# 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 V to 5.5 V
- All inputs $V_{IH}$ (Max.) = 5.5 V (@$V_{CC}$ = 0 V to 5.5 V)
- Typical $V_{OL}$ ground bounce < 0.8 V (@$V_{CC}$ = 3.3 V, Ta = 25°C)
- Typical $V_{OH}$ undershoot > 2.0 V (@$V_{CC}$ = 3.3 V, Ta = 25°C)
- High output current ±4 mA (@$V_{CC}$ = 1.65 V)
  ±8 mA (@$V_{CC}$ = 2.3 V)
  ±12 mA (@$V_{CC}$ = 2.7 V)
  ±24 mA (@$V_{CC}$ = 3.0 V to 5.5 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) |

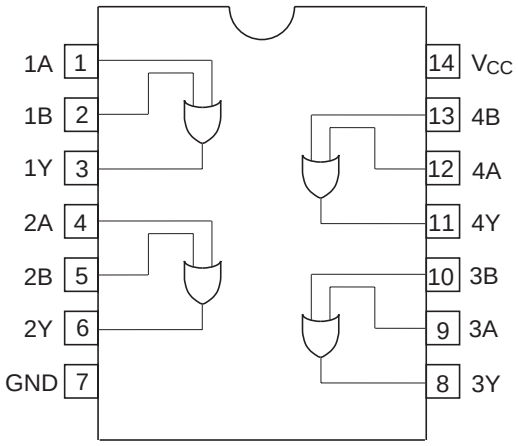
## Function Table

| 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




(Top view)

## Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit | Conditions |
|---|---|---|---|---|
| Supply voltage | $V_{CC}$ | –0.5 to 7.0 | V | |
| Input diode current | $I_{IK}$ | –50 | mA | $V_I$ = –0.5 V |
| Input voltage | $V_I$ | –0.5 to 7.0 | V | |
| Output diode current | $I_{OK}$ | –50 | mA | $V_O$ = –0.5 V |
| | | 50 | mA | $V_O$ = $V_{CC}$+0.5 V |
| Output voltage | $V_O$ | –0.5 to $V_{CC}$+0.5 | V | |
| Output current | $I_O$ | ±50 | mA | |
| $V_{CC}$, GND current / pin | $I_{CC}$ or $I_{GND}$ | 100 | mA | |
| Storage temperature | Tstg | –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 | Ta | –40 to 85 | °C | |
| Output current | $I_{OH}$ | –4 | mA | $V_{CC}$ = 1.65 V |
| | | –8 | | $V_{CC}$ = 2.3 V |
| | | –12 | | $V_{CC}$ = 2.7 V |
| | | –24 | | $V_{CC}$ = 3.0 V to 5.5 V |
| | $I_{OL}$ | 4 | | $V_{CC}$ = 1.65 V |
| | | 8 | | $V_{CC}$ = 2.3 V |
| | | 12 | | $V_{CC}$ = 2.7 V |
| | | 24 | | $V_{CC}$ = 3.0 V to 5.5 V |
| Input rise / fall time[*1] | $t_r$, $t_f$ | 20 | ns/V | $V_{CC}$ = 1.65 V to 2.7 V |
| | | 10 | | $V_{CC}$ = 3.0 V to 5.5 V |

Notes: 1. This item guarantees maximum limit when one input switches.
Waveform: Refer to test circuit of switching characteristics.

