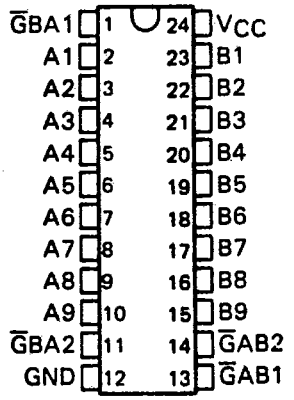
SN74BCT29863A, SN74BCT29864A
9-BIT BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

D3162, NOVEMBER 1988–REVISED JULY 1989

- BiCMOS Design Substantially Reduces Standby Current
- Functionally Equivalent to Am29863A, Am29864A, 'ALS29863, and 'ALS29864
- Choice of True ('BCT29863A) or Inverting ('BCT29864A) Logic
- Power-Up High-Impedance State
- Package Options Include Plastic "Small Outline" Packages and Standard Plastic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

DW OR NT PACKAGE
(TOP VIEW)

T-52-31



description

These 9-bit bus transceivers are designed for asynchronous two-way 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 enable inputs ($\overline{G}$BA1, $\overline{G}$BA2, $\overline{G}$AB1, and $\overline{G}$AB2).

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 SN74BCT29863A and SN74BCT29864A are characterized for operation from 0°C to 70°C.

FUNCTION TABLE

ENABLE INPUTS				OPERATION	
$\overline{G}$AB1	$\overline{G}$AB2	$\overline{G}$BA1	$\overline{G}$BA2	'BCT29863A	'BCT29864A
L	L	L	L	Latch A and B	Latch A and B
L	L	H	X	A to B	A to $\overline{B}$
L	L	X	H		
H	X	L	L	B to A	B to $\overline{A}$
X	H	L	L		
H	X	H	X	Isolation	Isolation
H	X	X	H		
X	H	X	H		
X	H	H	X		

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SN74BCT29863A
9-BIT BUS TRANSCEIVER WITH 3-STATE OUTPUTS

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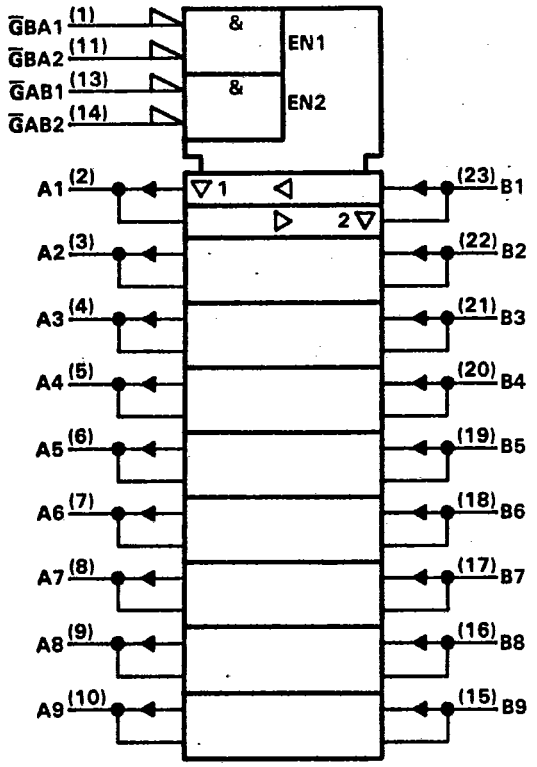
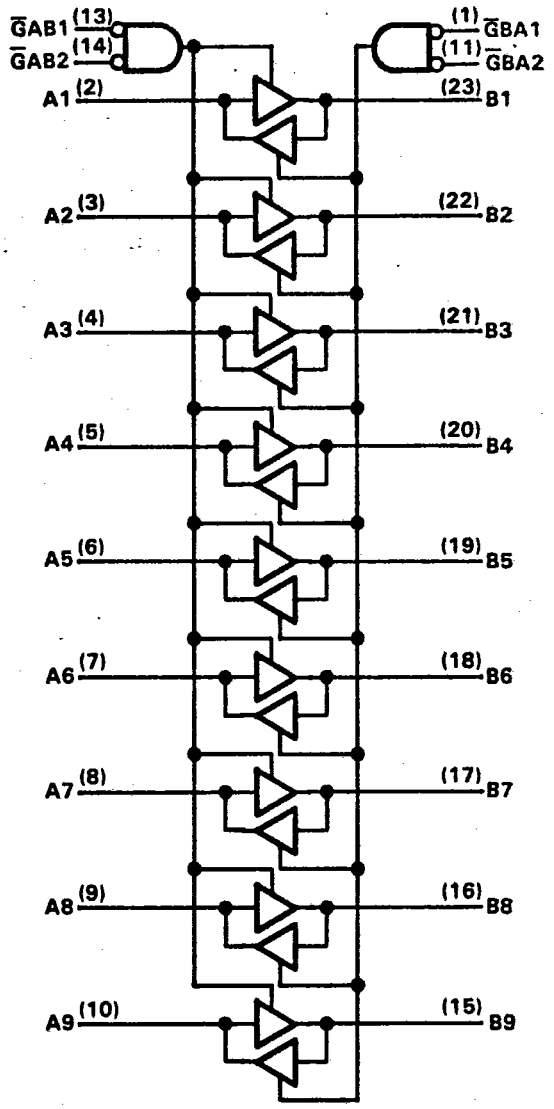
logic symbol†



