

# 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.

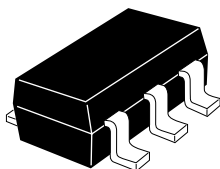
## Features

- 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  $+85^{\circ}\text{C}$
- 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.

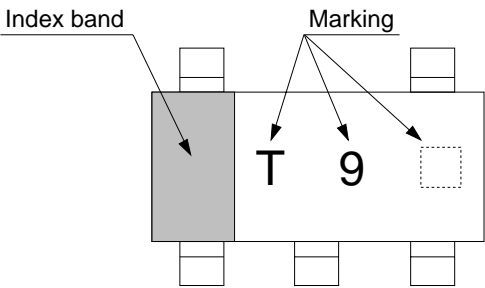
# HD74LV1GT66A


## Outline and Article Indication

• HD74LV1GT66A

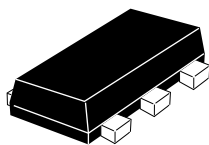


CMPAK-5

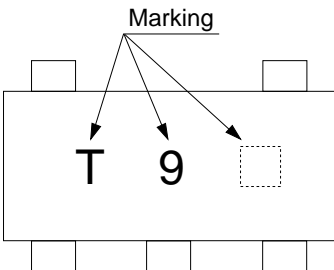



 = Control code  
( — or blank)

