HD74LV2G66A

2–channel Analog Switch

HITACHI

ADE-205-566A (Z)
2nd. Edition
October 2000

Description

The HD74LV2G66A has 2–channel analog switch in a 8 pin package. Each switch section has its own enable input control (C). High level voltage applied to C turns on the associated 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.

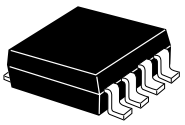
Features

- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Electrical characteristics equivalent to the HD74LV4066A
  Supply voltage range : 1.65 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.

Hitachi semiconductor

Outline and Article Indication

• HD74LV2G66A



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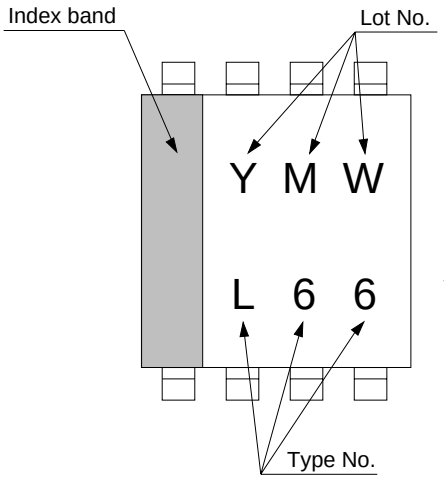


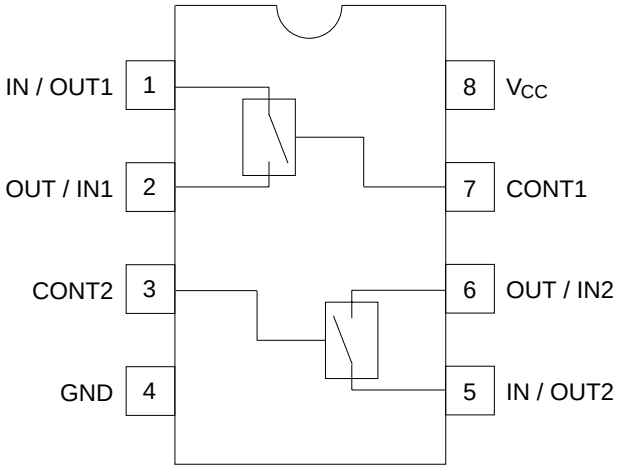
Y : Year code
(the last digit of year)
M : Month code
W : Week code

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 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	Conditions
Supply voltage range	V_{CC}	1.65	5.5	V	
Input voltage range	V_I	0	5.5	V	
Input / output voltage range	$V_{I/O}$	0	V_{CC}	V	
Input transition rise or fall rate	$\Delta t / \Delta v$	0	300	ns / V	V_{CC} = 1.65 to 1.95 V
		0	200		V_{CC} = 2.3 to 2.7 V
		0	100		V_{CC} = 3.0 to 3.6 V
		0	20		V_{CC} = 4.5 to 5.5 V
Operating free-air temperature	T_a	–40	85	°C	

