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Data Communication Products	

AM26LS32/AM26LS33

Quad high-speed differential line receivers

DESCRIPTION

The AM26LS32 and AM26LS33 are quad line receivers with the AM26LS32 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 $\pm 7\text{V}$.

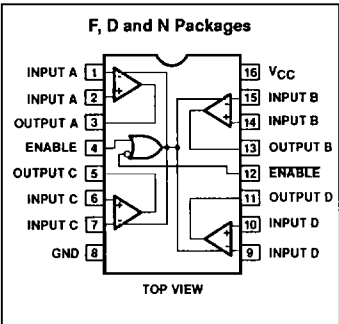
The AM26LS33 features an input sensitivity of $\pm 500\text{mV}$ over the common mode input voltage range of $\pm 15\text{V}$.

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
- $6\text{k}\Omega$ 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
16-Pin Plastic DIP	0°C to +70°C	AM26LS32CN
16-Pin SO	0°C to +70°C	AM26LS32CD
16-Pin Plastic DIP	-40°C to +85°C	AM26LS32IN
16-Pin SO	-40°C to +85°C	AM26LS32ID
16-Pin Plastic DIP	-55°C to +125°C	AM26LS32MN
16-Pin Plastic DIP	0°C to +70°C	AM26LS33CN
16-Pin SO	0°C to +70°C	AM26LS33CD
16-Pin Plastic DIP	-40°C to +85°C	AM26LS33IN
16-Pin SO	-40°C to +85°C	AM26LS33ID
16-Pin Plastic DIP	-55°C to +125°C	AM26LS33MN

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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 $+150$	$^{\circ}\text{C}$

DISSIPATION OPERATING TABLE

PACKAGE	POWER DISSIPATION	DERATING FACTOR	ABOVE T_A
F	1,524mW	12.19mW/ $^{\circ}\text{C}$	25°C
N	1,275mW	10.2mW/ $^{\circ}\text{C}$	25°C
D	1,262W	10.1mW/ $^{\circ}\text{C}$	25°C

DC AND AC ELECTRICAL CHARACTERISTICS $V_{CC} = 5.0\text{V} \pm 10\%$ for AM26LS32/33MX, $V_{CC} = 5.0\text{V} \pm 5\%$ 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	0.06	0.2	V	
		AM26LS33, -15V ≤ V _{CM} ≤ +15V	-0.5	0.06	0.5	V	
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 -10V ≤ V _{IN} ≤ +15V			2.3	mA	
I _{IN}	Input current (under test)	V _{IN} = -15V Other input +10V ≤ 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	Com ¹	2.7	3.4		V
			Mil	2.5	3.4		V
V _{OL}	Output LOW voltage	V _{CC} = Min., V _{ENABLE} = 0.8V ΔV _{IN} = +1.0V	I _{OL} = 4.0mA		0.3	0.4	V
			I _{OL} = 8.0mA			0.45	V
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	μA

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DC AND AC ELECTRICAL CHARACTERISTICS (Continued) $V_{CC} = 5.0V \pm 10\%$ 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	
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		mV
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 $T_A = 25^\circ C$, $V_{CC} = 5.0V$.

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:

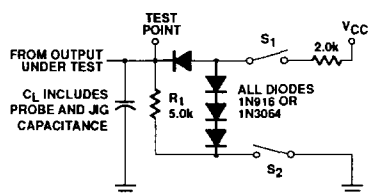
H = High level, L = Low level, X = Irrelevant

Z = High impedance (off), ? = Indeterminate

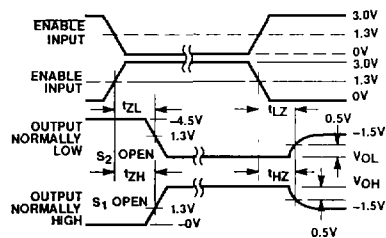
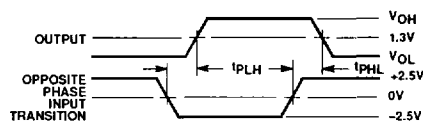
E = Enable, $\bar{E}$ = Enable

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Load Test Circuit for 3-State Outputs

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

NOTES:

1. Diagram shown for Enable Low.
2. Enable is tested with Enable High; Enable is tested with Enable Low.
3. S_1 and S_2 of Load Circuit are closed except where shown.
4. Pulse Generator for All Pulses: Rate $\leq 1.0\text{MHz}$; $Z_O = 50\Omega$; $t_r \leq 15\text{ns}$; $t_f \leq 6.0\text{ns}$.