
HD74LVC1G97

Configurable Multiple-Function Gate

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Preliminary
Rev.1.00
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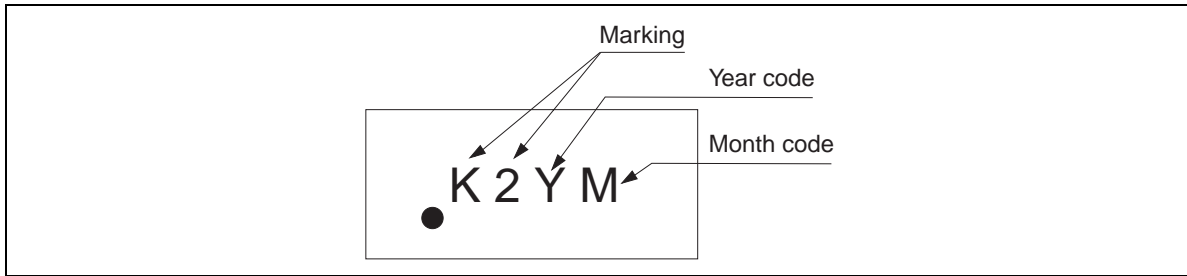
Description

The HD74LVC1G97 has configurable multiple-function gate in a 6 pin package. The Output state is determined by eight patterns of 3-bit input. The user can choose the logic functions AND, NAND, OR, NOR, INVERTER, Non-Invert Buffer, Data Selector. Low voltage and high speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

Features

- The basic gate function is lined up as hitachi uni logic series.
- Supply voltage range : 1.65 to 5.5 V
Operating temperature range : -40 to +85°C
- All inputs V_{IH} (Max.) = 5.5 V (@ V_{CC} = 0 V to 5.5 V)
All outputs V_O (Max.) = 5.5 V (@ V_{CC} = 0 V)
- Output current:
 - ± 4 mA (@ V_{CC} = 1.65 V)
 - ± 8 mA (@ V_{CC} = 2.3 V)
 - ± 24 mA (@ V_{CC} = 3.0 V)
 - ± 32 mA (@ V_{CC} = 4.5 V)
- All the logical input has hysteresis voltage for the slow transition.

