

# Quad high-speed differential line driver

# AM26LS31

## DESCRIPTION

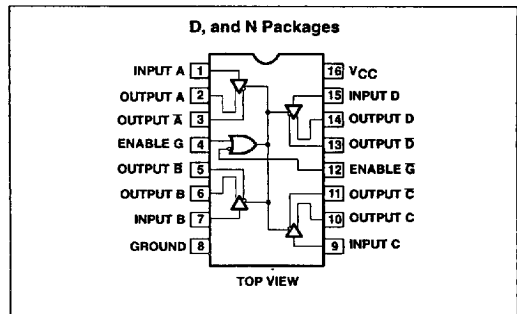
The AM26LS31 is a quad differential line driver, designed for digital data transmission over balanced lines. The AM26LS31 meets all the requirements of EIA standard RS-422 and Federal standard 1020. It is designed to provide unipolar differential drive to twisted-pair or parallel-wire transmission lines. The circuit provides an enable and disable function common to all four drivers. The AM26LS31 features 3-State outputs and logical OR-ed complementary enable inputs. The inputs are all LS compatible and are all one unit load.

The AM26LS31 is constructed using advanced Low Power Schottky processing.

## FEATURES

- Output skew of 2.0ns typical
- Input to output delay: 12ns
- Operation from single +5V
- 16-pin DIP and SO packages
- Four line drivers in one package
- Output short-circuit protection
- Complementary outputs
- Meets EIA standard RS-422
- High output drive capability for 100Ω terminated transmission lines
- Available in military and commercial temperature range
- Advanced low power Schottky processing
- Outputs won't load line when  $V_{CC} = 0V$

## PIN CONFIGURATION



## APPLICATIONS

- Data communications equipment
- Computer peripherals
- Workstations
- Automatic test equipment

## FUNCTION TABLE (Each Driver)

INPUT	ENABLES		OUTPUTS	
	A	G	A	Ā
H	H	X	H	L
L	H	X	L	H
H	X	L	H	L
L	X	L	L	H
X	L	H	Z	Z

NOTES:  
 H = High level  
 L = Low level  
 X = Irrelevant  
 Z = High-impedance (OFF)

## ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
16-Pin Plastic Dual In-Line Package (DIP)	0°C to +70°C	AM26LS31CN	0406C
16-Pin Small Outline (SO) Package	0°C to +70°C	AM26LS31CD	0005D
16-Pin Plastic Dual In-Line Package (DIP)	-40°C to +85°C	AM26LS31IN	0406C
16-Pin Small Outline (SO) Package	-40°C to +85°C	AM26LS31ID	0005D
16-Pin Plastic Dual In-Line Package (DIP)	-55°C to +125°C	AM26LS31MN	0406C



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## DC AND AC ELECTRICAL CHARACTERISTICS

