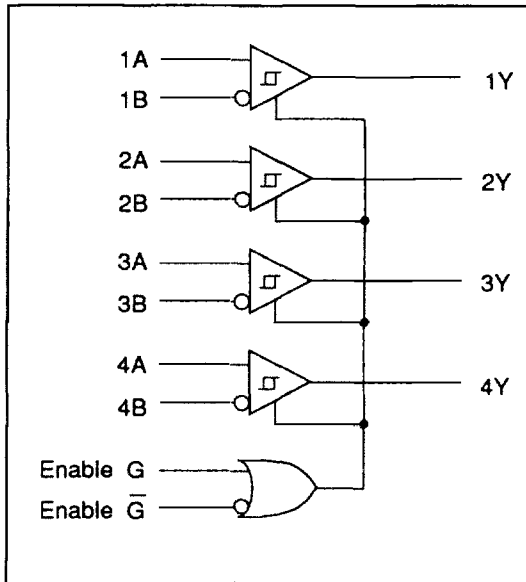


HD26LS33A

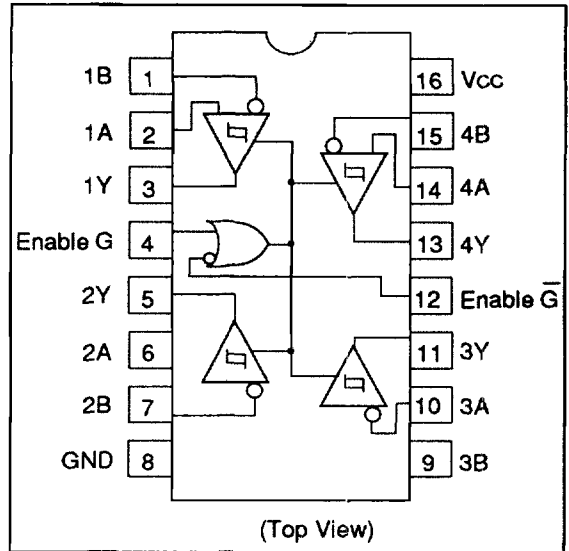
Quadruple Differential Line Receivers With 3 State Outputs

The HD26LS33A is quadruple differential line receivers with three state outputs. This device has the function equivalent to the HD26LS32A, but different in phase voltage range of -15 V to +15 V. The sensitivity of differential input is ± 500 mV.

Logic Diagram



Pin Arrangement



Function Table

Differential Input A - B	Enable		Output Y
	G	\bar{G}	
$V_{ID} \geq V_{TH}$	H	X	H
	X	L	H
$V_{TL} < V_{ID} < V_{TH}$	H	X	?
	X	L	?
$V_{ID} \leq V_{TL}$	H	X	L
	X	L	L
X	L	H	Z

H : High level
 L : Low level
 X : Immaterial
 ? : Irrelevant
 Z : High impedance

Absolute Maximum Ratings (Ta = 0 to +70 °C)

Item	Symbol	Ratings	Unit
Supply Voltage	V _{CC} ^{*1}	7.0	V
Input Voltage A or B	V _{IN}	±25	V
Differential Input Voltage	V _{ID} ^{*2}	±25	V
Enable Input Voltage	V _{IE}	7	V
Output Sink Current	I _{out}	50	mA
Continuous Total Dissipation	P _T	1	W
Operating Temperature	T _{opr}	0 to +70	°C
Storage Temperature	T _{stg}	- 65 to 150	°C

- Notes: 1. All voltage values except for differential input voltage are with respect to network ground terminal.
2. Differential input voltage is measured at the noninverting input with respect to the corresponding inverting input.
3. The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply Voltage	V _{CC}	4.75	5.00	5.25	V
In Phase Input Voltage	V _{IC}	—	—	±15.0	V
Output Current	I _{OH}	—	—	- 440	μA
	I _{OL}	—	—	8	mA
Operating Temperature	T _{opr}	0	—	70	°C

HD26LS33A

Electrical Characteristics (Ta = 0 to +70 °C)