Article Indication



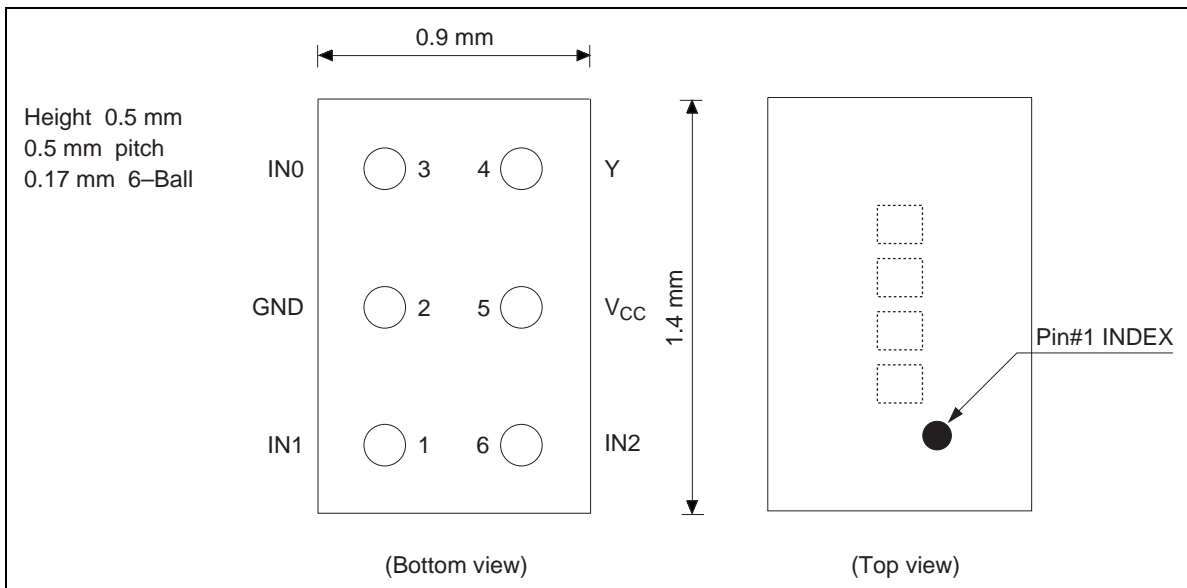
Function Table

Inputs			Output
IN2	IN1	IN0	Y
L	L	L	L
L	L	H	L
L	H	L	H
L	H	H	H
H	L	L	L
H	L	H	H
H	H	L	L
H	H	H	H

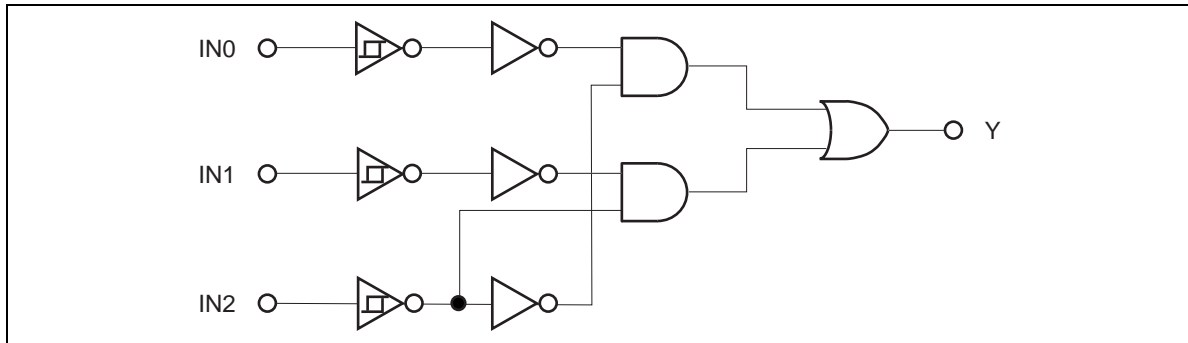
H : High level

L : Low level

Pin Arrangement



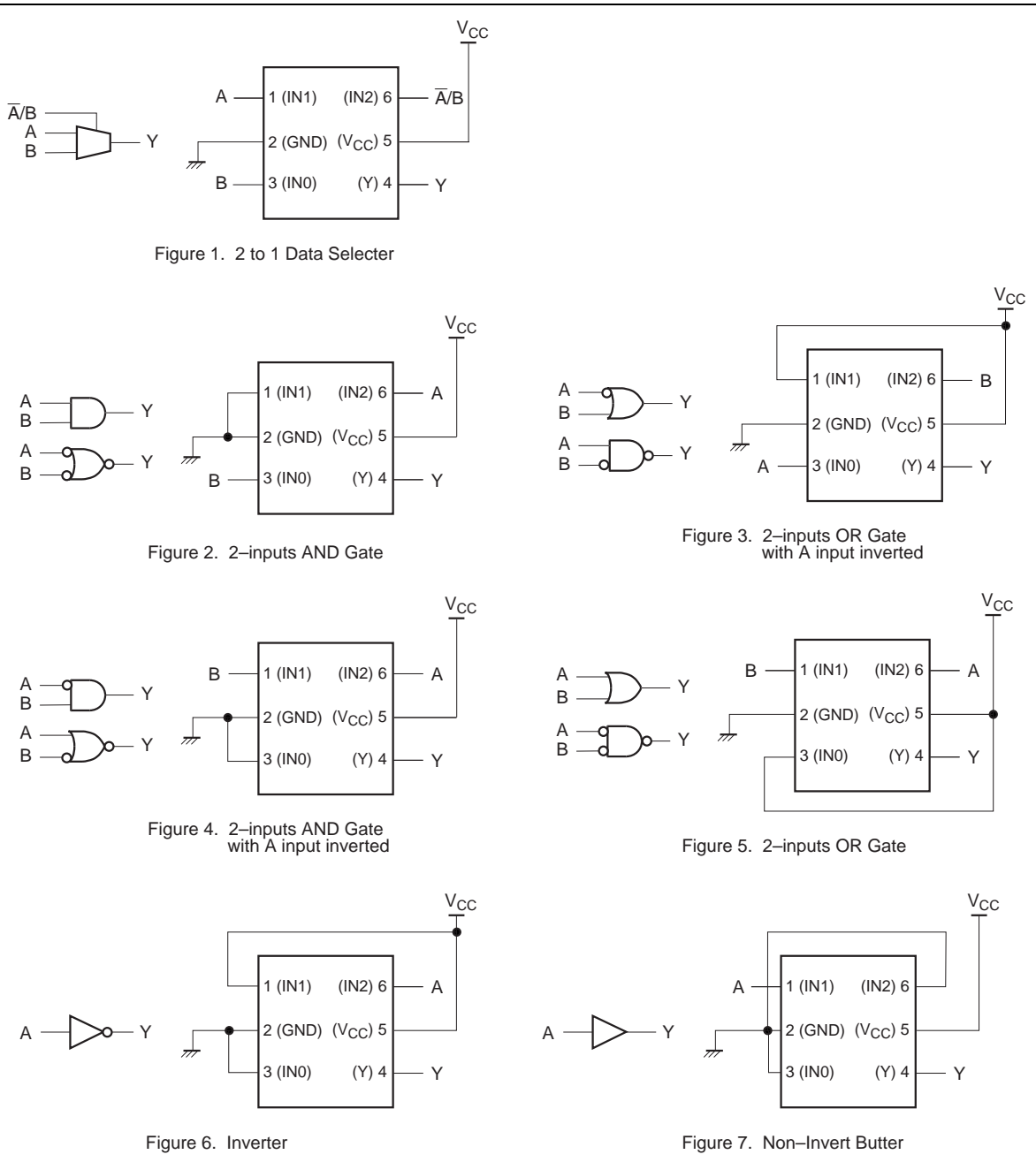
Logic Diagram



Function Selection Table

Logic Function	Figure No.
2 to 1 data Selector	1
2-inputs AND	2
2-inputs OR with one input inverted	3
2-inputs NAND with one input inverted	3
2-inputs AND with one input inverted	4
2-inputs NOR with one input inverted	4
2-inputs OR	5
Inverter	6
Non-Inverter Buffer	7

Logic Configurations



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Test Conditions
Supply voltage range	V_{CC}	−0.5 to 6.5	V	
Input voltage range ^{*1}	V_I	−0.5 to 6.5	V	
Output voltage range ^{*1, 2}	V_O	−0.5 to $V_{CC} + 0.5$ −0.5 to 6.5	V	Output : H or L V_{CC} : OFF
Input clamp current	I_{IK}	−50	mA	$V_I < 0$
Output clamp current	I_{OK}	−50	mA	$V_O < 0$
