HD74LV240

Octal Buffers / Line Drivers with 3-state Outputs

Description

The HD74LV240 has eight inverter drivers with three state outputs in a 20 pin package. This device is a inverting buffer and has two active low enables ($1\overline{G}$ and $2\overline{G}$). Each enable independently controls four buffers. Low voltage operation is suitable at the battery drive product (note type personal computer) and low power consumption extends the life of a battery for long time operation.

Features

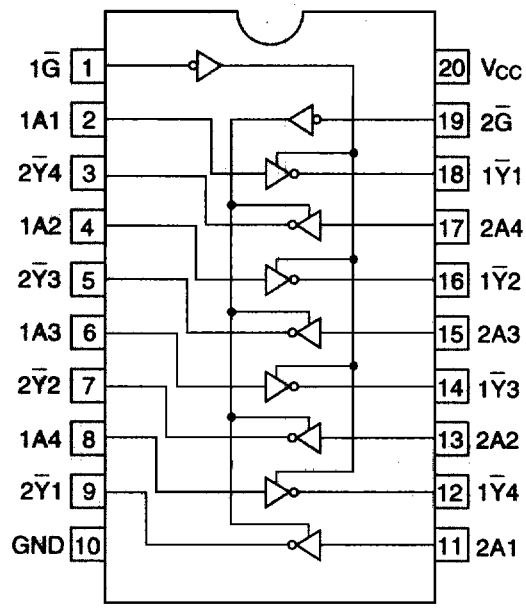
- V_{CC} = 2.0 V to 5.5 V
- All inputs V_{IH} (Max.) = 5.5 V (@V_{CC} = 0 V to 5.5 V)
- Typical V_{OL} ground bounce < 0.8 V (@V_{CC} = 3.3 V, Ta = 25°C)
- Typical V_{OH} undershoot > 2.0 V (@V_{CC} = 3.3 V, Ta = 25°C)
- Output current ±8 mA (@V_{CC} = 3.0 V to 3.6 V)
  ±16 mA (@V_{CC} = 4.5 V to 5.5 V)

Function Table

Inputs		
$\overline{G}$	A	Output $\overline{Y}$
H	X	Z
L	H	L
L	L	H

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

Pin Arrangement



(Top view)

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V_{CC}	–0.5 to 7.0	V	
Input diode current	I_{IK}	–20	mA	V_I = –0.5 V
Input voltage	V_I	–0.5 to 7.0	V	
Output diode current	I_{OK}	–50	mA	V_O = –0.5 V
		50	mA	V_O = V_{CC}+0.5 V
Output voltage	V_O	–0.5 to V_{CC} +0.5	V	
Output current	I_O	±35	mA	
V_{CC}, GND current / pin	I_{CC} or I_{GND}	70	mA	
Storage temperature	Tstg	–65 to +150	°C	

Note: 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	Ratings	Unit	Conditions
Supply voltage	V_{CC}	2.0 to 5.5	V	
Input / output voltage	V_I	0 to 5.5	V	$\overline{G}$, A
	V_O	0 to V_{CC}	V	$\overline{Y}$
Operating temperature	Ta	–40 to 85	°C	
Output current	I_{OH}	–8	mA	V_{CC} = 3.0 V to 3.6 V
		–16*2	mA	V_{CC} = 4.5 V to 5.5 V
	I_{OL}	8	mA	V_{CC} = 3.0 V to 3.6 V
		16*2	mA	V_{CC} = 4.5 V to 5.5 V
Input rise / fall time*1	t_r, t_f	50	ns/V	V_{CC} = 5.5 V
		100	ns/V	V_{CC} = 3.6 V

Notes: 1. This item guarantees maximum limit when one input switches.
Waveform : Refer to test circuit of switching characteristics.
2. duty cycle ≤ 50%

