

HD74ALVC2G245

Dual Bus Transceivers with 3-state Output

REJ03D0176-0400Z
(Previous ADE-205-641C (Z))
Rev.4.00
Dec.18.2003

Description

The HD74ALVC2G245 has two buffers with three state output in an 8 pin package. When DIR is high, data is transferred from the A inputs to the B outputs, and when DIR is low, data is transferred from the B inputs to the A outputs. The A and B buses are separated by making the enable input (\overline{OE}) high level. 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

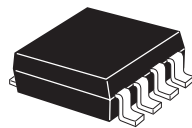
- The basic gate function is lined up as Renesas uni logic series.
- Supplied on emboss taping for high-speed automatic mounting.
- Supply voltage range : 1.2 to 3.6 V
Operating temperature range: -40 to +85°C
- All inputs V_{IH} (Max.) = 3.6 V (@ V_{CC} = 0 V to 3.6 V)
All outputs V_O (Max.) = 3.6 V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

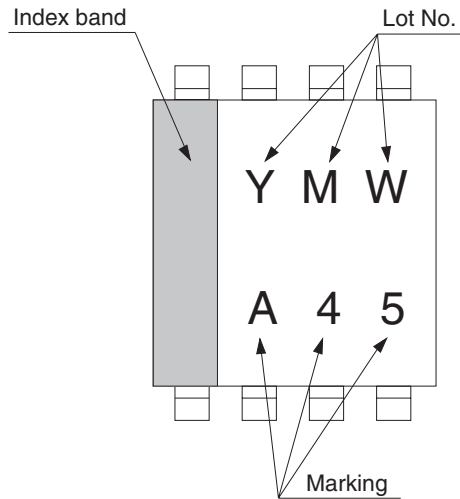
Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74ALVC2G245USE	SSOP-8 pin	TTP-8DBV	US	E (3,000 pcs/reel)

Outline and Article Indication

• HD74ALVC2G245



SSOP-8



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

Function Table

Inputs

\overline{OE}	DIR	Operation
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

H: High level
L: Low level
X: Immaterial

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	$V_{CC} = 1.2\text{ V}$
		—	–4		$V_{CC} = 1.4\text{ V}$
		—	–6		$V_{CC} = 1.65\text{ V}$
		—	–18		$V_{CC} = 2.3\text{ V}$
		—	–24		$V_{CC} = 3.0\text{ V}$
	I_{OL}	—	2		$V_{CC} = 1.2\text{ V}$
		—	4		$V_{CC} = 1.4\text{ V}$
		—	6		$V_{CC} = 1.65\text{ V}$
		—	18		$V_{CC} = 2.3\text{ V}$
		—	24		$V_{CC} = 3.0\text{ V}$
Input transition rise or fall rate	$\Delta t / \Delta v$	0	20	ns / V	$V_{CC} = 1.2\text{ to }2.7\text{ V}$
		0	10		$V_{CC} = 3.3\pm 0.3\text{ V}$
Operating free-air temperature	T_a	–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
Output capacitance	C _O	3.3	—	6.5	—	pF	V _O = 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}	—	7.0	—	ns	C _L = 15 pF	A or B	B or A
Enable time	t _{ZH} t _{ZL}	—	8.5	—	ns	C _L = 15 pF	$\overline{\text{OE}}$	A or B
Disable time	t _{HZ} t _{LZ}	—	7.0	—	ns	C _L = 15 pF	$\overline{\text{OE}}$	A or B

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	—	8.0	ns	C _L = 15 pF	A or B	B or A
Enable time	t _{ZH} t _{ZL}	2.0	—	11.0	ns	C _L = 15 pF	$\overline{\text{OE}}$	A or B
Disable time	t _{HZ} t _{LZ}	2.0	—	10.0	ns	C _L = 15 pF	$\overline{\text{OE}}$	A or B

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	—	6.0	ns	C _L = 30 pF	A or B	B or A
Enable time	t _{ZH} t _{ZL}	1.5	—	8.0	ns	C _L = 30 pF	$\overline{\text{OE}}$	A or B
Disable time	t _{HZ} t _{LZ}	1.5	—	7.5	ns	C _L = 30 pF	$\overline{\text{OE}}$	A or B

