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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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HD74HCT1G66

Analog Switch

ADE-205-308E (Z)

6th. Edition
Feb. 2003

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.

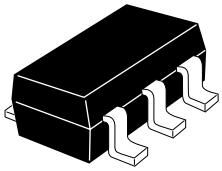
Features

- 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 mA (min)
- Ordering Information

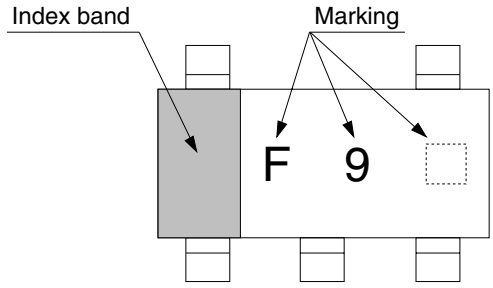
Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HCT1G66CME	CMPAK-5 pin	CMPAK-5V	CM	E (3,000 pcs/reel)

Outline and Article Indication

• HD74HCT1G66



CMPAK-5



= Control code
(— or blank)

Function Table

Control	Switch
L	OFF
H	ON

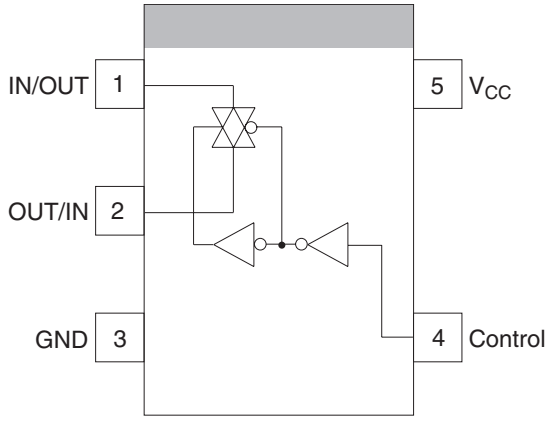
H : High level

L : Low level

GND • 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 *[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 Ta = 25°C (in still air) *[3]	P_T	200	mW	
Storage temperature	Tstg	–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}	4.5	5.5	V	
Input voltage range	V_I	0	5.5	V	
Output voltage range	$V_{I/O}$	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	Ta	–40	85	°C	

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

Electrical Characteristics

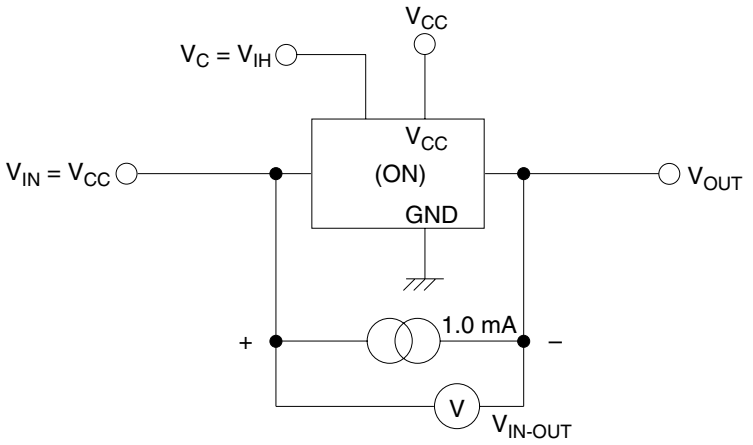
Item	Symbol	V_{CC} (V)	Ta = 25°C Min	Typ	Max	Ta = –40 to 85°C Min	Max	Unit	Test Conditions
Input voltage	V_{IH}	4.5 to 5.5	2.0	—	—	2.0	—	V	Control input only
	V_{IL}	4.5 to 5.5	—	—	0.8	—	0.8		
On resistance	R_{ON}	4.5 to 5.5	—	90	160	—	180	Ω	$V_C = V_{IH}$ $V_{IN} = V_{CC}$ or GND I_T = 1 mA
Peak on 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 Min	Typ	Max	Ta = –40 to 85°C Min	Max	Unit	Test Conditions
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	

