

HD74HCT1G66

Analog Switch

HITACHI

ADE-205-308D (Z)

5th Edition
May 2001

Description

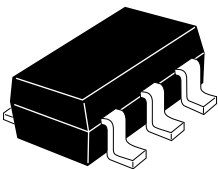
The HD74HCT1G66 is high speed CMOS analog switch using silicon gate CMOS process. With CMOS low power dissipation, it provides high speed. The device has low ON resistance for good transfer characteristics and can take wide range of input voltage.

Features

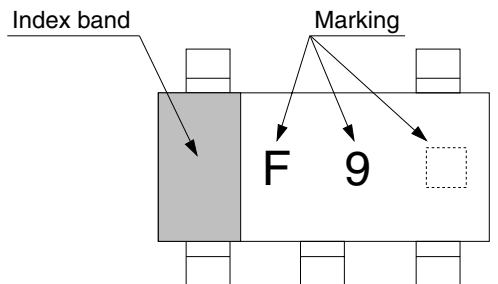
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Control input is TTL compatible input level.
Supply voltage range : 4.5 to 5.5 V
Operating temperature range : -40 to +85°C
- $|I_{OH}| = I_{OL} = 2 \text{ mA (min)}$

Outline and Article Indication

- HD74HCT1G66



CMPAK-5



HD74HCT1G66

Function Table

Control	Switch
L	OFF
H	ON

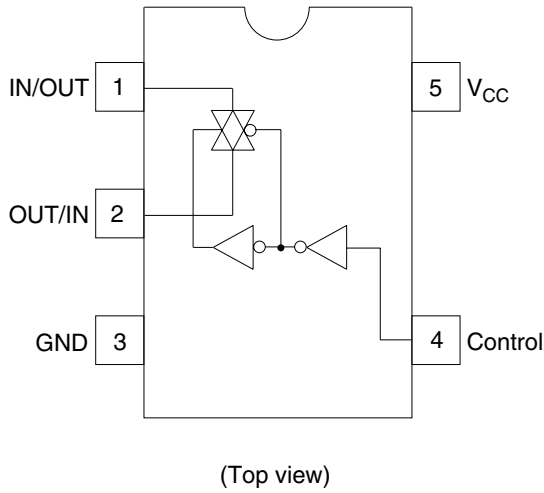
H : High level

L : Low level

$GND \leq V_{IN} \leq V_{CC}$

$GND \leq V_{OUT} \leq V_{CC}$

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 $V_{CC} + 0.5$	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	$V_I < 0$ or $V_I > V_{CC}$
Output clamp current	I_{OK}	± 20	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}	± 25	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	$^\circ\text{C}$	

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	Test Conditions
Supply voltage range	V_{CC}	4.5	5.5	V	
Input voltage range	V_I	0	5.5	V	
Output voltage range	V_{IO}	0	V_{CC}	V	
Input rise / fall time (Control input 0.3 V to 2.7 V)	t_r, t_f	0	500	ns	$V_{CC} = 4.5$ to 5.5 V
Operating temperature	T_a	-40	85	$^\circ\text{C}$	