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Switching Characteristics (cont)

$$V_{CC} = 2.5 \pm 0.2 \text{ V}$$

Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time	t_{PLH} t_{PHL}	1.0	—	4.0	ns	$C_L = 30 \text{ pF}$	A or B	B or A
Enable time	t_{ZH} t_{ZL}	1.0	—	5.0	ns	$C_L = 30 \text{ pF}$	\overline{OE}	A or B
Disable time	t_{HZ} t_{LZ}	1.0	—	4.5	ns	$C_L = 30 \text{ pF}$	\overline{OE}	A or B

$$V_{CC} = 3.3 \pm 0.3 \text{ V}$$

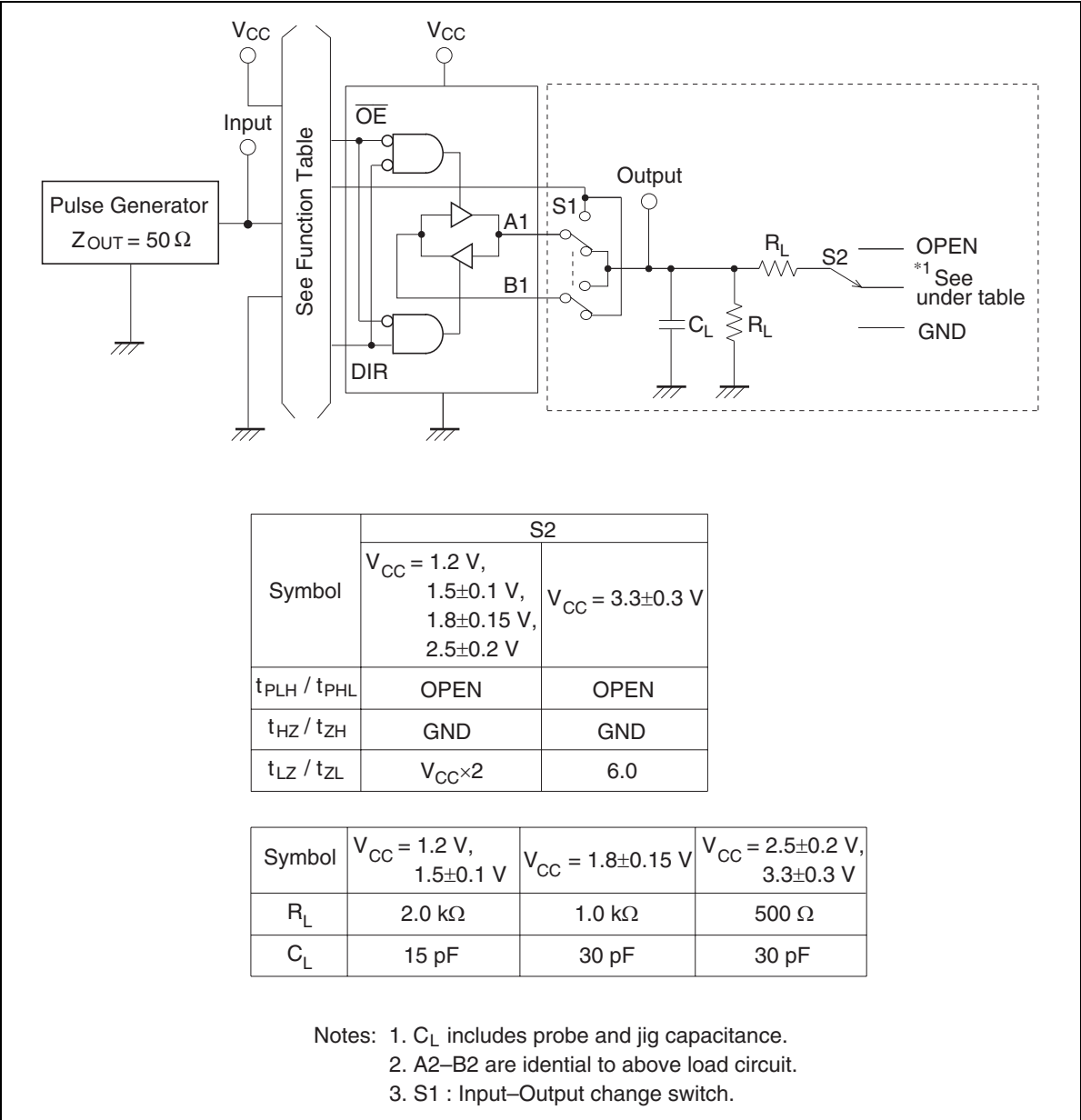
Item	Symbol	Min	Typ	Max	Unit	Test conditions	FROM (Input)	TO (Output)
Propagation delay time	t_{PLH} t_{PHL}	1.0	—	3.0	ns	$C_L = 30 \text{ pF}$	A or B	B or A
Enable time	t_{ZH} t_{ZL}	1.0	—	4.0	ns	$C_L = 30 \text{ pF}$	\overline{OE}	A or B
Disable time	t_{HZ} t_{LZ}	1.0	—	4.0	ns	$C_L = 30 \text{ pF}$	\overline{OE}	A or B

