

HD74HCT1G66

Analog Switch

HITACHI

ADE-205-308C (Z)
4th. Edition
April 2001

Description

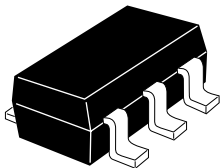
The HD74HCT1G66 is high speed CMOS analog switch using silicon gate CMOS process. With CMOS low power dissipation, it provides high speed. The device has low ON resistance for good transfer characteristics and can take wide range of input voltage.

Features

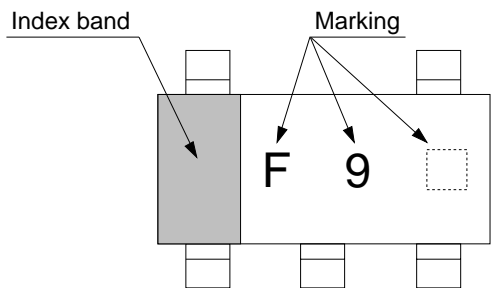
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Control input is TTL compatible input level.
Supply voltage range : 4.5 to 5.5 V
Operating temperature range : -40 to +85°C
- $|I_{OH}| = I_{OL} = 2 \text{ mA (min)}$

Outline and Article Indication

- HD74HCT1G66



CMPAK-5



□ = Control code
(— or blank)

Function Table

Control	Switch
L	OFF
H	ON

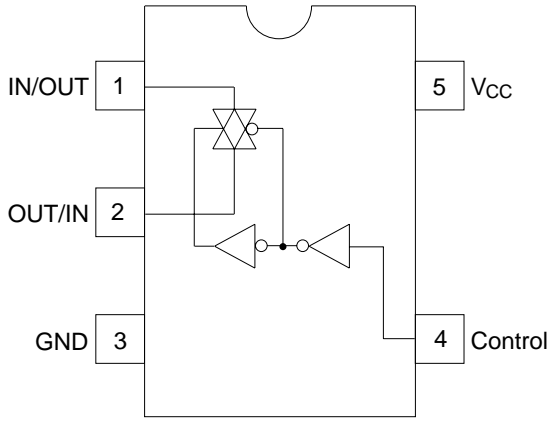
H : High level

L : Low level

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

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

Pin Arrangement



(Top view)

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 P_T at $T_a = 25^\circ\text{C}$ (in still air) ^{*3}		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.

