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

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HD74LV1GT66A

Analog Switch



ADE-205-565E (Z)

6th. Edition
Feb. 2003

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

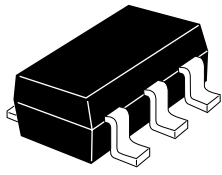
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Control input is TTL compatible input level.
Supply voltage range : 4.5 to 5.5 V
Operating temperature range : -40 to +85°C
- Control inputs V_{IH} (Max.) = 5.5 V (@ V_{CC} = 0 V to 5.5 V)
- Control inputs has hysteresis voltage for the slow transition.
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LV1GT66ACME	CMPAK-5 pin	CMPAK-5V	CM	E (3,000 pcs/reel)
HD74LV1GT66AVSE	VSON-5 pin	TNP-5DV	VS	E (3,000 pcs/reel)

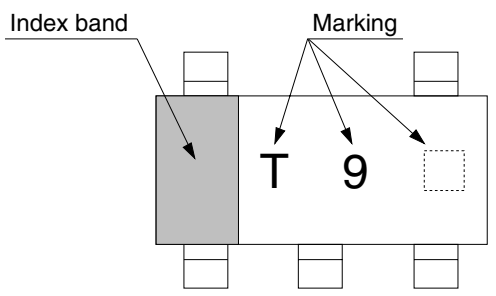
Note: Please consult the sales office for the above package availability.

Outline and Article Indication

• HD74LV1GT66A

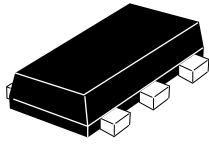


CMPAK-5

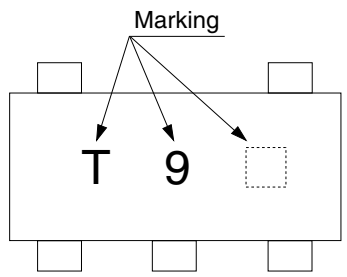


□ = Control code
(— or blank)

• HD74LV1GT66A



VSON-5



□ = Control code

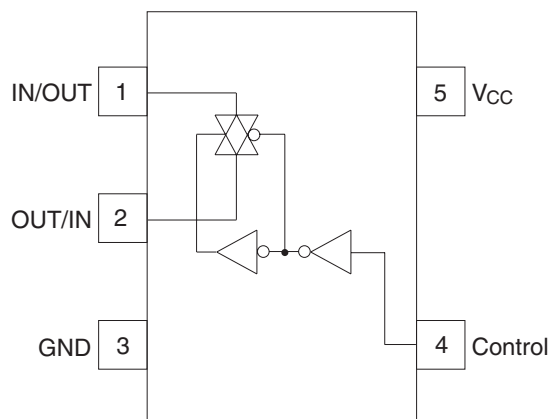
Function Table

Control	Switch
L	OFF
H	ON

H : High level

L : Low level

Pin Arrangement



(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 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	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	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_{IO}	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 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	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	
Feed through capacitance	C_{IN-OUT}	—	—	0.5	—	—	—	—	pF	

Switching Characteristics

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

Item	Symbol	Ta = 25°C			Ta = -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 pF

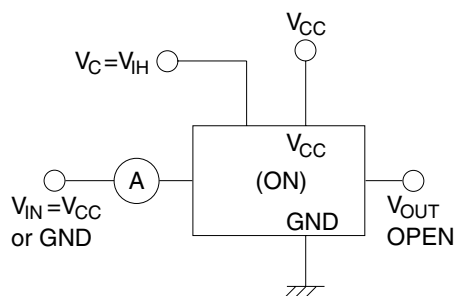
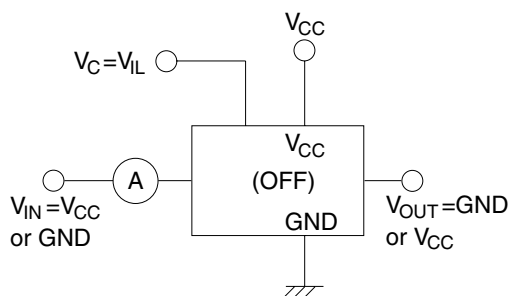
Item	Symbol	V _{CC} (V)	Ta = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C _{PD}	5.0	—	4.0	—	pF	f = 10 MHz

Test Circuit

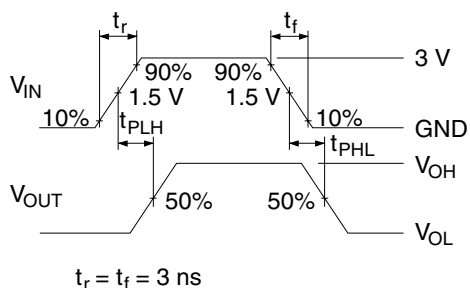
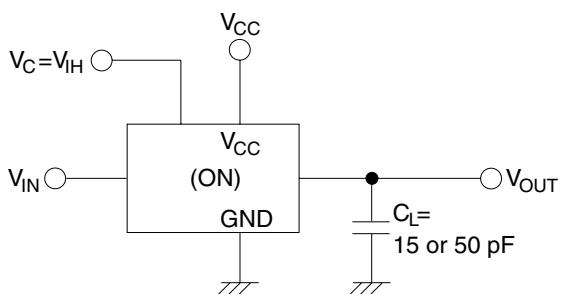
- R_{ON}

