

54AC11245, 74AC11245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCAS010A – JULY 1987 – REVISED APRIL 1993

- 3-State Outputs Drive Bus Lines Directly
- 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, Plastic Thin Shrink Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

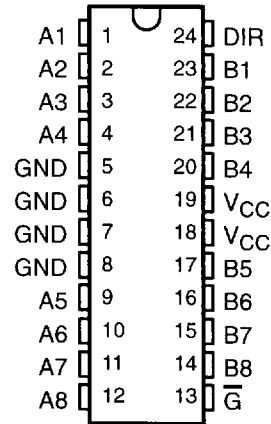
description

These octal bus transceivers are designed for asynchronous two-way communication between data buses. The control function implementation minimizes external timing requirements.

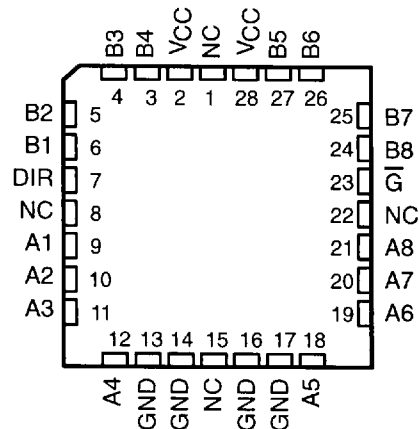
The devices allow data transmission from the A bus to the B bus, or from the B bus to the A bus, depending upon the logic level at the direction control (DIR) input. The enable input (\bar{G}) can be used to disable the device so that the buses are effectively isolated.

The 54AC11245 is characterized for operation over the full military temperature range of -55°C to 125°C . The 74AC11245 is characterized for operation from -40°C to 85°C .

54AC11245 . . . JT PACKAGE
74AC11244 . . . DB, DW, NT, OR PW PACKAGE
(TOP VIEW)



54AC11245 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

FUNCTION TABLE

ENABLE \bar{G}	DIRECTION CONTROL DIR	OPERATION
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

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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.

TEXAS
INSTRUMENTS

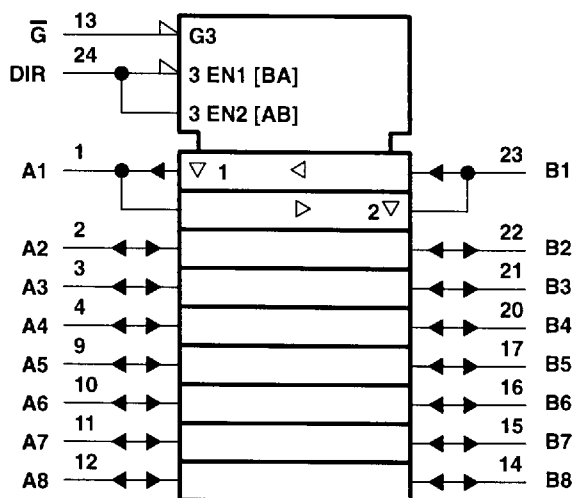
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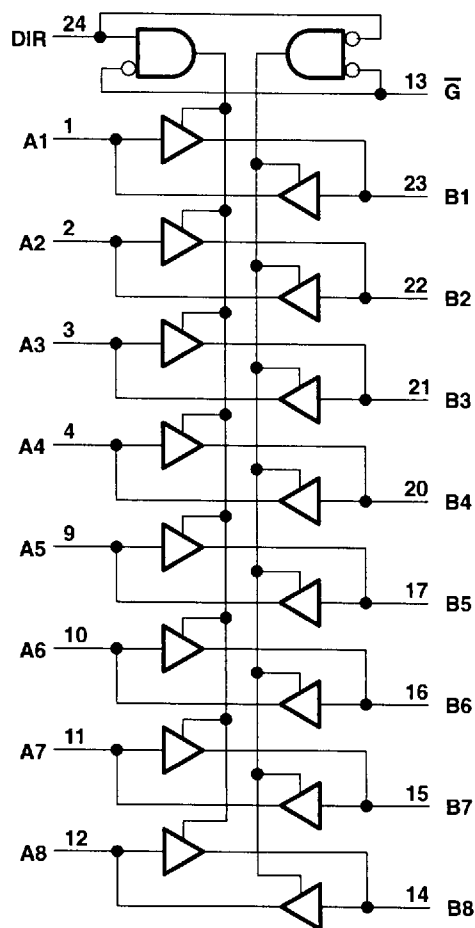
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logic symbol†



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

logic diagram (positive logic)



Pin numbers shown are for the DW, JT, and NT packages.

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SCAS010A – JULY 1987 – REVISED APRIL 1993

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	± 200 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.

recommended operating conditions

		54AC11245			74AC11245			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	$V_{CC} = 3$ V		2.1	V
		$V_{CC} = 4.5$ V		3.15	$V_{CC} = 4.5$ V		3.15	
		$V_{CC} = 5.5$ V		3.85	$V_{CC} = 5.5$ V		3.85	
V_{IL}	Low-level input voltage	$V_{CC} = 3$ V			$V_{CC} = 3$ V		0.9	V
		$V_{CC} = 4.5$ V			$V_{CC} = 4.5$ V		1.35	
		$V_{CC} = 5.5$ V			$V_{CC} = 5.5$ 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			$V_{CC} = 3$ V		-4	mA
		$V_{CC} = 4.5$ V			$V_{CC} = 4.5$ V		-24	
		$V_{CC} = 5.5$ V			$V_{CC} = 5.5$ V		-24	
I_{OL}	Low-level output current	$V_{CC} = 3$ V			$V_{CC} = 3$ V		12	mA
		$V_{CC} = 4.5$ V			$V_{CC} = 4.5$ V		24	
		$V_{CC} = 5.5$ V			$V_{CC} = 5.5$ V		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



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

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C			54AC11245		74AC11245		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			
		4.5 V	3.94			3.7	3.8			
	I _{OH} = -24 mA	5.5 V	4.94			4.7	4.8			
		5.5 V				3.85				
	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			
		4.5 V	0.36			0.5	0.44			
	I _{OL} = 24 mA	5.5 V	0.36			0.5	0.44			
		5.5 V				1.65				
	5.5 V					1.65				
I _I	A or B ports†	V _O = V _{CC} or GND	5.5 V	±0.5			±10	±5		μA
	\bar{G} or DIR			±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 _{io}	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.

