

# RD74LVC2G02

## Dual 2-Input NOR Gate

REJ03D0748-0100  
Rev.1.00  
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### Description

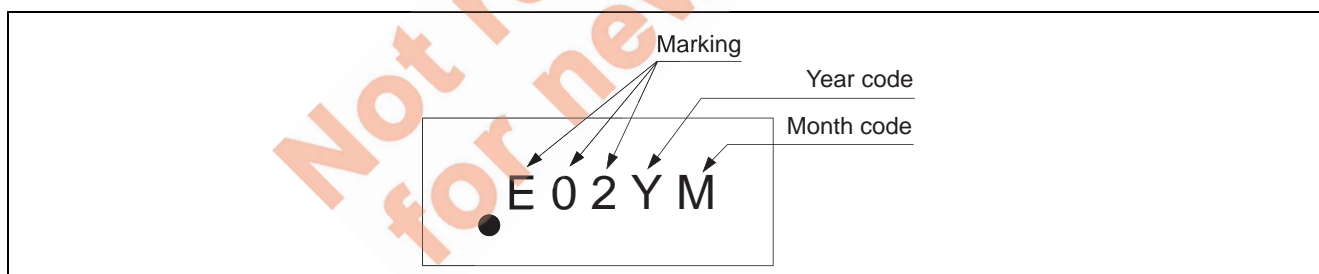
The RD74LVC2G02 has dual 2-input NOR gate in an 8-pin package. Low voltage and high-speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

### 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 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)
RD74LVC2G02WPE	WCSP-8 pin	SXBG0008LA-A (TBS-8BV)	WP	E (3,000 pcs/reel)

