

# SN74LVC245 OCTAL BUS TRANSCEIVER WITH 3-STATE OUTPUTS

SCAS218B - JANUARY 1993 - REVISED MARCH 1994

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

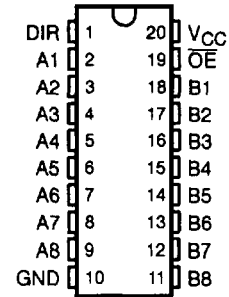
## description

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  $-40^\circ\text{C}$  to  $85^\circ\text{C}$ .

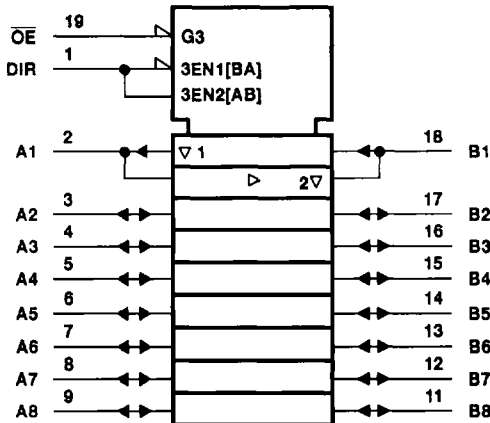
DB, DW, OR PW PACKAGE  
(TOP VIEW)



FUNCTION TABLE

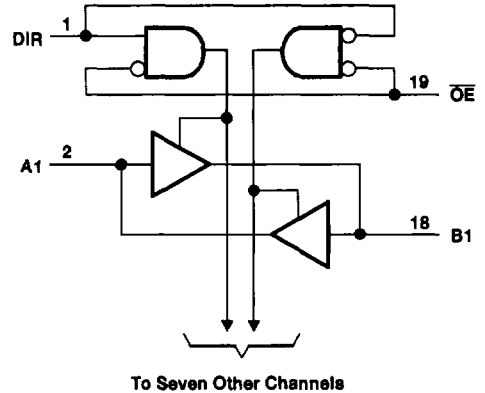
INPUTS		OPERATION
$\overline{OE}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

logic symbol†



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

logic diagram (positive logic)



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PRODUCT PREVIEW information concerns products in the formative or design phase of development. Characteristic data and other specifications are design goals. Texas Instruments reserves the right to change or discontinue these products without notice.

 **TEXAS  
INSTRUMENTS**

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PRODUCT PREVIEW

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**absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>**

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
Input voltage range, $V_I$ (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 $T_A = 55^\circ\text{C}$ (in still air): DB package .....	0.6 W
..... DW package .....	1.6 W
..... PW package .....	0.7 W
Storage temperature range .....	-65°C to 150°C

<sup>†</sup> 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: This value is limited to 4.6 V maximum.

**recommended operating conditions (see Note 2)**

		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		V
$V_{IL}$	Low-level input voltage	$V_{CC} = 2.7$ V to 3.6 V		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	
$\Delta t/\Delta v$	Input transition rise or fall rate	0	10	ns/V
$T_A$	Operating free-air temperature	-40	85	°C

NOTE 2: 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 <sub>CC</sub> †	T <sub>A</sub> = -40°C to 85°C			UNIT
			MIN	TYP	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = -100 μA	MIN to MAX	V <sub>CC</sub> - 0.2			V
	I <sub>OH</sub> = -12 mA	2.7 V	2.2			
	I <sub>OH</sub> = -24 mA	3 V	2.4			
V <sub>OL</sub>	I <sub>OL</sub> = 100 μA	MIN to MAX	0.2			V
	I <sub>OL</sub> = 12 mA	2.7 V	0.4			
	I <sub>OL</sub> = 24 mA	3 V	0.55			
I <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	3.6 V	±5			μA
I <sub>OZ</sub> ‡	V <sub>O</sub> = V <sub>CC</sub> or GND	3.6 V	±10			μA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	3.6 V	20			μA
ΔI <sub>CC</sub>	V <sub>CC</sub> = 3 V to 3.6 V, One input at V <sub>CC</sub> - 0.6 V, Other inputs at V <sub>CC</sub> or GND		500			μA
C <sub>i</sub>	Control inputs V <sub>I</sub> = V <sub>CC</sub> or GND	3.3 V	3			pF
C <sub>io</sub>	A or B ports V <sub>O</sub> = V <sub>CC</sub> or GND	3.3 V	4			pF

† For conditions shown as MIN or MAX, use the appropriate values under recommended operating conditions.

‡ For I/O ports, the parameter I<sub>OZ</sub> includes the input leakage current.

**switching characteristics over recommended operating free-air temperature range, C<sub>L</sub> = 50 pF (unless otherwise noted) (see Note 3)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 3.3 V ± 0.3 V		V <sub>CC</sub> = 2.7 V		UNIT
			MIN	MAX	MIN	MAX	
t <sub>pd</sub>	A or B	B or A	1.5	7	8		ns
t <sub>en</sub>	$\overline{OE}$	A or B	1.5	9	10		ns
t <sub>dis</sub>	$\overline{OE}$	A or B	1.5	8	9		ns

NOTE 3: Load circuit and voltage waveforms are shown in Section 1.

**operating characteristics, V<sub>CC</sub> = 3.3 V, T<sub>A</sub> = 25°C**

PARAMETER		TEST CONDITIONS	TYP	UNIT
C <sub>pd</sub>	Power dissipation capacitance per transceiver	Outputs enabled	25	pF
		Outputs disabled	2	