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

Electrical Characteristic

Item	Symbol	V_{CC} (V)	T_a = 25°C			T_a = –40 to 85°C			Unit	Test Conditions
			Min	Typ	Max	Min	Typ	Max		
Input voltage	V_{IH}	1.65 to 1.95	—	—	—	V_{CC}×0.75	—	—	V	Control input only
		2.3 to 2.7	—	—	—	V_{CC}×0.7	—	—		
		3.0 to 3.6	—	—	—	V_{CC}×0.7	—	—		
		4.5 to 5.5	—	—	—	V_{CC}×0.7	—	—		
	V_{IL}	1.65 to 1.95	—	—	—	—	—	V_{CC}×0.25		
		2.3 to 2.7	—	—	—	—	—	V_{CC}×0.3		
		3.0 to 3.6	—	—	—	—	—	V_{CC}×0.3		
		4.5 to 5.5	—	—	—	—	—	V_{CC}×0.3		
Hysteresis voltage	V_H	1.8	—	—	—	—	0.25	—	V	$V_T^+ – V_T^-$
		2.5	—	—	—	—	0.30	—		
		3.3	—	—	—	—	0.35	—		
		5.0	—	—	—	—	0.45	—		
On-state switch resistance	R_{ON}	1.65	—	120	360	—	—	450	Ω	V_{IN} = V_{CC} or GND V_C = V_{IH} I_T = 1 mA
		2.3	—	60	180	—	—	225		
		3.0	—	50	150	—	—	190		
		4.5	—	40	75	—	—	100		
Peak on resistance	$R_{ON (P)}$	1.65	—	400	1100	—	—	1400	Ω	V_{IN} = V_{CC} to GND V_C = V_{IH} I_T = 1 mA
		2.3	—	200	500	—	—	600		
		3.0	—	90	180	—	—	225		
		4.5	—	50	100	—	—	125		
Difference of on- state resistance between switches	ΔR_{ON}	1.65	—	40	120	—	—	160	Ω	V_{IN} = V_{CC} to GND V_C = V_{IH} I_T = 1 mA
		2.3	—	20	30	—	—	40		
		3.0	—	10	20	—	—	30		
		4.5	—	7	15	—	—	20		
Off-state switch leakage current	$I_{s (OFF)}$	5.5	—	—	±0.1	—	—	±1.0	µA	V_{IN} = V_{CC}, V_{OUT} = GND or V_{IN} = 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 V or GND
Quiescent supply current	I_{CC}	5.5	—	—	—	—	—	10	µA	V_{IN} = V_{CC} or GND
Control input capacitance	C_{IC}	—	—	3.5	—	—	—	—	pF	
Switch terminal capacitance	$C_{IN / OUT}$	—	—	4.0	—	—	—	—	pF	
Feedthrough capacitance	$C_{IN–OUT}$	—	—	0.5	—	—	—	—	pF	

Switching Characteristics

- V_{CC} = 1.8 ± 0.15 V

Item	Symbol	T_a = 25°C			T_a = –40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation	t_{PLH}	—	4.0	13.0	—	19.0	ns	C_L = 15 pF	IN/OUT	OUT/IN
delay time	t_{PHL}	—	11.0	23.0	—	29.0		C_L = 50 pF	or OUT/IN	or IN/OUT
Enable time	t_{ZH}	—	11.0	24.0	—	29.0	ns	C_L = 15 pF	C	IN/OUT
	t_{ZL}	—	18.0	44.0	—	51.0		C_L = 50 pF		or OUT/IN
Disable time	t_{HZ}	—	11.0	21.0	—	29.0	ns	C_L = 15 pF	C	IN/OUT
	t_{LZ}	—	18.0	46.0	—	53.0		C_L = 50 pF		or OUT/IN

- V_{CC} = 2.5 ± 0.2 V

Item	Symbol	T_a = 25°C			T_a = –40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation	t_{PLH}	—	2.0	10.0	—	16.0	ns	C_L = 15 pF	IN/OUT	OUT/IN
delay time	t_{PHL}	—	5.0	12.0	—	18.0		C_L = 50 pF	or OUT/IN	or IN/OUT
Enable time	t_{ZH}	—	6.0	15.0	—	20.0	ns	C_L = 15 pF	C	IN/OUT
	t_{ZL}	—	8.0	25.0	—	32.0		C_L = 50 pF		or OUT/IN
Disable time	t_{HZ}	—	7.0	15.0	—	23.0	ns	C_L = 15 pF	C	IN/OUT
	t_{LZ}	—	11.0	25.0	—	32.0		C_L = 50 pF		or OUT/IN

- V_{CC} = 3.3 ± 0.3 V

Item	Symbol	T_a = 25°C			T_a = –40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation	t_{PLH}	—	1.5	6.0	—	10.0	ns	C_L = 15 pF	IN/OUT	OUT/IN
delay time	t_{PHL}	—	4.0	9.0	—	12.0		C_L = 50 pF	or OUT/IN	or IN/OUT
Enable time	t_{ZH}	—	4.0	11.0	—	15.0	ns	C_L = 15 pF	C	IN/OUT
	t_{ZL}	—	6.0	18.0	—	22.0		C_L = 50 pF		or OUT/IN
Disable time	t_{HZ}	—	5.0	11.0	—	15.0	ns	C_L = 15 pF	C	IN/OUT
	t_{LZ}	—	8.0	18.0	—	22.0		C_L = 50 pF		or OUT/IN

Switching Characteristics (cont)

