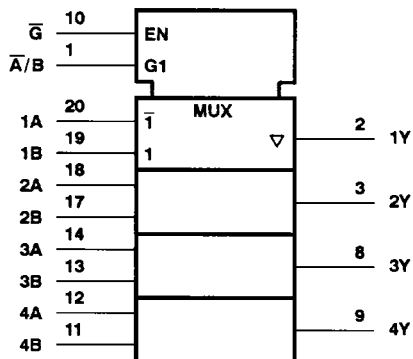
PRODUCTION DATA Information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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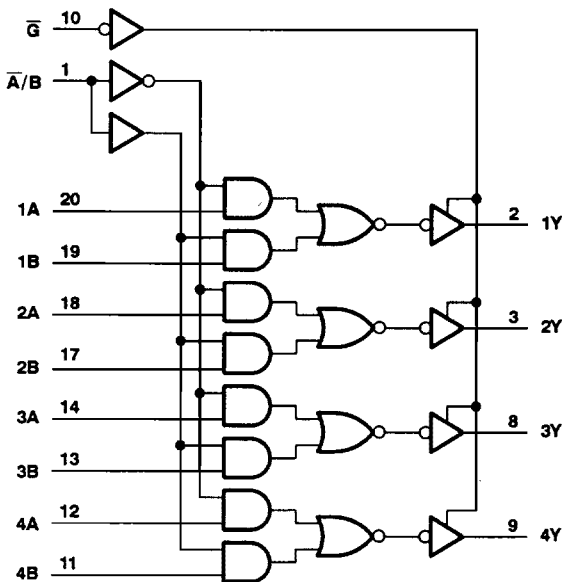
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logic symbol†



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

logic diagram (positive logic)



Pin numbers shown are for the DW, J, and N packages.

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 current ratings are observed.

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recommended operating conditions

		54ACT11257		74ACT11257		UNIT
		MIN	MAX	NOM	MAX	
V _{CC}	Supply voltage	4.5	5.5	4.5	5.5	V
V _{IH}	High-level input voltage	2		2		V
V _{IL}	Low-level input voltage		0.8		0.8	V
V _I	Input voltage	0	V _{CC}	0	V _{CC}	V
V _O	Output voltage	0	V _{CC}	0	V _{CC}	V
I _{OH}	High-level output current		-24		-24	mA
I _{OL}	Low-level output current		24		24	mA
Δt/Δv	Input transition rise or fall rate	0	10	0	10	ns/V
T _A	Operating free-air temperature	-55	125	-40	85	°C

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

PARAMETERS	TEST CONDITIONS	V _{CC}	T _A = 25°C			54ACT11257		74ACT11257		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{OH}	I _{OH} = -50 μA	4.5 V	4.4		4.4		4.4		V	
		5.5 V	5.4		5.4		5.4			
	I _{OH} = -24 mA	4.5 V	3.94		3.7		3.8			
		5.5 V	4.94		4.7		4.8			
	I _{OH} = -50 mA [†]	5.5 V			3.85					
I _{OH} = -75 mA [†]	5.5 V					3.85				
V _{OL}	I _{OL} = 50 μA	4.5 V			0.1		0.1		V	
		5.5 V			0.1		0.1			
	I _{OL} = 24 mA	4.5 V			0.36		0.5	0.44		
		5.5 V			0.36		0.5	0.44		
	I _{OL} = 50 mA [†]	5.5 V				1.65				
I _{OL} = 75 mA [†]	5.5 V						1.65			
I _{OZ}	V _O = V _{CC} or GND	5.5 V		±0.5		±10		±5	μA	
I _I	V _I = V _{CC} or GND	5.5 V		±0.1		±1		±1	μA	
I _{CC}	V _I = V _{CC} or GND, I _O = 0	5.5 V		8		160		80	μA	
ΔI _{CC} [‡]	One input at 3.4 V, Other inputs at V _{CC} or GND	5.5 V		0.9		1		1	mA	
C _i	V _I = V _{CC} or GND	5 V		3.5					pF	
C _o	V _O = V _{CC} or GND	5 V		8					pF	

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

[‡] This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V to V_{CC}.

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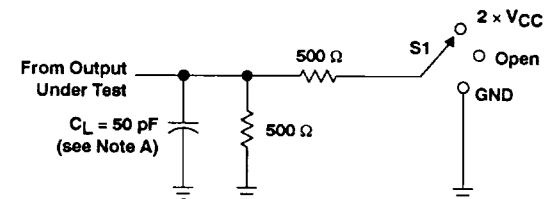
switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			54ACT11257		74ACT11257		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	1.5	4.4	6.4	1.5	7.4	1.5	6.9	ns
t_{PHL}			1.5	5	8	1.5	9.3	1.5	8.7	
t_{PLH}	\bar{A}/\bar{B}	Any Y	1.5	4.7	7.6	1.5	8.7	1.5	8.2	ns
t_{PHL}			1.5	5.7	8.5	1.5	10.1	1.5	9.4	
t_{PZH}	\bar{G}	Any Y	1.5	4.2	6.9	1.5	7.7	1.5	7.3	ns
t_{PZL}			1.5	5.5	8.7	1.5	10.3	1.5	9.6	
t_{PHZ}	\bar{G}	Any Y	1.5	5.7	7.6	1.5	8.9	1.5	8.4	ns
t_{PLZ}			1.5	6	7.9	1.5	9	1.5	8.5	

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

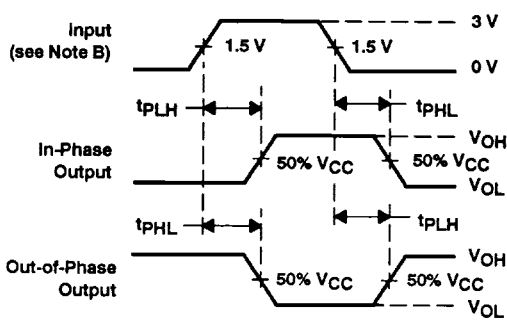
PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance			
	Outputs enabled		13	
	Outputs disabled			

PARAMETER MEASUREMENT INFORMATION

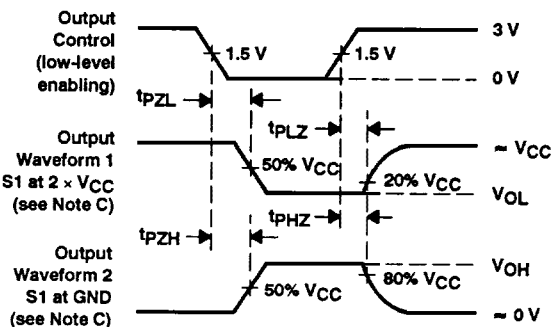


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	2 x V_{CC}
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT



VOLTAGE WAVEFORMS



VOLTAGE WAVEFORMS

NOTES: A. C_L includes probe and jig capacitance.

B. All 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. 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.

D. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms