Am26LS29

Quad Three-State Single Ended RS-423 Line Driver

DISTINCTIVE CHARACTERISTICS

- Four single ended line drivers in one package for maximum package density
- Output short-circuit protection
- Individual rise time control for each output
- High capacitive load drive capability
- Low I_{CC} and I_{EE} power consumption (26mW/driver typ.)
- Meets all requirements of RS-423
- Three-state outputs for bus oriented systems
- Outputs do not clamp line with power off or in hi-impedance state over entire transmission line voltage range of RS-423
- Low current PNP inputs compatible with TTL, MOS and CMOS
- Available in military and commercial temperature range
- Advanced low power Schottky processing

GENERAL DESCRIPTION

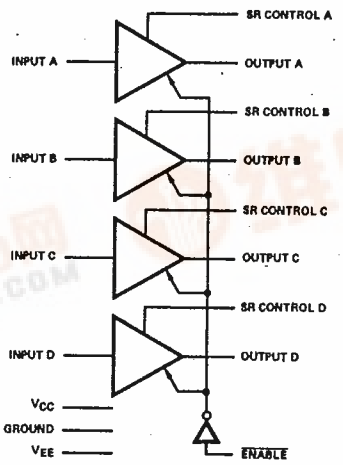
The Am26LS29 is a quad single ended line driver, designed for digital data transmission. The Am26LS29 meets all the requirements of EIA Standard RS-423 and Federal STD 1030. It features four buffered outputs with high source and sink current, and output short circuit protection.

A slew rate control pin allows the use of an external capacitor to control slew rate for suppression of near end cross talk to receivers in the cable.

The Am26LS29 has three-state outputs for bus oriented systems. The outputs in the hi-impedance state will not clamp the line over the transmission line voltage of RS-423. A typical full duplex system would use the Am26LS29 line driver and up to twelve Am26LS32 line receivers or an Am26LS32 line receiver and up to thirty-two Am26LS29 line drivers with only one enabled at a time and all others in the three-state mode.

The Am26LS29 is constructed using advanced low-power Schottky processing.

BLOCK DIAGRAM



BD001730

RELATED PRODUCTS

Part No.	Description
26LS30	Dual Differential RS-422 Party Line/Quad Single Ended RS-423 Line Driver
26LS32	Quad Differential Line Receiver
26LS33	Quad Differential Line Receiver

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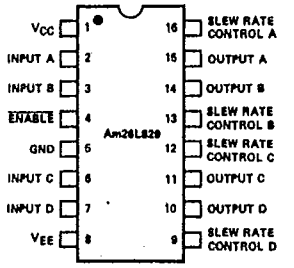
CONNECTION DIAGRAM
Top View



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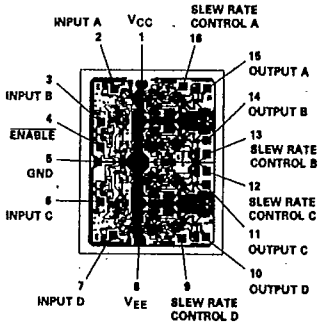
Note: Pin 1 is marked for orientation

METALLIZATION AND PAD LAYOUT



DIE SIZE 0.070" x 0.094"

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).

Am26LS29 **D** **C** **B**

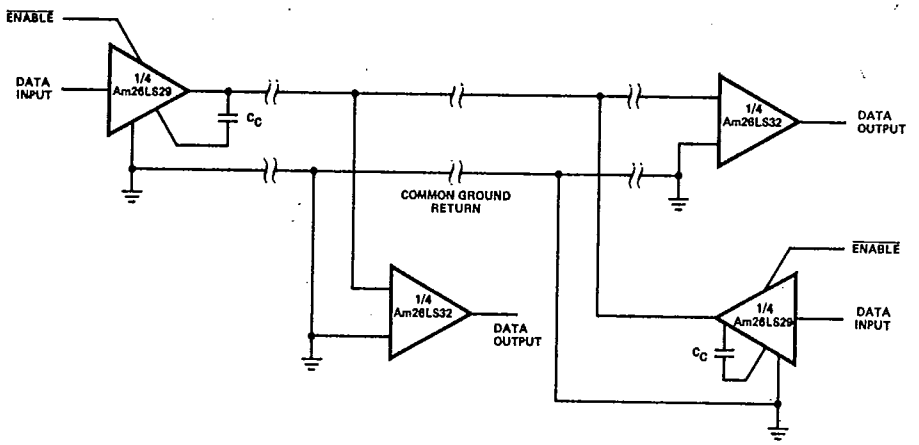
- B — Screening Option: Blank – Standard processing; B – Burn-in
- C — Temperature (See Operating Range): C – Commercial (0°C to +70°C); M – Military (–55°C to +125°C)
- D — Package: D – 16-pin CERDIP; F – 16-pin flatpak; P – 16-pin plastic DIP; X – Dice
- Am26LS29 — Device type: Quad Single Line Driver

Valid Combinations	
Am26LS29	PC DC, DM FM 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.

