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

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HD74ALVC2G240

Dual Bus Buffer Inverted with 3-state Output

ADE-205-623B (Z)

Rev.2
Feb. 2003

Description

The HD74ALVC2G240 has dual bus buffer inverted with 3-state output in a 8 pin package. Output is disabled when the associated output enable ($\overline{OE}$) input is high. To ensure the high impedance state during power up or power down, $\overline{OE}$ should be connected to V_{CC} through a pull-up resistor; the minimum value of the resistor is determined by the current sinking capability of the driver. 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.

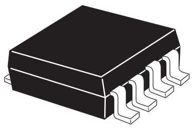
Features

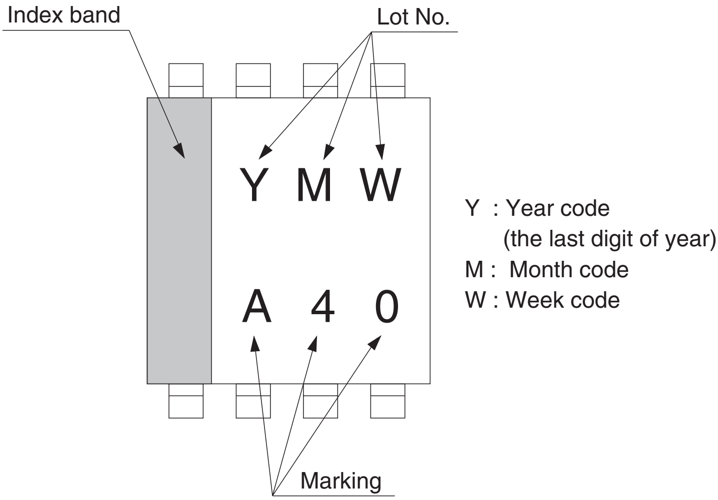
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Supply voltage range : 1.2 to 3.6 V
  Operating temperature range : –40 to +85°C
- All inputs V_{IH} (Max.) = 3.6 V (@V_{CC} = 0 V to 3.6 V)
  All outputs V_O (Max.) = 3.6 V (@V_{CC} = 0 V)
- Output current ±2 mA (@V_{CC} = 1.2 V)
  ±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)
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74ALVC2G240USE	SSOP-8 pin	TTP-8DBV	US	E (3,000 pcs/reel)

Outline and Article Indication

• HD74ALVC2G240



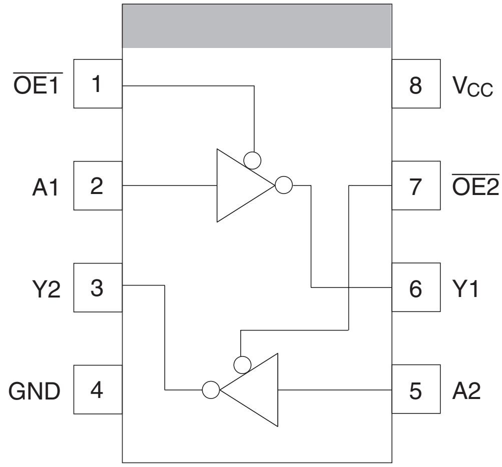


Function Table

Inputs		
$\overline{OE}$	A	Output Y
L	L	H
L	H	L
H	X	Z

H: High level
L: Low level
X: Immaterial
Z: High impedance

Pin Arrangement



(Top view)

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	V	Output : H or L or Z
		–0.5 to 4.6		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 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 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
	I_{OL}	—	2		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
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.

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
Off state output current	I_{OZ}	3.6	—	—	±5	µA	V_O = V_{CC} 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	—	4.5	—	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} t_{PHL}	—	5.5	—	ns	C_L = 15 pF	A	Y
Enable time	t_{ZH} t_{ZL}	—	6.5	—	ns	C_L = 15 pF	$\overline{OE}$	Y
Disable time	t_{HZ} t_{LZ}	—	4.5	—	ns	C_L = 15 pF	$\overline{OE}$	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} t_{PHL}	2.0	—	7.0	ns	C_L = 15 pF	A	Y
Enable time	t_{ZH} t_{ZL}	2.0	—	7.0	ns	C_L = 15 pF	$\overline{OE}$	Y
Disable time	t_{HZ} t_{LZ}	2.0	—	7.0	ns	C_L = 15 pF	$\overline{OE}$	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} t_{PHL}	1.5	—	5.0	ns	C_L = 30 pF	A	Y
Enable time	t_{ZH} t_{ZL}	1.5	—	5.0	ns	C_L = 30 pF	$\overline{OE}$	Y
Disable time	t_{HZ} t_{LZ}	1.5	—	5.0	ns	C_L = 30 pF	$\overline{OE}$	Y

