Am2958 • Am2959

Octal Buffers/Line Drivers/Line Receivers with Three-State Outputs

DISTINCTIVE CHARACTERISTICS

- Three-state outputs drive bus lines directly
- Advanced Schottky processing
- Hysteresis at inputs improve noise margin
- PNP inputs reduce D.C. loading on bus lines
- V_{OL} of 0.55V at 65mA for commercial-range product; 48mA for military-range product
- Data-to-output propagation delay times:
  - Inverting – 7.0ns MAX
  - Non-inverting – 9.0ns MAX
- Enable-to-output – 15.0ns MAX
- 20-pin hermetic and molded DIP packages

FUNCTIONAL DESCRIPTION

These buffers/line drivers, used as memory-address drivers, clock drivers, and bus oriented transmitters/receivers, provide improved PC board density. The outputs of the commercial temperature range versions have 64mA sink and 15mA source capability, which can be used to drive terminated lines down to 133Ω. The outputs of the military temperature range versions have 48mA sink and 12mA source current capability.

Featuring 0.2V minimum guaranteed hysteresis at each low-current PNP data input, they provide improved noise rejection and high-fan-out outputs to restore Schottky TTL levels completely.

The Am2958 and Am2959 have four buffers enabled from one common line, and the other four buffers enabled from another common line. The Am2958 is inverting, while the Am2959 presents true data at the outputs.

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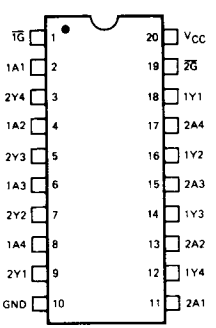
CONNECTION DIAGRAMS
Top Views

Am2958



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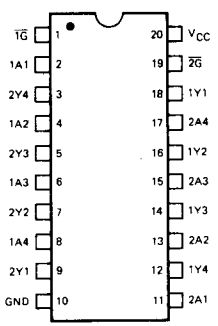
Am2959



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ORDERING INFORMATION

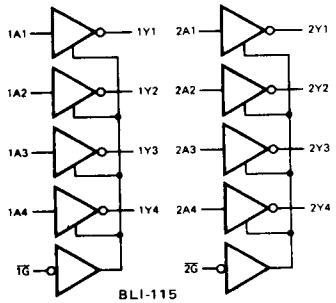
Order the part number according to the table below to obtain the desired package, temperature range, and screening level.

Am2958 Order Number	Am2959 Order Number	Package Type (Note 1)	Operating Range (Note 2)	Screening Level (Note 3)
AM2958PC	AM2959PC	P-20-1	C	C-1
AM2958DC	AM2959DC	D-20-1	C	C-1
AM2958DC-B	AM2959DC-B	D-20-1	C	B-1
AM2958DM	AM2959DM	D-20-1	M	C-3
AM2958DM-B	AM2959DM-B	D-20-1	M	B-3
Am2958XC	Am2959XC	Dice	C	Visual inspection to MIL-STD-883 Method 2010B.
Am2958XM	Am2959XM	Dice	M	

Notes: 1. P = Molded DIP, D = Hermetic DIP, F = Flat Pak. Number following letter is number of leads. See Appendix B for detailed outline. Where Appendix B contains several dash numbers, any of the variations of the package may be used unless otherwise specified.
2. C = 0 to 70°C, V_{CC} = 4.75V to 5.25V, M = −55 to +125°C, V_{CC} = 4.50V to 5.50V.
3. See Appendix A for details of screening. Levels C-1 and C-3 conform to MIL-STD-883, Class C. Level B-3 conforms to MIL-STD-883.

