

Quad high-speed differential line receivers

**AM26LS32/
AM26LS33**

DESCRIPTION

The AM26LS32 and AM26LS33 are quad line receivers 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 AM26LS32 features an input sensitivity of $\pm 200\text{mV}$ over the common mode input range of $\pm 7\text{V}$.

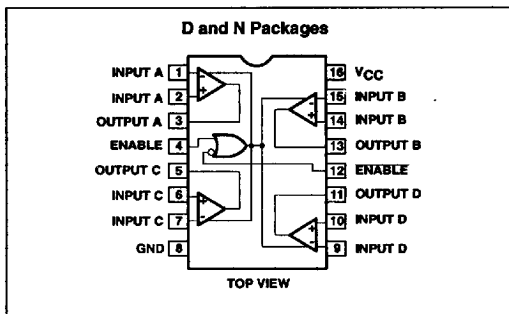
The AM26LS33 features an input sensitivity of $\pm 500\text{mV}$ over the common mode input voltage range of $\pm 15\text{V}$.

The AM26LS32 and AM26LS33 provide an enable and disable function common to all four receivers. Both parts feature 3-State outputs with 8mA sink capability and incorporate a fail-safe input-output relationship which forces the outputs high when the inputs are open.

FEATURES

- Input voltage range of 15V (differential or common mode) on AM26LS33; 7V (differential or common mode) on AM26LS32
- $\pm 0.2\text{V}$ sensitivity over the input voltage range on AM26LS32
- $\pm 0.5\text{V}$ sensitivity on AM26LS33
- 6k Ω minimum input impedance
- The AM26LS32 meets all the requirements of RS-422 and RS-423
- Operation from single +5V supply
- Fail safe input-output relationship. Output always high when inputs are open
- 3-State drive, with choice of complementary output enables, for receiving directly onto a data bus
- 3-State outputs disabled during power up and power down

PIN CONFIGURATION



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
16-Pin Plastic Dual In-Line Package (DIP)	0°C to +70°C	AM26LS32CN	0406C
16-Pin Small Outline (SO) Package	0°C to +70°C	AM26LS32CD	0005D
16-Pin Plastic Dual In-Line Package (DIP)	-40°C to +85°C	AM26LS32IN	0406C
16-Pin Small Outline (SO) Package	-40°C to +85°C	AM26LS32ID	0005D
16-Pin Plastic Dual In-Line Package (DIP)	-55°C to +125°C	AM26LS32MN	0406C
16-Pin Plastic Dual In-Line Package (DIP)	0°C to +70°C	AM26LS33CN	0406C
16-Pin Small Outline (SO) Package	0°C to +70°C	AM26LS33CD	0005D
16-Pin Plastic Dual In-Line Package (DIP)	-40°C to +85°C	AM26LS33IN	0406C
16-Pin Small Outline (SO) Package	-40°C to +85°C	AM26LS33ID	0005D
16-Pin Plastic Dual In-Line Package (DIP)	-55°C to +125°C	AM26LS33MN	0406C

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V _{CC}	Power supply	7	V
V _{IN}	Power supply	7	V
	Output sink current	50	mA
	Common mode range	± 25	V
V _{TH}	Differential input voltage	± 25	V
T _{STG}	Storage temperature range	-65 to +150	°C

DISSIPATION OPERATING TABLE

PACKAGE	POWER DISSIPATION	DERATING FACTOR	ABOVE T _A
N	1,275mW	10.2mW/°C	25°C
D	1,262W	10.1mW/°C	25°C

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DC AND AC ELECTRICAL CHARACTERISTICS

