

- Supports Mixed-Mode Signal Operation; 5 V Input and Output Voltages With 3.3 V V_{CC}
- Supports Unregulated Battery Operation Down to 2.7 V
- State-of-the-Art BiCMOS Design for 3.3 V Operation and Low-Static Power Dissipation
- Typical V_{OLP} (Output Ground Bounce) < 0.8 V at $V_{CC} = 3.3$ V, $T_A = 25^\circ C$
- Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17
- Bus-Hold Inputs Eliminate the Need for External Pullup Resistors

description

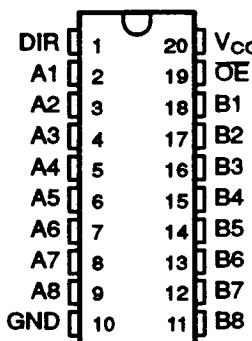
This octal bus transceiver is designed specifically for low-voltage (3.3 V) V_{CC} operation, but with the capability to provide a TTL interface to a 5 V system environment.

The SN74LVT245 is designed for asynchronous communication between data buses. The device transmits data 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 output-enable (OE) input can be used to disable the device so the buses are effectively isolated.

Active bus-hold circuitry is provided to hold unused or floating data inputs at a valid logic state.

The SN74LVT245 is characterized for operation from 0°C to 70°C.

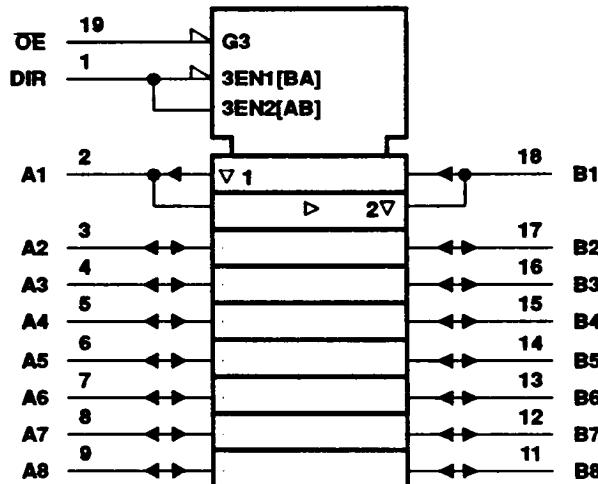
PACKAGE PINOUT (TOP VIEW)



FUNCTION TABLE

INPUTS		OPERATION
OE	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

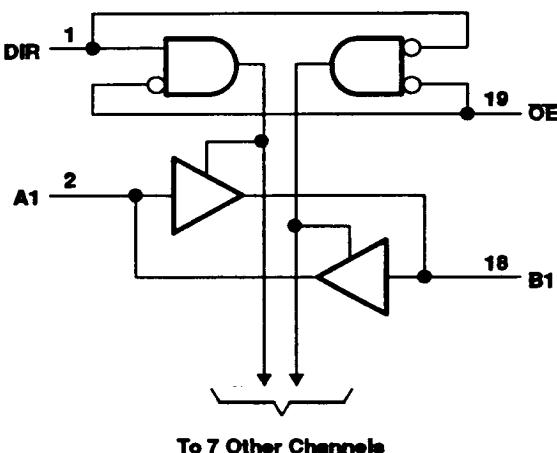
logic symbol†



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

SN74LVT245
OCTAL BUS TRANSCEIVER
WITH 3-STATE OUTPUTS

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 4.6 V
Input voltage range, V_I (see Note 1)	-0.5 V to 5.5 V
Voltage applied to any output in the high state or power-off state, V_O (see Note 1)	-0.5 V to 5.5 V
Current into any output in the low state, I_O	64 mA
Input clamp current, I_{IK} ($V_I < 0$)	-20 mA
Output clamp current, I_{OK} ($V_O < 0$)	-50 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 negative-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	2.7	3.6	4.6	V
V_{IH}	High-level input voltage	2	3.6	5.5	V
V_{IL}	Low-level input voltage	0.8	2	3.6	V
V_I	Input voltage	0.8	2	5.5	V
$\Delta V/\Delta t$	Input transition rise or fall rate	Outputs enabled	10	100	ns/V
T_A	Operating free-air temperature	0	25	70	°C