$V_{CC} = 5V \pm 10\%$ ,  $T_A = -55$  to  $+125^\circ\text{C}$  for AM26LS31MN;  $V_{CC} = 5V \pm 5\%$ ,  $T_A = -40$  to  $+85^\circ\text{C}$  for AM26LS31IN and AM26LS31ID;  $V_{CC} = 5V \pm 5\%$ ,  $T_A = 0$  to  $+70^\circ\text{C}$  for AM26LS31CN and AM26LS31CD, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ <sup>1</sup>	Max	
$V_{OH}$	Output High voltage	$V_{CC} = \text{Min.}$ , $I_{OH} = -20\text{mA}$	2.5	3.0		V
$V_{OL}$	Output Low voltage	$V_{CC} = \text{Min.}$ , $I_{OL} = 20\text{mA}$		0.3	0.5	V
$V_{IH}$	Input High voltage	$V_{CC} = \text{Min.}$	2.0			V
$V_{IL}$	Input Low voltage	$V_{CC} = \text{Max.}$			0.8	V
$I_{IL}$	Input Low current	$V_{CC} = \text{Max.}$ , $V_{IN} = 0.4\text{V}$		-0.26	-0.36	mA
$I_{IH}$	Input High current	$V_{CC} = \text{Max.}$ , $V_{IN} = 2.7\text{V}$		0.001	20	$\mu\text{A}$
$I_I$	Input reverse current	$V_{CC} = \text{Max.}$ , $V_{IN} = 7.0\text{V}$		0.001	0.1	mA
$I_O$	OFF-state (high-impedance) output current	$V_{CC} = \text{Max.}$ , $V_O = 5.5\text{V}$ , $V_O = 0.5\text{V}$		0.6 -0.050	20 -20	$\mu\text{A}$ $\mu\text{A}$
$V_I$	Input clamp voltage	$V_{CC} = \text{Min.}$ , $I_{IN} = -18\text{mA}$		-0.8	-1.5	V
$I_{SC}$	Output short-circuit current	$V_{CC} = \text{Max.}$	-30		-150	mA
$I_{CC}$	Power supply current	$V_{CC} = \text{Max.}$ ; all outputs disabled		40	80	mA
$t_{PLH}$	Input to output	$T_A = 25^\circ\text{C}$ , load <sup>2</sup>		9	20	ns
$t_{PHL}$	Input to output	$T_A = 25^\circ\text{C}$ , load <sup>2</sup>		9	20	ns
SKEW	Output to output	$T_A = 25^\circ\text{C}$ , load <sup>2</sup>		2	6	ns
$t_{LZ}$	Enable to output	$T_A = 25^\circ\text{C}$ , $C_L = 10\text{pF}$		17	35	ns
$t_{HZ}$	Enable to output	$T_A = 25^\circ\text{C}$ , $C_L = 10\text{pF}$		12	30	ns
$t_{ZL}$	Enable to output	$T_A = 25^\circ\text{C}$ , load <sup>2</sup>		14	45	ns
$t_{ZH}$	Enable to output	$T_A = 25^\circ\text{C}$ , load <sup>2</sup>		12	40	ns

## NOTES:

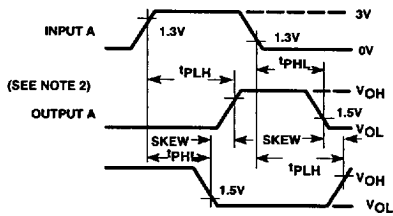
- All typical values are  $T_A = +25^\circ\text{C}$ ;  $V_{CC} = 5.0\text{V}$ .
- $C_L = 30\text{pF}$ ;  $V_{IN} = 1.3\text{V}$  to  $V_{OUT} = 1.3\text{V}$ ;  $V_{PULSE} = 0\text{V}$  to  $3.0\text{V}$ .

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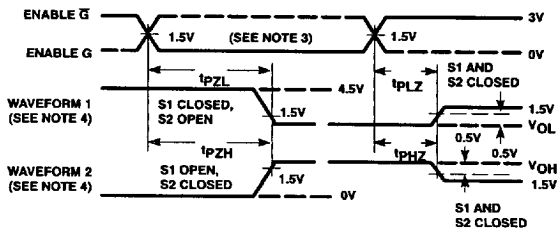
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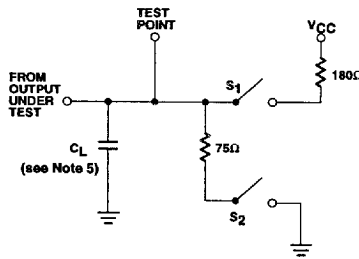
## TIMING DIAGRAMS



