To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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HD74UH32

2-input OR Gate

REJ03D0203–0500Z
(Previous ADE-205-018C (Z))
Rev.5.00
Feb.02.2004

Description

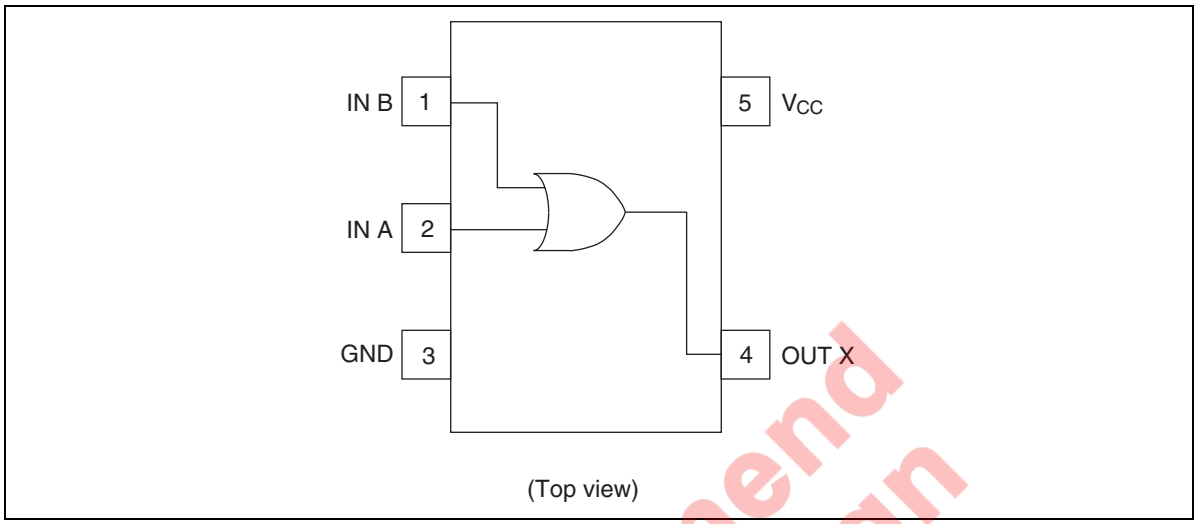
The HD74UH32 is high speed CMOS two input OR gate using silicon gate CMOS process. With CMOS low power dissipation, it provides high-speed equivalent to LS-TTL series. The internal circuit of three stages construction with buffer provides wide noise margin and stable output.

Features

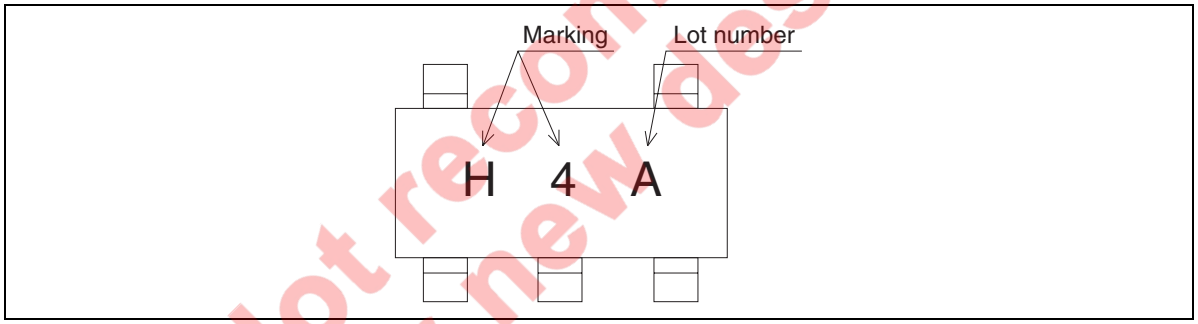
- Encapsulated in very small 5pins package of 2.9 × 1.6 × 1.1 mm, the efficiency to mount on substrate is significantly improved.
- The basic gate function is lined up as Renesas uni logic series.
- Supplied on emboss taping for high-speed automatic mounting.
- Electrical characteristics equivalent to the HD74HC32
  Supply voltage range: 2 to 6 V
  Operating temperature range: –40 to +85°C
- $| I_{OH} | = I_{OL}$ = 2 mA (min)
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74UH32EL	MPAK-5 pin	MPAK-5V	–	EL (3,000 pcs/reel)

