

Am29861 - 64

High Performance Bus Transceivers

DISTINCTIVE CHARACTERISTICS

- High-speed symmetrical bidirectional transceivers
 - Noninverting $t_{PD} = 5.0ns$ typ
 - Inverting $t_{PD} = 4.5ns$ typ
- 200mV minimum input hysteresis on input data ports
- Three-state outputs glitch-free during power-up and down. Outputs have Schottky clamp to ground
- 48mA commercial I_{OL} , 32mA military I_{OL}
- Low input/output capacitance
- I_{OH} specified 2.0V and 2.4V

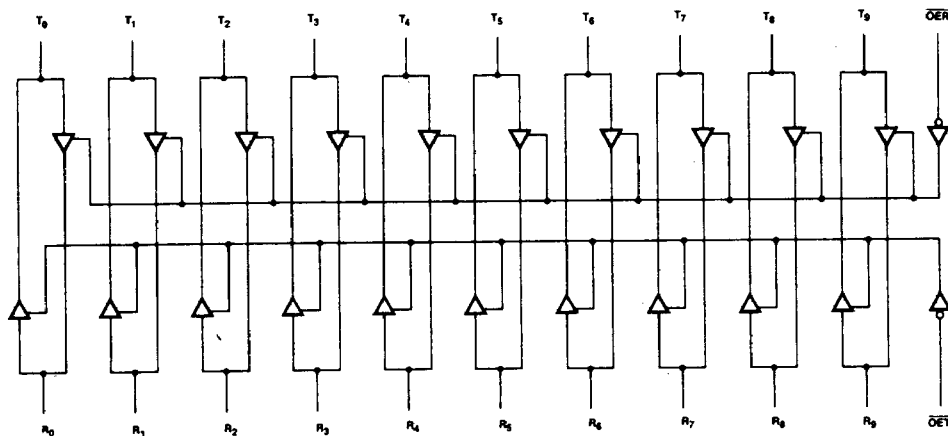
GENERAL DESCRIPTION

The Am29860 Series bus transceivers provide high performance bus interface buffering for wide data/address paths or buses carrying parity. The Am29863/64 9-bit transceivers have NOR-ed output enables for maximum control flexibility. All transceiver data inputs have 200mV minimum input hysteresis to provide improved noise rejection.

All of the Am29800 high performance interface family are designed for high capacitance load drive capability while providing low capacitance bus loading at both inputs and outputs. All inputs are Schottky diode inputs, and all outputs are designed for low capacitance bus loading in the high impedance state.

BLOCK DIAGRAM

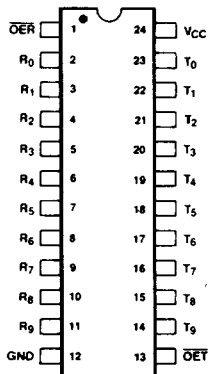
Am29861/Am29862 10-BIT TRANSCEIVERS



BD001060

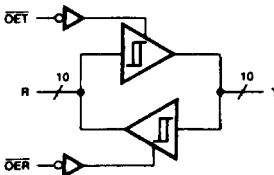
CONNECTION DIAGRAM Top View

Am29861/Am29862 10-BIT TRANSCEIVERS



CD001150

LOGIC SYMBOL



Am29861 (NONINVERTING)

LS000370

ORDERING INFORMATION

AMD products are available in several packages and operating ranges. The order number is formed by a combination of the following: Device number, speed option (if applicable), package type, operating range and screening option (if desired).

Am29861 - 64

D

C

B

Screening Option
Blank - Standard processing
B - Burn-in

Temperature (See Operating Range)
C - Commercial (0°C to +70°C)
M - Military (-55°C to +125°C)

Package

D - 24-pin SLIM DIP (D-24-SLIM)
L - 28-pin Leadless Chip Carrier (L-28-1)
X - Dice

Device type

High Performance Bus Transceiver

Valid Combinations

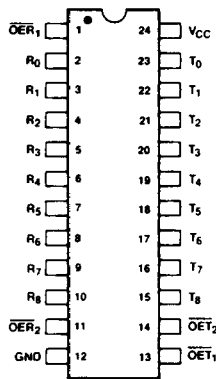
| | |
|---------|--------------|
| Am29861 | DC, DCB, DM, |
| Am29862 | DMB |
| Am29863 | LC, LCB, LM, |
| Am29864 | LMB |
| | XC, XM |

Valid Combinations

Consult the AMD sales office in your area to determine if a device is currently available in the combination you wish.