Item	Symbol	Conditions	Min	Typ ^{*1}	Max	Unit
Differential Input High Threshold Voltage	V _{TH}	V _{IC} = -15 to +15 V V _{OH} = 2.7 V, I _{OH} = -440 μA	—	—	0.5	V
Differential Input Low Threshold Voltage	V _{TL}	V _{OL} = 0.4 V, I _{OL} = 4 mA	—	—	-0.5	
		V _{OL} = 0.45 V, I _{OL} = 8 mA	—	—	-0.5	
Input Hysteresis ^{*2}	V _{TH} - V _{TL}		—	50	—	mV
Enable Input Voltage	V _{IH}		2.0	—	—	V
	V _{IL}		—	—	0.8	
Enable Input Clamp Voltage	V _{IK}	V _{CC} = 4.75 V, I _{IN} = -18 mA	—	—	-1.5	
Output Voltage	V _{OH}	V _{CC} = 4.75V, V _{ID} = 1 V, I _{OH} = -440 μA	2.7	—	—	
	V _{OL}	V _{IL} (G) = 0.8 V, V _{ID} = -1 V, I _{OL} = 4 mA	—	—	0.4	
		V _{ID} = -1 V, I _{OL} = 8 mA	—	—	0.45	
Off State(High Impedance) Output Current	I _{OZ}	V _{CC} = 5.25 V, V _O = 2.4 V	—	—	20	μA
		V _O = 0.4 V	—	—	-20	
Line Input Current	I _I	V _I = 15 V, Other Inputs -10 to +15 V	—	—	1.2	mA
		V _I = -15 V, Other Inputs -15 to +10 V	—	—	-1.7	
Enable Input Current	I _I (EN)	V _I = 5.5 V	—	—	100	μA
	I _{IH}	V _I = 2.7 V	—	—	20	
	I _{IL}	V _I = 0.4 V	—	—	-0.36	mA
Input Resistance	r _i	V _{IC} = -15 to +15 V(Other Inputs AC GND)	12	15	—	KΩ
Short Circuit Output Current	I _{OS} ^{*3}	V _{CC} = 5.25 V	-15	—	-85	mA
Supply Current	I _{CC}	V _{CC} = 5.25 V, V _I = 0 V(All Outputs Disable)	—	52	70	

Note: 1. All typical values are at V_{CC} = 5 V, Ta = 25 °C, V_{IC} = 0.

2. Hysteresis is the differential between the positive going input threshold voltage and the negative going input threshold voltage.

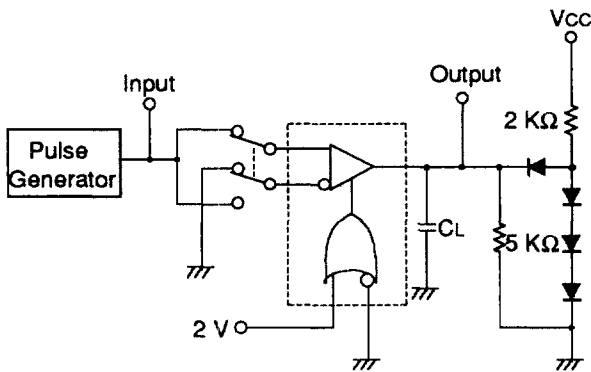
3. Not more than one output should be shorted at a time.

Switching Characteristics ($V_{CC} = 5\text{ V}$, $T_a = 25\text{ }^\circ\text{C}$)

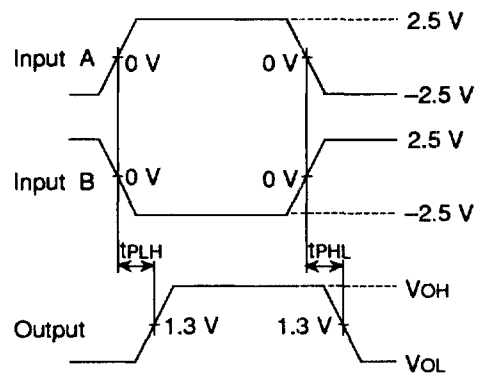
Item	Symbol	Conditions	Min	Typ	Max	Unit
Propagation Delay Time	t_{PLH}	$C_L = 15\text{ pF}$	—	20	35	ns
	t_{PHL}		—	22	35	
Output Enable Time	t_{ZH}	$C_L = 15\text{ pF}$	—	17	22	ns
	t_{ZL}		—	20	25	
Output Disable Time	t_{HZ}	$C_L = 5\text{ pF}$	—	21	30	ns
	t_{LZ}		—	30	40	

