

# AmZ8140 • AmZ8144

## Octal Three-State Buffers

### DISTINCTIVE CHARACTERISTICS

- Three-state outputs drive bus lines directly
- Hysteresis at inputs improves noise margin
- PNP inputs reduce DC loading on bus lines
- Data-to-output propagation delay times – 16ns MAX
- Enable-to-output – 20ns MAX
- 48mA output current
- 20-pin hermetic and molded DIP packages
- 100% product assurance testing to MIL-STD-883 requirements

### FUNCTIONAL DESCRIPTION

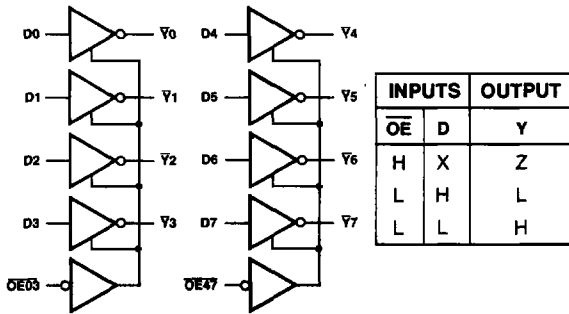
The AmZ8140 and AmZ8144 are octal buffers fabricated using advanced low-power Schottky technology. The 20-pin package provides improved printed circuit board density for use in memory address and clock driver applications.

Three-state outputs are provided to drive bus lines directly. The AmZ8140 and AmZ8144 are specified at 48mA and 24mA output sink current. Four buffers are enabled from one common line and the other four from a second enable line. The AmZ8140 and AmZ8144 enables are of similar polarity for use as a unidirectional buffer in which both halves are enabled simultaneously.

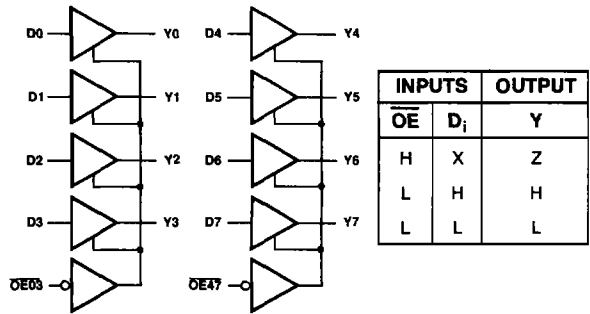
Improved noise rejection and high fan-out are provided by input hysteresis and low current PNP inputs.

### LOGIC DIAGRAMS

AmZ8140



AmZ8144

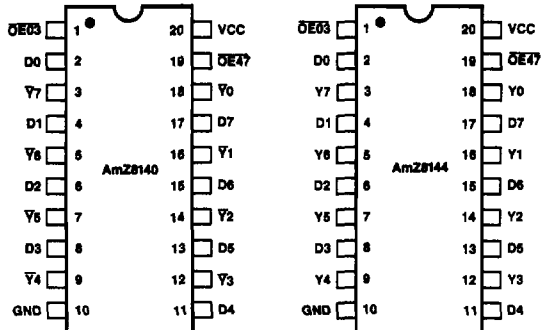


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Note: All devices have input hysteresis.

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### CONNECTION DIAGRAMS Top Views

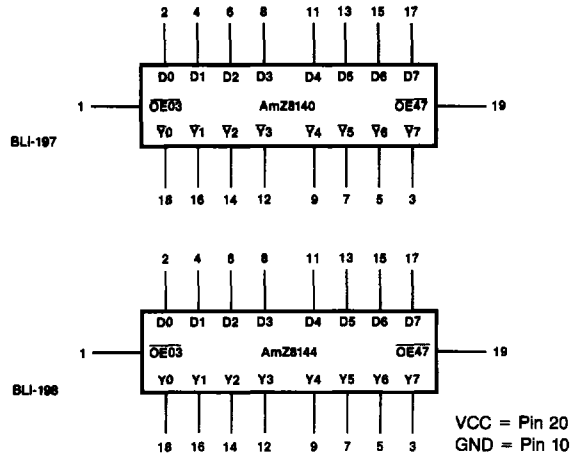


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Note: Pin 1 is marked for orientation.