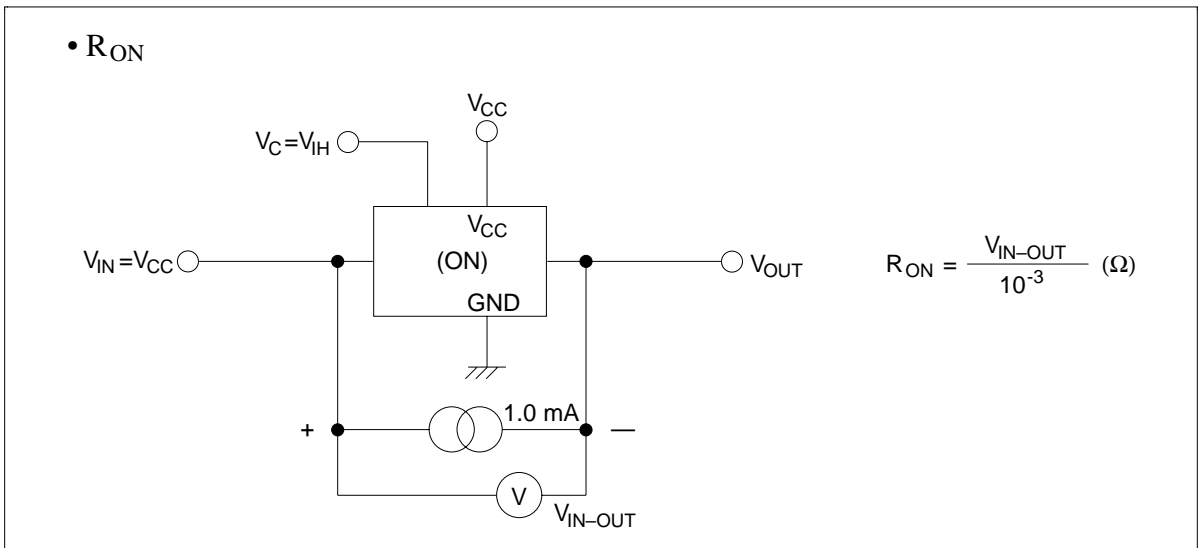
Electrical Characteristics

Item	Symbol	V_{CC} (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		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	—	100	200	—	250	Ω	$V_C = V_{IH}$ $V_{IN} = 0 \text{ to } V_{CC}$ $I_{IN/OUT} = 1 \text{ mA}$
Leak current	I_S (off)	5.5	—	—	± 0.1	—	± 1.0	μA	$V_C = V_{IL}$ $V_{IN} = V_{CC}, V_{OUT} = \text{GND}$ or $V_{IN} = \text{GND}, V_{OUT} = V_{CC}$
	I_S (on)	5.5	—	—	± 0.1	—	± 1.0	μA	$V_C = V_{IH}$ $V_{IN} = V_{CC} \text{ or } \text{GND}$
Input current	I_{IN}	5.5	—	—	± 0.1	—	± 1.0	μA	$V_{IN} = V_{CC} \text{ or } \text{GND}$
Operating current	I_{CC}	5.5	—	—	1.0	—	10.0	μA	$V_{IN} = V_{CC} \text{ or } \text{GND}$
Quiescent supply current	I_{CCT}	5.5	—	—	2.0	—	2.9	mA	$V_C = 2.4 \text{ V},$ $V_{IN} (\text{switch}) = V_{CC} \text{ or } \text{GND}$

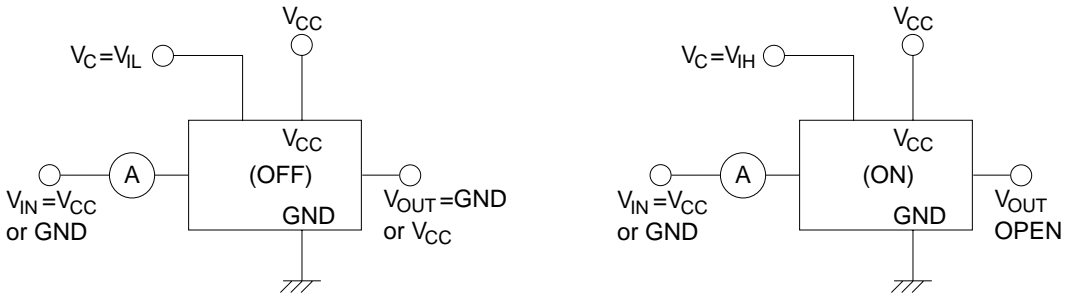
Switching Characteristics

Item	Symbol	V _{CC} (V)	T _a = 25°C			T _a = -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	

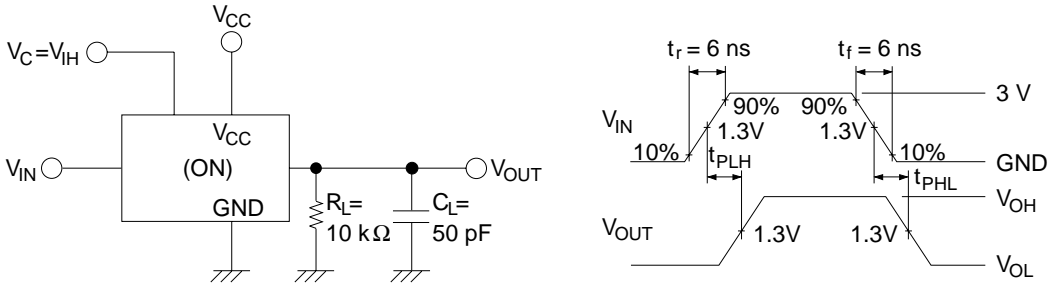
Test Circuit



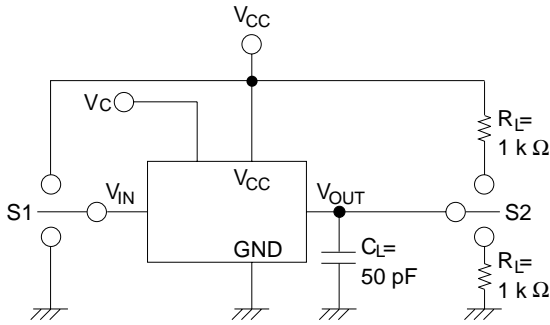
• I_S (off), I_S (on)



