

# RJH30H2DPK-M0

Silicon N Channel IGBT  
High speed power switching

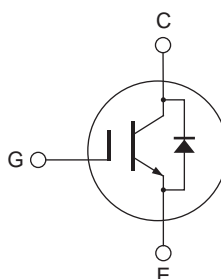
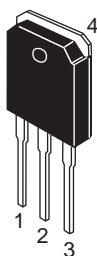
R07DS0464EJ0200  
Rev.2.00  
Jun 15, 2011

## Features

- Trench gate and thin wafer technology (G6H-II series)
- Low collector to emitter saturation voltage:  $V_{CE(sat)} = 1.4 \text{ V typ}$
- High speed switching:  $t_r = 100 \text{ ns typ}$ ,  $t_f = 180 \text{ ns typ}$
- Low leak current:  $I_{CES} = 1 \mu\text{A max}$
- Built-in Fast Recovery Diode:  $V_F = 1.4 \text{ V typ}$ ,  $t_{rr} = 23 \text{ ns typ}$

## Outline

RENESAS Package code: PRSS0004ZH-A  
(Package name: TO-3PSG)



1. Gate
2. Collector
3. Emitter
4. Collector (Flange)

## Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Collector to Emitter voltage	$V_{CES}$	360	V
Gate to Emitter voltage	$V_{GES}$	$\pm 30$	V
Collector current	$I_C$	35	A
Collector peak current	$i_{c(peak)}$ <sup>Note1</sup>	250	A
Collector to emitter diode Forward peak current	$i_{DF(peak)}$ <sup>Note1</sup>	100	A
Collector dissipation	$P_C$ <sup>Note2</sup>	60	W
Junction to case thermal impedance	$\theta_{j-c}$	2.08	$^\circ\text{C}/\text{W}$
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

- Notes: 1.  $PW \leq 10 \mu\text{s}$ , duty cycle  $\leq 1\%$   
2.  $T_c = 25^\circ\text{C}$

## Electrical Characteristics

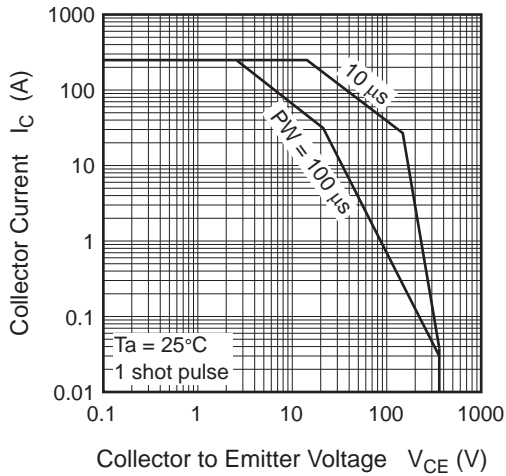
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	$I_{CES}$	—	—	1	$\mu\text{A}$	$V_{CE} = 360 \text{ V}, V_{GE} = 0$
Gate to emitter leak current	$I_{GES}$	—	—	$\pm 100$	nA	$V_{GE} = \pm 30 \text{ V}, V_{CE} = 0$
Gate to emitter cutoff voltage	$V_{GE(off)}$	2.5	—	5	V	$V_{CE} = 10 \text{ V}, I_C = 1 \text{ mA}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.4	1.9	V	$I_C = 35 \text{ A}, V_{GE} = 15 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{ies}$	—	1200	—	pF	$V_{CE} = 25 \text{ V}$
Output capacitance	$C_{oes}$	—	80	—	pF	$V_{GE} = 0$
Reveres transfer capacitance	$C_{res}$	—	30	—	pF	$f = 1 \text{ MHz}$
Total gate charge	$Q_g$	—	37	—	nC	$V_{GE} = 15 \text{ V}$
Gate to emitter charge	$Q_{ge}$	—	6	—	nC	$V_{CE} = 150 \text{ V}$
Gate to collector charge	$Q_{gc}$	—	10	—	nC	$I_C = 35 \text{ A}$
Switching time	$t_{d(on)}$	—	0.02	—	$\mu\text{s}$	$I_C = 35 \text{ A}$
	$t_r$	—	0.1	—	$\mu\text{s}$	$R_L = 4.5 \Omega$
	$t_{d(off)}$	—	0.06	—	$\mu\text{s}$	$V_{GE} = 15 \text{ V}$
	$t_f$	—	0.18	—	$\mu\text{s}$	$R_G = 5 \Omega$
FRD forward voltage	$V_F$	—	1.4	1.7	V	$I_F = 20 \text{ A}$ <sup>Note3</sup>
FRD reverse recovery time	$t_{rr}$	—	23	—	ns	$I_F = 20 \text{ A}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

