- **BiCMOS Design Substantially Reduces Standby Current**
- **Functionally Equivalent to ′ALS29864 and AMD Am29864A**
- **Power-Up High-Impedance State**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015**
- **Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic 300-mil DIPs (NT)**

DW OR NT PACKAGE
(TOP VIEW)

|		
$\overline{OEBA1}$	1	24	V_{CC}
A1	2	23	B1
A2	3	22	B2
A3	4	21	B3
A4	5	20	B4
A5	6	19	B5
A6	7	18	B6
A7	8	17	B7
A8	9	16	B8
A9	10	15	B9
$\overline{OEBA2}$	11	14	$\overline{OEAB2}$
GND	12	13	$\overline{OEAB1}$

description

This 9-bit 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 SN74BCT29864B is characterized for operation from 0°C to 70°C.
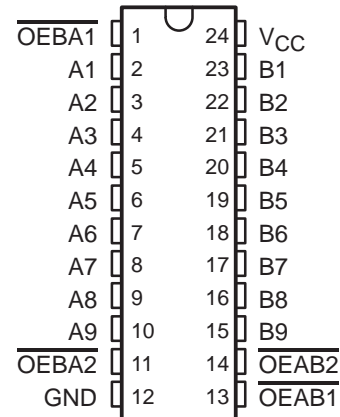
FUNCTION TABLE

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

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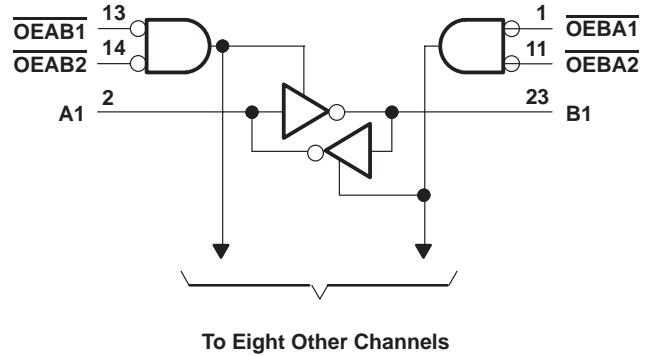
TEXAS INSTRUMENTS

SN74BCT29864B
9-BIT BUS TRANSCEIVER
WITH 3-STATE OUTPUTS

SCBS010A – NOVEMBER 1988 – REVISED NOVEMBER 1993

logic symbol†
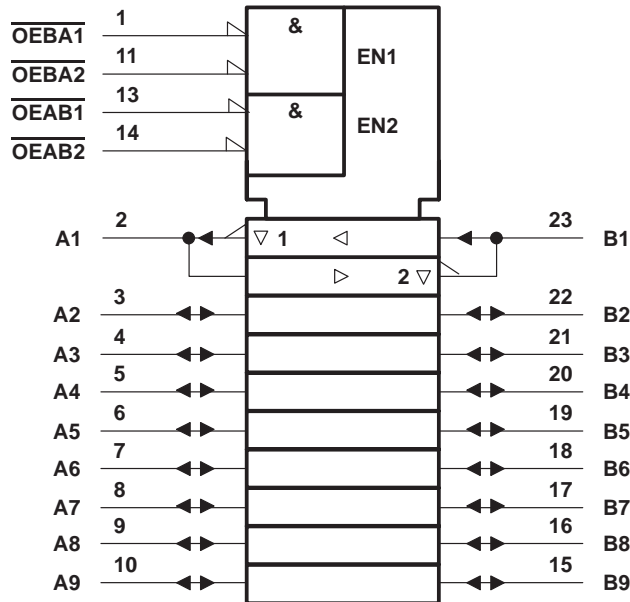
logic diagram (positive logic)

To Eight Other Channels

† 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 (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 .... 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 negative voltage rating may be exceeded if the input 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