Pin Arrangement



Article Indication



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}	–0.5 to +7.0	V
Input voltage	V_{IN}	–0.5 to V_{CC} +0.5	V
Output voltage	V_{OUT}	–0.5 to V_{CC} +0.5	V
Input diode current	I_{IK}	±20	mA
Output diode current	I_{OK}	±20	mA
Output current	I_{OUT}	±25	mA
V_{CC}/GND current	I_{CC}, I_{GND}	±25	mA
Power dissipation	P_T	200	mW
Storage temperature	Tstg	–65 to +150	°C

Recommended Operating Conditions

Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}	2 to 6	V
Input voltage	V_{IN}	0 to V_{CC}	V
Output voltage	V_{OUT}	0 to V_{CC}	V
Operating temperature	Topr	–40 to +85	°C
Input rise/fall time	t_r, t_f	0 to 1000 (V_{CC} = 2.0 V)	ns
		0 to 500 (V_{CC} = 4.5 V)	
		0 to 400 (V_{CC} = 6.0 V)	

Electrical Characteristics

		V_{CC}	Ta = 25°C			Ta = –40 to 85°C				
Item	Symbol	(V)	Min	Typ	Max	Min	Max	Unit	Test Conditions	
Input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V_{IL}	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V_{OH}	2.0	1.9	2.0	—	1.9	—	V		I_{OH} = –20 µA
		4.5	4.4	4.5	—	4.4	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	4.31	—	4.13	—			I_{OH} = –2 mA
		6.0	5.68	5.80	—	5.63	—			I_{OH} = –2.6 mA
	V_{OL}	2.0	—	0.0	0.1	—	0.1	V	V_{IN} = V_{IL}	I_{OL} = 20 µA
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	0.17	0.26	—	0.33			I_{OL} = 2 mA
		6.0	—	0.18	0.26	—	0.33			I_{OL} = 2.6 mA
Input current	I_{IN}	6.0	—	—	±0.1	—	±1.0	µA	V_{IN} = V_{CC} or GND	
Operating current	I_{CC}	6.0	—	—	1.0	—	10.0		V_{IN} = V_{CC} or GND	

Switching Characteristics

(C_L = 15 pF, t_r = t_f = 6 ns, V_{CC} = 5 V)

Item	Symbol	Ta = 25°C Min	Typ	Max	Unit	Test Conditions
Output rise/fall time	t_{TLH} t_{THL}	—	5	10	ns	See Test circuit
Propagation delay time	t_{PLH} t_{PHL}	—	7	15	ns	See Test circuit

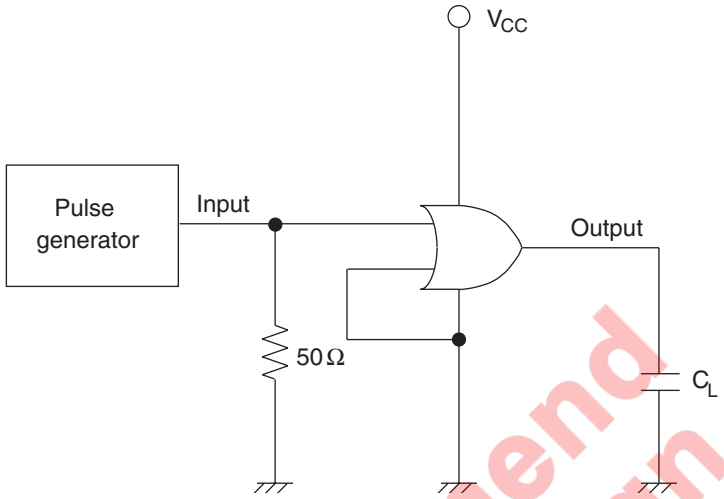
(C_L = 50 pF, t_r = t_f = 6 ns)

