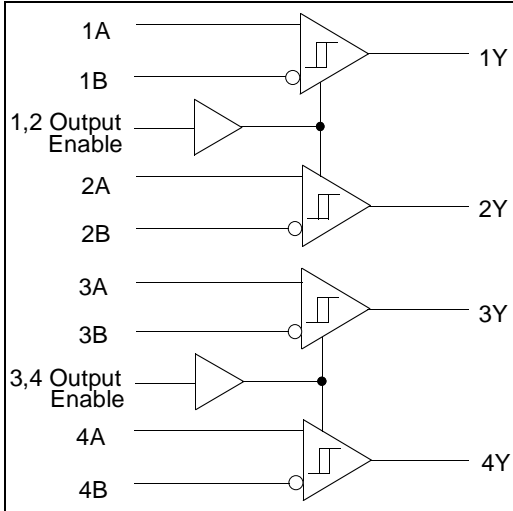


HD293486

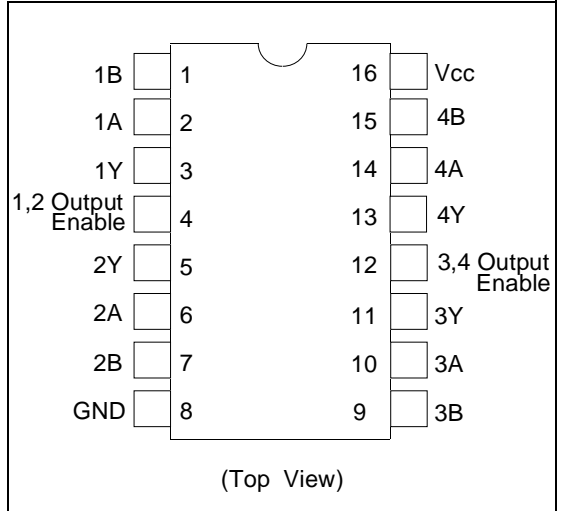
Quadruple Differential Line Receivers With 3 State Outputs

The HD293486 features quadruple Differential line receivers designed to meet the specs of EIA RS-422A and RS-423A. This device operates from a single 5 V power supply. When the enable input is low the associated outputs are in a high impedance state.

Logic Diagram



Pin Arrangement



Function Table

Differential Input A – B	Output Enable	Output Y
$V_{ID} \geq 0.2 \text{ V}$	H	H
$-0.2 \text{ V} < V_{ID} < 0.2 \text{ V}$	H	?
$V_{ID} \leq -0.2 \text{ V}$	H	L
X	L	Z

H : High level
 L : Low level
 X : Irrelevant
 ? : Indeterminate
 Z : High Impedance

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	
Supply Voltage	V_{CC}^{*2}	7.0	V	
A , B Input Voltage	V_{IN}	± 15.0	V	
Differential Input Voltage	V_{ID}^{*3}	± 25.0	V	
Enable Input Voltage	V_{IE}	7.0	V	
Output Current	IOL	50	mA	
Power Dissipation	P_T	^{*1} DP	1000	mW
		FP	785	
Operating Temperature	T_{opr}	0 to +70	°C	
Storage Temperature	T_{stg}	-65 to +150	°C	

Notes: 1. The above data were taken by the ΔV_{EB} method mounting on a glass epoxy board (40 × 40 × 1.6 mm) of 10 % wiring density.

2. All voltage values except for differential input voltage are with respect to ground terminal.

3. Differential input voltage is measured at the noninverting input with respect to the corresponding inverting input.

4. 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.

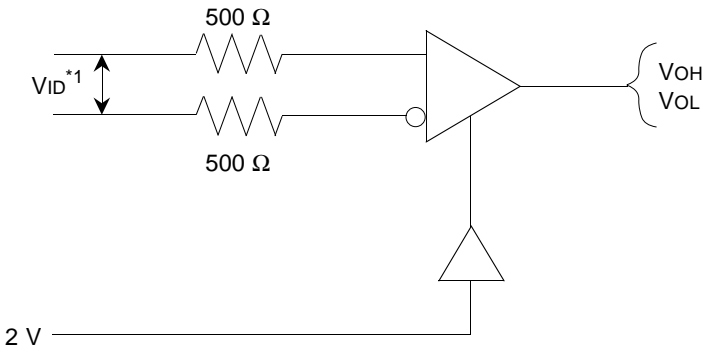
Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	4.75	5.00	5.25	V
In Phase Input Voltage	V_{IC}	—	—	± 7	V
Differential Input Voltage	V_{ID}	—	—	± 6	V
Output Current	I _{OH}	—	—	-0.4	mA
	I _{OL}	—	—	8.0	mA
Operating Temperature	T_{opr}	0	—	70	°C