## Electrical Characteristics

| Item | Symbol | $V_{CC}$ (V) | Ta = –40 to 85°C | | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| | | | Min | Max | | |
| Input voltage | $V_{IH}$ | 1.65 to 1.95 | $V_{CC}$×0.65 | — | V | |
| | | 2.3 to 2.7 | 1.7 | — | | |
| | | 2.7 to 3.6 | 2.0 | — | | |
| | | 4.5 to 5.5 | $V_{CC}$×0.7 | — | | |
| | $V_{IL}$ | 1.65 to 1.95 | — | $V_{CC}$×0.35 | | |
| | | 2.3 to 2.7 | — | 0.7 | | |
| | | 2.7 to 3.6 | — | 0.8 | | |
| | | 4.5 to 5.5 | — | $V_{CC}$×0.3 | | |
| Output voltage | $V_{OH}$ | 1.65 to 5.5 | $V_{CC}$–0.2 | — | V | $I_{OH}$ = –100 µA |
| | | 1.65 | 1.2 | — | | $I_{OH}$ = –4 mA |
| | | 2.3 | 1.7 | — | | $I_{OH}$ = –8 mA |
| | | 2.7 | 2.2 | — | | $I_{OH}$ = –12 mA |
| | | 3.0 | 2.4 | — | | |
| | | 3.0 | 2.2 | — | | $I_{OH}$ = –24 mA |
| | | 4.5 | 3.8 | — | | |
| | $V_{OL}$ | 1.65 to 5.5 | — | 0.2 | | $I_{OL}$ = 100 µA |
| | | 1.65 | — | 0.45 | | $I_{OL}$ = 4 mA |
| | | 2.3 | — | 0.7 | | $I_{OL}$ = 8 mA |
| | | 2.7 | — | 0.4 | | $I_{OL}$ = 12 mA |
| | | 3.0 | — | 0.55 | | $I_{OL}$ = 24 mA |
| | | 4.5 | — | 0.55 | | |
| Input current | $I_{IN}$ | 0 to 5.5 | — | ±5.0 | µA | $V_{IN}$ = 5.5 V or GND |
| Quiescent supply current | $I_{CC}$ | 2.7 to 3.6 | — | ±5.0 | µA | $V_{IN}$ = 3.6 V to 5.5 V |
| | | 2.7 to 5.5 | — | 5.0 | | $V_{IN}$ = $V_{CC}$ or GND |
| | $\Delta I_{CC}$ | 2.7 to 3.6 | — | 500 | | $V_{IN}$ = one input at ($V_{CC}$–0.6)V, other inputs at $V_{CC}$ or GND |

## Switching Characteristics

| Item | Symbol | $V_{CC}$ (V) | Ta = –40 to 85°C | | | Unit | From (Input) | To (Output) |
|---|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | | | |
| Propagation delay time | $t_{PLH}$ | 1.8±0.15 | 1.0 | — | 8.7 | ns | A or B | Y |
| | $t_{PHL}$ | 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] | $t_{OSLH}$ | 1.8±0.15 | — | — | — | ns | | |
| | $t_{OSHL}$ | 2.5±0.2 | — | — | — | | | |
| | | 2.7 | — | — | — | | | |
| | | 3.3±0.3 | — | — | 1.0 | | | |
| | | 5.0±0.5 | — | — | 1.0 | | | |
| Input capacitance | $C_{IN}$ | 3.3 | — | 5.0 | — | pF | | |

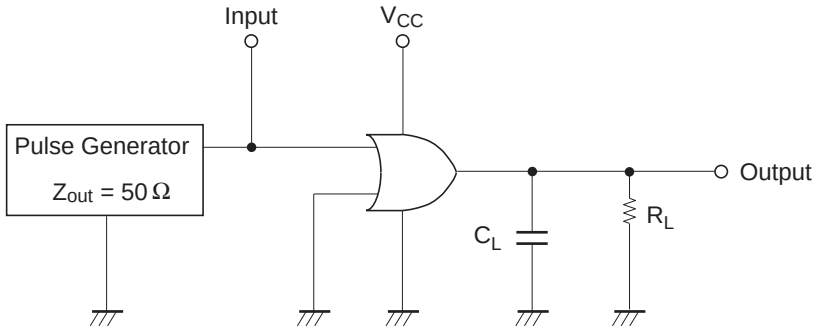
Note: 1. This parameter is characterized but not tested.

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

## Operating Characteristics

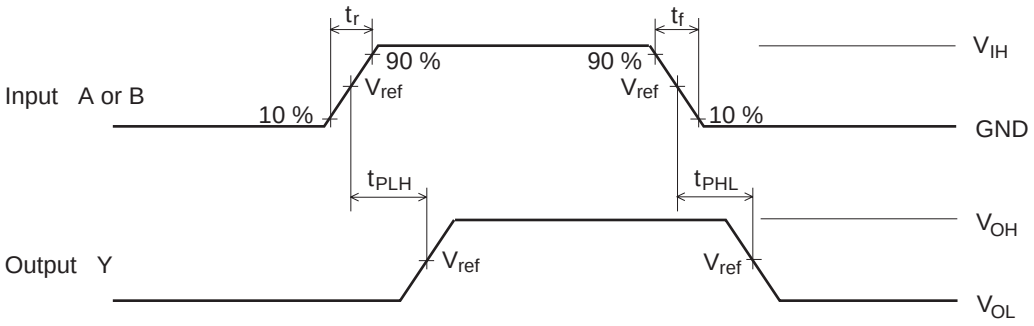
| Item | Symbol | $V_{CC}$ (V) | Ta = 25°C | | | Unit | Test conditions |
|---|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | | |
| Power dissipation Capacitance | $C_{PD}$ | 1.8 | — | 10 | — | pF | f = 10 MHz |
| | | 2.5 | — | 12 | — | | |
| | | 3.3 | — | 12 | — | | |
| | | 5.0 | — | 15 | — | | |

