

HD74ALVC2G157

2-channel Multiplexer

HITACHI

ADE-205-640 (Z)

Preliminary

Rev. 0

July, 2001

Description

The HD74ALVC2G157 has 2-channel multiplexer in a 8 pin package. 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.

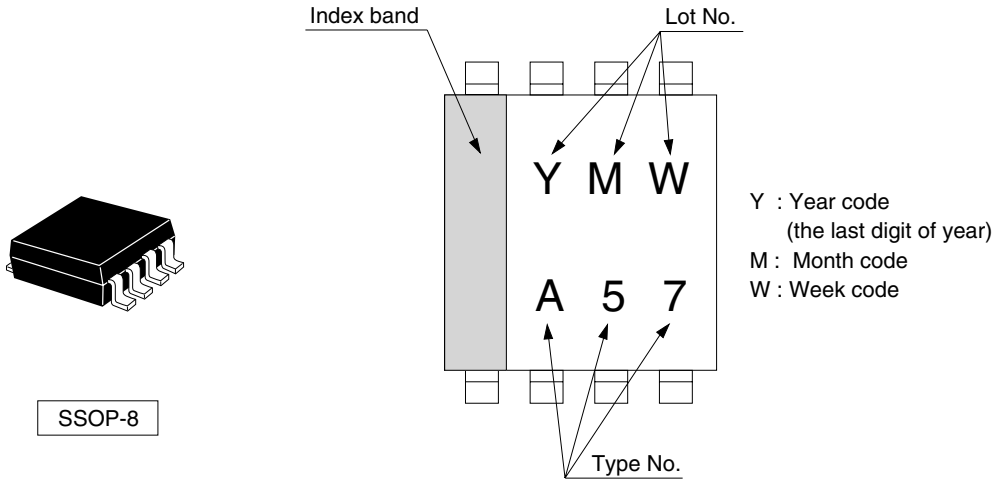
Features

- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Supply voltage range : 1.2 to 3.6 V
Operating temperature range : -40 to $+85^{\circ}\text{C}$
- All inputs V_{IH} (Max.) = 3.6 V (@ V_{CC} = 0 V to 3.6 V)
All outputs V_{O} (Max.) = 3.6 V (@ V_{CC} = 0 V)
- Output current ± 2 mA (@ V_{CC} = 1.2)
 ± 4 mA (@ V_{CC} = 1.4 V to 1.6 V)
 ± 6 mA (@ V_{CC} = 1.65 V to 1.95 V)
 ± 18 mA (@ V_{CC} = 2.3 V to 2.7 V)
 ± 24 mA (@ V_{CC} = 3.0 V to 3.6 V)
- Package type

Package type	Package code	Package suffix	Taping code
SSOP-8 pin	TTP-8DB	US	E (3,000 pcs / Reel)