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

Item	Symbol	Conditions	Min	Typ	Max	Unit	
Differential Input High Threshold Voltage	V _{TH}	V _O = 2.7 V, I _O = -0.4 mA	—	—	0.2	V	
Differential Input Low Threshold Voltage	V _{TL}	V _O = 0.5 V, I _O = 8 mA	—	—	-0.2	V	
Enable Input Voltage	V _{IH}		2.0	—	—	V	
	V _{IL}		—	—	0.8		
Input Clamp Voltage	V _{IK}	I _I = -10 mA	—	—	-1.5	V	
Output Voltage	V _{OH}	V _{ID} *1 = 0.4 V, I _O = -0.4 mA	2.7	—	—	V	
	V _{OL}	V _{ID} *1 = -0.4 V, I _O = 8 mA	—	—	0.5		
Off State Output Current	I _{OZ}	V _{IE} = 0.8 V, V _{ID} = -3 V, V _O = 2.7 V	—	—	40	μA	
	I _{OZ}	V _{IE} = 0.8 V, V _{ID} = 3V, V _O = 0.5V	—	—	40		
Differential Input Bias Current	I _{IB}	V _{CC} = 0 V	V _I = -10 V	—	—	-3.25	mA
		or 5.25 V	V _I = -3 V	—	—	-1.5	
		Other	V _I = 3 V	—	—	1.5	
		Input = 0 V	V _I = 10 V	—	—	3.25	
Enable Input Current	I _{IH}	V _I = 5.25 V	—	—	100	μA	
	I _{IH}	V _I = 2.7 V	—	—	20		
	I _{IL}	V _I = 0.5 V	—	—	-100		
Short Circuit Output Current	I _{OS} *2	V _{ID} = 3 V, V _O = 0 V	-15	—	-100	mA	
Supply Current	I _{CC}	V _{IE} = 0 V	—	—	85	mA	

Note: 1. Not more than one output should be shorted at a time.



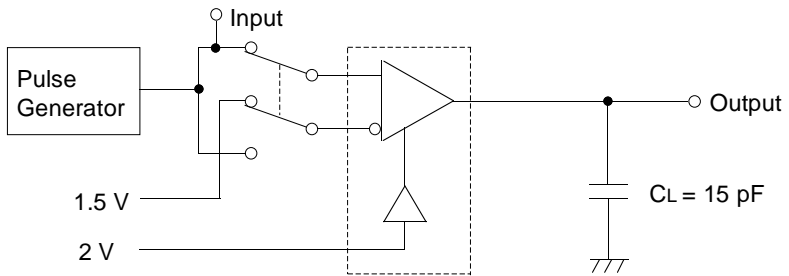
Switching Characteristics ($V_{CC} = 5\text{ V}$, $T_a = 25^\circ\text{C}$)

Item	Symbol	Conditions	Min	Typ	Max	Unit
Propagation Delay Time	t_{PHL}	$C_L = 15\text{ pF}$	—	28	35	ns
	t_{PLH}		—	27	30	
Output Disable Time	t_{HZ}		—	26	35	ns
	t_{LZ}		—	27	35	
Output Enable Time	t_{ZH}		—	13	30	ns
	t_{ZL}		—	20	30	