SN74LVT245
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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS			MIN	TYPT	MAX	UNIT
V _{IK}	V _{CC} = 2.7 V,	I _I = -18 mA					-1.2	V
	V _{CC} = Min to Max,	I _{OH} = -100 μ A			V _{CC} -0.2			V
	V _{CC} = 2.7 V,	I _{OH} = -8 mA			2.4			
	V _{CC} = 3 V,	I _{OH} = -32 mA			2			
V _{OL}	V _{CC} = 2.7 V,	I _{OL} = 100 μ A					0.2	V
	V _{CC} = 2.7 V,	I _{OL} = 24 mA					0.5	
	V _{CC} = 3 V,	I _{OL} = 32 mA					0.5	
	V _{CC} = 3 V,	I _{OL} = 64 mA [‡]					0.55	
I _I	V _{CC} = 0 V or Max,	V _I = 5.5 V					\pm 10	μ A
	V _{CC} = 3.6 V,	V _I = V _{CC} or GND					\pm 1	
I _{hold} pins	V _{CC} = 3 V,	V _I = 0.8 V			100			μ A
	V _{CC} = 3 V,	V _I = 2 V			-100			
I _{OZH}	V _{CC} = 0 or 3.6 V,	V _O = 3 V					10	μ A
I _{OZL}	V _{CC} = 0 or 3.6 V,	V _O = 0 V					-10	μ A
I _{CC}	V _{CC} = 3.6 V, V _I = V _{CC} or GND	I _O = 0,	Outputs high		0.25			mA
			Outputs low		15			
			Outputs disabled		0.25			
$\Delta I_{CC}^§$	V _{CC} = 3.6 V,	One input at 2.7 V,	Other inputs at V _{CC} or GND				0.75	mA
C _I	V _I = 3 V or 0 V						4	pF
C _O	V _O = 3 V or 0 V						8	pF

[†] All typical values are at V_{CC} = 3.3 V, T_A = 25°C.

[‡] Not to exceed 10 ms.

[§] This is the increase in supply current for each input that is at the specified TTL voltage level rather than V_{CC} or GND.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T _A = MIN to MAX				UNIT	
			V _{CC} = 3.3 V \pm 0.3 V		V _{CC} = 2.7 V			
			MIN	TYPT	MAX	MAX		
t _{PLH}	A or B	B or A		2.3			ns	
				2.5				
t _{PHL}	OE	A or B		3.1			ns	
				3.7				
t _{PZH}	OE	A or B		4.1			ns	
				3.3				
t _{PZL}	OE	A or B					ns	
t _{PHZ}	OE	A or B					ns	
t _{PLZ}	OE	A or B					ns	

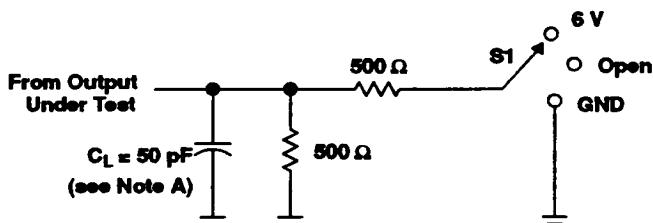
[†] All typical values are at V_{CC} = 3.3 V, T_A = 25°C.


**TEXAS
INSTRUMENTS**

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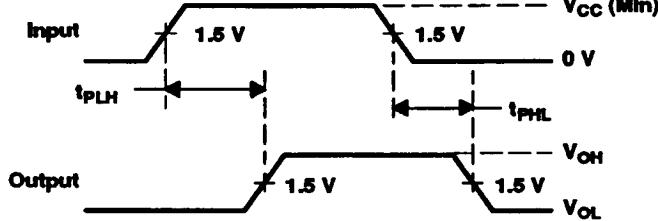
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PARAMETER MEASUREMENT INFORMATION

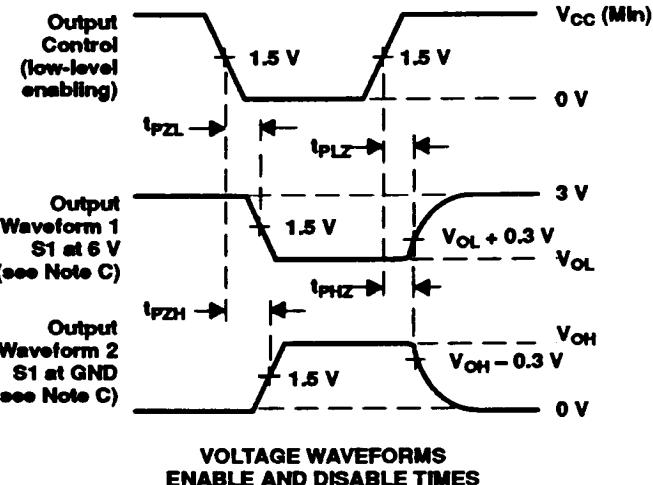


LOAD CIRCUIT FOR OUTPUTS

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	6 V
t_{PHZ}/t_{PZH}	GND



VOLTAGE WAVEFORMS
 PROPAGATION DELAY TIMES



VOLTAGE WAVEFORMS
 ENABLE AND DISABLE TIMES

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, $Z_o = 50 \Omega$, $t_r \leq 2.5$ ns, $t_f \leq 2.5$ 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 transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms