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AM26LS30

Dual differential RS-422 party line/quad single-ended RS-423 line driver

DESCRIPTION

The AM26LS30 is a line driver designed for digital data transmission. A mode control input provides a choice of operation either as two differential line drivers which meet all the requirements of EIA Standard RS-422 or as four independent single-ended RS-423 line drivers.

In the differential mode, the outputs have individual 3-State controls. In the high impedance state, these outputs will not clamp the line over a common mode transmission line voltage of $\pm 10V$. A typical full duplex system consists of the AM26LS30 differential line driver and up to twelve AM26LS32 line receivers, or the AM26LS32 line receiver and up to thirty-two AM26LS30 differential drivers.

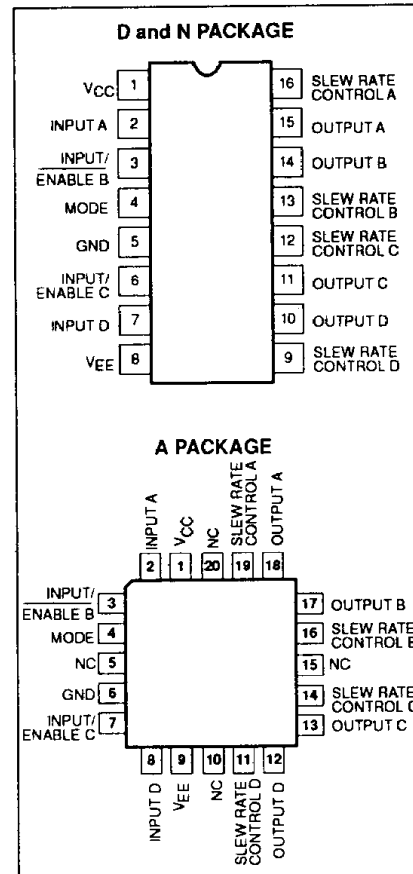
A slew control pin allows the use of an external capacitor to control slew rate for suppression of near-end cross-talk to receivers in the cable.

The AM26LS30 is constructed using high speed oxide isolated bipolar processing.

FEATURES

- Dual RS-422 line driver or quad RS-423 line driver
- Driver outputs do not clamp line with power off or in high impedance state
- Individual 3-State controls when used in differential mode
- Low I_{CC} and I_{EE} power consumption
- RS-422 differential mode: 35mW/driver typ
- RS-423 single-ended mode: 26mW/driver typ
- Individual slew rate control for each output
- 50 Ω transmission line drive capability (RS-422 into virtual ground)
- Low current PNP inputs compatible with TTL, MOS and CMOS
- High capacitive load drive capability
- Exact replacement for DS16/3691
- High speed oxide isolated bipolar processing

PIN CONFIGURATION



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
16-Pin Plastic DIP	0°C to +70°C	AM26LS30CN
16-Pin Plastic SO	0°C to +70°C	AM26LS30CD
16-Pin Plastic DIP	-40°C to +85°C	AM26LS30IN
16-Pin Plastic SO	-40°C to +85°C	AM26LS30ID
20-Pin PLCC	0°C to +70°C	AM26LS30CA