Switching Characteristics (cont)

- V_{CC} = 2.5±0.2 V

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time	t_{PLH} t_{PHL}	1.0	—	4.0	ns	C_L = 30 pF	A	Y
Enable time	t_{ZH} t_{ZL}	1.0	—	4.0	ns	C_L = 30 pF	$\overline{OE}$	Y
Disable time	t_{HZ} t_{LZ}	1.0	—	4.0	ns	C_L = 30 pF	$\overline{OE}$	Y

- V_{CC} = 3.3±0.3 V

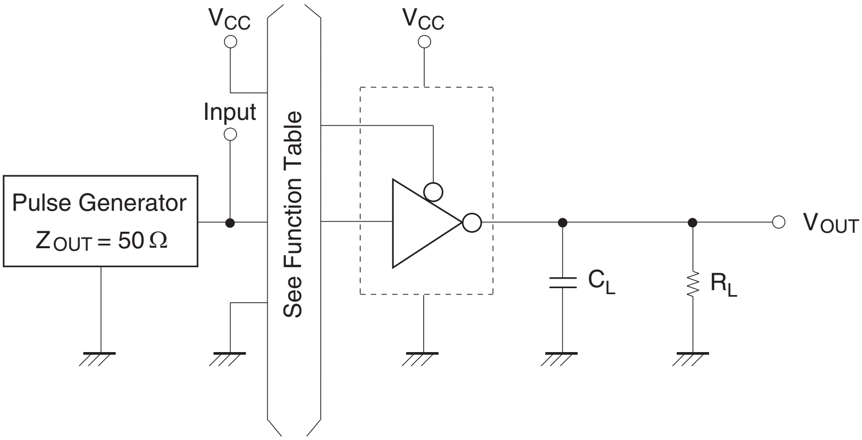
Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time	t_{PLH} t_{PHL}	1.0	—	3.0	ns	C_L = 30 pF	A	Y
Enable time	t_{ZH} t_{ZL}	1.0	—	3.0	ns	C_L = 30 pF	$\overline{OE}$	Y
Disable time	t_{HZ} t_{LZ}	1.0	—	3.0	ns	C_L = 30 pF	$\overline{OE}$	Y

Operating Characteristics

(Ta = 25°C)

Item	Symbol	V_{CC} (V)	Min	Typ	Max	Unit	Test conditions
Power dissipation capacitance	C_{PD}	1.5	—	10.5	—	pF	f = 10 MHz
		1.8	—	10.5	—		
		2.5	—	11.0	—		
		3.3	—	13.0	—		

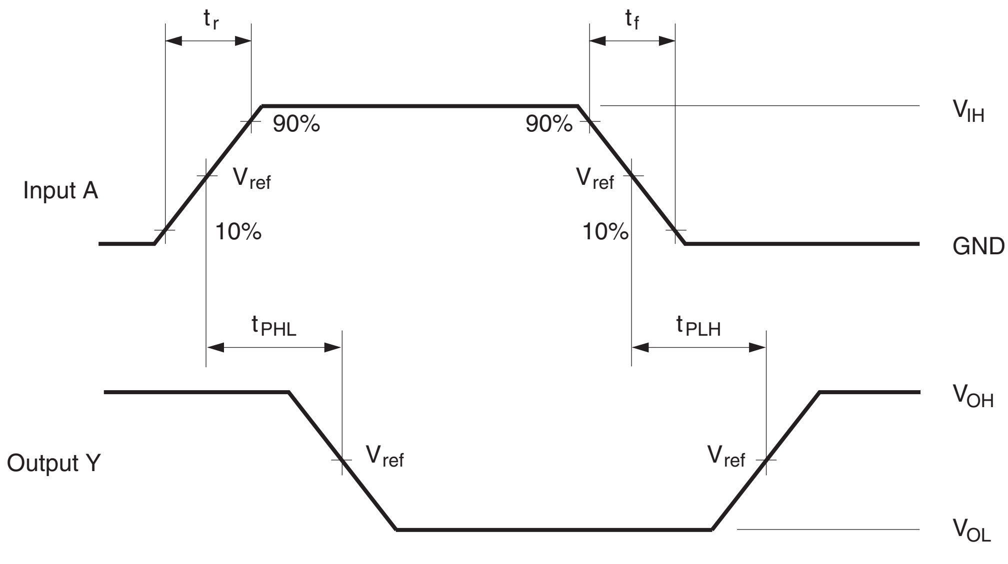
Test Circuit - 1



Symbol	V_{CC} = 1.2 V, 1.5±0.1 V	V_{CC} = 1.8±0.15 V	V_{CC} = 2.5±0.2 V, 3.3±0.3 V
R_L	2.0 kΩ	1.0 kΩ	500 Ω
C_L	15 pF	30 pF	30 pF

Note: C_L includes probe and jig capacitance.