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

logic diagram (positive logic)



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SN74BCT29864A
9-BIT BUS TRANSCEIVER WITH 3-STATE OUTPUTS

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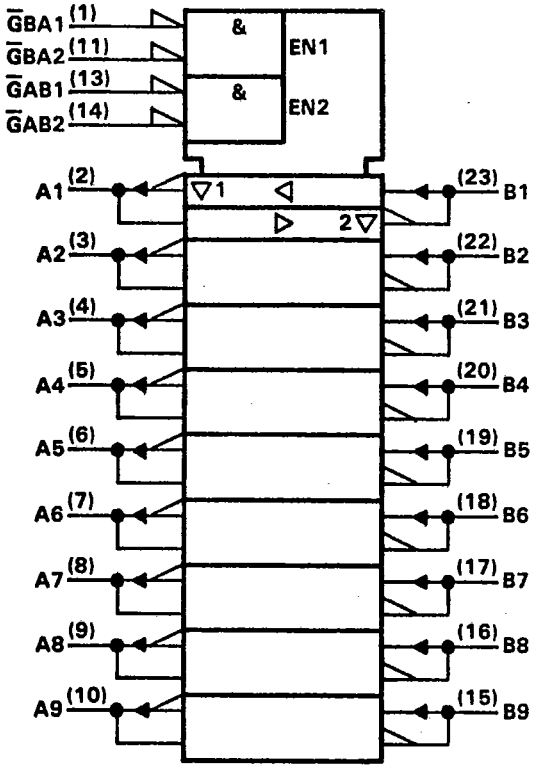
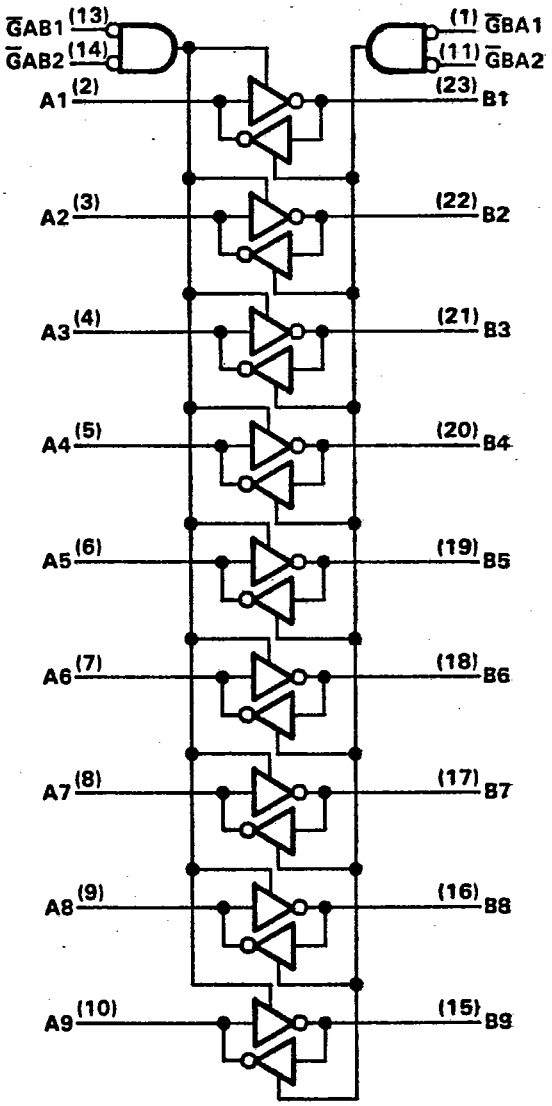
logic symbol†



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

logic diagram (positive logic)



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

Supply voltage, V_{CC} . . . . . 7 V
Input voltage (all inputs and I/O ports) . . . . . 5.5 V
Operating free-air temperature range . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

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_{OH}	High-level output current			−24	mA
I_{OL}	Low-level output current			48	mA
T_A	Operating free-air temperature	0		70	°C

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			V
			I_{OH} = −24 mA		2			
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 = 0.4 V				−0.2	mA
	A or B port‡						−0.2	
$I_{O(off)}$§		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	

† 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.

