

# Am8T26A·Am8T28

## Schottky Three-State Quad Bus Driver/Receiver

### Distinctive Characteristics

- Advanced Schottky technology
- 48mA driver sink current
- Three-state outputs on driver and receiver
- PNP inputs
- Am8T26A has inverting outputs
- Am8T28 has non-inverting outputs
- Driver propagation delay — 14ns max. for 8T26A  
17ns max. for 8T28
- Receiver propagation delay — 14ns max. for 8T26A  
17ns max. for 8T28
- 100% reliability assurance testing in compliance with MIL-STD-883

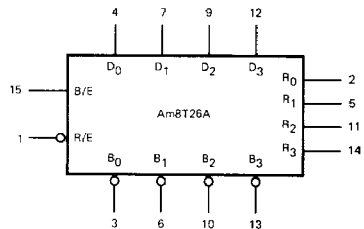
### FUNCTIONAL DESCRIPTION

The Am8T26A/Am8T28 are high speed bus transceivers consisting of four bus drivers with three-state outputs and four bus receivers, also with three-state outputs. Each driver output is internally connected to a receiver input. Both the drivers and receivers have PNP inputs.

One buffered common "bus enable" input is connected to the four drivers and another buffered common "receiver enable" input is connected to the receivers. A LOW on the bus enable (B/E) input forces the four driver outputs to the high-impedance state. A HIGH on the bus enable allows input data to be transferred onto the data bus.

A HIGH on the receiver enable (R/E) input forces the four receiver outputs to the high-impedance state while a LOW on the receiver enable input allows the received data to be transferred to the output. The complementary design of the bus enable and receiver enable inputs allows these control inputs to be connected together externally such that a single transmit/receive function is derived.

### LOGIC SYMBOL

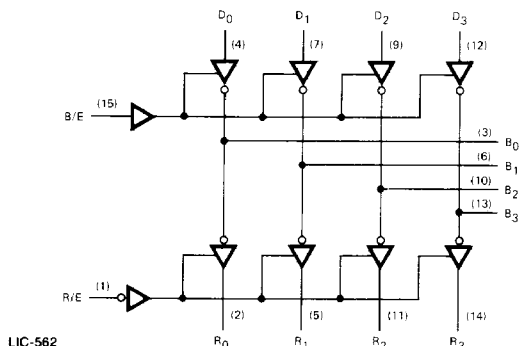


V<sub>CC</sub> = Pin 16  
GND = Pin 8

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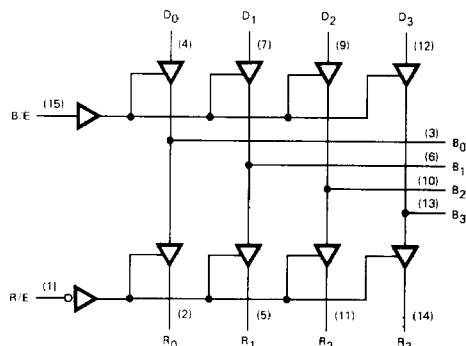
### LOGIC DIAGRAMS

**Am8T26A**  
Inverting Output (Three-State)



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**Am8T28**  
Non-Inverting Output (Three-State)

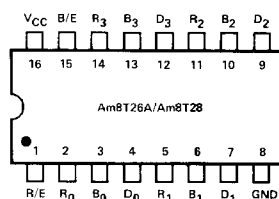


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### ORDERING INFORMATION

Package Type	Temperature Range	Am8T26A	Am8T28
		Order Number	Order Number
Molded DIP	0°C to +75°C	N8T26AB	N8T28B
Hermetic DIP	0°C to +75°C	N8T26AF	N8T28F
Dice	0°C to +75°C	AM8T26AXC	AM8T28XC
Hermetic DIP	-55°C to +125°C	S8T26AF	S8T28F
Dice	-55°C to +125°C	AM8T26AXM	AM8T28XM

### CONNECTION DIAGRAM (Top View)



Note: Pin 1 is marked for orientation.

