

HD74LV2G245A

Dual Bus Transceivers with 3-state Outputs

REJ03D0104-0400Z
(Previous ADE-205-354C (Z))
Rev.4.00
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Description

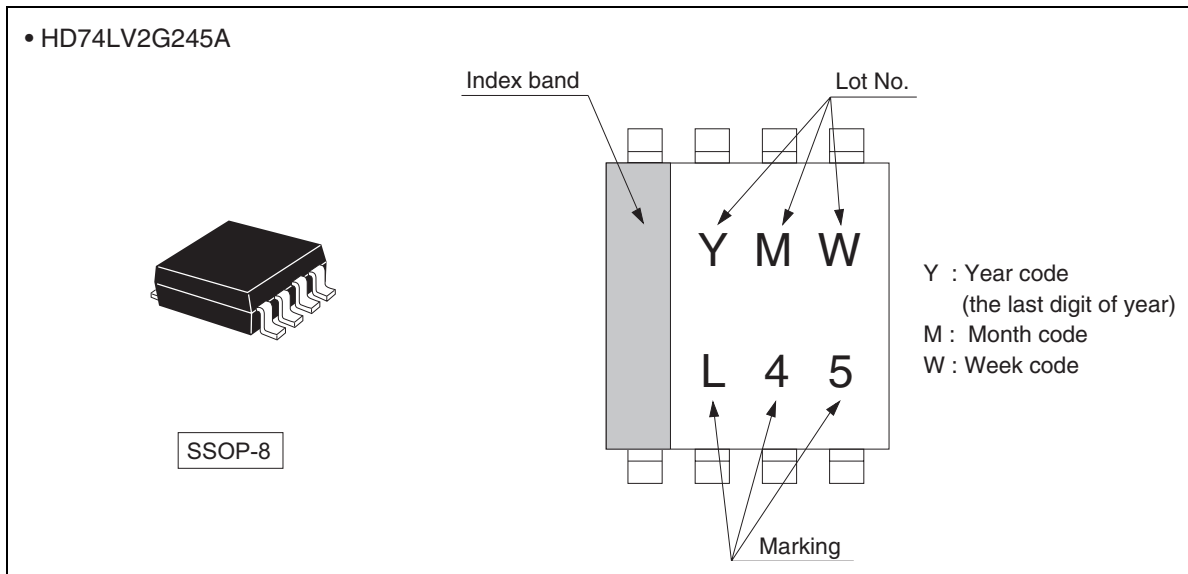
The HD74LV2G245A has two buffers with three state output in an 8 pin package. When DIR is high, data is transferred from the A inputs to the B outputs, and when DIR is low, data is transferred from the B inputs to the A outputs. The A and B buses are separated by making the enable input ($\overline{OE}$) 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.
- Electrical characteristics equivalent to the HD74LV245A
Supply voltage range : 1.65 to 5.5 V
Operating temperature range : -40 to +85°C
- All inputs V_{IH} (Max.) = 5.5 V (@ V_{CC} = 0 V to 5.5 V)
All outputs V_O (Max.) = 5.5 V (@ V_{CC} = 0 V, Output : Z)
- Output current ± 6 mA (@ V_{CC} = 3.0 V to 3.6 V), ± 12 mA (@ V_{CC} = 4.5 V to 5.5 V)
- All the logical input has hysteresis voltage for the slow transition.
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LV2G245AUSE	SSOP-8 pin	TTP-8DBV	US	E (3,000 pcs/reel)

