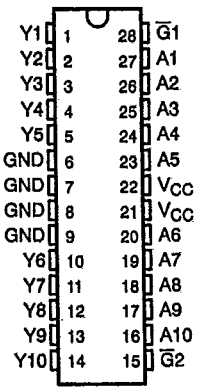
54AC11827, 74AC11827
10-BIT BUFFERS/BUS DRIVERS WITH 3-STATE OUTPUTS

T-52-09-00

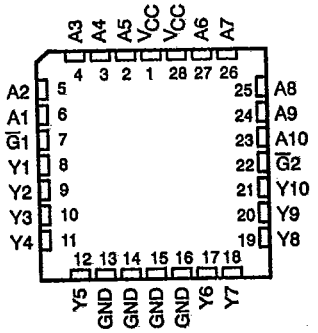
TI0155—D3379, NOVEMBER 1989—REVISED MARCH 1990

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Flow-Through Architecture to Optimize PCB Layout
- Center-Pin V_{CC} and GND Configurations to 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, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

54AC11827 ... JT PACKAGE
74AC11827 ... DW OR NT PACKAGE
(TOP VIEW)



54AC11827 ... FK PACKAGE
(TOP VIEW)



description

These 10-bit buffers/bus drivers provide high-performance bus interface for wide data paths or buses carrying parity.

The 3-state control gate is a 2-input NOR such that if either $\overline{G}1$ or $\overline{G}2$ is high, all ten outputs are in the high-impedance state.

The 'AC11827 provides true data.

The 54AC11827 is characterized for operation over the full military temperature range of −55°C to 125°C. The 74AC11827 is characterized for operation from −40°C to 85°C.

FUNCTION TABLE

INPUTS			OUTPUT
$\overline{G}1$	$\overline{G}2$	A	Y
L	L	H	H
L	L	L	L
X	H	X	Z
H	X	X	Z

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TEXAS INSTRUMENTS
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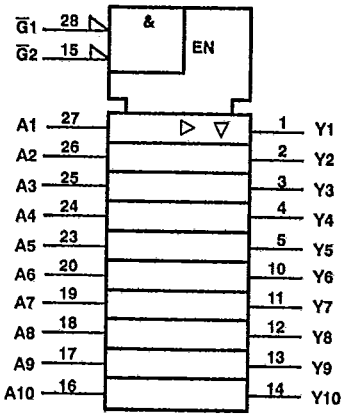
54AC11827, 74AC11827
10-BIT BUFFERS/BUS DRIVERS WITH 3-STATE OUTPUTS

T-52-09

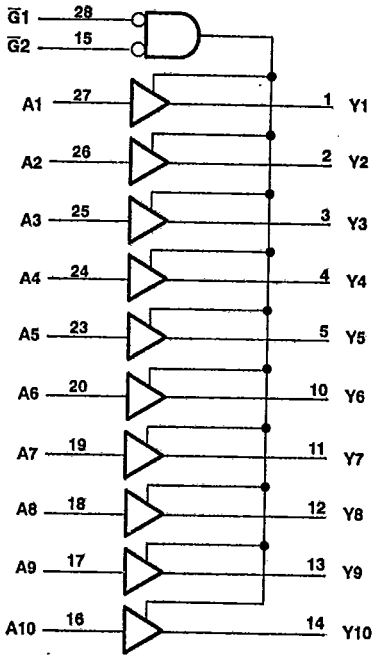
D3379, NOVEMBER 1989—REVISED MARCH 1990—TI0155

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for DW, JT, and NT packages.