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**MAXIMUM RATINGS** (Above which the useful life may be impaired)

Storage Temperature	-65°C to +150°C
Temperature (Ambient) Under Bias	-55°C to +125°C
Supply Voltage to Ground Potential (Pin 16 to Pin 8) Continuous	-0.5V to +7V
V <sub>OC</sub> Voltage Applied to Outputs for HIGH Output State	-0.5V to +V <sub>CC</sub> max.
V <sub>IC</sub> Input Voltage	-0.5V to +5.5V
V <sub>IC</sub> Output Current, Into Outputs (Receiver)	30mA
V <sub>IC</sub> Output Current, Into Outputs (BUS)	80mA
V <sub>IC</sub> Input Current	-30mA to +5.0mA

**ELECTRICAL CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE**

The Following Conditions Apply Unless Otherwise Noted:

8T26A, N8T28 T<sub>A</sub> = 0°C to +75°C (COM'L) MIN. = 4.75 V MAX. = 5.25 V8T26A, S8T28 T<sub>A</sub> = -55°C to +125°C (MIL) MIN. = 4.50 V MAX. = 5.50 V**V<sub>IC</sub> CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE**

Parameters	Description	Test Conditions (Note 1)	Min.	Typ. (Note 2)	Max.	Units
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**Driver**

I <sub>IL</sub>	Low Level Input Current	V <sub>IN</sub> = 0.4 V			-200	μA
I <sub>IL</sub>	Low Level Input Current (Disabled)	V <sub>IN</sub> = 0.4 V			-50	μA
I <sub>IH</sub>	High Level Input Current (D <sub>IN</sub> , D <sub>E</sub> )	V <sub>IN</sub> = V <sub>CC</sub> MAX.			25	μA
V <sub>OL</sub>	Low Level Output Voltage	I <sub>OUT</sub> = 48mA (Note 5)			0.5	Volts
V <sub>OH</sub>	High Level Output Voltage	I <sub>OUT</sub> = -10mA, V <sub>CC</sub> = V <sub>CC</sub> MIN. (Note 6)	2.4			Volts
I <sub>OS</sub>	Short Circuit Output Current	V <sub>OUT</sub> = 0V, V <sub>CC</sub> = V <sub>CC</sub> MAX. (Note 4)	-50		-150	mA

**Receiver**

I <sub>IL</sub>	Low Level Input Current	V <sub>IN</sub> = 0.4 V			-200	μA
I <sub>IH</sub>	High Level Input Current (R <sub>E</sub> )	V <sub>IN</sub> = V <sub>CC</sub> MAX.			25	μA
V <sub>OL</sub>	Low Level Output Voltage	I <sub>OUT</sub> = 20mA (Note 5)			0.5	Volts
V <sub>OH</sub>	High Level Output Voltage	I <sub>OUT</sub> = -100μA, V <sub>CC</sub> = 5.0V	3.5			Volts
		I <sub>OUT</sub> = -2.0mA (Note 6)	2.4			
I <sub>OS</sub>	Short Circuit Output Current	V <sub>OUT</sub> = 0V, V <sub>CC</sub> = V <sub>CC</sub> MAX.	-30		-75	mA

**Both Driver and Receiver**

V <sub>TL</sub>	Low Level Input Threshold Voltage		0.85			Volts
V <sub>TH</sub>	High Level Input Threshold Voltage				2.0	Volts
I <sub>O</sub>	Low Level Output Off Leakage Current	V <sub>OUT</sub> = 0.5V			-100	μA
	High Level Output Off Leakage Current	V <sub>OUT</sub> = 2.4V			100	μA
V <sub>I</sub>	Input Clamp Voltage	I <sub>IN</sub> = -12mA			-1.0	Volts
P <sub>WR</sub> / I <sub>CC</sub>	Power/Current Consumption	Am8T26A	V <sub>CC</sub> = V <sub>CC</sub> MAX.		457/87	mW/mA
		Am8T28	V <sub>CC</sub> = V <sub>CC</sub> MAX.		578/110	