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

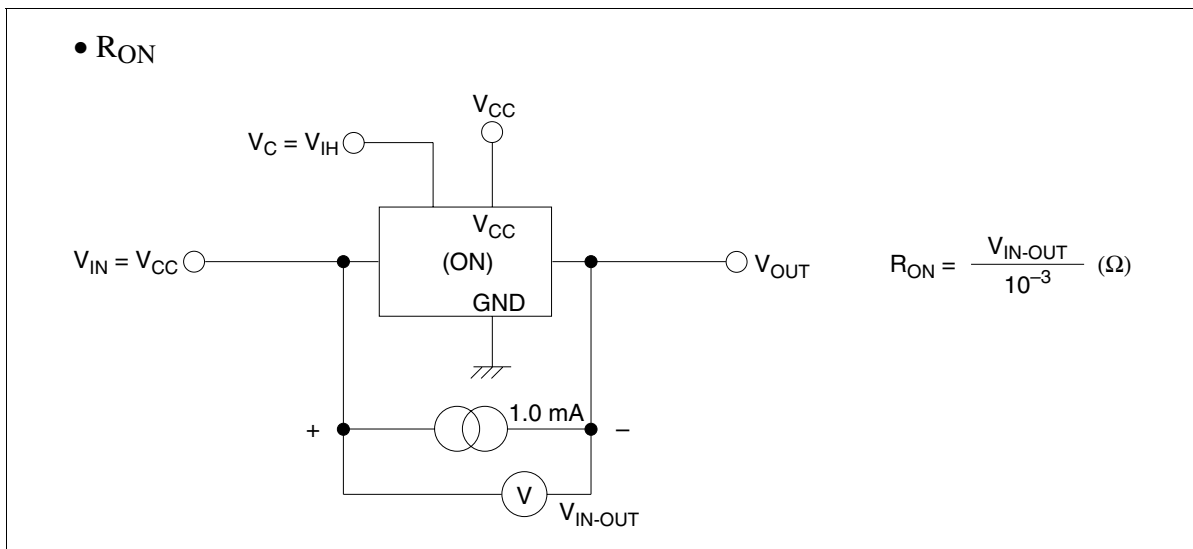
Electrical Characteristics

Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to 85°C		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Input voltage	V _{IH}	4.5 to 5.5	2.0	—	—	2.0	—	V	Control input only
	V _{IL}	4.5 to 5.5	—	—	0.8	—	0.8		
On resistance	R _{ON}	4.5 to 5.5	—	90	160	—	180	Ω	V _C = V _{IH} V _{IN} = V _{CC} or GND I _T = 1 mA
Peak on resistance	R _{ON} (p)	4.5 to 5.5	—	125	200	—	250	Ω	V _C = V _{IH} V _{IN} = 0 to V _{CC} I _{IN/OUT} = 1 mA
Leak current	I _S (off)	5.5	—	—	±0.1	—	±1.0	μA	V _C = V _{IL} V _{IN} = V _{CC} ; V _{OUT} = GND or V _{IN} = GND, V _{OUT} = V _{CC}
	I _S (on)	5.5	—	—	±0.1	—	±1.0	μA	V _C = V _{IH} V _{IN} = V _{CC} or GND
Input current	I _{IN}	5.5	—	—	±0.1	—	±1.0	μA	V _{IN} = V _{CC} or GND
Operating current	I _{CC}	5.5	—	—	1.0	—	10.0	μA	V _{IN} = V _{CC} or GND
Quiescent supply current	I _{CCT}	5.5	—	—	2.0	—	2.9	mA	V _C = 2.4 V, V _{IN} (switch) = V _{CC} or GND

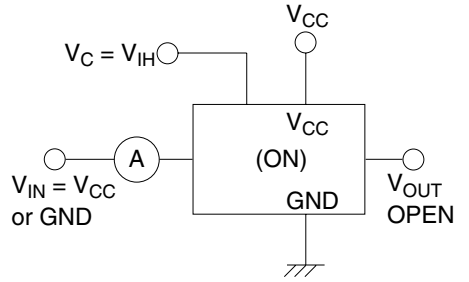
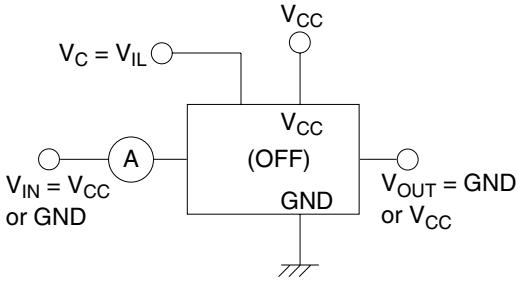
Switching Characteristics

Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to 85°C		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Propagation delay time	t _{PLH} , t _{PHL}	4.5	—	4	10	—	13	ns	R _L = 10 kΩ
Output enable time	t _{ZH} , t _{ZL}	4.5	—	10	23	—	29	ns	R _L = 1 kΩ
Output disable time	t _{HZ} , t _{LZ}	4.5	—	14	23	—	29	ns	R _L = 1 kΩ
Maximum control frequency		4.5	—	30	—	—	—	MHz	
Control input capacitance	C _{IN}		—	2.5	5	—	5	pF	
Switch I/O capacitance	C _{IN/OUT}		—	2.5	—	—	—	pF	
Feed through capacitance	C _{IN-OUT}		—	0.5	—	—	—	pF	
Power dissipation capacitance	C _{PD}		—	5	—	—	—	pF	

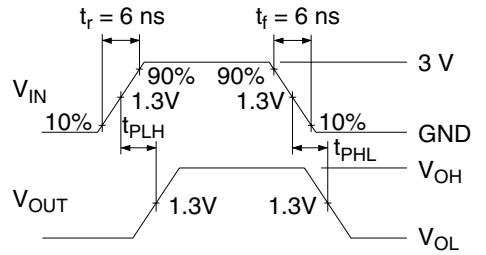
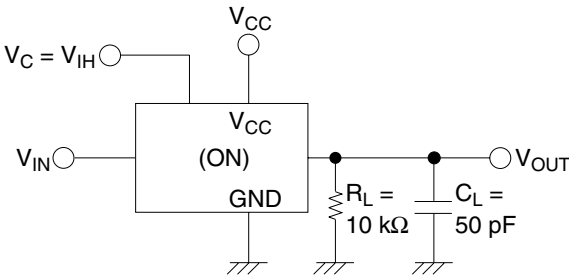
Test Circuit



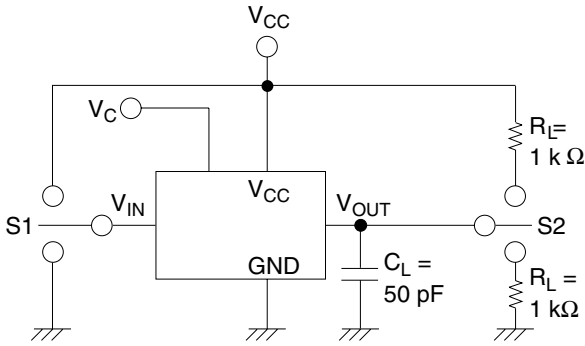
• I_S (off), I_S (on)



