

# SN54BCT25245, SN74BCT25245 25-Ω OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS053B – MAY 1990 – REVISED APRIL 1994

- State-of-the-Art BiCMOS Design Significantly Reduces  $I_{CCZ}$
- ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015; Exceeds 200 V Using Machine Model (C = 200 pF, R = 0)
- Designed to Facilitate Incident-Wave Switching for Line Impedances of 25 Ω or Greater
- Distributed  $V_{CC}$  and GND Pins Minimize Noise Generated by the Simultaneous Switching of Outputs
- Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Standard Plastic and Ceramic 300-mil DIPs (JT, NT)

## description

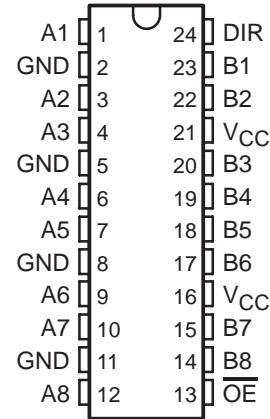
The 'BCT25245 is a 25-Ω octal bus transceiver designed for asynchronous communication between data buses. It improves both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented transceivers.

The device allows data transmission 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 disable the device so that both buses are effectively isolated.

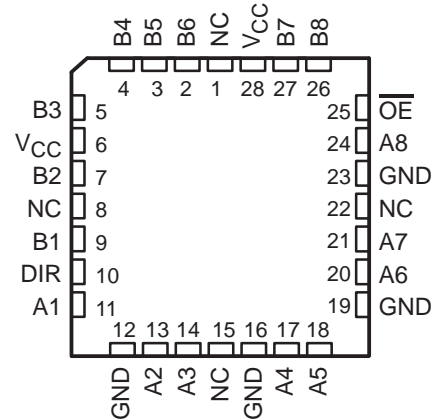
These transceivers are capable of sinking 188-mA  $I_{OL}$ , which facilitates switching 25-Ω transmission lines on the incident wave. The distributed  $V_{CC}$  and GND pins minimize switching noise for more reliable system operation.

The SN54BCT25245 is characterized for operation over the full military temperature range of -55°C to 125°C. The SN74BCT25245 is characterized for operation from 0°C to 70°C.

SN54BCT25245 . . . JT OR W PACKAGE  
SN74BCT25245 . . . DW OR NT PACKAGE  
(TOP VIEW)



SN54BCT25245 . . . FK PACKAGE  
(TOP VIEW)



NC – No internal connection

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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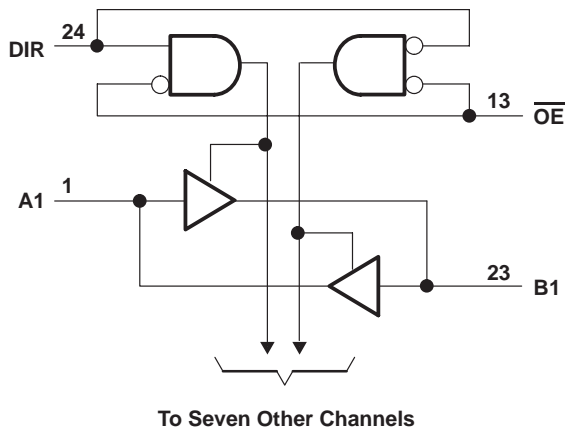
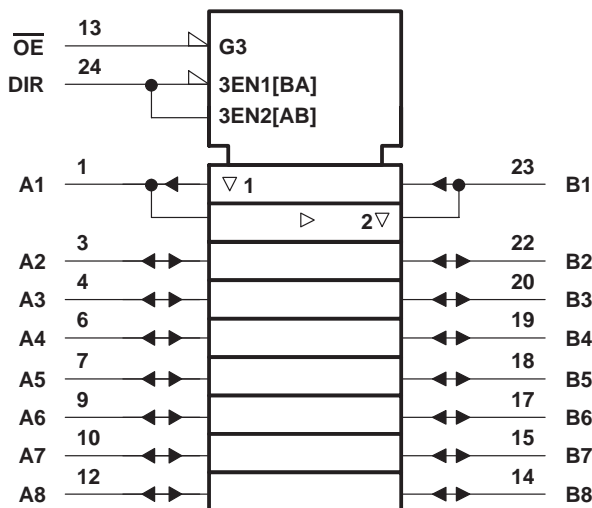


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**logic diagram (positive logic)**



Pin numbers shown are for the DW, JT, NT, and W packages.