Operating Characteristics

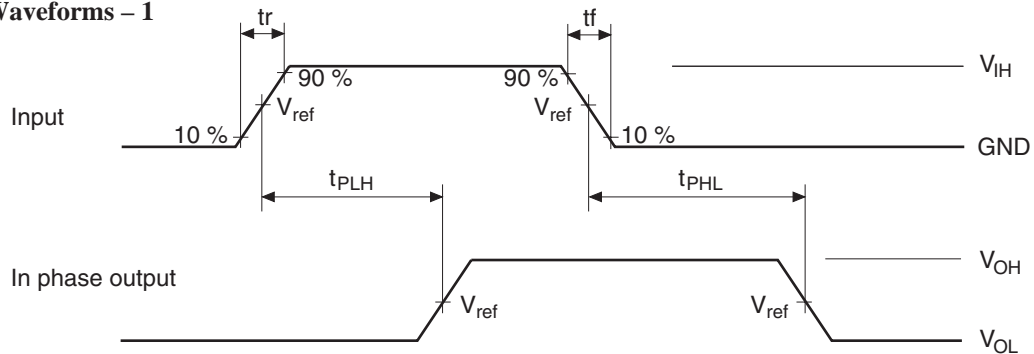
$$(T_a = 25^\circ\text{C})$$

Item	Symbol	V_{CC} (V)	Min	Typ	Max	Unit	Test conditions
Power dissipation capacitance	C_{PD}	1.5	—	13.0	—	pF	$f = 10 \text{ MHz}$
		1.8	—	13.0	—		
		2.5	—	14.0	—		
		3.3	—	17.0	—		