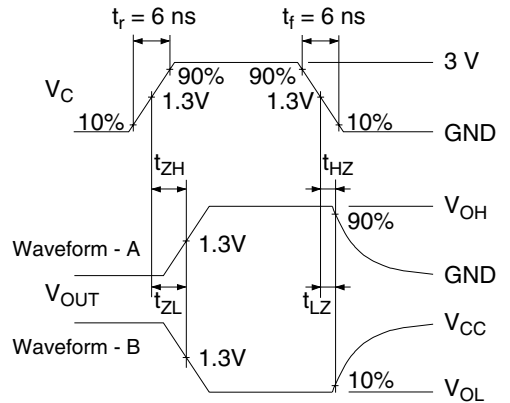
• t_{PLH} , t_{PHL}



• t_{ZH} , t_{ZL} / t_{HZ} , t_{LZ}

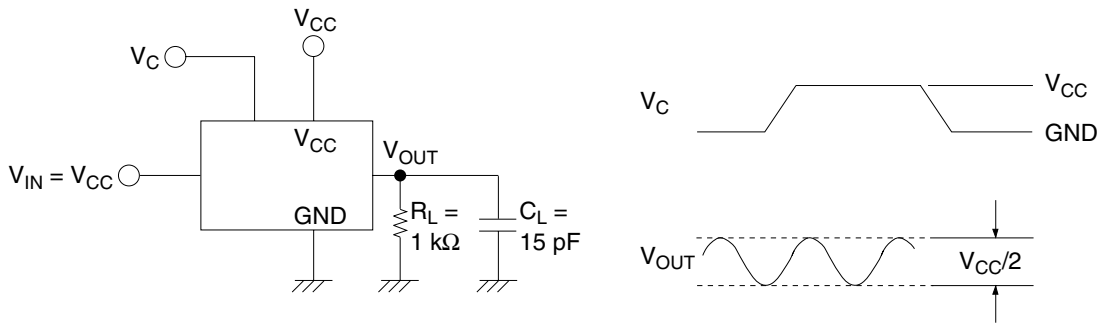


Item	S1	S2
t_{ZH}	V_{CC}	GND
t_{ZL}	GND	V_{CC}
t_{HZ}	V_{CC}	GND
t_{LZ}	GND	V_{CC}

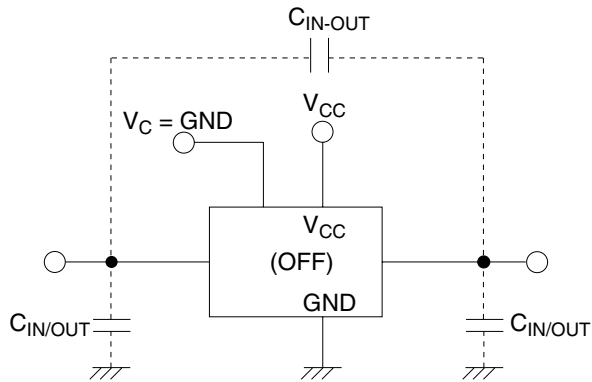


- Notes: 1. Waveform - A is for an output with internal conditions such that the output is high except when disabled by the output control.
 2. Waveform - B is for an output with internal conditions such that the output is low except when disabled by the output control.

• Maximum control frequency



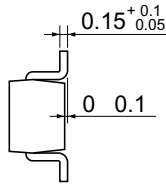
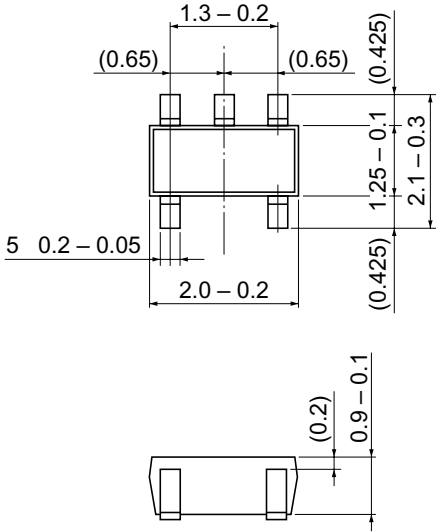
• $C_{IN/OUT}$, C_{IN-OUT}



Package Dimensions

As of January, 2001

Unit: mm



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

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HITACHI

Hitachi, Ltd.

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

URL	North America	: http://semiconductor.hitachi.com/
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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 Ltd. Electronic Components Group Whitebrook Park Lower Cookham Road Maidenhead Berkshire SL6 8YA, United Kingdom Tel: <44> (1628) 585000 Fax: <44> (1628) 585200	Hitachi Europe GmbH Electronic Components Group Dornacher Straße 3 D-85622 Feldkirchen, Munich Germany Tel: <49> (89) 9 9180-0 Fax: <49> (89) 9 29 30 00
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Hitachi Asia Ltd. Hitachi Tower 16 Collyer Quay #20-00 Singapore 049318 Tel: <65>-538-6533/538-8577 Fax: <65>-538-6933/538-3877 URL: http://www.hitachi.com.sg
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Hitachi Asia Ltd. (Taipei Branch Office) 4/F, No. 167, Tun Hwa North Road Hung-Kuo Building Taipei (105), Taiwan Tel: <886>-(2)-2718-3666 Fax: <886>-(2)-2718-8180 Telex: 23222 HAS-TP URL: http://www.hitachi.com.tw

Hitachi Asia (Hong Kong) Ltd. Group III (Electronic Components) 7/F., 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 URL: http://semiconductor.hitachi.com.hk
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