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# HD74LV1GT66A

Analog Switch

# HITACHI

ADE-205-565B (Z)  
3rd. Edition  
October 2000

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## Description

The HD74LV1GT66A has an analog switch in a 5 pin package. Switch section has its enable input control (C). High level voltage applied to C turns on the switch section. Applications include signal gating, chopping, modulation or demodulation (modem), and signal multiplexing for analog to digital and digital to analog conversion systems. 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.

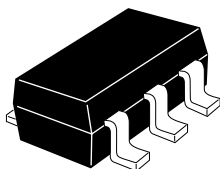
## Features

- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- TTL compatible control input level.  
Supply voltage range : 4.5 to 5.5 V  
Operating temperature range : -40 to +85°C
- Control inputs  $V_{IH}$  (Max.) = 5.5 V (@  $V_{CC}$  = 0 V to 5.5 V)
- Control inputs has hysteresis voltage for the slow transition.

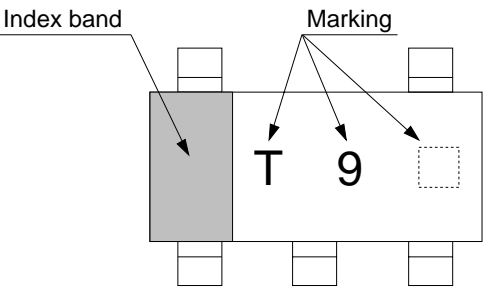
HD74LV1GT66A

Outline and Article Indication

• HD74LV1GT66A

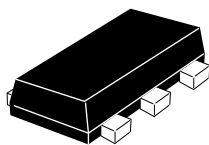


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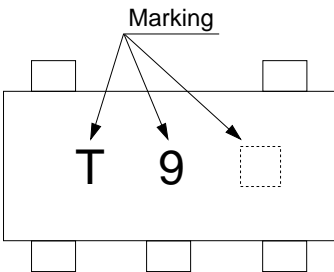


= Control code  
( — or blank)

• HD74LV1GT66A



VSON-5



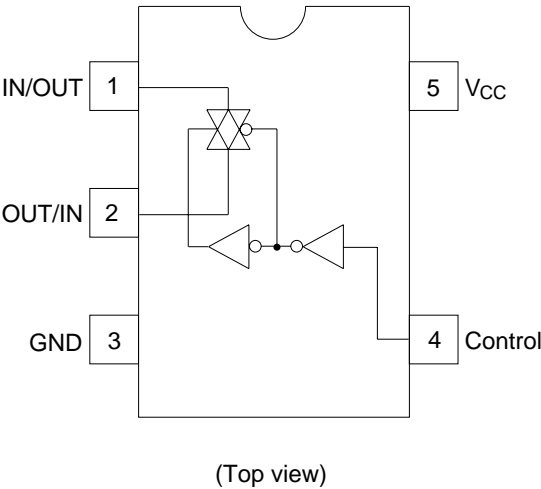
= Control code

Function Table

Control	Switch
L	OFF
H	ON

H : High level  
L : Low level

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Test Conditions
Supply voltage range	$V_{CC}$	−0.5 to 7.0	V	
Input voltage range <sup>*1</sup>	$V_I$	−0.5 to 7.0	V	
Output voltage range <sup>*1, 2</sup>	$V_O$	−0.5 to $V_{CC} + 0.5$	V	Output : H or L
Input clamp current	$I_{IK}$	−20	mA	$V_I < 0$
Output clamp current	$I_{OK}$	±50	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	$I_O$	±25	mA	$V_O = 0$ to $V_{CC}$
Continuous current through $V_{CC}$ or GND	$I_{CC}$ or $I_{GND}$	±50	mA	
Maximum power dissipation at $T_a = 25^{\circ}\text{C}$ (in still air) <sup>*3</sup>	$P_T$	200	mW	
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.
  3. The maximum package power dissipation was calculated using a junction temperature of 150°C.

