RD5CYD08

IGBT Driver

R04DS0041EJ0800
Rev.8.00
Jan 10, 2014

Description

The RD5CYD08 has two–input AND gate in a 5 pin package. This product is suited as IGBT Driver IC for the strobe.

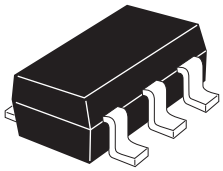
Features

- Supplied on emboss taping for high-speed automatic mounting.
- Supply voltage range : 4.0 to 6.0 V
- Operating temperature range: –40 to +85°C
- High drive current
  I_{OH} short = –130 mA (min) (@V_{CC} = 5.0 V)
- Low sink current
  I_{OL} short = 40 mA (max) (@V_{CC} = 5.0 V)
- Ordering Information

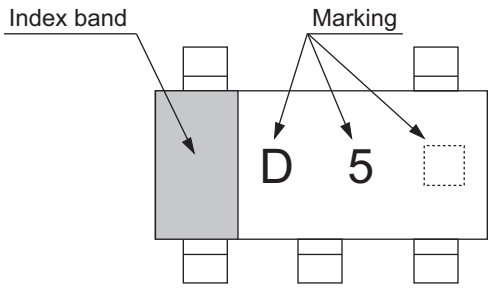
Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
RD5CYD08CME	CMPAK–5 pin	PTSP0005ZC-A (CMPAK–5V)	CM	E (3,000 pcs/reel)

Outline and Article Indication

• RD5CYD08

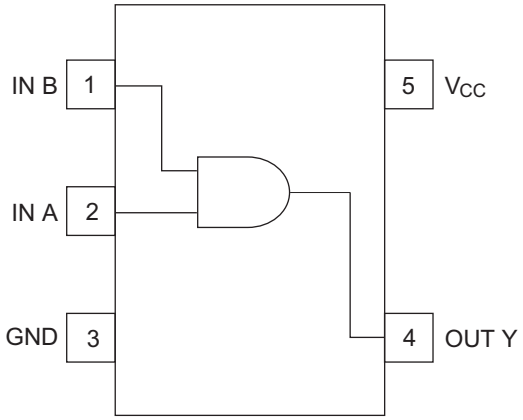


CMPAK–5



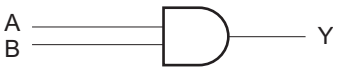
= Control code

Pin Arrangement



(Top view)

