

To all our customers

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Customer Support Dept.  
April 1, 2003

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# HD74HC1G66

## Analog Switch



ADE-205-314F (Z)

7th. Edition  
Feb. 2003

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### Description

The HD74HC1G66 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

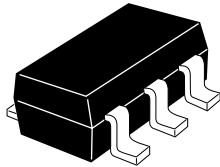
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Electrical characteristics equivalent to the HD74HC4066
  - Supply voltage range : 2 to 6 V
  - Operating temperature range : -40 to +85°C
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HC1G66CME	CMPAK-5 pin	CMPAK-5A	CM	E (3,000 pcs/reel)

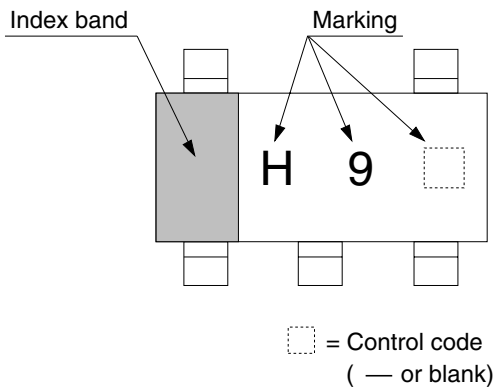
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Outline and Article Indication

• HD74HC1G66



CMPAK-5

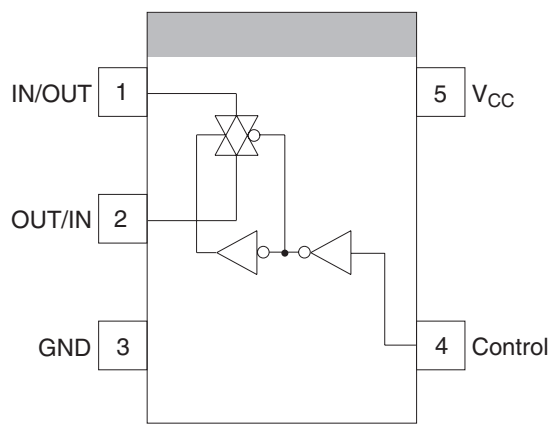


Function Table

Control	Switch
L	OFF
H	ON

H : High level  
L : Low level  
GND •  $V_{IN}$  •  $V_{CC}$   
GND •  $V_{OUT}$  •  $V_{CC}$

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 <sup>*1</sup>	$V_I$	−0.5 to $V_{CC} + 0.5$	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	$V_I < 0$ 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) <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	Test Conditions
Supply voltage range	$V_{CC}$	2	6	V	
Input voltage range	$V_{IO}$	0	$V_{CC}$	V	
Output voltage range	$V_O$	0	$V_{CC}$	V	
Input rise / fall time (Control input 10% to 90%)	$t_r, t_f$	0	1000	ns	$V_{CC} = 2.0\text{ V}$
		0	500		$V_{CC} = 4.5\text{ V}$
		0	400		$V_{CC} = 6.0\text{ V}$
Operating temperature	$T_a$	−40	85	°C	

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

**Electrical Characteristics**

Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to 85°C		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Input voltage	V <sub>IH</sub>	2.0	1.5	—	—	1.5	—	V	Control input only
		4.5	3.15	—	—	3.15	—		
		6.0	4.2	—	—	4.2	—		
	V <sub>IL</sub>	2.0	—	—	0.5	—	0.5		
		4.5	—	—	1.35	—	1.35		
		6.0	—	—	1.8	—	1.8		
On resistance	R <sub>ON</sub>	2.0	—	200	450	—	550	Ω	V <sub>C</sub> = V <sub>IH</sub> V <sub>IN</sub> = V <sub>CC</sub> or GND I <sub>T</sub> = 1 mA
		4.5	—	90	160	—	180		
		6.0	—	80	130	—	140		
Peak on resistance	R <sub>ON</sub> (p)	2.0	—	600	1500	—	2000	Ω	V <sub>C</sub> = V <sub>IH</sub> V <sub>IN</sub> = 0 to V <sub>CC</sub> I <sub>IN/OUT</sub> = 1 mA
		4.5	—	125	200	—	250		
		6.0	—	100	170	—	210		
Leak current	I <sub>S</sub> (off)	6.0	—	—	±0.1	—	±1.0	μA	V <sub>C</sub> = V <sub>IL</sub> V <sub>IN</sub> = V <sub>CC</sub> , V <sub>OUT</sub> = GND or V <sub>IN</sub> = GND, V <sub>OUT</sub> = V <sub>CC</sub>
	I <sub>S</sub> (on)	6.0	—	—	±0.1	—	±1.0	μA	V <sub>C</sub> = V <sub>IH</sub> V <sub>IN</sub> = V <sub>CC</sub> or GND
Input current	I <sub>IN</sub>	6.0	—	—	±0.1	—	±1.0	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND
Operating current	I <sub>CC</sub>	6.0	—	—	1.0	—	10.0	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND

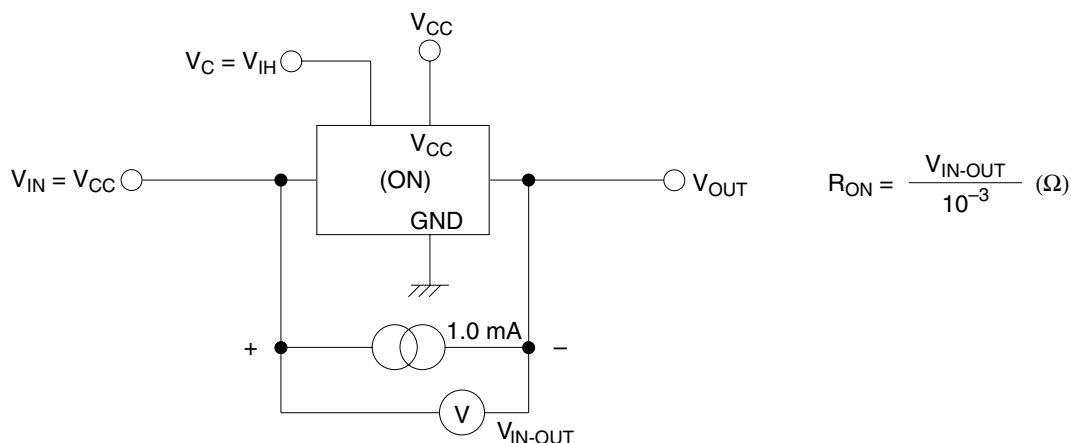
## Switching Characteristics

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		
Propagation delay time	$t_{PLH}, t_{PHL}$	2.0	—	—	50	—	65	ns	$R_L = 10 \text{ k}\Omega$
		4.5	—	4	10	—	13		
		6.0	—	—	9	—	11		
Output enable time	$t_{ZH}, t_{ZL}$	2.0	—	—	115	—	145	ns	$R_L = 1 \text{ k}\Omega$
		4.5	—	10	23	—	29		
		6.0	—	—	20	—	25		
Output disable time	$t_{HZ}, t_{LZ}$	2.0	—	—	115	—	145	ns	$R_L = 1 \text{ k}\Omega$
		4.5	—	14	23	—	29		
		6.0	—	—	20	—	25		
Maximum control frequency		2.0	—	20	—	—	—	MHz	
		4.5	—	30	—	—	—		
		6.0	—	30	—	—	—		
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	

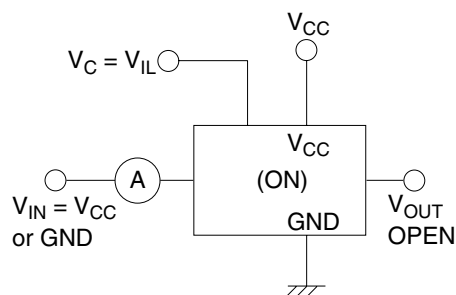
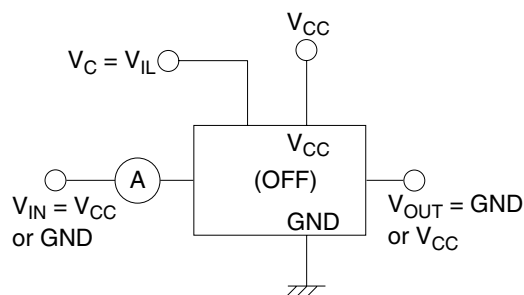
(C<sub>L</sub> = 50 pF, t<sub>r</sub> = t<sub>f</sub> = 6 ns)

## Test Circuit

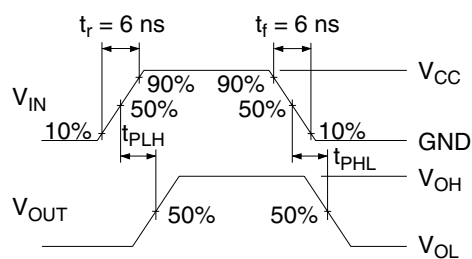
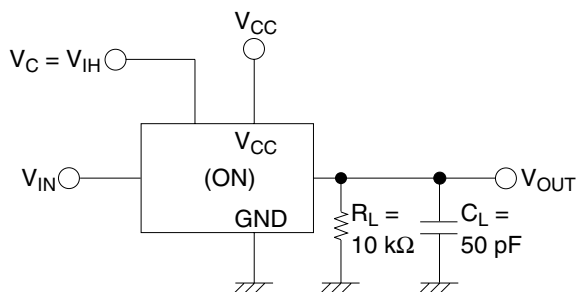
### • $R_{ON}$



