

# RD74LVC2G08

## Dual 2-Input AND Gate

REJ03D0752-0100

Rev.1.00

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### Description

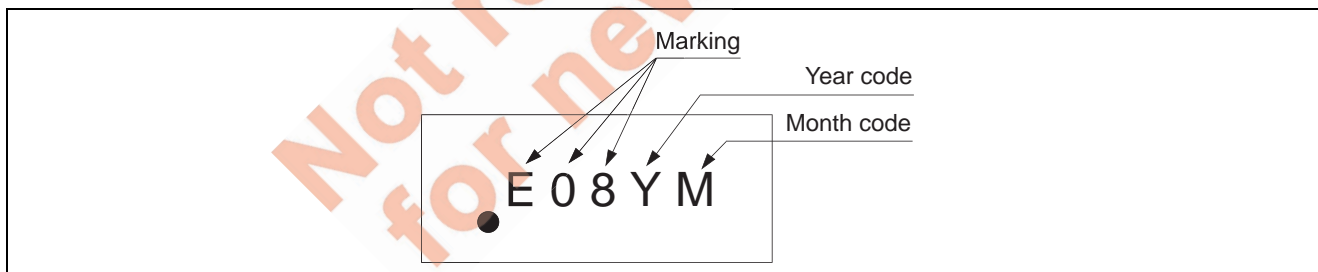
The RD74LVC2G08 has dual 2-input AND gate in an 8-pin package. Low voltage and high-speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

### Features

- The basic gate function is lined up as renesas uni logic series.
- Supply voltage range: 1.65 to 5.5 V
- Operating temperature range: -40 to +85°C
- All inputs:  $V_{IH} (\text{Max.}) = 5.5 \text{ V} (@V_{CC} = 0 \text{ V to } 5.5 \text{ V})$
- All outputs:  $V_O (\text{Max.}) = 5.5 \text{ V} (@V_{CC} = 0 \text{ V})$
- Output current:
  - $\pm 4 \text{ mA} (@V_{CC} = 1.65 \text{ V})$
  - $\pm 8 \text{ mA} (@V_{CC} = 2.3 \text{ V})$
  - $\pm 24 \text{ mA} (@V_{CC} = 3.0 \text{ V})$
  - $\pm 32 \text{ mA} (@V_{CC} = 4.5 \text{ V})$
- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
RD74LVC2G08WPE	WCSP-8 pin	SXBG0008LA-A (TBS-8BV)	WP	E (3,000 pcs/reel)