• HD74LV1GT66A



VSON-5



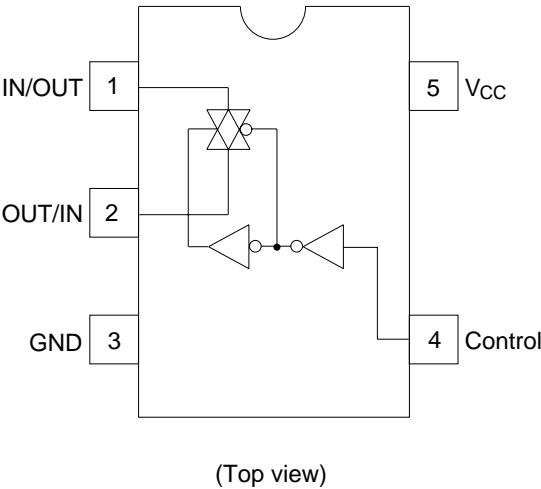
 = Control code

## 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

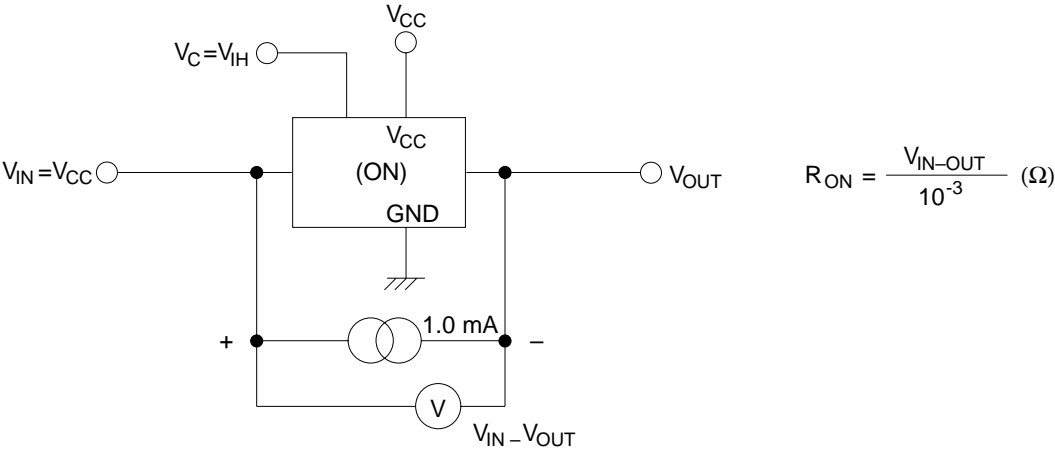
Operating Characteristics

- $C_L = 50\text{ pF}$

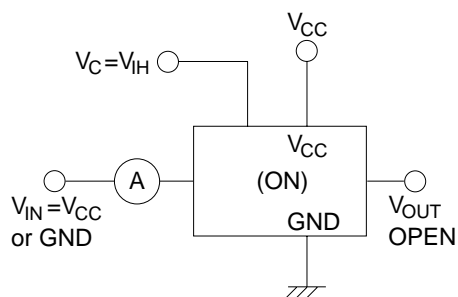
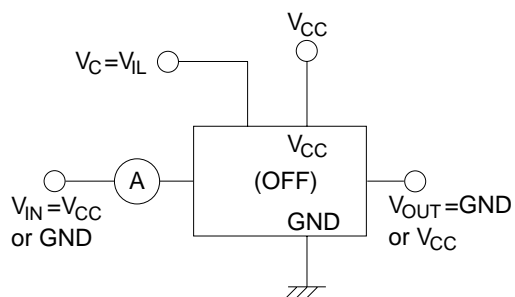
Item	Symbol	V <sub>cc</sub> (V)	T <sub>a</sub> = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C <sub>PD</sub>	5.0	—	4.0	—	pF	f = 10 MHz

Test Circuit

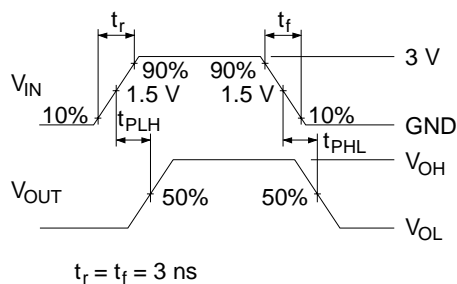
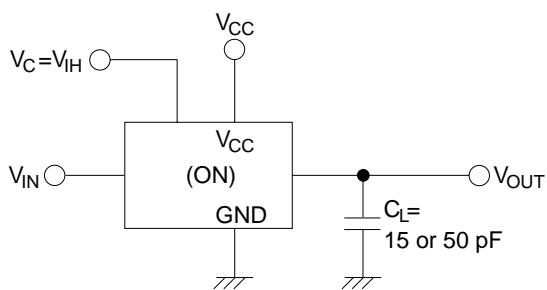
- $R_{ON}$



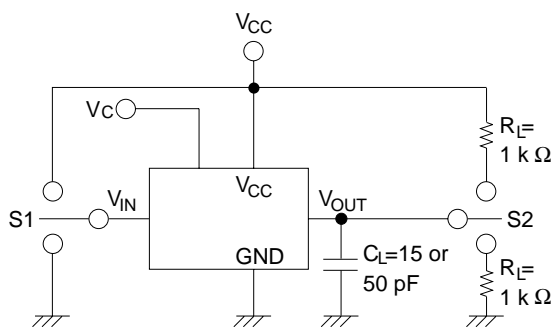
- $I_S$  (off),  $I_S$  (on)



