SN74ALS29861, SN74ALS29862
10-BIT BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

- **Functionally Equivalent to AM29861 and AM29862**
- **Choice of True or Inverting Logic**
- **Power-Up High-Impedance State**
- **Package Options include Plastic Small Outline Packages, Plastic Chip Carriers, and Standard Plastic DIPs**

description

These 10-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 ($\overline{GBA}$ and $\overline{GAB}$).
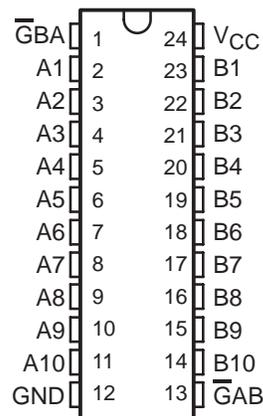
The enable inputs can be used to disable the device so that the buses are effectively isolated.

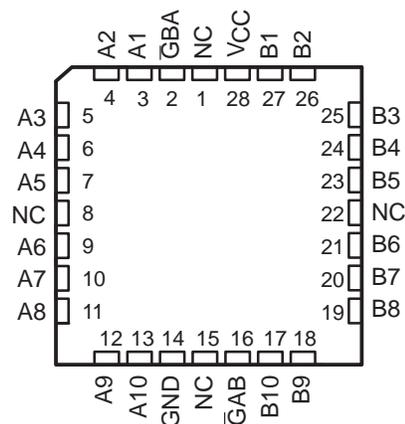The SN74' family is characterized for operation from 0°C to 70°C.

**DW OR NT PACKAGE
(TOP VIEW)**

$\overline{G}$BA	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
A10	11	14	B10
GND	12	13	$\overline{G}$AB

**FN PACKAGE
(TOP VIEW)**

Top pins (left to right): A2 (4), A1 (3), $\overline{G}$BA (2), NC (1), V$_{CC}$ (28), B1 (27), B2 (26)

Left pins: A3 (5), A4 (6), A5 (7), NC (8), A6 (9), A7 (10), A8 (11)

Right pins: B3 (25), B4 (24), B5 (23), NC (22), B6 (21), B7 (20), B8 (19)

Bottom pins (left to right): A9 (12), A10 (13), GND (14), NC (15), $\overline{G}$AB (16), B10 (17), B9 (18)

NC – No internal connection

FUNCTION TABLE

INPUTS		OPERATION	
$\overline{G}$AB	$\overline{G}$BA	ALS29861	ALS29862
L	H	A to B	$\overline{A}$ to B
H	L	B to A	$\overline{B}$ to A
H	H	Isolation	Isolation
L	L	Latch A and B (A = B)	Latch A and B (A = $\overline{B}$)

**TEXAS
INSTRUMENTS**

POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

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SN74ALS29861, SN74ALS29862
10-BIT BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

logic symbols†

'ALS29861

$\overline{G}$BA	1	EN 1	
$\overline{G}$AB	13	EN 2	
A1	2	▽ 1 ◁	23	B1
		▷ 2▽	
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
A10	11		14	B10