LOGIC DIAGRAMS

Am2958



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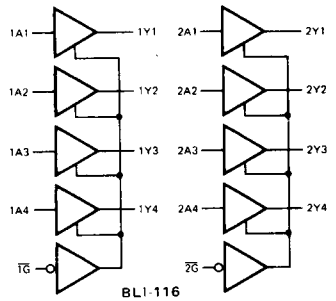

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MAXIMUM RATINGS above which the useful life may be impaired

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

ELECTRICAL CHARACTERISTICS

The Following Conditions Apply Unless Otherwise Noted:

Am2958 (MIL)	T_A = −55 to +125°C	V_{CC} (MIN.) = 4.50V	V_{CC} (MAX.) = 5.50V
Am2959 (COM'L)	T_A = 0 to 70°C	V_{CC} (MIN.) = 4.75V	V_{CC} (MAX.) = 5.25V

ELECTRICAL CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

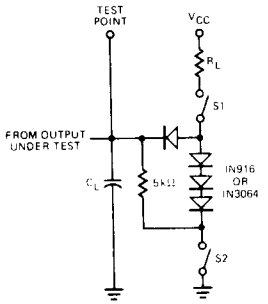
Parameters	Description		Test Conditions (Note 1)		Min.	Typ. (Note 2)	Max.	Units
V_{IH}	High-Level Input Voltage				2.0			Volts
V_{IL}	Low-Level Input Voltage					0.8		Volts
V_{IK}	Input Clamp Voltage		V_{CC} = MIN., I_I = −18mA				−1.2	Volts
	Hystersis ($V_{T+} - V_{T-}$)		V_{CC} = MIN.		0.2	0.4		Volts
V_{OH}	High-Level Output Voltage		V_{CC} = MIN., V_{CC} = 0.8V	COM'L, I_{OH} = −1mA	2.7			Volts
				I_{OH} = −3mA	2.4	3.4		
			V_{CC} = MIN., V_{IL} = 0.5V	MIL, I_{OH} = −12mA	2.0			
				COM'L, I_{OH} = −15mA	2.0			
V_{OL}	Low-Level Output Voltage		V_{CC} = MIN., V_{IL} = 0.8V	MIL, I_{OL} = 48mA			0.55	Volts
				COM'L, I_{OL} = 64mA			0.55	
I_{OZH}	Off-State Output Current, High-Level Voltage Applied		V_{CC} = MAX., V_{IH} = 2.0V, V_{IL} = 0.8V	V_O = 2.4V			50	µA
I_{OZL}	Off-State Output Current, Low-Level Voltage applied			V_O = 0.5V			−50	µA
I_I	Input Current at Maximum Input Voltage		V_{CC} = MAX., V_I = 5.5V				1.0	mA
I_{IH}	High-Level Input Current, Any Input		V_{CC} MAX., V_{IH} = 2.7V				50	µA
I_{IL}	Low-Level Input Circuit	Any A	V_{CC} = MAX., V_{IL} = 0.5V				−400	µA
		Any G					−2.0	mA
I_{OS}	Short-Circuit Output Current (Note 3)		V_{CC} = MAX.		−50		−225	mA
I_{CC}	Supply Current	Am2958 All Outputs HIGH	V_{CC} = MAX., Outputs Open	MIL and COM'L		37	65	mA
		Am2958 All Outputs LOW				59	90	
		Am2958 Outputs at Hi-Z				69	105	
		Am2959 All Outputs HIGH	V_{CC} = MAX., Outputs Open	MIL and COM'L		37	65	mA
		Am2959 All Outputs LOW				63	105	
		Am2959 Outputs at Hi-Z				72	120	

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} = 5.0V, T_A = 25°C.
3. Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed on second.