‡ For I/O ports, the parameter I_{OZ} includes the input leakage current.

**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			54AC11245		74AC11245		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A or B	B or A	1.5	6.5	11.2	1.5	13.3	1.5	12.5	ns
t _{PHL}			1.5	5.7	8.5	1.5	10.3	1.5	9.7	
t _{PZH}	\bar{G}	B or A	1.5	8.6	14.2	1.5	17.1	1.5	15.9	ns
t _{PZL}			1.5	8.2	11.5	1.5	13.7	1.5	12.7	
t _{PHZ}	\bar{G}	B or A	1.5	7.7	10.5	1.5	11.9	1.5	11.3	ns
t _{PLZ}			1.5	8.5	12	1.5	13.8	1.5	13	



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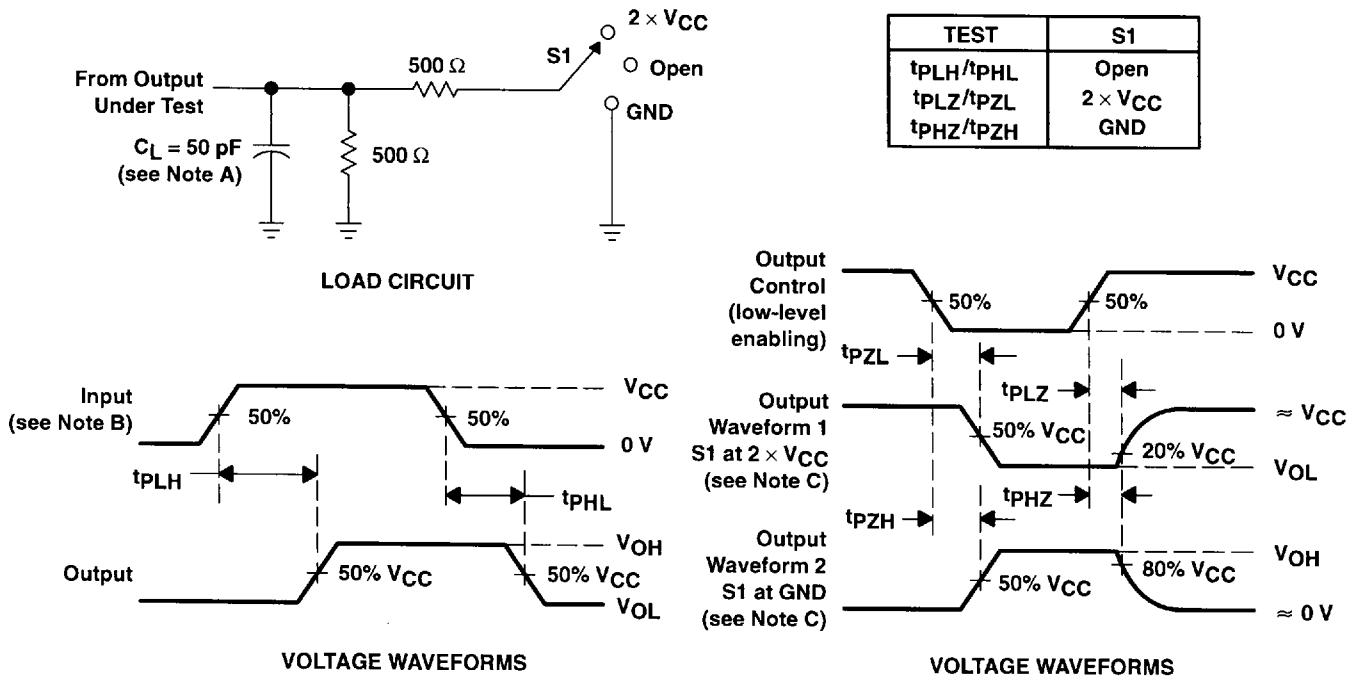
switching characteristics over recommended operating free-air temperature range,
 $V_{CC} = 5 V \pm 0.5 V$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ C$			54AC11245		74AC11245		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	1.5	4.8	8.5	1.5	10.2	1.5	9.5	ns
t_{PHL}			1.5	4.1	6.3	1.5	7.4	1.5	6.9	
t_{PZH}	\bar{G}	B or A	1.5	6.2	10.2	1.5	12.4	1.5	11.4	ns
t_{PZL}			1.5	5.9	8.6	1.5	10.3	1.5	9.5	
t_{PHZ}	\bar{G}	B or A	1.5	6.4	8.8	1.5	10	1.5	9.5	ns
t_{PLZ}			1.5	7	9.6	1.5	11	1.5	10.4	

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

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance per transceiver	$C_L = 50 pF$, $f = 1 MHz$	64	pF
			16	

PARAMETER MEASUREMENT INFORMATION



- NOTES: A. C_L includes probe and jig capacitance.
 B. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 MHz$, $Z_O = 50 \Omega$, $t_r = 3 ns$, $t_f = 3 ns$.
 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