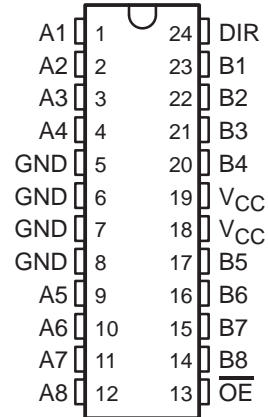


- Bidirectional Bus Transceivers in High-Density 24-Pin Packages
- Flow-Through Architecture Optimizes PCB Layout
- Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise
- **EPIC™** (Enhanced-Performance Implanted CMOS) 1- μ m Process
- 500-mA Typical Latch-Up Immunity at 125°C
- Package Options Include Plastic Small-Outline Packages and Standard Plastic 300-mil DIPs

**DW OR NT PACKAGE
(TOP VIEW)**



description

These octal bus transceivers are designed for asynchronous communication between data buses. These devices transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the level at the direction-control (DIR) input. The output-enable (\overline{OE}) input can be used to disable the device so that the buses are effectively isolated.

The 74AC11640 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE

INPUTS		OPERATION
\overline{OE}	DIR	
L	L	\overline{B} data to A bus
L	H	\overline{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.



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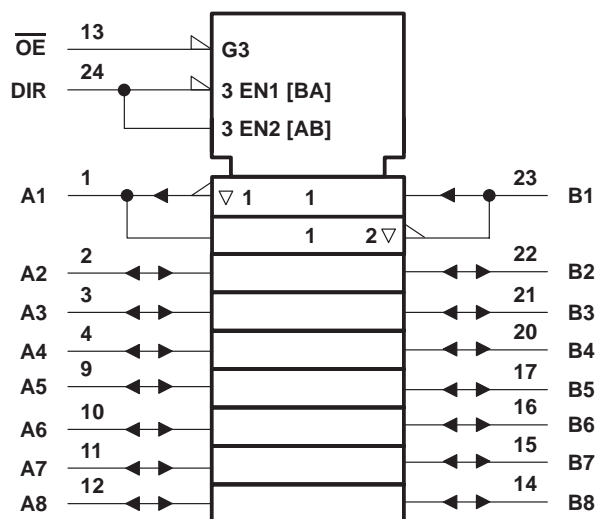
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74AC11640

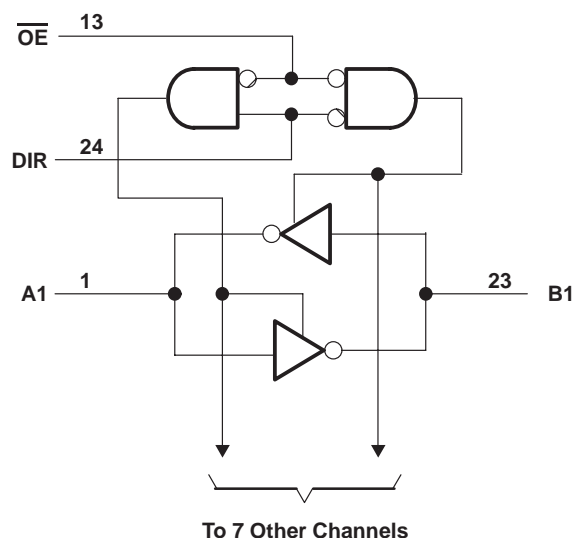
OCTAL BUS TRANSCEIVER WITH 3-STATE OUTPUTS

SCAS052A – JULY 1987 – REVISED APRIL 1993

logic symbol†



logic diagram (positive logic)



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

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	±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 clamp-current ratings are observed.

recommended operating conditions

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	3	5	5.5	V
V_{IH}	High-level input voltage	$V_{CC} = 3\text{ V}$	2.1		V
		$V_{CC} = 4.5\text{ V}$	3.15		
		$V_{CC} = 5.5\text{ V}$	3.85		
V_{IL}	Low-level input voltage	$V_{CC} = 3\text{ V}$		0.9	V
		$V_{CC} = 4.5\text{ V}$		1.35	
		$V_{CC} = 5.5\text{ V}$		1.65	
V_I	Input voltage	0		V_{CC}	V
V_O	Output voltage	0		V_{CC}	V
I_{OH}	High-level output current	$V_{CC} = 3\text{ V}$		–4	mA
		$V_{CC} = 4.5\text{ V}$		–24	
		$V_{CC} = 5.5\text{ V}$		–24	
I_{OL}	Low-level output current	$V_{CC} = 3\text{ V}$		12	mA
		$V_{CC} = 4.5\text{ V}$		24	
		$V_{CC} = 5.5\text{ V}$		24	
$\Delta t/\Delta v$	Input transition rise or fall rate	\overline{OE} or DIR	0	5	ns/V
		Data	0	10	
T_A	Operating free-air temperature	–40		85	°C

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

PARAMETER		TEST CONDITIONS	V _{CC}	T _A = 25°C			MIN	MAX	UNIT
				MIN	TYP	MAX			
V _{OH}		I _{OH} = − 50 μA	3 V	2.9			2.9		V
			4.5 V	4.4			4.4		
			5.5 V	5.4			5.4		
		I _{OH} = − 4 mA	3 V	2.58			2.48		
			4.5 V	3.94			3.8		
			5.5 V	4.94			4.8		
		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			0.44		
			4.5 V	0.36			0.44		
			5.5 V	0.36			0.44		
		I _{OL} = 75 mA†	5.5 V				1.65		
I _I	OE or DIR	V _I = V _{CC} or GND	5.5 V	±0.1			±1	μA	
I _{OZ} ‡	A or B ports	V _O = V _{CC} or GND	5.5 V	±0.5			±5	μA	
I _{CC}		V _I = V _{CC} or GND, I _O = 0	5.5 V	8			80	μA	
C _i	OE or DIR	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.

