

# 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

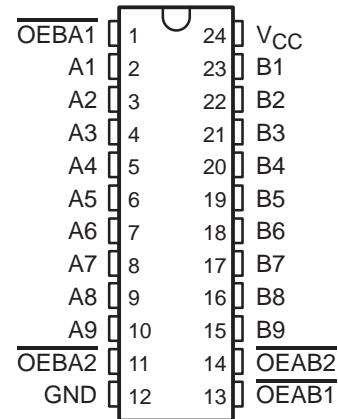
#### description

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 ( $\overline{\text{OEAB1}}$ ,  $\overline{\text{OEAB2}}$ ,  $\overline{\text{OEBA1}}$ , and  $\overline{\text{OEBA2}}$ ) inputs.

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

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



FUNCTION TABLE

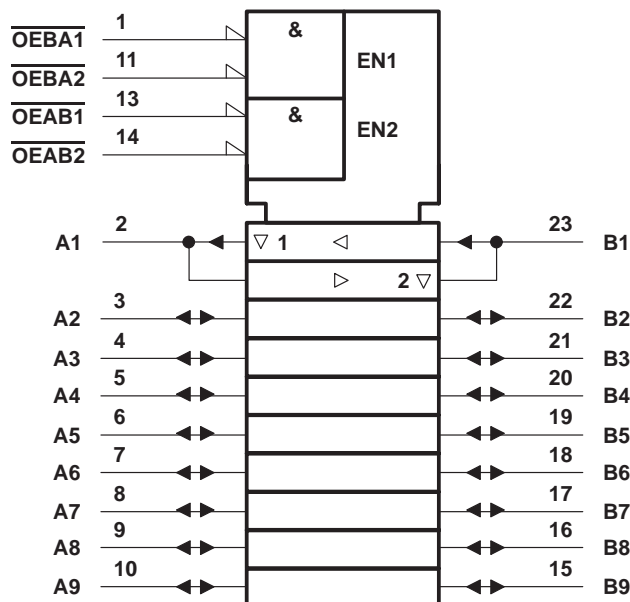
INPUTS				OPERATION
$\overline{\text{OEAB1}}$	$\overline{\text{OEAB2}}$	$\overline{\text{OEBA1}}$	$\overline{\text{OEBA2}}$	
L	L	L	L	Latch A and B
L	L	H	X	A to B
L	L	X	H	
H	X	L	L	B to A
X	H	L	L	
H	X	H	X	Isolation
H	X	X	H	
X	H	X	H	
X	H	H	X	

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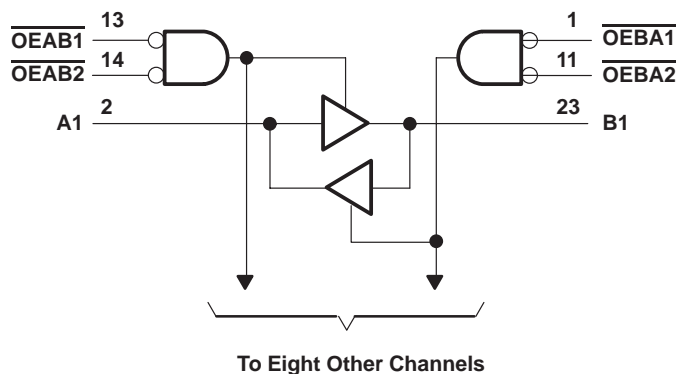
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### logic symbol†



### 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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**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  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

‡ 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.

**switching characteristics (see Figure 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	$V_{CC} = 4.75\text{ V to } 5.25\text{ V}$		UNIT
				MIN	MAX	
$t_{PLH}$	A or B	B or A	$C_L = 300\text{ pF}$		15	ns
$t_{PHL}$					15	
$t_{PLH}$	A or B	B or A	$C_L = 50\text{ pF}$		8	ns
$t_{PHL}$					8	
$t_{PZH}$	$\overline{OEAB}$ or $\overline{OEBA}$	A or B	$C_L = 300\text{ pF}$		20	ns
$t_{PZL}$					23	
$t_{PZH}$	$\overline{OEAB}$ or $\overline{OEBA}$	A or B	$C_L = 50\text{ pF}$		15	ns
$t_{PZL}$					15	
$t_{PHZ}$	$\overline{OEAB}$ or $\overline{OEBA}$	A or B	$C_L = 50\text{ pF}$		17	ns
$t_{PLZ}$					12	
$t_{PHZ}$	$\overline{OEAB}$ or $\overline{OEBA}$	A or B	$C_L = 5\text{ pF}$		9	ns
$t_{PLZ}$					9	

