AmZ8133 • AmZ8173

Octal Latches with Three-State Outputs

DISTINCTIVE CHARACTERISTICS

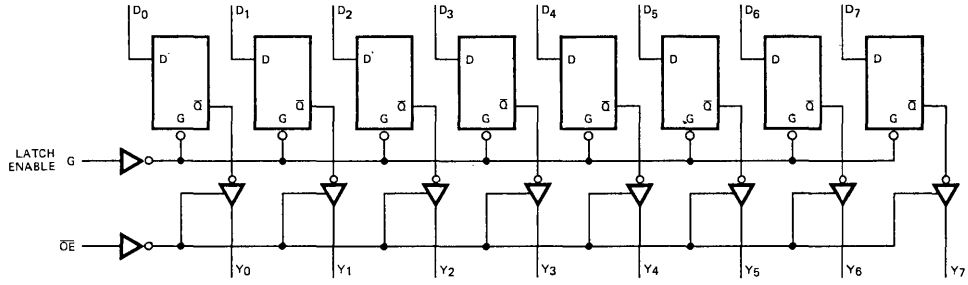
- 18ns max data in to data out
- Non-inverting AmZ8173, inverting AmZ8133
- Three-state outputs interface directly with bus organized systems
- Hysteresis on latch enable input for improved noise margin
- 100% product assurance screening to MIL-STD-883 requirements

FUNCTIONAL DESCRIPTION

The AmZ8133 and AmZ8173 are octal latches with three-state outputs for bus organized system applications. The latches appear to be transparent to the data (data changes asynchronously) when latch enable, G, is HIGH. When G is LOW, the data that meets the set-up times is latched. Data appears on the bus when the output enable, $\overline{OE}$, is LOW. When $\overline{OE}$ is HIGH the bus output is in the high-impedance state.

The AmZ8173 has non-inverted data inputs while the AmZ8133 is inverting.

LOGIC DIAGRAM
AmZ8173



Inputs D_0 through D_7 are inverted on the AmZ8133.

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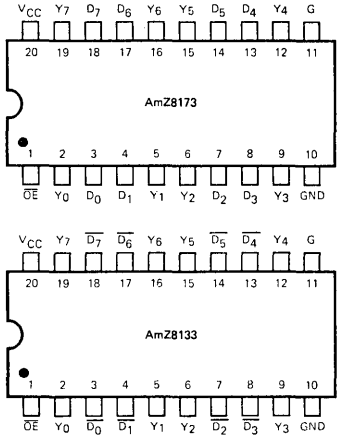
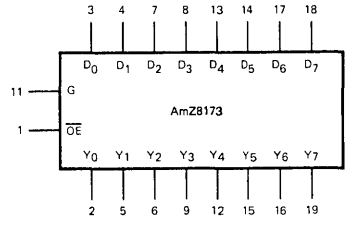
CONNECTION DIAGRAMS
Top Views



Note: Pin 1 is marked for orientation.

BLI-042

LOGIC SYMBOL



BLI-043

V_{CC} = Pin 20
GND = Pin 10

Inputs D_0 through D_7 are inverted on the AmZ8133.

8

AmZ8133 • AmZ8173

ELECTRICAL CHARACTERISTICS

The Following Conditions Apply Unless Otherwise Specified:

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

DC CHARACTERISTICS OVER OPERATING RANGE

Parameters	Description	Test Conditions (Note 1)			Min.	Typ. (Note 2)	Max.	Units
V_{OH}	Output HIGH Voltage	V_{CC} = MIN., $V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -1.0mA$	MIL	2.4	3.4		Volts
			$I_{OH} = -2.6mA$	COM'L	2.4	3.4		
V_{OL}	Output LOW Voltage	V_{CC} = MIN., $V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 12mA$				0.4	Volts
			$I_{OL} = 24mA$				0.5	
V_{IH}	Input HIGH Level	Guaranteed input logical HIGH voltage for all inputs			2.0			Volts
V_{IL}	Input LOW Level	Guaranteed input logical LOW voltage for all inputs		MIL			0.7	Volts
				COM'L			0.8	
V_I	Input Clamp Voltage	V_{CC} = MIN., $I_{IN} = -18mA$					−1.5	Volts
I_{IL}	Input LOW Current	V_{CC} = MAX., $V_{IN} = 0.4V$					−0.4	mA
I_{IH}	Input HIGH Current	V_{CC} = MAX., $V_{IN} = 2.7V$					20	μA
I_I	Input HIGH Current	V_{CC} = MAX., $V_{IN} = 7.0V$					0.1	mA
I_{OZ}	Off-State (High-Impedance) Output Current	V_{CC} = MAX.	$V_O = 0.4V$				−20	μA
			$V_O = 2.4V$				20	
I_{SC}	Output Short Circuit Current (Note 3)	V_{CC} = MAX.			−30		−85	mA
I_{CC}	Power Supply Current (Note 4)	V_{CC} = MAX.				24	40	mA

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 $V_{CC} = 5.0V$, 25°C ambient and maximum loading.
3. Not more than one output should be shorted at a time. Duration of the short circuit test should not exceed one second.
4. Inputs grounded; outputs open.