SWITCHING CHARACTERISTICS (V_{CC} = 5V, T_A = 25°C)

Parameter	Description	Test Conditions	Am2958 Min.	Am2958 Typ.	Am2958 Max.	Am2959 Min.	Am2959 Typ.	Am2959 Max.	Units
t_{PLH}	Propagation Delay Time, Low-to-High-Level Output	C_L = 50pF, R_L = 90Ω (Note 3)		4.5	7.0		6.0	9.0	ns
t_{PHL}	Propagation Delay Time, High-to-Low-Level Output			4.5	7.0		6.0	9.0	ns
t_{ZL}	Output Enable Time to Low Level			10	15		10	15	ns
t_{ZH}	Output Enable Time to High Level			6.5	10		8.0	12	ns
t_{LZ}	Output Disable Time from Low Level	C_L = 5.0pF, R_L = 90Ω (Note 3)		10	15		10	15	ns
t_{HZ}	Output Disable Time from High Level			6.0	9.0		6.0	9.0	ns

LOAD CIRCUIT FOR THREE-STATE OUTPUTS



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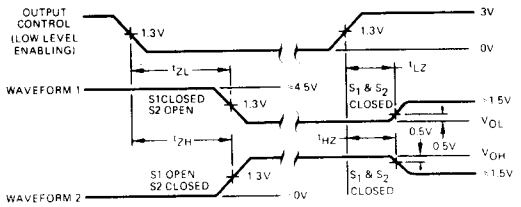
VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES, THREE-STATE OUTPUTS



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Notes: 1. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
2. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
3. In the examples above, the phase relationships between inputs and outputs have been chosen arbitrarily. PRR ≤ 1.0MHz, $Z_{OUT} \approx 50\Omega$ and $t_r \leq 2.5$ns, $t_f \leq 2.5$ns.

FUNCTION TABLES

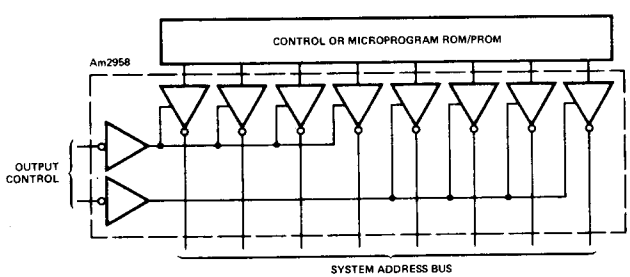
Am2958

INPUTS		OUTPUT
$\overline{G}$	A	Y
H	X	Z
L	H	L
L	L	H

Am2959

INPUTS		OUTPUT
$\overline{G}$	A	
H	X	Z
L	H	H
L	L	L

Am2958 USED AS SYSTEM BUS DRIVER – 4-BIT ORGANIZATION CAN BE APPLIED TO HANDLE BINARY OR BCD



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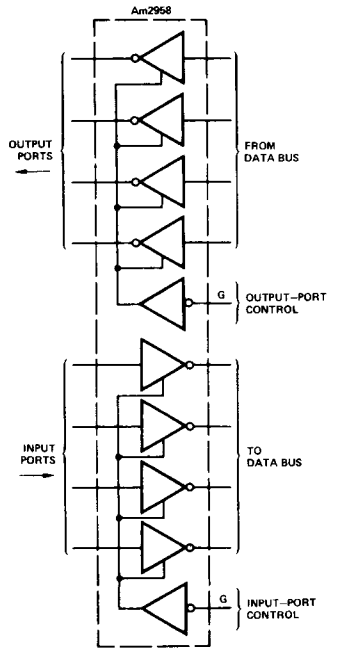
APPLICATIONS (Cont.)

INDEPENDENT 4-BIT BUS DRIVERS/RECEIVERS IN A SINGLE PACKAGE



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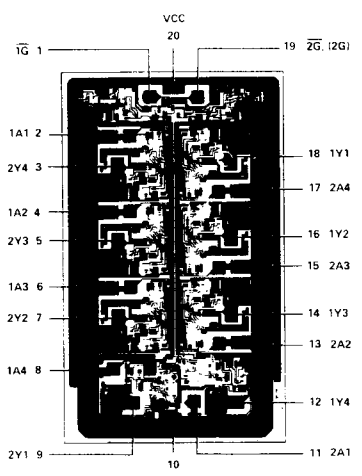
Metallization and Pad Layout

Am2958 • Am2959



DIE SIZE 0.077" X 0.124"