



# RD74LVC32B

## Quad. 2-input OR Gates

REJ03D0224-0100Z

Rev.1.00

May 11, 2004

### Description

The RD74LVC32B has four 2-input OR gates in a 14 pin package. Low voltage and high speed operation is suitable at the battery drive product (note type personal computer) and low power consumption extends the life of a battery for long time operation.

### Features

- $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}$
- All inputs  $V_{IH} (\text{Max.}) = 5.5 \text{ V} (@V_{CC} = 0 \text{ V to } 5.5 \text{ V})$
- Typical  $V_{OL}$  ground bounce  $< 0.8 \text{ V} (@V_{CC} = 3.3 \text{ V}, T_a = 25^\circ\text{C})$
- Typical  $V_{OH}$  undershoot  $> 2.0 \text{ V} (@V_{CC} = 3.3 \text{ V}, T_a = 25^\circ\text{C})$
- High output current
  - $\pm 4 \text{ mA} (@V_{CC} = 1.65 \text{ V})$
  - $\pm 8 \text{ mA} (@V_{CC} = 2.3 \text{ V})$
  - $\pm 12 \text{ mA} (@V_{CC} = 2.7 \text{ V})$
  - $\pm 24 \text{ mA} (@V_{CC} = 3.0 \text{ V to } 5.5 \text{ V})$
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
RD74LVC32BFPEL	SOP-14 pin (JEITA)	FP-14DAV	FP	EL (2,000 pcs/reel)
RD74LVC32BTELL	TSSOP-14 pin	TTP-14DV	T	ELL (2,000 pcs/reel)

### Function Table

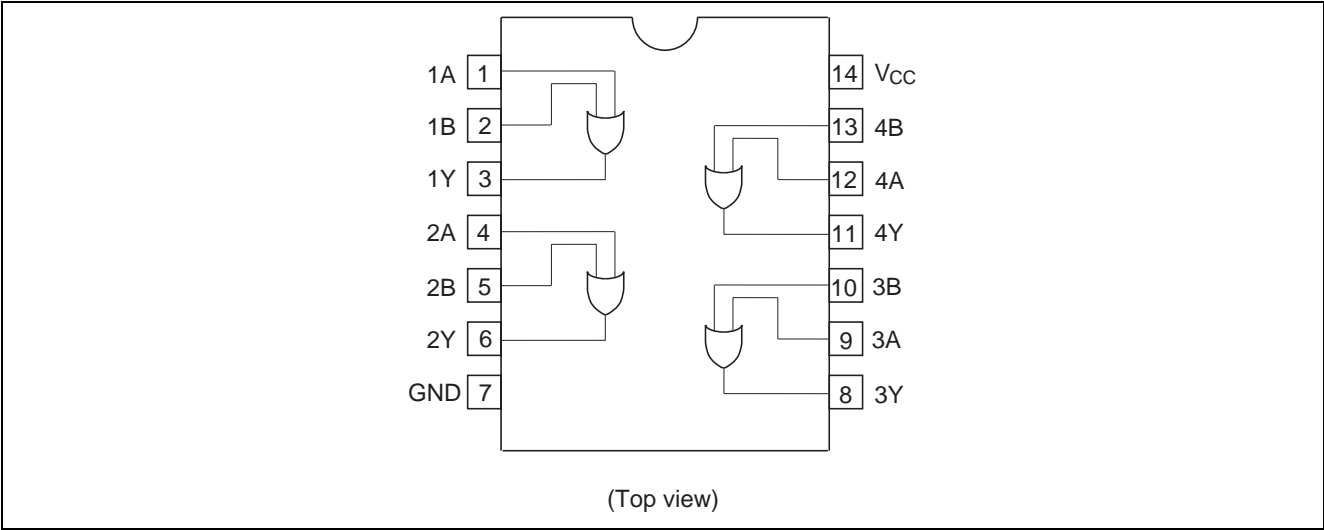
Inputs		Output Y
A	B	
L	L	L
H	L	H
L	H	H
H	H	H

H : High level

L : Low level



Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V <sub>CC</sub>	−0.5 to 7.0	V	
Input diode current	I <sub>IK</sub>	−50	mA	V <sub>I</sub> = −0.5 V
Input voltage	V <sub>I</sub>	−0.5 to 7.0	V	
Output diode current	I <sub>OK</sub>	−50	mA	V <sub>O</sub> = −0.5 V
		50	mA	V <sub>O</sub> = V <sub>CC</sub> +0.5 V
Output voltage	V <sub>O</sub>	−0.5 to V <sub>CC</sub> +0.5	V	
Output current	I <sub>O</sub>	±50	mA	
V <sub>CC</sub> , GND current / pin	I <sub>CC</sub> or I <sub>GND</sub>	100	mA	
Storage temperature	T <sub>stg</sub>	−65 to +150	°C	

Note: 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.

## Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	$V_{CC}$	1.5 to 5.5	V	Data hold
		1.65 to 5.5		At operation
Input / Output voltage	$V_I$	0 to 5.5	V	A, B
	$V_O$	0 to $V_{CC}$		Y
Operating temperature	$T_a$	-40 to 85	°C	
Output current	$I_{OH}$	-4	mA	$V_{CC} = 1.65\text{ V}$
		-8		$V_{CC} = 2.3\text{ V}$
		-12		$V_{CC} = 2.7\text{ V}$
		-24		$V_{CC} = 3.0\text{ V to }5.5\text{ V}$
	$I_{OL}$	4		$V_{CC} = 1.65\text{ V}$
		8		$V_{CC} = 2.3\text{ V}$
		12		$V_{CC} = 2.7\text{ V}$
		24		$V_{CC} = 3.0\text{ V to }5.5\text{ V}$
Input rise / fall time <sup>*1</sup>	$t_r, t_f$	20	ns/V	$V_{CC} = 1.65\text{ V to }2.7\text{ V}$
		10		$V_{CC} = 3.0\text{ V to }5.5\text{ V}$

Notes: 1. This item guarantees maximum limit when one input switches.

Waveform: Refer to test circuit of switching characteristics.

## Electrical Characteristics

Item	Symbol	V <sub>CC</sub> (V)	Ta = -40 to 85°C		Unit	Test Conditions
			Min	Max		
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	—		
		2.7 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		
		2.7 to 3.6	—	0.8		
		4.5 to 5.5	—	V <sub>CC</sub> ×0.3		
Output voltage	V <sub>OH</sub>	1.65 to 5.5	V <sub>CC</sub> -0.2	—	V	I <sub>OH</sub> = -100 µA
		1.65	1.2	—		I <sub>OH</sub> = -4 mA
		2.3	1.7	—		I <sub>OH</sub> = -8 mA
		2.7	2.2	—		I <sub>OH</sub> = -12 mA
		3.0	2.4	—		
		3.0	2.2	—		I <sub>OH</sub> = -24 mA
		4.5	3.8	—		
	V <sub>OL</sub>	1.65 to 5.5	—	0.2		I <sub>OL</sub> = 100 µA
		1.65	—	0.45		I <sub>OL</sub> = 4 mA
		2.3	—	0.7		I <sub>OL</sub> = 8 mA
		2.7	—	0.4		I <sub>OL</sub> = 12 mA
		3.0	—	0.55		I <sub>OL</sub> = 24 mA
		4.5	—	0.55		
Input current	I <sub>IN</sub>	0 to 5.5	—	±5.0	µA	V <sub>IN</sub> = 5.5 V or GND
Quiescent supply current	I <sub>CC</sub>	2.7 to 3.6	—	±5.0	µA	V <sub>IN</sub> = 3.6 V to 5.5 V
		2.7 to 5.5	—	5.0		V <sub>IN</sub> = V <sub>CC</sub> or GND
	ΔI <sub>CC</sub>	2.7 to 3.6	—	500		V <sub>IN</sub> = one input at (V <sub>CC</sub> -0.6)V, other inputs at V <sub>CC</sub> or GND

## Switching Characteristics

Item	Symbol	V <sub>CC</sub> (V)	Ta = -40 to 85°C			Unit	From (Input)	To (Output)
			Min	Typ	Max			
Propagation delay time	t <sub>PLH</sub>	1.8±0.15	1.0	—	8.7	ns	A or B	Y
	t <sub>PHL</sub>	2.5±0.2	1.0	—	5.4			
		2.7	1.0	—	4.4			
		3.3±0.3	1.0	—	3.8			
		5.0±0.5	1.0	—	3.5			
Between output pins skew*1	t <sub>OSLH</sub>	1.8±0.15	—	—	—	ns		
	t <sub>OSHL</sub>	2.5±0.2	—	—	—			
		2.7	—	—	—			
		3.3±0.3	—	—	1.0			
		5.0±0.5	—	—	1.0			
Input capacitance	C <sub>IN</sub>	3.3	—	5.0	—	pF		

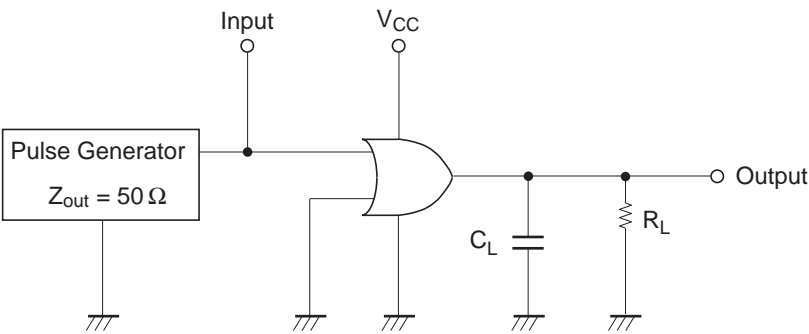
Note: 1. This parameter is characterized but not tested.

