

# RD74LVC14B

## Hex Schmitt-trigger Inverters

REJ03D0218-0100Z

Rev.1.00

Apr.09.2004

### Description

The RD74LVC14B has six Schmitt trigger inverters 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

- $V_{CC} = 2.0\text{ V to }5.5\text{ V}$
- 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)
RD74LVC14BFPEL	SOP-14 pin (JEITA)	FP-14DAV	FP	EL (2,000 pcs/reel)
RD74LVC14BTELL	TSSOP-14 pin	TTP-14DV	T	ELL (2,000 pcs/reel)

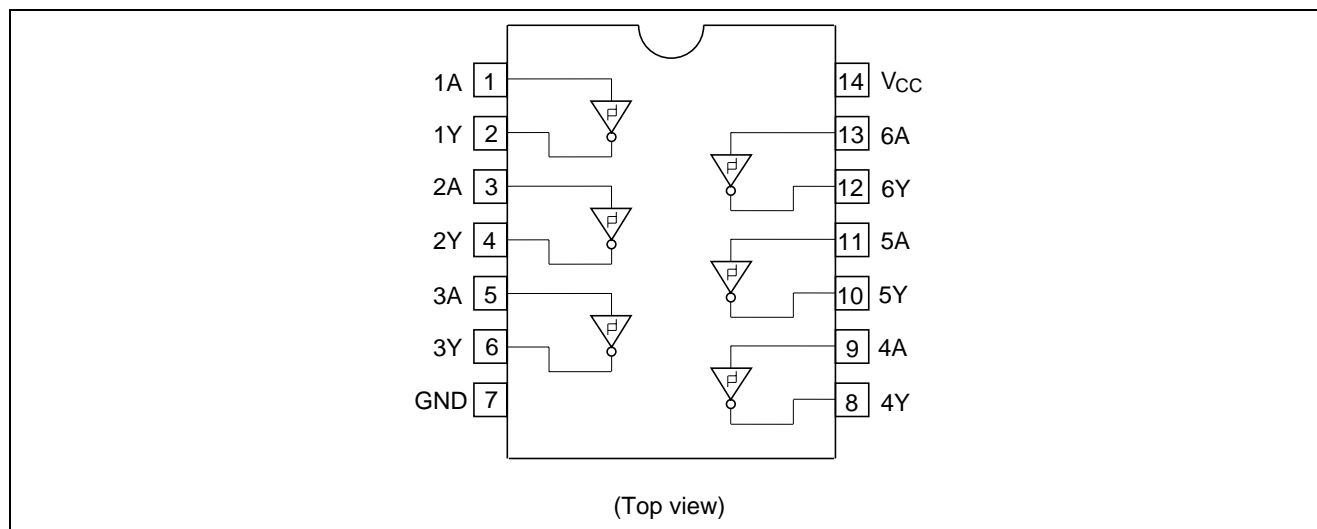
### Function Table

Input A	Output Y
L	H
H	L

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 50	mA	$V_O = -0.5$ V $V_O = V_{CC}+0.5$ V
Output voltage	$V_O$	-0.5 to $V_{CC}+0.5$	V	
Output current	$I_O$	$\pm 50$	mA	
$V_{CC}$ , GND current / pin	$I_{CC}$ or $I_{GND}$	100	mA	
Storage temperature	$T_{stg}$	-65 to +150	$^{\circ}$ 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 1.65 to 5.5	V	Data hold At operation
Input / Output voltage	$V_I$	0 to 5.5	V	A
	$V_O$	0 to $V_{CC}$		Y
Operating temperature	$T_a$	-40 to 85	$^{\circ}$ C	
Output current	$I_{OH}$	-4 -8 -12 -24	mA	$V_{CC} = 1.65$ V $V_{CC} = 2.3$ V $V_{CC} = 2.7$ V $V_{CC} = 3.0$ V to 5.5 V
	$I_{OL}$	4 8 12 24	mA	$V_{CC} = 1.65$ V $V_{CC} = 2.3$ V $V_{CC} = 2.7$ V $V_{CC} = 3.0$ V to 5.5 V