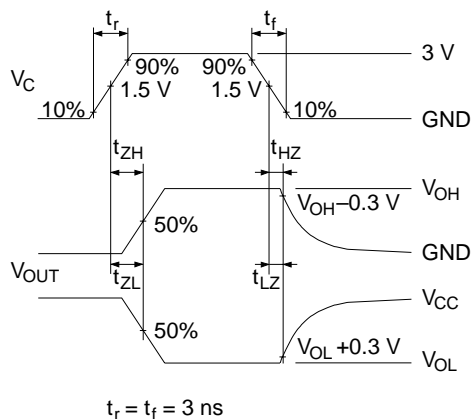
- $t_{PLH}, t_{PHL}$



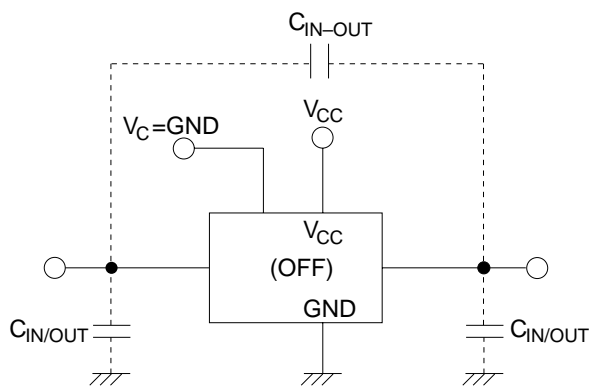
- $t_{ZH}, t_{ZL} / t_{HZ}, t_{LZ}$



Item	S1	S2
t <sub>ZH</sub>	V <sub>CC</sub>	GND
t <sub>ZL</sub>	GND	V <sub>CC</sub>
t <sub>HZ</sub>	V <sub>CC</sub>	GND
t <sub>LZ</sub>	GND	V <sub>CC</sub>



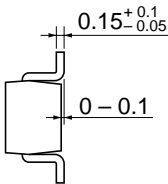
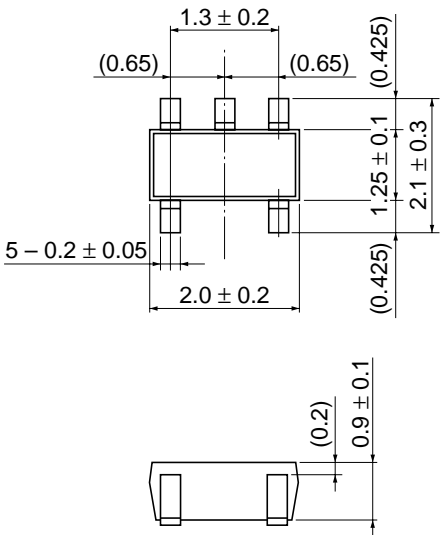
•  $C_{IN/OUT}$ ,  $C_{IN-OUT}$



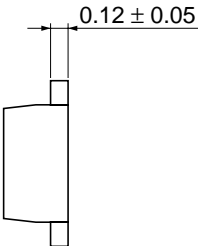
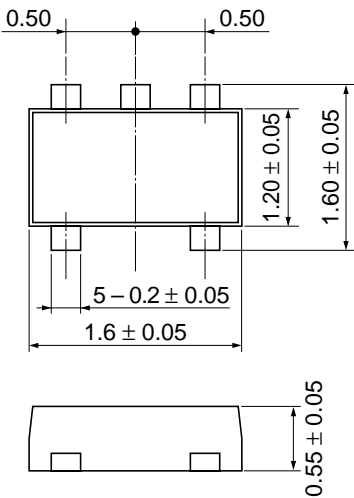


Package Dimensions

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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Semiconductor & Integrated Circuits.  
Nippon Bldg., 2-6-2, Ohite-machi, Chiyoda-ku, Tokyo 100-0004, Japan  
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL	North America	:	<a href="http://semiconductor.hitachi.com/">http://semiconductor.hitachi.com/</a>
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**For further information write to:**

Hitachi Semiconductor  
(America) Inc.  
179 East Tasman Drive,  
San Jose, CA 95134  
Tel: <1> (408) 433-1990  
Fax: <1> (408) 433-0223

Hitachi Europe GmbH  
Electronic Components Group  
Dornacher StraÙe 3  
D-85622 Feldkirchen, Munich  
Germany  
Tel: <49> (89) 9 9180-0  
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 585160

Hitachi Asia Ltd.  
16 Collyer Quay #20-00  
Hitachi Tower  
Singapore 049318  
Tel: 535-2100  
Fax: 535-1533

Hitachi Asia Ltd.  
Taipei Branch Office  
3rd Flr, Hung Kuo Building, No.167,  
Tun Hwa North Road, Taipei (105)  
Taiwan  
Tel: <886> (2) 2718-3666  
Fax: <886> (2) 2718-8180  
Telex: 23222 HAS-TP

Hitachi Asia (Hong Kong) Ltd.  
Group III (Electronic Components)  
7th Flr, North Tower, World Finance Centre,  
Harbour City, Canton Road, Tsim Sha Tsui,  
Kowloon, Hong Kong  
Tel: <852> (2) 735 9218  
Fax: <852> (2) 730 0281  
Telex: 40815 HITEC HX

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