Supply voltage range, $V_{CC}$	.....	-0.5 V to 7 V
Input voltage range, $V_I$ (see Note 1): Control inputs	.....	-0.5 V to 7 V
I/O ports	.....	-0.5 V to 5.5 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, $V_O$ (B port)	.....	-0.5 V to $V_{CC}$
Input clamp current, $I_{IK}$	.....	-30 mA
Current into any output in the low state, $I_O$ : SN54BCT25245 (A port)	.....	250 mA
SN54BCT25245 (B port)	.....	40 mA
SN74BCT25245 (A port)	.....	376 mA
SN74BCT25245 (B port)	.....	48 mA
Operating free-air temperature range: SN54BCT25245	.....	-55°C to 125°C
SN74BCT25245	.....	0°C to 70°C
Storage temperature range	.....	-65°C to 150°C

NOTE 1: The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

# SN54BCT25245, SN74BCT25245 25-Ω OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

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## recommended operating conditions

		SN54BCT25245			SN74BCT25245			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V <sub>IH</sub>	High-level input voltage	2			2			V
V <sub>IL</sub>	Low-level input voltage			0.8			0.8	V
I <sub>IK</sub>	Input clamp current			–18			–18	mA
I <sub>OH</sub>	High-level output current	A port		–53			–80	mA
		B port		–3			–3	
I <sub>OL</sub>	Low-level output current	A port		125			188	mA
		B port		20			24	
T <sub>A</sub>	Operating free-air temperature	–55		125	0		70	°C

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

PARAMETER		TEST CONDITIONS		SN54BCT25245			SN74BCT25245			UNIT
				MIN	TYP†	MAX	MIN	TYP†	MAX	
V <sub>IK</sub>		V <sub>CC</sub> = 4.5 V, I <sub>I</sub> = –18 mA				–1.2			–1.2	V
V <sub>OH</sub>	A port	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = –53 mA		2						V
		I <sub>OH</sub> = –80 mA					2			
	B port	V <sub>CC</sub> = 4.75 V, I <sub>OH</sub> = –3 mA					2.7			
V <sub>OL</sub>	A port	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 94 mA		0.38	0.55		0.42	0.55		V
		I <sub>OL</sub> = 125 mA			0.8					
		I <sub>OL</sub> = 188 mA						0.7		
	B port	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 20 mA		0.3	0.5					
		I <sub>OL</sub> = 24 mA					0.35	0.5		
I <sub>I</sub>	A or B port	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 5.5 V			0.25			0.25		mA
	Control input				0.1			0.1		
I <sub>IH</sub> ‡	A or B port	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 2.7 V			70			70		μA
	Control input				20			20		
I <sub>IL</sub> ‡	A or B port	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.5 V			–0.6			–0.6		mA
	Control input				–0.6			–0.6		
I <sub>OS</sub> §	B port only¶	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 0		–60		–150	–60		–150	mA
I <sub>CCH</sub>	A to B	V <sub>CC</sub> = 5.5 V		36	46		36	46		mA
	B to A			63	80		63	80		
I <sub>CCL</sub>	A to B	V <sub>CC</sub> = 5.5 V		48	60		48	60		mA
	B to A			95	125		95	125		
I <sub>CCZ</sub>		V <sub>CC</sub> = 5.5 V		12	16		12	16		mA
C <sub>i</sub>	Control input	V <sub>CC</sub> = 5 V, V <sub>I</sub> = 2.5 V or 0.5 V		8			8			pF
C <sub>io</sub>	A port	V <sub>CC</sub> = 5 V, V <sub>O</sub> = 2.5 V or 0.5 V		18			18			pF
	B port			8			8			

† All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

‡ For I/O ports, the parameters I<sub>IH</sub> and I<sub>IL</sub> 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.

¶ Testing for this parameter on the A port is not recommended.

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# SN54BCT25245, SN74BCT25245

## 25-Ω OCTAL BUS TRANSCEIVERS

### WITH 3-STATE OUTPUTS

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#### switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 5 V, C <sub>L</sub> = 50 pF, R1 = 500 Ω, R2 = 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, R1 = 500 Ω, R2 = 500 Ω, T <sub>A</sub> = MIN to MAX†				UNIT
			BCT25245			SN54BCT25245		SN74BCT25245		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	B	1.2	3.3	5.1	1.2	5.8	1.2	5.7	ns
t <sub>PHL</sub>			1.9	4.3	6.7	1.9	7.6	1.9	7.2	
t <sub>PLH</sub>	B	A	1.2	3.3	4.8	1.2	5.7	1.2	5.5	ns
t <sub>PHL</sub>			2.1	4	5.6	2.1	6.4	2.1	6.2	
t <sub>PZH</sub>	OE	A	3.7	6.3	8.4	3.7	10.1	3.7	9.6	ns
t <sub>PZL</sub>			4.5	7.4	9.2	4.5	11.1	4.5	10.3	
t <sub>PHZ</sub>	OE	A	1.8	3.7	5.5	1.8	6.4	1.8	6.2	ns
t <sub>PLZ</sub>			3.3	5.1	7.2	3.3	9.6	3.3	8.3	
t <sub>PZH</sub>	OE	B	3.4	5.7	7.9	3.4	9.2	3.4	8.9	ns
t <sub>PZL</sub>			4.3	6.6	8.7	4.3	10.1	4.3	9.7	
t <sub>PHZ</sub>	OE	B	2.7	4.5	6.3	2.7	7.2	2.7	6.9	ns
t <sub>PLZ</sub>			1.7	4.5	6.8	1.7	8.3	1.7	7.5	

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

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

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**TAPE AND REEL INFORMATION**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74BCT25245DWR	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74BCT25245DWR	SOIC	DW	24	2000	346.0	346.0	41.0

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