

HD75153

Quadruple Differential Line Drivers With 3 State Outputs

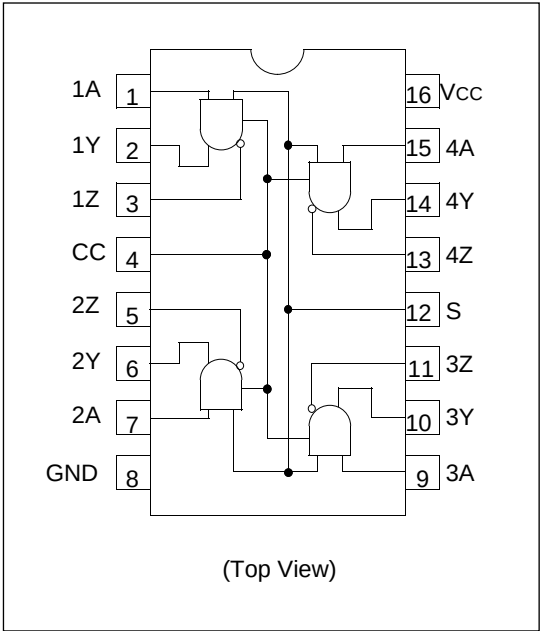
HD75153 features line drivers which satisfy the requirements of EIA RS 422 A and Federal Standard 1020. This device is designed to provide differential signals with high current capability on bus lines. The circuit provides strobe and enable inputs to control all four drivers. The output circuit has active pull up and pull down and is capable of sinking or sourcing 40 mA.

Function Table

Input			Output	
Enable CC	Strobe S	Data A	Y	Z
L	X	X	Z	Z
H	L	X	L	H
H	X	L	L	H
H	H	H	H	L

- H : High level
- L : Low level
- X : Irrelevant
- Z : High impedance

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply Voltage	VCC	7	V
Input Voltage	VIN	5.5	V
Power Dissipation (Ta = 25 °C)	PT	DP	1000
		FP	785
Operating Temperature Range	Topr	0 to +70	°C
Storage Temperature Range	Tstg	−60 to +150	°C

- Note: 1. The above data were taken by the ΔV_{BE} method, mounting on a glass epoxy board (40 × 40 × 1.6 mm) of 10 % wiring density.
2. 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

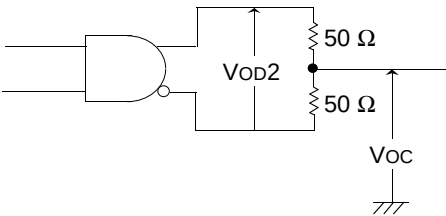
Item	Symbol	Min	Typ	Max	Unit
Supply Voltage	VCC	4.75	500	5.25	V
Common Mode Output Voltage	Vout C	−0.25		6	V
Output Current	IOH	—	—	−40	mA
Output Current	IOL	—	—	40	mA
Operating Temperature	Topr	0	—	70	°C

Electrical Characteristics (Ta = 0 to 70°C)

Item	Symbol	Conditions	Min	Typ ^{*1}	Max	Unit
Input Voltage	VIH		2	—	—	V
	VIL		—	—	0.8	
Input Clamp Voltage	VIK	VCC = 4.75 V	CC, S		—	—
		II = −12 mA	All Others		−0.9	−1.5
Output Voltage	VOH	VCC = 4.75 V, VIL = 0.8 V	IOH = −20 mA	2.5	—	—
		VIH = 2 V	IOH = −40 mA	2.4	—	—
	VOL	VCC = 4.75 V, VIL = 0.8 V, VIH = 2 V, IOL = 40 mA		—	—	0.5
Differential Output Voltage	VOD1	VCC = 5.25 V, IO = 0		—	3.4	2 VOD2 V
	VOD2	VCC = 4.75 V	RL = 100 Ω ^{*5}	2	2.8	—
Change In Magnitude Of Differential Output Voltage	$\Delta V_{OD} $	^{*2} VCC = 4.75 V		—	0.01	0.4 V
Common Mode Output Voltage	VOC ^{*3}	VCC = 5.25 V		—	1.8	3 V
		VCC = 4.75 V		—	1.6	3
Change In Magnitude Of Common Mode Output Voltage	$\Delta V_{OC} $	^{*2} VCC = 4.75 V or 5.25 V		—	0.02	0.4 V
Off State (High Impedance State) Output Current	IOZ	VCC = 5.25 V	VO = 0.5 V	—	—	−20 μA
		Enable = 0.8 V	VO = 2.5 V	—	—	20
			VO = VCC	—	—	20