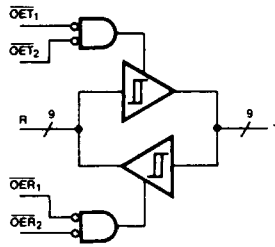
CONNECTION DIAGRAM Top View

Am29863/Am29864 9-BIT TRANSCEIVERS



GD001140

LOGIC SYMBOL



Am29863 (NONINVERTING)

LS000380

PIN DESCRIPTION

| Pin No. | Name | I/O | Description |
|------------------------|--------------------|-----|--|
| Am29861/Am29862 | | | |
| 1 | \overline{OET} | I | When LOW in conjunction with \overline{OER} HIGH activates the RECEIVE mode. |
| 13 | \overline{OER} | I | When LOW in conjunction with \overline{OET} HIGH activates the TRANSMIT mode. |
| | R_i | I/O | 10-bit RECEIVE input/output. |
| | T_i | I/O | 10-bit TRANSMIT input/output. |
| Am29863/Am29864 | | | |
| | \overline{OET}_i | I | When both are LOW in conjunction with any \overline{OET}_i HIGH indicates the RECEIVE mode. |
| | \overline{OET}_i | I | When both are LOW in conjunction with any \overline{OER}_i HIGH indicates the TRANSMIT mode. |
| | R_i | I/O | 9-bit RECEIVE input/output. |
| | T_i | I/O | 9-bit TRANSMIT input/output. |

FUNCTION TABLES

Am29861/Am2983 (Noninverting)

| Inputs | | | | Outputs | | Function |
|------------------|------------------|-------|-------|---------|-------|--------------|
| \overline{OET} | \overline{OER} | R_i | T_i | R_i | T_i | |
| L | H | L | N/A | N/A | L | Transmitting |
| L | H | H | N/A | N/A | H | Transmitting |
| H | L | N/A | L | L | N/A | Receiving |
| H | L | N/A | H | H | N/A | Receiving |
| H | H | X | X | Z | Z | Hi-Z |

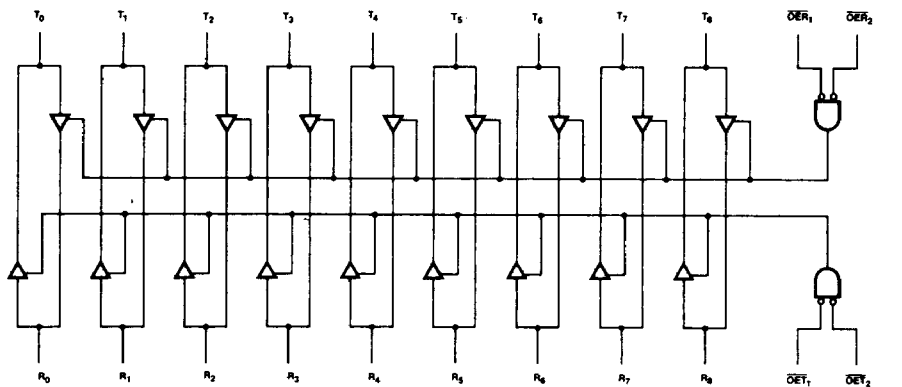
Am29862/Am29864 (Inverting)

| Inputs | | | | Outputs | | Function |
|------------------|------------------|-------|------------------|---------|------------------|--------------|
| \overline{OET} | \overline{OER} | R_i | \overline{T}_i | R_i | \overline{T}_i | |
| L | H | L | N/A | N/A | H | Transmitting |
| L | H | H | N/A | N/A | L | Transmitting |
| H | L | N/A | L | H | N/A | Receiving |
| H | L | N/A | H | L | N/A | Receiving |
| H | H | X | X | Z | Z | Hi-Z |

H = HIGH
L = LOW
Z = High Impedance

X = Don't Care
N/A = Not Applicable

Am29863/Am29864 9-BIT TRANSCEIVERS



BD001070

ABSOLUTE MAXIMUM RATINGS

Storage Temperature -65°C to +150°C
 Ambient Temperature with
 Power Applied -55°C to +125°C
 Supply Voltage to Ground Potential
 Continuous -0.5V to +7.0V
 DC Voltage Applied to Output
 for High Output State -1.5V to V_{CCmax}
 DC Input voltage -0.5V to +5.5V
 DC Output Current, Into Outputs 100mA
 DC Input Current -30mA to +5.0mA

Stresses above those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent device failure. Functionality at or above these limits is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability.

