- *EPIC* ™ (Enhanced-Performance Implanted CMOS) Submicron Process
- Typical V_{OLP} (Output Ground Bounce) < 0.8 V at V_{CC} = 3.3 V, T_A = 25°C
- Typical V_{OHV} (Output V_{OH} Undershoot) > 2 V at V_{CC} = 3.3 V, T_A = 25°C
- Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages

DB, DW, OR PW PACKAGE
(TOP VIEW)

|		
DIR	1	20 V_{CC}
A1	2	19 $\overline{OE}$
A2	3	18 B1
A3	4	17 B2
A4	5	16 B3
A5	6	15 B4
A6	7	14 B5
A7	8	13 B6
A8	9	12 B7
GND	10	11 B8
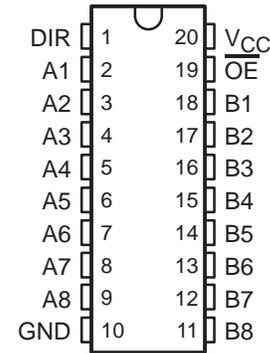
description

This octal bus transceiver is designed for 2.7-V to 3.6-V V_{CC} operation.

The SN74LVC245 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 ($\overline{OE}$) input can be used to disable the device so the buses are effectively isolated.

The SN74LVC245 is characterized for operation from −40°C to 85°C.

FUNCTION TABLE

INPUTS		OPERATION
$\overline{OE}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

logic symbol†
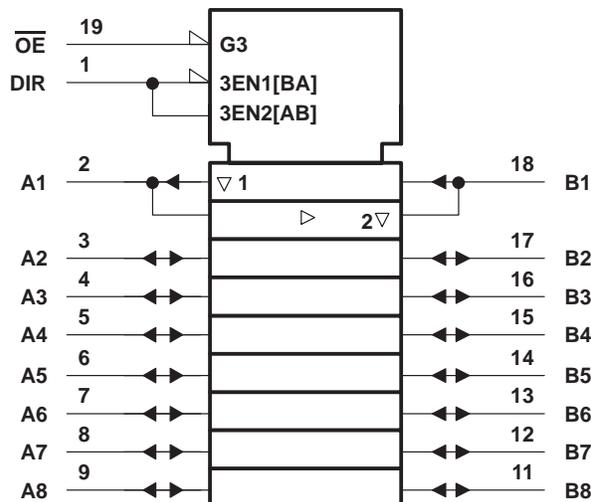
logic diagram (positive logic)

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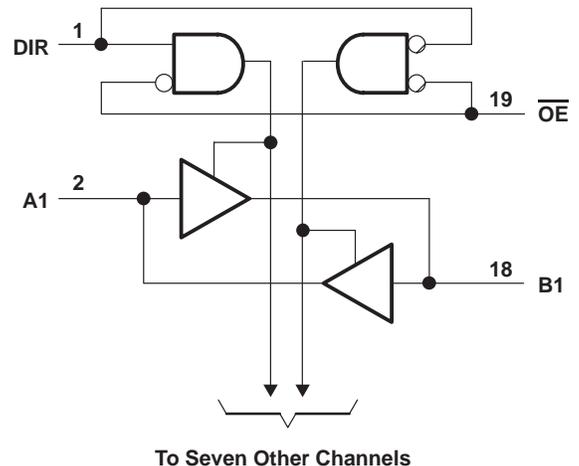
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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SN74LVC245
OCTAL BUS TRANSCEIVER
WITH 3-STATE OUTPUTS
SCAS218C – JANUARY 1993 – REVISED JULY 1994

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: except I/O ports .... −0.5 V to 4.6 V

                  I/O ports (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) .... −50 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 .... ±100 mA

Maximum power dissipation at T_A = 55°C (in still air) (see Note 2): DB package .... 0.6 W

                                     DW package .... 1.6 W

                                     PW package .... 0.7 W

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.

NOTES: 1. This value is limited to 4.6 V maximum.
2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils. For more information, refer to the *Package Thermal Considerations* application note in the 1994 *ABT Advanced BiCMOS Technology Data Book*, literature# SCBD002B.

recommended operating conditions (see Note 3)

			MIN	MAX	UNIT
V_{CC}	Supply voltage		2.7	3.6	V
V_{IH}	High-level input voltage	V_{CC} = 2.7 V to 3.6 V	2		V
V_{IL}	Low-level input voltage	V_{CC} = 2.7 V to 3.6 V		0.8	V
V_I	Input voltage		0	V_{CC}	V
V_O	Output voltage		0	V_{CC}	V
I_{OH}	High-level output current	V_{CC} = 2.7 V		−12	mA
		V_{CC} = 3 V		−24	
I_{OL}	Low-level output current	V_{CC} = 2.7 V		12	mA
		V_{CC} = 3 V		24	
Δt/Δv	Input transition rise or fall rate		0	10	ns/V
T_A	Operating free-air temperature		−40	85	°C

NOTE 3: Unused or floating pins (input or I/O) must be held high or low.

