

# Quad high speed differential line receiver

# 26LS32/26LS32A

### FEATURES

- Input voltage range of 30 volts differential for 26LS32 and 25V differential for 26LS32A
- $\pm 0.2V$  sensitivity over the input voltage range of  $-7V$  to  $+7V$
- 6k minimum input impedance
- 60mV input hysteresis
- The 26LS32/32A meets all the requirements of RS-422 and RS-423
- Operation from single +5V
- Fail safe input-output relationship. Output always high when inputs are open.
- Three-state drive, with choice of complementary output enables, for receiving directly onto a data bus
- Three-state outputs disabled during power up and power down

### ORDERING INFORMATION

DESCRIPTION	ORDER CODE	PACKAGE DESIGNATOR*
16-Pin Ceramic DIP	26LS32/BEA 26LS32A/BEA	GDIP1-T16
16-Pin Flat Pack	26LS32/BFA 26LS32A/BFA	GDFP2-F16
20-Pin Ceramic LLCC	26LS32/B2A 26LS32A/B2A	CQCC2-N20

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

### FUNCTION TABLE (EACH RECEIVER)

DIFFERENTIAL INPUT	ENABLES		OUTPUT
	EN	EN	
$V_{ID} \geq V_{TH}$	H	X	H
$V_{TL} \leq V_{ID} \leq V_{TH}$	H	X	?
$V_{ID} \leq V_{TL}$	X	L	L
X	L	H	Z

H = High level  
 L = Low level  
 X = Irrelevant  
 Z = High impedance (off)  
 ? = Indeterminate  
 EN = Enable  
 EN = Enable

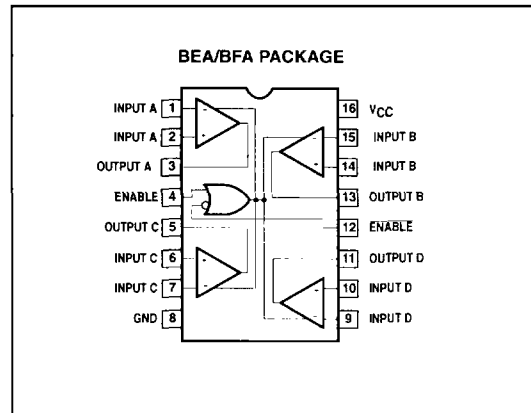
### DESCRIPTION

The 26LS32/32A is a quad line receiver designed to meet all of the requirements of RS-422 and RS-423 and Federal Standards 1020 and 1030 for balanced and unbalanced digital data transmission.

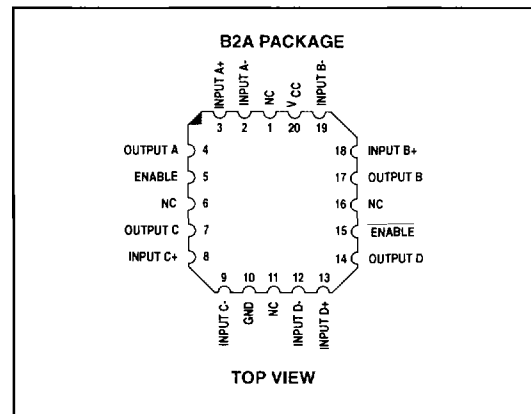
The 26LS32/32A features an input sensitivity of  $\pm 200mV$  over the common mode input range of  $\pm 7V$ .

The 26LS32/32A provides an enable and disable function common to all four receivers. Both the parts feature 3-State outputs with 8mA sink capability and incorporates a fail-safe input-output relationship which forces the outputs high when the inputs are open.

