

# SN74ALS29863 9-BIT TRANSCEIVER WITH 3-STATE OUTPUTS

SDAS096C – JANUARY 1986 – REVISED JANUARY 1995

- Functionally Equivalent to AMD's AM29863
- Power-Up High-Impedance State
- Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic (NT) 300-mil DIPs

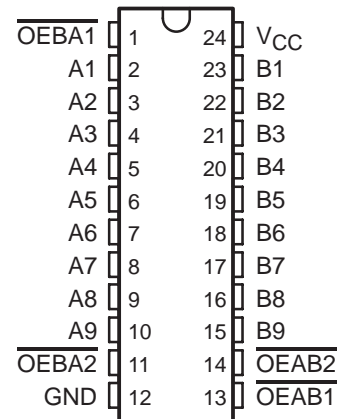
## description

This 9-bit transceiver is designed for asynchronous two-way communication between data buses. The control-function implementation allows for maximum flexibility in timing.

This device allows data transmission from the A bus to the B bus or from the B bus to the A bus, depending on the logic levels at the output-enable ( $\overline{OEAB1}$ ,  $\overline{OEAB2}$ ,  $\overline{OEBA1}$ , and  $\overline{OEBA2}$ ) inputs.

The SN74ALS29863 is characterized for operation from 0°C to 70°C.

DW OR NT PACKAGE  
(TOP VIEW)



FUNCTION TABLE

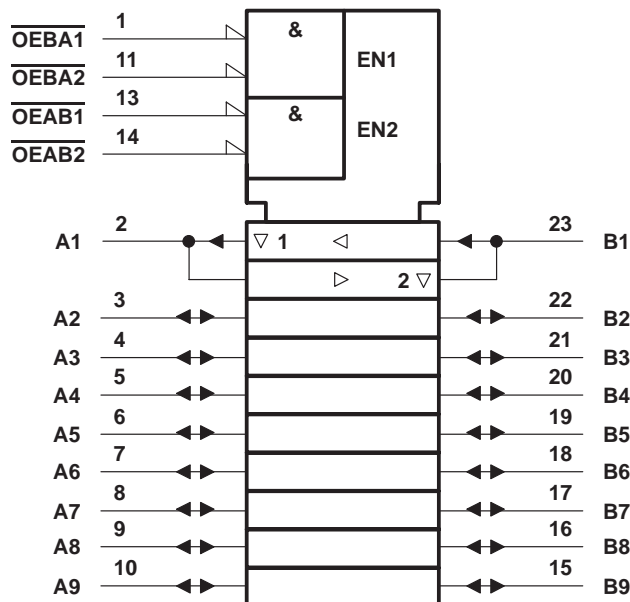
INPUTS				OPERATION
$\overline{OEAB1}$	$\overline{OEAB2}$	$\overline{OEBA1}$	$\overline{OEBA2}$	
L	L	L	L	Latch A and B
L	L	H	X	A to B
L	L	X	H	
H	X	L	L	B to A
X	H	L	L	
H	X	H	X	Isolation
H	X	X	H	
X	H	X	H	
X	H	H	X	

# SN74ALS29863

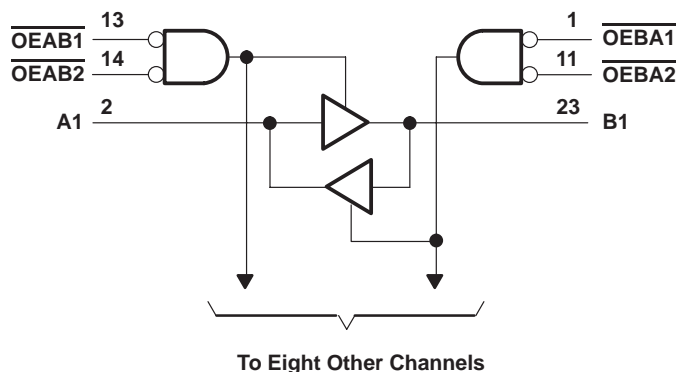
## 9-BIT TRANSCEIVER WITH 3-STATE OUTPUTS

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### logic symbol†



### logic diagram (positive logic)



† 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, $V_{CC}$	7 V
Input voltage, $V_I$ (all inputs and I/O ports)	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

	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



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**9-BIT TRANSCEIVER**  
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**electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)**

