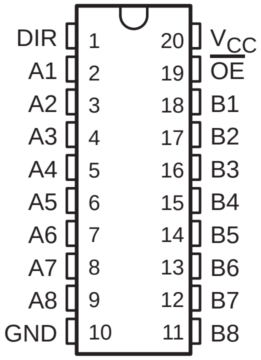
SN64BCT245
OCTAL BUS TRANSCEIVER
WITH 3-STATE OUTPUTS

SCBS040A – JANUARY 1990 – REVISED JANUARY 1994

- **BiCMOS Design Significantly Reduces I_{CCZ}**
- **3-State True Outputs Drive Bus Lines Directly**
- **High-Impedance State During Power Up and Power Down**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015**
- **Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic 300-mil DIPs (N)**

DW OR N PACKAGE
(TOP VIEW)



description

This octal bus transceiver is designed for asynchronous communication between data buses. The devices transmit 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 ($\overline{\text{OE}}$) input can be used to disable the device so the buses are effectively isolated.

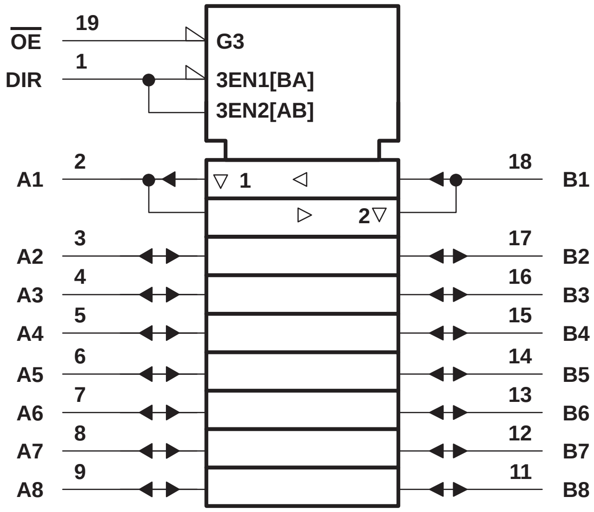
The outputs are in a high-impedance state during power up and power down while the supply voltage is less than approximately 3 V.

The SN64BCT245 is characterized for operation from –40°C to 85°C and 0°C to 70°C.

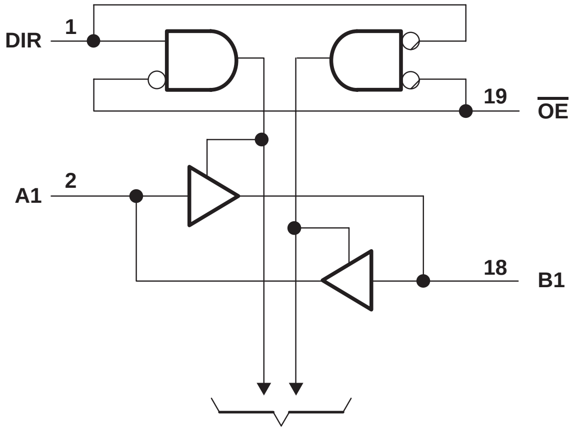
FUNCTION TABLE

INPUTS		OPERATION
$\overline{\text{OE}}$	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

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

TEXAS INSTRUMENTS

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 7 V
Voltage range applied to any output in the disabled or power-off state, V_O . . . . – 0.5 V to 5.5 V
Voltage range applied to any output in the high state, V_O . . . . – 0.5 V to V_{CC}
Current into any output in the low state . . . . 128 mA
Operating free-air temperature range . . . . – 40°C to 85°C
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

			MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage		4.5	5	5.5	V
V_{IH}	High-level input voltage		2			V
V_{IL}	Low-level input voltage				0.8	V
I_{IK}	Input clamp current				–18	mA
I_{OH}	High-level output current	A1 – A8			–3	mA
		B1 – B8			–15	
I_{OL}	Low-level output current	A1 – A8			24	mA
		B1 – B8			64	
T_A	Operating free-air temperature		–40		85	°C

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

PARAMETER		TEST CONDITIONS			MIN	TYP†	MAX	UNIT
V_{IK}		$V_{CC} = 4.5$ V,	$I_I = –18$ mA				–1.2	V
V_{OH}	Any A	$V_{CC} = 4.5$ V	$I_{OH} = –1$ mA		2.5	3.4		V
	Any A or B		$I_{OH} = –3$ mA		2.4	3.3		
	Any B		$I_{OH} = –15$ mA		2	3.1		
V_{OL}	Any A	$V_{CC} = 4.5$ V	$I_{OL} = 24$ mA			0.35	0.5	V
	Any B		$I_{OL} = 64$ mA			0.42	0.55	
I_{OZ}	Power up	$V_{CC} = 0$ to 2.3 V	$V_O = 2.7$ V	$\overline{OE}$ at 0.8 V			70	µA
			$V_O = 0.5$ V				–0.65	mA
	Power down	$V_{CC} = 1.8$ V to 0	$V_O = 2.7$ V	$\overline{OE}$ at 0.8 V			70	µA
			$V_O = 0.5$ V				–0.65	mA
I_I‡	A and B	$V_{CC} = 5.5$ V,	$V_I = 5.5$ V				1	mA
	DIR and $\overline{OE}$						0.1	
I_{IH}‡	A and B	$V_{CC} = 5.5$ V,	$V_I = 2.7$ V				70	µA
	DIR and $\overline{OE}$						20	
I_{IL}	A and B	$V_{CC} = 5.5$ V,	$V_I = 0.5$ V				–0.65	mA
	DIR and $\overline{OE}$						–1.2	
I_{OS}§	Any A	$V_{CC} = 5.5$ V,	$V_O = 0$		–60		–150	mA
	Any B				–100		–225	
I_{CCH}	A-to-B	$V_{CC} = 5.5$ V				36	57	mA
I_{CCL}	A-to-B	$V_{CC} = 5.5$ V				57	90	
I_{CCZ}		$V_{CC} = 5.5$ V				10	15	
C_i	$\overline{OE}$ and DIR	$V_{CC} = 5$ V,	$V_I = 2.5$ V or 0.5 V			7		pF
C_{io}	A to B	$V_{CC} = 5$ V,	$V_I = 2.5$ V or 0.5 V			9		pF
	B to A					12		

† All typical values are at $V_{CC} = 5$ V, $T_A = 25°C$.
‡ For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.
§ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5$ V, $C_L = 50$ pF, R1 = 500 Ω, R2 = 500 Ω, $T_A = 25°C$		$V_{CC} = 4.5$ V to 5.5 V, $C_L = 50$ pF, R1 = 500 Ω, R2 = 500 Ω				UNIT
					$T_A = –40°C$ to 85°C		$T_A = 0°C$ to 70°C		
			MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	1	6	1	7.2	1	7	ns
t_{PHL}			1.5	6.6	1.5	7.6	1.5	7	
t_{PZH}	$\overline{OE}$	A or B	1.5	9.4	1.5	11.2	1.5	10.9	ns
t_{PZL}			1.5	10.2	1.5	11.8	1.5	11.6	
t_{PHZ}	$\overline{OE}$	A or B	1.5	8.3	1.5	9.7	1.5	9.3	ns
t_{PLZ}			1.5	7.8	1.5	9.6	1.5	9.1	

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

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