

# SN54BCT29863B, SN74BCT29863B 9-BIT BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS015D – NOVEMBER 1988 – REVISED NOVEMBER 1993

- BiCMOS Design Substantially Reduces  $I_{CCZ}$
- Functionally Equivalent to 'ALS29863 and AMD Am29863A
- Power-Up High-Impedance State
- ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015
- Package Options Include Plastic Small-Outline Packages (DW), Ceramic Chip Carriers (FK) and Flatpacks (W), and Standard Plastic and Ceramic 300-mil DIPs (JT, NT)

## description

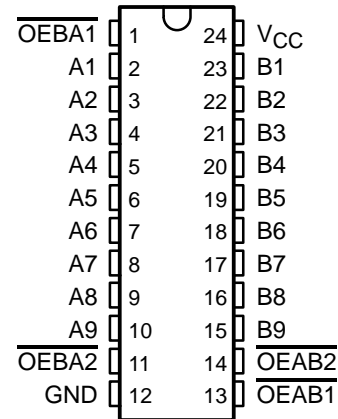
These 9-bit transceivers are designed for asynchronous communication between data buses. The control-function implementation allows for maximum flexibility in timing.

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 ( $\overline{OEBA}$  and  $\overline{OEAB}$ ) inputs.

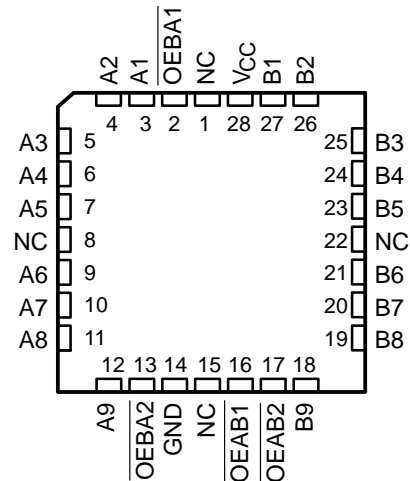
The outputs are in the high-impedance state during power-up and power-down conditions. The outputs remain in the high-impedance state while the device is powered down.

The SN54BCT29863B is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74BCT29863B is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

SN54BCT29863B ... JT OR W PACKAGE  
SN74BCT29863B ... DW OR NT PACKAGE  
(TOP VIEW)



SN54BCT29863B ... FK PACKAGE  
(TOP VIEW)



NC – No internal connection

FUNCTION TABLE

INPUTS				OPERATION
$\overline{OEAB1}$	$\overline{OEAB2}$	$\overline{OEBA1}$	$\overline{OEBA2}$	
L	L	L	L	Latch A and B
L	L	H	X	A to B
L	L	X	H	
H	X	L	L	B to A
X	H	L	L	
H	X	H	X	Isolation
H	X	X	H	
X	H	X	H	
X	H	H	X	

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS  
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1993, Texas Instruments Incorporated

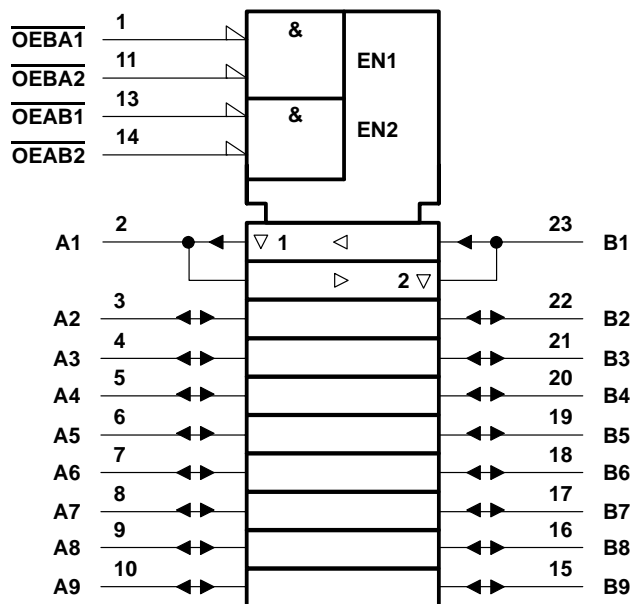
# SN54BCT29863B, SN74BCT29863B

## 9-BIT BUS TRANSCEIVERS

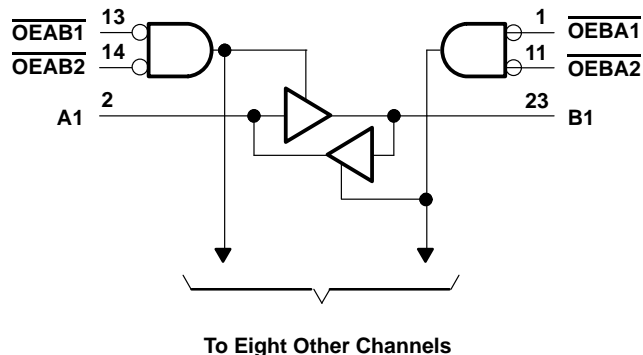
### WITH 3-STATE OUTPUTS

SCBS015D – NOVEMBER 1988 – 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.