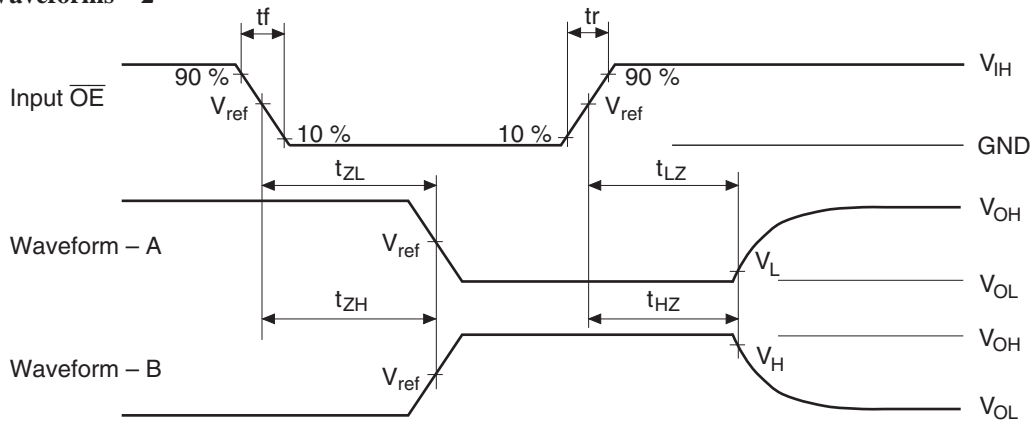
Test Circuit



• Waveforms – 1



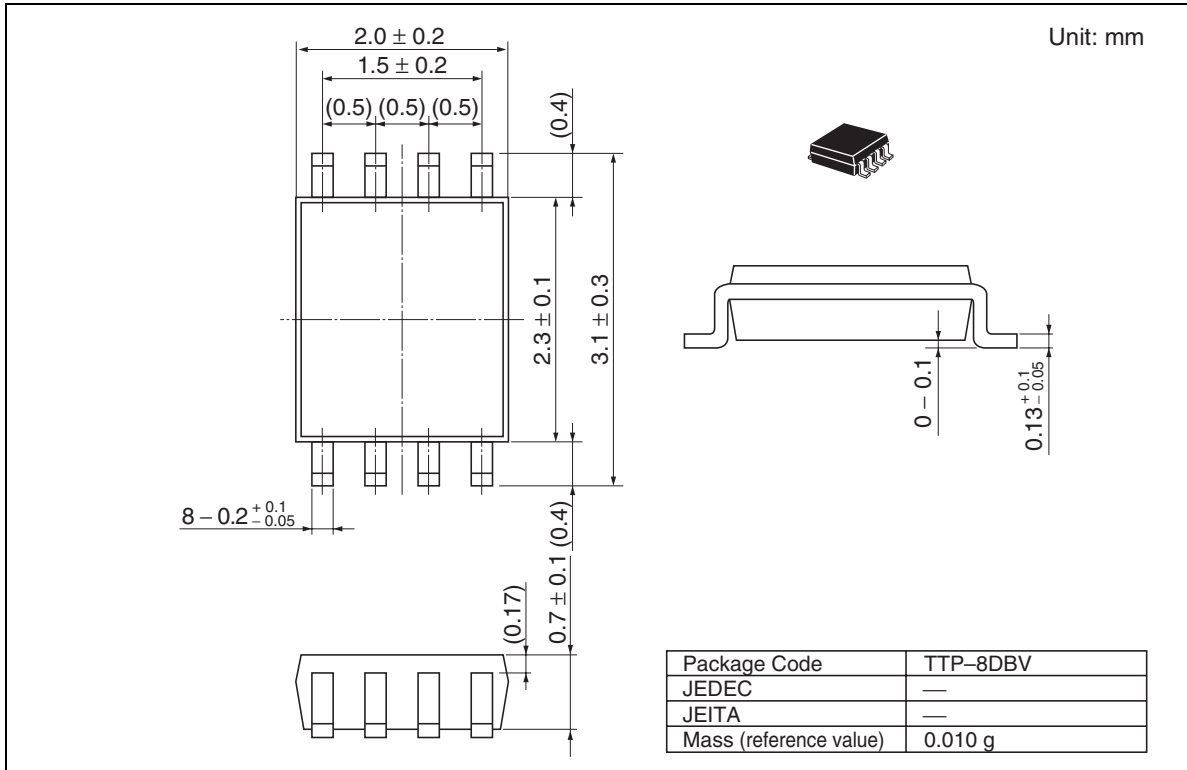
• Waveforms – 2



Symbol	$V_{CC} = 1.2 \text{ V},$ $1.5 \pm 0.1 \text{ V}$	$V_{CC} = 1.8 \pm 0.15 \text{ V}$	$V_{CC} = 2.5 \pm 0.2 \text{ V}$	$V_{CC} = 3.3 \pm 0.3 \text{ V}$
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	$V_H = V_{OH} - 0.1 \text{ V}$ $V_L = V_{OL} + 0.1 \text{ V}$	$V_H = V_{OH} - 0.15 \text{ V}$ $V_L = V_{OL} + 0.15 \text{ V}$	$V_H = V_{OH} - 0.15 \text{ V}$ $V_L = V_{OL} + 0.15 \text{ V}$	$V_H = V_{OH} - 0.3 \text{ V}$ $V_L = V_{OL} + 0.3 \text{ V}$

- Notes:
1. Input waveform : PRR $\leq 10 \text{ MHz}$, $Z_o = 50 \Omega$, duty cycle 50%.
 2. Waveform – A is for an output with internal conditions such that the output is low except when disabled by the output control.
 3. Waveform – B is for an output with internal conditions such that the output is high except when disabled by the output control.
 4. The output are measured one at a time with one transition per measurement.

Package Dimensions



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