Item	Symbol	V_{CC} (V)	Ta = 25°C Min	Typ	Max	Ta = –40 to 85°C Min	Max	Unit	Test Conditions
Output rise/fall time	t_{TLH} t_{THL}	2.0	—	50	125	—	155	ns	See Test circuit
		4.5	—	14	25	—	31		
		6.0	—	12	21	—	26		
Propagation delay time	t_{PLH} t_{PHL}	2.0	—	48	100	—	125	ns	See Test circuit
		4.5	—	12	20	—	25		
		6.0	—	9	17	—	21		
Input capacitance	C_{IN}	—	—	5	10	—	10	pF	
Equivalent capacitance	C_{PD}	—	—	10	—	—	—		

Note: C_{PD} is equivalent capacitance inside of the IC calculated from the operating current without load (see test circuit). The average operating current without load is calculated according to the expression below.

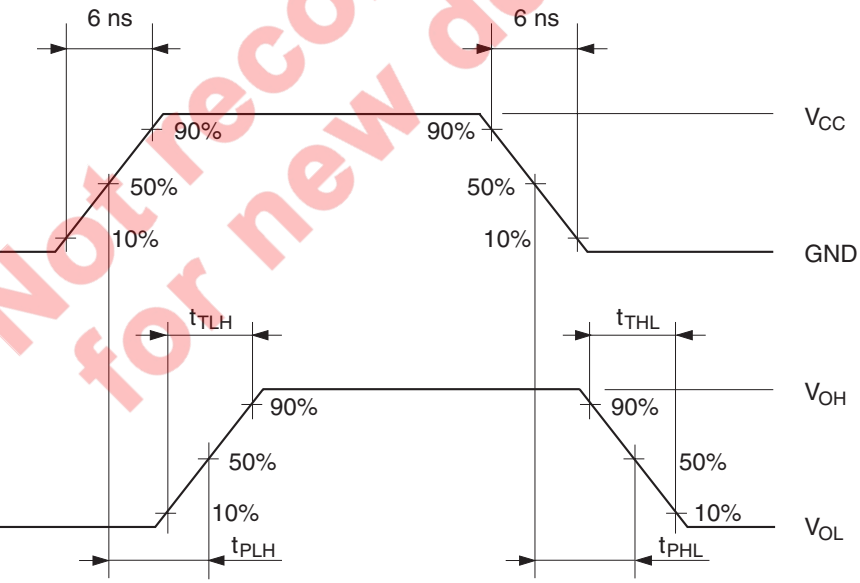
$I_{CC(opr)} = C_{PD} \bullet V_{CC} \bullet f_{IN} + I_{CC}$

Test Circuit



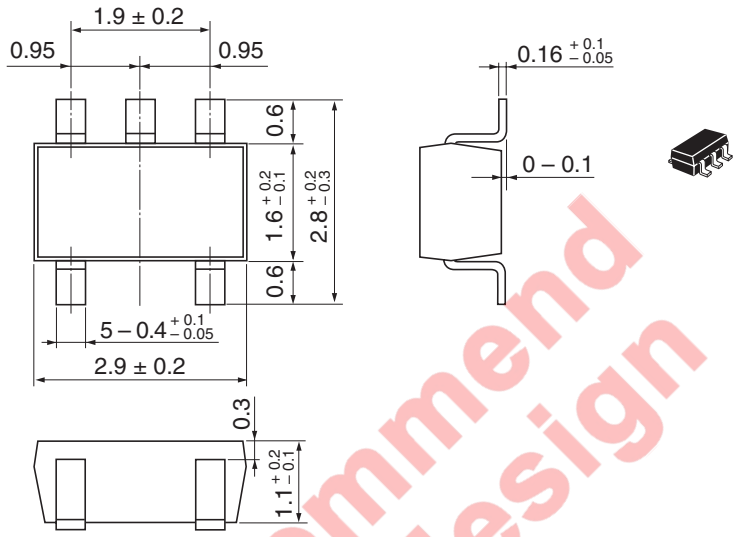
Note: Operating current test time, output is open.

Waveforms



Package Dimensions

Unit: mm



Package Code	MPAK–5V
JEDEC	—
JEITA	—
Mass (reference value)	0.015 g

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