### Article Indication



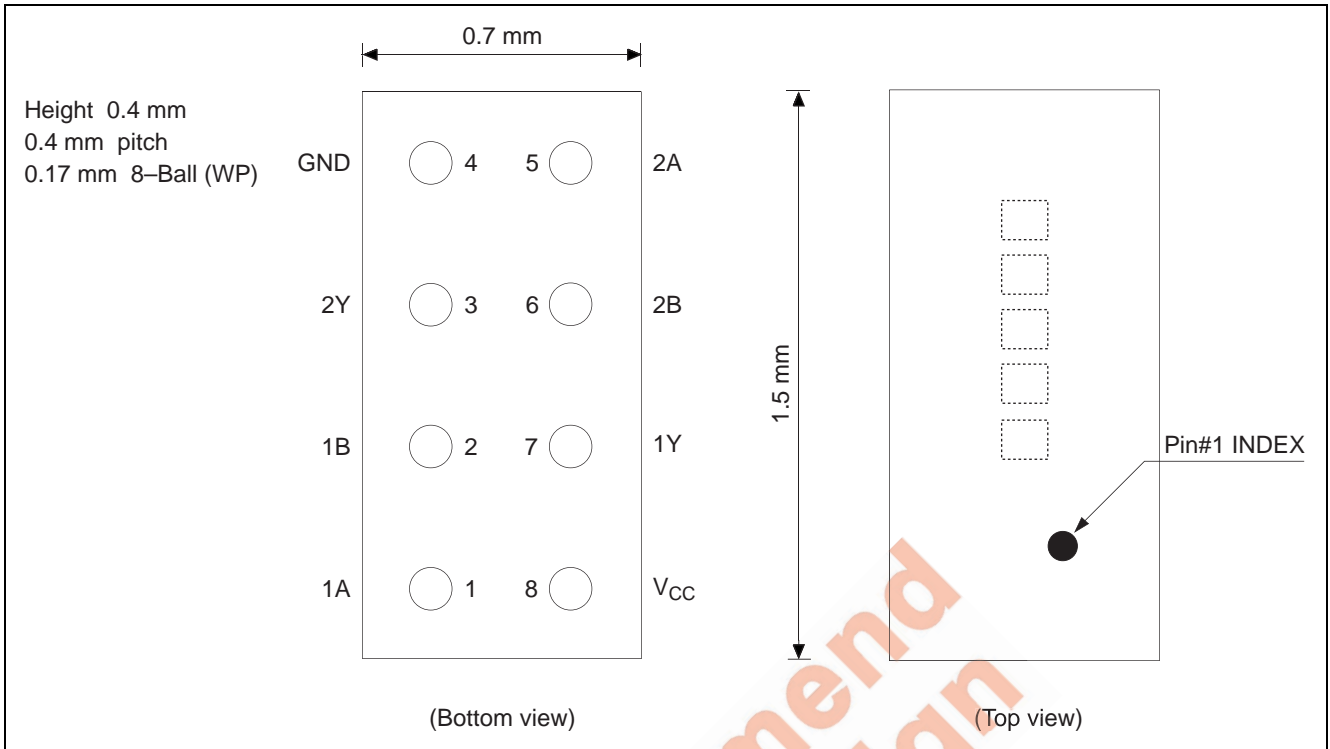
### Function Table

Inputs		Output Y
A	B	
L	L	L
H	L	L
L	H	L
H	H	H

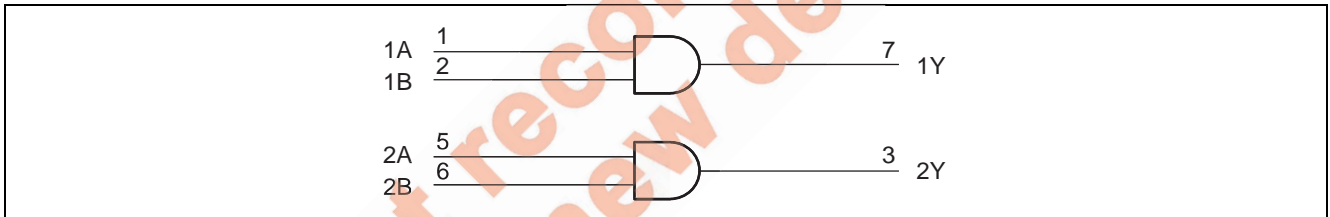
H: High level

L: Low level

Pin Arrangement



Logic Diagram



## Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Test Conditions
Supply voltage range	$V_{CC}$	-0.5 to 6.5	V	
Input voltage range <sup>*1</sup>	$V_I$	-0.5 to 6.5	V	
Output voltage range <sup>*1, 2</sup>	$V_O$	-0.5 to $V_{CC} + 0.5$	V	Output : H or L
		-0.5 to 6.5		$V_{CC} : \text{OFF}$
Input clamp current	$I_{IK}$	-50	mA	$V_I < 0$
Output clamp current	$I_{OK}$	-50	mA	$V_O < 0$
Continuous output current	$I_O$	$\pm 50$	mA	$V_O = 0$ to $V_{CC}$
Continuous current through $V_{CC}$ or GND	$I_{CC}$ or $I_{GND}$	$\pm 100$	mA	
Package Thermal impedance	$\theta_{ja}$	140	$^{\circ}\text{C}/\text{W}$	WP
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.

- The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
- This value is limited to 5.5 V maximum.

## 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	
Output current	$I_{OL}$	—	4	mA	$V_{CC} = 1.65 \text{ V}$
		—	8		$V_{CC} = 2.3 \text{ V}$
		—	16		$V_{CC} = 3.0 \text{ V}$
		—	24		$V_{CC} = 4.5 \text{ V}$
		—	32		$V_{CC} = 4.5 \text{ V}$
	$I_{OH}$	—	-4		$V_{CC} = 1.65 \text{ V}$
		—	-8		$V_{CC} = 2.3 \text{ V}$
		—	-16		$V_{CC} = 3.0 \text{ V}$
		—	-24		$V_{CC} = 4.5 \text{ V}$
		—	-32		$V_{CC} = 4.5 \text{ V}$
Input transition rise or fall rate	$\Delta t / \Delta v$	0	20	ns / V	$V_{CC} = 1.65$ to $1.95 \text{ V}$ , 2.3 to $2.7 \text{ V}$
		0	10		$V_{CC} = 3.0$ to $3.6 \text{ V}$
		0	5		$V_{CC} = 4.5$ to $5.5 \text{ V}$
Operating free-air temperature	$T_a$	-40	85	$^{\circ}\text{C}$	