## Electrical Characteristics

Item	Symbol	V <sub>CC</sub> (V)	Ta = -40 to 85°C		Unit	Test Conditions				
			Min	Max						
Threshold voltage	V <sub>T</sub> <sup>+</sup>	1.65	0.4	1.3	V					
		1.95	0.6	1.5						
		2.3	0.8	1.7						
		2.5	0.8	1.7						
		2.7	1.0	2.0						
		3.0	1.2	2.2						
		3.6	1.5	2.4						
		4.5	1.6	2.6						
		5.5	2.0	3.0						
	V <sub>T</sub> <sup>-</sup>	1.65	0.15	0.85	V					
		1.95	0.25	0.95						
		2.3	0.4	1.2						
		2.5	0.4	1.2						
		2.7	0.4	1.4						
		3.0	0.6	1.5						
		3.6	0.8	1.8						
		4.5	1.0	2.0						
		5.5	1.4	2.4						
Hysteresis voltage	ΔV <sub>T</sub>	1.65	0.10	1.15	V	V <sub>T</sub> <sup>+</sup> - V <sub>T</sub> <sup>-</sup>				
		1.95	0.15	1.25						
		2.3	0.25	1.3						
		2.5	0.25	1.3						
		2.7	0.3	1.1						
		3.0	0.4	1.2						
		3.6	0.4	1.2						
		4.5	0.4	1.2						
		5.5	0.4	1.2						
Input 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	V	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	2.7 to 3.6	—			±5.0	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	μA	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	—	11.0	ns	A	Y
	t <sub>PHL</sub>	2.5±0.2	1.0	—	7.8			
		2.7	1.0	—	7.5			
		3.3±0.3	1.0	—	6.4			
		5.0±0.5	1.0	—	6.0			
Between output pins skew* <sup>1</sup>	t <sub>OSLH</sub>	1.8±0.15	—	—	—	ns		
	t <sub>OSSL</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		

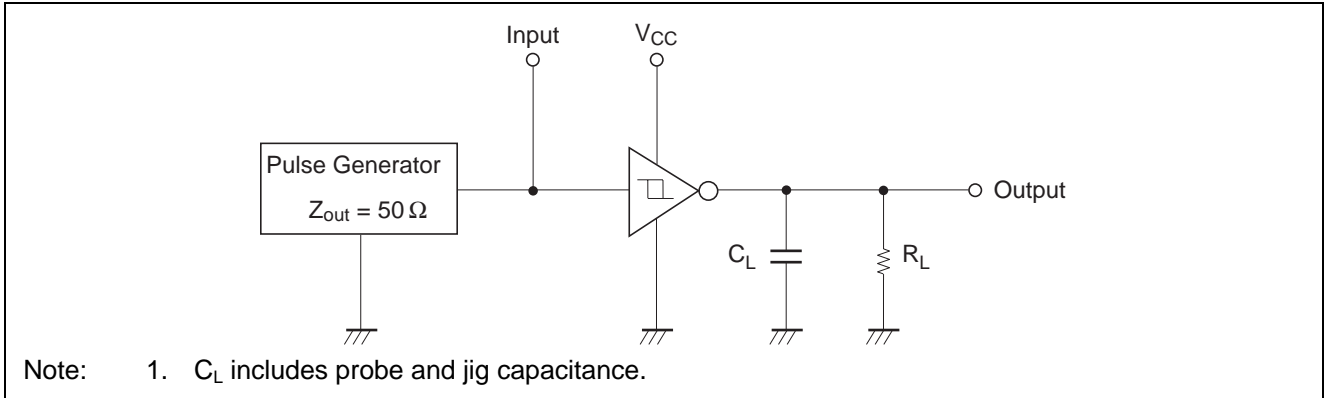
Note: 1. This parameter is characterized but not tested.

