SN74ALS29827, SN74ALS29828
10-BIT BUFFERS AND BUS DRIVERS
WITH 3-STATE OUTPUTS

- **Functionally Equivalent to AMD's AM29827 and AM29828**
- **3-State Outputs Drive Bus Lines or Buffer Memory Address Registers**
- **pnp Inputs Reduce dc Loading**
- **Data Flow-Through Pinout (All Inputs on Opposite Side From Outputs)**
- **Power-Up High-Impedance State**
- **Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic (NT) 300-mil DIPs**

DW OR NT PACKAGE
(TOP VIEW)

|			
$\overline{OE1}$	1	24	V_{CC}
A1	2	23	Y1
A2	3	22	Y2
A3	4	21	Y3
A4	5	20	Y4
A5	6	19	Y5
A6	7	18	Y6
A7	8	17	Y7
A8	9	16	Y8
A9	10	15	Y9
A10	11	14	Y10
GND	12	13	$\overline{OE2}$
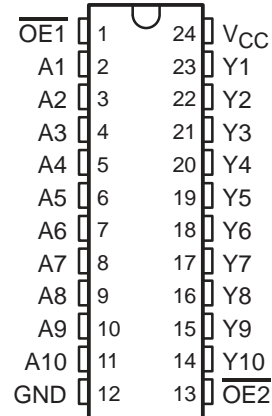
description

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 NOR such that if either output-enable ($\overline{OE1}$ or $\overline{OE2}$) input is high, all ten outputs are in the high-impedance state.

The SN74ALS29827 provides true data and the SN74ALS29828 provides inverted data at their respective outputs.

The SN74ALS29827 and SN74ALS29828 are characterized for operation from 0°C to 70°C.
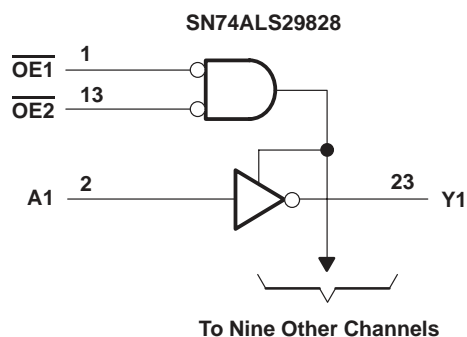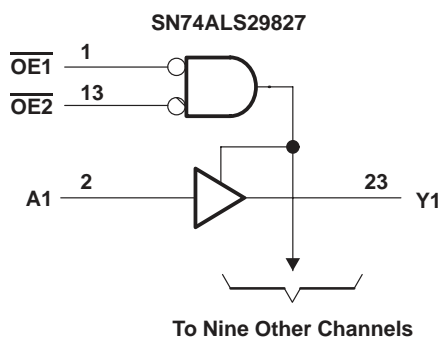
logic symbols†