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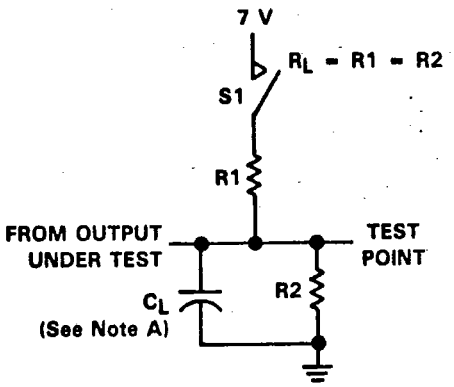
SN74BCT29863A switching characteristics (see Figure 1)

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 = 0°C to 70°C		UNIT
			MIN	TYP	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	1	5	7	1	8	ns
t_{PHL}			1	5	7	1	8	
t_{PZH}	$\overline{G}AB$ or $\overline{G}BA$	A or B	2	7	10	2	11	ns
t_{PZL}			2	9	12	2	13	
t_{PHZ}	$\overline{G}AB$ or $\overline{G}BA$	A or B	2	6	9	2	10	ns
t_{PLZ}			2	6	9	2	10	

SN74BCT29864A switching characteristics (see Figure 1)

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 = 0°C to 70°C		UNIT
			MIN	TYP	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	1	5	8	1	9	ns
t_{PHL}			1	5	7	1	8	
t_{PZH}	$\overline{G}AB$ or $\overline{G}BA$	A or B	2	7	10	2	11	ns
t_{PZL}			2	9	12	2	13	
t_{PHZ}	$\overline{G}AB$ or $\overline{G}BA$	A or B	2	6	9	2	10	ns
t_{PLZ}			2	6	9	2	10	

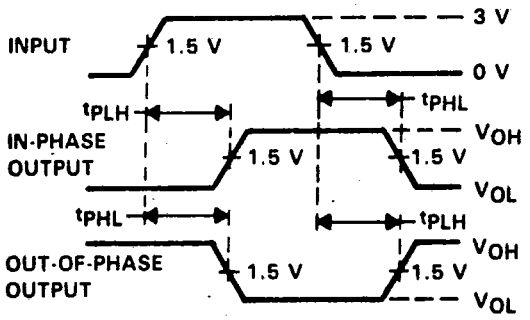
PARAMETER MEASUREMENT INFORMATION



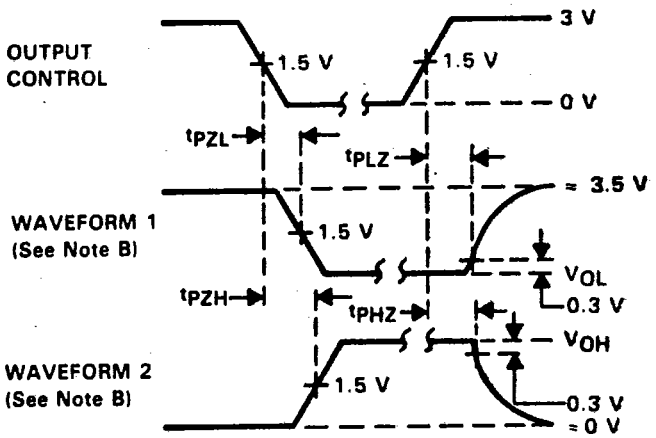
LOAD CIRCUIT

SWITCH POSITION TABLE

TEST	S1
t_{PLH}	Open
t_{PHL}	Open
t_{PZH}	Open
t_{PZL}	Closed
t_{PHZ}	Open
t_{PLZ}	Closed



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES, THREE-STATE OUTPUTS

NOTES: A. C_L includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
C. All input pulses are supplied by the generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.

FIGURE 1. LOAD CIRCUIT AND VOLTAGE WAVEFORMS

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