Continuous output current	I_O	±50	mA	$V_O = 0$ to V_{CC}
Continuous current through V_{CC} or GND	I_{CC} or I_{GND}	±100	mA	
Package Thermal impedance	θ_{ja}	143	°C/W	
Storage temperature	T_{stg}	−65 to 150	°C	

Notes: 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.

1. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. This value is limited to 5.5 V maximum.

Recommended Operating Conditions

Item	Symbol	Min	Max	Unit	Conditions
Supply voltage range	V_{CC}	1.65	5.5	V	
Input voltage range	V_I	0	5.5	V	
Output voltage range	V_O	0	V_{CC}	V	
Output current	I_{OL}	—	4	mA	$V_{CC} = 1.65$ V
		—	8		$V_{CC} = 2.3$ V
		—	16		$V_{CC} = 3.0$ V
		—	24		
		—	32		$V_{CC} = 4.5$ V
	I_{OH}	—	−4		$V_{CC} = 1.65$ V
		—	−8		$V_{CC} = 2.3$ V
		—	−16		$V_{CC} = 3.0$ V
		—	−24		
		—	−32		$V_{CC} = 4.5$ V
		0	20	ns / V	$V_{CC} = 1.65$ to 1.95 V, 2.3 to 2.7 V
		0	10		$V_{CC} = 3.0$ to 3.6 V
		0	5		$V_{CC} = 4.5$ to 5.5 V
Operating free-air temperature	T_a	−40	85	°C	

Note: Unused or floating inputs must be held high or low.