### PIN CONFIGURATION



### LLCC LEAD CONFIGURATION



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ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

SYMBOL	PARAMETER	RATING	UNIT
V <sub>CC</sub>	Power supply	7	V
V <sub>EN</sub>	Enable voltage	7	V
I <sub>O</sub>	Output sink current	50	mA
V <sub>CMV</sub>	Common mode range	±25	V
V <sub>TH</sub>	Differential input voltage	±30	V
T <sub>STG</sub>	Storage temperature range	-65 to +150	°C

## RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage	4.5	5.0	5.5	V
T <sub>amb</sub>	Operating free-air temperature range	-55		+125	°C

## DC ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP <sup>2</sup>	MAX	
V <sub>TH</sub>	Differential input voltage	V <sub>OUT</sub> = V <sub>OL</sub> or V <sub>OH</sub> , -7V ≤ V <sub>CM</sub> ≤ +7V	-0.2	0.06	+0.2	V
R <sub>IN</sub>	Input resistance <sup>3</sup>	V <sub>CC</sub> = Nom, -15V ≤ V <sub>CM</sub> ≤ +15V, (One input AC ground)	6.0	9.8		kΩ
I <sub>IN</sub>	Input current	V <sub>IN</sub> = +15V, V <sub>CC</sub> = Nom Other input <sup>7</sup> -15V ≤ V <sub>IN</sub> ≤ +15V			2.3	mA
I <sub>IN</sub>	Input current	V <sub>IN</sub> = -15V, V <sub>CC</sub> = Nom Other input <sup>8</sup> -15V ≤ V <sub>IN</sub> ≤ +15V			-2.8	mA
V <sub>OH</sub>	Output High voltage	V <sub>CC</sub> = MIN, I <sub>OH</sub> = -440μA ΔV <sub>IN</sub> = +1.0V, VENABLE = 0.8V	2.5	3.4		V
V <sub>OL</sub>	Output Low voltage	V <sub>CC</sub> = MIN, VENABLE = 0.8V, ΔV <sub>IN</sub> = -1.0V	I <sub>OL</sub> = 4.0mA	0.3	0.4	V
			I <sub>OL</sub> = 8.0mA		0.45	V
V <sub>IL</sub>	Enable Low voltage	V <sub>CC</sub> = 5.5V			0.8	V
V <sub>IH</sub>	Enable High voltage	V <sub>CC</sub> = 5.5V	2.0			V
V <sub>I</sub>	Enable clamp voltage	V <sub>CC</sub> = MIN, I <sub>IN</sub> = -18mA			-1.5	V
I <sub>O</sub>	Off state (high impedance) output current	V <sub>CC</sub> = MAX	V <sub>O</sub> = 2.4V		20	μA
			V <sub>O</sub> = 0.4V		-20	μA
I <sub>IL</sub>	Enable Low current	V <sub>IN</sub> = 0.4V, V <sub>CC</sub> = MAX		-0.2	-0.36	mA
I <sub>IH</sub>	Enable High current	V <sub>IN</sub> = 2.7V, V <sub>CC</sub> = MAX		0.5	20	μA
I <sub>I</sub>	Enable input High current	V <sub>IN</sub> = 5.5V, V <sub>CC</sub> = MAX		1	100	μA
I <sub>SC</sub>	Output short circuit current	V <sub>CC</sub> = MAX, ΔV <sub>IN</sub> = +1V, V <sub>OUT</sub> = 0V	-15	-60	-85	mA
I <sub>CC</sub>	Power supply current	V <sub>CC</sub> = MAX; All V <sub>IN</sub> = GND, outputs disabled		52	70	mA
V <sub>H</sub>	Input hysteresis	T <sub>amb</sub> = 25°C, V <sub>CC</sub> = 5.0V, V <sub>CM</sub> = 0V		60		mV

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**AC ELECTRICAL CHARACTERISTICS** $T_{amb} = +25^{\circ}\text{C}$ ,  $V_{CC} = 5.0\text{V}$ 