**Switching Characteristics** (T<sub>A</sub> = +25°C, V<sub>CC</sub> = 5.0V)

Parameters	Description	Test Conditions	Am8T26A			Am8T28			Units
			Min.	Typ.	Max.	Min.	Typ.	Max.	
t <sub>PLH</sub>	Driver Input to Bus	Figure 1		10	14		13	17	ns
t <sub>PHL</sub>				10	14		13	17	
t <sub>PLH</sub>	Bus to Receiver Output	Figure 2		9.0	14		12	17	ns
t <sub>PHL</sub>				6.0	14		9.0	17	
t <sub>ZL</sub>	Driver Enable to Bus	Figure 3		19	25		21	28	ns
t <sub>LZ</sub>				15	20		18	23	
t <sub>ZL</sub>	Receiver Enable to Receiver Output	Figure 4		15	20		18	23	ns
t <sub>LZ</sub>				10	15		13	18	

Notes: 1. For conditions shown as MIN. or MAX., use the appropriate value specified under Electrical Characteristics for the applicable device type.

2. Typical limits are at V<sub>CC</sub> = 5.0 V, 25°C ambient and maximum loading.

3. Actual input currents = Unit Load Current x Input Load Factor (See Loading Rules).

4. Not more than one output should be shorted at a time. Duration of the short circuit test should not exceed one second.

5. Output sink current is supplied through a resistor to V<sub>CC</sub>.

6. Measurements apply to each output and the associated data input independently.

## DEFINITION OF FUNCTIONAL TERMS

**D<sub>0</sub>, D<sub>1</sub>, D<sub>2</sub>, D<sub>3</sub>** The four driver inputs.

**B<sub>0</sub>, B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>** The four driver outputs and receiver inputs (data is inverted).

**R<sub>0</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>** The four receiver outputs. Data from the bus is inverted while data from the driver inputs is non-inverted.

**B/E** Bus enable input. When the bus enable input is LOW, the four driver outputs are in the high-impedance state.

**R/E** Receiver enable input. When the receiver enable input is HIGH, the four receiver outputs are in the high-impedance state.

## LOADING RULES (In Unit Loads)

Input/Output	Pin No.'s	LOW Input Unit Load	Output HIGH	Fan-out Output LOW
R/E	1	1/8	—	—
R <sub>0</sub>	2	—	50	10
B <sub>0</sub>	3	1/16	250	25
D <sub>0</sub>	4	1/8	—	—
R <sub>1</sub>	5	—	50	10
B <sub>1</sub>	6	1/16	250	25
D <sub>1</sub>	7	1/8	—	—
GND	8	—	—	—
D <sub>2</sub>	9	1/8	—	—
B <sub>2</sub>	10	1/16	250	25
R <sub>2</sub>	11	—	50	10
D <sub>3</sub>	12	1/8	—	—
B <sub>3</sub>	13	1/16	250	25
R <sub>3</sub>	14	—	50	10
B/E	15	1/8	—	—
V <sub>CC</sub>	16	—	—	—

A TTL Unit Load is defined as  $-1.6\text{mA}$  measured at 0.4V LOW and  $40\mu\text{A}$  measured at 2.4V HIGH.

## DRIVER FUNCTION TABLE

INPUTS		Am8T26A OUTPUT	Am8T28 OUTPUT
B/E	D <sub>i</sub>	B <sub>i</sub>	B <sub>i</sub>
L	X	Z	Z
H	L	H	L
H	H	L	H

L = LOW  
H = HIGH  
X = Don't Care  
Z = High Impedance

i = 0, 1, 2, or 3

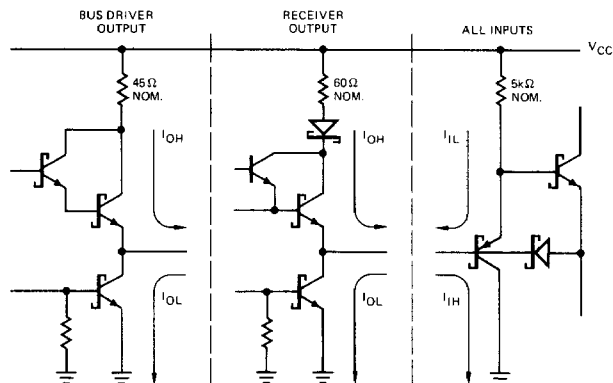
## RECEIVER FUNCTION TABLE

INPUTS		Am8T26A OUTPUT	Am8T28 OUTPUT
R/E	B <sub>i</sub>	R <sub>i</sub>	R <sub>i</sub>
H	X	Z	Z
L	L	H	L
L	H	L	H