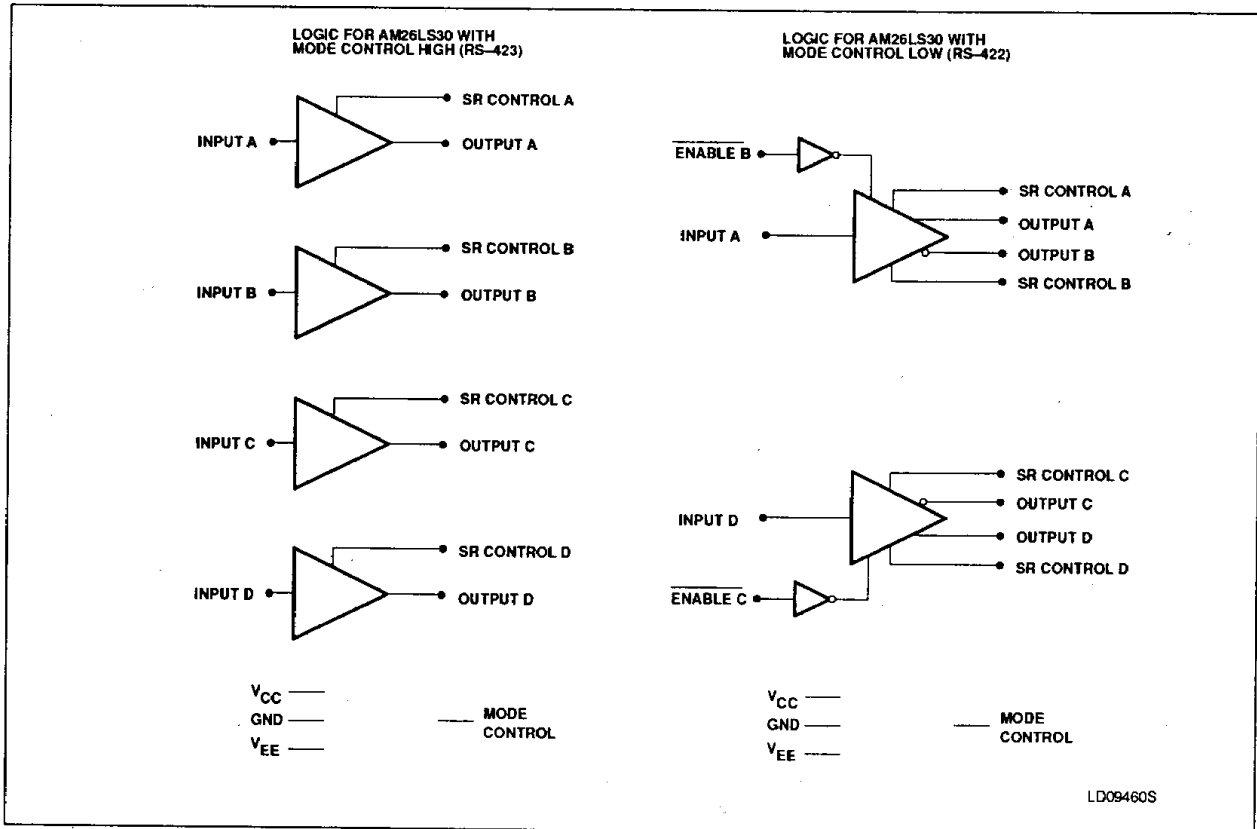
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FUNCTION TABLE

MODE	INPUTS		OUTPUTS	
	A(D)	B(C)	A(D)	B(C)
0	0	0	0	1
0	0	1	Z	Z
0	1	0	1	0
0	1	1	Z	Z
1	0	0	0	0
1	0	1	0	1
1	1	0	1	0
1	1	1	1	1

BLOCK DIAGRAM



Dual differential RS-422 party/line quad single-ended RS-423 line driver

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ABSOLUTE MAXIMUM RATINGS (Above which the useful life may be impaired.)

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage V_+	6	V
V_{EE}	V_-	-6	V
V_{IN}	Input voltage	-0.5V to V_{CC}	V
V_{OUT}	Output voltage (Power Off)	± 13.5	V
T_A	Ambient temperature range AM26LS30C	0 to +70	$^{\circ}\text{C}$
	AM26LS30I	-40 to +85	$^{\circ}\text{C}$
T_{STG}	Storage temperature range	-65 to +150	$^{\circ}\text{C}$
T_{SOLD}	Lead soldering temperature (10sec.)	300	$^{\circ}\text{C}$
θ_{JA}	Thermal impedance		$^{\circ}\text{C}/\text{W}$

PACKAGE POWER DISSIPATION DERATING TABLE

PACKAGE	POWER DISSIPATION AT $T_A = 25^{\circ}\text{C}$	DERATING FACTOR ABOVE T_A
N	1,488mW	11.9mW/ $^{\circ}\text{C}$
D	1,262mW	10.1mW/ $^{\circ}\text{C}$

DC ELECTRICAL CHARACTERISTICS

Over the operating temperature range. The following conditions apply unless otherwise specified: AM26LS30C, $T_A = 0$ to 70°C , $V_{CC} = 5.0\text{V} \pm 5\%$, $V_{EE} = \text{GND}$; AM26LS30I, $T_A = -40$ to $+85^{\circ}\text{C}$, $V_{CC} = 5.0\text{V} \pm 5\%$, $V_{EE} = \text{GND}$, RS-423 Connection Mode Voltage $\leq 2.0\text{V}$.