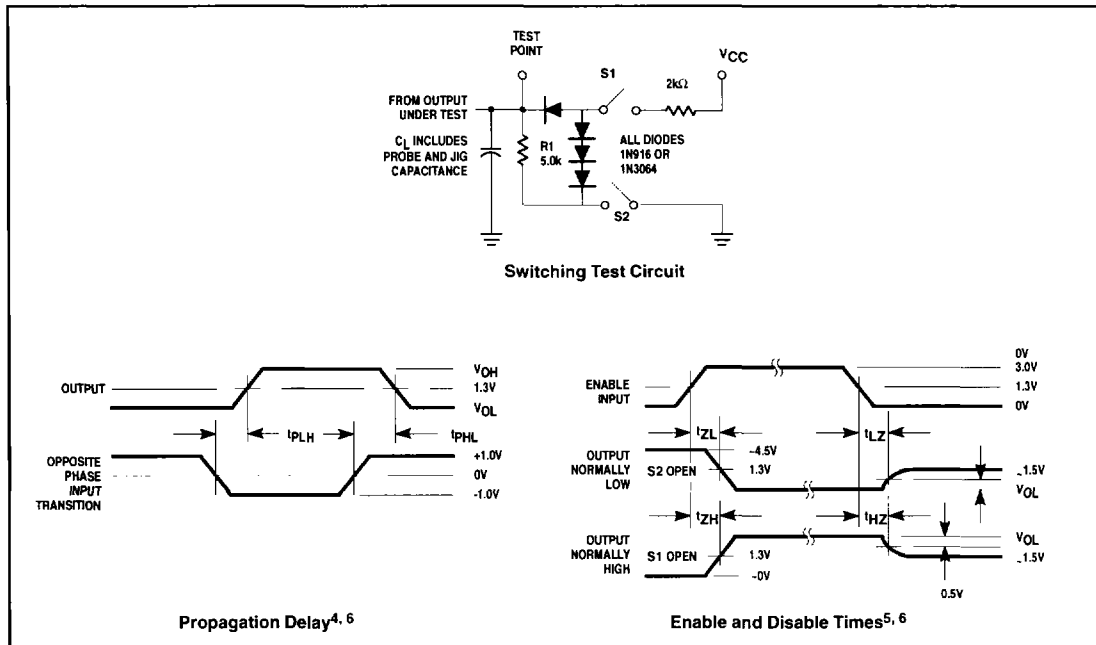
SYMBOL	PARAMETER	TEST CONDITIONS	26LS32 LIMITS			26LS32A LIMITS		UNIT
			MIN	TYP <sup>1</sup>	MAX	MIN	MAX	
$t_{PLH}$	Input to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		9	25		35	ns
$t_{PHL}$	Input to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		10	25		35	ns
$t_{LZ}$	Enable to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		15	30		40	ns
$t_{HZ}$	Enable to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		12	22		30	ns
$t_{ZL}$	Enable to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		8	22		25	ns
$t_{ZH}$	Enable to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		8	22		25	ns

**AC ELECTRICAL CHARACTERISTICS** $-55^{\circ}\text{C} \leq T_{amb} \leq +125^{\circ}\text{C}$ ,  $V_{CC} = 5.0\text{V}$ 

SYMBOL	PARAMETER	TEST CONDITIONS	26LS32 LIMITS		26LS32A LIMITS		UNIT
			MIN	MAX	MIN	MAX	
$t_{PLH}$	Input to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		38		53	ns
$t_{PHL}$	Input to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		38		53	ns
$t_{LZ}$	Enable to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		45		60	ns
$t_{HZ}$	Enable to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		33		45	ns
$t_{ZL}$	Enable to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		33		38	ns
$t_{ZH}$	Enable to output	See switching test circuit and waveforms. $C_L = 15\text{pF}$		33		38	ns

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NOTES:

1. Stresses above those listed under "Absolute Maximum Ratings" may cause malfunction or permanent damage to the device.
2. Typical values are at T<sub>amb</sub> = +25°C, V<sub>CC</sub> = 5.0V.
3. This parameter is guaranteed by correlation, but not tested.
4. Diagram shown for Enable Low.
5. S1 and S2 of load circuit are closed except where shown.
6. Pulse Generator for all pulses: Rate ≤ 1.0MHz, Z<sub>o</sub> = 50Ω, t<sub>r</sub> ≤ 15ns, t<sub>f</sub> ≤ 6.0ns.
7. For 26LS32A other input -10V ≤ V<sub>IN</sub> ≤ +15V.
8. For 26LS32A other input -15V ≤ V<sub>IN</sub> ≤ +10V.