

# Quad high speed differential line driver

# 26LS31

## 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  $V_{CC} = 0V$

## DESCRIPTION

The 26LS31 is a quad differential line driver, designed for digital data transmission over

balanced lines. The 26LS31 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 26LS31 features 3-state outputs and logical ORed complementary enable inputs. The inputs are all LS compatible and are all one unit load.

The 26LS31 is constructed using advanced Low Power Schottky processing.

## ORDERING INFORMATION

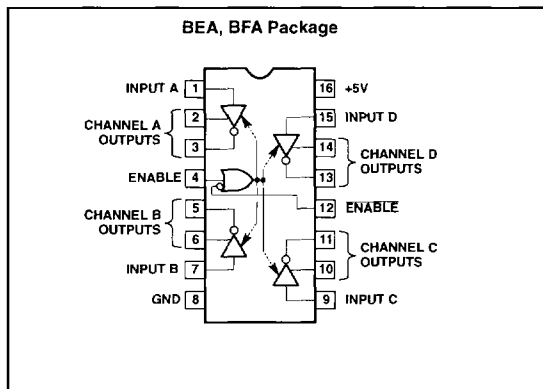
DESCRIPTION	ORDER CODE	PACKAGE DESIGNATOR*
16-Pin Ceramic DIP	26LS31/BEA	GDIP1-T16
16-Pin Ceramic Flat Pack	26LS31/BFA	GDFP2-F16
20-Pin Ceramic CLCC	26LS31/B2A	CQCC2-N20

\* MIL-STD 1835 or Appendix A of 1995 Military Data Handbook

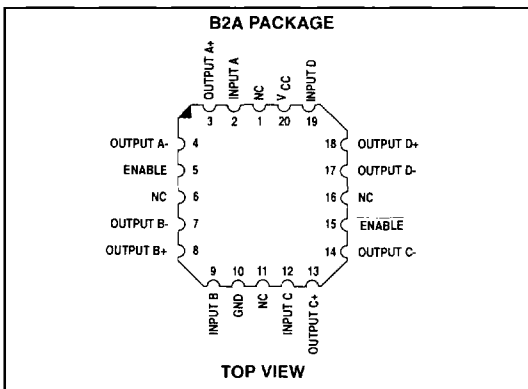
## ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	LIMITS		UNIT
		MIN	MAX	
$T_{STG}$	Storage temperature range	-65	+150	°C
$V_{CC}$	Supply voltage		7.0	V
$V_I$	Input voltage		7.0	V
$V_O$	Output voltage		5.5	V

## PIN CONFIGURATION



## PIN CONFIGURATION LLCC



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## RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS		UNIT
		MIN	MAX	
$T_{amb}$	Operating temperature range	-55	+125	°C
$V_{CC}$	Supply voltage	4.5	5.5	V
$V_{IH}$	Input High threshold voltage	2.0		V
$V_{IK}$	Input Low threshold voltage		0.8	V

## DC ELECTRICAL CHARACTERISTICS

(Over recommended operating temperature and supply voltage range unless otherwise specified.)

SYMBOL	PARAMETER	CONDITIONS	LIMITS		UNITS
			MIN	MAX	
$V_{OH}$	Output High voltage	$V_{CC} = \text{MIN}, I_{OH} = -20\text{mA}$	2.5		V
$V_{OL}$	Output Low voltage	$V_{CC} = \text{MIN}, I_{OL} = 20\text{mA}$		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	$V_{CC} = \text{MAX}, V_{IN} = 0.4\text{V}$		-0.36	mA
$I_{IH}$	Input High current	$V_{CC} = \text{MAX}, V_{IN} = 2.7\text{V}$		20	μA
$I_I$	Input reverse current	$V_{CC} = \text{MAX}, V_{IN} = 7.0\text{V}$		0.1	mA
$I_O$	Off-state (high impedance) output current	$V_{CC} = \text{MAX}$	$V_O = 2.5\text{V}$	20	μA
			$V_O = 0.5\text{V}$	-20	μA
$V_I$	Input clamp voltage	$V_{CC} = \text{MIN}, I_N = -18\text{mA}$		-1.5	V
$I_{SC}$	Output short circuit current	$V_{CC} = \text{MAX}, V_{CC} = \text{MAX}$	-30	-150	mA
$I_{CC}$	Power supply current	$V_{CC} = \text{MAX}, \text{All outputs disabled}$		80	mA

## AC ELECTRICAL CHARACTERISTICS

 $T_{amb} = +25^\circ\text{C}$ 

SYMBOL	PARAMETER	CONDITIONS	LIMITS		UNIT
			MIN	MAX	
$t_{PLH}$	Propagation delay input to output	$V_{CC} = 5.0\text{V}$ Load = 1		20	ns
$t_{PHL}$				20	ns
SKEW	Output to output	$V_{CC} = 5.0\text{V}, \text{Load} = 1$		6.0	ns
$t_{LZ}$	Propagation delay enable to output	$V_{CC} = 5.0\text{V}$ $C_L = 10\text{pF}$		35	ns
$t_{HZ}$				30	ns
$t_{ZL}$	Propagation delay enable to output	$V_{CC} = 5.0\text{V}$ Load = 1		45	ns
$t_{ZH}$				40	ns

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## AC ELECTRICAL CHARACTERISTICS

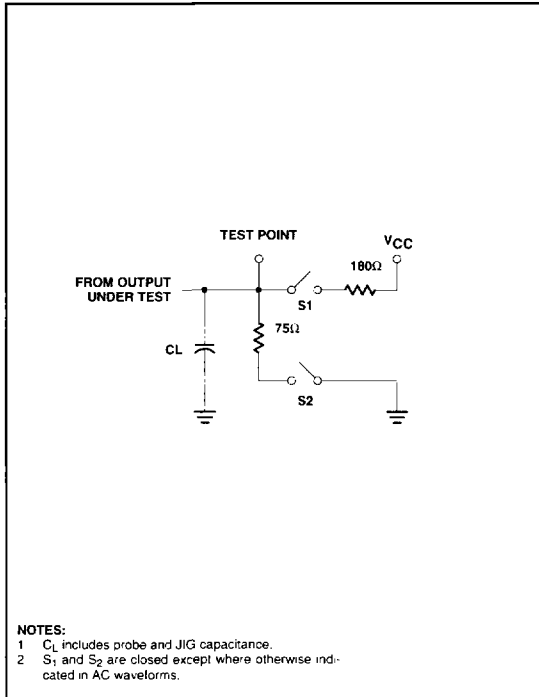
T<sub>amb</sub> = -55°C and +125°C

SYMBOL	PARAMETER	CONDITIONS	LIMITS		UNIT
			MIN	MAX	
t <sub>PLH</sub>	Propagation delay input to output	V <sub>CC</sub> = 5.0V Load = 1		30	ns
t <sub>PHL</sub>				30	
SKEW	Output to output	V <sub>CC</sub> = 5.0V, Load = 1		9.0	ns
t <sub>LZ</sub>	Propagation delay enable to output	V <sub>CC</sub> = 5.0V C <sub>L</sub> = 10pF		53	ns
t <sub>HZ</sub>				45	
t <sub>ZL</sub>	Propagation delay enable to output	V <sub>CC</sub> = 5.0V Load = 1		68	ns
t <sub>ZH</sub>				60	

**NOTE:**

1. C<sub>L</sub> = 30pF, V<sub>IN</sub> = 1.3V to V<sub>OUT</sub> 1.3V, V<sub>PULSE</sub> = 0V to +3.0V.

## EQUIVALENT AC TEST CIRCUIT



## AC WAVEFORMS