### Article Indication



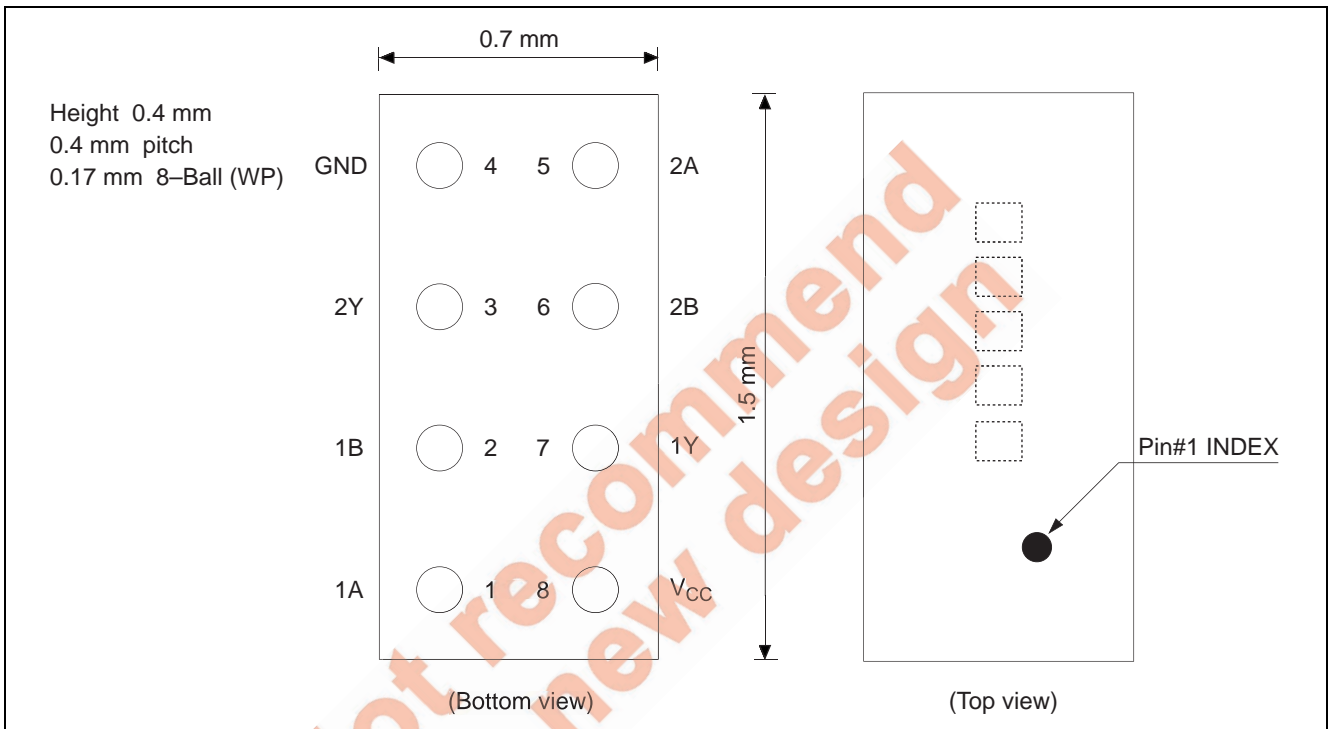
**Function Table**

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

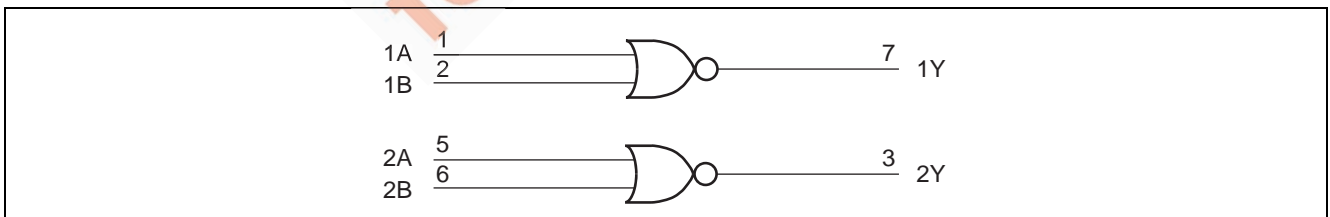
H: High level

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		$V_{CC} : OFF$
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	$^{\circ}C/W$	WP
Storage temperature	$T_{stg}$	-65 to 150	$^{\circ}C$	

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

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	$t_{PLH}$ $t_{PHL}$	2.8	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	$t_{PLH}$ $t_{PHL}$	1.2	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