TYPICAL APPLICATION



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ABSOLUTE MAXIMUM RATINGS

Storage Temperature ..... −65°C to +150°C
Supply Voltage
V+ 7.0V
V− ..... −7.0V
Power Dissipation 600mW
Input Voltage ..... −0.5 to +15.0V
Output Voltage (Power Off) ..... ±15V
Lead Soldering Temperature (10) seconds) ..... 300°C

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 (V_{CC}) ..... +4.75V to +5.25V
(V_{EE}) ..... −4.75V to −5.25V

Military (M) Devices
Temperature ..... −55°C to +125°C
Supply Voltage (V_{CC}) ..... +4.5V to +5.5V
(V_{EE}) ..... −4.75 to −5.5V

Operating ranges define those limits over which the functionality of the device is guaranteed.

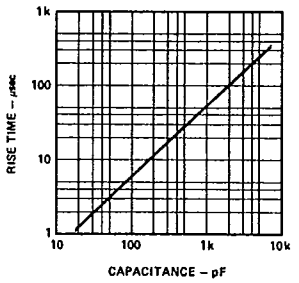
DC CHARACTERISTICS over operating range unless otherwise specified

Parameters	Description	Test Conditions		Min	Typ (Note 1)	Max	Units
V_O	Output Voltage	$R_L = \infty$ (Note 3)	$V_{IN} = 2.4V$	4.0	4.4	6.0	Volts
$\overline{V_O}$			$V_{IN} = 0.4V$	−4.0	−4.4	−6.0	Volts
V_T	Output Voltage	$R_L = 450\Omega$	$V_{IN} = 2.4V$	3.6	4.1		Volts
$\overline{V_T}$			$V_{IN} = 0.4V$	−3.6	−4.1		Volts
$\lvert V_T\rvert - \lvert\overline{V_T}\rvert$	Output Unbalance	$\lvert V_{CC}\rvert = \lvert V_{EE}\rvert$, $R_L = 450\Omega$			0.02	0.4	Volts
I_X+	Output Leakage Power Off	$V_{CC} = V_{EE} = 0V$	$V_O = 10V$		2.0	100	µA
I_X-			$V_O = -10V$		−2.0	−100	µA
I_S+	Output Short Circuit Current	$V_O = 0V$	$V_{IN} = 2.4V$		−70	−150	mA
I_S-			$V_{IN} = 0.4V$		60	150	mA
I_{SLEW}	Slew Control Current	$V_{SLEW} = V_{EE} + 0.9V$			±110		µA
I_{CC}	Positive Supply Current	$V_{IN} = 0.4V$, $R_L = \infty$			18	30	mA
I_{EE}	Negative Supply Current	$V_{IN} = 0.4V$, $R_L = \infty$			−10	−22	mA
I_O	Off State (High Impedance) Output Current	V_{CC} = MAX	$V_O = 10V$		2.0	100	µA
			$V_O = -10V$		−2.0	−100	µA
V_{IH}	High Level Input Voltage			2.0			Volts
V_{IL}	Low Level Input Voltage					0.8	Volts
I_{IH}	High Level Input Current	$V_{IN} = 2.4V$			1.0	40	µA
		$V_{IN} \leq 15V$			10	100	µA
I_{IL}	Low Level Input Current	$V_{IN} = 0.4V$			−30	−200	µA
V_I	Input Clamp Voltage	$I_{IN} = -12mA$				−1.5	Volts

Notes: 1. Typical limits are at $V_{CC} = 5.0V$, $V_{EE} = -5.0V$, 25°C ambient and maximum loading.
2. Symbols and definitions correspond to EIA RS-423 where applicable.
3. Output voltage is +3.9V minimum and −3.9V minimum at −55°C.

TYPICAL PERFORMANCE CURVES

Slew Rate (Rise or Fall Time) Versus External Capacitor



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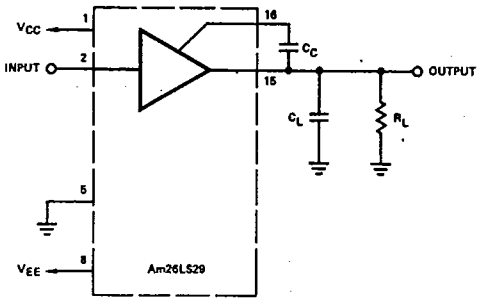
SWITCHING TEST CIRCUIT