TEXAS INSTRUMENTS

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

PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT
V_{IK}		$V_{CC} = 4.5$ V,	$I_I = -18$ mA			−1.2	V
V_{OH}		$V_{CC} = 4.5$ V	$I_{OH} = -15$ mA	2.4	3.3		V
			$I_{OH} = -24$ mA	2	3.1		
		$V_{CC} = 4.75$ V,	$I_{OH} = -3$ mA	2.7			
V_{OL}		$V_{CC} = 4.5$ V	$I_{OL} = 48$ mA		0.35	0.5	V
I_I		$V_{CC} = 5.5$ V,	$V_I = 5.5$ V			0.1	mA
I_{IH}	Control inputs	$V_{CC} = 5.5$ V,	$V_I = 2.7$ V			20	μA
	A or B port‡					20	
I_{IL}	Control inputs	$V_{CC} = 5.5$ V,	$V_I = 0.5$ V			−0.2	mA
	A or B port‡					−0.2	
$I_{IO(off)}$§		$V_{CC} = 0$,	$V_O = 2.7$ V			0.1	mA
I_{OS}¶		$V_{CC} = 5.5$ V,	$V_O = 0$	−75		−250	mA
I_{CC}		$V_{CC} = 5.5$ V	Outputs high		18	30	mA
			Outputs low		30	45	
			Outputs disabled		6.5	12	
C_i		$V_{CC} = 5$ V,	$V_I = 0.5$ V or 2.5 V		6		pF
C_{io}		$V_{CC} = 5$ V,	$V_I = 0.5$ V or 2.5 V		8		pF

† All typical values are at $V_{CC} = 5$ V, $T_A = 25°C$.
‡ For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.
§ $I_{O(off)}$ = 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.

switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5$ V, $C_L = 50$ pF, R1 = 500 Ω, R2 = 500 Ω, $T_A = 25°C$			$V_{CC} = 4.5$ V to 5.5 V, $C_L = 50$ pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX#		UNIT
			MIN	TYP	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	1	3.5	5.3	1	6.1	ns
t_{PHL}			0.5	2.3	4.6	0.5	4.8	
t_{PZH}	$\overline{OEAB}$ or $\overline{OEBA}$	A or B	2.3	5	7.2	2.3	8.4	ns
t_{PZL}			4.3	7.3	10.6	4.3	12.5	
t_{PHZ}	$\overline{OEAB}$ or $\overline{OEBA}$	A or B	2.3	4.6	7.6	2.3	8.4	ns
t_{PLZ}			2	4	7	2	8.2	

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.

TEXAS
INSTRUMENTS

PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
SN74BCT29864BDW	ACTIVE	SOIC	DW	24	25	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/Level-1-235C-UNLIM
SN74BCT29864BDWR	ACTIVE	SOIC	DW	24	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/Level-1-235C-UNLIM
SN74BCT29864BNT	ACTIVE	PDIP	NT	24	15	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC

[1] The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

[2] Eco Plan - May not be currently available - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
None: Not yet available Lead (Pb-Free).
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