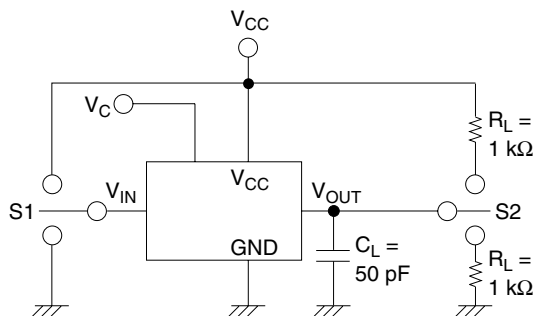
### • $I_S$ (off), $I_S$ (on)



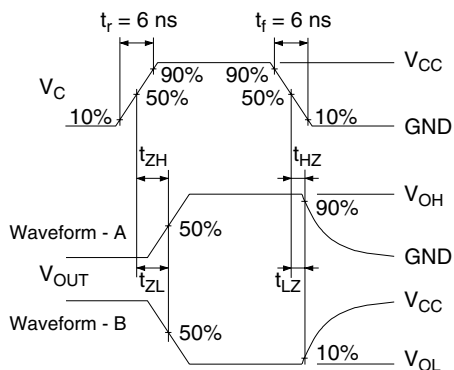
### • $t_{PLH}$ , $t_{PHL}$



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

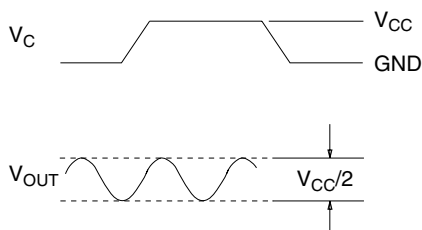
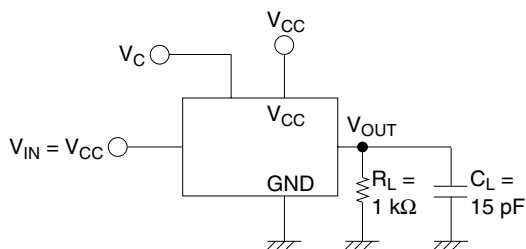


Item	S1	S2
$t_{ZH}$	$V_{CC}$	GND
$t_{ZL}$	GND	$V_{CC}$
$t_{HZ}$	$V_{CC}$	GND
$t_{LZ}$	GND	$V_{CC}$

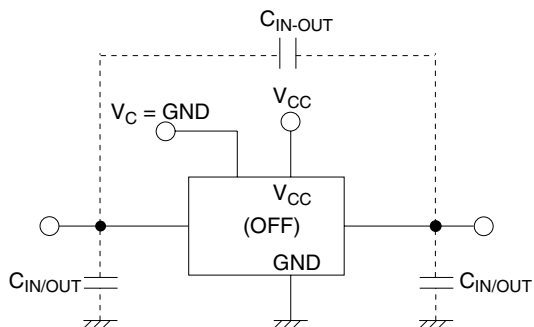


- Notes: 1. Waveform - A is for an output with internal conditions such that the output is high except when disabled by the output control.  
2. Waveform - B is for an output with internal conditions such that the output is low except when disabled by the output control.

• Maximum control frequency

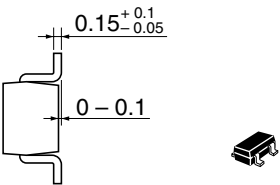
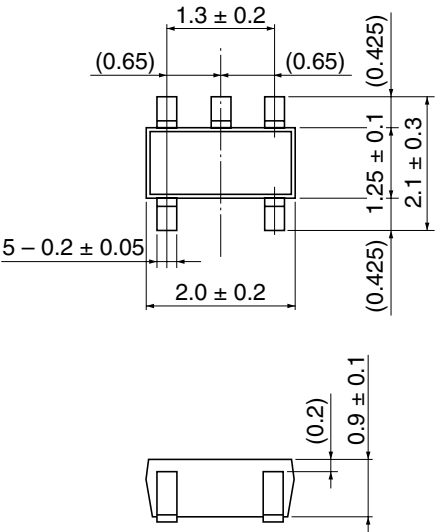


•  $C_{IN/OUT}$ ,  $C_{IN-OUT}$



Package Dimensions

Unit: mm



\*Sn-Bi plating

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

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