SYMBOL ²	PARAMETER	TEST CONDITIONS ³	LIMITS			UNIT	
			Min	Typ ¹	Max		
V_O	Differential output	$R_L = \infty$	$V_{IN} = 2.0\text{V}$		3.6	6.0	V
$\overline{V_O}$	Voltage, $V_{A,B}$				-3.6	-6.0	V
V_T	Differential output	$R_L = 100\Omega$	$V_{IN} = 2.0\text{V}$	2.0	2.4		V
$\overline{V_T}$	Voltage, $V_{A,B}$				-2.0	-2.4	
$V_{OS}, \overline{V_{OS}}$	Common mode offset voltage	$R_L = 100\Omega$		2.5	3.0	V	
$ V_T - \overline{V_T} $	Difference in common mode output voltage	$R_L = 100\Omega$		0.005	0.4	V	
$ V_{OS} - \overline{V_{OS}} $	Difference in common mode offset voltage	$R_L = 100\Omega$		0.005	0.4	V	
V_{SS}	$ V_T - \overline{V_T} $	$R_L = 100\Omega$	4.0	4.8		V	
V_{CMR}	Output voltage common mode range	$V_{ENABLE} = 2.4\text{V}$	± 10			V	
I_{xA}	Output leakage current	$V_{CC} = 0\text{V}$	$V_{CMR} = 10\text{V}$		0.5	20	μA
I_{xB}					-0.5	-20	μA
I_{oX}	Off-state (hi-Z) output current	$V_{CC} = \text{MAX}$	$V_{CMR} \leq 10\text{V}$	0.5	20	μA	
			$V_{CMR} \geq -10\text{V}$	-0.5	-20	μA	
I_{oX}	Off-state (hi-Z) output current	$V_{CC} = \text{MAX}$	$V_{CMR} \leq 5\text{V}$	0.03	1	μA	
			$V_{CMR} \geq -5\text{V}$	-0.03	1	μA	
I_{SA}, I_{SB}	Output short circuit current	$V_{IN} = 2.4\text{V}$	$V_{OA} = 0\text{V}$	-75	-150	mA	
			$V_{OB} = 6\text{V}$	100	150	mA	
		$V_{IN} = 0.4\text{V}$	$V_{OA} = 0\text{V}$	100	150	mA	
			$V_{OB} = 6\text{V}$	-75	-150	mA	

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DC ELECTRICAL CHARACTERISTICS (Continued)

SYMBOL ²	PARAMETER	TEST CONDITIONS ³	LIMITS			UNIT
			Min	Typ ¹	Max	
I_{CC}	Supply current			18	30	mA
V_{IH}	High level input voltage		2.0			V
V_{IL}	Low level input voltage				0.8	V
I_{IH}	High level input current	$V_{IN} = 2.4V$		0.3	40	μA
		$V_{IN} \leq V_{CC}$		0.3	100	μA
I_{IL}	Low level input current	$V_{IN} = 0.4V$		-10	-200	μA
V_I	Input clamp voltage	$I_{IN} = -12mA$			-1.5	V

NOTES:

1. Typical limits are at $V_{CC} = 5V$, $V_{EE} = GND$, 25°C ambient and maximum loading.
2. Symbols and definitions correspond to EIA RS-422 where applicable.
3. R_L connected between each output and its complement.

AC ELECTRICAL CHARACTERISTICS EIA RS-423 Connection, $V_{CC} = 5.0V$, $V_{EE} = -5V$, Mode = 2.4V, $T_A = 25^\circ C$.

