
HD74LV1GT66A

Analog Switch

HITACHI

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

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.

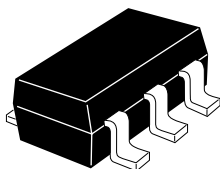
Features

- 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.

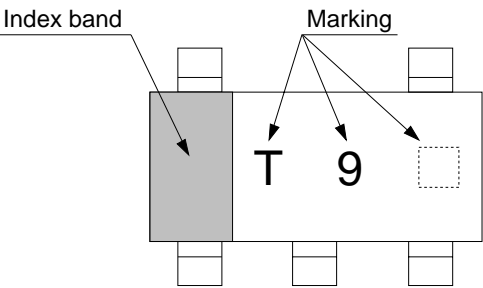
HD74LV1GT66A


Outline and Article Indication

• HD74LV1GT66A

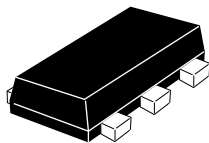


CMPAK-5

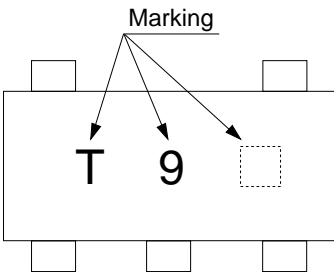



 = Control code
(— or blank)

• HD74LV1GT66A



VSON-5



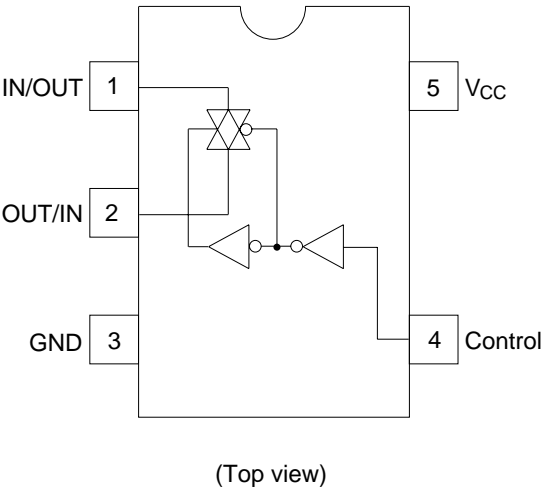
 = Control code

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 ^{*1}	V_I	−0.5 to 7.0	V	
Output voltage range ^{*1, 2}	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) ^{*3}	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	Ω	$V_{IN} = V_{CC}$ or GND $V_C = V_{IH}$ $I_T = 1 \text{ mA}$
Peak on resistance	$R_{ON(P)}$	4.5	—	50	100	—	—	125	Ω	$V_{IN} = V_{CC}$ to GND $V_C = V_{IH}$ $I_T = 1 \text{ mA}$
Off-state switch leakage current	$I_{s(OFF)}$	5.5	—	—	± 0.1	—	—	± 1.0	μA	$V_{IN} = V_{CC}$, $V_{OUT} = \text{GND}$ or $V_{IN} = \text{GND}$, $V_O = V_{CC}$, $V_C = V_{IL}$
On-state switch leakage current	$I_{s(ON)}$	5.5	—	—	± 0.1	—	—	± 1.0	μA	$V_{IN} = V_{CC}$ or GND $V_C = V_{IH}$
Input current	I_{IN}	0 to 5.5	—	—	± 0.1	—	—	± 1.0	μA	$V_{IN} = 5.5 \text{ V}$ or GND
Quiescent supply current	I_{CC}	5.5	—	—	—	—	—	10	μA	$V_{IN} = V_{CC}$ or GND
	ΔI_{CC}	5.5	—	—	—	—	—	1.5	mA	$V_{IN} = 3.4 \text{ V}$
Control input capacitance	C_{IC}	—	—	3.5	—	—	—	—	pF	
Switch terminal capacitance	$C_{IN/OUT}$	—	—	4.0	—	—	—	—	pF	
Feedthrough capacitance	C_{IN-OUT}	—	—	0.5	—	—	—	—	pF	

