

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)

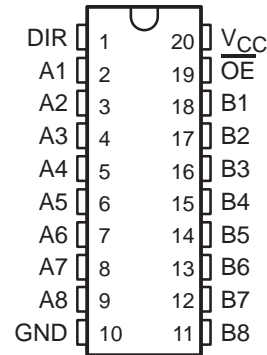
description

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.

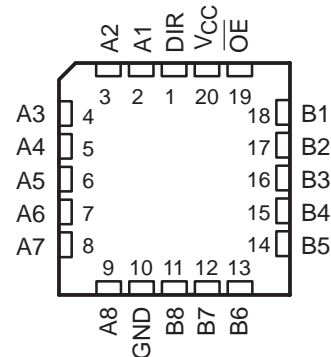
The SN74BCT245 is available in TI's shrink small-outline package (DB), which provides the same I/O pin count and functionality of standard small-outline packages in less than half the printed-circuit-board area.

The SN54BCT245 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74BCT245 is characterized for operation from 0°C to 70°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			-3	mA
		B port		-12			-15	
I_{OL}	Low-level output current	A port		20			24	mA
		B port		48			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	mA	
	B port					-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 V			7		7		pF
C_{io}	A to B	$V_{CC} = 5\text{ V}$,	$V_O = 2.5\text{ V}$ or 0.5 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 _{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, T _A = MIN to MAX†				UNIT
			'BCT245			SN54BCT245		SN74BCT245		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A or B	B or A	1	4.4	6	1	7.2	1	7	ns
t _{PHL}			1.5	4.8	6.6	1.5	7.6	1.5	7	
t _{PZH}	\overline{OE}	A or B	1.5	8	9.4	1.5	11.2	1.5	10.9	ns
t _{PZL}			1.5	8	10.2	1.5	11.8	1.5	11.6	
t _{PHZ}	\overline{OE}	A or B	1.5	5.8	8.3	1.5	9.7	1.5	9.3	ns
t _{PLZ}			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.

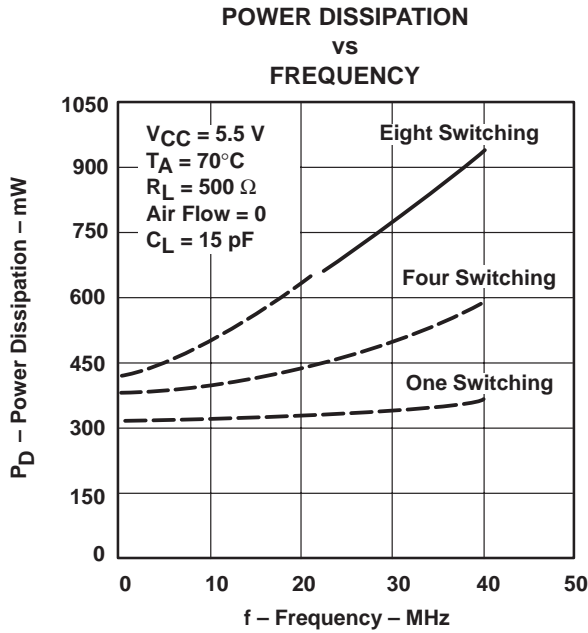


Figure 1

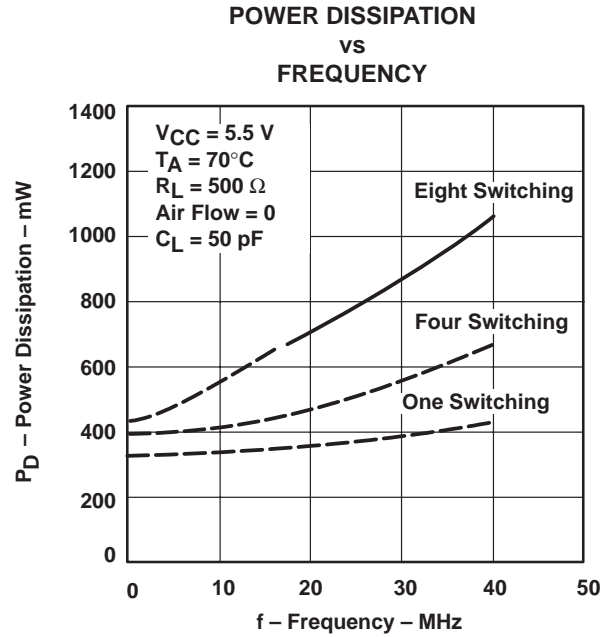


Figure 2

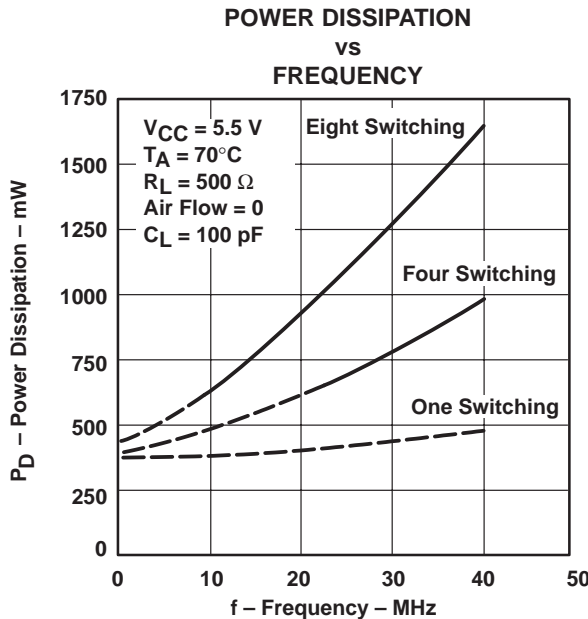


Figure 3

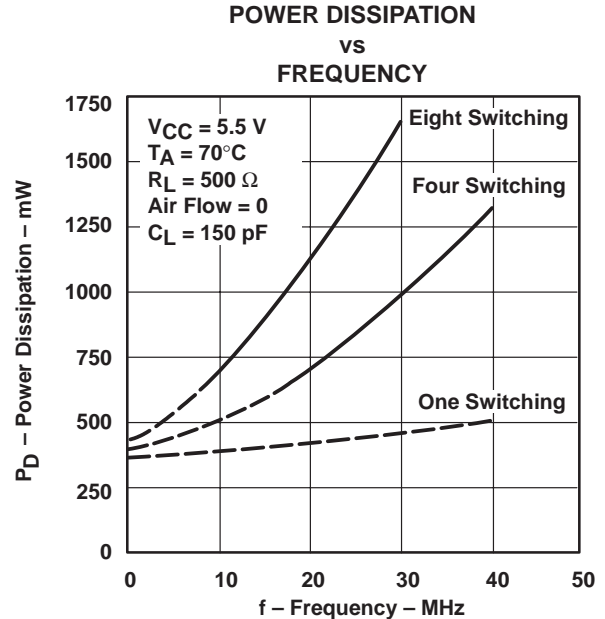


Figure 4

† The dashed lines are for the DB package only.

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