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

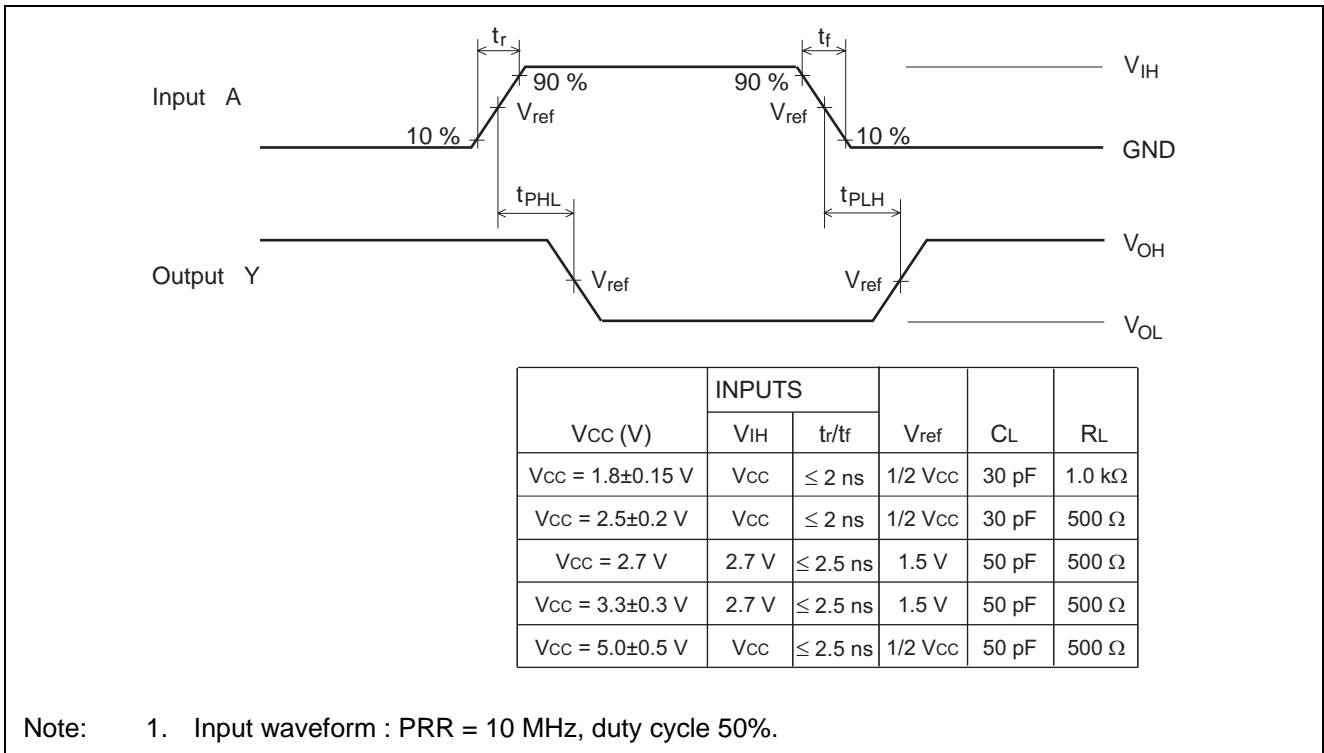
## Operating Characteristics

Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Unit	Test conditions
			Min	Typ	Max		
Power dissipation	C <sub>PD</sub>	1.8	—	16	—	pF	f = 10 MHz
Capacitance		2.5	—	18	—		
		3.3	—	20	—		
		5.0	—	25	—		

Test Circuit

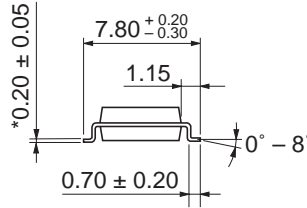
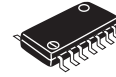
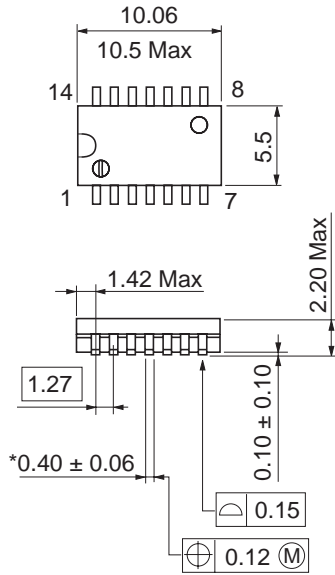


Waveforms



Package Dimensions

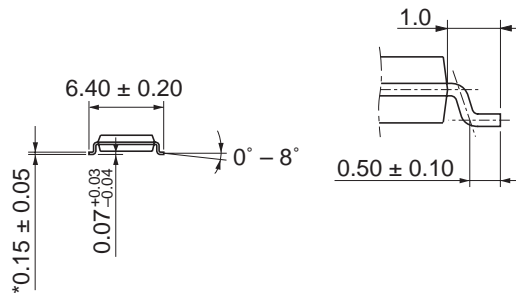
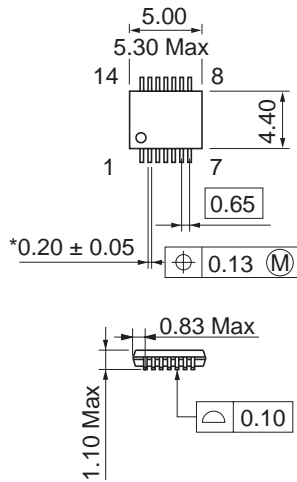
As of January, 2003  
Unit: mm



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

\*Ni/Pd/Au plating

As of January, 2003  
Unit: mm



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

\*Ni/Pd/Au plating

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