Electrical Characteristics

- $T_a = -40$ to 85°C

Item	Symbol	V_{CC} (V) *	Min	Typ	Max	Unit	Test condition
Threshold voltage	V_T^+	1.8	0.8	—	1.4	V	
		2.5	1.2	—	1.7		
		3.3	1.6	—	2.3		
		5.0	2.3	—	3.0		
	V_T^-	1.8	0.4	—	0.7		
		2.5	0.6	—	1.0		
		3.3	0.9	—	1.4		
		5.0	1.5	—	2.0		
	ΔV_T	1.8	0.4	—	0.7		
		2.5	0.4	—	0.8		
		3.3	0.4	—	0.9		
		5.0	0.4	—	1.0		
Output voltage	V_{OH}	1.65 to 5.5	$V_{CC}-0.1$	—	—	V	$I_{OH} = 100\ \mu\text{A}$
		1.65	1.2	—	—		$I_{OH} = -4\ \text{mA}$
		2.3	1.9	—	—		$I_{OH} = -8\ \text{mA}$
		3.0	2.4	—	—		$I_{OH} = -16\ \text{mA}$
			2.3	—	—		$I_{OH} = -24\ \text{mA}$
		4.5	3.8	—	—		$I_{OH} = -32\ \text{mA}$
	V_{OL}	1.65 to 5.5	—	—	0.1		$I_{OL} = 100\ \mu\text{A}$
		1.65	—	—	0.45		$I_{OL} = 4\ \text{mA}$
		2.3	—	—	0.3		$I_{OL} = 8\ \text{mA}$
		3.0	—	—	0.4		$I_{OL} = 16\ \text{mA}$
					0.55		$I_{OL} = 24\ \text{mA}$
		4.5	—	—	0.55		$I_{OL} = 32\ \text{mA}$
Input current	I_{IN}	0 to 5.5	—	—	± 5	μA	$V_{IN} = 5.5\ \text{V}$ or GND
Quiescent supply current	I_{CC}	5.5	—	—	10	μA	$V_{IN} = V_{CC}$ or GND, $I_O = 0$
	ΔI_{CC}	3 to 5.5	—	—	500		One input at $V_{CC}-0.6\ \text{V}$, Other input at V_{CC} or GND
Output leakage current	I_{OFF}	0	—	—	± 10	μA	V_{IN} or $V_O = 0$ to $5.5\ \text{V}$
Input capacitance	C_{IN}	3.3	—	3.5	—	pF	$V_{IN} = V_{CC}$ or GND

Note: For conditions shown as Min or Max, use the appropriate values under recommended operating conditions.

HD74LVC1G97

Switching Characteristics

- $V_{CC} = 1.8 \pm 0.15 \text{ V}$

Item	Symbol	Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Max				
Propagation delay time	t _{PLH} t _{PHL}	3.2	14.4	ns	C _L = 30 pF, R _L = 1.0 kΩ	IN	Y

- $V_{CC} = 2.5 \pm 0.2 \text{ V}$

Item	Symbol	Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Max				
Propagation delay time	t _{PLH} t _{PHL}	2.0	8.3	ns	C _L = 30 pF, R _L = 500 Ω	IN	Y

- $V_{CC} = 3.3 \pm 0.3 \text{ V}$

Item	Symbol	Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Max				
Propagation delay time	t _{PLH} t _{PHL}	1.5	6.3	ns	C _L = 50 pF, R _L = 500 Ω	IN	Y

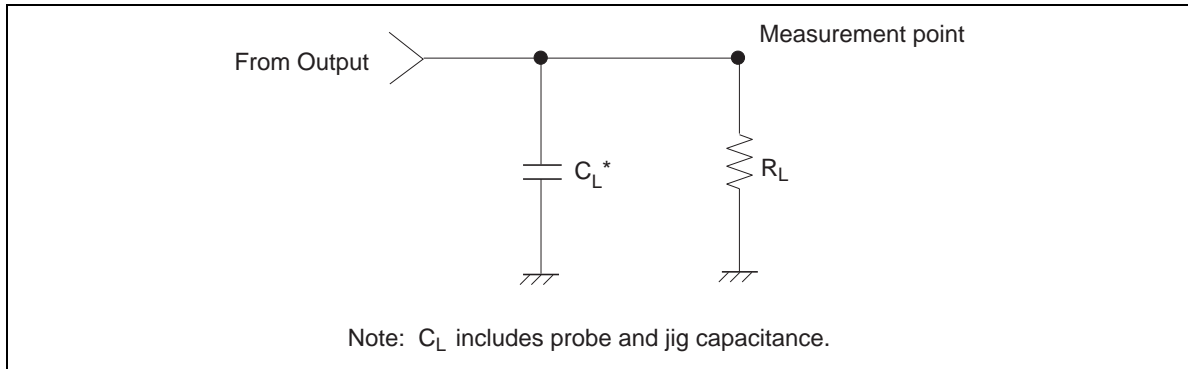
- $V_{CC} = 5.0 \pm 0.5 \text{ V}$

Item	Symbol	Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Max				
Propagation delay time	t _{PLH} t _{PHL}	1.1	5.1	ns	C _L = 50 pF, R _L = 500 Ω	IN	Y