Outline and Article Indication

- HD74ALVC2G157

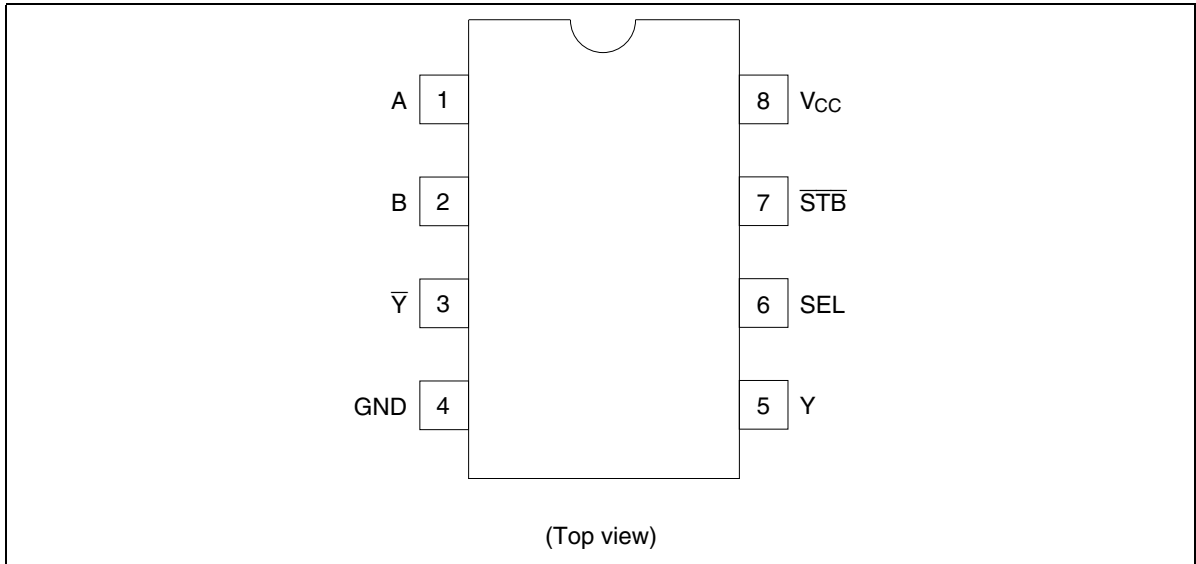


Function Table

Inputs				Outputs	
$\overline{\text{STB}}$	SEL	A	B	Y	$\overline{\text{Y}}$
H	X	X	X	L	H
L	L	L	X	L	H
L	L	H	X	H	L
L	H	X	L	L	H
L	H	X	H	H	L

H : High level
L : Low level
X : Immaterial

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage range	V_{CC}	-0.5 to 4.6	V	
Input voltage range ^{*1}	V_I	-0.5 to 4.6	V	
Output voltage range ^{*1,2}	V_O	-0.5 to $V_{CC}+0.5$ -0.5 to 4.6	V	Output : H or L V_{CC} : OFF
Input clamp current	I_{IK}	-50	mA	$V_I < 0$
Output clamp current	I_{OK}	± 50	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	I_O	± 50	mA	$V_O = 0$ to V_{CC}
Continuous current through V_{CC} or GND	I_{CC} or I_{GND}	± 100	mA	
Maximum power dissipation at $T_a = 25^{\circ}\text{C}$ (in still air) ^{*3}	P_T	200	mW	
Storage temperature	T_{stg}	-65 to 150	$^{\circ}\text{C}$	

