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.

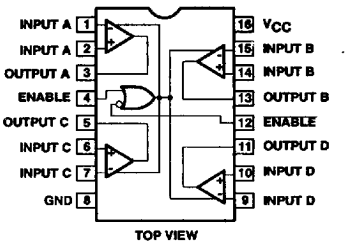
The AM26LS32 features an input sensitivity of ±200mV over the common mode input range of ±7V.

The AM26LS33 features an input sensitivity of ±500mV over the common mode input voltage range of ±15V.

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.

PIN CONFIGURATION

D and N Packages



TOP VIEW

FEATURES

- Input voltage range of 15V (differential or common mode) on AM26LS33; 7V (differential or common mode) on AM26LS32
- ±0.2V sensitivity over the input voltage range on AM26LS32
- ±0.5V sensitivity on AM26LS33
- 6kΩ 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

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

DC AND AC ELECTRICAL CHARACTERISTICS

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

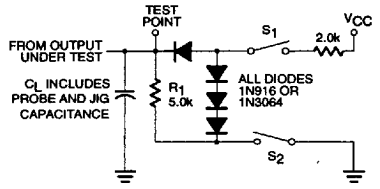
SYMBOL	PARAMETER	TEST CONDITIONS		LIMITS AM26LS32/33 Min	Typ[1]	Max	UNIT
V_{TH}	Differential input voltage	$V_{OUT} = V_{OL}$ or V_{OH}, AM26LS32, $-7V \le V_{CM} \le +7V$		–0.2		0.2	V
		AM26LS33, $-15V \le V_{CM} \le +15V$		–0.5		0.5	
R_{IN}	Input resistance	$-15V \le V_{CM} \le +15V$ (One input AC ground)		6.0	9.8		kΩ
I_{IN}	Input current (under test)	$V_{IN} = +15V$, Other input $-15V \le V_{IN} \le +15V$				2.3	mA
I_{IN}	Input current (under test)	$V_{IN} = -15V$, Other input $+15V \le V_{IN} \le -15V$				–2.8	mA
V_{OH}	Output HIGH voltage	V_{CC} = Min., $I_{OH} = -440\mu A$, $\Delta V_{IN} = +1.0V$, $V_{\overline{ENABLE}} = 0.8V$	Com'l	2.7	3.4		V
			Mil	2.5	3.4		
V_{OL}	Output LOW voltage	V_{CC} = Min., $V_{\overline{ENABLE}} = 0.8V$, $\Delta V_{IN} = +1.0V$	I_{OL} = 4.0mA		0.3	0.4	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., $\Delta V_{IN} = +1V$, $V_{OUT} = 0V$		–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°C, V_{CC} = 5.0V.

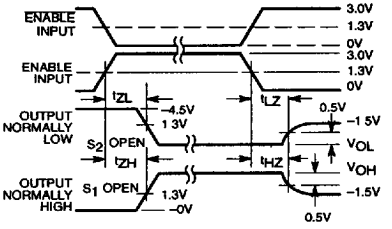
FUNCTION TABLE (EACH RECEIVER)

DIFFERENTIAL INPUT	ENABLES E	ENABLES $\overline{E}$	OUTPUT
$V_{ID} \geq V_{TH}$	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

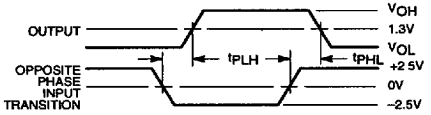
NOTES:
H = High level, L = Low level, X = Irrelevant
Z = High impedance (off), ? = Indeterminate
E = Enable, $\overline{E}$ = $\overline{\text{Enable}}$



Load Test Circuit for 3-State Outputs



Enable and Disable Tmes[2, 3, 4]



Propagation Delay[1, 4]

NOTES:
1. Diagram shown for $\overline{\text{Enable}}$ Low.
2. Enable is tested with $\overline{\text{Enable}}$ High, $\overline{\text{Enable}}$ 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 ≤ 1.0MHz, Z_O = 50Ω; t_r ≤ 15ns; t_f ≤ 6.0ns