SN74ALS29827
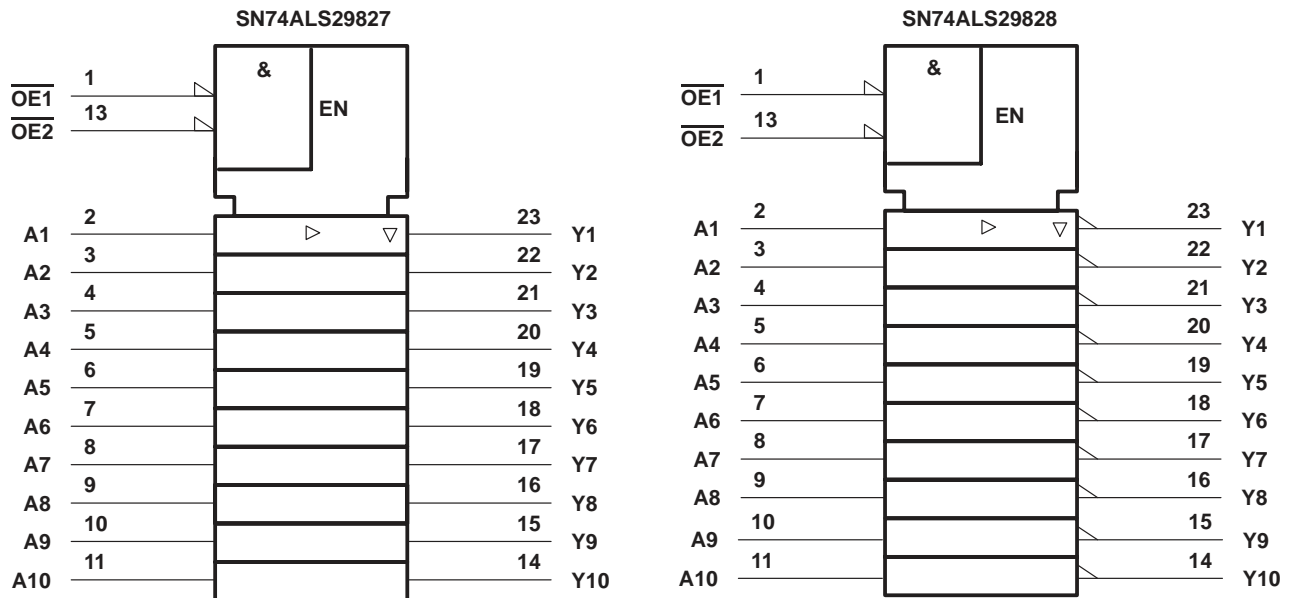
SN74ALS29828

† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

TEXAS INSTRUMENTS

logic diagrams (positive logic)

SN74ALS29827

$\overline{OE1}$ 1
$\overline{OE2}$ 13

A1 2   23 Y1

To Nine Other Channels

SN74ALS29828

$\overline{OE1}$ 1
$\overline{OE2}$ 13

A1 2   23 Y1

To Nine Other Channels

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

Supply voltage, V_{CC} .... 7 V
Input voltage, V_I .... 5.5 V
Voltage applied to a disabled 3-state output .... 5.5 V
Operating free-air temperature range, T_A .... 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.

recommended operating conditions

		SN74ALS29827 SN74ALS29828			UNIT
		MIN	NOM	MAX	
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		SN74ALS29827 SN74ALS29828			UNIT
			MIN	TYP†	MAX	
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
		$I_{OH} = -24$ mA	2			
V_{OL}	$V_{CC} = 4.75$ V,	$I_{OL} = 48$ mA		0.35	0.5	V
I_{OZH}	$V_{CC} = 5.25$ V,	$V_O = 2.4$ V			20	µA
I_{OZL}	$V_{CC} = 5.25$ V,	$V_O = 0.4$ V			−20	µA
I_I	$V_{CC} = 5.25$ V,	$V_I = 5.5$ V			0.1	mA
I_{IH}	$V_{CC} = 5.25$ V,	$V_I = 2.7$ V			20	µA
I_{IL}	$V_{CC} = 5.25$ V,	$V_I = 0.4$ V			−0.1	mA
I_{OS}‡	$V_{CC} = 5.25$ V,	$V_O = 0$	−75		−250	mA
I_{CC}	$V_{CC} = 5.25$ V			25	40	mA

† All typical values are at $V_{CC} = 5$ V, $T_A = 25°$C.
‡ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

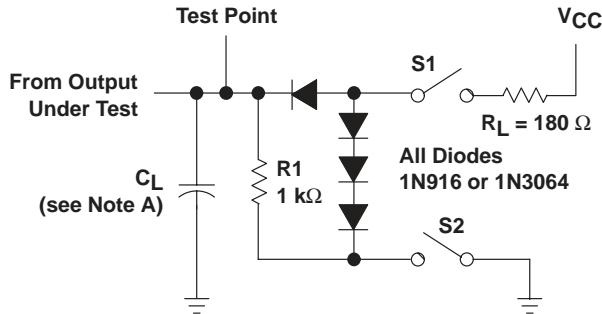## switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	$V_{CC} = 4.75$ V to 5.25 V				UNIT
				SN74ALS29827		SN74ALS29828		
				MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	$C_L = 300$ pF		15		14	ns
t_{PHL}					15		14	
t_{PLH}	A	Y	$C_L = 50$ pF		8		7	ns
t_{PHL}					8		7.5	
t_{PZH}	$\overline{OE}$	Y	$C_L = 300$ pF		20		20	ns
t_{PZL}					23		23	
t_{PZH}	$\overline{OE}$	Y	$C_L = 50$ pF		15		15	ns
t_{PZL}					15		15	
t_{PHZ}	$\overline{OE}$	Y	$C_L = 50$ pF		17		17	ns
t_{PLZ}					12		12	
t_{PHZ}	$\overline{OE}$	Y	$C_L = 5$ pF		9		9	ns
t_{PLZ}					9		9	