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### LOGIC SYMBOLS



**ELECTRICAL CHARACTERISTICS**

The Following Conditions Apply Unless Otherwise Specified:

COM'L  $T_A = 0$  to  $70^\circ\text{C}$   $V_{CC} = 5.0\text{V} \pm 5\%$  (MIN = 4.75V MAX = 5.25V)  
 MIL  $T_A = -55$  to  $+125^\circ\text{C}$   $V_{CC} = 5.0\text{V} \pm 10\%$  (MIN = 4.50V MAX = 5.50V)

**DC CHARACTERISTICS OVER OPERATING RANGE**

Parameters	Description	Test Conditions (Note 1)	Typ (Note 2)		Units			
			Min	Max				
VOH	High-Level Output Voltage	$V_{CC} = \text{MIN}, V_{IH} = 2.0\text{V}$ $I_{OH} = -3.0\text{mA}, V_{IL} = V_{IL \text{ MAX}}$	2.4	3.4	Volts			
		$V_{CC} = \text{MIN},$ $V_{IL} = 0.5\text{V}$	MIL, $I_{OH} = -12\text{mA}$	2.0				
			COM'L, $I_{OH} = -15\text{mA}$	2.0				
VOL	Low-Level Output Voltage	$V_{CC} = \text{MIN}$	All $I_{OL} = 12\text{mA}$	0.25	0.4	Volts		
			All $I_{OL} = 24\text{mA}$	0.35	0.5			
			COM'L, $I_{OL} = 48\text{mA}$		0.55			
VIH	High-Level Input Voltage	Guaranteed input logical HIGH voltage for all inputs	2.0		Volts			
VIL	Low-Level Input Voltage	COM'L		0.8	Volts			
		MIL		0.7				
VIK	Input Clamp Voltage	$V_{CC} = \text{MIN}, I_I = -18\text{mA}$		-1.5	Volts			
	Hysteresis ( $V_{T+} - V_{T-}$ )	$V_{CC} = \text{MIN}$	0.2	0.4	Volts			
IOZH	Off-State Output Current, High-Level Voltage Applied	$V_{CC} = \text{MAX}$ $V_{IH} = 2.0\text{V}$ $V_{IL} = V_{IL \text{ MAX}}$	$V_O = 2.7\text{V}$		20	$\mu\text{A}$		
IOZL	Off-State Output Current, Low-Level Voltage Applied		$V_O = 0.4\text{V}$		-20			
II	Input Current at Maximum Input Voltage	$V_{CC} = \text{MAX}, V_I = 7.0\text{V}$		0.1	mA			
IIH	High-Level Input Current, Any Input	$V_{CC} = \text{MAX}, V_{IH} = 2.7\text{V}$		20	$\mu\text{A}$			
IIL	Low-Level Input Current	$V_{CC} = \text{MAX}, V_{IL} = 0.4\text{V}$		-200	$\mu\text{A}$			
ISC	Short Circuit Output Current (Note 3)	$V_{CC} = \text{MAX}$	-50	-225	mA			
ICC	Supply Current $V_{CC} = \text{MAX}$ Outputs Open	AmZ8140	All Outputs HIGH		13	23	$\text{m}\mu\text{A}$	
			All Outputs LOW		26	44		
			Outputs at Hi-Z		29	50		
ICC		Supply Current $V_{CC} = \text{MAX}$ Outputs Open	AmZ8144	All Outputs HIGH		13	23	mA
				All Outputs LOW		27	46	
				Outputs at Hi-Z		32	54	

- Notes: 1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.  
 2. All typical values are  $V_{CC} = 5.0\text{V}$ ,  $T_A = 25^\circ\text{C}$ .  
 3. Not more than one output should be shorted at a time, and duration of the short-circuits should not exceed one second.