'ALS29862

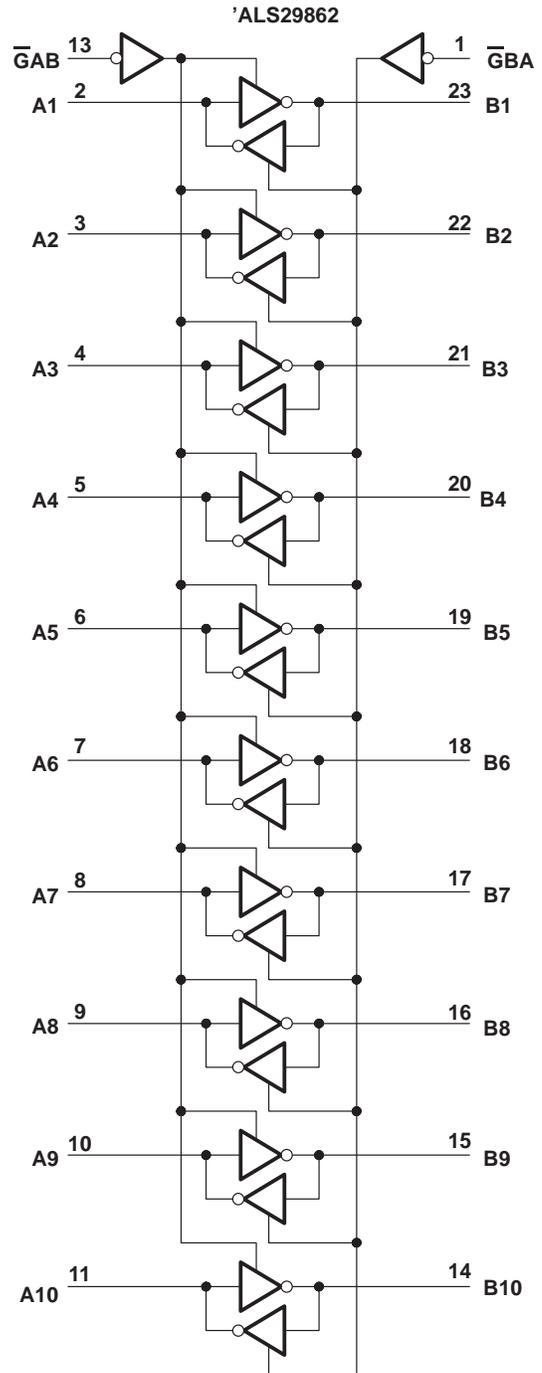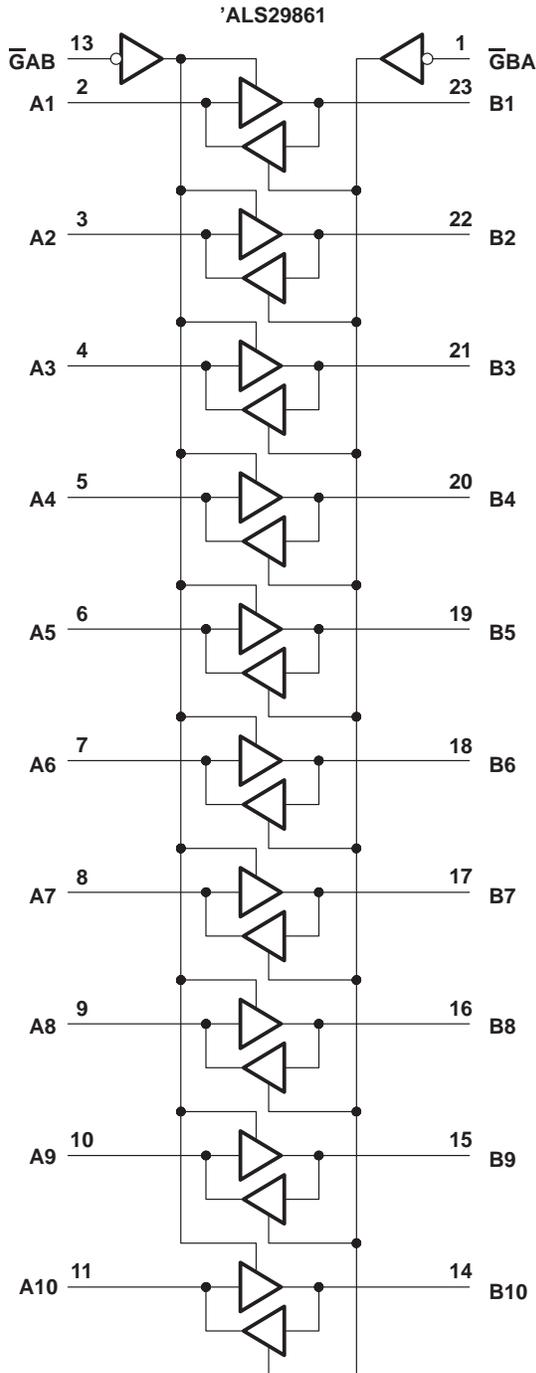|			
$\overline{G}$BA	1	EN 1	
$\overline{G}$AB	13	EN 2	
A1	2	▽ 1 ◁	23	B1
		▷ 2▽	
A2	3		22	B2
A3	4		21	B3
A4	5		20	B4
A5	6		19	B5