PARAMETER MEASUREMENT INFORMATION

SWITCH POSITION TABLE

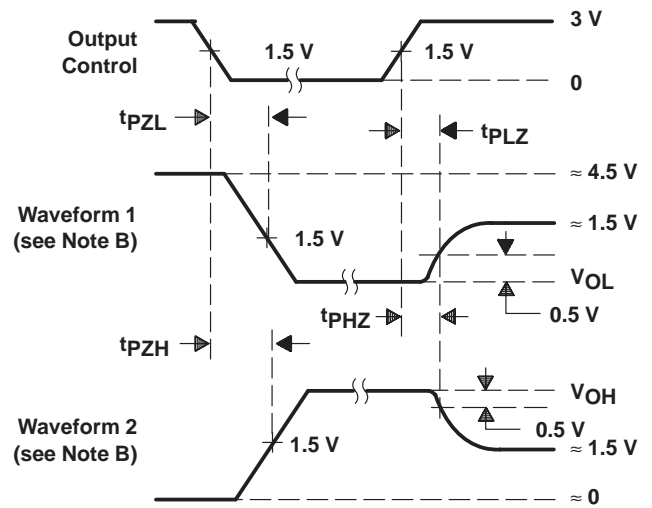| TEST	S1	S2
t_{PLH}	Closed	Closed
t_{PHL}	Closed	Closed
t_{PZH}	Open	Closed
t_{PZL}	Closed	Open
t_{PHZ}	Closed	Closed
t_{PLZ}	Closed	Closed

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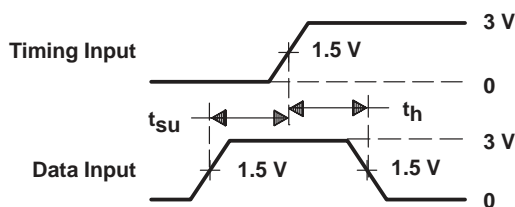
**VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES**
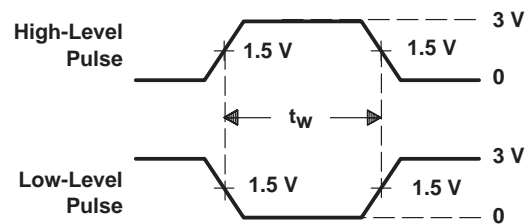
**VOLTAGE WAVEFORMS
PULSE DURATIONS**
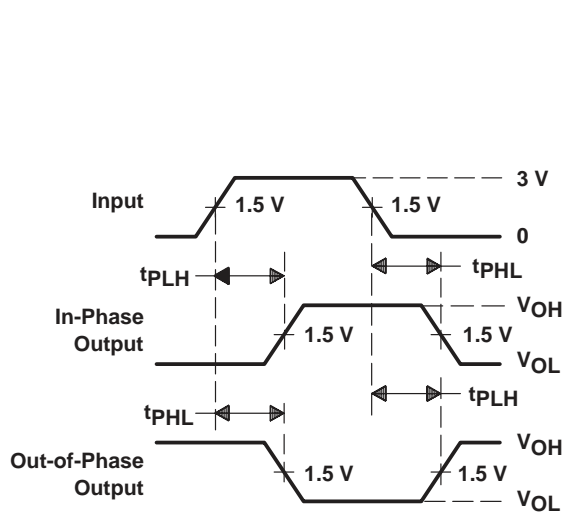
**VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES**

**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. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
SN74ALS29827DW	ACTIVE	SOIC	DW	24	25	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS29827	Samples