Outline and Article Indication



Function Table

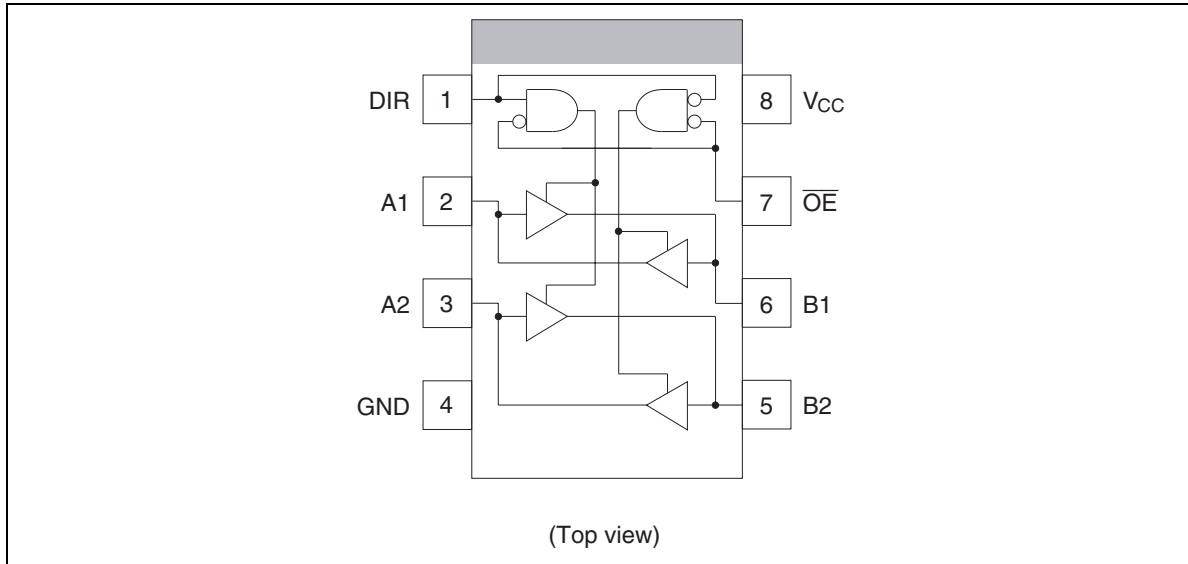
Inputs		Operation
$\overline{OE}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

H : High level

L : Low level

X : Immaterial

Pin Arrangement



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 $V_{CC} + 0.5$ -0.5 to 7.0	V	Output : H or L V_{CC} : OFF or output : Z
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	T_{stg}	-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	
Output voltage range	V_O	0	V_{CC}	V	
		0	5.5		Output : Z
Output current	I_{OL}	—	1	mA	$V_{CC} = 1.65$ to 1.95 V
		—	2		$V_{CC} = 2.3$ to 2.7 V
		—	6		$V_{CC} = 3.0$ to 3.6 V
		—	12		$V_{CC} = 4.5$ to 5.5 V
	I_{OH}	—	–1		$V_{CC} = 1.65$ to 1.95 V
		—	–2		$V_{CC} = 2.3$ to 2.7 V
		—	–6		$V_{CC} = 3.0$ to 3.6 V
		—	–12		$V_{CC} = 4.5$ to 5.5 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

- $T_a = -40$ to 85°C

Item	Symbol	V _{CC} (V) *	Min	Typ	Max	Unit	Test condition
Input voltage	V _{IH}	1.65 to 1.95	V _{CC} ×0.75	—	—	V	
		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	—		
Output voltage	V _{OH}	Min to Max	V _{CC} –0.1	—	—	V	I _{OH} = –50 μA
		1.65	1.4	—	—		I _{OH} = –1 mA
		2.3	2.0	—	—		I _{OH} = –2 mA
		3.0	2.48	—	—		I _{OH} = –6 mA
		4.5	3.8	—	—		I _{OH} = –12 mA
	V _{OL}	Min to Max	—	—	0.1	I _{OL} = 50 μA	
		1.65	—	—	0.3	I _{OL} = 1 mA	
		2.3	—	—	0.4	I _{OL} = 2 mA	
		3.0	—	—	0.44	I _{OL} = 6 mA	
		4.5	—	—	0.55	I _{OL} = 12 mA	
Input current	I _{IN}	0 to 5.5	—	—	±1	μA	V _{IN} = 5.5 V or GND
Off state output current	I _{OZ}	Min to Max	—	—	±5	μA	V _O = 5.5 V or GND
Quiescent supply current	I _{CC}	5.5	—	—	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 5.5 V
Input capacitance	C _{IN}	3.3	—	3.0	—	pF	V _{IN} = V _{CC} or GND
Output capacitance	C _O	3.3	—	5.5	—	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

- $V_{CC} = 1.8 \pm 0.15 \text{ V}$

Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	14.0	25.0	1.0	27.0	ns	$C_L = 15 \text{ pF}$	A or B	B or A
	t_{PHL}	—	20.5	34.0	1.0	36.5		$C_L = 50 \text{ pF}$		
Enable time	t_{ZH}	—	21.5	38.0	1.0	40.5	ns	$C_L = 15 \text{ pF}$	$\overline{OE}$	A or B
	t_{ZL}	—	28.0	50.0	1.0	53.5		$C_L = 50 \text{ pF}$		
Disable time	t_{HZ}	—	16.5	26.0	1.0	28.0	ns	$C_L = 15 \text{ pF}$	$\overline{OE}$	A or B
	t_{LZ}	—	25.0	34.0	1.0	36.0		$C_L = 50 \text{ pF}$		

