

54AC11241, 74AC11241 OCTAL BUFFERS/LINE DRIVERS WITH 3-STATE OUTPUTS

D2957, JULY 1987 - REVISED APRIL 1993

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- 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
- Package Options Include Plastic Small-Outline Packages, Plastic Shrink Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

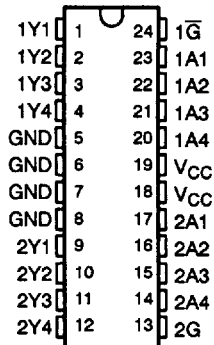
description

This octal buffer or line driver is designed specifically to improve both the performance and density of three-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. Taken together with the AC11240 and AC11244, these devices provide the choice of selected combinations of inverting and noninverting outputs, symmetrical \bar{G} (active-low output control) inputs, and complementary G and \bar{G} inputs. This device features a high fan-out.

The 54AC11241 is characterized for operation over the full military temperature range of -55°C to 125°C. The 74AC11241 is characterized for operation from -40°C to 85°C.

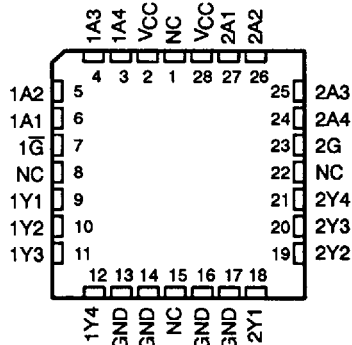
54AC11241 . . . JT PACKAGE
74AC11241 . . . DB, DW OR NT PACKAGE

(TOP VIEW)



54AC11241 . . . FK PACKAGE

(TOP VIEW)



NC - No internal connection

FUNCTION TABLE

OUTPUT CONTROL 1 \bar{G}	DATA INPUT 1A	OUTPUT 1Y	OUTPUT CONTROL 2G	DATA INPUT 2A	OUTPUT 2Y
H	X	Z	L	X	Z
L	L	L	H	L	L
L	H	H	H	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.

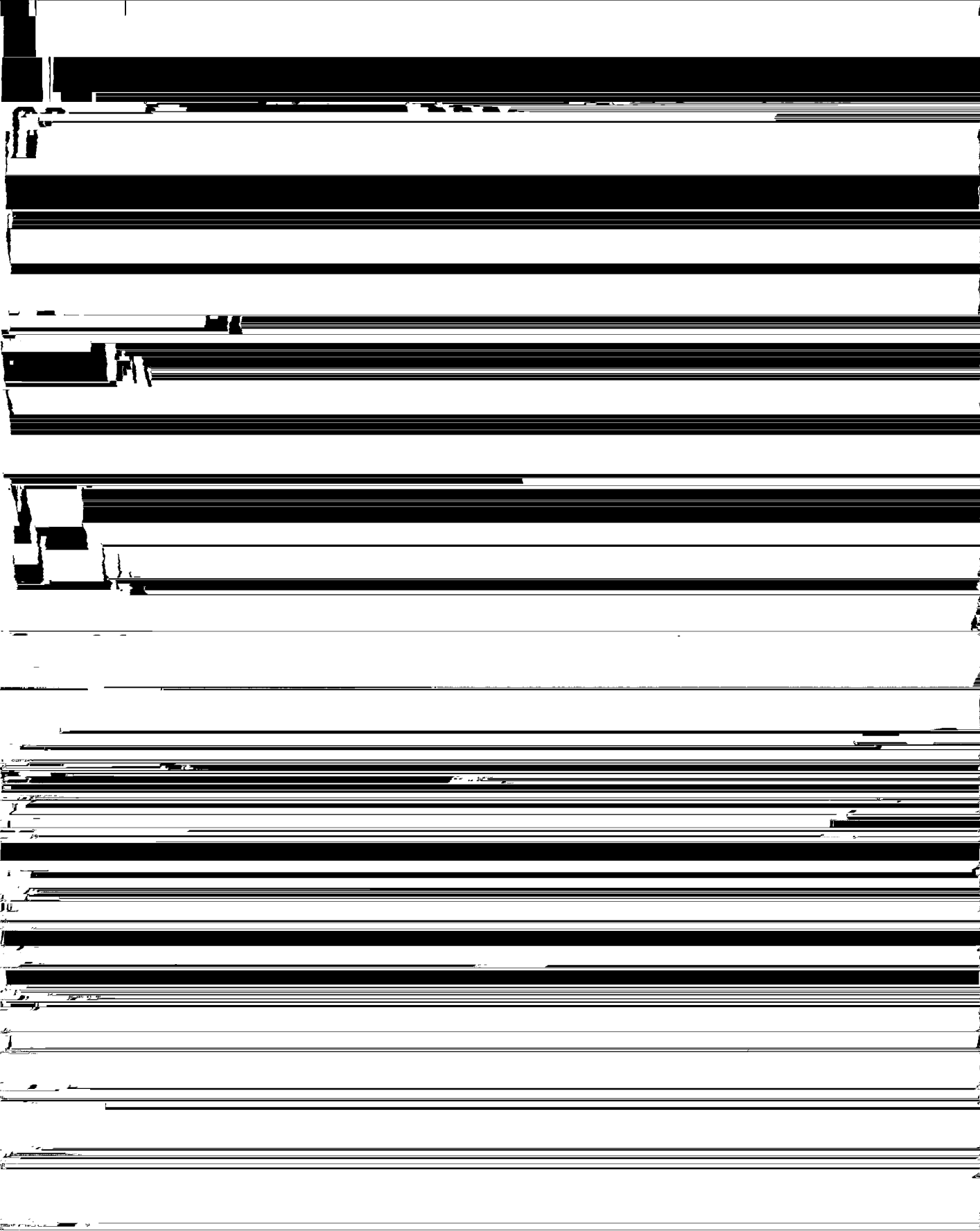
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WITH 3-STATE OUTPUTS

