

# SN74BCT29861B 10-BIT BUS TRANSCEIVER WITH 3-STATE OUTPUTS

SCBS009D – NOVEMBER 1988 – REVISED NOVEMBER 1993

- BiCMOS Design Substantially Reduces Standby Current
- Functionally Equivalent to SN74ALS29861 and AMD Am29861A
- Power-Up High-Impedance State
- Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic 300-mil DIPs (NT)

## description

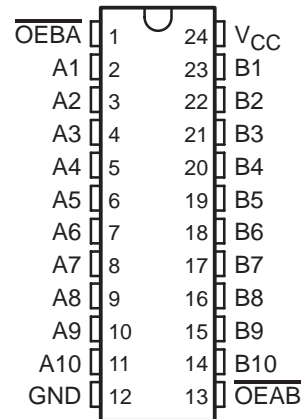
This 10-bit bus transceiver is designed for asynchronous communication between data buses. The control-function implementation allows for maximum flexibility in timing.

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 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 SN74BCT29861B is characterized for operation from 0°C to 70°C.

DW OR NT PACKAGE  
(TOP VIEW)



FUNCTION TABLE

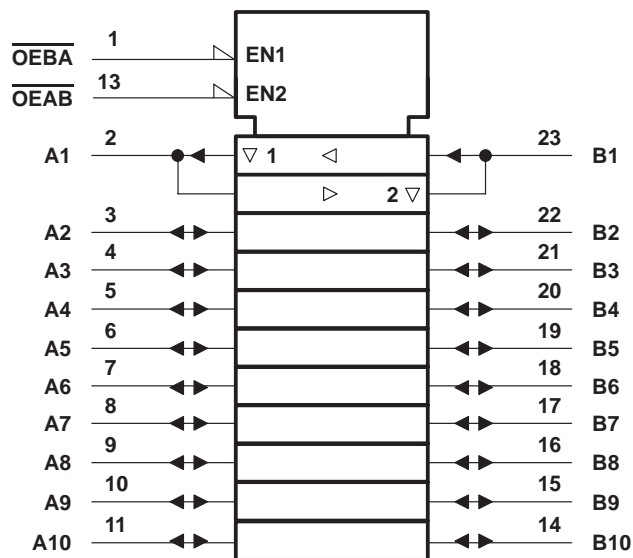
INPUTS		OPERATION
$\overline{OEAB}$	$\overline{OEBA}$	
L	H	A to B
H	L	B to A
H	H	Isolation
L	L	Latch A and B (A = B)

# SN74BCT29861B

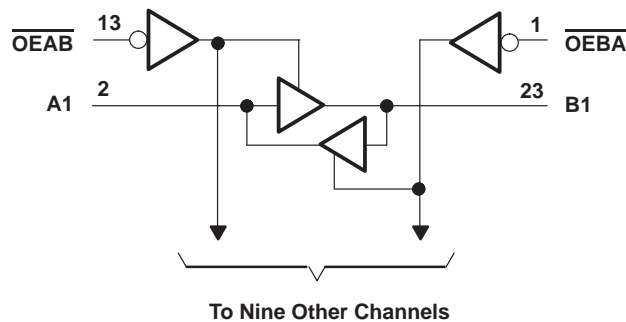
## 10-BIT BUS TRANSCEIVER WITH 3-STATE OUTPUTS

SCBS009D – 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.

### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

Supply voltage, $V_{CC}$	.....	-0.5 V to 7 V
Input voltage (I/O ports) (see Note 1)	.....	-0.5 V to 5.5 V
Input voltage (excluding I/O ports) (see Note 1)	.....	-0.5 V to 7 V
Voltage 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	.....	96 mA
Operating free-air temperature range	.....	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 negative voltage rating may be exceeded if the input clamp current rating is observed.

### recommended operating conditions

		MIN	NOM	MAX	UNIT
$V_{CC}$	Supply voltage	4.5	5	5.5	V
$V_{IH}$	High-level input voltage	2			V
$V_{IL}$	Low-level input voltage			0.8	V
$I_{IK}$	Input clamp current			-18	mA
$I_{OH}$	High-level output current			-24	mA
$I_{OL}$	Low-level output current			48	mA
$T_A$	Operating free-air temperature	0		70	°C

# SN74BCT29861B 10-BIT BUS TRANSCEIVER WITH 3-STATE OUTPUTS

SCBS009D – NOVEMBER 1988 – REVISED NOVEMBER 1993

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

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT	
V <sub>IK</sub>		V <sub>CC</sub> = 4.5 V, I <sub>I</sub> = -18 mA			-1.2	V	
V <sub>OH</sub>		V <sub>CC</sub> = 4.5 V	I <sub>OH</sub> = -15 mA		2.4	3.3	V
			I <sub>OH</sub> = -24 mA		2	3.1	
V <sub>OL</sub>		V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 48 mA		0.35	0.5	V	
I <sub>I</sub>		V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 5.5 V			0.1	mA	
I <sub>IH</sub>	Control inputs	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 2.7 V			20	μA	
	A or B port‡				70		
I <sub>IL</sub>	Control inputs	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.5 V			-0.2	mA	
	A or B port‡				-0.2		
I <sub>O(off)</sub> §		V <sub>CC</sub> = 0, V <sub>O</sub> = 2.7 V			0.1	mA	
I <sub>OS</sub> ¶		V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 0	-75		-250	mA	
I <sub>CC</sub>		V <sub>CC</sub> = 5.5 V	Outputs high		18	30	mA
			Outputs low		30	45	
			Outputs disabled		6.5	12	
C <sub>i</sub>		V <sub>CC</sub> = 5 V, V <sub>I</sub> = 0.5 V or 2.5 V		6		pF	
C <sub>o</sub>		V <sub>CC</sub> = 5 V, V <sub>I</sub> = 0.5 V or 2.5 V		8		pF	

† 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.

§ I<sub>O(off)</sub> = 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.

## 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
			MIN	TYP	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	B or A	1	3.2	4.6	1	5.1	ns
t <sub>PHL</sub>			1	4.6	6.2	1	6.8	
t <sub>PZH</sub>	OEAB or OEBA	A or B	2	5.2	6.8	2	8.1	ns
t <sub>PZL</sub>			2	8.3	10.1	2	11.7	
t <sub>PHZ</sub>	OEAB or OEBA	A or B	2	5.3	7.1	2	7.9	ns
t <sub>PLZ</sub>			2	5	6.7	2	7.7	

# 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 Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

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

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

### Products

Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>
Clocks and Timers	<a href="http://www.ti.com/clocks">www.ti.com/clocks</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>
RF/IF and ZigBee® Solutions	<a href="http://www.ti.com/lprf">www.ti.com/lprf</a>

### Applications

Audio	<a href="http://www.ti.com/audio">www.ti.com/audio</a>
Automotive	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
Broadband	<a href="http://www.ti.com/broadband">www.ti.com/broadband</a>
Digital Control	<a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a>
Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Military	<a href="http://www.ti.com/military">www.ti.com/military</a>
Optical Networking	<a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a>
Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
Telephony	<a href="http://www.ti.com/telephony">www.ti.com/telephony</a>
Video & Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>
Wireless	<a href="http://www.ti.com/wireless">www.ti.com/wireless</a>

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2008, Texas Instruments Incorporated