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 Continuous	−0.5 V to +7.0 V
DC Voltage Applied to Outputs for High Output State	−0.5 V to +V_{CC} max.
DC Input Voltage	−0.5 V to +7.0 V
DC Output Current, Into Outputs	30 mA
DC Input Current	−30 mA to +5.0 mA

AmZ8133
SWITCHING CHARACTERISTICS
(T_A = +25°C, V_{CC} = 5.0V)

Parameters	Description	Min	Typ	Max	Units	Test Conditions
t_{PLH}	Enable to Output		20	30	ns	C_L = 45pF, R_L = 667Ω
t_{PHL}			18	30		
t_{PLH}	Data Input to Output		13	20	ns	
t_{PHL}			15	23		
t_s(H)	HIGH Data to Enable	3			ns	
t_s(L)	LOW Data to Enable	0				
t_h(H)	HIGH Data to Enable	13			ns	
t_h(L)	LOW Data to Enable	7				
t_{pw}	Enable Pulse Width	15			ns	
t_{ZH}	$\overline{OE}$ to Y_i			28	ns	
t_{ZL}				36		
t_{HZ}	$\overline{OE}$ to Y_i			20	ns	C_L = 5pF, R_L = 667Ω
t_{LZ}				25		

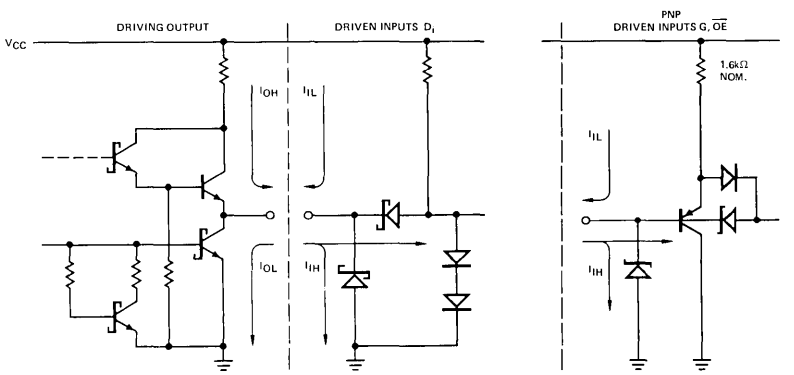
AmZ8133
SWITCHING CHARACTERISTICS OVER OPERATING RANGE

Parameters	Description	COM'L T_A = 0°C to +70°C, V_{CC} = 5.0V ±5% Min.	COM'L Max.	MIL T_A = −55°C to +125°C, V_{CC} = 5.0V ±10% Min.	MIL Max.	Units	Test Conditions
t_{PLH}	Enable to Output		35		40	ns	C_L = 45pF, R_L = 667Ω
t_{PHL}			35		40		
t_{PLH}	Data Input to Output		20		21	ns	
t_{PHL}			25		30		
t_s(H)	HIGH Data to Enable	5		5		ns	
t_s(L)	LOW Data to Enable	0		0			
t_h(H)	HIGH Data to Enable	14		15		ns	
t_h(L)	LOW Data to Enable	9		10			
t_{pw}	Enable Pulse Width	17		20		ns	
t_{ZH}	$\overline{OE}$ to Y_i		28		28	ns	
t_{ZL}			36		36		
t_{HZ}	$\overline{OE}$ to Y_i		33		36	ns	C_L = 5pF, R_L = 667Ω
t_{LZ}			33		36		

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

8

LOW-POWER SCHOTTKY INPUT/OUTPUT CURRENT INTERFACE CONDITIONS



Note: Actual current flow direction shown.