Recommended Operating Conditions

Item	Symbol	Min	Max	Unit	Conditions
Supply voltage range	$V_{CC}$	4.5	5.5	V	
Input voltage range	$V_I$	0	5.5	V	
Input / output voltage range	$V_{I/O}$	0	$V_{CC}$	V	
Input transition rise or fall rate	$\Delta t / \Delta v$	0	20	ns / V	$V_{CC} = 4.5$ 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

Item	Symbol	$V_{CC}$ (V)	$T_a = 25^{\circ}\text{C}$			$T_a = -40 \text{ to } 85^{\circ}\text{C}$			Unit	Test Conditions
			Min	Typ	Max	Min	Typ	Max		
Input voltage	$V_{IH}$	4.5 to 5.5	—	—	—	2.0	—	—	V	Control input only
	$V_{IL}$	4.5 to 5.5	—	—	—	—	—	0.8		
Hysteresis voltage	$V_H$	5.0	—	—	—	—	0.15	—	V	$V_T^+ - V_T^-$
On-state switch resistance	$R_{ON}$	4.5	—	40	75	—	—	100	$\Omega$	$V_{IN} = V_{CC}$ or GND $V_C = V_{IH}$ $I_T = 1 \text{ mA}$
Peak on resistance	$R_{ON(P)}$	4.5	—	50	100	—	—	125	$\Omega$	$V_{IN} = V_{CC}$ to GND $V_C = V_{IH}$ $I_T = 1 \text{ mA}$
Off-state switch leakage current	$I_{s(OFF)}$	5.5	—	—	$\pm 0.1$	—	—	$\pm 1.0$	$\mu\text{A}$	$V_{IN} = V_{CC}$ , $V_{OUT} = \text{GND}$ or $V_{IN} = \text{GND}$ , $V_O = V_{CC}$ , $V_C = V_{IL}$
On-state switch leakage current	$I_{s(ON)}$	5.5	—	—	$\pm 0.1$	—	—	$\pm 1.0$	$\mu\text{A}$	$V_{IN} = V_{CC}$ or GND $V_C = V_{IH}$
Input current	$I_{IN}$	0 to 5.5	—	—	$\pm 0.1$	—	—	$\pm 1.0$	$\mu\text{A}$	$V_{IN} = 5.5 \text{ V}$ or GND
Quiescent supply current	$I_{CC}$	5.5	—	—	—	—	—	10	$\mu\text{A}$	$V_{IN} = V_{CC}$ or GND
	$\Delta I_{CC}$	5.5	—	—	—	—	—	1.5	$\text{mA}$	$V_{IN} = 3.4 \text{ V}$
Control input capacitance	$C_{IC}$	—	—	3.5	—	—	—	—	$\text{pF}$	
Switch terminal capacitance	$C_{IN/OUT}$	—	—	4.0	—	—	—	—	$\text{pF}$	
Feedthrough capacitance	$C_{IN-OUT}$	—	—	0.5	—	—	—	—	$\text{pF}$	

Switching Characteristics

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

Item	Symbol	T <sub>a</sub> = 25°C			T <sub>a</sub> = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t <sub>PLH</sub>	—	1.0	4.0	—	7.0	ns	C <sub>L</sub> = 15 pF	IN/OUT	OUT/IN
	t <sub>PHL</sub>	—	3.0	6.0	—	8.0		C <sub>L</sub> = 50 pF	or OUT/IN	or IN/OUT
Enable time	t <sub>ZH</sub>	—	3.0	7.0	—	10.0	ns	C <sub>L</sub> = 15 pF	C	IN/OUT
	t <sub>ZL</sub>	—	5.0	12.0	—	16.0		C <sub>L</sub> = 50 pF		or OUT/IN
Disable time	t <sub>HZ</sub>	—	4.0	7.0	—	10.0	ns	C <sub>L</sub> = 15 pF	C	IN/OUT
	t <sub>LZ</sub>	—	6.0	12.0	—	16.0		C <sub>L</sub> = 50 pF		or OUT/IN