L = LOW  
H = HIGH  
X = Don't Care  
Z = High Impedance

i = 0, 1, 2, or 3

## INPUT/OUTPUT CURRENT INTERFACE CONDITIONS



Note: Actual current flow direction shown.

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## AC TEST CIRCUITS AND WAVEFORMS

## PROPAGATION DELAY (Data In to Bus)

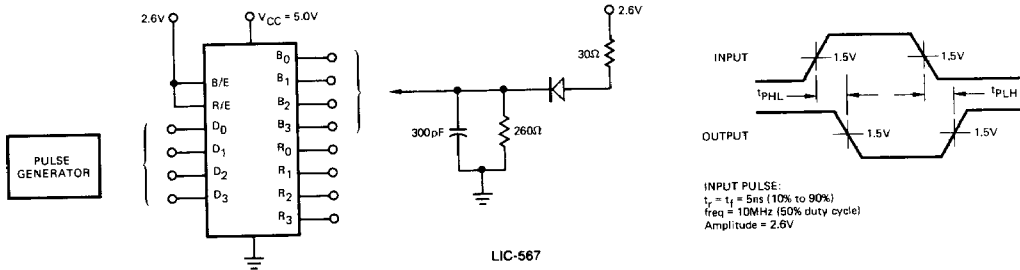


Figure 1

## PROPAGATION DELAY (Bus to Receiver Out)

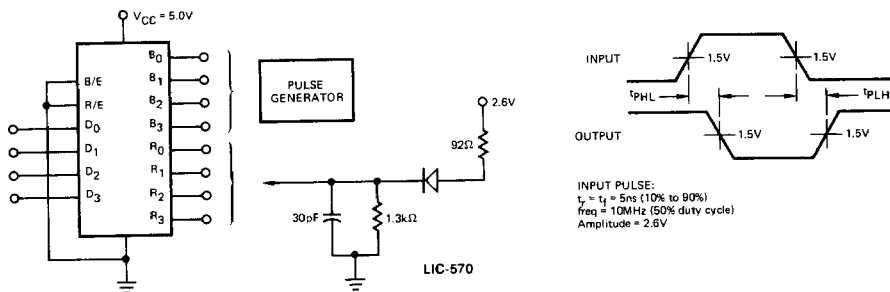


Figure 2