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

Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	8.3	13.0	1.0	15.0	ns	$C_L = 15 \text{ pF}$	A or B	B or A
	t_{PHL}	—	11.2	15.9	1.0	18.0		$C_L = 50 \text{ pF}$		
Enable time	t_{ZH}	—	11.8	19.9	1.0	22.0	ns	$C_L = 15 \text{ pF}$	$\overline{OE}$	A or B
	t_{ZL}	—	14.1	22.7	1.0	26.0		$C_L = 50 \text{ pF}$		
Disable time	t_{HZ}	—	11.8	18.1	1.0	20.0	ns	$C_L = 15 \text{ pF}$	$\overline{OE}$	A or B
	t_{LZ}	—	17.6	23.1	1.0	25.0		$C_L = 50 \text{ pF}$		

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

Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	5.9	8.4	1.0	10.0	ns	$C_L = 15 \text{ pF}$	A or B	B or A
	t_{PHL}	—	7.9	11.9	1.0	13.5		$C_L = 50 \text{ pF}$		
Enable time	t_{ZH}	—	8.2	13.2	1.0	15.5	ns	$C_L = 15 \text{ pF}$	$\overline{OE}$	A or B
	t_{ZL}	—	9.9	16.7	1.0	19.0		$C_L = 50 \text{ pF}$		
Disable time	t_{HZ}	—	9.6	16.5	1.0	19.5	ns	$C_L = 15 \text{ pF}$	$\overline{OE}$	A or B
	t_{LZ}	—	13.9	19.8	1.0	22.0		$C_L = 50 \text{ pF}$		

Switching Characteristics (cont)

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

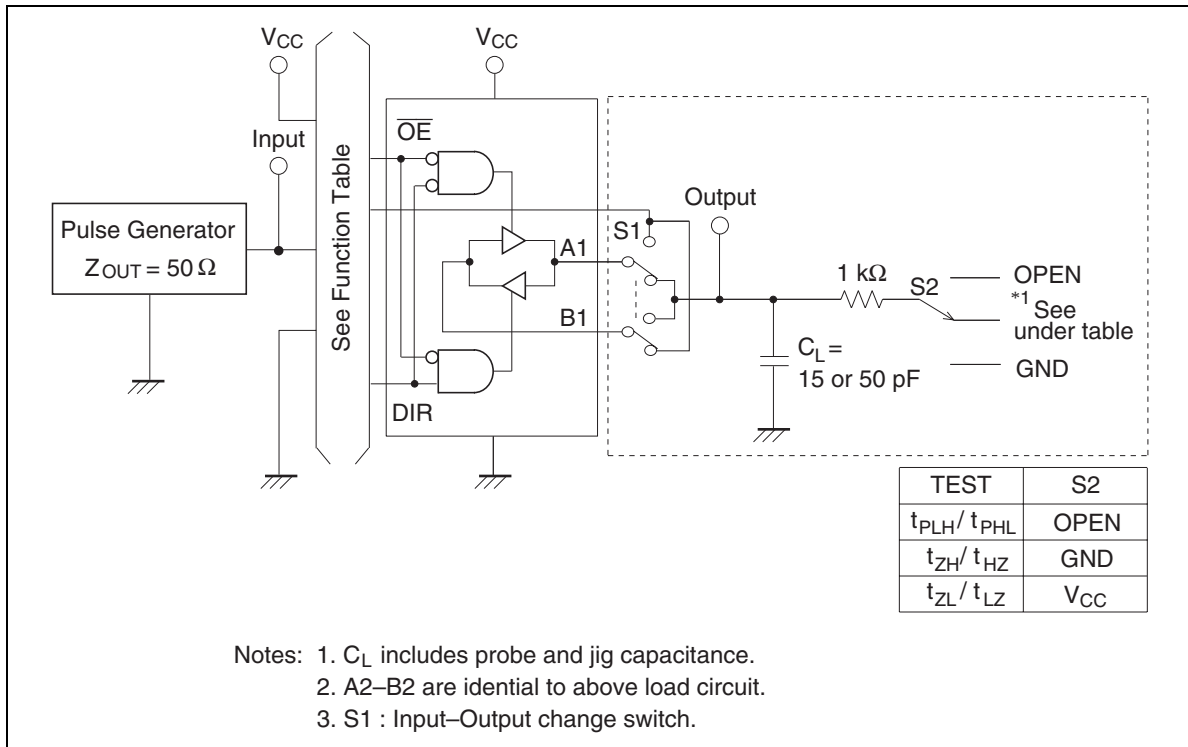
Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	4.3	5.5	1.0	6.5	ns	$C_L = 15 \text{ pF}$	A or B	B or A
	t_{PHL}	—	5.6	7.5	1.0	8.5		$C_L = 50 \text{ pF}$		
Enable time	t_{ZH}	—	5.7	8.5	1.0	10.0	ns	$C_L = 15 \text{ pF}$	$\overline{OE}$	A or B
	t_{ZL}	—	7.0	10.6	1.0	12.0		$C_L = 50 \text{ pF}$		
Disable time	t_{HZ}	—	7.8	12.8	1.0	14.2	ns	$C_L = 15 \text{ pF}$	$\overline{OE}$	A or B
	t_{LZ}	—	10.9	14.7	1.0	16.0		$C_L = 50 \text{ pF}$		