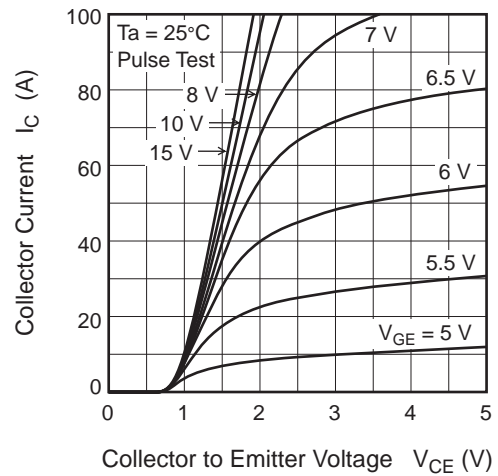
Notes: 3. Pulse test.

Main Characteristics

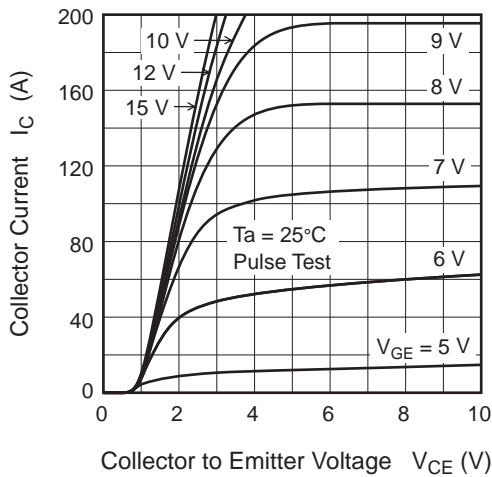
Maximum Safe Operation Area



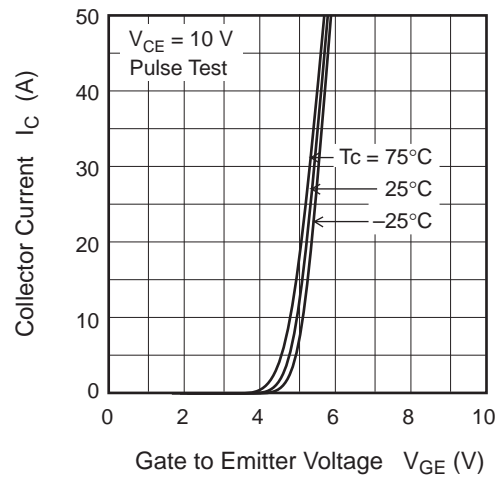
Typical Output Characteristics (1)



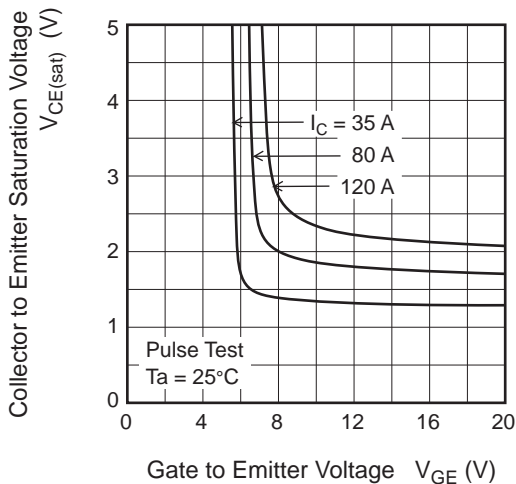
Typical Output Characteristics (2)