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SWITCHING TEST WAVEFORM

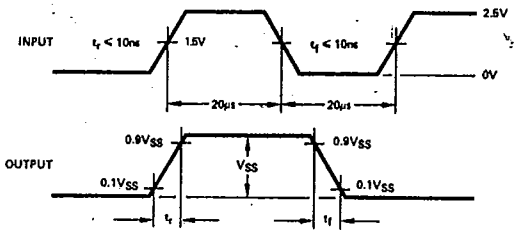

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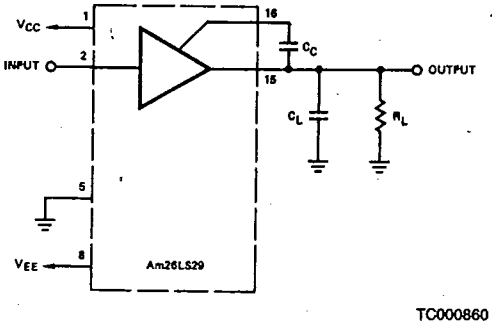
Figure 1. Rise Time Control.

SWITCHING TEST CIRCUIT



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SWITCHING TEST WAVEFORM

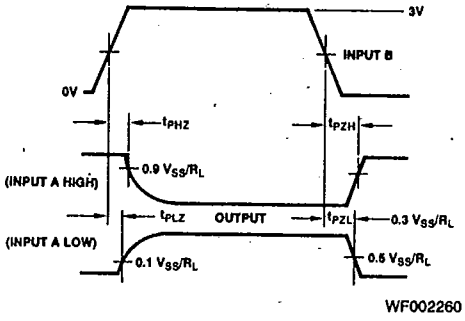

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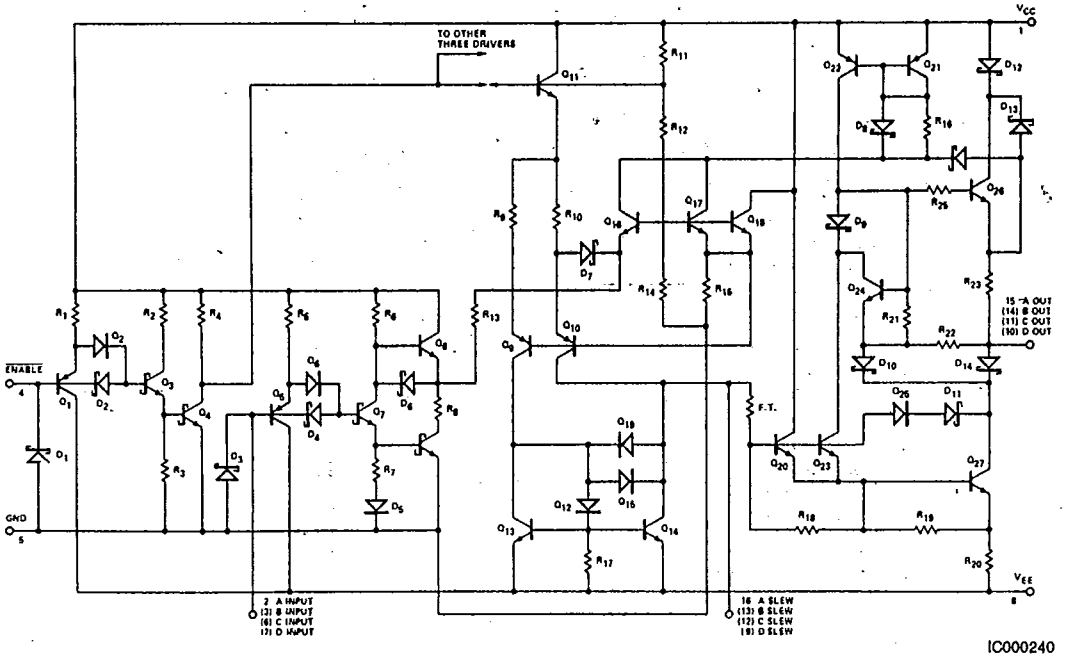
Figure 2. Three State Delays

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

Parameters	Description	Test Conditions		Min	Typ	Max	Units
t_r	Rise Time	R_L = 450 Ω, C_L = 500 pF, Fig. 1	C_C = 50 pF		3.0		μs
			C_C = 0 pF		120	300	ns
t_f	Fall Time	R_L = 450 Ω, C_L = 500 pF, Fig. 1	C_C = 50 pF		3.0		μs
			C_C = 0 pF		120	300	ns
Src	Slow Rate Coefficient	R_L = 450 Ω, C_L = 500 pF, Fig. 1			.06		μs/pF
t_{LZ}	Output Enable to Output	R_L = 450 Ω, C_L = 500 pF, C_C = 0 pF, Fig. 2			180	300	ns
t_{HZ}					250	350	
t_{ZL}		R_L = 450 Ω, C_L = 500 pF, C_C = 0 pF, Fig. 2.			250	350	
t_{ZH}					180	300	

Am26LS29EQUIVALENT CIRCUIT



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