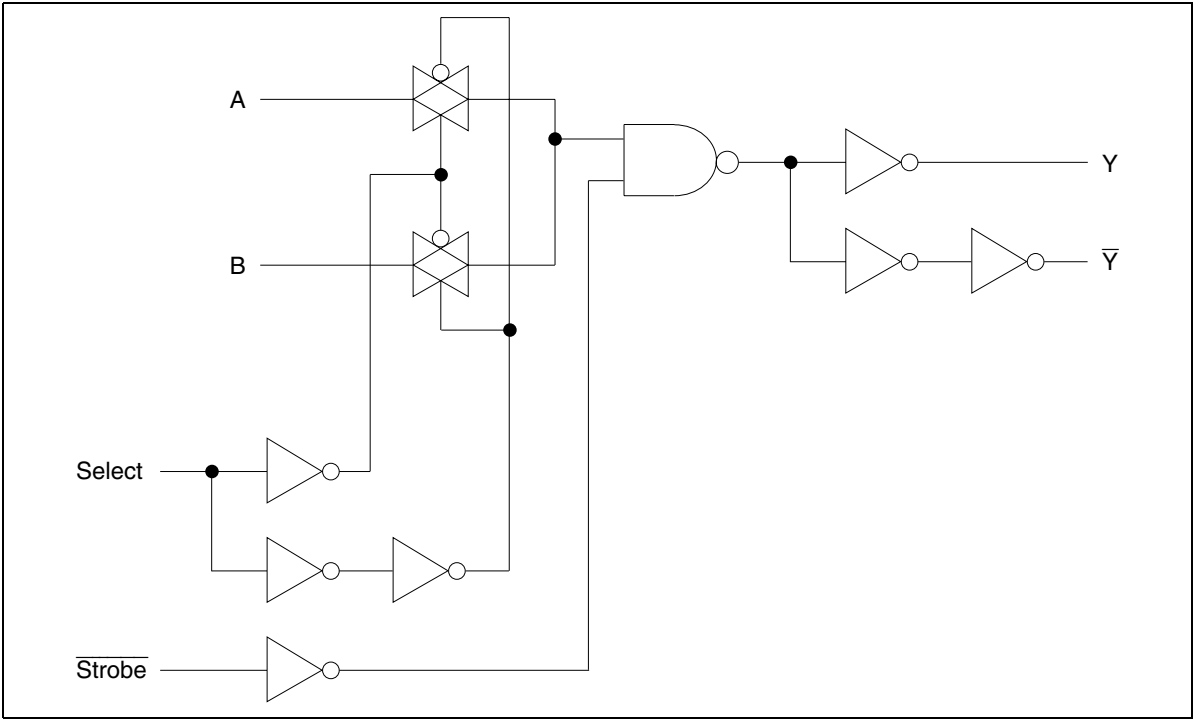
- Notes:
- The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.
 - 1. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
 - 2. This value is limited to 4.6 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}	1.2	3.6	V	
Input voltage range	V _I	0	3.6	V	
Output voltage range	V _O	0	V _{CC}	V	
Output current	I _{OH}	—	−2	mA	V _{CC} = 1.2 V
		—	−4		V _{CC} = 1.4 V
		—	−6		V _{CC} = 1.65 V
		—	−18		V _{CC} = 2.3 V
		—	−24		V _{CC} = 3.0 V
		—	2		V _{CC} = 1.2 V
	I _{OL}	—	4		V _{CC} = 1.4 V
		—	6		V _{CC} = 1.65 V
		—	18		V _{CC} = 2.3 V
		—	24		V _{CC} = 3.0 V
Input transition rise or fall rate	$\Delta t / \Delta v$	0	20	ns / V	V _{CC} = 1.2 to 2.7 V
		0	10		V _{CC} = 3.3±0.3 V
Operating free-air temperature	Ta	−40	85	°C	

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

Logic Diagram



Electrical Characteristics

(Ta = -40 to 85°C)

Item	Symbol	V _{cc} (V) †	Min	Typ	Max	Unit	Test conditions
Input voltage	V _{IH}	1.2	V _{cc} ×0.75	—	—	V	
		1.4 to 1.6	V _{cc} ×0.7	—	—		
		1.65 to 1.95	V _{cc} ×0.7	—	—		
		2.3 to 2.7	1.7	—	—		
		3.0 to 3.6	2.0	—	—		
	V _{IL}	1.2	—	—	V _{cc} ×0.25		
		1.4 to 1.6	—	—	V _{cc} ×0.3		
		1.65 to 1.95	—	—	V _{cc} ×0.3		
		2.3 to 2.7	—	—	0.7		
		3.0 to 3.6	—	—	0.8		
Output voltage	V _{OH}	Min to Max	V _{cc} -0.2	—	—	V	I _{OH} = -100 μA
		1.2	0.9	—	—		I _{OH} = -2 mA
		1.4	1.1	—	—		I _{OH} = -4 mA
		1.65	1.2	—	—		I _{OH} = -6 mA
		2.3	1.7	—	—		I _{OH} = -18 mA
		3.0	2.2	—	—		I _{OH} = -24 mA
	V _{OL}	Min to Max	—	—	0.2		I _{OL} = 100 μA
		1.2	—	—	0.3		I _{OL} = 2 mA
		1.4	—	—	0.3		I _{OL} = 4 mA
		1.65	—	—	0.3		I _{OL} = 6 mA
		2.3	—	—	0.55		I _{OL} = 18 mA
		3.0	—	—	0.55		I _{OL} = 24 mA
Input current	I _{IN}	3.6	—	—	±5	μA	V _{IN} = 3.6 V or GND
Quiescent supply current	I _{CC}	3.6	—	—	10	μA	V _{IN} = V _{CC} or GND, I _O = 0
Output leakage current	I _{OFF}	0	—	—	5	μA	V _{IN} or V _O = 0 to 3.6 V
Input capacitance	C _{IN}	3.3	—	TBD	—	pF	V _{IN} = V _{CC} or GND

Note: For conditions shown as Min or Max, use the appropriate values under recommended operating conditions.