SYMBOL ²	PARAMETER	TEST CONDITIONS ³	LIMITS			UNIT
			Min	Typ ¹	Max	
t_R	Rise time	$R_L = 100\Omega$, $C_L = 500pF$, Figure 1		80	200	ns
t_F	Fall time	$R_L = 100\Omega$, $C_L = 500pF$, Figure 1		110	200	ns
t_{PDH}	Output propagation delay	$R_L = 100\Omega$, $C_L = 500pF$, Figure 1		90	200	ns
t_{PDL}	Output propagation delay	$R_L = 100\Omega$, $C_L = 500pF$, Figure 1		95	200	ns
t_{PLZ}	Output enable to output	$R_L = 450\Omega$, $C_L = 500pF$, Figure 2			0.8	ns
t_{PHZ}	Output enable to output			60	350	ns
t_{PZL}	Output enable to output	$R_L = 450\Omega$, $C_L = 500pF$, Figure 2		140	350	ns
t_{PZH}	Output enable to output			120	300	ns

NOTES:

1. Typical limits are at $V_{CC} = 5V$, $V_{EE} = GND$, 25°C ambient and maximum loading.
2. Symbols and definitions correspond to EIA RS-422 where applicable.
3. R_L connected between each output and its complement.

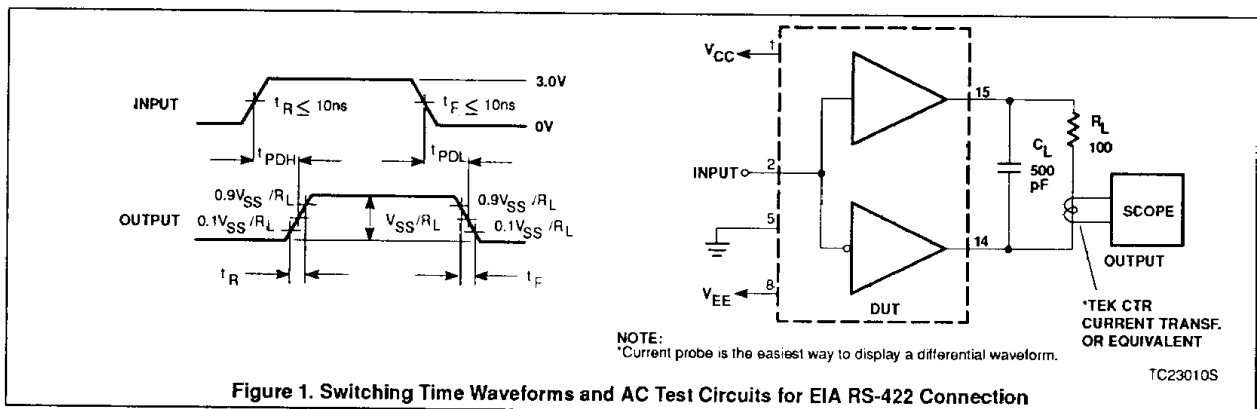


Figure 1. Switching Time Waveforms and AC Test Circuits for EIA RS-422 Connection

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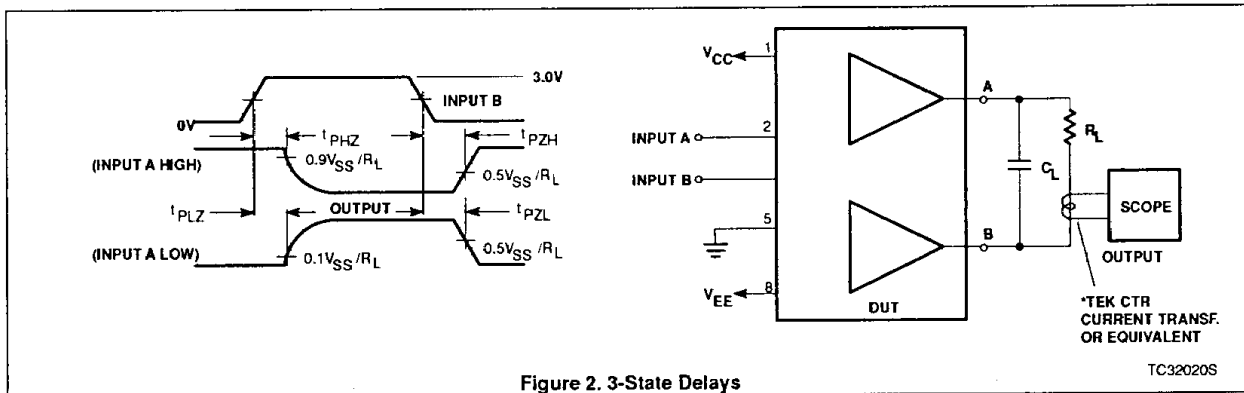