Logic Diagram

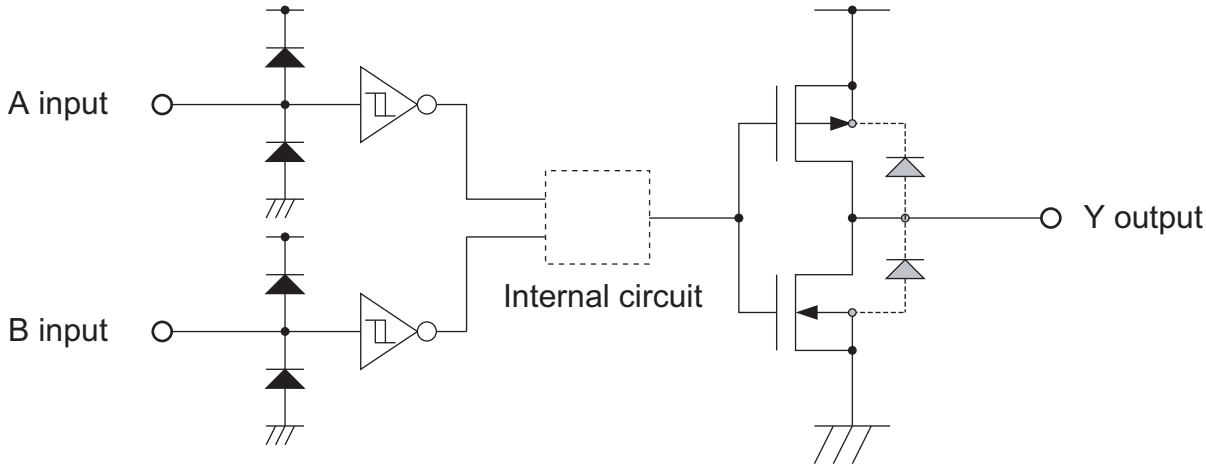


Function Table

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

H : High level
L : Low level

Block Diagram



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Test Conditions
Supply voltage range	V_{CC}	–0.5 to 7.0	V	
Input voltage range [*1]	V_I	–0.5 to V_{CC} + 0.5	V	
Output voltage range [*1, 2]	V_O	–0.5 to V_{CC} + 0.5	V	
Input clamp current	I_{IK}	±20	mA	$V_I < 0$ or $V_I > V_{CC}$
Output clamp current	I_{OK}	±50	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	I_O	–200	mA	$V_O = 0$
		100		$V_O = V_{CC}$
Continuous current through V_{CC} or GND	I_{CC} or I_{GND}	±200	mA	
Maximum power dissipation at Ta = 25°C (in still air) [*3]	P_T	200	mW	
Storage temperature	Tstg	–65 to 150	°C	

Notes: 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.

1. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed. When Over shoot / Under shoot pulse width is under 10 ns, input and output voltage permit to –1.5 V or V_{CC}+1.5 V.
2. This value is limited to 5.5 V maximum.
3. The maximum package power dissipation was calculated using a junction temperature of 150°C.

Recommended Operating Conditions

Item	Symbol	Min	Max	Unit	Conditions
Supply voltage range	V_{CC}	4.0	6.0	V	
Input voltage range	V_I	0	V_{CC}	V	
Output voltage range	V_O	0	V_{CC}	V	
Operating free-air temperature	T_a	–40	85	°C	

Note: Unused or floating inputs must be held high or low.

Electrical Characteristics

Ta = –40 to 85°C

Item	Symbol	V_{CC} (V)	Min	Typ	Max	Unit	Test condition
Input voltage	V_{IH}	4.0	V_{CC}×0.7	—	—	V	
		4.5 to 5.5	V_{CC}×0.7	—	—		
	V_{IL}	4.0	—	—	V_{CC}×0.3		
		4.5 to 5.5	—	—	V_{CC}×0.3		
	V_H	4.0	—	0.35	—		
		5.0	—	0.40	—		
Output current	I_{OH} short	4.0	–65	–85	–105	mA	V_O = 0 V
		5.0	–100	–130	–160		
	I_{OL} short	4.0	20	28	40		$V_O = V_{CC}$
		5.0	30	40	50		
Input current	I_{IN}	5.5	—	—	±5	µA	V_{IN} = 5.5 V or GND
Quiescent supply current	I_{CC}	5.5	—	—	10	µA	$V_{IN} = V_{CC}$ or GND, I_O = 0
Input capacitance	C_{IN}	5.0	—	2.5	—	pF	$V_{IN} = V_{CC}$ or GND

Switching Characteristics

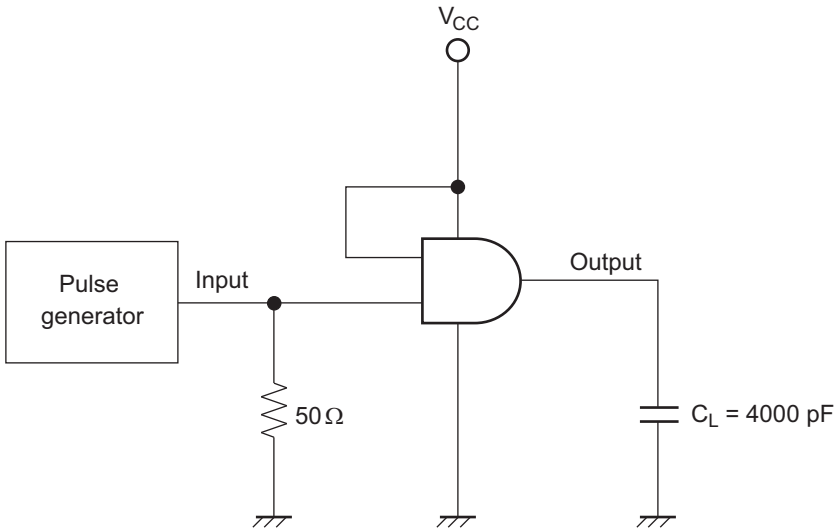
V_{CC} = 4.0 V

Item	Symbol	Ta = –40 to 85°C			Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max				
Propagation delay time	$t_{d(ON)}$	—	—	80	ns	C_L = 4000 pF	A or B	Y
	$t_{d(OFF)}$	—	—	160				
Output rise time	t_r	—	—	1000				
Output fall time	t_f	—	—	2000				