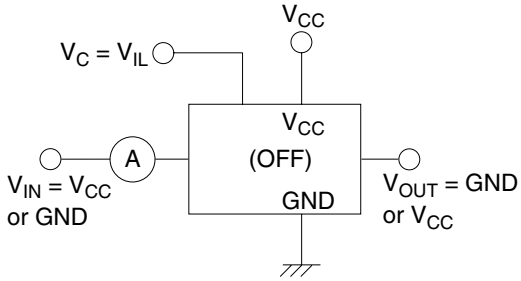
Test Circuit

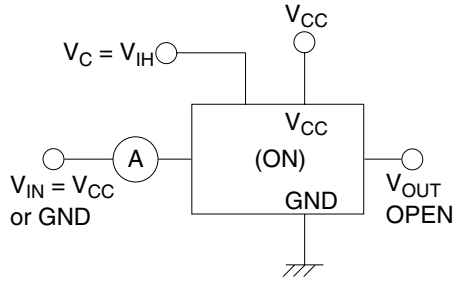
• R_{ON}



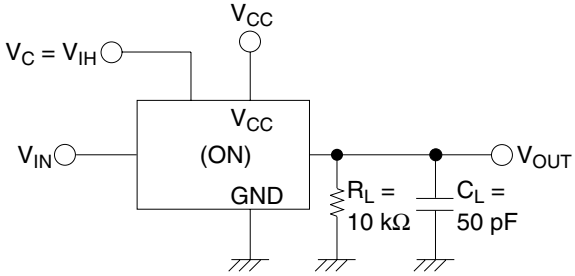
$$R_{ON} = \frac{V_{IN\text{-}OUT}}{10^{-3}} \ (\Omega)$$

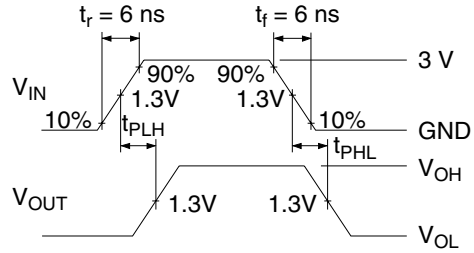
• I_S (off), I_S (on)