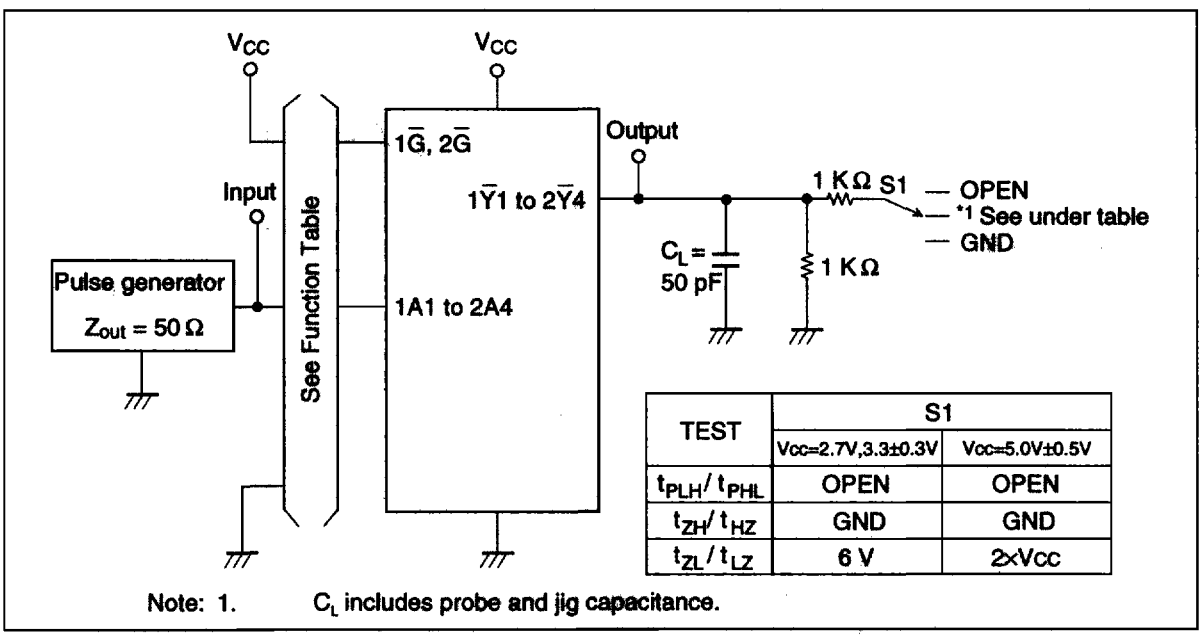
Electrical Characteristics

			Ta = –40 to 85°C			
Item	Symbol	V_{CC} (V)	Min	Max	Unit	Test Conditions
Input voltage	V_{IH}	2.7 to 3.6	2.0	—	V	
		4.5 to 5.5	V_{CC}×0.7	—	V	
	V_{IL}	2.7 to 3.6	—	0.8	V	
		4.5 to 5.5	—	V_{CC}×0.3	V	
Output voltage	V_{OH}	2.7 to 5.5	V_{CC}–0.2	—	V	I_{OH} = –100 µA
		3.0	2.4	—	V	I_{OH} = –8 mA
		4.5	3.6	—	V	I_{OH} = –16 mA
	V_{OL}	2.7 to 5.5	—	0.2	V	I_{OL} = 100 µA
		3.0	—	0.4	V	I_{OL} = 8 mA
		4.5	—	0.5	V	I_{OL} = 16 mA
Input current	I_{IN}	0 to 5.5	—	±1.0	µA	V_{IN} = 5.5 V or GND
Off state output current	I_{OZ}	5.5	—	±5.0	µA	V_{IN} = V_{CC}, GND V_{OUT} = V_{CC} or GND
Quiescent supply current	I_{CC}	5.5	—	20	µA	V_{IN} = V_{CC} or GND
	ΔI_{CC}	3.0 to 3.6	—	500	µA	V_{IN} = one input at (V_{CC} – 0.6) V, other inputs at V_{CC} or GND

Switching Characteristics

Item	Symbol	V_{cc} (V)	Ta = 25°C			Ta = −40 to 85°C			Unit	From (Input)	To (Output)
			Min	Typ	Max	Min	Typ	Max			
Propagation delay time	t_{PLH}	2.7	—	8.5	12.5	1.0	—	14.0	ns	A	$\overline{Y}$
	t_{PHL}	3.3±0.3	—	8.0	10.5	1.0	—	12.0	ns		
		5.0±0.5	—	4.5	8.0	1.0	—	9.0	ns		
Enable time	t_{ZH}	2.7	—	11.0	15.5	1.0	—	17.5	ns	$\overline{G}$	$\overline{Y}$
	t_{ZL}	3.3±0.3	—	10.0	13.5	1.0	—	15.0	ns		
		5.0±0.5	—	6.5	10.0	1.0	—	11.0	ns		
Disable time	t_{HZ}	2.7	—	10.0	13.5	1.0	—	15.0	ns	$\overline{G}$	$\overline{Y}$
	t_{LZ}	3.3±0.3	—	8.5	13.0	1.0	—	14.5	ns		
		5.0±0.5	—	6.0	11.0	1.0	—	12.0	ns		
Input capacitance	C_{IN}	3.3±0.3	—	—	—	—	3.0	—	pF		
Output capacitance	C_O	3.3±0.3	—	—	—	—	8.0	—	pF		