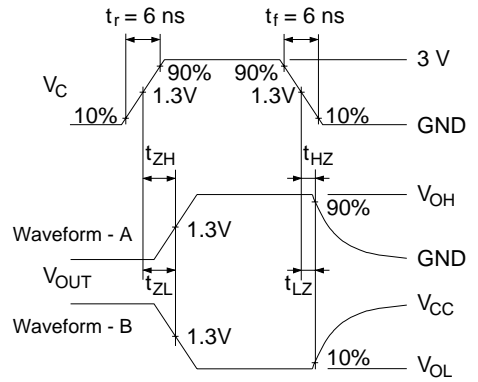
• t_{PLH} , t_{PHL}



• $t_{ZH}, t_{ZL} / t_{HZ}, t_{LZ}$

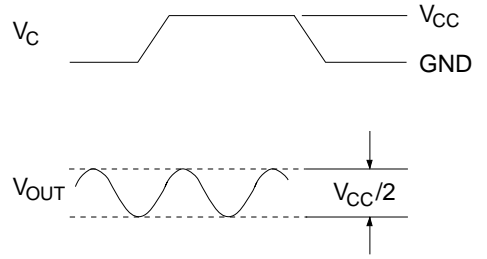
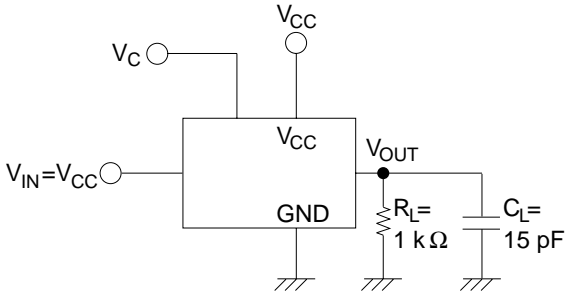


Item	S1	S2
t_{ZH}	V_{CC}	GND
t_{ZL}	GND	V_{CC}
t_{HZ}	V_{CC}	GND
t_{LZ}	GND	V_{CC}

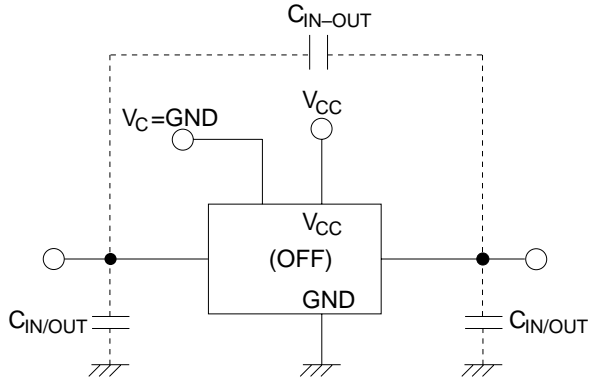


- Notes: 1. Waveform — A is for an output with internal conditions such that the output is high except when disabled by the output control.
 2. Waveform — B is for an output with internal conditions such that the output is low except when disabled by the output control.

- Maximum control frequency

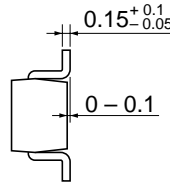
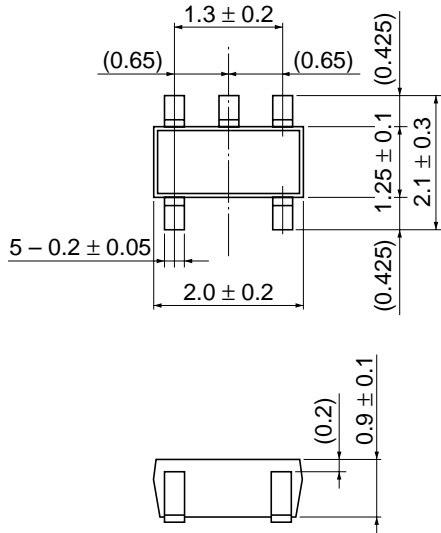


- $C_{IN/OUT}$, C_{IN-OUT}



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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