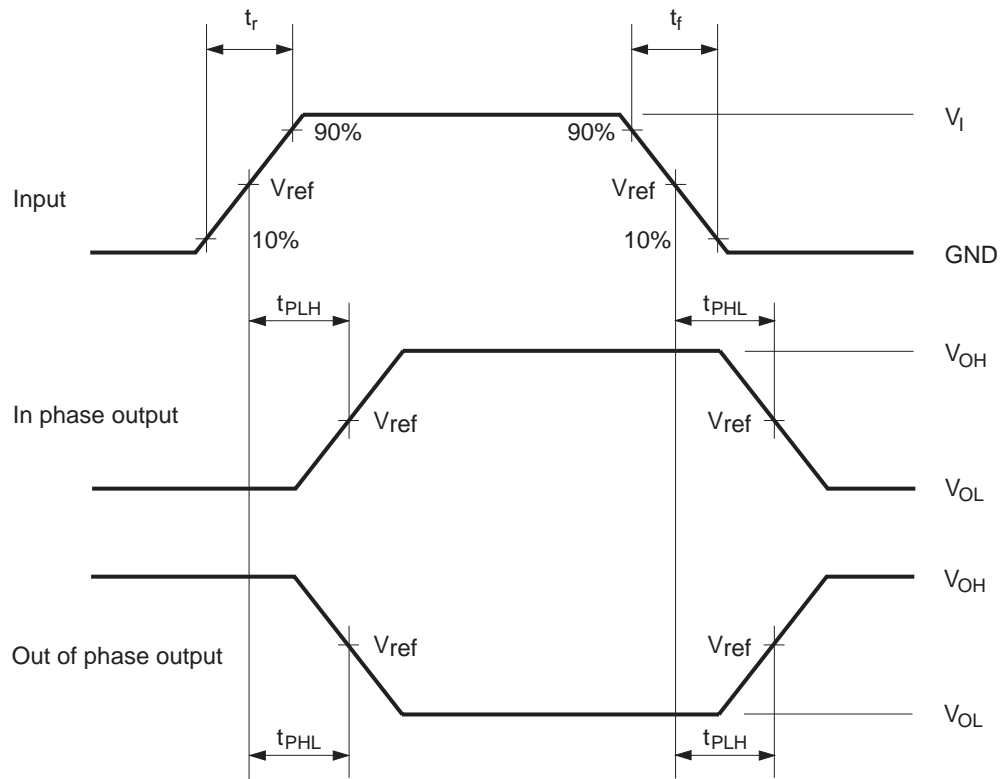
Operating Characteristics

Item	Symbol	V _{CC} (V)	Ta = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C _{PD}	1.8	—	22	—	pF	f = 10 MHz
		2.5	—	23	—		
		3.3	—	23	—		
		5.0	—	26	—		

Test Circuit



• Waveforms



V_{CC} (V)	INPUTS		V_{ref}	C_L	R_L
	V_I	t_r / t_f			
1.8 ± 0.15	V_{CC}	$\leq 2 \text{ ns}$	$V_{CC} / 2$	30 pF	1.0 k Ω
2.5 ± 0.2	V_{CC}	$\leq 2 \text{ ns}$	$V_{CC} / 2$	30 pF	500 Ω
3.3 ± 0.3	3 V	$\leq 2.5 \text{ ns}$	1.5 V	50 pF	500 Ω
5.0 ± 0.5	V_{CC}	$\leq 2.5 \text{ ns}$	$V_{CC} / 2$	50 pF	500 Ω

Notes: 1. Input waveform : $PRR \leq 10 \text{ MHz}$, $Z_o = 50 \Omega$.
 2. The output are measured one at a time with one transition per measurement.

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