Operating Characteristics

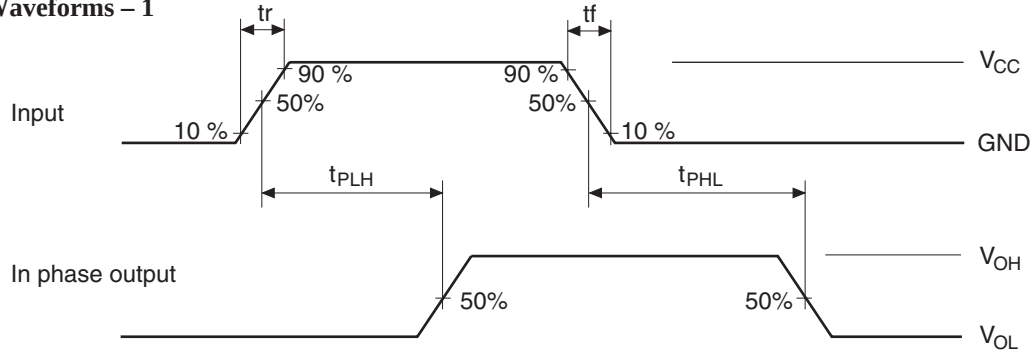
- $C_L = 50 \text{ pF}$

Item	Symbol	$V_{CC} \text{ (V)}$	$T_a = 25^\circ\text{C}$			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C_{PD}	3.3	—	20.0	—	pF	$f = 10 \text{ MHz}$
		5.0	—	25.0	—		

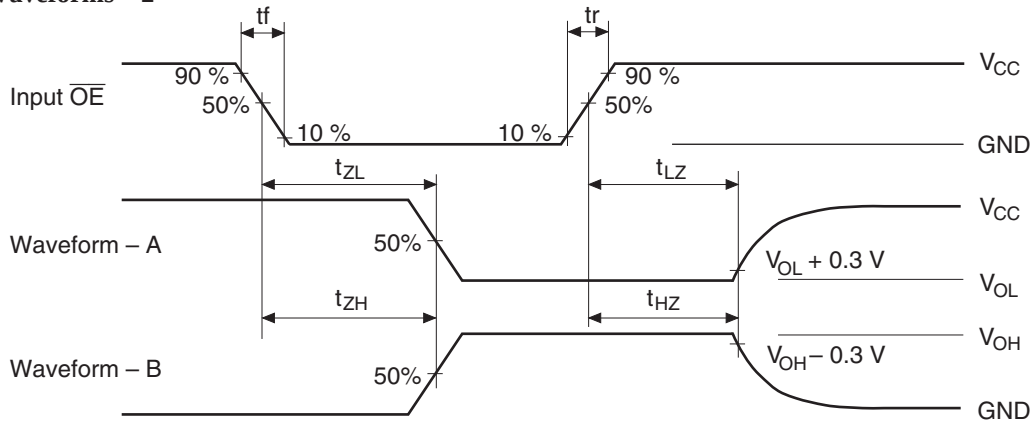
Test Circuit



• Waveforms – 1



• Waveforms – 2



- Notes:
1. Input waveform : $PRR \leq 1 \text{ MHz}$, $Z_o = 50 \Omega$, $t_r \leq 3 \text{ ns}$, $t_f \leq 3 \text{ ns}$.
 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.

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