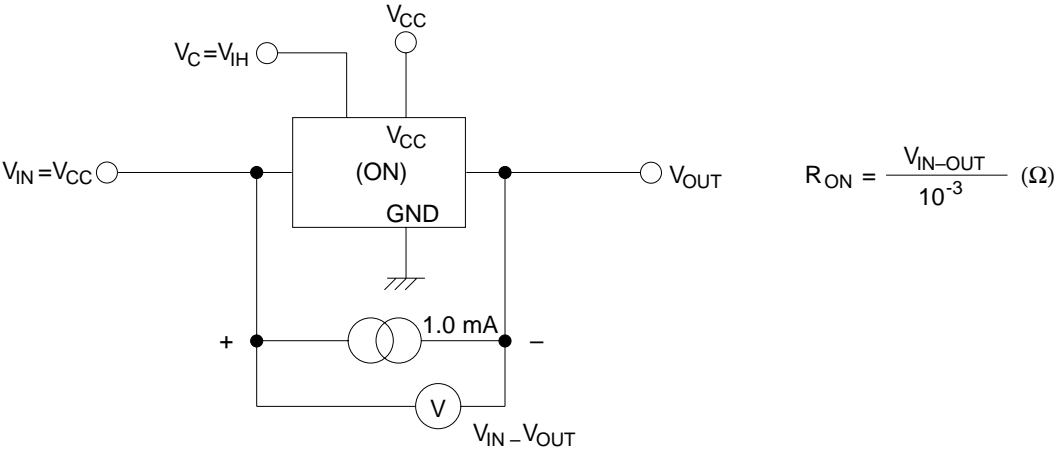
Operating Characteristics

- $C_L = 50 \text{ pF}$

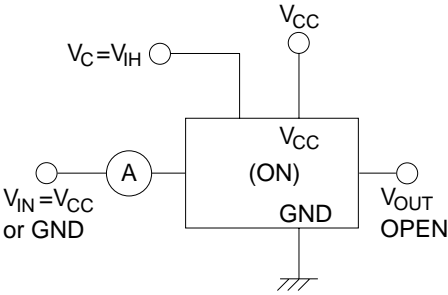
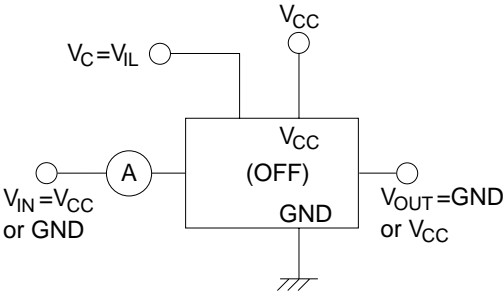
Item	Symbol	V <sub>cc</sub> (V)	T <sub>a</sub> = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C <sub>PD</sub>	5.0	—	4.0	—	pF	f = 10 MHz

Test Circuit

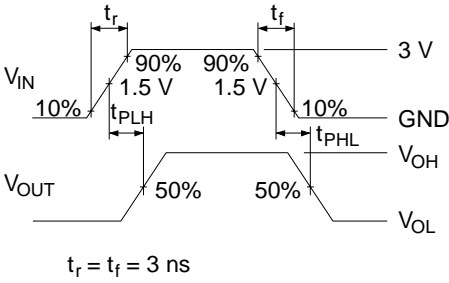
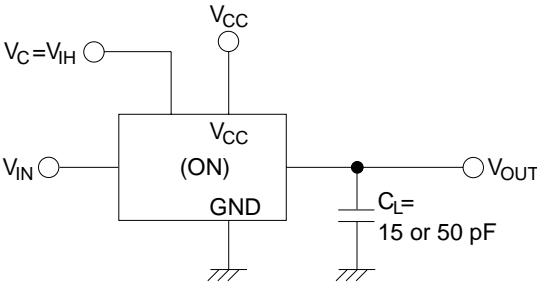
- $R_{ON}$



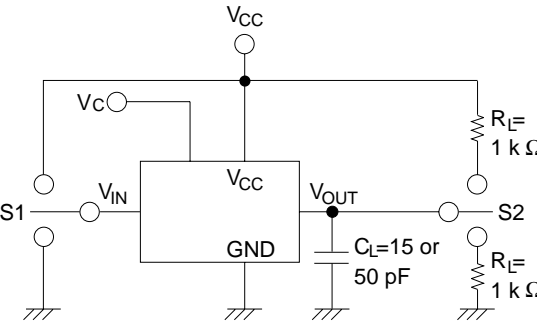
•  $I_S$  (off),  $I_S$  (on)