## Test Circuit




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

### Waveforms



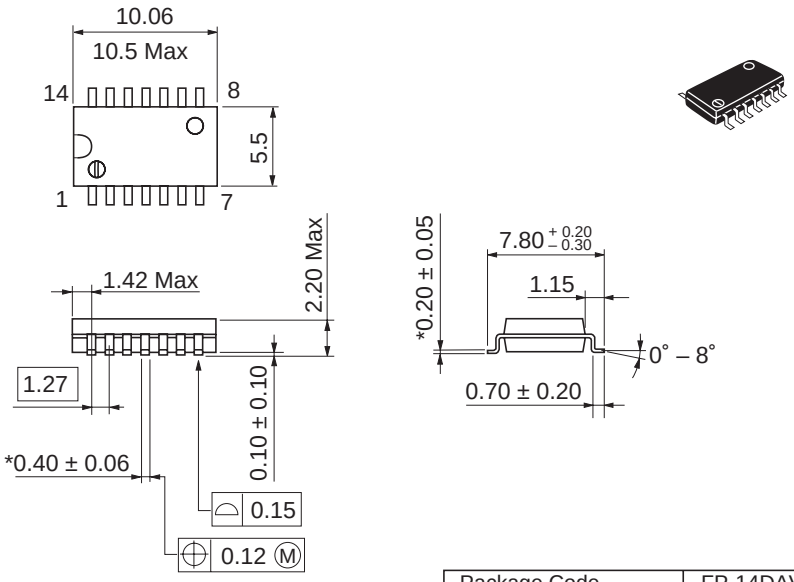

| | INPUTS | | | | |
|---|---|---|---|---|---|
| $V_{CC}$ (V) | $V_{IH}$ | $t_r/t_f$ | $V_{ref}$ | $C_L$ | $R_L$ |
| $V_{CC}$ = 1.8±0.15 V | $V_{CC}$ | ≤ 2 ns | 1/2 $V_{CC}$ | 30 pF | 1.0 kΩ |
| $V_{CC}$ = 2.5±0.2 V | $V_{CC}$ | ≤ 2 ns | 1/2 $V_{CC}$ | 30 pF | 500 Ω |
| $V_{CC}$ = 2.7 V | 2.7 V | ≤ 2.5 ns | 1.5 V | 50 pF | 500 Ω |
| $V_{CC}$ = 3.3±0.3 V | 2.7 V | ≤ 2.5 ns | 1.5 V | 50 pF | 500 Ω |
| $V_{CC}$ = 5.0±0.5 V | $V_{CC}$ | ≤ 2.5 ns | 1/2 $V_{CC}$ | 50 pF | 500 Ω |

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

## Package Dimensions

As of January, 2003

Unit: mm

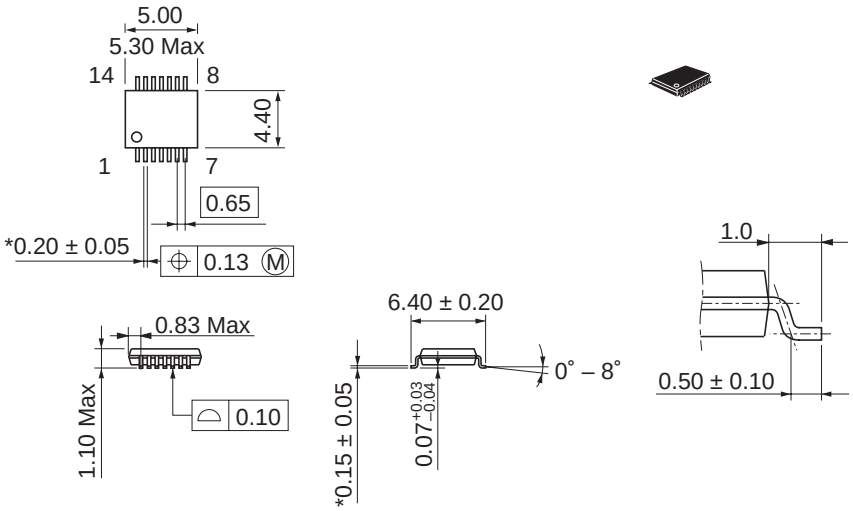



*Ni/Pd/Au plating

| | |
|---|---|
| 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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