

# SN54BCT245, SN74BCT245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS013F – SEPTEMBER 1988 – REVISED APRIL 1994

- State-of-the-Art BiCMOS Design Significantly Reduces  $I_{CCZ}$
- ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Package Options Include Plastic Small-Outline (DW) and Shrink Small-Outline (DB) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Standard Plastic and Ceramic 300-mil DIPs (J, N)

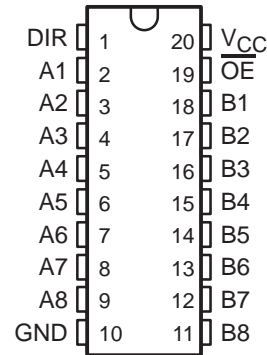
## description

These octal bus transceivers are 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 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.

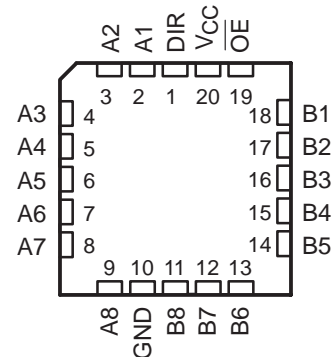
The SN74BCT245 is available in TI's shrink small-outline package (DB), which provides the same I/O pin count and functionality of standard small-outline packages in less than half the printed-circuit-board area.

The SN54BCT245 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74BCT245 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

SN54BCT245 . . . J OR W PACKAGE  
SN74BCT245 . . . DB, DW, OR N PACKAGE  
(TOP VIEW)



SN54BCT245 . . . FK 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



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## recommended operating conditions

		SN54BCT245			SN74BCT245			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
$V_{CC}$	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
$V_{IH}$	High-level input voltage	2			2			V
$V_{IL}$	Low-level input voltage			0.8			0.8	V
$I_{IK}$	Input clamp current			-18			-18	mA
$I_{OH}$	High-level output current	A port		-3	B port		-3	mA
		B port		-12	A port		-15	
$I_{OL}$	Low-level output current	A port		20	B port		24	mA
		B port		48	A port		64	
$T_A$	Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER		TEST CONDITIONS		SN54BCT245			SN74BCT245			UNIT
				MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$		$V_{CC} = 4.5\text{ V}$ ,	$I_I = -18\text{ mA}$			-1.2			-1.2	V
$V_{OH}$	A port	$V_{CC} = 4.5\text{ V}$	$I_{OH} = -1\text{ mA}$	2.5	3.4		2.5	3.4		V
			$I_{OH} = -3\text{ mA}$	2.4	3.3		2.4	3.3		
	B port	$V_{CC} = 4.5\text{ V}$	$I_{OH} = -3\text{ mA}$	2.4	3.3		2.4	3.3		
			$I_{OH} = -12\text{ mA}$	2	3.2					
			$I_{OH} = -15\text{ mA}$				2	3.1		
$V_{OL}$	A port	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 20\text{ mA}$		0.3	0.5				V
			$I_{OL} = 24\text{ mA}$					0.35	0.5	
	B port	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 48\text{ mA}$		0.38	0.55				
			$I_{OL} = 64\text{ mA}$					0.42	0.55	
$I_I$	A or B port	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 5.5\text{ V}$			1			1	mA
	Control input					0.1		0.1		
$I_{IH}‡$	A or B port	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 2.7\text{ V}$			70			70	µA
	Control input					20		20		
$I_{IL}‡$	A or B port	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 0.5\text{ V}$			-0.65			-0.65	mA
	Control input					-1.2		-1.2		
$I_{OS}§$	A port	$V_{CC} = 5.5\text{ V}$ ,	$V_O = 0$	-60		-150	-60		-150	mA
	B port			-100		-225	-100		-225	
$I_{CCL}$	A to B	$V_{CC} = 5.5\text{ V}$		57	90		57	90		mA
$I_{CCH}$	A to B	$V_{CC} = 5.5\text{ V}$		36	57		36	57		mA
$I_{CCZ}$		$V_{CC} = 5.5\text{ V}$		10	15		10	15		mA
$C_i$	Control input	$V_{CC} = 5\text{ V}$ ,	$V_I = 2.5\text{ V}$ or $0.5\text{ V}$		7			7		pF
$C_{io}$	A to B	$V_{CC} = 5\text{ V}$ ,	$V_O = 2.5\text{ V}$ or $0.5\text{ V}$		9			9		pF
	B to A				12			12		

† All typical values are at  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

‡ 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.



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## switching characteristics (see Note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = 25°C			V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX†				UNIT
			'BCT245			SN54BCT245		SN74BCT245		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	B or A	1	4.4	6	1	7.2	1	7	ns
t <sub>PHL</sub>			1.5	4.8	6.6	1.5	7.6	1.5	7	
t <sub>PZH</sub>	$\overline{OE}$	A or B	1.5	8	9.4	1.5	11.2	1.5	10.9	ns
t <sub>PZL</sub>			1.5	8	10.2	1.5	11.8	1.5	11.6	
t <sub>PHZ</sub>	$\overline{OE}$	A or B	1.5	5.8	8.3	1.5	9.7	1.5	9.3	ns
t <sub>PLZ</sub>			1.5	5.1	7.8	1.5	9.6	1.5	9.1	

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

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

TYPICAL CHARACTERISTICS†

Figures 1 through 4 show the typical power dissipation for an SN74BCT245 over variations in outputs switching, output frequency, and capacitive load.