Switching Time Test Method

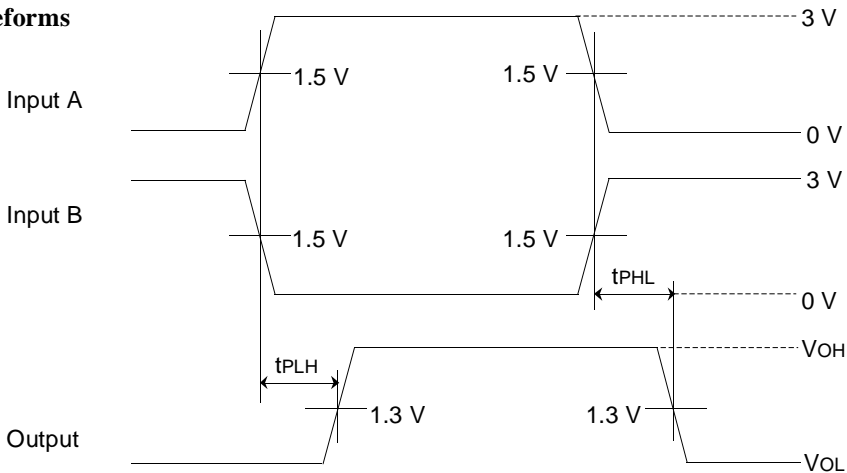
1. t_{PLH} , t_{PHL}

Test circuit



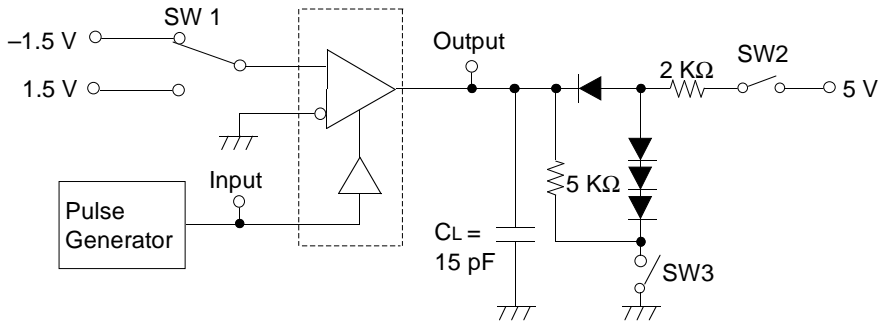
- Notes : 1. The pulse generator has following characteristics:
 PRR = 1 MHz, 50 % duty cycle, $t_r \leq 6\text{ ns}$, $t_f \leq 6\text{ ns}$, $Z_{out} = 50\ \Omega$
 2. C_L includes probe and jig capacitance.

Waveforms



2. tHZ, tZH, tLZ, tZL

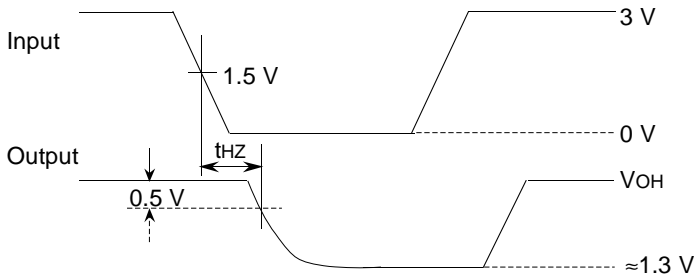
Test circuit



- Notes: 1. The pulse generator has following characteristics:
 PRR = 1 MHz, 50 % duty cycle, $t_r \leq 6$ ns, $t_f \leq 6$ ns, $Z_{out} = 50 \Omega$
 2. CL includes probe and jig capacitance.
 3. All diodes are 1S2074(H)

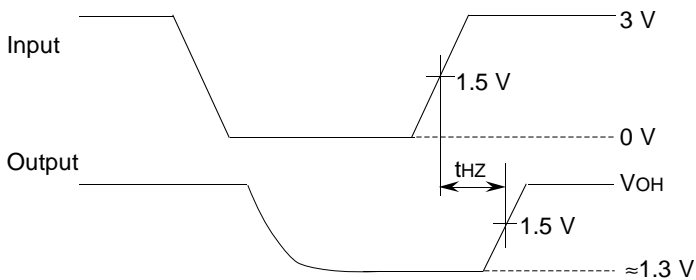
Waveforms

(1) tHZ



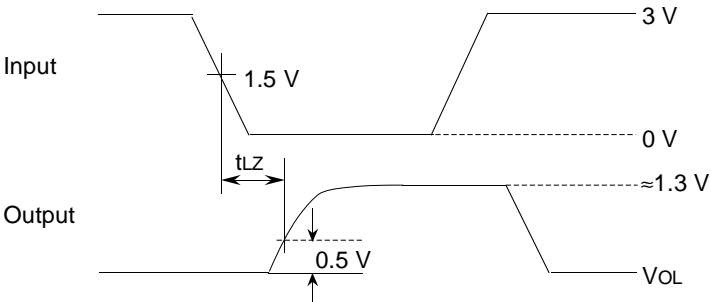
SW1 to 1.5 V
 SW2 CLOSE
 SW3 CLOSE

(2) tZH



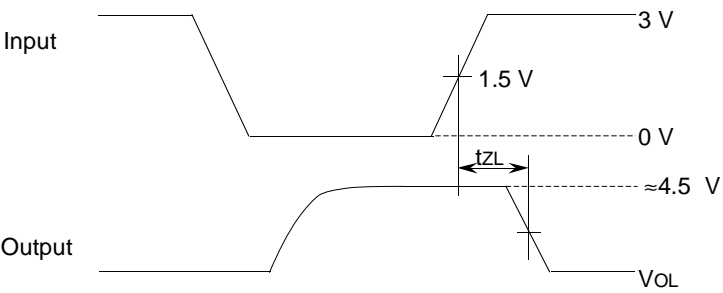
SW1 to 1.5 V
 SW2 OPEN
 SW3 CLOSE

(3) t_{LZ}



SW1 to -1.5 V
SW2 CLOSE
SW3 CLOSE

(4) t_{ZL}



SW1 to -1.5 V
SW2 CLOSE
SW3 OPEN