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
V <sub>IK</sub>		V <sub>CC</sub> = 4.75 V, I <sub>I</sub> = -18 mA			-1.2	V
V <sub>OH</sub>		V <sub>CC</sub> = 4.75 V	I <sub>OH</sub> = -15 mA		2.4	V
			I <sub>OH</sub> = -24 mA		2	
V <sub>OL</sub>		V <sub>CC</sub> = 4.75 V, I <sub>OL</sub> = 48 mA		0.35	0.5	V
I <sub>I</sub>		V <sub>CC</sub> = 5.25 V, V <sub>I</sub> = 5.5 V			0.1	mA
I <sub>IH</sub>	Control inputs	V <sub>CC</sub> = 5.25 V, V <sub>I</sub> = 2.7 V			20	μA
	A or B ports‡				20	
I <sub>IL</sub>	Control inputs	V <sub>CC</sub> = 5.25 V, V <sub>I</sub> = 0.4 V			-0.1	mA
	A or B ports‡				-0.1	
I <sub>OS</sub> §		V <sub>CC</sub> = 5.25 V, V <sub>O</sub> = 0	-75		-250	mA
I <sub>CC</sub>		V <sub>CC</sub> = 5.25 V		40	65	mA

† All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

‡ For I/O ports, the parameters I<sub>IH</sub> and I<sub>IL</sub> 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.

**switching characteristics (see Figure 1)**

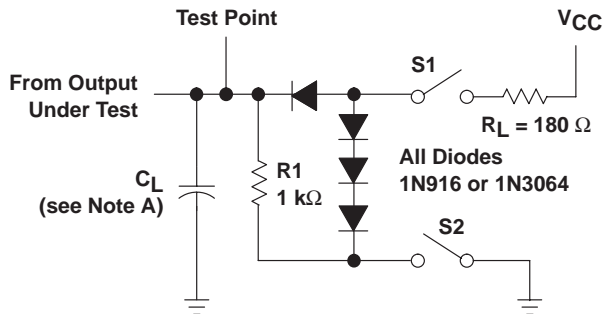
PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	V <sub>CC</sub> = 4.75 V to 5.25 V		UNIT
				MIN	MAX	
t <sub>PLH</sub>	A or B	B or A	C <sub>L</sub> = 300 pF			ns
t <sub>PHL</sub>						
t <sub>PLH</sub>	A or B	B or A	C <sub>L</sub> = 50 pF			ns
t <sub>PHL</sub>						
t <sub>PZH</sub>	$\overline{OEAB}$ or $\overline{OEBA}$	A or B	C <sub>L</sub> = 300 pF			ns
t <sub>PZL</sub>						
t <sub>PZH</sub>	$\overline{OEAB}$ or $\overline{OEBA}$	A or B	C <sub>L</sub> = 50 pF			ns
t <sub>PZL</sub>						
t <sub>PHZ</sub>	$\overline{OEAB}$ or $\overline{OEBA}$	A or B	C <sub>L</sub> = 50 pF			ns
t <sub>PLZ</sub>						
t <sub>PHZ</sub>	$\overline{OEAB}$ or $\overline{OEBA}$	A or B	C <sub>L</sub> = 5 pF			ns
t <sub>PLZ</sub>						



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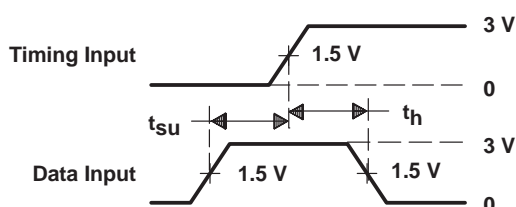
## PARAMETER MEASUREMENT INFORMATION