[3] MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDECindustry standard classifications, and peak solder temperature.
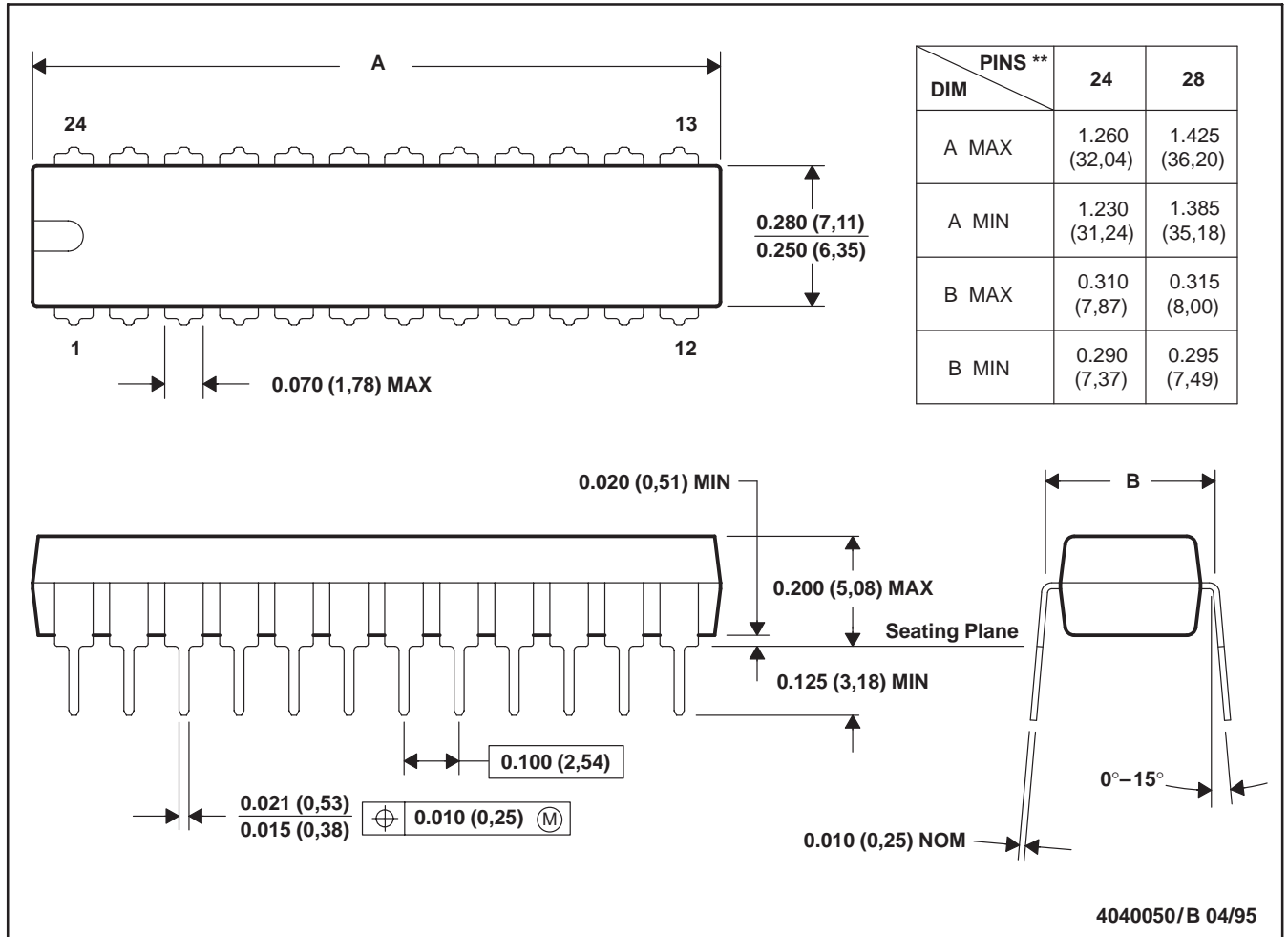
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MECHANICAL DATA

NT (R-PDIP-T**)   **PLASTIC DUAL-IN-LINE PACKAGE**

24 PINS SHOWN

PINS ** DIM	24	28
A MAX	1.260 (32,04)	1.425 (36,20)
A MIN	1.230 (31,24)	1.385 (35,18)
B MAX	0.310 (7,87)	0.315 (8,00)
B MIN	0.290 (7,37)	0.295 (7,49)

A

24   13

0.280 (7,11) / 0.250 (6,35)

1   12

0.070 (1,78) MAX

0.020 (0,51) MIN

0.200 (5,08) MAX

Seating Plane

0.125 (3,18) MIN

0.100 (2,54)