A6	7		18	B6
A7	8		17	B7
A8	9		16	B8
A9	10		15	B9
A10	11		14	B10
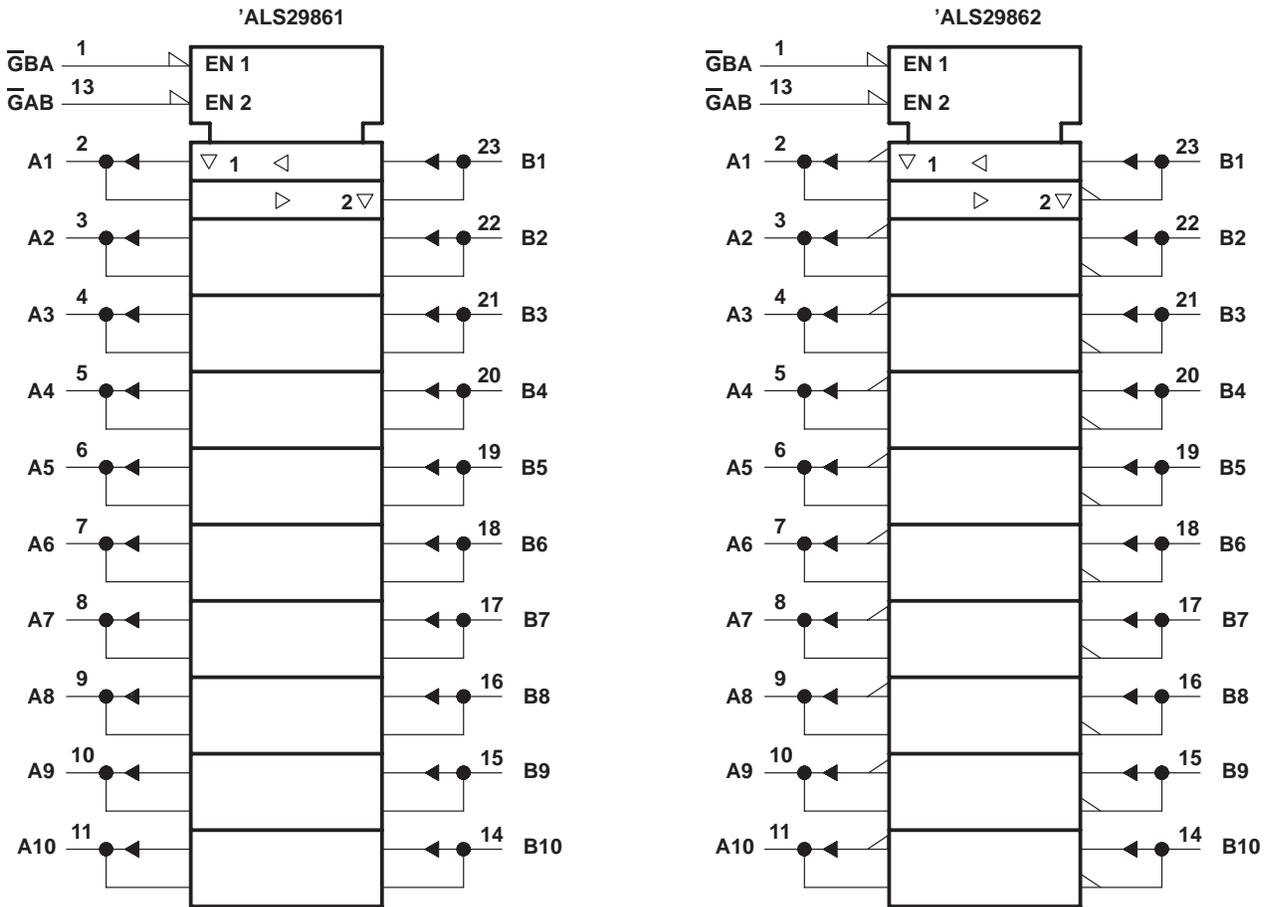
† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
‡ Pin numbers shown are for DW and NT packages.