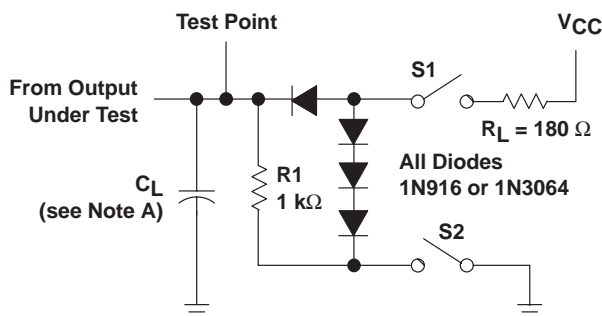
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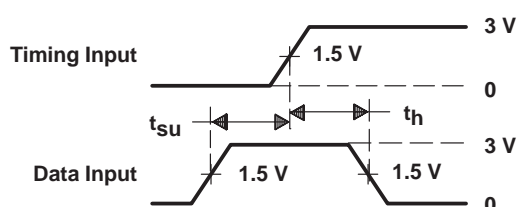
#### PARAMETER MEASUREMENT INFORMATION



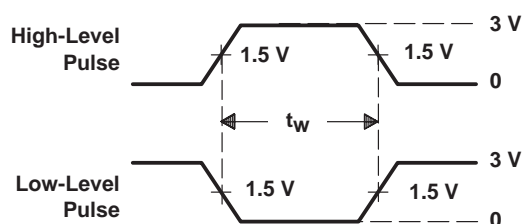
LOAD CIRCUIT

SWITCH POSITION TABLE

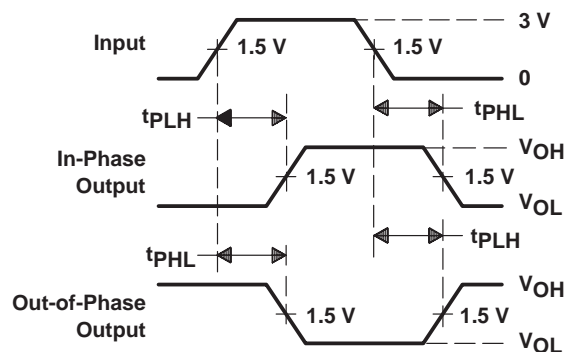
TEST	S1	S2
$t_{PLH}$	Closed	Closed
$t_{PHL}$	Closed	Closed
$t_{PZH}$	Open	Closed
$t_{PZL}$	Closed	Open
$t_{PHZ}$	Closed	Closed
$t_{PLZ}$	Closed	Closed



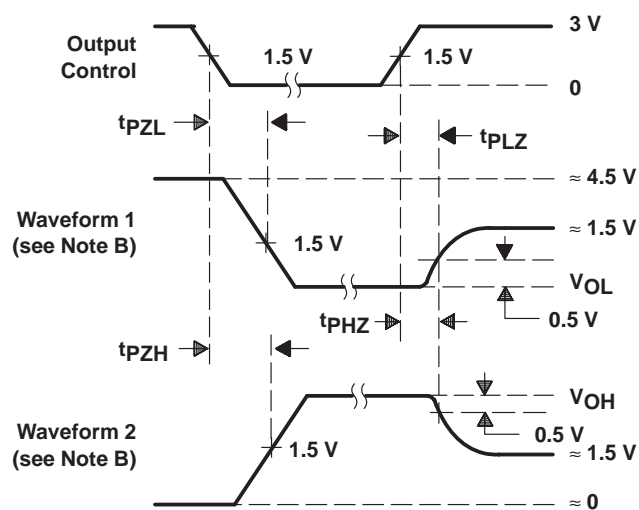
VOLTAGE WAVEFORMS  
SETUP AND HOLD TIMES



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

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