1. t_{PLH} , t_{PHL}

Test circuit



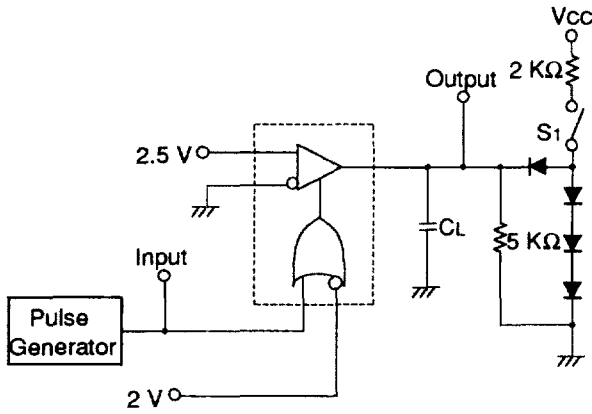
Waveforms



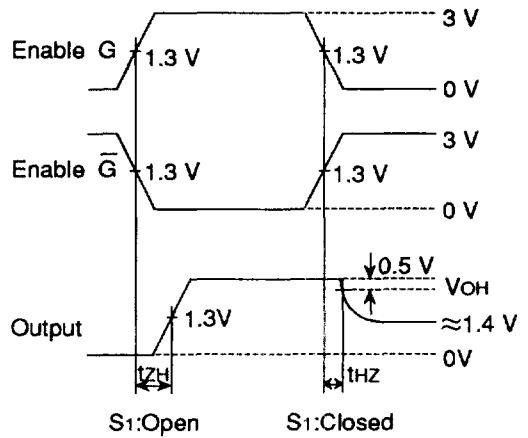
HD26LS33A

2. tHZ, tZH

Test circuit

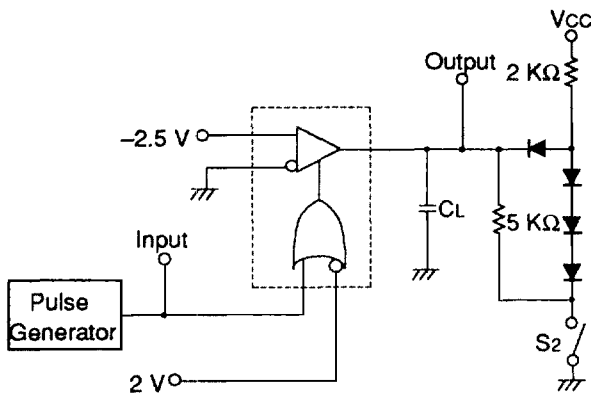


Waveforms

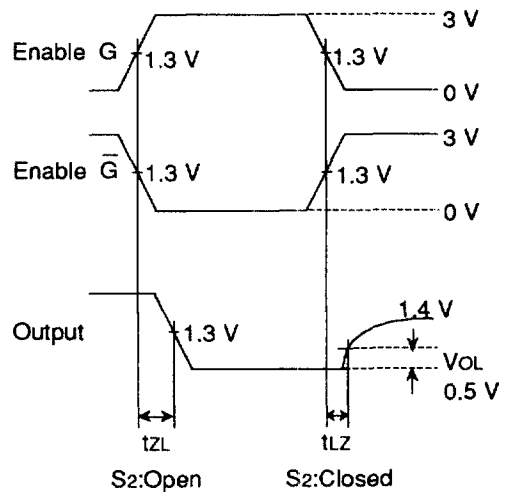


3. tLZ, tZL

Test circuit



Waveforms



- Notes:
1. The pulse generator has the following characteristics :
 PRR = 1 MHz, 50 % duty cycle, $t_r \leq 6$ ns, $t_f \leq 6$ ns, $Z_{out} = 50 \Omega$.
 2. C_L includes probe and jig capacitance.
 3. All diodes are 1S2074 (H).
 4. To test \bar{G} input, ground G input and apply an inverted input waveform.