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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	-0.5V to +7.0V
DC Voltage Applied to Outputs for HIGH Output State	-0.5V to + $V_{CC}$ max.
DC Input Voltage	-0.5V to +7.0V
DC Output Current	150mA
DC Input Current	-30mA to +5.0mA

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**SWITCHING CHARACTERISTICS**

(T<sub>A</sub> = +25°C, VCC = 5.0V)

Parameters	Description	AmZ8140			AmZ8144			Units	Test Conditions (Notes 1-5)
		Min	Typ	Max	Min	Typ	Max		
tPLH	Propagation Delay Time, Low-to-High-Level Output		6	10		9	13	ns	CL = 45pF RL = 667Ω
tPHL	Propagation Delay Time, High-to-Low-Level Output		9	13		11	16	ns	
tPZL	Output Enable Time to Low Level		13	20		13	20	ns	
tPZH	Output Enable Time to High Level		8	14		8	14	ns	
tPLZ	Output Disable Time from Low Level		13	20		13	20	ns	CL = 5.0pF RL = 667Ω
tPHZ	Output Disable Time from High Level		12	18		12	18	ns	

**AmZ8140**

**SWITCHING CHARACTERISTICS  
OVER OPERATING RANGE\***

Parameters	Description	COM'L T <sub>A</sub> = 0 to 70°C VCC = 5.0V ±5%		MIL T <sub>A</sub> = -55 to +125°C VCC = 5.0V ±10%		Units	Test Conditions
		Min	Max	Min	Max		
tPLH	Propagation Delay Time, Low-to-High-Level Output		13		15	ns	CL = 45pF RL = 667Ω
tPHL	Propagation Delay Time, High-to-Low-Level Output		15		18	ns	
tPZL	Output Enable Time to Low Level		25		30	ns	
tPZH	Output Enable Time to High Level		18		21	ns	
tPLZ	Output Disable Time from Low Level		25		30	ns	CL = 5.0pF RL = 667Ω
tPHZ	Output Disable Time from High Level		21		25	ns	

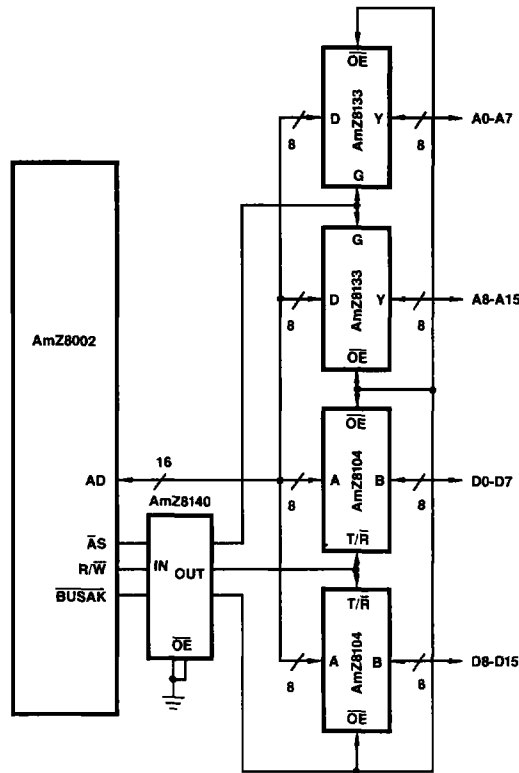
**AmZ8144**

**SWITCHING CHARACTERISTICS  
OVER OPERATING RANGE\***

Parameters	Description	COM'L T <sub>A</sub> = 0 to 70°C VCC = 5.0V ±5%		MIL T <sub>A</sub> = -55 to +125°C VCC = 5.0V ±10%		Units	Test Conditions
		Min	Max	Min	Max		
tPLH	Propagation Delay Time, Low-to-High-Level Output		15		16	ns	CL = 45pF RL = 667Ω
tPHL	Propagation Delay Time, High-to-Low-Level Output		18		20	ns	
tPZL	Output Enable Time to Low Level		25		30	ns	
tPZH	Output Enable Time to High Level		18		21	ns	
tPLZ	Output Disable Time from Low Level		25		30	ns	CL = 5.0pF RL = 667Ω
tPHZ	Output Disable Time from High Level		21		25	ns	

\*AC performance over the operating temperature range is guaranteed by testing defined in Group A, Subgroup 9.

APPLICATION



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METALLIZATION AND PAD LAYOUTS