V_{CC} = 5.0 ± 0.5 V

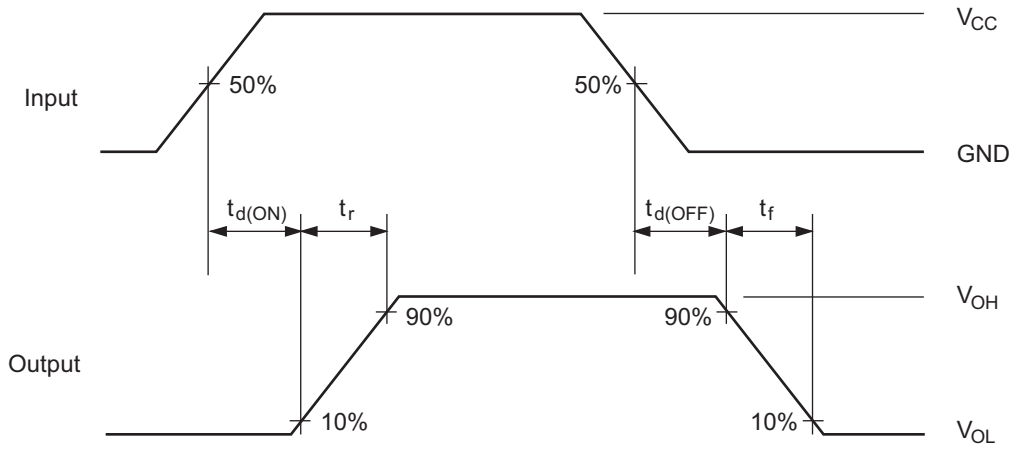
Item	Symbol	Ta = –40 to 85°C			Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max				
Propagation delay time	$t_{d(ON)}$	—	—	70	ns	C_L = 4000 pF	A or B	Y
	$t_{d(OFF)}$	—	—	140				
Output rise time	t_r	—	—	800				
Output fall time	t_f	—	—	1500				

Test Circuit



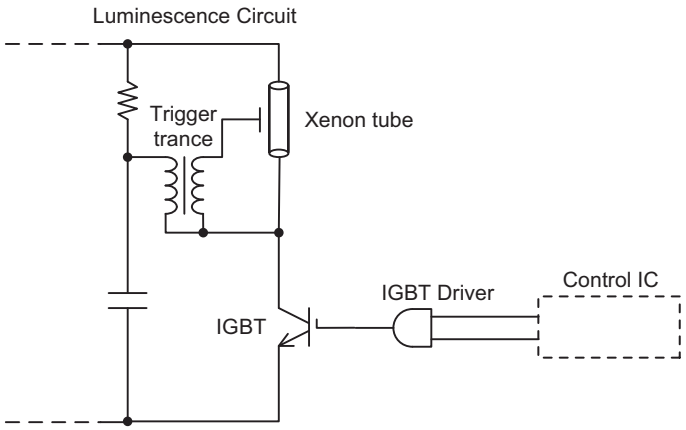
Note: C_L includes probe and jig capacitance.

Waveforms



Note: Input waveform : duty cycle 50%

Application Note (Strobe circuit)



Combination example

SYSTEM	IGBT	IGBT Driver	Control IC
3.3 V	RJP4002ANS RJP4002ASA	RD3CYD08 RD3CYDT08	3.3 V signal
5.0 V	RJP4003ANS RJP4003ASA	RD5CYD08 RD5CYDT08	5.0 V signal 3.3 V signal