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

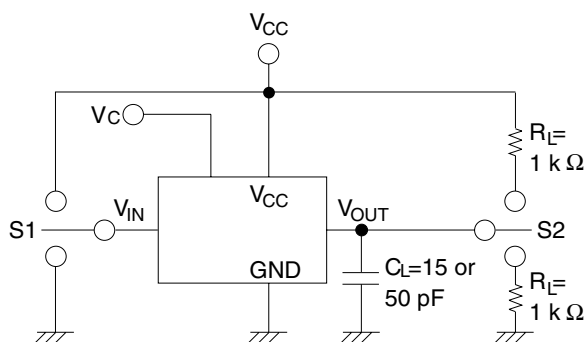
- I_S (off), I_S (on)



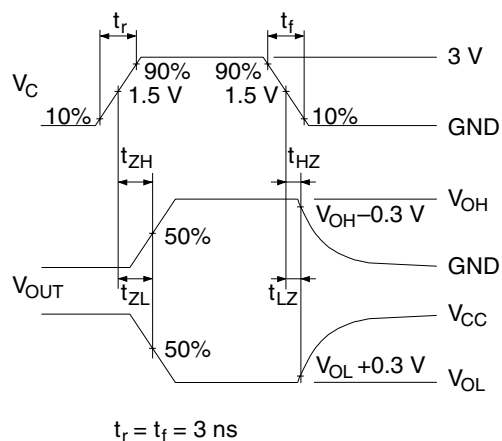
- t_{PLH} , t_{PHL}



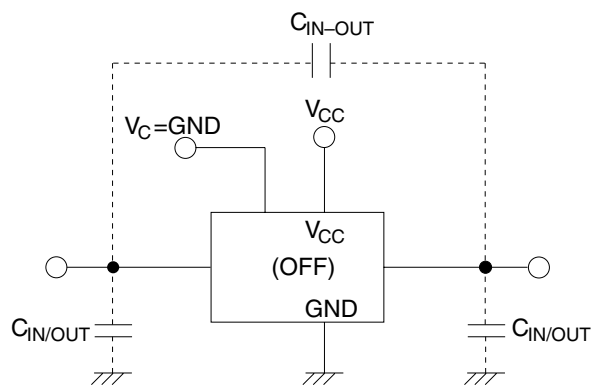
- t_{ZH} , t_{ZL} / t_{HZ} , t_{LZ}



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

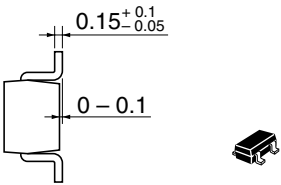
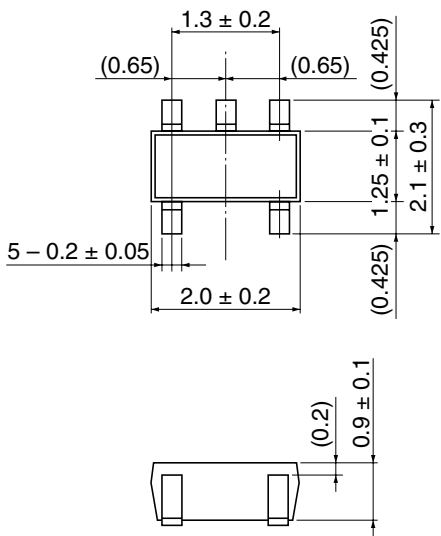


• $C_{IN/OUT}$, C_{IN-OUT}



Package Dimensions

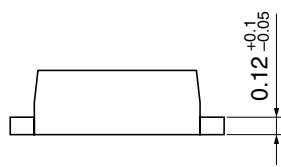
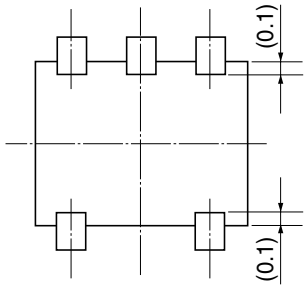
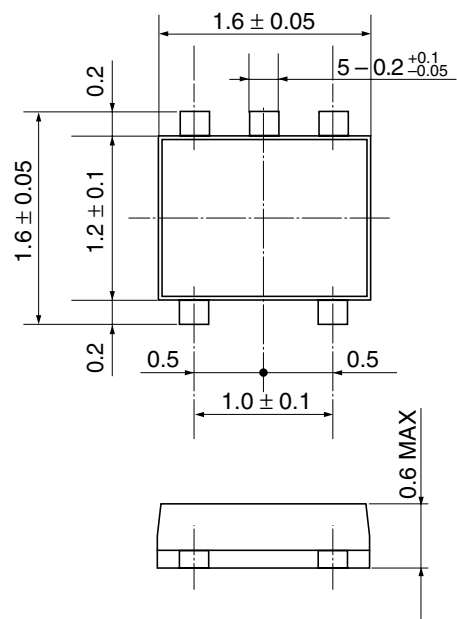
Unit: mm



*Sn-Bi plating

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

Unit: mm



*Sn-Bi plating

Hitachi Code	TNP-5DV
JEDEC	—
JEITA	—
Mass (reference value)	0.002 g

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