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

## Electrical Characteristics

Ta = -40 to 85°C

Item	Symbol	V <sub>CC</sub> (V)	Min	Typ	Max	Unit	Test condition			
Input voltage	V <sub>IH</sub>	1.65 to 1.95	V <sub>CC</sub> ×0.65	—	—	V				
		2.3 to 2.7	1.7	—	—					
		3.0 to 3.6	2.0	—	—					
		4.5 to 5.5	V <sub>CC</sub> ×0.7	—	—					
	V <sub>IL</sub>	1.65 to 1.95	—	—	V <sub>CC</sub> ×0.35					
		2.3 to 2.7	—	—	0.7					
		3.0 to 3.6	—	—	0.8					
		4.5 to 5.5	—	—	V <sub>CC</sub> ×0.3					
Output voltage	V <sub>OH</sub>	Min to Max	V <sub>CC</sub> -0.1	—	—	V	I <sub>OH</sub> = -100 μA			
		1.65	1.2	—	—		I <sub>OH</sub> = -4 mA			
		2.3	1.9	—	—		I <sub>OH</sub> = -8 mA			
		3.0	2.4	—	—		I <sub>OH</sub> = -16 mA			
			2.3	—	—		I <sub>OH</sub> = -24 mA			
		4.5	3.8	—	—		I <sub>OH</sub> = -32 mA			
	V <sub>OL</sub>	Min to Max	—	—	0.1		I <sub>OL</sub> = 100 μA			
		1.65	—	—	0.45		I <sub>OL</sub> = 4 mA			
		2.3	—	—	0.3		I <sub>OL</sub> = 8 mA			
		3.0	—	—	0.4		I <sub>OL</sub> = 16 mA			
			—	—	0.55		I <sub>OL</sub> = 24 mA			
		4.5	—	—	0.55		I <sub>OL</sub> = 32 mA			
		Input current	I <sub>IN</sub>	0 to 5.5	—		—	±5	μA	V <sub>IN</sub> = 5.5 V or GND
		Quiescent supply current	I <sub>CC</sub>	1.65 to 5.5	—		—	10	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0
ΔI <sub>CC</sub>	3 to 5.5		—	—	500	One input at V <sub>CC</sub> -0.6 V, Other input at V <sub>CC</sub> or GND				
Output leakage current	I <sub>OFF</sub>	0	—	—	±10	μA	V <sub>IN</sub> or V <sub>O</sub> = 0 to 5.5 V			
Input capacitance	C <sub>IN</sub>	3.3	—	4	—	pF	V <sub>IN</sub> = V <sub>CC</sub> 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	Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Max				
Propagation delay time	$t_{PLH}$ $t_{PHL}$	2.4	8.0	ns	$C_L = 30 \text{ pF}$ , $R_L = 1.0 \text{ k}\Omega$	A, B	Y

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

Item	Symbol	Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Max				
Propagation delay time	$t_{PLH}$ $t_{PHL}$	1.1	5.5	ns	$C_L = 30 \text{ pF}$ , $R_L = 500 \Omega$	A, B	Y

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

Item	Symbol	Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Max				
Propagation delay time	$t_{PLH}$ $t_{PHL}$	1.0	4.5	ns	$C_L = 50 \text{ pF}$ , $R_L = 500 \Omega$	A, B	Y