IGBT Driver Lineup

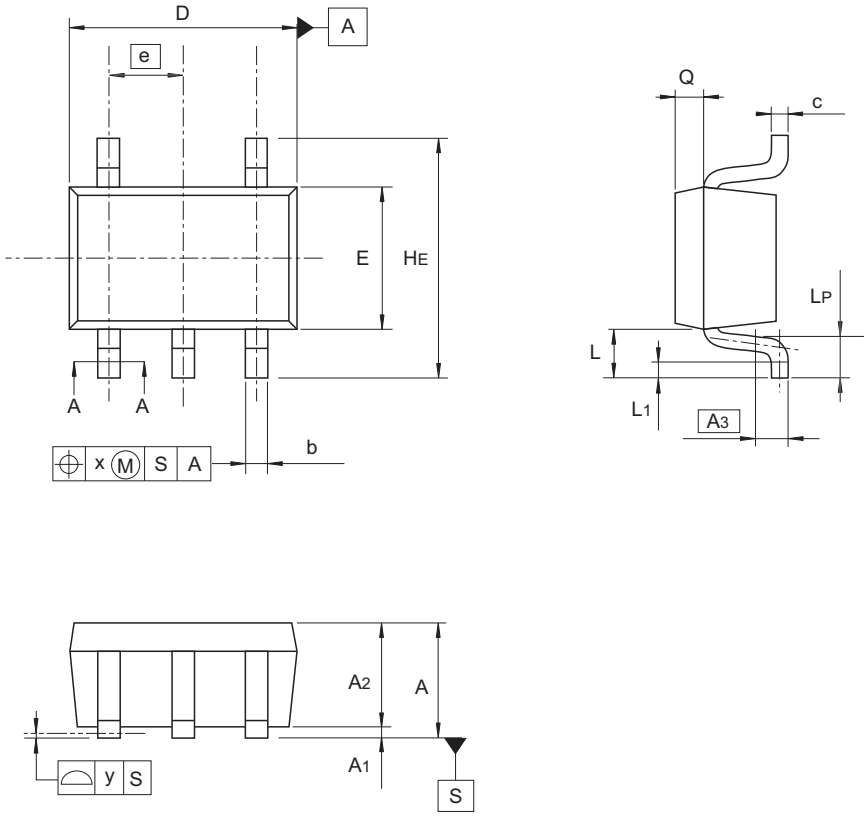
TYPE No.	Specification	Package
RD3CYD08	V_{CC} = 2.0 to 3.6V CMOS lever input I_{OH}(short) = -130mA(typ) @ V_{CC} = 3.3V I_{OL}(short) = 45mA(typ) @ V_{CC} = 3.3V	CMPAK-5 VSON-5
RD3CYDT08	V_{CC} = 2.0 to 3.6V CMOS lever input I_{OH}(short) = -130mA(typ) @ V_{CC} = 3.3V I_{OL}(short) = 45mA(typ) @ V_{CC} = 3.3V	CMPAK-5
RD5CYD08	V_{CC} = 4.0 to 6.0V CMOS lever input I_{OH}(short) = -130mA(typ) @ V_{CC} = 5.0V I_{OL}(short) = 40mA(typ) @ V_{CC} = 5.0V	CMPAK-5
RD5CYDT08	V_{CC} = 4.0 to 6.0V TTL lever input I_{OH}(short) = -130mA(typ) @ V_{CC} = 5.0V I_{OL}(short) = 40mA(typ) @ V_{CC} = 5.0V	

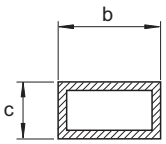
IGBT Lineup

TYPE No.	Specification	Package
RJP4002ANS	V_{CES} = 400V(max), I_{CP} = 150A(max), 2.5V drive	VSON-8
RJP4002ASA	V_{CES} = 400V(max), I_{CP} = 150A(max), 2.5V drive	TSSOP-8
RJP4003ANS	V_{CES} = 400V(max), I_{CP} = 150A(max), 4V drive	VSON-8
RJP4003ASA	V_{CES} = 400V(max), I_{CP} = 150A(max), 4V drive	TSSOP-8

Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS (Typ) [g]
SC-88A	PTSP0005ZC-A	CMPAK-5 / CMPAK-5V	0.006





A-A Section

Reference Symbol	Dimensions in millimeters		
	Min	Nom	Max
A	0.8	—	1.1
A_1	0	—	0.1
A_2	0.8	0.9	1.0
$\boxed{A_3}$	—	0.25	—
b	0.15	0.22	0.3
c	0.1	0.13	0.15
D	1.8	2.0	2.2
E	1.15	1.25	1.35
$\boxed{e}$	—	0.65	—
H_E	1.8	2.1	2.4
L	0.3	—	0.7
L_1	0.1	—	0.5
L_P	0.2	—	0.6
x	—	—	0.05
y	—	—	0.05
Q	—	0.25	—

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-651-700, Fax: +44-1628-651-804

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 301, Tower A, Central Towers, 555 LanGao Rd., Putuo District, Shanghai, China
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
12F., 234 Teheran-ro, Gangnam-Gu, Seoul, 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

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