Item	Symbol	Conditions	Min	Typ ^{*1}	Max	Unit
Output Current With Power Off	I _O	V _{CC} = 0 V	V _O = 6 V	—	0.1	100 μA
			V _O = −0.25 V	—	−0.1	−100
			V _O = −0.25 V to 6 V	—	—	±100
Input Current	I _I	V _{CC} = 5.25 V, V _I = 5.5 V	—	—	0.1	mA
	I _{IH}	V _{CC} = 5.25 V	A	—	20	μA
		V _I = 2.4 V	CC, S	—	80	
	I _{IL}	V _{CC} = 5.25 V	A	—	−0.36	mA
		V _I = 0.4 V	CC,S	—	−1.6	
Short Circuit Output Current	I _{OS} ^{*4}	V _{CC} = 5.25 V	−50	−90	−150	mA
Supply Current	I _{CC}	V _{CC} = 5.25 V No Load	Outputs Disabled	—	30	60 mA
			Outputs Enabled	—	60	84

- Notes: 1. All typical values are at V_{CC} = 5 V, T_a = 25°C.
- ΔV_{OD} and ΔV_{OC} are the changes in magnitudes of V_{OD} and V_{OC}, respectively, that occur when the input is changed from a high level to a low level.
2. In EIA standard RS-422A, V_{OC}, which is the average of the two output voltages with respect to ground, is called output offset voltage, V_{OS}.
3. Only one output should be shorted at a time, and duration of the short circuit should not exceed one second.
4. Differential and common mode output voltages.



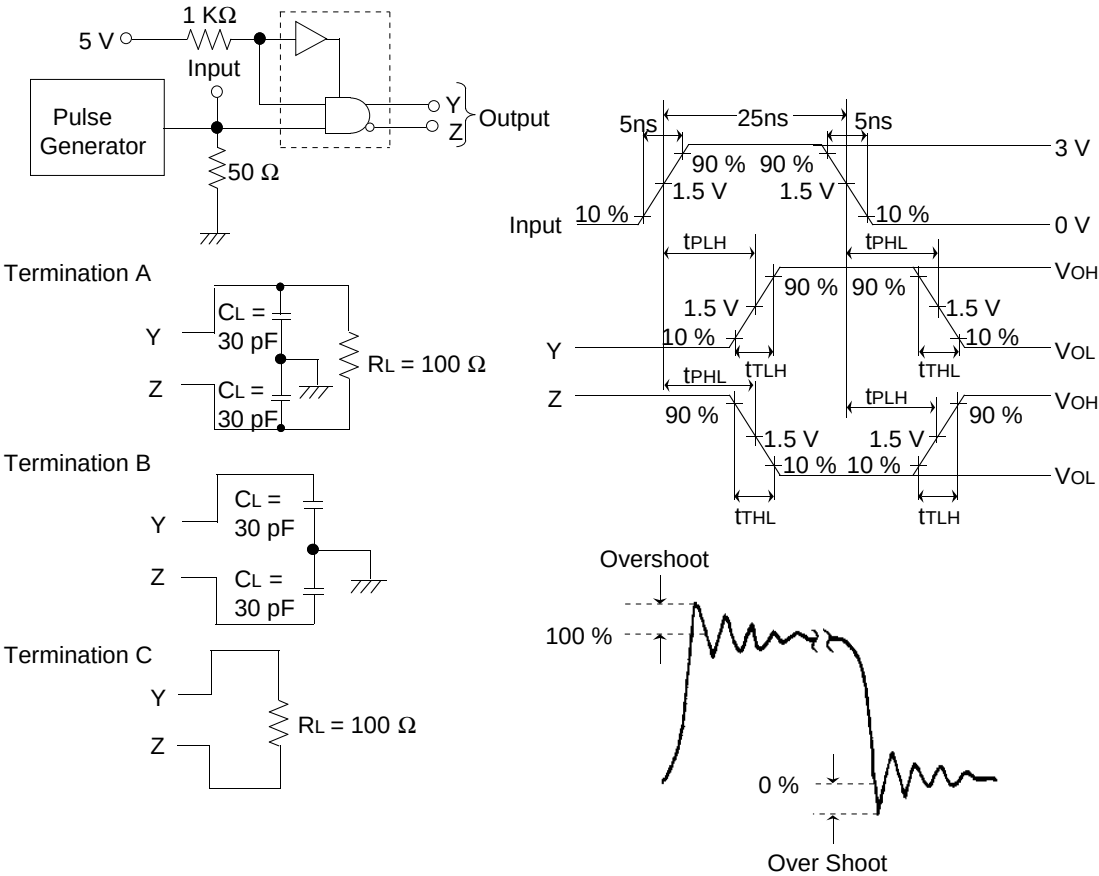
Switching Characteristics (V_{CC} = 5.0 V, T_a = 25°C)