$V_{CC} = 5.0V \pm 10\%$ for AM26LS32/33MX, $V_{CC} = 5.0V \pm 5\%$ for AM26LS32/33CX and AM26LS32/33IX over operating temperature range unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			AM26LS32/33			
			Min	Typ ¹	Max	
V _{TH}	Differential input voltage	V _{OUT} = V _{OL} or V _{OH} AM26LS32, -7V ≤ V _{CM} ≤ +7V	-0.2		0.2	V
		AM26LS33, -15V ≤ V _{CM} ≤ +15V	-0.5		0.5	
R _{IN}	Input resistance	-15V ≤ V _{CM} ≤ +15V (One input AC ground)	6.0	9.8		kΩ
I _{IN}	Input current (under test)	V _{IN} = +15V Other input -15V ≤ V _{IN} ≤ +15V			2.3	mA
I _{IN}	Input current (under test)	V _{IN} = -15V Other input +15V ≤ V _{IN} ≤ -15V			-2.8	mA
V _{OH}	Output HIGH voltage	V _{CC} = Min., I _{OH} = -440μA ΔV _{IN} = +1.0V V _{ENABLE} = 0.8V	Com1	2.7	3.4	V
		Mil	2.5	3.4		
V _{OL}	Output LOW voltage	V _{CC} = Min., V _{ENABLE} = 0.8V ΔV _{IN} = +1.0V	I _{OL} = 4.0mA		0.3	V
		I _{OL} = 8.0mA		0.45		
V _{IL}	Enable LOW voltage				0.8	V
V _{IH}	Enable HIGH voltage		2.0			V
V _I	Enable clamp voltage	V _{CC} = Min., I _{IN} = -18mA			-1.5	V
I _O	Off state (high impedance) output current	V _{CC} = Max.	V _O = 2.4V		20	μA
			V _O = 0.4V		-20	
I _{IL}	Enable LOW current	V _{IN} = 0.4V		-0.2	-0.36	mA
I _{IH}	Enable HIGH current	V _{IN} = 2.7V		0.5	20	μA
I _I	Enable input HIGH current	V _{IN} = 5.5V		1	100	μA
I _{SC}	Output short circuit current	V _{CC} = Max., ΔV _{IN} = +1V, V _{OUT} = 0V	-15	-60	-85	mA
I _{CC}	Power supply current	V _{CC} = Max.; All V _{IN} = GND outputs disabled		52	70	mA
V _{HYST}	Input hysteresis	T _A = 25°C, V _{CC} = 5.0V, V _{CM} = 0V	AM26LS32	120		mV
		AM26LS33		120		
t _{PLH}	Input to output	T _A = 25°C, V _{CC} = 5.0V C _L = 15pF (see test condition)		10	25	ns
t _{PHL}	Input to output	T _A = 25°C, V _{CC} = 5.0V C _L = 15pF (see test condition)		10	25	ns
t _{LZ}	Enable to output	T _A = 25°C, V _{CC} = 5.0V C _L = 5pF (see test condition)		15	30	ns
t _{HZ}	Enable to output	T _A = 25°C, V _{CC} = 5.0V C _L = 5pF (see test condition)		12	22	ns
t _{ZL}	Enable to output	T _A = 25°C, V _{CC} = 5.0V C _L = 15pF (see test condition)		8	22	ns
t _{ZH}	Enable to output	T _A = 25°C, V _{CC} = 5.0V C _L = 15pF		9	22	ns

NOTE:

1. All typical values are $T_A = 25^\circ C, V_{CC} = 5.0V$.

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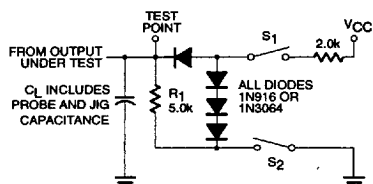
FUNCTION TABLE (EACH RECEIVER)

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

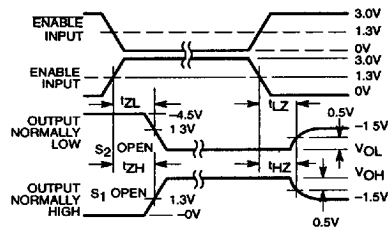
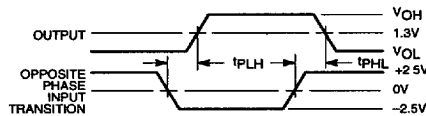
NOTES:

H = High level, L = Low level, X = Irrelevant

Z = High impedance (off), ? = Indeterminate

E = Enable, $\bar{E}$ = Enable

Load Test Circuit for 3-State Outputs

Enable and Disable Times^{2, 3, 4}Propagation Delay^{1, 4}

NOTES:

- Diagram shown for $\bar{E}$ Enable Low.
- Enable is tested with $\bar{E}$ Enable High, $\bar{E}$ Enable is tested with Enable Low.
- S_1 and S_2 of Load Circuit are closed except where shown.
- Pulse Generator for All Pulses. Rate ≤ 1.0 MHz, $Z_0 = 50\Omega$; $t_r \leq 15$ ns; $t_f \leq 6.0$ ns