OPERATING RANGES

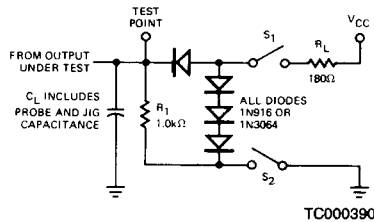
Commercial (C) Devices
 Temperature 0°C to +70°C
 Supply Voltage +4.75V to +5.25V
 Military (M) Devices
 Temperature -55°C to +125°C
 Supply Voltage +4.5V to +5.5V
Operating ranges define those limits over which the functionality of the device is guaranteed.

DC CHARACTERISTICS over operating range unless otherwise specified

| Parameter | Description | Test Conditions | Min | Typ | Max | Units | |
|-------------------|--|--|-------------------------------|-----|------|-------|----|
| VOH | Output HIGH Voltage | $V_{CC} = \text{MIN}$ $V_{IN} = V_{IH}$ or V_{IL} | $I_{OH} = -15\text{mA}$ | 2.4 | | | V |
| | | | $I_{OH} = -24\text{mA}$ | 2.0 | | | |
| VOL | Output LOW Voltage | $V_{CC} = \text{MIN}$ $V_{IN} = V_{IH}$ or V_{IL} | MIL, $I_{OL} = 32\text{mA}$ | | | 0.5 | V |
| | | | COM'L, $I_{OL} = 48\text{mA}$ | | | 0.5 | |
| V _{IH} | Input HIGH Level | Guaranteed input logical HIGH voltage for all inputs | 2.0 | | | V | |
| V _{IL} | Input LOW Level | Guaranteed input logical LOW voltage for all inputs | | | 0.8 | V | |
| V _I | Input Clamp Voltage | $V_{CC} = \text{MIN}$, $I_{IN} = -18\text{mA}$ | | | -1.2 | V | |
| V _{HYST} | Input Hysteresis | Tested output is connected to AC load test circuit | 200 | | | mV | |
| I _{IL} | Input LOW Current | $V_{CC} = \text{MAX}$, $V_{IN} = 0.4\text{V}$ | | | -1.0 | mA | |
| I _{IH} | Input HIGH Current | $V_{CC} = \text{MAX}$, $V_{IN} = 2.7\text{V}$ | | | 50 | μA | |
| I _I | Input HIGH Current | $V_{CC} = \text{MAX}$, $V_{IN} = 5.5\text{V}$ | | | 1.0 | mA | |
| I _{OZH} | Output Off-State Output Current (HI-Z) | $V_{CC} = \text{MAX}$, $V_O = 2.4\text{V}$ | | | 50 | μA | |
| I _{OZL} | Output Off-State Output Current (HI-Z) | $V_{CC} = \text{MAX}$, $V_O = 0.4\text{V}$ | | | -1.0 | mA | |
| I _{SC} | Output Short Circuit Current | $V_{CC} = \text{MAX}$ | -75 | | -250 | mA | |
| I _{CC} | Supply Current | $V_{CC} = \text{MAX}$ Outputs Open | Over Temperature Range | | | 160 | mA |
| | | | +70°C | | | 150 | |
| | | | +125°C | | | 140 | |

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SWITCHING TEST CIRCUIT



Note: Pulse Generator for All Pulses: Rate \leq 10MHz; $Z_0 = 50\Omega$; $t_r \leq 2.5\text{ns}$; $t_f \leq 2.5\text{ns}$.

SWITCHING CHARACTERISTICS ($T_A = +25^\circ\text{C}$, $V_{CC} = 5.0\text{V}$)