- **V_{CC} = 5.0 ± 0.5 V**

Item	Symbol	T_a = 25°C			T_a = –40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation	t_{PLH}	—	1.0	4.0	—	7.0	ns	C_L = 15 pF	IN/OUT	OUT/IN
delay time	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

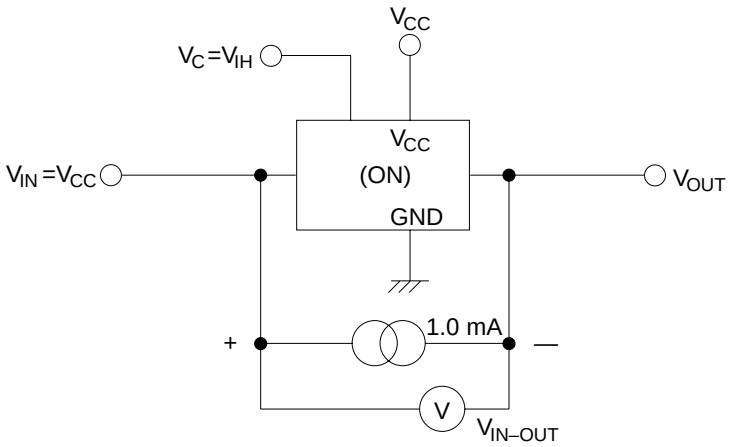
Operating Characteristics

- **C_L = 50 pF**

Item	Symbol	V_{CC} (V)	T_a = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C_{PD}	3.3	—	3.5	—	pF	f = 10 MHz
		5.0	—	4.0	—		

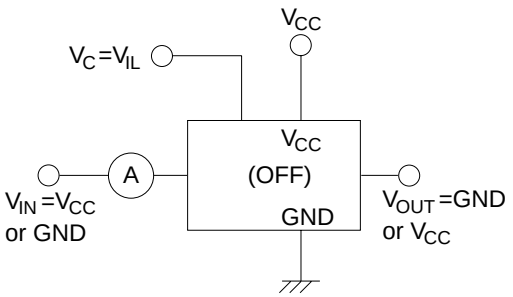
Test Circuit

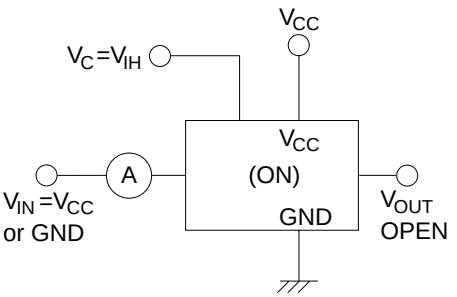
• R_{ON}



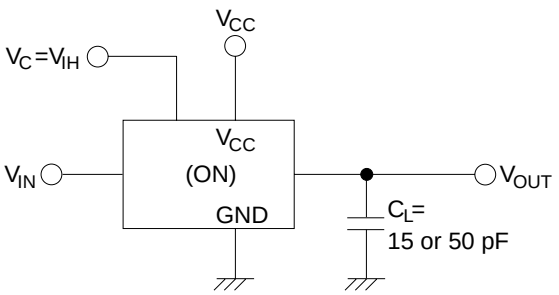
$$R_{ON} = \frac{V_{IN-OUT}}{10^{-3}} \ (\Omega)$$

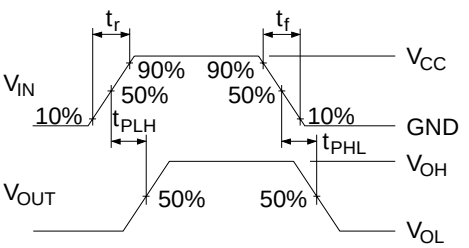
• I_S (off), I_S (on)