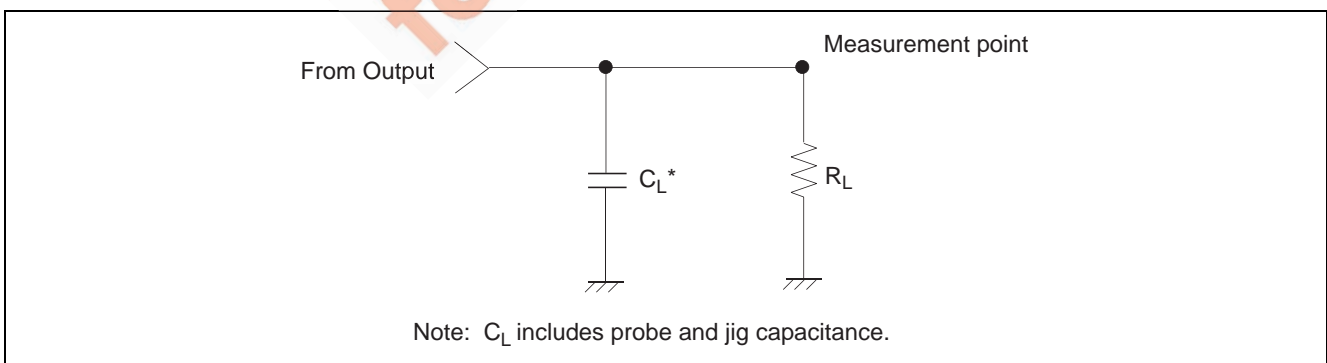
$V_{CC} = 5.0 \pm 0.5 \text{ V}$

Item	Symbol	Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Max				
Propagation delay time	$t_{PLH}$ $t_{PHL}$	1.0	4.0	ns	$C_L = 50 \text{ pF}$ , $R_L = 500 \Omega$	A, B	Y

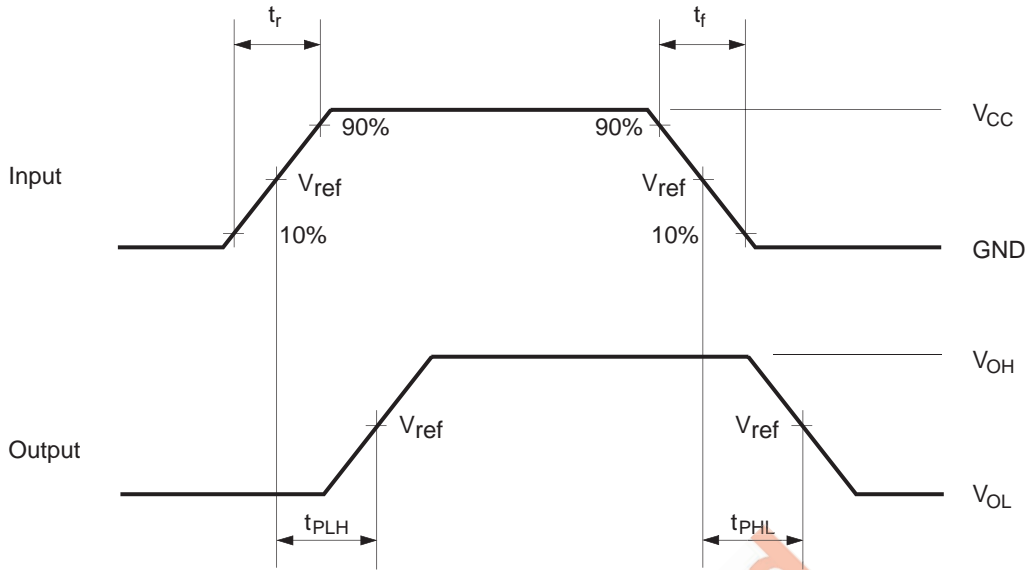
## Operating Characteristics

Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C <sub>PD</sub>	1.8	—	19	—	pF	f = 10 MHz
		2.5	—	19	—		
		3.3	—	20	—		
		5.0	—	22	—		