(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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.
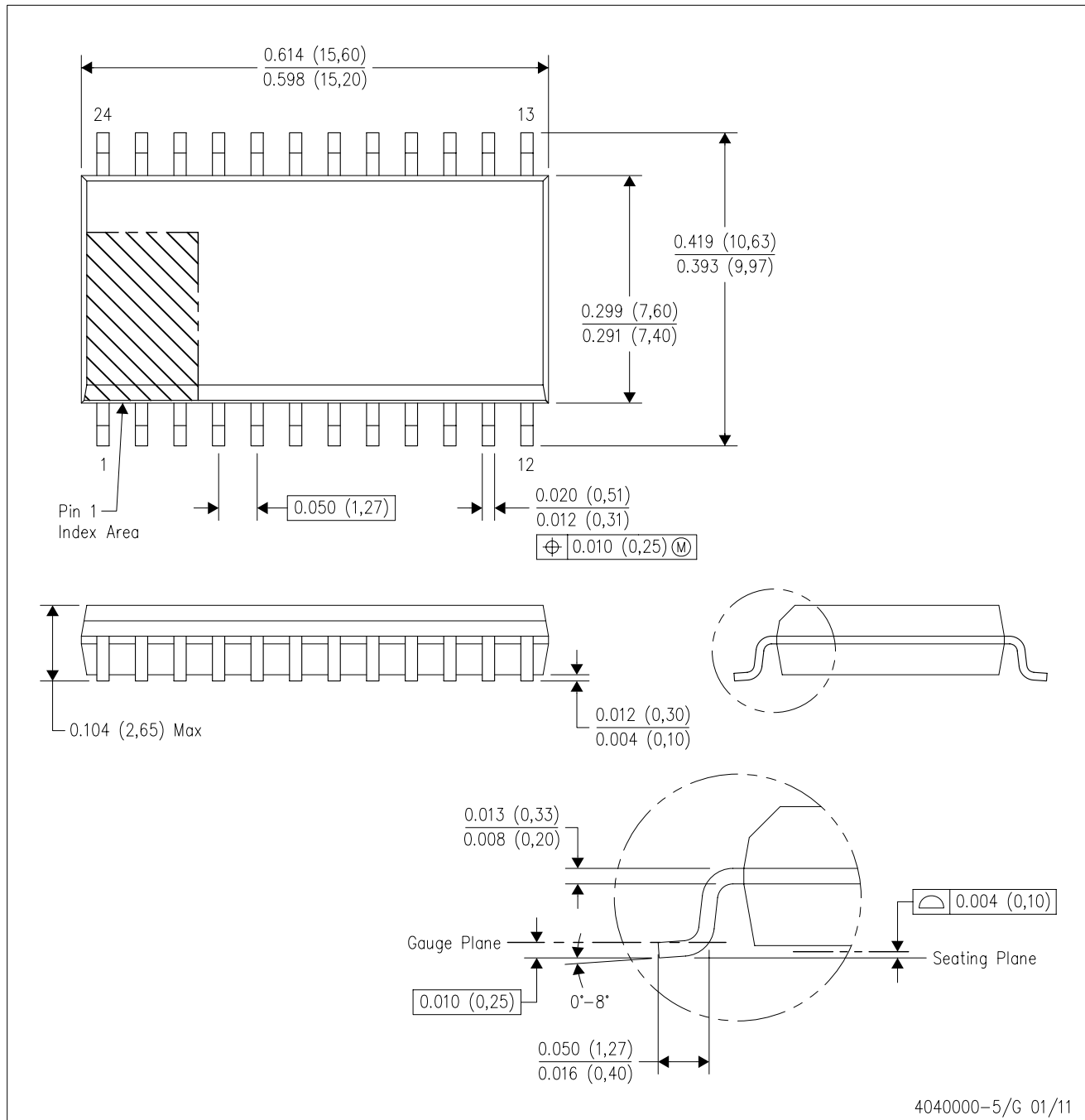
TUBE

T - Tube height

L - Tube length

W - Tube width

B - Alignment groove width

*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
SN74ALS29827DW	DW	SOIC	24	25	506.98	12.7	4826	6.6

DW (R−PDSO−G24)   PLASTIC SMALL OUTLINE

$\frac{0.614\ (15,60)}{0.598\ (15,20)}$

24   13

$\frac{0.419\ (10,63)}{0.393\ (9,97)}$

$\frac{0.299\ (7,60)}{0.291\ (7,40)}$

1   12

Pin 1
Index Area

0.050 (1,27)

$\frac{0.020\ (0,51)}{0.012\ (0,31)}$

⊕ | 0.010 (0,25) Ⓜ

0.104 (2,65) Max

$\frac{0.012\ (0,30)}{0.004\ (0,10)}$

$\frac{0.013\ (0,33)}{0.008\ (0,20)}$

⌐ | 0.004 (0,10)

Gauge Plane

Seating Plane

0.010 (0,25)

0°−8°

$\frac{0.050\ (1,27)}{0.016\ (0,40)}$

4040000−5/G 01/11

NOTES: A.   All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M−1994.
         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.

**TEXAS
INSTRUMENTS**
www.ti.com

IMPORTANT NOTICE AND DISCLAIMER