Switching Characteristics

(Ta = -40 to 85°C)

- V_{CC} = 1.2 V

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time	t _{PLH}	—	TBD	—	ns	C _L = 15 pF	A or B	Y
		—	TBD	—			SEL	Y
		—	TBD	—			STB	Y

- V_{CC} = 1.5±0.1 V

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time	t _{PLH}	2.0	—	11.0	ns	C _L = 15 pF	A or B	Y
		2.0	—	11.0			SEL	Y
		2.0	—	11.0			STB	Y

- V_{CC} = 1.8±0.15 V

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time	t _{PLH}	1.5	—	9.0	ns	C _L = 30 pF	A or B	Y
		1.5	—	9.0			SEL	Y
		1.5	—	9.0			STB	Y

- V_{CC} = 2.5±0.2 V

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time	t _{PLH}	1.0	—	4.5	ns	C _L = 30 pF	A or B	Y
		1.0	—	4.5			SEL	Y
		1.0	—	4.5			STB	Y

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- $V_{CC} = 3.3\pm0.3\text{ V}$

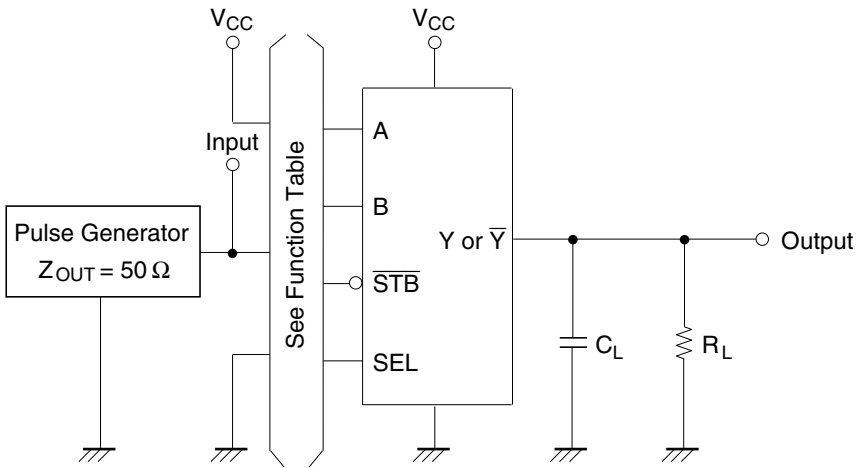
Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time	t_{PLH}	1.0	—	3.5	ns	$C_L = 30\text{ pF}$	A or B	Y
	t_{PHL}	1.0	—	3.5			SEL	Y
		1.0	—	3.5			$\overline{STB}$	Y

Operating Characteristics

($T_a = 25^{\circ}\text{C}$)

Item	Symbol	V_{CC} (V)	Min	Typ	Max	Unit	Test conditions
Power dissipation	C_{PD}	1.5	—	TBD	—	pF	$f = 10\text{ MHz}$
capacitance		1.8	—	TBD	—		
		2.5	—	TBD	—		
		3.3	—	TBD	—		