Figure 2. 3-State Delays

DC ELECTRICAL CHARACTERISTICS

Over the operating temperature range. The following conditions apply unless otherwise specified: AM26LS30C, $T_A = 0$ to 70°C , $V_{CC} = 5.0\text{V} \pm 5\%$, $V_{EE} = \text{GND}$; AM26LS30I, $T_A = -40$ to $+85^\circ\text{C}$, $V_{CC} = 5.0\text{V} \pm 5\%$, $V_{EE} = \text{GND}$, RS-422 Connection Mode Voltage $\leq 0.8\text{V}$.

SYMBOL ²	PARAMETER	TEST CONDITIONS	LIMITS			UNIT	
			Min	Typ ¹	Max		
V_O	Output voltage	$R_L = \infty^3$ $ V_{CC} = V_{EE} $ $= 4.75\text{V}$	$V_{IN} = 2.4\text{V}$	4.0	4.1	6.0	V
$\overline{V_O}$			$V_{IN} = 0.4\text{V}$	-4.0	-4.2	-6.0	V
V_T	Output voltage	$R_L = 450\Omega$ $ V_{CC} = V_{EE} $ $= 4.75\text{V}$	$V_{IN} = 2.4\text{V}$	3.6	3.9		V
$\overline{V_T}$			$V_{IN} = 0.4\text{V}$	-3.6	-3.9		V
$ V_T - \overline{V_T} $	Output unbalance	$ V_{CC} = V_{EE} $, $R_L = 450\Omega$		0.05	0.4	V	
I_{X+} I_{X-}	Output leakage power off	$V_{CC} = V_{EE} = 0$	$V_O = 6\text{V}$		0.5	20	μA
			$V_O = -6\text{V}$		-0.5	-20	μA
I_{S+} I_{S-}	Output short circuit current	$V_O = 0\text{V}$	$V_{IN} = 2.4\text{V}$		-75	-150	mA
			$V_{IN} = 0.4\text{V}$		100	150	mA
I_{SLEW}	Slew control current	$V_{SLEW} = V_{EE} + 0.9\text{V}$		± 125	20	μA	
I_{CC}	Positive supply current	$V_{IN} = 0.4\text{V}$, $R_L = \infty$		18	30	mA	
I_{EE}	Negative supply current	$V_{IN} = 0.4\text{V}$, $R_L = \infty$		-8	-22	mA	
V_{IH}	High level input voltage		2.0			V	
V_{IL}	Low level input voltage				0.8	V	
I_{IH}	High level input current	$V_{IN} = 2.4\text{V}$		0.3	40	μA	
		$V_{IN} \leq V_{CC}$		0.3	100	μA	
I_{IL}	Low level input current	$V_{IN} = 0.4\text{V}$		-10	-200	μA	
V_I	Input clamp voltage	$I_{IN} = -12\text{mA}$			-1.5	V	

NOTES:

1. Typical limits are at $V_{CC} = 5.0\text{V}$, $V_{EE} = -5\text{V}$, 25°C ambient and maximum loading.
2. Symbols and definitions correspond to EIA RS-423 where applicable.
3. Output voltage is $+3.9\text{V}$ minimum and -3.9V minimum at -40°C .