

SN54BCT29828B, SN74BCT29828B 10-BIT BUFFERS/DRIVERS WITH 3-STATE OUTPUTS

SCBS080B – DECEMBER 1990 – REVISED NOVEMBER 1993

- 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, $R = 0$)
- 3-State Inverting Outputs Drive Bus Lines or Buffer Memory Address Registers
- P-N-P Inputs Reduce dc Loading
- Flow-Through Architecture Optimizes PCB Layout
- 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)

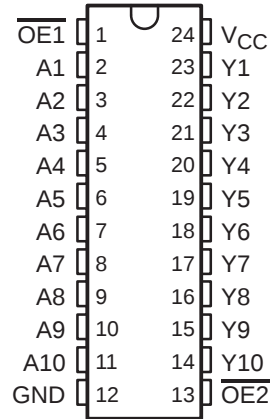
description

These 10-bit buffers and bus drivers provide high-performance bus interface for wide data paths or buses carrying parity.

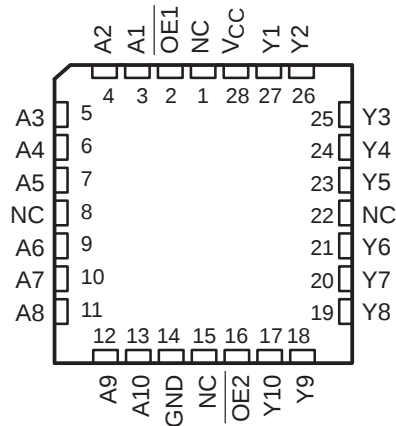
The 3-state control gate is a 2-input AND gate with active-low inputs so that if either output-enable ($\overline{OE1}$ or $\overline{OE2}$) input is high, all ten outputs are in the high-impedance state. The outputs are also in the high-impedance state during power-up and power-down conditions. The outputs remain in the high-impedance state while the device is powered down.

The SN54BCT29828B is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74BCT29828B is characterized for operation from 0°C to 70°C .

SN54BCT29828B . . . JT OR W PACKAGE
SN74BCT29828B . . . DW OR NT PACKAGE
(TOP VIEW)



SN54BCT29828B . . . FK PACKAGE
(TOP VIEW)

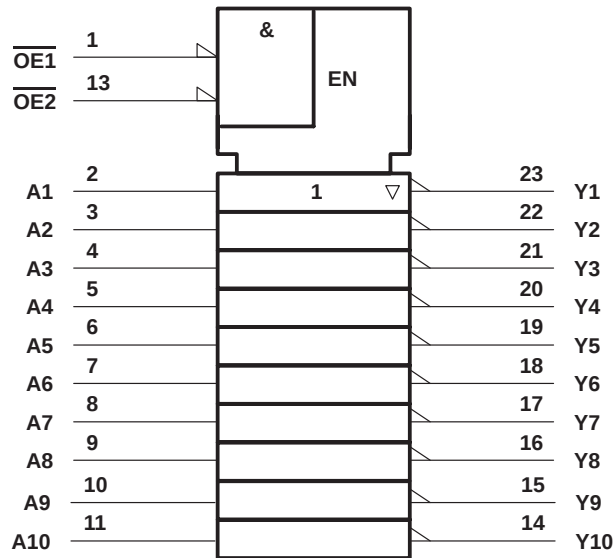


NC – No internal connection

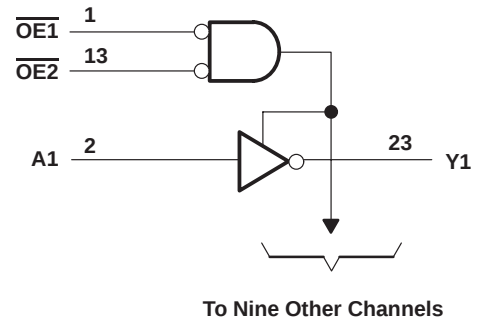
FUNCTION TABLE

INPUTS			OUTPUT Y
$\overline{OE1}$	$\overline{OE2}$	A	
L	L	L	H
L	L	H	L
H	X	X	Z
X	H	X	Z

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, V_I (see Note 1)	–0.5 V to 7 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} ($V_I < 0$)	–30 mA
Current into any output in the low state, I_O : SN54BCT29828B	48 mA
SN74BCT29828B	96 mA
Operating free-air temperature range: SN54BCT29828B	–55°C to 125°C
SN74BCT29828B	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 negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

recommended operating conditions

		SN54BCT29828B			SN74BCT29828B			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

SN54BCT29828B, SN74BCT29828B
10-BIT BUFFERS/DRIVERS
WITH 3-STATE OUTPUTS

SCBS080B – DECEMBER 1990 – REVISED NOVEMBER 1993

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

PARAMETER	TEST CONDITIONS		SN54BCT29828B			SN74BCT29828B			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	3.2		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}	$V_{CC} = 4.5 \text{ V}$	$I_{OL} = 24 \text{ mA}$		0.38	0.55				V
		$I_{OL} = 48 \text{ mA}$					0.42	0.5	
I_I	$V_{CC} = 5.5 \text{ V}$, $V_I = 7 \text{ V}$				0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5 \text{ V}$, $V_I = 2.7 \text{ V}$				20			20	μA
I_{IL}	$V_{CC} = 5.5 \text{ V}$, $V_I = 0.5 \text{ V}$				-0.2			-0.2	mA
$I_{OS}^\ddagger$	$V_{CC} = 5.5 \text{ V}$, $V_O = 0$		-75		-250	-75		-250	mA
I_{OZH}	$V_{CC} = 5.5 \text{ V}$, $V_O = 2.7 \text{ V}$				20			20	μA
I_{OZL}	$V_{CC} = 5.5 \text{ V}$, $V_O = 0.5 \text{ V}$				-20			-20	μA
I_{CCL}	$V_{CC} = 5.5 \text{ V}$, Outputs open			28			28	40	mA
I_{CCH}	$V_{CC} = 5.5 \text{ V}$, Outputs open			15			15	25	mA
I_{CCZ}	$V_{CC} = 5.5 \text{ V}$, Outputs open			3.5			3.5	6	mA
C_i	$V_{CC} = 5 \text{ V}$, $V_I = 2.5 \text{ V}$ or 0.5 V			4.5			4.5		pF
C_o	$V_{CC} = 5 \text{ V}$, $V_O = 2.5 \text{ V}$ or 0.5 V			7			7		pF

† All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

‡ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L = 50 \text{ pF}$ (unless otherwise noted) (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$			SN54BCT29828B		SN74BCT29828B		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1	3.3	5.2	1	6.3	1	5.9	ns
t_{PHL}			1	2.7	4.2	1	4.9	1	4.5	
t_{PZH}	$\overline{OE}$	Y	2	5.3	7.7	2	9.2	2	8.6	ns
t_{PZL}			2	8.5	10.2	2	12.7	2	11.9	
t_{PHZ}	$\overline{OE}$	Y	2	5.4	7.6	2	9.4	2	8.7	ns
t_{PLZ}			2	5.1	6.8	2	9	2	8.1	

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.