TEXAS
INSTRUMENTS

logic diagrams

Pin numbers shown are for DW and NT packages.

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	4.75	5	5.25	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} = 4.75 V,	I_I = − 18 mA			−1.2	V
V_{OH}		V_{CC} = 4.75 V,	I_{OH} = − 15 mA	2.4			V
		V_{CC} = 4.75 V,	I_{OH} = − 24 mA	2			
V_{OL}		V_{CC} = 4.75 V,	I_{OL} = 48 mA		0.35	0.5	V
I_I		V_{CC} = 5.25 V,	V_I = 5.5 V			0.1	mA
I_{IH}	Control inputs	V_{CC} = 5.25 V,	V_I = 2.7 V			20	µA
	A or B ports‡					20	
I_{IL}	Control inputs	V_{CC} = 5.25 V,	V_I = 0.4 V			−0.1	mA
	A or B ports‡					−0.1	
I_{OS}§		V_{CC} = 5.25 V,	V_O = 0 V	−75		−250	mA
I_{CC}	'ALS29861	V_{CC} = 5.25 V			40	65	mA
	'ALS29862				40	65	

† 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.
§ 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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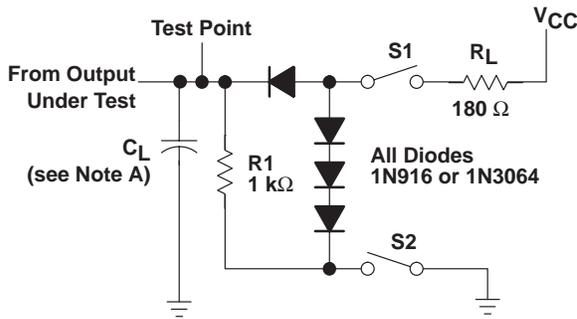POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

SN74ALS29861 switching characteristics

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS See Figure 1	V_{CC} = 5 V, T_A = 25°C			V_{CC} = 4.75 V to 5.25 V, T_A = 0°C to 70°C		UNIT
				MIN	TYP	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	C_L = 300 pF		8	11		15	ns
t_{PHL}					11	14		15	
t_{PLH}			C_L = 50 pF		4.8	6		8	
t_{PHL}					5.2	6.2		8	
t_{PZH}	$\overline{GAB}$ or $\overline{GBA}$	A or B	C_L = 300 pF		11	17		20	ns
t_{PZL}					17	21		23	
t_{PZH}			C_L = 50 pF		6.5	12		15	
t_{PZL}					9.5	12		15	
t_{PHZ}	$\overline{GAB}$ or $\overline{GBA}$	A or B	C_L = 50 pF		11.2	16		17	ns
t_{PLZ}					4.5	9		12	
t_{PHZ}			C_L = 5 pF		3.5	8		9	
t_{PLZ}					3.5	8		9	

SN74ALS29862 switching characteristics

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS See Figure 1	V_{CC} = 5 V, T_A = 25°C			V_{CC} = 4.75 V to 5.25 V, T_A = 0°C to 70°C		UNIT
				MIN	TYP	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	C_L = 300 pF		7.3	10		14	ns
t_{PHL}					10.5	12.9		14	
t_{PLH}			C_L = 50 pF		4	5.2		7	
t_{PHL}					4.9	5.9		7.5	
t_{PZH}	$\overline{GAB}$ or $\overline{GBA}$	A or B	C_L = 300 pF		11	17		20	ns
t_{PZL}					17	21		23	
t_{PZH}			C_L = 50 pF		6.5	12		15	
t_{PZL}					9.5	12		15	
t_{PHZ}	$\overline{GAB}$ or $\overline{GBA}$	A or B	C_L = 50 pF		11.2	16		17	ns
t_{PLZ}					4.5	9		12	
t_{PHZ}			C_L = 5 pF		3.5	8		9	
t_{PLZ}					3.5	8		9	