## Test Circuit



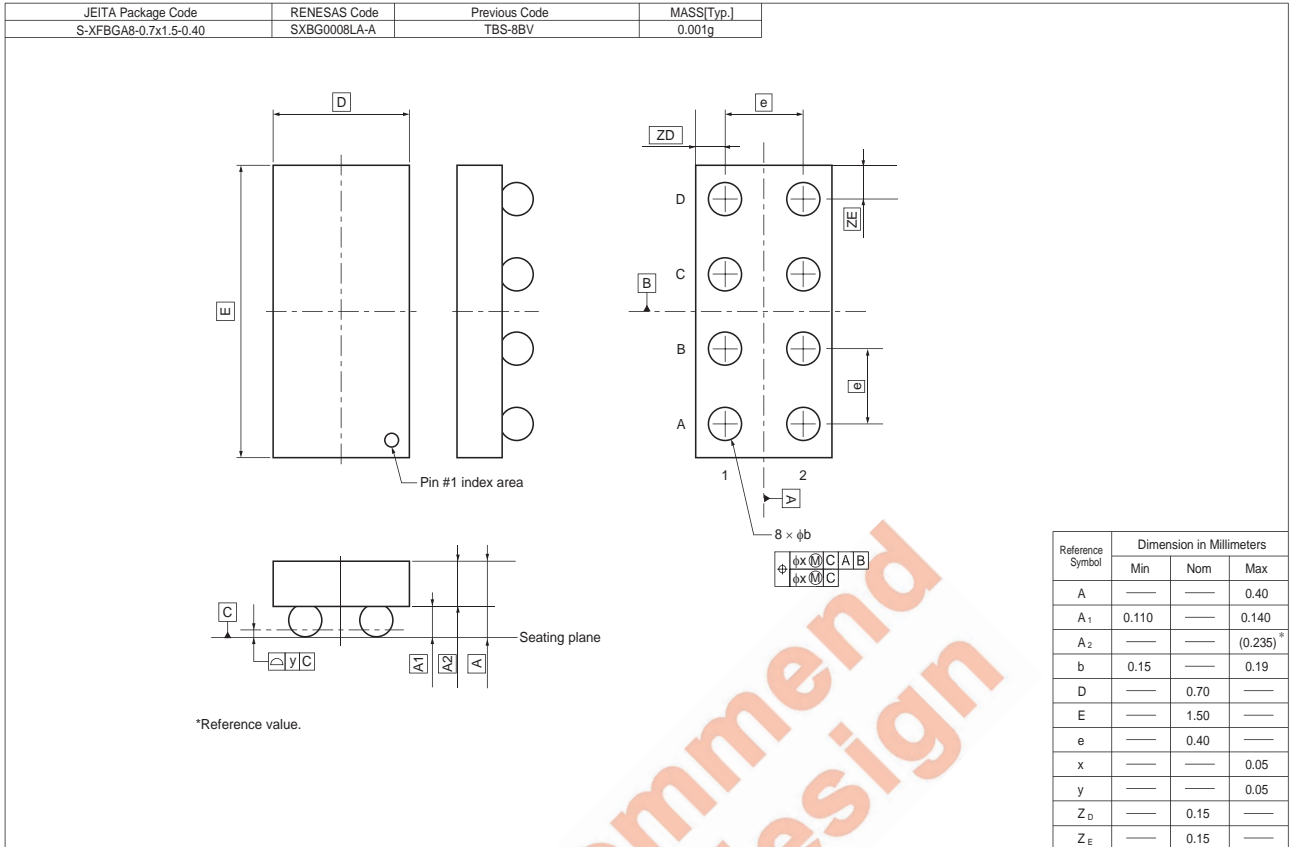
• Waveforms



$V_{CC}$ (V)	Inputs		$V_{ref}$	$C_L$	$R_L$
	$V_I$	$t_r / t_f$			
$1.8 \pm 0.15$	$V_{CC}$	$\leq 2$ ns	$V_{CC} / 2$	30 pF	1.0 k $\Omega$
$2.5 \pm 0.2$	$V_{CC}$	$\leq 2$ ns	$V_{CC} / 2$	30 pF	500 $\Omega$
$3.3 \pm 0.3$	3 V	$\leq 2.5$ ns	1.5 V	50 pF	500 $\Omega$
$5.0 \pm 0.5$	$V_{CC}$	$\leq 2.5$ ns	$V_{CC} / 2$	50 pF	500 $\Omega$

- Notes: 1. Input waveform: PRR  $\leq$  10 MHz,  $Z_o = 50 \Omega$ .  
 2. The output are measured one at a time with one transition per measurement.

Package Dimensions



Not recommend for new design

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**Renesas Technology America, Inc.**

450 Holger Way, San Jose, CA 95134-1368, U.S.A  
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

**Renesas Technology Europe Limited**

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

**Renesas Technology (Shanghai) Co., Ltd.**

Unit 204, 205, AZIACenter, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120  
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7898

**Renesas Technology Hong Kong Ltd.**

7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong  
Tel: <852> 2265-6688, Fax: <852> 2730-6071

**Renesas Technology Taiwan Co., Ltd.**

10th Floor, No.99, Fushing North Road, Taipei, Taiwan  
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

**Renesas Technology Singapore Pte. Ltd.**

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
Tel: <65> 6213-0200, Fax: <65> 6278-8001

**Renesas Technology Korea Co., Ltd.**

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea  
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

**Renesas Technology Malaysia Sdn. Bhd**

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: <603> 7955-9390, Fax: <603> 7955-9510