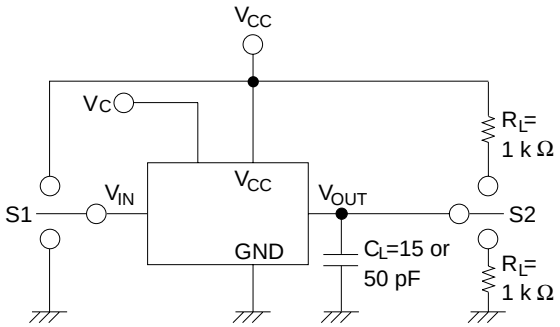
• t_{PLH} ,t_{PHL}



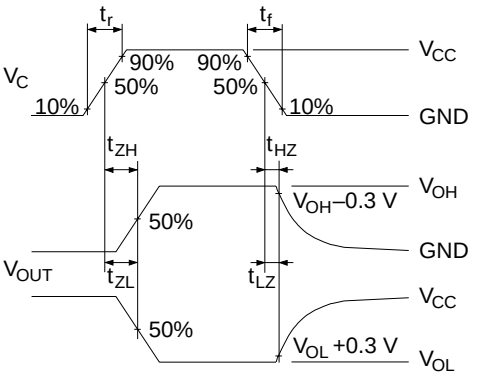


$t_r = t_f = 3$ ns

• t_{ZH}, t_{ZL} / t_{HZ}, t_{LZ}

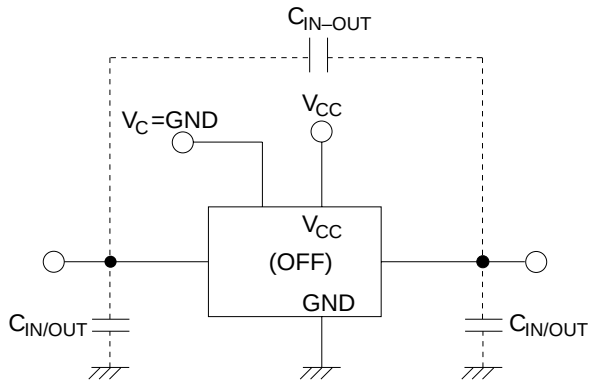


Item	S1	S2
t_{ZH}	V_{CC}	GND
t_{ZL}	GND	V_{CC}
t_{HZ}	V_{CC}	GND
t_{LZ}	GND	V_{CC}



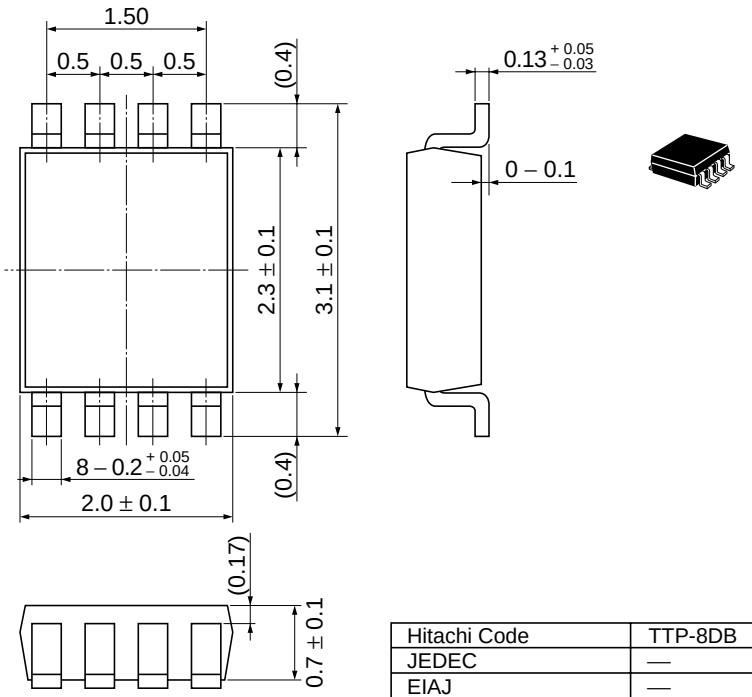
$t_r = t_f = 3$ ns

• $C_{IN/OUT}$, $C_{IN–OUT}$



Package Dimensions

Unit : mm



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HITACHI

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

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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 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

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 585160

Hitachi Asia Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 049318
Tel: 535-2100
Fax: 535-1533

Hitachi Asia Ltd.
Taipei Branch Office
3rd Flr, Hung Kuo Building, No.167,
Tun Hwa North Road, Taipei (105)
Taiwan
Tel: <886> (2) 2718-3666
Fax: <886> (2) 2718-8180
Telex: 23222 HAS-TP

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7th Flr, 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
Telex: 40815 HITEC HX

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