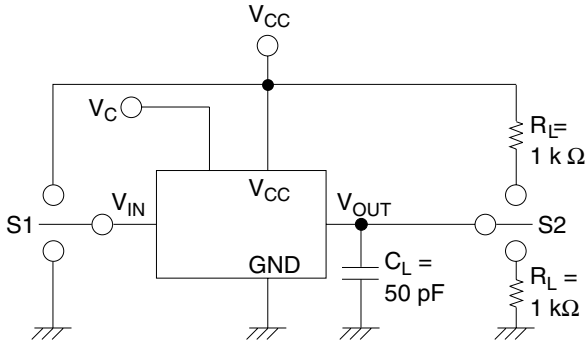


• t_{PLH}, t_{PHL}

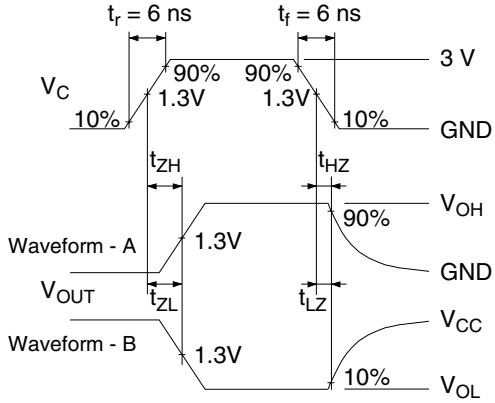




• t_{ZH}, t_{ZL} / t_{HZ}, t_{LZ}

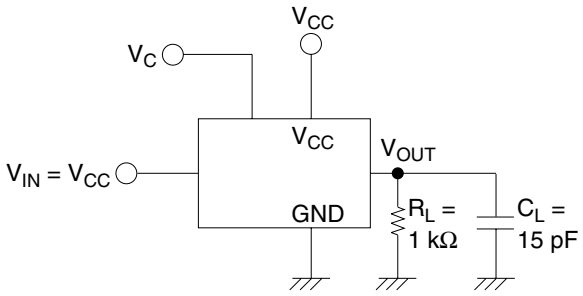


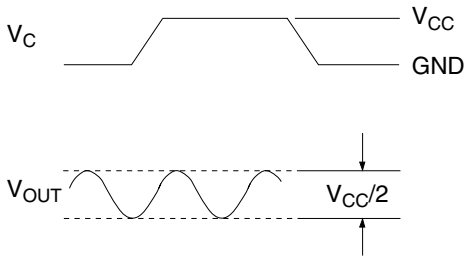
Item	S1	S2
t_{ZH}	V_{CC}	GND
t_{ZL}	GND	V_{CC}
t_{HZ}	V_{CC}	GND
t_{LZ}	GND	V_{CC}



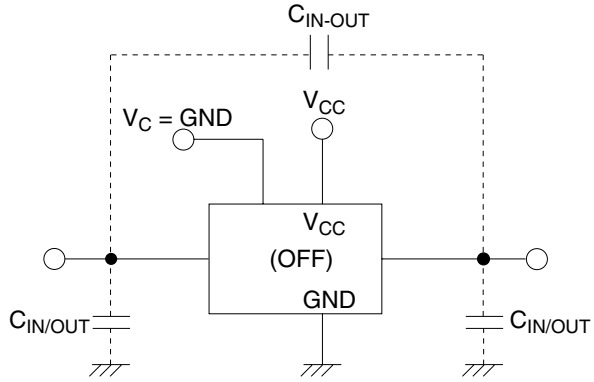
Notes: 1. Waveform - A is for an output with internal conditions such that the output is high except when disabled by the output control.
2. Waveform - B is for an output with internal conditions such that the output is low except when disabled by the output control.

• Maximum control frequency



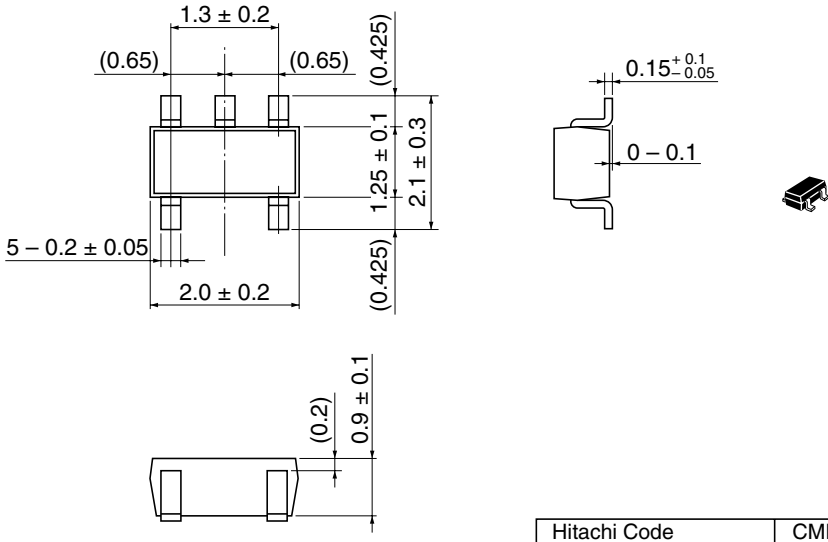


• $C_{IN/OUT}$, C_{IN-OUT}



Package Dimensions

Unit: mm



*Sn-Bi plating

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

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