$$t_{OSLH} = |t_{PLHm} - t_{PLHn}|, t_{OSHL} = |t_{PHLm} - t_{PHLn}|$$

## Operating Characteristics

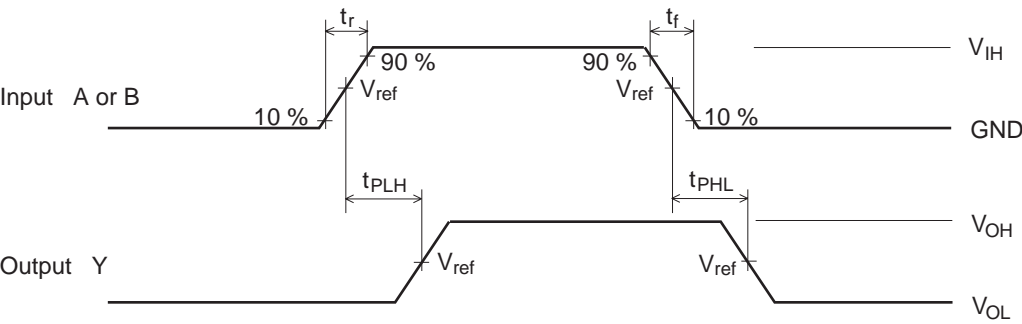
Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Unit	Test conditions
			Min	Typ	Max		
Power dissipation Capacitance	C <sub>PD</sub>	1.8	—	10	—	pF	f = 10 MHz
		2.5	—	12	—		
		3.3	—	12	—		
		5.0	—	15	—		

# Test Circuit



Note: 1.  $C_L$  includes probe and jig capacitance.

# Waveforms

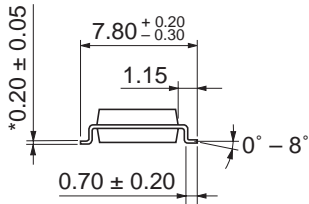
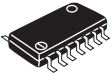
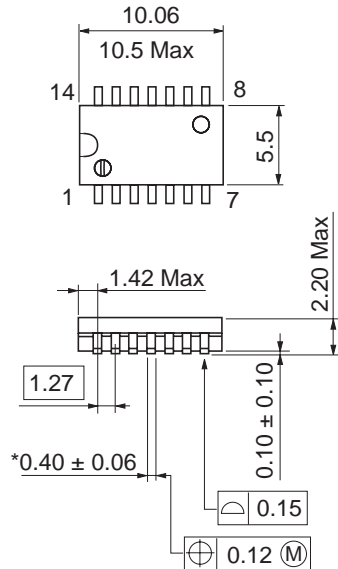


VCC (V)	INPUTS		Vref	CL	RL
	V <sub>IH</sub>	t <sub>r</sub> /t <sub>f</sub>			
V <sub>CC</sub> = 1.8±0.15 V	V <sub>CC</sub>	≤ 2 ns	1/2 V <sub>CC</sub>	30 pF	1.0 kΩ
V <sub>CC</sub> = 2.5±0.2 V	V <sub>CC</sub>	≤ 2 ns	1/2 V <sub>CC</sub>	30 pF	500 Ω
V <sub>CC</sub> = 2.7 V	2.7 V	≤ 2.5 ns	1.5 V	50 pF	500 Ω
V <sub>CC</sub> = 3.3±0.3 V	2.7 V	≤ 2.5 ns	1.5 V	50 pF	500 Ω
V <sub>CC</sub> = 5.0±0.5 V	V <sub>CC</sub>	≤ 2.5 ns	1/2 V <sub>CC</sub>	50 pF	500 Ω

Note: 1. Input waveform : PRR = 10 MHz, duty cycle 50%.

Package Dimensions

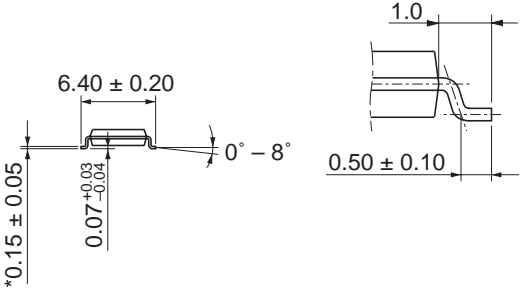
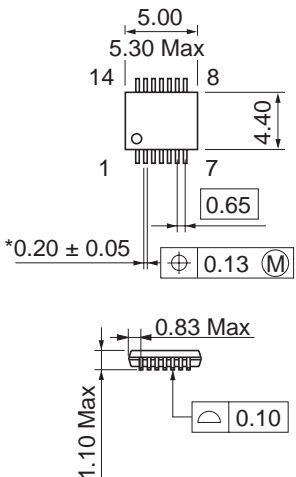
As of January, 2003  
Unit: mm



\*Ni/Pd/Au plating

Package Code	FP-14DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.23 g

As of January, 2003  
Unit: mm



\*Ni/Pd/Au plating

Package Code	TTP-14DV
JEDEC	—
JEITA	—
Mass (reference value)	0.05 g

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