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AmZ8173
SWITCHING CHARACTERISTICS
(T_A = 25°C, V_{CC} = 5.0V)

Parameters	Description	Min	Typ	Max	Units	Test Conditions
t_{PLH}	Enable to Output		20	30	ns	C_L = 45pF R_L = 667Ω
t_{PHL}			18	30		
t_{PLH}	Data Input to Output		10	18	ns	
t_{PHL}			12	18		
t_s(H)	HIGH Data to Enable	0			ns	
t_s(L)	LOW Data to Enable	0				
t_h(H)	HIGH Data to Enable	10			ns	
t_h(L)	LOW Data to Enable	10				
t_{pw}	Enable Pulse Width	15			ns	
t_{ZH}	$\overline{OE}$ to Y_i			28	ns	
t_{ZL}				36		
t_{HZ}	$\overline{OE}$ to Y_i			20	ns	C_L = 5pF R_L = 667Ω
t_{LZ}				25		

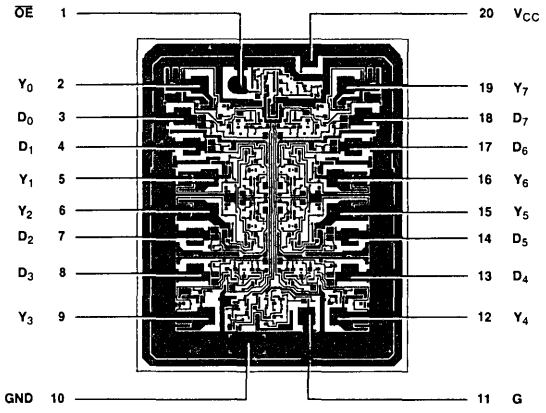
AmZ8173
SWITCHING CHARACTERISTICS OVER OPERATING RANGE

Parameters	Description	COM'L T_A = 0°C to +70°C V_{CC} = 5.0V ±5% Min.	 Max.	MIL T_A = −55°C to +125°C V_{CC} = 5.0V ±10% Min.	 Max.	Units	Test Conditions
t_{PLH}	Enable to Output		35		40	ns	C_L = 45pF R_L = 667Ω
t_{PHL}			35		40		
t_{PLH}	Data Input to Output		19		20	ns	
t_{PHL}			20		25		
t_s(H)	HIGH Data to Enable	0		0		ns	
t_s(L)	LOW Data to Enable	0		0			
t_h(H)	HIGH Data to Enable	11		12		ns	
t_h(L)	LOW Data to Enable	15		17			
t_{pw}	Enable Pulse Width	17		20		ns	
t_{ZH}	$\overline{OE}$ to Y_i		28		28	ns	
t_{ZL}			36		36		
t_{HZ}	$\overline{OE}$ to Y_i		33		36	ns	C_L = 5pF R_L = 667Ω
t_{LZ}			33		36		

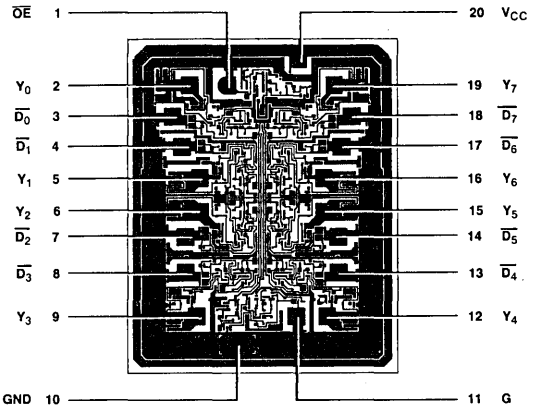
*AC performance over the operating temperature range is guaranteed by testing defined in Group A, Subgroup 9.

Metallization and Pad Layouts

AmZ8173



AmZ8133



DIE SIZE 0.073" X 0.089"

FUNCTION TABLES

AmZ8173

Inputs			Internal	Outputs	Function
$\overline{OE}$	G	D_i	Q_i	Y_i	
H	X	X	X	Z	Hi-Z
L	H	L	H	L	Transparent
L	H	H	L	H	
L	L	X	NC	NC	Latched

AmZ8133

Inputs			Internal	Outputs	Function
$\overline{OE}$	G	$\overline{D_i}$	Q_i	Y_i	
H	X	X	X	Z	Hi-Z
L	H	L	H	H	Transparent
L	H	H	L	L	
L	L	X	NC	NC	Latched

H = HIGH
L = LOW
X = Don't Care

NC = No Change
Z = High Impedance

DEFINITION OF FUNCTIONAL TERMS

AmZ8173

D_i The latch data inputs.

G The latch enable input. The latches are transparent when G is HIGH. Input data is latched on the HIGH-to-LOW transition.

Y_i The three-state latch outputs.

$\overline{OE}$ The output enable control. When $\overline{OE}$ is LOW, the outputs Y_i are enabled. When $\overline{OE}$ is HIGH, the outputs Y_i are in the high-impedance (off) state.

AmZ8133

$\overline{D_i}$ The latch inverting data inputs.

G The latch enable input. The latches are transparent when G is HIGH. Input data is latched on the HIGH-to-LOW transition.

Y_i The three-state latch outputs.

$\overline{OE}$ The output enable control. When $\overline{OE}$ is LOW, the inverted outputs Y_i are enabled. When $\overline{OE}$ is HIGH, the outputs Y_i are in the high-impedance (off) state.

8