Switching Characteristics

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

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

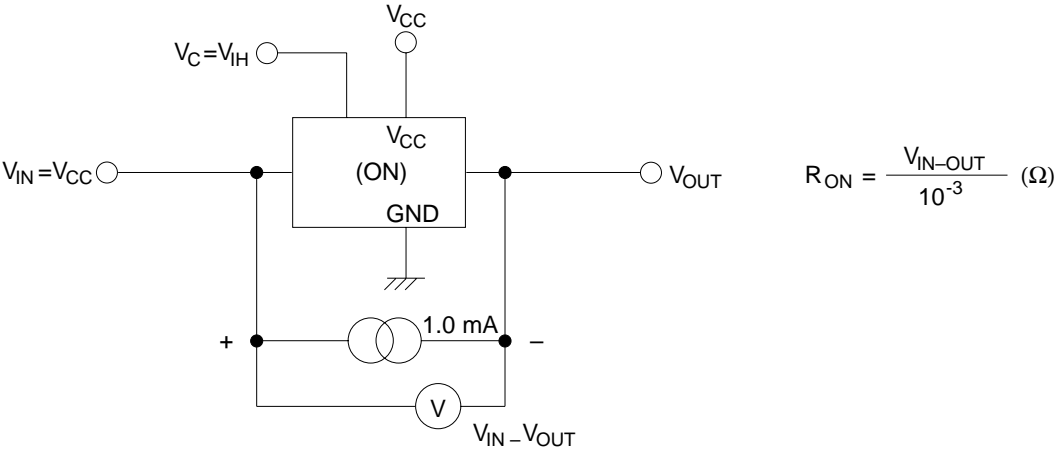
Operating Characteristics

- $C_L = 50\text{ pF}$

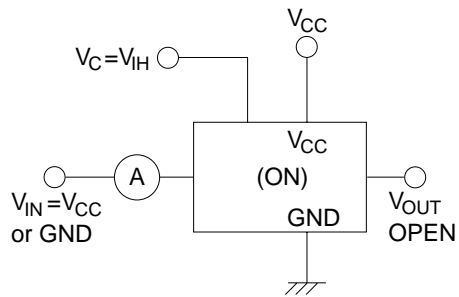
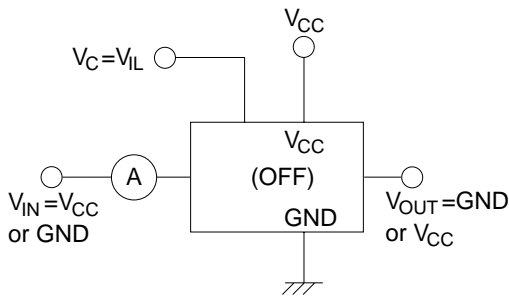
Item	Symbol	V _{cc} (V)	T _a = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C _{PD}	5.0	—	4.0	—	pF	f = 10 MHz

Test Circuit

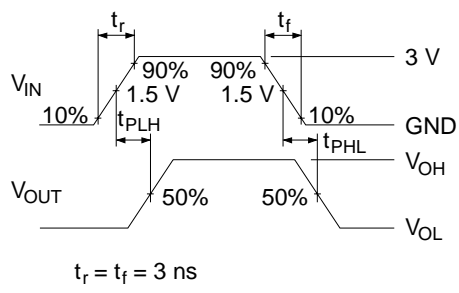
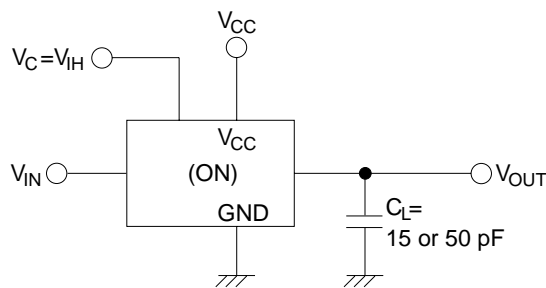
- R_{ON}



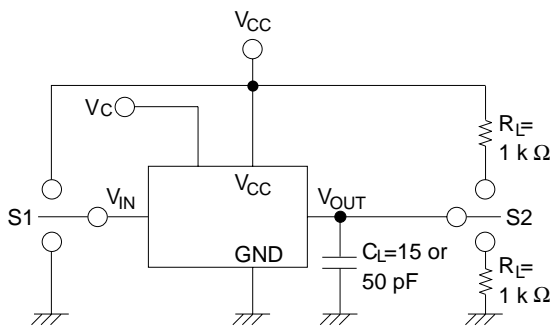
• I_S (off), I_S (on)