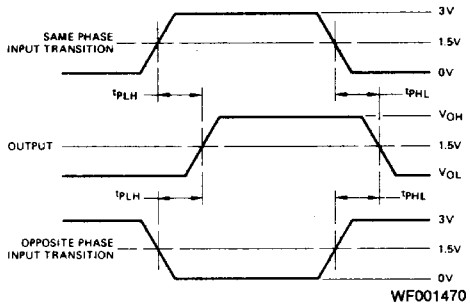
| Parameters | Description | Test Conditions | Min | Typ | Max | Units |
|------------|--|----------------------|-----|------|------|-------|
| t_{PLH} | Propagation Delay from R_i to T_i or T_i to R_i Am29861/Am29863 (Noninverting) | $C_L = 50\text{pF}$ | | 4.8 | 6.0 | ns |
| t_{PHL} | | | | 5.2 | 6.2 | ns |
| t_{PLH} | | $C_L = 300\text{pF}$ | | 8 | 11 | ns |
| t_{PHL} | | | | 11 | 14 | ns |
| t_{PLH} | Propagation Delay from R_i to \bar{T}_i or \bar{T}_i to R_i Am29862/Am29864 (Inverting) | $C_L = 50\text{pF}$ | | 4.0 | 5.2 | ns |
| t_{PHL} | | | | 4.9 | 5.9 | ns |
| t_{PLH} | | $C_L = 300\text{pF}$ | | 7.3 | 10 | ns |
| t_{PHL} | | | | 10.5 | 12.9 | ns |
| t_{ZH} | Output Enable Time $\overline{\text{OET}}$ to T_i and OER to R_i | $C_L = 50\text{pF}$ | | 6.5 | 12 | ns |
| t_{ZL} | | | | 9.5 | 12 | ns |
| t_{ZH} | | $C_L = 300\text{pF}$ | | 11 | 17 | ns |
| t_{ZL} | | | | 17 | 21 | ns |
| t_{HZ} | Output Disable Time OET to T_i and OER to R_i | $C_L = 5\text{pF}$ | | 3.5 | 8.0 | ns |
| t_{LZ} | | | | 3.5 | 8.0 | ns |
| t_{HZ} | | $C_L = 50\text{pF}$ | | 11.2 | 16 | ns |
| t_{LZ} | | | | 4.5 | 9.0 | ns |

SWITCHING CHARACTERISTICS over operating range unless otherwise specified

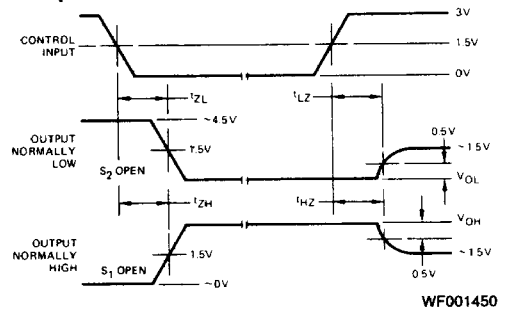
| Parameters | Description | Test Conditions | COMMERCIAL | | MILITARY | | Units |
|------------|---|----------------------|------------|-----|----------|-----|-------|
| | | | Min | Max | Min | Max | |
| t_{PLH} | Propagation Delay from R_i to T_i or T_i to R_i Am29861/Am29863 (Noninverting) | $C_L = 50\text{pF}$ | | 8 | | 10 | ns |
| t_{PHL} | | | | 8 | | 10 | ns |
| t_{PLH} | | $C_L = 300\text{pF}$ | | 15 | | 17 | ns |
| t_{PHL} | | | | 15 | | 17 | ns |
| t_{PLH} | Propagation Delay from R_i to \bar{T}_i or \bar{T}_i to R_i Am29862/Am29864 (Inverting) | $C_L = 50\text{pF}$ | | 7.0 | | 9.0 | ns |
| t_{PHL} | | | | 7.5 | | 9.5 | ns |
| t_{PLH} | | $C_L = 300\text{pF}$ | | 14 | | 16 | ns |
| t_{PHL} | | | | 14 | | 16 | ns |
| t_{ZH} | Output Enable Time $\overline{\text{OET}}$ to T_i or OER to R_i | $C_L = 50\text{pF}$ | | 15 | | 17 | ns |
| t_{ZL} | | | | 15 | | 17 | ns |
| t_{ZH} | | $C_L = 300\text{pF}$ | | 20 | | 22 | ns |
| t_{ZL} | | | | 23 | | 25 | ns |
| t_{HZ} | Output Disable Time OET to T_i or OER to R_i | $C_L = 5\text{pF}$ | | 9 | | 10 | ns |
| t_{LZ} | | | | 9 | | 10 | ns |
| t_{HZ} | | $C_L = 50\text{pF}$ | | 17 | | 19 | ns |
| t_{LZ} | | | | 12 | | 12 | ns |

SWITCHING WAVEFORMS

PROPAGATION DELAY



ENABLE AND DISABLE TIMES



- Notes: 1. Diagram shown for Input Control Enable-LOW and Input Control Disable-HIGH.
 2. S_1 and S_2 of Load Circuit are closed except where shown.