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

#### 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 (I/O ports) (see Note 1)	–0.5 V to 5.5 V
Input voltage range (excluding I/O ports) (see Note 1)	–0.5 V to 7 V
Voltage range applied to any output in the high state	–0.5 V to $V_{CC}$
Input clamp current	–30 mA
Current into any output in the low state: SN54BCT29863B	48 mA
SN74BCT29863B	96 mA
Operating free-air temperature range: SN54BCT29863B	–55°C to 125°C
SN74BCT29863B	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 negative input voltage ratings may be exceeded if the input current rating is observed.

# SN54BCT29863B, SN74BCT29863B

## 9-BIT BUS TRANSCEIVERS

### WITH 3-STATE OUTPUTS

SCBS015D – NOVEMBER 1988 – REVISED NOVEMBER 1993

#### recommended operating conditions

		SN54BCT29863B			SN74BCT29863B			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			-15			-24	mA
$I_{OL}$	Low-level output current			24			48	mA
$T_A$	Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER		TEST CONDITIONS		SN54BCT29863B			SN74BCT29863B			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
$V_{OH}$		$V_{CC} = 4.5\text{ V}$	$I_{OH} = -15\text{ mA}$	2.4	3.3		2.4	3.3		V
			$I_{OH} = -24\text{ mA}$				2	3.1		
		$V_{CC} = 4.75\text{ V}$ ,	$I_{OH} = -3\text{ mA}$				2.7			
$V_{OL}$		$V_{CC} = 4.5\text{ V}$	$I_{OL} = 24\text{ mA}$	0.35	0.5					V
			$I_{OL} = 48\text{ mA}$				0.35	0.5		
$I_I$		$V_{CC} = 5.5\text{ V}$ ,	$V_I = 5.5\text{ V}$			0.1			0.1	mA
$I_{IH}$	Control inputs	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 2.7\text{ V}$			20			20	$\mu\text{A}$
	A or B port‡					20			20	
$I_{IL}$	Control inputs	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 2.7\text{ V}$			-0.2			-0.2	mA
	A or B port‡					-0.2			-0.2	
$I_{IO(off)}^{\S}$		$V_{CC} = 0$ ,	$V_O = 2.7\text{ V}$			0.1			0.1	mA
$I_{OS}^{\parallel}$		$V_{CC} = 5.5\text{ V}$ ,	$V_O = 0$	-75		-250	-75		-250	mA
$I_{CC}$		$V_{CC} = 5.5\text{ V}$	Outputs high	18	30		18	30		mA
			Outputs low	30	45		30	45		
			Outputs disabled	6.5	12		6.5	12		
$C_i$		$V_{CC} = 5\text{ V}$ ,	$V_I = 2.5\text{ V or }0.5\text{ V}$	6			6			pF
$C_{io}$		$V_{CC} = 5\text{ V}$ ,	$V_I = 2.5\text{ V or }0.5\text{ V}$	8			8			pF

† 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.

§  $I_{IO(off)}$  = Power-off bus-leakage current

¶ Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.



# SN54BCT29863B, SN74BCT29863B

## 9-BIT BUS TRANSCEIVERS

### WITH 3-STATE OUTPUTS

SCBS015D – NOVEMBER 1988 – 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, 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
			74BCT29863B			SN54BCT29863B		SN74BCT29863B		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	B or A	1	3	4.5	1	5.4	1	5	ns
t <sub>PHL</sub>			2	4.8	6.8	2	7.9	2	7.5	
t <sub>PZH</sub>	$\overline{\text{OEAB}}$ or $\overline{\text{OEBA}}$	A or B	2	5.1	7	2	9.2	2	8.4	ns
t <sub>PZL</sub>			4.5	8.4	10.8	4.5	13.6	4.5	12.6	
t <sub>PHZ</sub>	$\overline{\text{OEAB}}$ or $\overline{\text{OEBA}}$	A or B	2	5	7.2	2	9.6	2	8.8	ns
t <sub>PLZ</sub>			1.7	4.7	6.7	1.7	9.1	1.7	8.1	

† 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 (TI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

TI warrants performance of its semiconductor products and related software 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, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS.**

Inclusion of TI products in such applications is understood to be fully at the risk of the customer. Use of TI products in such applications requires the written approval of an appropriate TI officer. Questions concerning potential risk applications should be directed to TI through a local SC sales office.

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

TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor does TI 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.