PARAMETER MEASUREMENT INFORMATION

SWITCH POSITION TABLE

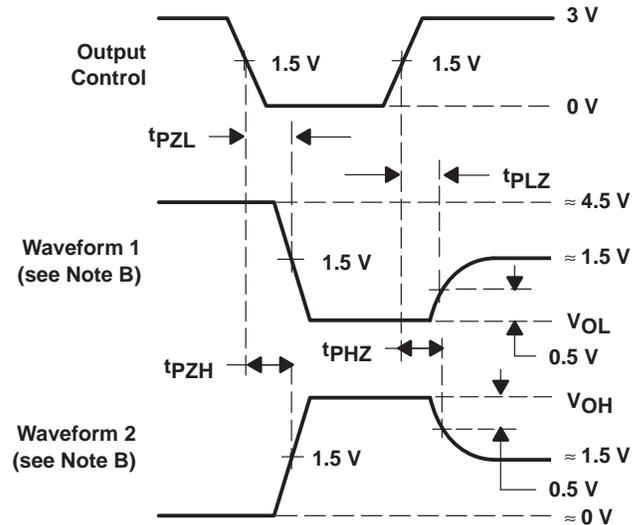| TEST	S1	S2
t_{PLH}	Closed	Closed
t_{PHL}	Closed	Closed
t_{PZH}	Open	Closed
t_{PZL}	Closed	Open
t_{PHZ}	Closed	Closed
t_{PLZ}	Closed	Closed

LOAD CIRCUIT
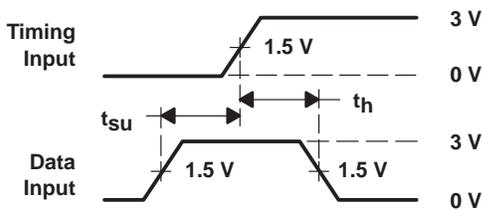
**VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES**
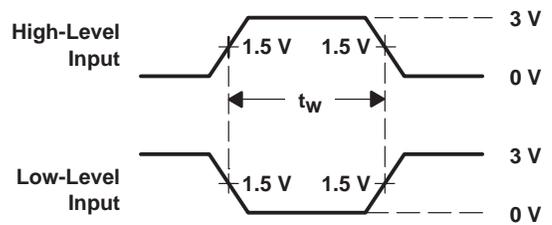
**VOLTAGE WAVEFORMS
PULSE DURATIONS**
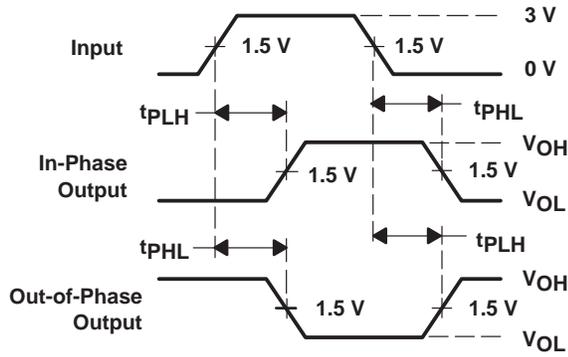
**VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES**

**VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES, 3-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 generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.

Figure 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]
SN74ALS29861DW	OBSOLETE	SOIC	DW	24		TBD	Call TI	Call TI
SN74ALS29861DWR	OBSOLETE	SOIC	DW	24		TBD	Call TI	Call TI
SN74ALS29861DWR	OBSOLETE	SOIC	DW	24		TBD	Call TI	Call TI
SN74ALS29861NT	OBSOLETE	PDIP	NT	24		TBD	Call TI	Call TI
SN74ALS29861NT	OBSOLETE	PDIP	NT	24		TBD	Call TI	Call TI

[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 - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
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.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

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