B

0°–15°

0.021 (0,53) / 0.015 (0,38)   ⊕ 0.010 (0,25) Ⓜ

0.010 (0,25) NOM

4040050/B 04/95
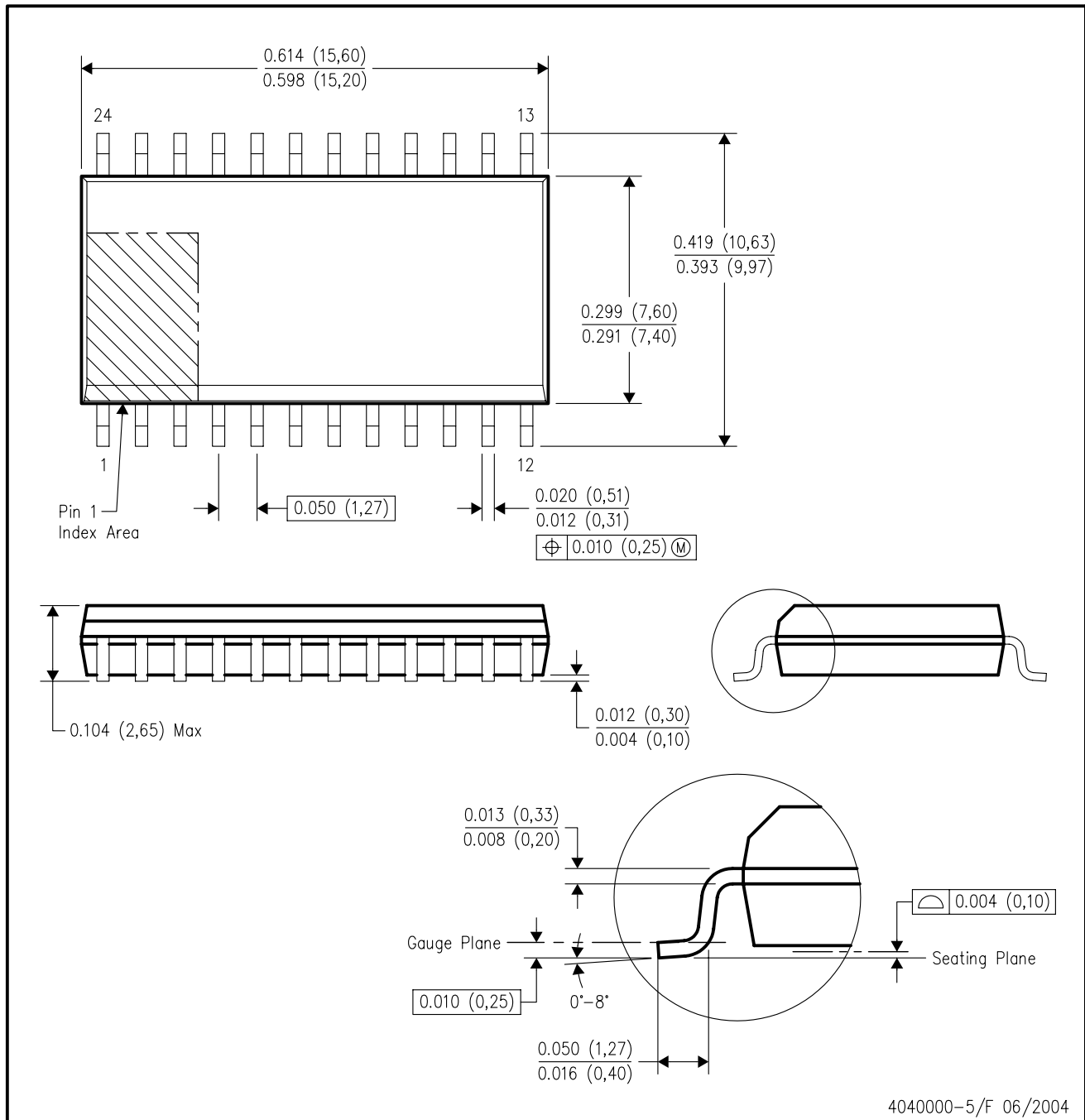
NOTES: A.   All linear dimensions are in inches (millimeters).
             B.   This drawing is subject to change without notice.

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DW (R−PDSO−G24)   PLASTIC SMALL−OUTLINE PACKAGE

0.614 (15,60)
0.598 (15,20)

24   13

0.419 (10,63)
0.393 (9,97)

0.299 (7,60)
0.291 (7,40)

1   12

Pin 1
Index Area

0.050 (1,27)

0.020 (0,51)
0.012 (0,31)

⊕ 0.010 (0,25) Ⓜ

0.104 (2,65) Max

0.012 (0,30)
0.004 (0,10)

0.013 (0,33)
0.008 (0,20)

⌂ 0.004 (0,10)

Gauge Plane

Seating Plane

0.010 (0,25)   0°−8°

0.050 (1,27)
0.016 (0,40)

4040000−5/F 06/2004

NOTES: A.   All linear dimensions are in inches (millimeters).
          B.   This drawing is subject to change without notice.
          C.   Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
          D.   Falls within JEDEC MS−013 variation AD.

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