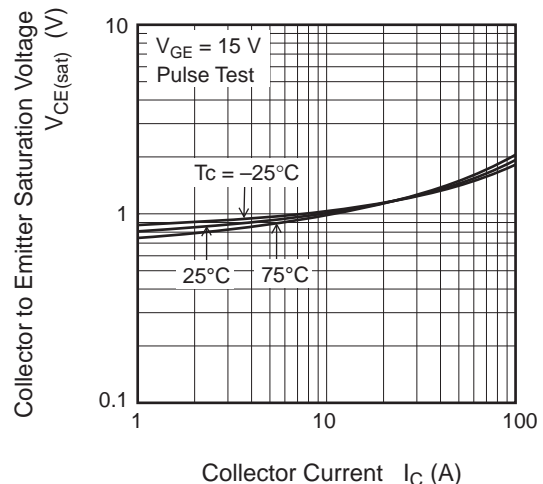
Typical Transfer Characteristics



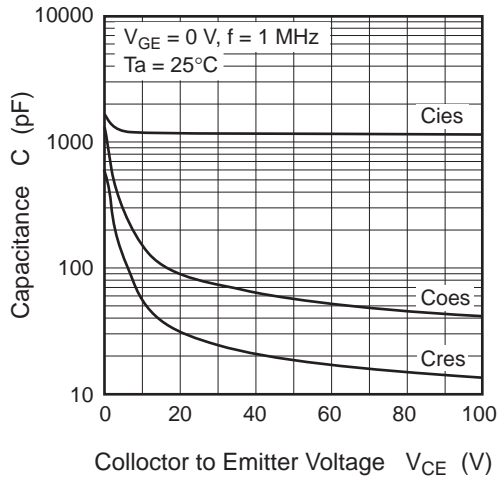
Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage (Typical)



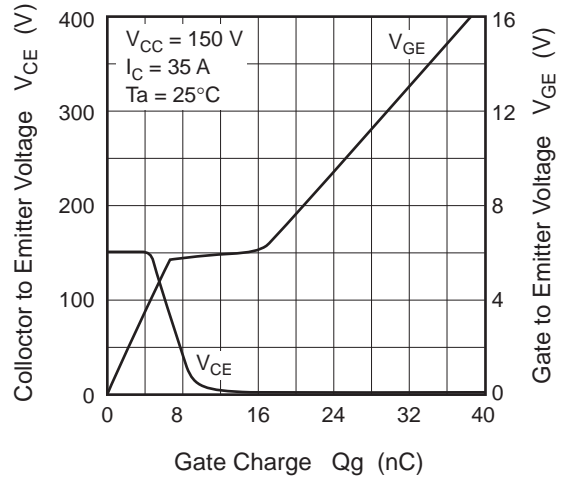
Collector to Emitter Saturation Voltage vs. Collector Current (Typical)



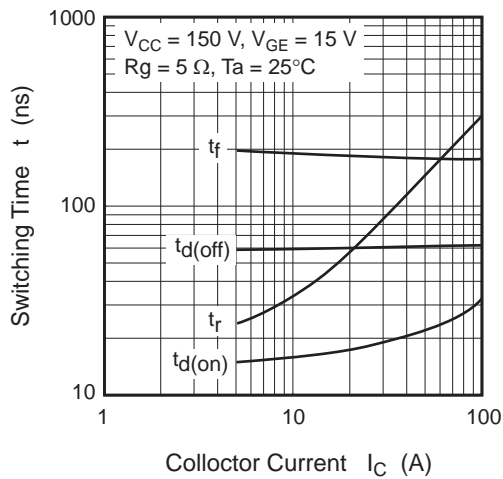
Typical Capacitance vs. Collector to Emitter Voltage



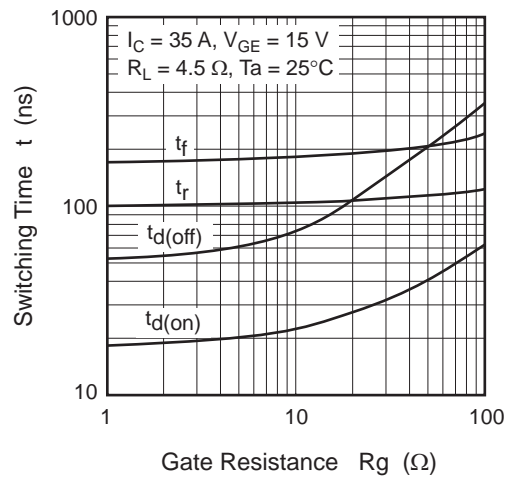
Dynamic Input Characteristics (Typical)



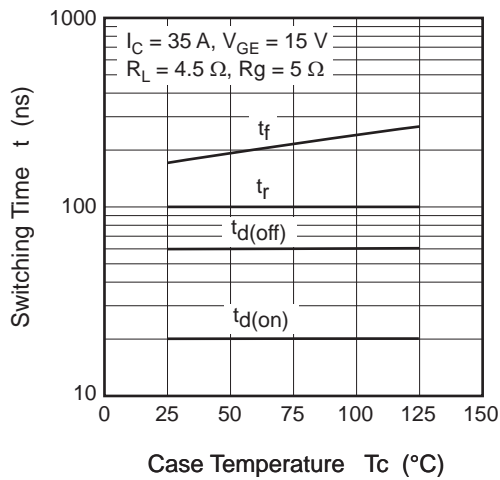
Switching Characteristics (Typical) (1)



