

# SN54BCT620A, SN74BCT620A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS001B – SEPTEMBER 1987 – REVISED NOVEMBER 1993

- State-of-the-Art BiCMOS Design Significantly Reduces  $I_{CCZ}$
- P-N-P Inputs Reduce DC Loading
- ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015
- Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Plastic and Ceramic 300-mil DIPs (J, N)

## description

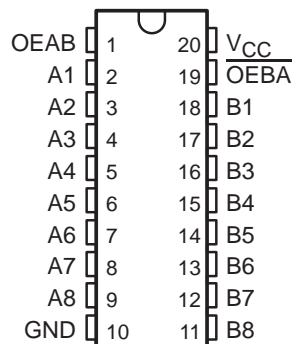
The 'BCT620A bus transceiver is designed for asynchronous communication between data buses. The control function implementation allows for maximum flexibility in timing. The 'BCT620A provides inverted data at its outputs.

These devices allow data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic levels at the output-enable (OEAB and  $\overline{OEBA}$ ) inputs.

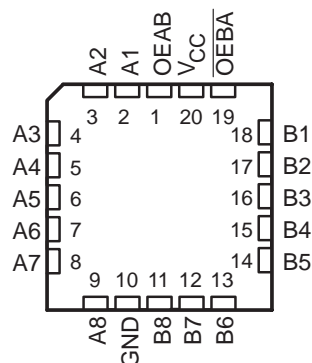
The output-enable inputs can be used to disable the device so that the buses are effectively isolated. The dual-enable configuration gives the transceivers the capability of storing data by simultaneously enabling OEAB and  $\overline{OEBA}$ . When both OEAB and  $\overline{OEBA}$  are enabled and all other data sources to the two sets of bus lines are at high impedance, both sets of bus lines (16 in all) will remain at their last states. In this way, each output reinforces its input in this configuration.

The SN54BCT620A is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74BCT620A is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

SN54BCT620A . . . J OR W PACKAGE  
SN74BCT620A . . . DW OR N PACKAGE  
(TOP VIEW)



SN54BCT620A . . . FK PACKAGE  
(TOP VIEW)



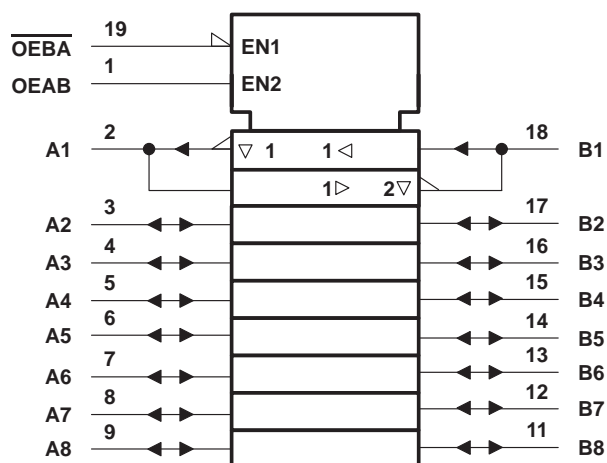
FUNCTION TABLE

INPUTS		OPERATION
$\overline{OEBA}$	OEAB	
L	L	$\overline{B}$ data to A bus
L	H	$\overline{B}$ data to A bus, A data to B bus
H	L	Isolation
H	H	A data to B bus

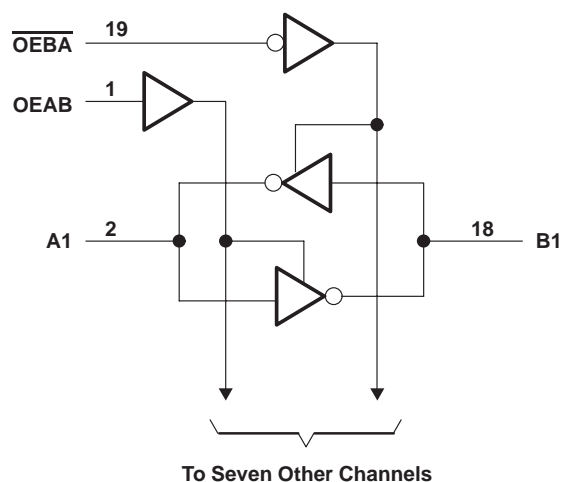
# SN54BCT620A, SN74BCT620A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS001B – SEPTEMBER 1987 – REVISED NOVEMBER 1993