Item	Symbol	Conditions	Min	Typ	Max	Unit
Propagation Delay Time	t _{PLH}	C _L = 30 pF, R _L = 100 Ω	—	15	30	ns
	t _{PHL}	Termination A	—	15	30	
	t _{PLH}	C _L = 30 pF	—	13	25	
	t _{PHL}	Termination B	—	13	25	
Transition Time	t _{TLH}	C _L = 30 pF, R _L = 100 Ω	—	12	20	ns
	t _{THL}	Termination A	—	12	20	
Output Enable Time	t _{ZH}	C _L = 30 pF, R _L = 60 Ω	—	18	35	ns
	t _{ZL}	C _L = 30 pF, R _L = 111 Ω	—	20	35	
Output Disable Time	t _{HZ}	C _L = 30 pF, R _L = 60 Ω	—	19	30	ns
	t _{LZ}	C _L = 30 pF, R _L = 111 Ω	—	13	30	
Overshoot Factor		R _L = 100 Ω Termination C	—	—	10	%

Switching Time Test Method

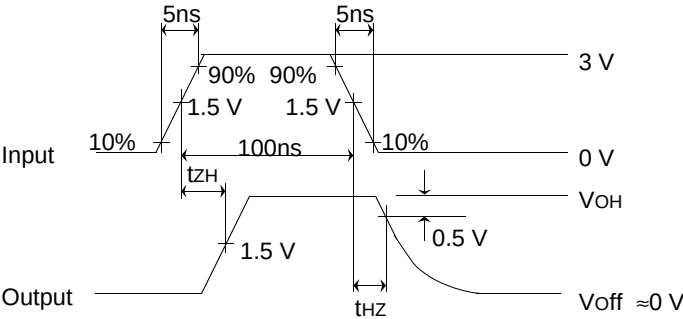
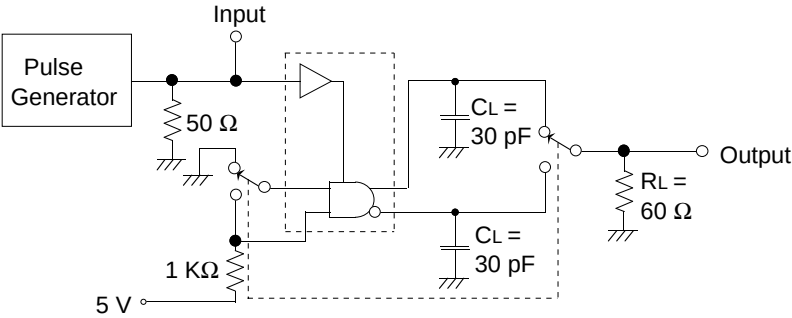
• Test circuit

1. tPLH, tPHL, tTLH, tTHL, and overshoot factor

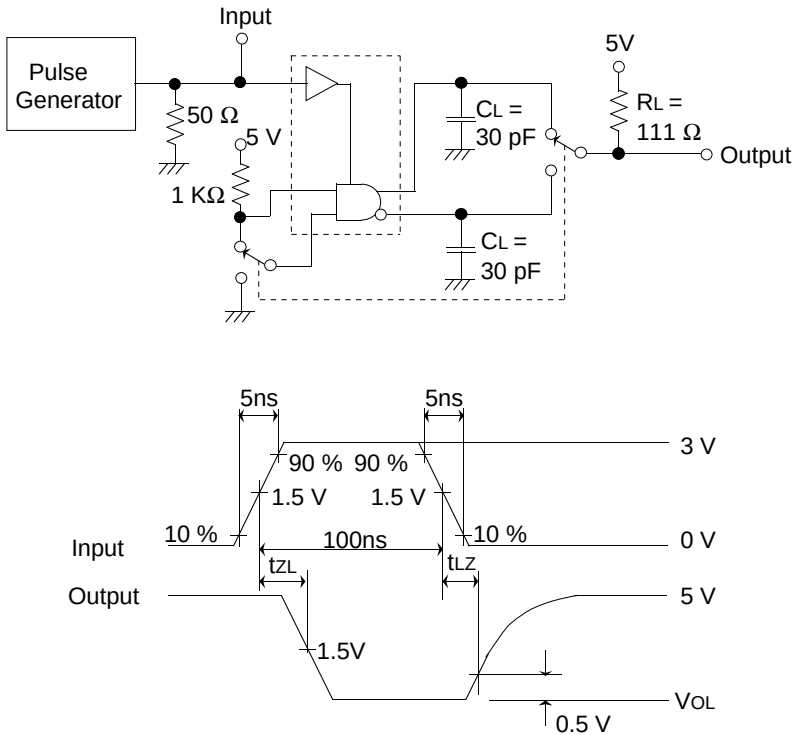


Notes: 1. The pulse generator has the following characteristics:
Zout = 50 Ω , PRR = 10 MHz
2. CL includes probe and jig capacitance.

2. t_{zH}, t_{zL}



3. t_{zL} , t_{LZ}



- Notes: 1. The pulse generator has the following characteristics:
Zout = 50 Ω, PRR = 500 kHz
2. CL includes probe and jig capacitance.