## PROPAGATION DELAY (Bus Enable to Bus Output)

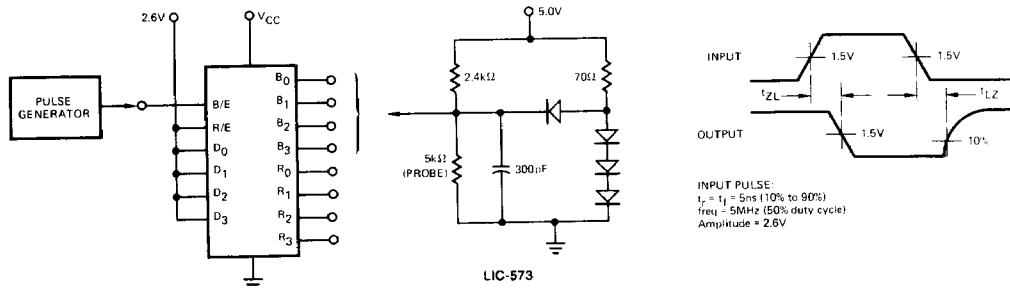


Figure 3

## PROPAGATION DELAY (Receive Enable to Receive Output)

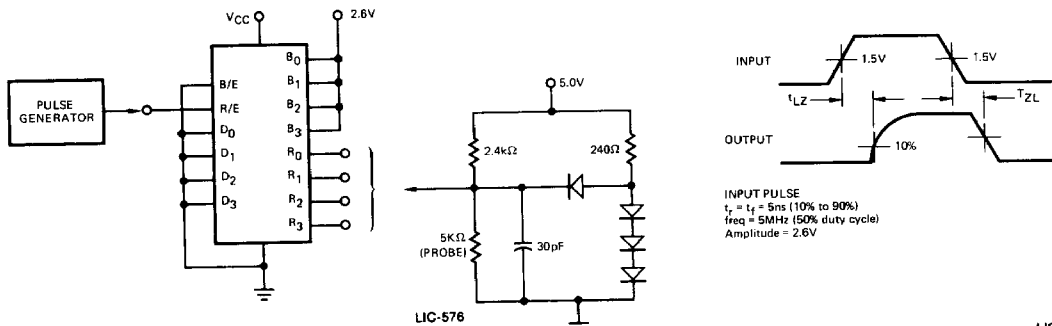
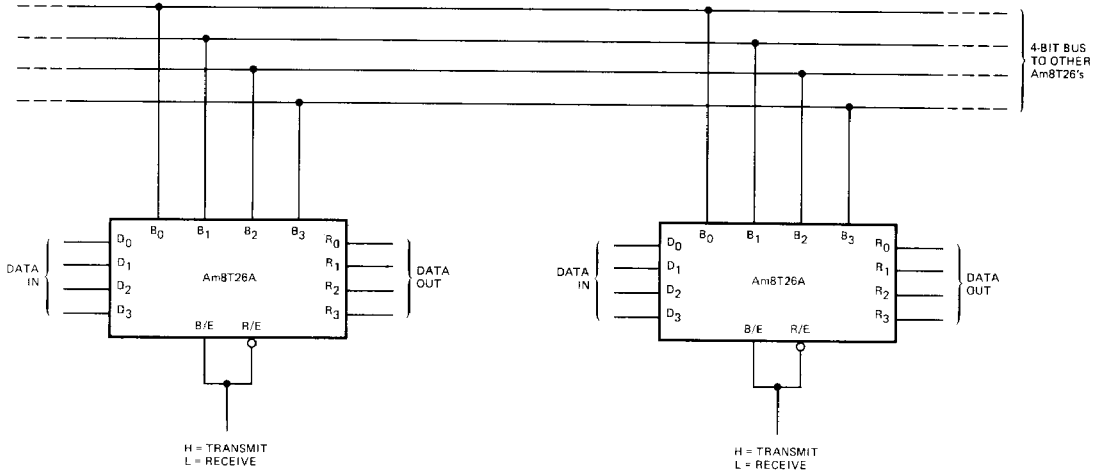


Figure 4

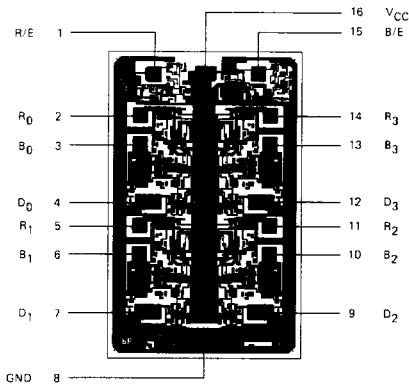
APPLICATION



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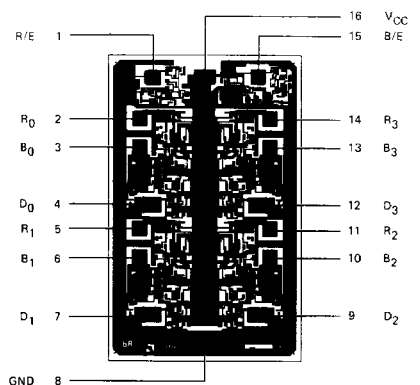
Metallization and Pad Layouts

Am8T26A



DIE SIZE 0.058" X 0.091"

Am8T28



DIE SIZE 0.058" X 0.091"