

54AC11828, 74AC11828  
10-BIT BUFFERS/BUS DRIVERS WITH 3-STATE OUTPUTS

T-52-09-00

T10156—D3376, 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 VCC 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

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  $\bar{G}1$  or  $\bar{G}2$  is high, all ten outputs are in the high-impedance state.

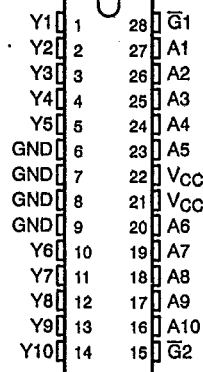
The 'AC11828 provides inverted data.

The 54AC11828 is characterized for operation over the full military temperature range of -55°C to 125°C. The 74AC11828 is characterized for operation from -40°C to 85°C.

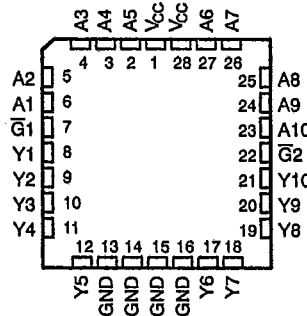
FUNCTION TABLE

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

54AC11828 ... JT PACKAGE  
74AC11828 ... DW OR NT PACKAGE  
(TOP VIEW)



54AC11828 ... FK PACKAGE  
(TOP VIEW)



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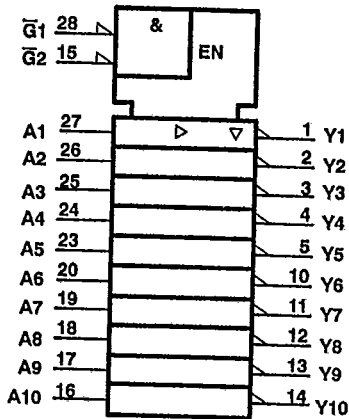


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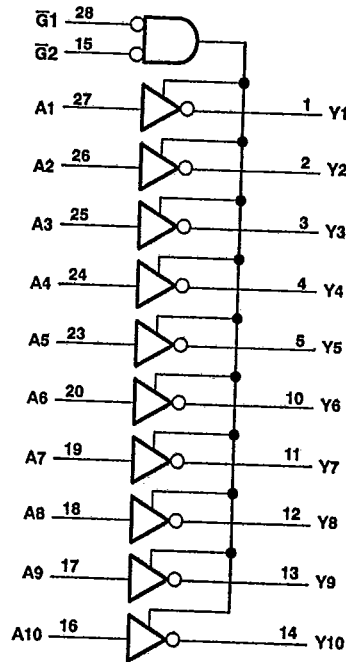
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logic symbol†



† 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 DW, JT, and NT 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 $V_I > V_{CC}$ ) .....	$\pm 20$ 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 pins .....	$\pm 250$ 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

		54AC11828			74AC11828			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
VCC	Supply voltage	3	5	5.5	3	5	5.5	V
VIH	High-level input voltage	VCC = 3 V		2.1	2.1		V	
		VCC = 4.5 V		3.15	3.15			
		VCC = 5.5 V		3.85	3.85			
VIL	Low-level input voltage	VCC = 3 V			0.9		V	
		VCC = 4.5 V			1.35			
		VCC = 5.5 V			1.65			
VI	Input voltage	0		VCC	0	VCC	V	
VO	Output voltage	0		VCC	0	VCC	V	
IOH	High-level output current	VCC = 3 V			-4		mA	
		VCC = 4.5 V			-24			
		VCC = 5.5 V			-24			
IOL	Low-level output current	VCC = 3 V			12		mA	
		VCC = 4.5 V			24			
		VCC = 5.5 V			24			
Δt/Δv	Input transition rise or fall rate	0		10	0	10	ns/V	
TA	Operating free-air temperature	-55		125	-40	85	°C	