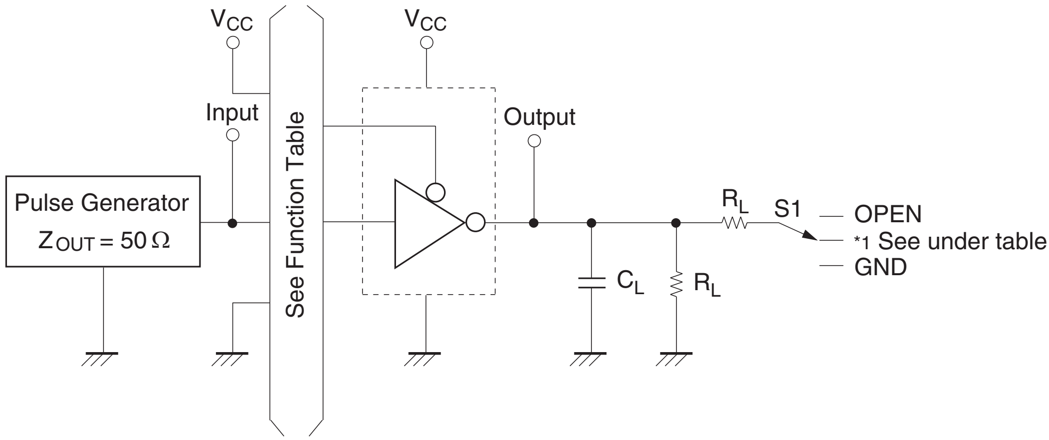
Waveforms - 1



Symbol	V_{CC} = 1.2 V, 1.5±0.1 V, 1.8±0.15 V	V_{CC} = 2.5±0.2 V	V_{CC} = 3.3±0.3 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%

Test Circuit - 2

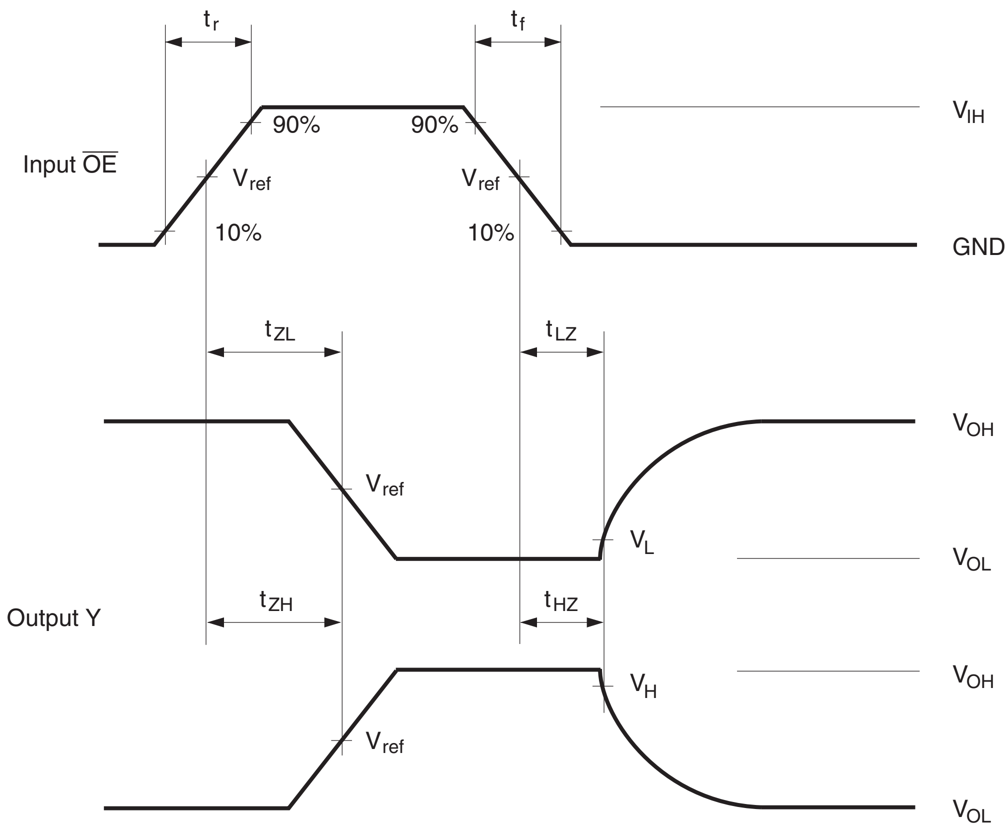


Symbol	S1	
	V_{CC} = 1.2 V, 1.5±0.1 V, 1.8±0.15 V, 2.5±0.2 V	V_{CC} = 3.3±0.3 V
t_{PLH} / t_{PHL}	OPEN	OPEN
t_{HZ} / t_{ZH}	GND	GND
t_{LZ} / t_{ZL}	V_{CC}×2	6.0