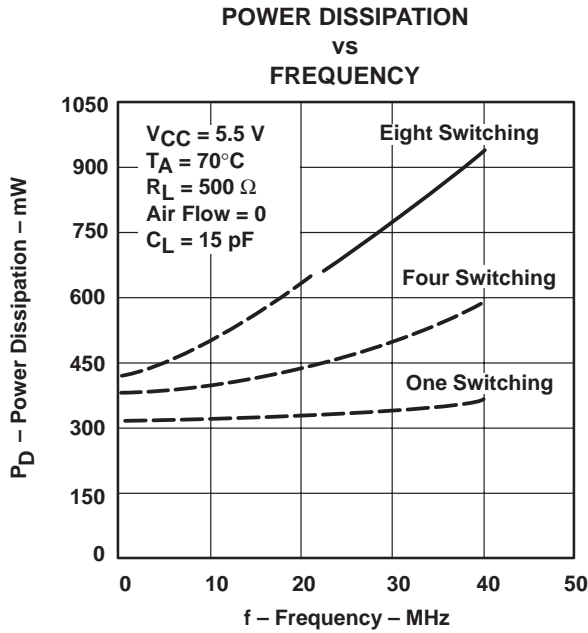


Figure 1

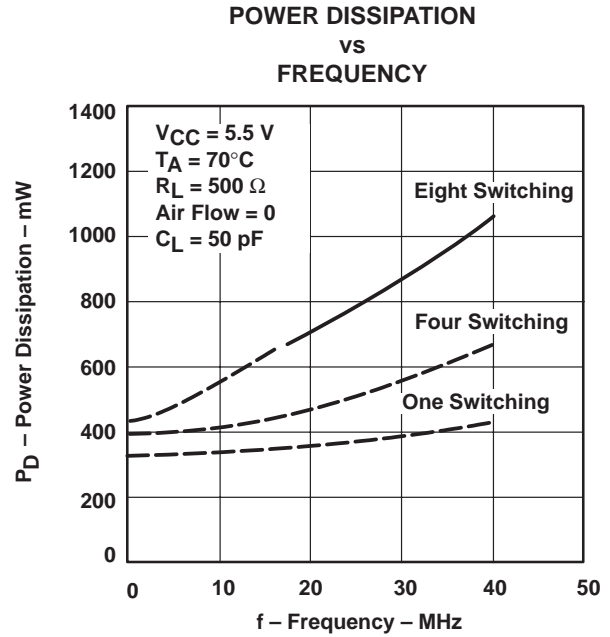


Figure 2

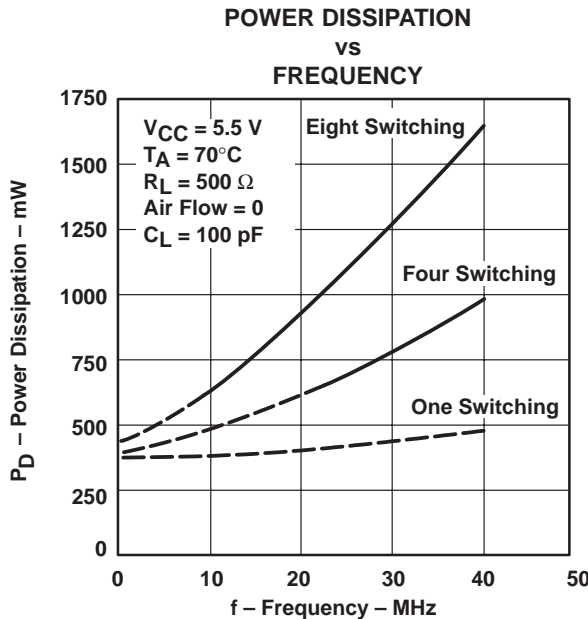


Figure 3

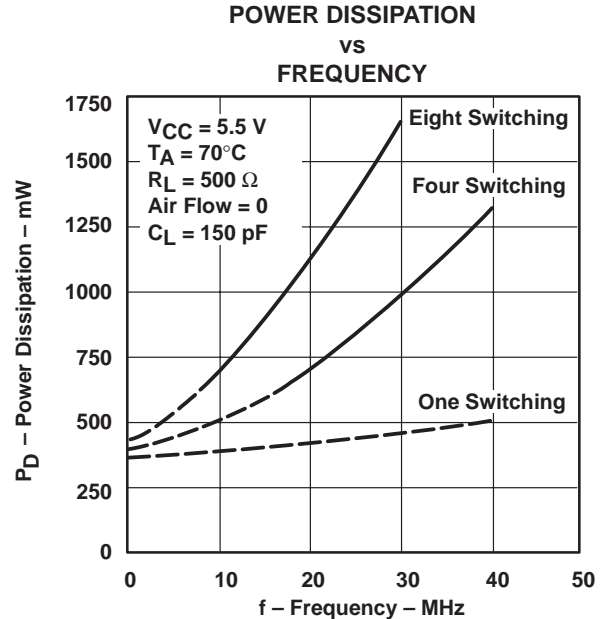


Figure 4

† The dashed lines are for the DB package only.



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