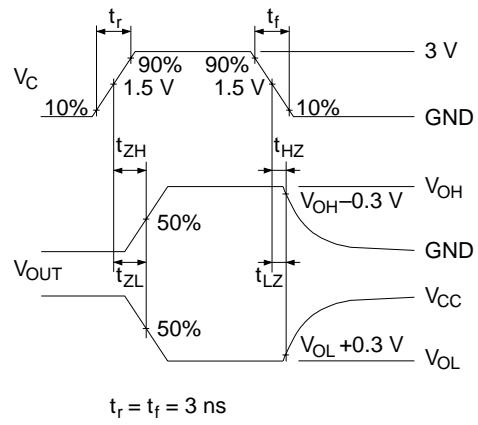
• t_{PLH} , t_{PHL}



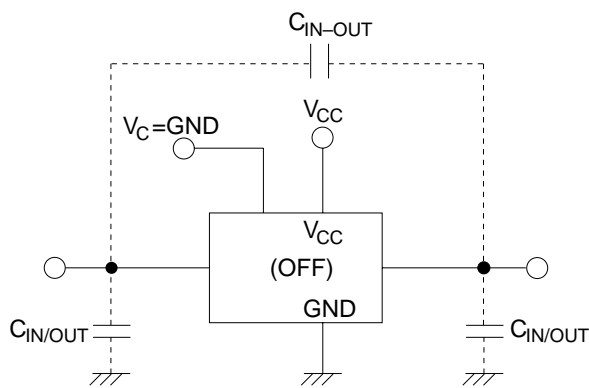
• t_{ZH} , t_{ZL} / t_{HZ} , t_{LZ}



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

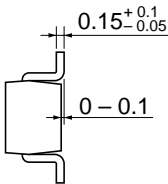
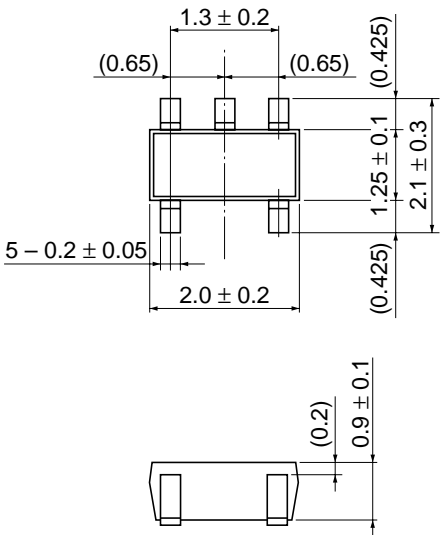


• $C_{IN/OUT}$, C_{IN-OUT}

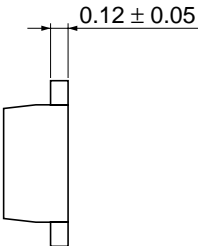
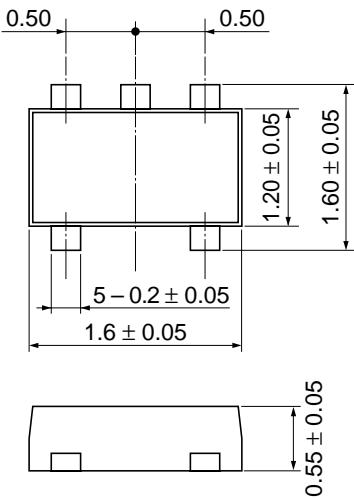


Package Dimensions

Unit : mm



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



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

Cautions

1. Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.
2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.
5. This product is not designed to be radiation resistant.
6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.
7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.

HITACHI

Hitachi, Ltd.

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	:	http://semiconductor.hitachi.com/
	Europe	:	http://www.hitachi-eu.com/hel/ecg
	Asia	:	http://www.hitachi.com.sg/grp3/sicd
	Japan	:	http://www.hitachi.co.jp/Sicd/indx.htm

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

Copyright ' Hitachi, Ltd., 2000. All rights reserved. Printed in Japan.
Colophon 1.0