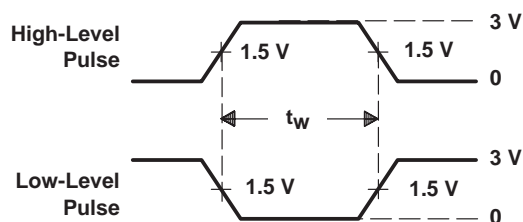
LOAD CIRCUIT

SWITCH POSITION TABLE

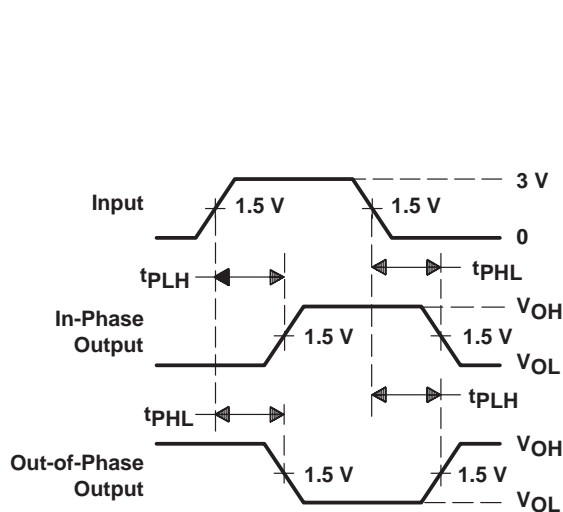
TEST	S1	S2
$t_{PLH}$	Closed	Closed
$t_{PHL}$	Closed	Closed
$t_{PZH}$	Open	Closed
$t_{PZL}$	Closed	Open
$t_{PHZ}$	Closed	Closed
$t_{PLZ}$	Closed	Closed



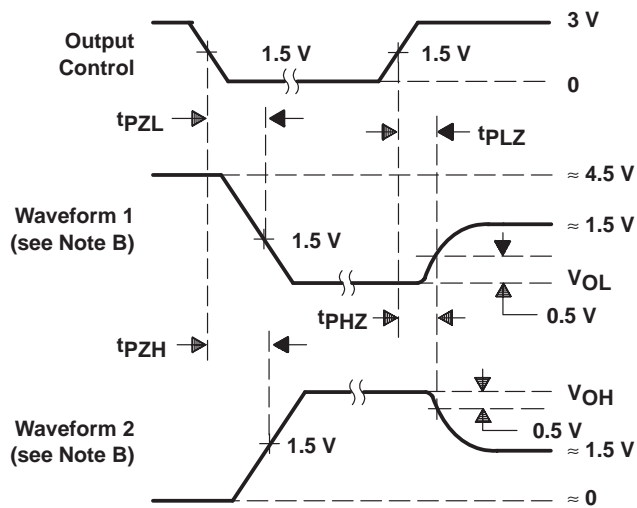
VOLTAGE WAVEFORMS  
SETUP AND HOLD TIMES



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  $\leq$  10 MHz,  $Z_O = 50 \Omega$ ,  $t_r \leq 2.5$  ns,  $t_f \leq 2.5$  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
SN74ALS29863DW	ACTIVE	SOIC	DW	24	25	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS29863	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.

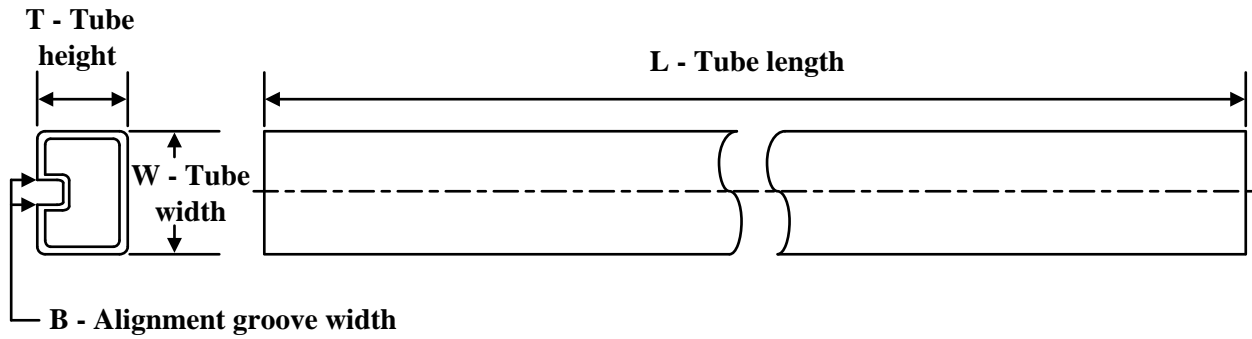
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(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.

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**TUBE**


\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
SN74ALS29863DW	DW	SOIC	24	25	506.98	12.7	4826	6.6

DW (R-PDSO-G24)

PLASTIC SMALL OUTLINE



- 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.

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