Symbol	V_{CC} = 1.2 V, 1.5±0.1 V	V_{CC} = 1.8±0.15 V	V_{CC} = 2.5±0.2 V, 3.3±0.3 V
R_L	2.0 kΩ	1.0 kΩ	500 Ω
C_L	15 pF	30 pF	30 pF

Note: C_L includes probe and jig capacitance.

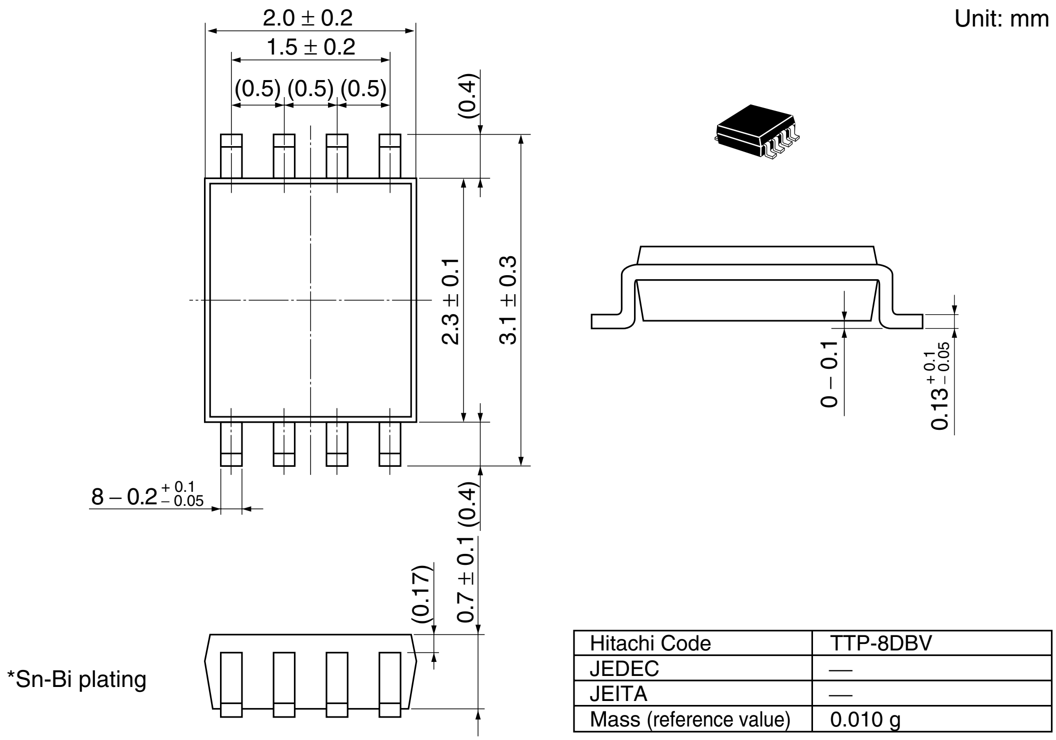
Waveforms - 2



Symbol	V_{CC} = 1.2 V, 1.5±0.1 V	V_{CC} = 1.8±0.15 V	V_{CC} = 2.5±0.2 V	V_{CC} = 3.3±0.3 V
t_r / t_f	2.0 ns	2.0 ns	2.5 ns	2.5 ns
V_{IH}	V_{CC}	V_{CC}	V_{CC}	2.7 V
V_{ref}	50%	50%	50%	1.5 V
V_H / V_L	$V_H = V_{OH}$-0.1 V $V_L = V_{OL}$+0.1 V	$V_H = V_{OH}$-0.15 V $V_L = V_{OL}$+0.15 V	$V_H = V_{OH}$-0.15 V $V_L = V_{OL}$+0.15 V	$V_H = V_{OH}$-0.3 V $V_L = V_{OL}$+0.3 V

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

Package Dimensions



Hitachi Code	TTP-8DBV
JEDEC	—
JEITA	—
Mass (reference value)	0.010 g

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