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

PARAMETER		TEST CONDITIONS		V_{CC}†	$T_A = -40°C$ to $85°C$			UNIT
					MIN	TYP	MAX	
V_{OH}		$I_{OH} = -100\ \mu A$		MIN to MAX	$V_{CC}-0.2$			V
		$I_{OH} = -12\ mA$		2.7 V	2.2			
				3 V	2.4			
		$I_{OH} = -24\ mA$		3 V	2			
V_{OL}		$I_{OL} = 100\ \mu A$		MIN to MAX			0.2	V
		$I_{OL} = 12\ mA$		2.7 V			0.4	
		$I_{OL} = 24\ mA$		3 V			0.55	
I_I		$V_I = V_{CC}$ or GND		3.6 V			±5	μA
I_{OZ}‡		$V_O = V_{CC}$ or GND		3.6 V			±10	μA
I_{CC}		$V_I = V_{CC}$ or GND,	$I_O = 0$	3.6 V			20	μA
ΔI_{CC}		$V_{CC} = 3$ V to 3.6 V, Other inputs at V_{CC} or GND	One input at $V_{CC} - 0.6$ V,				500	μA
C_i	Control inputs	$V_I = V_{CC}$ or GND		3.3 V		5.5		pF
C_{io}	A or B ports	$V_O = V_{CC}$ or GND		3.3 V		6.7		pF

† For conditions shown as MIN or MAX, use the appropriate values under recommended operating conditions.
‡ For I/O ports, the parameter I_{OZ} includes the input leakage current.

switching characteristics over recommended operating free-air temperature range, $C_L = 50$ pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 3.3$ V ± 0.3 V			$V_{CC} = 2.7$ V		UNIT
			MIN	TYP§	MAX	MIN	MAX	
t_{pd}	A or B	B or A	1.5	4	7		8	ns
t_{en}	$\overline{OE}$	A or B	1.5	4.5	9		10	ns
t_{dis}	$\overline{OE}$	A or B	1.5	5.5	8		9	ns

§ All typical values are $V_{CC} = 3.3$ V, $T_A = 25°C$.

operating characteristics, $V_{CC} = 3.3$ V, $T_A = 25°C$

PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance per transceiver	Outputs enabled	$C_L = 50$ pF, f = 10 MHz	25	pF
		Outputs disabled		2	

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PARAMETER MEASUREMENT INFORMATION
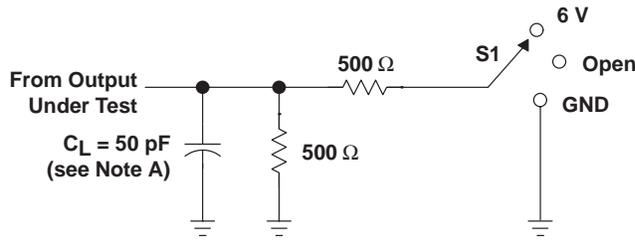
LOAD CIRCUIT FOR OUTPUTS

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	6 V
t_{PHZ}/t_{PZH}	GND
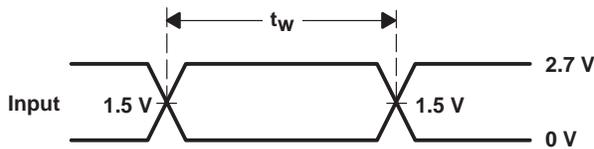
VOLTAGE WAVEFORMS
PULSE DURATION
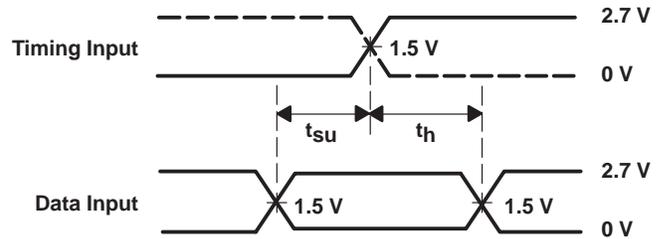
VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES
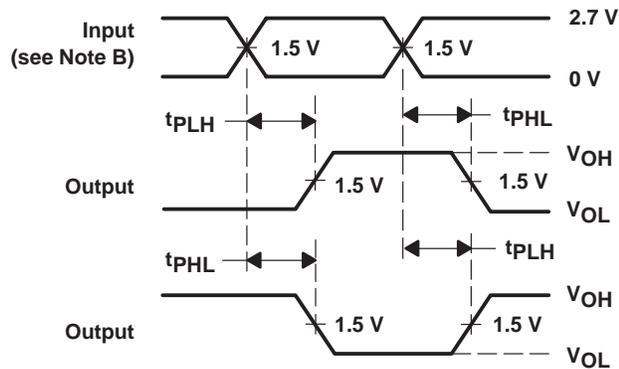
VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS
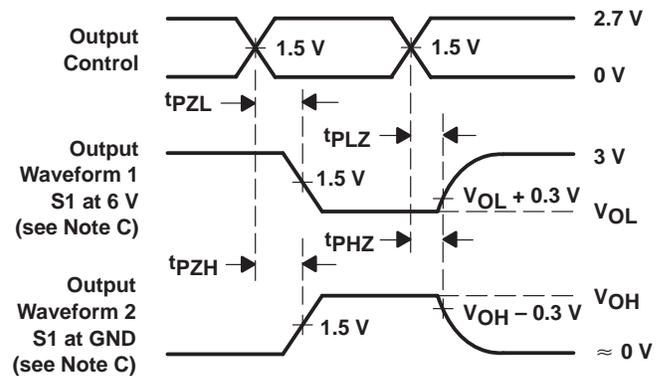
VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

NOTES: A. C_L includes probe and jig capacitance.
   B. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 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

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