

RD74LVC08B

Quad. 2-input AND Gates

REJ03D0221-0100Z

Rev.1.00

May 11, 2004

Description

The RD74LVC08B has four 2-input AND 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 V
- All inputs $V_{IH} (\text{Max.}) = 5.5 \text{ V}$ ($@V_{CC} = 0 \text{ V}$ to 5.5 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 V)
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
RD74LVC08BFPEL	SOP-14 pin (JEITA)	FP-14DAV	FP	EL (2,000 pcs/reel)
RD74LVC08BTELL	TSSOP-14 pin	TTP-14DV	T	ELL (2,000 pcs/reel)

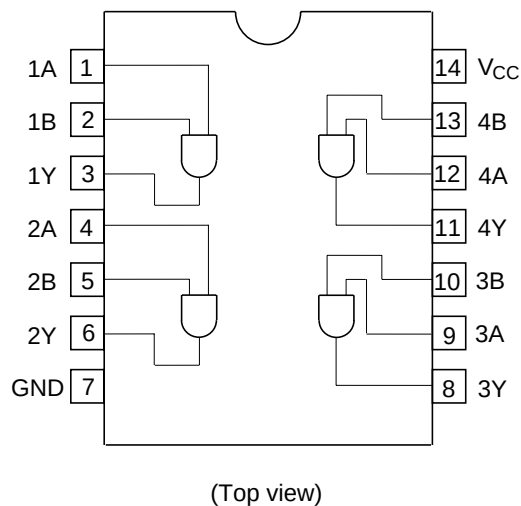
Function Table

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



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage range	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	T_{stg}	-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 ^{*1}	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 _{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
	ΔI _{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	—	9.8	ns	A or B	Y
	t _{PHL}	2.5±0.2	1.0	—	6.9			
		2.7	1.0	—	4.8			
		3.3±0.3	1.0	—	4.1			
		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		

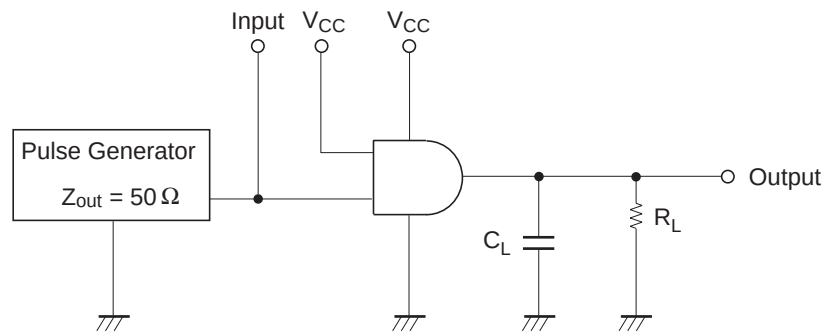
Note: 1. This parameter is characterized but not tested.

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

Operating Characteristics

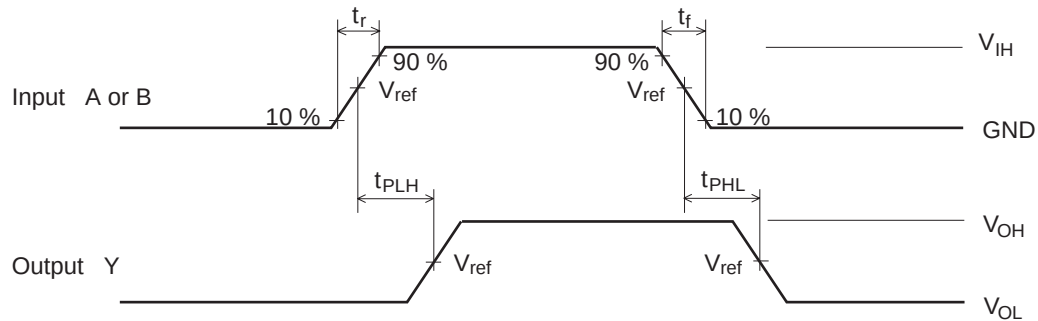
Item	Symbol	V _{CC} (V)	Ta = 25°C			Unit	Test conditions
			Min	Typ	Max		
Power dissipation Capacitance	C _{PD}	1.8	—	10	—	pF	f = 10 MHz
		2.5	—	12	—		
		3.3	—	12	—		
		5.0	—	15	—		

Test Circuit



Note: 1. C_L includes probe and jig capacitance.

Waveforms



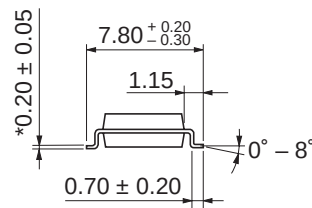
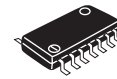
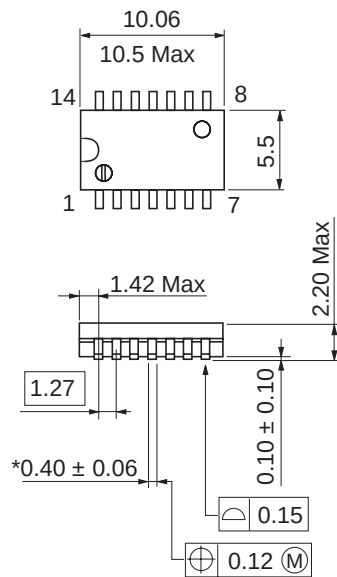
VCC (V)	INPUTS		Vref	CL	RL
	VIH	tr/tf			
VCC = 1.8±0.15 V	VCC	≤ 2 ns	1/2 VCC	30 pF	1.0 kΩ
VCC = 2.5±0.2 V	VCC	≤ 2 ns	1/2 VCC	30 pF	500 Ω
VCC = 2.7 V	2.7 V	≤ 2.5 ns	1.5 V	50 pF	500 Ω
VCC = 3.3±0.3 V	2.7 V	≤ 2.5 ns	1.5 V	50 pF	500 Ω
VCC = 5.0±0.5 V	VCC	≤ 2.5 ns	1/2 VCC	50 pF	500 Ω

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

Package Dimensions

As of January, 2003

Unit: mm

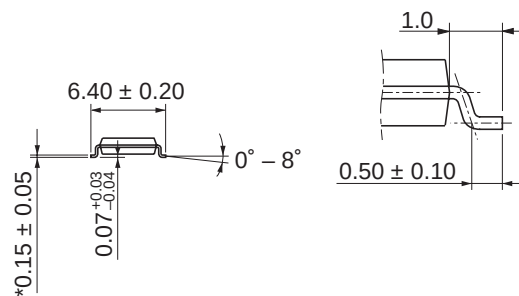
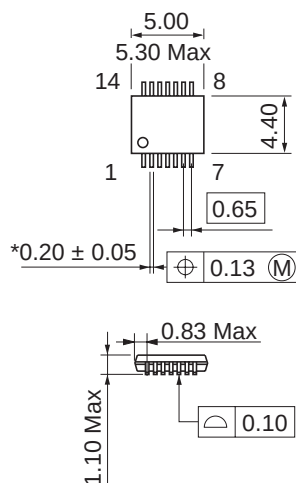


*Ni/Pd/Au plating

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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