Propagation Delay Times and Skew



Enable and Disable Times



Test Circuit

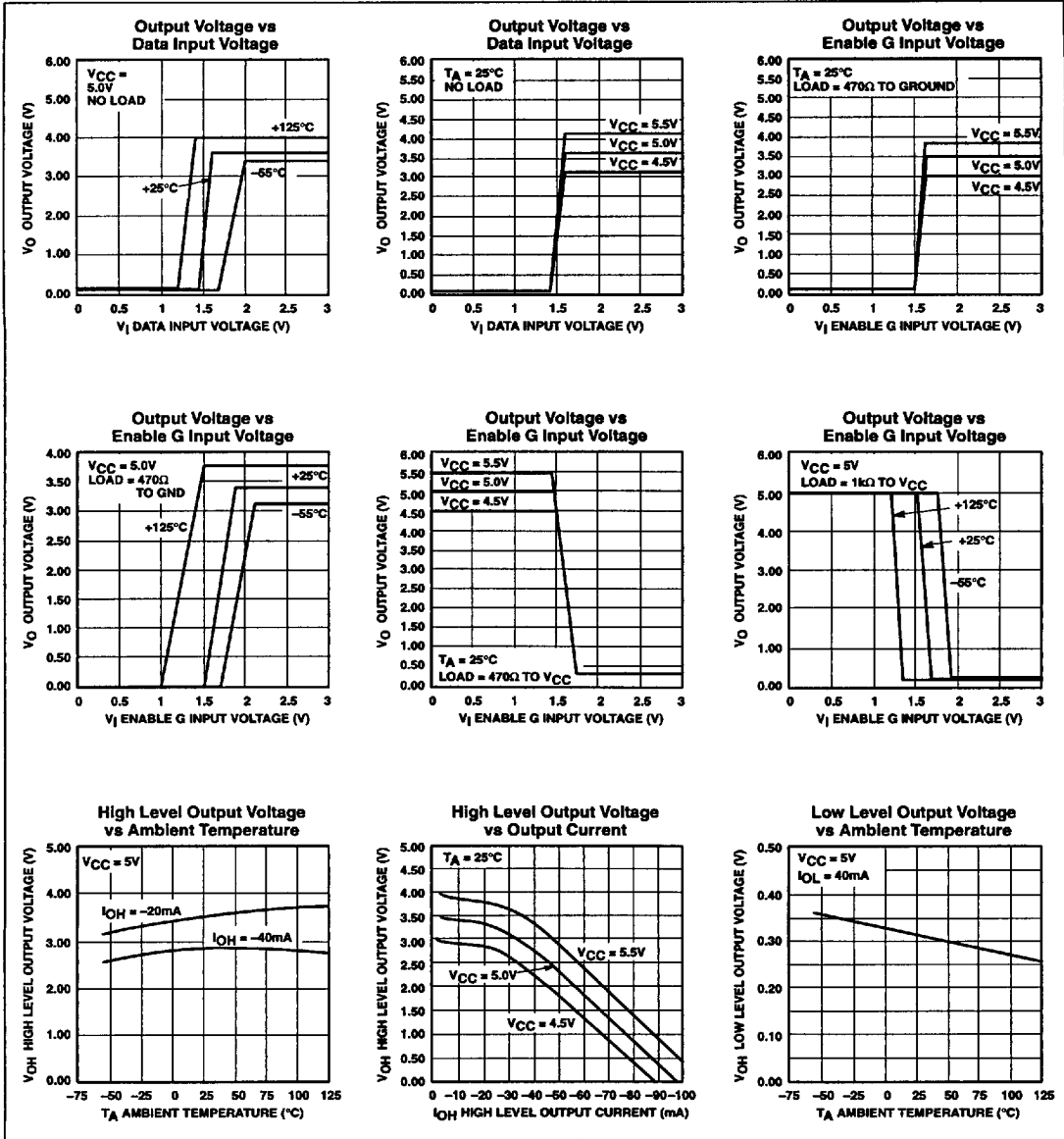
**NOTES:**

1. All pauses are supplied by generators having the following characteristics PRR ≤ 1MHz, Z<sub>OUT</sub> = 50Ω, 1R ≤ 15ns, 1F ≤ 6ns
2. When measuring propagation delay times and skew, switches S1 and S2 are open.
3. Each enable is tested separately.
4. Waveform 1 is for an output with internal condition such that the output is low except when disabled by the output control  
Waveform 2 is for an output with internal condition such that the output is high except when disabled by the output control
5. C<sub>L</sub> includes probe and jig capacitance

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## TYPICAL PERFORMANCE CHARACTERISTICS



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TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