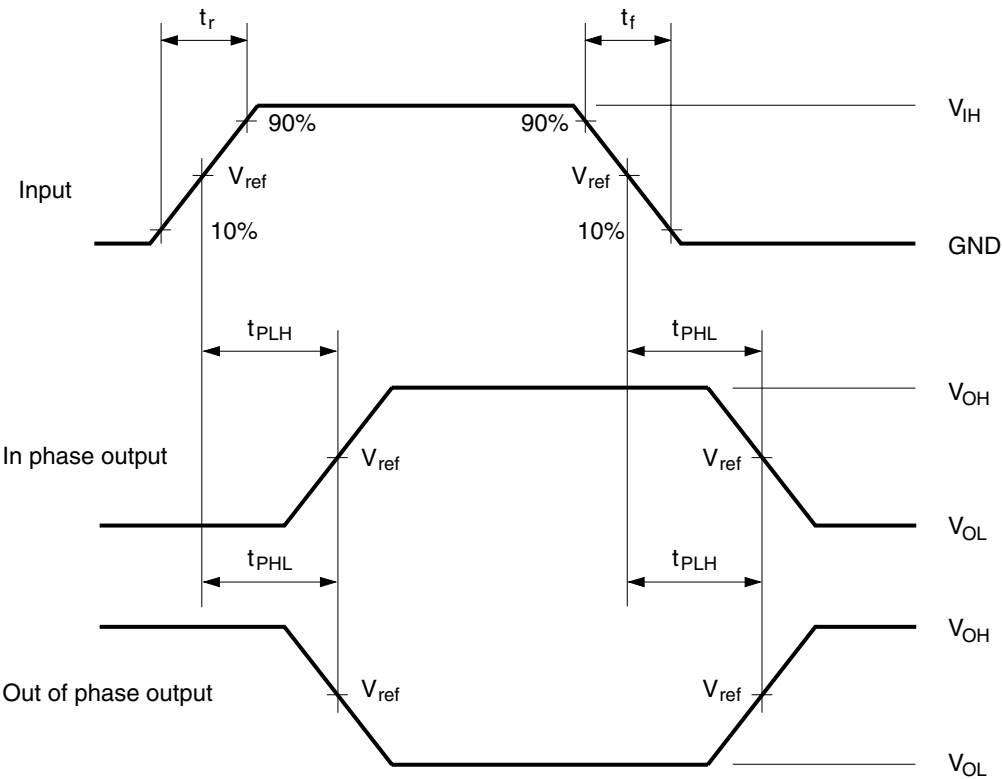
Test Circuit



Symbol	$V_{CC} = 1.2\text{ V},$ $1.5\pm0.1\text{ V}$	$V_{CC} = 1.8\pm0.15\text{ V}$	$V_{CC} = 2.5\pm0.2\text{ V},$ $3.3\pm0.3\text{ V}$
R_L	2.0 k Ω	1.0 k Ω	500 Ω
C_L	15 pF	30 pF	30 pF

Note: C_L includes probe and jig capacitance.

Waveforms



Symbol	$V_{CC} = 1.2\text{ V},$ $1.5\pm0.1\text{ V},$ $1.8\pm0.15\text{ V}$	$V_{CC} = 2.5\pm0.2\text{ V}$	$V_{CC} = 3.3\pm0.3\text{ V}$
t_r / t_f	2.0 ns	2.5 ns	2.5 ns
V_{IH}	V_{CC}	V_{CC}	2.7 V
V_{ref}	50%	50%	1.5 V

Note: Input waveform : PRR = 10 MHz, duty cycle 50%

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HITACHI

Hitachi, Ltd.

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

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	Hitachi Europe GmbH Electronic Components Group Domacher StraÙe 3 D-85622 Feldkirchen, Munich Germany Tel: <49> (89) 9 9180-0 Fax: <49> (89) 9 29 30 00

Hitachi Asia Ltd. Hitachi Tower 16 Collyer Quay #20-00 Singapore 049318 Tel: <65>-538-6533/538-8577 Fax: <65>-538-6933/538-3877 URL: http://www.hitachi.com.sg	Hitachi Asia Ltd. (Taipei Branch Office) 4/F, No. 167, Tun Hwa North Road Hung-Kuo Building Taipei (105), Taiwan Tel: <886>-(2)-2718-3666 Fax: <886>-(2)-2718-8180 Telex: 23222 HAS-TP URL: http://www.hitachi.com.tw
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Hitachi Asia (Hong Kong) Ltd. Group III (Electronic Components) 7/F., 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 URL: http://semiconductor.hitachi.com.hk
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