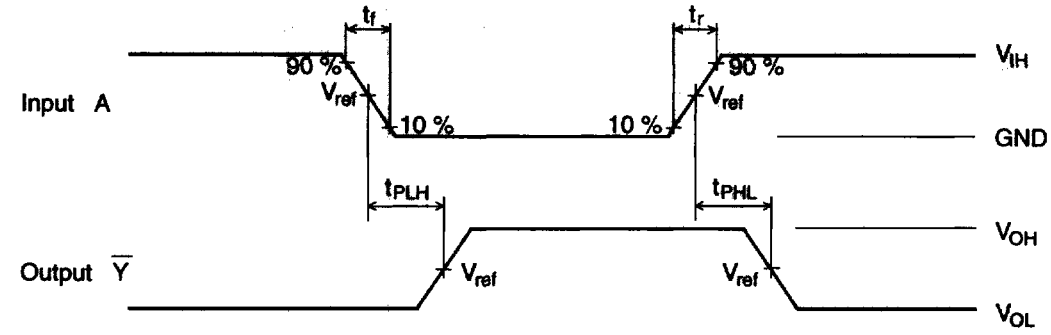
Test Circuit



TEST	S1	
	Vcc=2.7V,3.3±0.3V	Vcc=5.0V±0.5V
t_{PLH}/t_{PHL}	OPEN	OPEN
t_{ZH}/t_{HZ}	GND	GND
t_{ZL}/t_{LZ}	6 V	2×Vcc

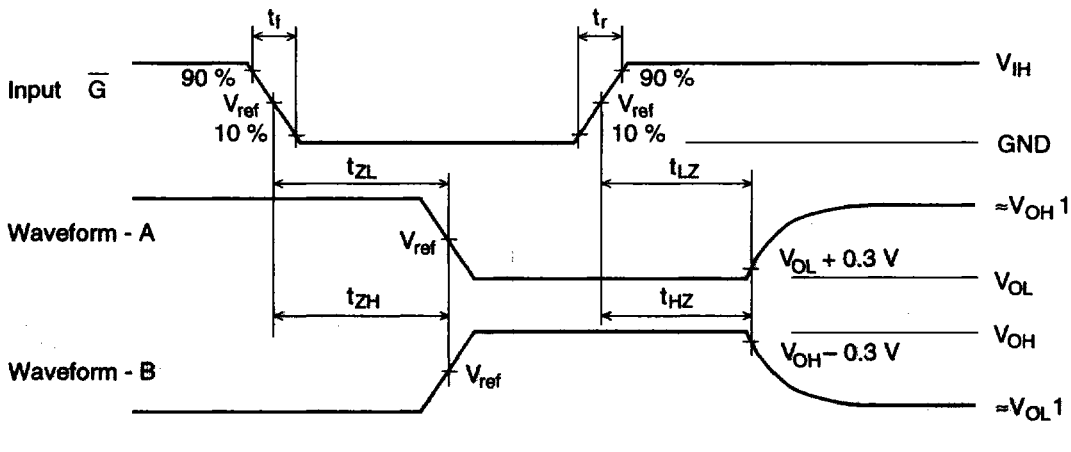
Note: 1. C_L includes probe and jig capacitance.

Waveforms-1



Notes: 1. t_r = 2.5 ns, t_f = 2.5 ns
2. Input waveform : PRR = 10 MHz, duty cycle 50%

Waveforms-2



Symbol	Vcc=2.7V,3.3±0.3V	Vcc=5.0V±0.5V
V_{IH}	2.7 V	Vcc
V_{ref}	1.5 V	50%Vcc
V_{OH}1	3 V	Vcc
V_{OL}1	GND	GND

Notes: 1. t_r = 2.5 ns, t_f = 2.5 ns
2. Input waveform : PRR = 10 MHz, duty cycle 50%
3. Waveform – A shows input conditions such that the output is "L" level when enable by the output control.
4. Waveform – B shows input conditions such that the output is "H" level when enable by the output control.