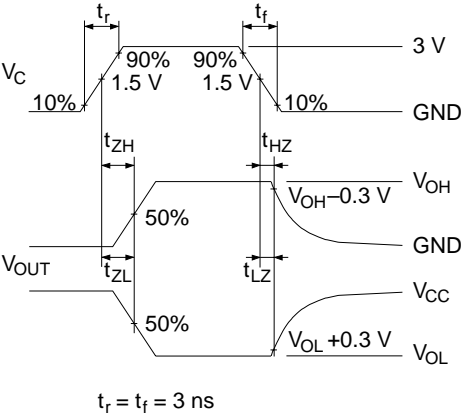
•  $t_{PLH}$ ,  $t_{PHL}$



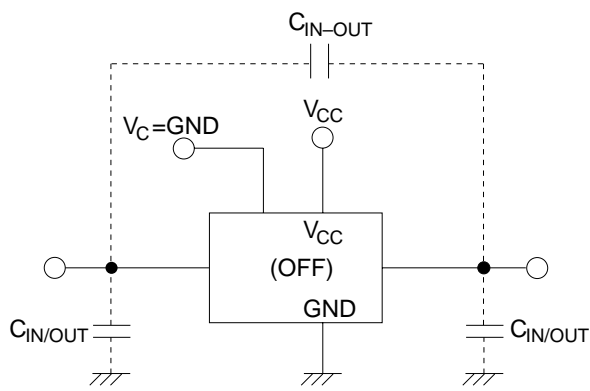
•  $t_{ZH}$ ,  $t_{ZL}$  /  $t_{HZ}$ ,  $t_{LZ}$



Item	S1	S2
$t_{ZH}$	$V_{CC}$	GND
$t_{ZL}$	GND	$V_{CC}$
$t_{HZ}$	$V_{CC}$	GND
$t_{LZ}$	GND	$V_{CC}$

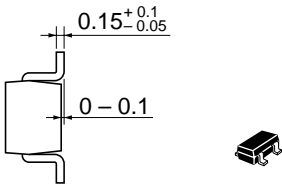
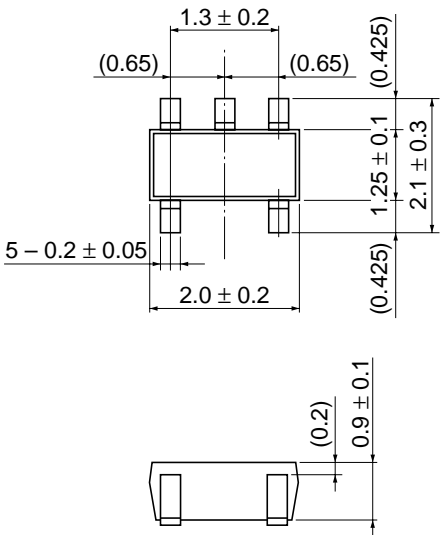


- $C_{IN/OUT}$ ,  $C_{IN-OUT}$

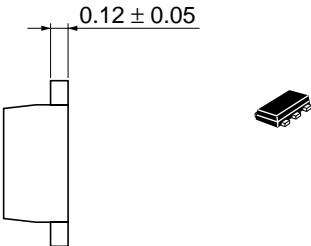
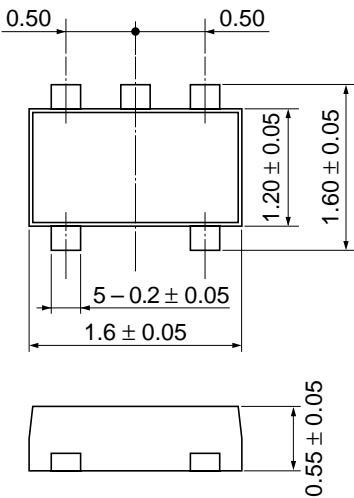


Package Dimensions

Unit : mm



Hitachi Code	CMPAK-5
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.006 g



Hitachi Code	TNP-5D
JEDEC	—
EIAJ	—
Mass (reference value)	—

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