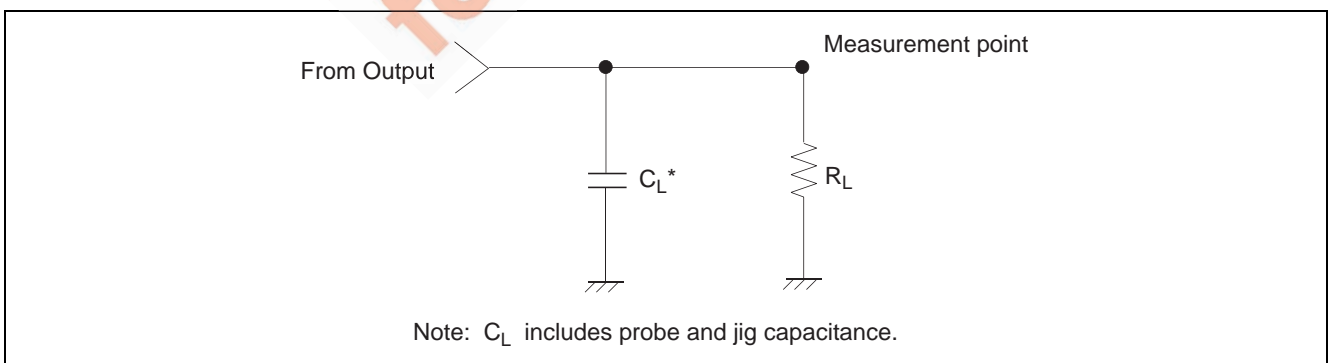
$V_{CC} = 5.0 \pm 0.5 \text{ V}$

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

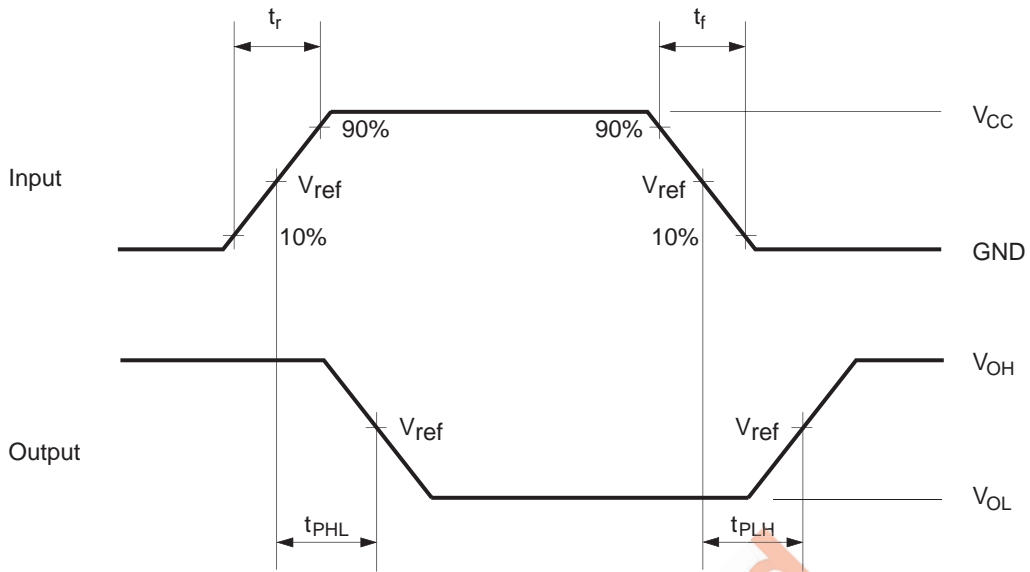
## Operating Characteristics

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



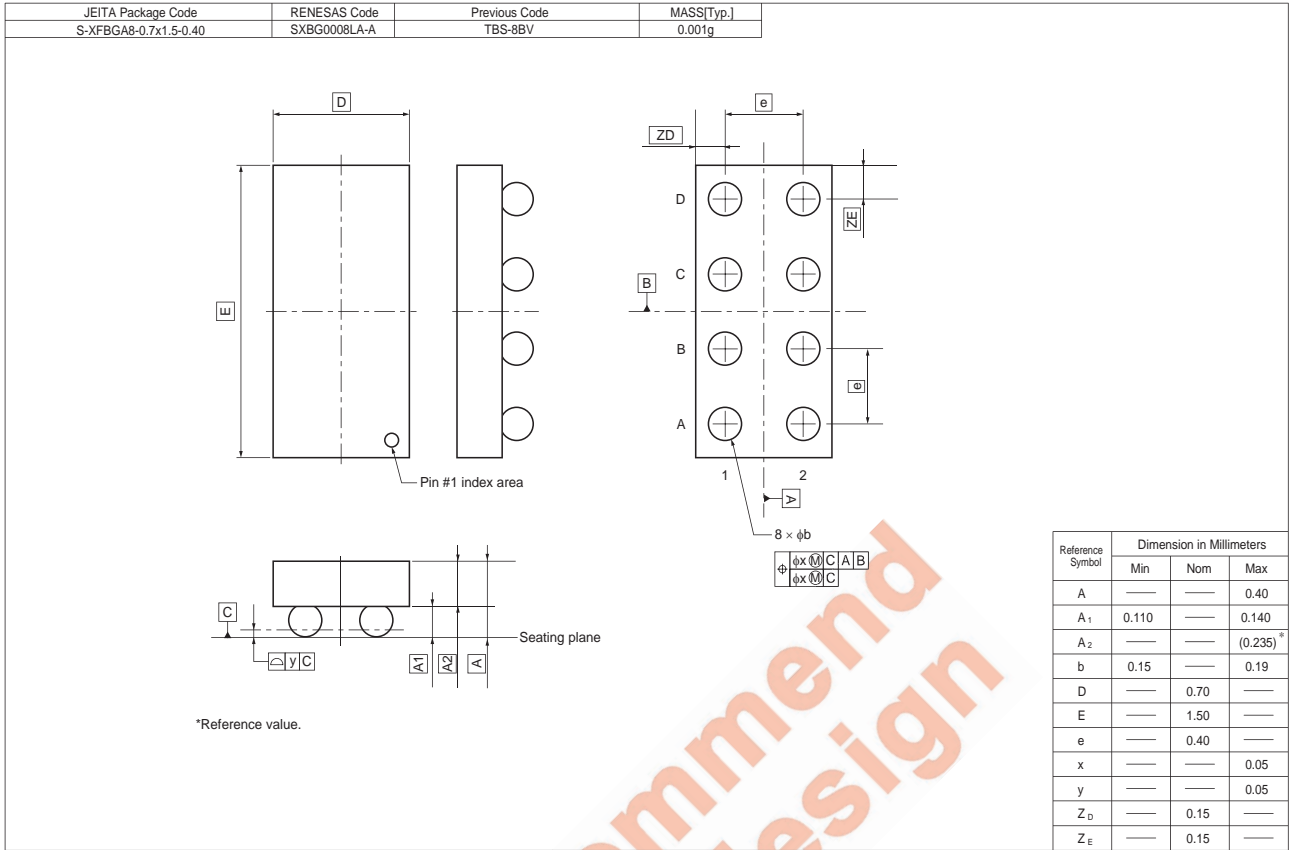
• Waveforms



V <sub>CC</sub> (V)	Inputs		V <sub>ref</sub>	C <sub>L</sub>	R <sub>L</sub>
	V <sub>I</sub>	t <sub>r</sub> / t <sub>f</sub>			
1.8±0.15	V <sub>CC</sub>	≤ 2 ns	V <sub>CC</sub> / 2	30 pF	1.0 kΩ
2.5±0.2	V <sub>CC</sub>	≤ 2 ns	V <sub>CC</sub> / 2	30 pF	500 Ω
3.3±0.3	3 V	≤ 2.5 ns	1.5 V	50 pF	500 Ω
5.0±0.5	V <sub>CC</sub>	≤ 2.5 ns	V <sub>CC</sub> / 2	50 pF	500 Ω

- Notes: 1. Input waveform: PRR ≤ 10 MHz, Z<sub>o</sub> = 50 Ω.  
 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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