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 pins ..... ±250 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

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			54AC11827			74AC11827			UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage		3	5	5.5	3	5	5.5	V
V_{IH}	High-level input voltage	V_{CC} = 3 V	2.1			2.1			V
		V_{CC} = 4.5 V	3.15			3.15			
		V_{CC} = 5.5 V	3.85			3.85			
V_{IL}	Low-level input voltage	V_{CC} = 3 V			0.9			0.9	V
		V_{CC} = 4.5 V			1.35			1.35	
		V_{CC} = 5.5 V			1.65			1.65	
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	V_{CC} = 3 V			−4			−4	mA
		V_{CC} = 4.5 V			−24			−24	
		V_{CC} = 5.5 V			−24			−24	
I_{OL}	Low-level output current	V_{CC} = 3 V			12			12	mA
		V_{CC} = 4.5 V			24			24	
		V_{CC} = 5.5 V			24			24	
$\Delta t/\Delta v$	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)

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C			54AC11827		74AC11827		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}	I_{OH} = − 50 μA	3 V	2.9			2.9		2.9		V
		4.5 V	4.4			4.4		4.4		
		5.5 V	5.4			5.4		5.4		
	I_{OH} = −4 mA	3 V	2.58			2.4		2.48		
	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	3 V			0.1		0.1		0.1	V
		4.5 V			0.1		0.1		0.1	
		5.5 V			0.1		0.1		0.1	
	I_{OL} = 12 mA	3 V			0.36		0.5		0.44	
	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
C_i	V_I = V_{CC} or GND	5 V		4.5						pF
C_o	V_O = V_{CC} or GND	5 V		12						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			54AC11827		74AC11827		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	4.8	8.4	10.8	4.8	13.5	4.8	12.4	ns
t_{PHL}			6.8	10.4	12.6	6.8	14.1	6.8	13.4	
t_{PZH}	$\overline{G1}$ or $\overline{G2}$	Y	6.3	10.2	12.7	6.3	15.9	6.3	14.5	ns
t_{PZL}			10	16	19.2	10	22.3	10	21.7	
t_{PHZ}	$\overline{G1}$ or $\overline{G2}$	Y	5.9	8.5	10.4	5.9	11.6	5.9	11.1	ns
t_{PLZ}			5.4	8	10	5.4	10.9	5.4	10.5	

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			54AC11827		74AC11827		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	2.1	5.3	7.5	2.1	9.2	2.1	8.7	ns
t_{PHL}			2.9	6.2	8.4	2.9	10.2	2.9	9.7	
t_{PZH}	$\overline{G1}$ or $\overline{G2}$	Y	3.1	5.9	8.2	3.1	10.5	3.1	9.7	ns
t_{PZL}			4.1	7.7	10.6	4.1	14	4.1	13	
t_{PHZ}	$\overline{G1}$ or $\overline{G2}$	Y	3.9	6.6	8.4	3.9	9.6	3.9	9.1	ns
t_{PLZ}			4	6.3	7.9	4	9.2	4	8.8	

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

PARAMETER			TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance	Outputs enabled	C_L = 50 pF, f = 1 MHz	35	pF
		Outputs disabled		9	

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PARAMETER MEASUREMENT INFORMATION

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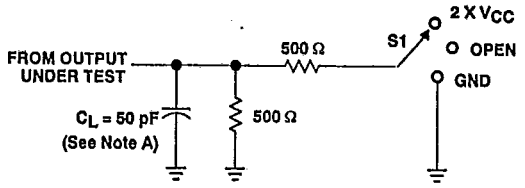
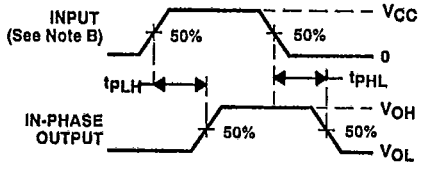
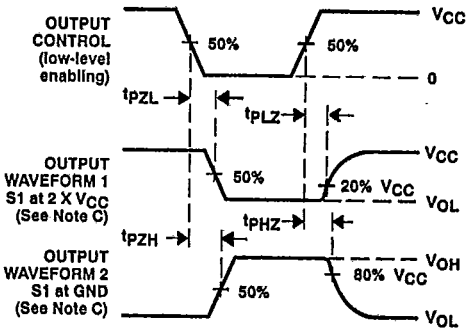


LOAD CIRCUIT FOR OUTPUTS

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	2 × VCC
t_{PHZ}/t_{PZH}	GND



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

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 the generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.
D. The outputs are measured one at a time with one transition per measurement.

FIGURE 1. LOAD CIRCUIT AND VOLTAGE WAVEFORMS