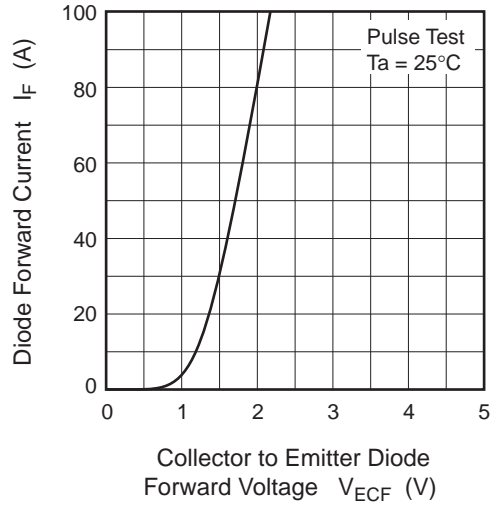
Switching Characteristics (Typical) (2)



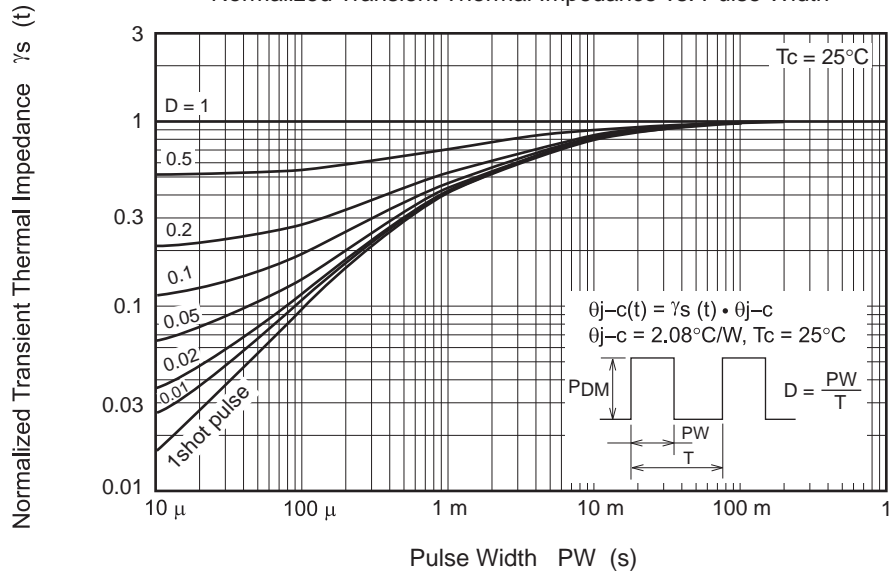
Switching Characteristics (Typical) (3)



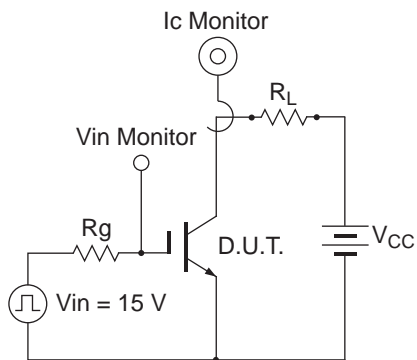
Collector to Emitter Diode Forward Voltage vs. Diode Forward Current



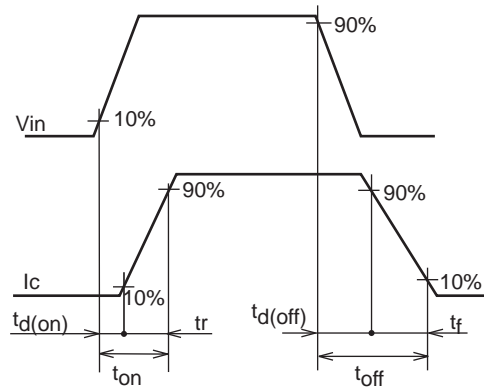
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveform





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Tel: +1-408-588-6000, Fax: +1-408-588-6130

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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: +44-1628-585-100, Fax: +44-1628-585-900

**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 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China  
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

**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  
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Tel: +65-6213-0200, Fax: +65-6278-8001

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**Renesas Electronics Korea Co., Ltd.**  
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Tel: +82-2-558-3737, Fax: +82-2-558-5141