74AC11640
OCTAL BUS TRANSCEIVER
WITH 3-STATE OUTPUTS

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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)	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A or B	B or A	1.5	7	10.5	1.5	12	ns
t_{PHL}			1.5	6.3	9.1	1.5	10.2	
t_{PZH}	OE	A or B	1.5	8.9	12.5	1.5	14.3	ns
t_{PZL}			1.5	8.4	12.9	1.5	14.6	
t_{PHZ}	OE	A or B	1.5	7.9	10	1.5	10.8	ns
t_{PLZ}			1.5	8.6	11	1.5	12	

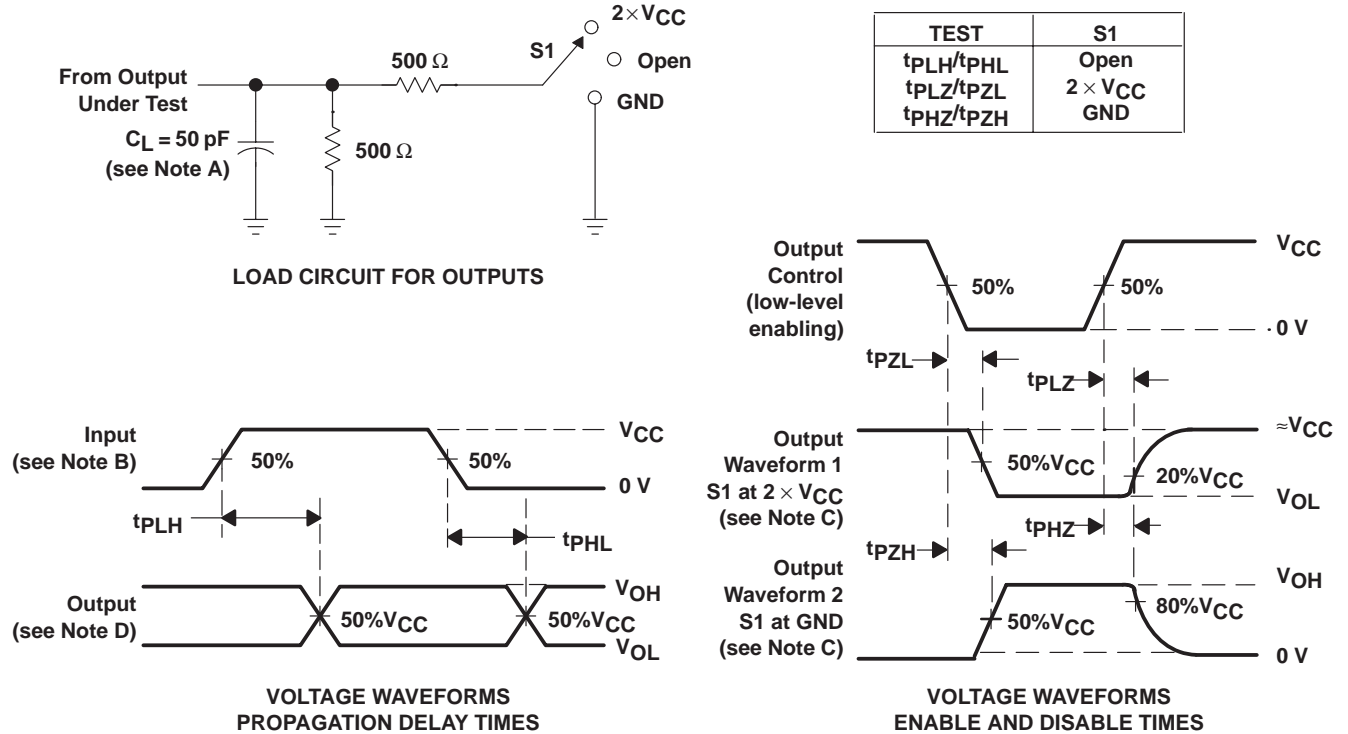
switching characteristics over recommended operating free-air temperature range,
 $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A or B	B or A	1.5	5.1	7.7	1.5	8.8	ns
t_{PHL}			1.5	4.6	6.9	1.5	7.8	
t_{PZH}	OE	A or B	1.5	6.5	9.4	1.5	10.6	ns
t_{PZL}			1.5	6.1	9.4	1.5	10.6	
t_{PHZ}	OE	A or B	1.5	6.7	8.6	1.5	9.3	ns
t_{PLZ}			1.5	7.2	9.1	1.5	9.9	

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

PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance per transceiver	Outputs enabled	$C_L = 50\text{ pF}$, $f = 1\text{ MHz}$	45	pF
		Outputs disabled		12	

PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_L includes probe and jig capacitance.

B. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 3 \text{ ns}$, $t_f \leq 3 \text{ ns}$. For testing pulse duration: $t_r = t_f = 1 \text{ to } 3 \text{ ns}$. Pulse polarity can be either high-to-low-to-high or low-to-high-to-low.

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 transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

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