## logic symbol†



## logic diagram (positive logic)



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

## 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: Control inputs (see Note 1) .....	- 0.5 V to 7 V
I/O ports (see Note 1) .....	- 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, $V_O$ .....	- 0.5 V to $V_{CC}$
Input clamp current, $I_{IK}$ .....	-30 mA
Current into any output in the low state: SN54BCT620A .....	96 mA
SN74BCT620A .....	128 mA
Operating free-air temperature range: SN54BCT620A .....	- 55°C to 125°C
SN74BCT620A .....	0°C to 70°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

		SN54BCT620A			SN74BCT620A			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	mA
$I_{OL}$	Low-level output current	A port		20			24	mA
		B port		48			64	mA
$T_A$	Operating free-air temperature	-55		125	0		70	°C



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

# SN54BCT620A, SN74BCT620A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS001B – SEPTEMBER 1987 – REVISED NOVEMBER 1993

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

PARAMETER		TEST CONDITIONS		SN54BCT620A			SN74BCT620A			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> = -1 mA	2.5	3.4		2.5	3.4	V	
			I <sub>OH</sub> = -3 mA	2.4	3.3		2.4	3.3		
	B port		I <sub>OH</sub> = -3 mA	2.4	3.3		2.4	3.3		
			I <sub>OH</sub> = -12 mA	2	3.2					
			I <sub>OH</sub> = -15 mA				2	3.1		
V <sub>OL</sub>	A port	V <sub>CC</sub> = 4.5 V	I <sub>OL</sub> = 20 mA		0.3	0.5			V	
			I <sub>OL</sub> = 24 mA				0.35	0.5		
	B port		I <sub>OL</sub> = 48 mA		0.38	0.55				
			I <sub>OL</sub> = 64 mA				0.42	0.55		
I <sub>I</sub>	A or B port	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 5.5 V			1		1	mA		
	OEAB or OEBA				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		
	OEAB or OEBA				20		20			
I <sub>IL</sub> ‡	A or B port	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.5 V			-0.65		-0.65	mA		
	OEAB or OEBA				-0.6		-0.6			
I <sub>OS</sub> §	A port	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 0		-60	-150		-60	mA		
	B port			-100	-225		-100		-225	
I <sub>CCL</sub>	A to B	V <sub>CC</sub> = 5.5 V		53	84		53	84	mA	
I <sub>CCH</sub>	A to B	V <sub>CC</sub> = 5.5 V		23	37		23	37	mA	
I <sub>CCZ</sub>		V <sub>CC</sub> = 5.5 V		4	10		4	10	mA	
C <sub>i</sub>	OEAB or OEBA	V <sub>CC</sub> = 5 V, V <sub>I</sub> = 2.5 V or 0.5 V		5			5		pF	
C <sub>io</sub>	A to B	V <sub>CC</sub> = 5 V, V <sub>O</sub> = 2.5 V or 0.5 V		9			9		pF	
	B to A			12			12			

† 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.



# SN54BCT620A, SN74BCT620A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS001B – SEPTEMBER 1987 – REVISED NOVEMBER 1993

## switching characteristics (see Note 2)

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	
			BCT620A			SN54BCT620A		SN74BCT620A		
			MIN	TYP	MAX	MIN	MAX	MIN		MAX
t <sub>PLH</sub>	A	B	0.6	3.4	5.2	0.6	6.2	0.6	5.8	ns
t <sub>PHL</sub>			0.1	1.9	3.4	0.1	3.7	0.1	3.6	
t <sub>PLH</sub>	B	A	0.9	4.1	6	0.9	7.2	0.9	6.9	ns
t <sub>PHL</sub>			0.1	2	3.7	0.1	4	0.1	3.9	
t <sub>PZH</sub>	$\overline{\text{OEBA}}$	A	3.5	7.2	9.2	3.5	10.9	3.5	10.6	ns
t <sub>PZL</sub>			3.7	7.6	9.9	3.7	11.5	3.7	11.1	
t <sub>PHZ</sub>	$\overline{\text{OEBA}}$	A	3.1	5.3	8.6	3.1	10.8	3.1	10	ns
t <sub>PLZ</sub>			1.3	4.4	6.9	1.3	8.3	1.3	7.8	
t <sub>PZH</sub>	OEAB	B	2	5.3	6.7	2	7.9	2	7.4	ns
t <sub>PZL</sub>			2.9	6.1	8.1	2.9	9.2	2.9	9	
t <sub>PHZ</sub>	OEAB	B	2.1	5.2	7	2.1	8.5	2.1	8.1	ns
t <sub>PLZ</sub>			0.1	3.7	5.3	0.1	6	0.1	5.9	

† 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.



## **IMPORTANT NOTICE**

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.