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recommended operating conditions

		54AC11241			74AC11241			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		V		
		V _{CC} = 4.5 V			1.35				
		V _{CC} = 5.5 V			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		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				
Δt/Δv	Input transition rise or fall rate	Data		0	10		ns/V		
		\bar{G}		0	5				
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			54AC11241		74AC11241		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			4.7		4.4		
		5.5 V	5.4			5.4		5.4		
	I _{OH} = -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 _{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	V	
		4.5 V				0.1		0.1		
		5.5 V				0.1		0.1		
	I _{OL} = 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 _{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				pF	
C _o	V _O = V _{CC} or GND	5 V			10				pF	

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



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switching characteristics over recommended operating free-air temperature range,
 $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			54AC11241		74AC11241		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1.5	7	10	1.5	12.2	1.5	11.4	ns
t_{PHL}			1.5	6.2	8.4	1.5	10.2	1.5	9.2	
t_{PZH}	\bar{G} or G	Y	1.5	7.8	11.4	1.5	13.8	1.5	12.9	ns
t_{PZL}			1.5	7.7	10.6	1.5	12.6	1.5	11.7	
t_{PHZ}	\bar{G} or G	Y	1.5	5.8	7.6	1.5	8.2	1.5	7.9	ns
t_{PLZ}			1.5	7.1	9.3	1.5	10.3	1.5	9.9	

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)	$T_A = 25^\circ\text{C}$			54AC11241		74AC11241		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1.5	4.9	7.1	1.5	8.5	1.5	8	ns
t_{PHL}			1.5	4.5	6.3	1.5	7.2	1.5	6.8	
t_{PZH}	\bar{G} or G	Y	1.5	5.4	8	1.5	9.7	1.5	9	ns
t_{PZL}			1.5	5.3	7.6	1.5	9	1.5	8.4	
t_{PHZ}	\bar{G} or G	Y	1.5	4.9	6.6	1.5	7.2	1.5	6.9	ns
t_{PLZ}			1.5	5.6	7.5	1.5	8.3	1.5	8	

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

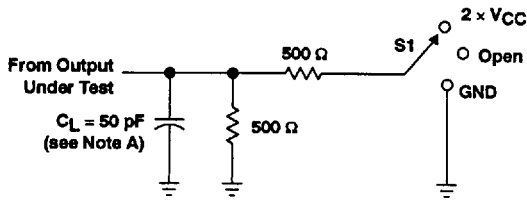
PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance per buffer	Outputs enabled	$C_L = 50\text{ pF}$, $f = 1\text{ MHz}$	26	pF
		Outputs disabled		10	

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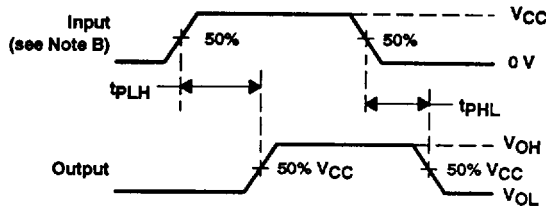


PARAMETER MEASUREMENT INFORMATION

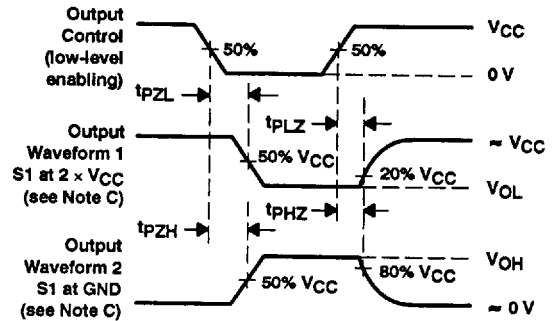


LOAD CIRCUIT

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



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