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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			54AC11828		74AC11828		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = -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 <sub>OH</sub> = -4 mA	3 V	2.58			2.4		2.48		
		4.5 V	3.94			3.7		3.8		
		5.5 V	4.94			4.7		4.8		
I <sub>OH</sub> = -50 mA†	5.5 V				3.85					
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		0.5	0.44		
		4.5 V			0.36		0.5	0.44		
		5.5 V			0.36		0.5	0.44		
I <sub>OL</sub> = 50 mA†	5.5 V				1.65					
I <sub>OL</sub> = 75 mA†	5.5 V						1.65			
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			160	80	μA
C <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5 V			4.5					pF
C <sub>O</sub>	V <sub>O</sub> = V <sub>CC</sub> 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<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			54AC11828		74AC11828		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	Y	5.4	9.8	12.7	6.4	15.3	5.4	14.3	ns
t <sub>PHL</sub>			7.2	10.4	13.2	7.2	15.2	7.2	14.5	
t <sub>PZH</sub>	Q1 or Q2	Y	6.5	10.8	14.4	6.5	17.7	6.5	16.3	ns
t <sub>PZL</sub>			9.5	15	19.2	9.5	22	9.5	21.8	
t <sub>PHZ</sub>	Q1 or Q2	Y	5.3	8.2	11	5.5	12.5	5.3	11.9	ns
t <sub>PLZ</sub>			5.1	7.9	10.5	5.1	11.7	5.1	11.2	

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			54AC11828		74AC11828		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	Y	2.4	5.2	7.9	2.4	10.2	2.4	9.5	ns
t <sub>PHL</sub>			3.2	6.2	8.9	3.2	11	3.2	10.4	
t <sub>PZH</sub>	Q1 or Q2	Y	3.1	6.4	8.8	3.1	11.5	3.1	10.7	ns
t <sub>PZL</sub>			3.8	7.7	10.5	3.8	14.2	3.8	13.2	
t <sub>PHZ</sub>	Q1 or Q2	Y	3.7	6.4	8.8	3.7	10.1	3.7	9.6	ns
t <sub>PLZ</sub>			3.9	6.2	8.2	3.9	9.6	3.9	9.2	

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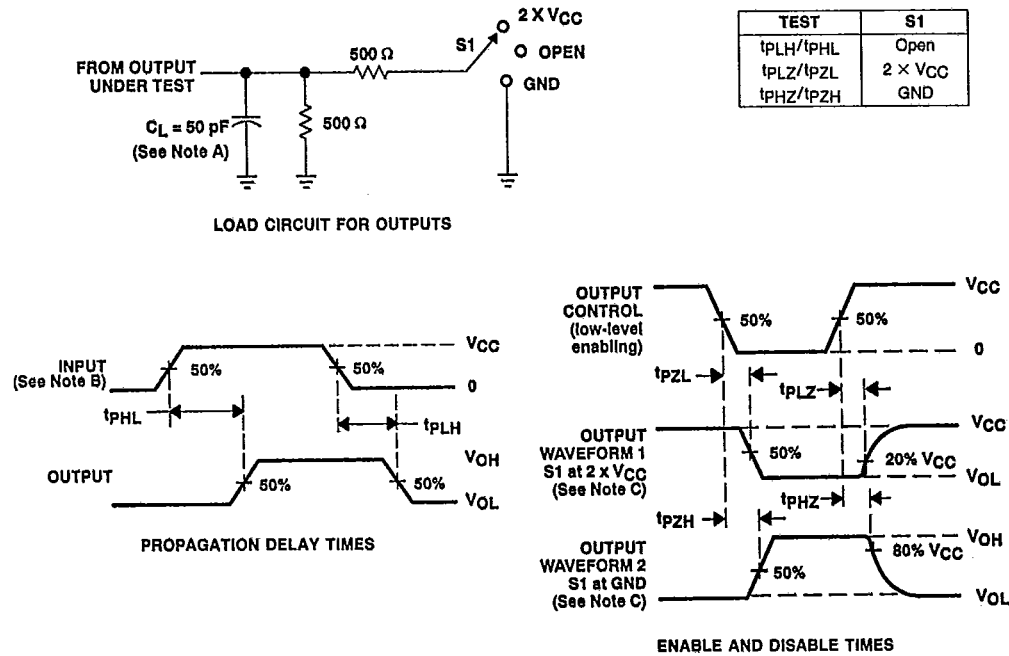
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operating characteristics,  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	TYP	UNIT
C <sub>pd</sub>	Power dissipation capacitance	C <sub>L</sub> = 50 pF, f = 1 MHz	37	pF
			11	

PARAMETER MEASUREMENT INFORMATION



- NOTES: A. C<sub>L</sub> 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<sub>O</sub> = 50 Ω, t<sub>r</sub> ≤ 2.5 ns, t<sub>f</sub> ≤ 2.5 ns.  
 D. The outputs are measured one at a time with one transition per measurement.

FIGURE 1. LOAD CIRCUIT AND VOLTAGE WAVEFORMS