

# RJH30H2DPK-M0

Silicon N Channel IGBT  
High speed power switching

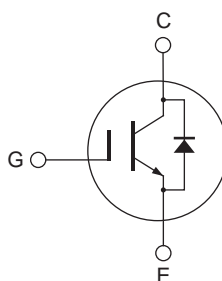
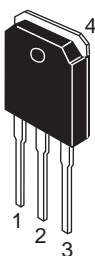
R07DS0464EJ0200  
Rev.2.00  
Jun 15, 2011

## 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

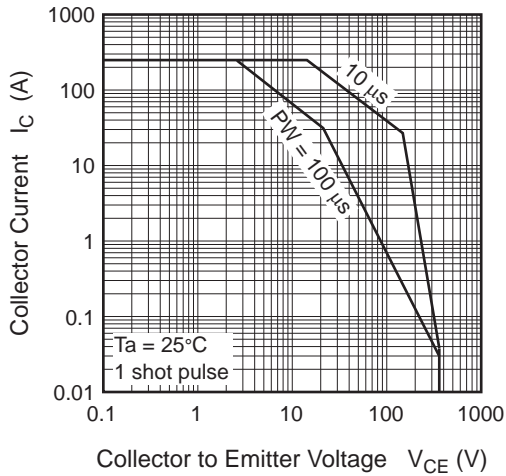
(Ta = 25°C)

| 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            | $I_F = 20 \text{ A}$<br>$di_F/dt = 100 \text{ A}/\mu\text{s}$ |

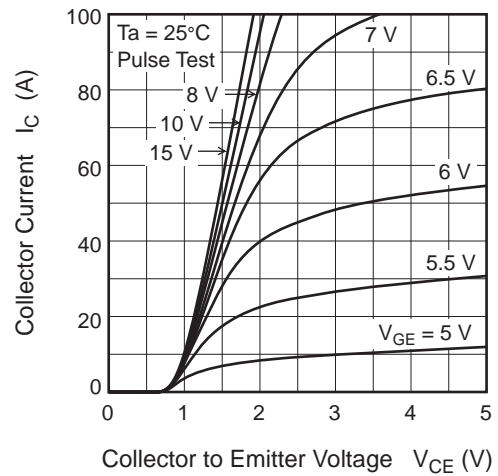
Notes: 3. Pulse test.

Main Characteristics

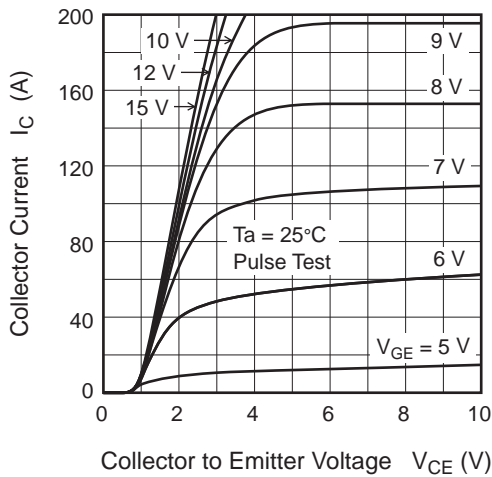
Maximum Safe Operation Area



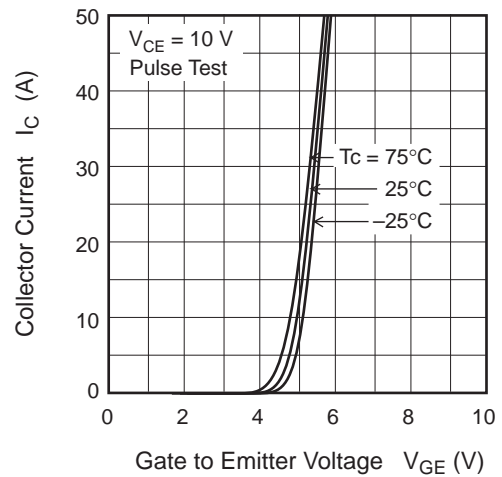
Typical Output Characteristics (1)



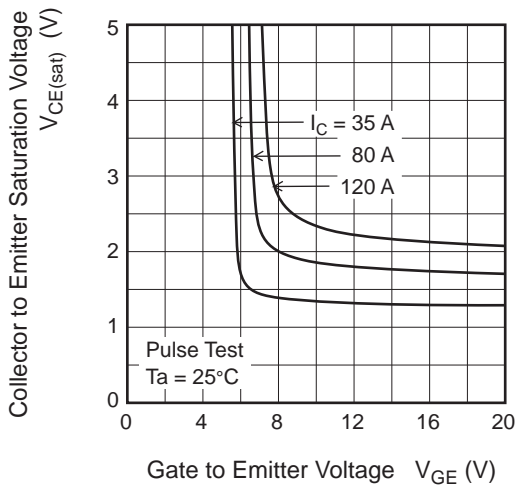
Typical Output Characteristics (2)



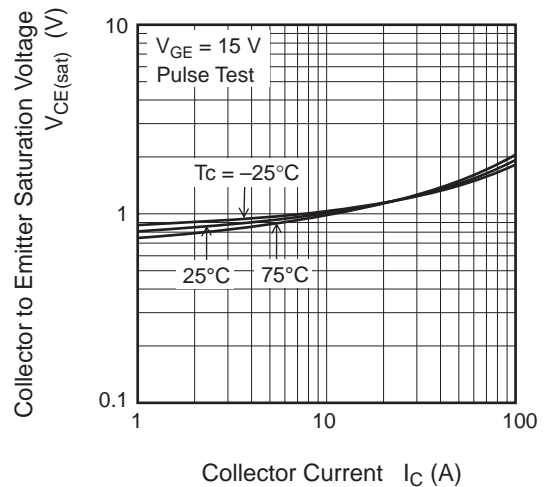
Typical Transfer Characteristics



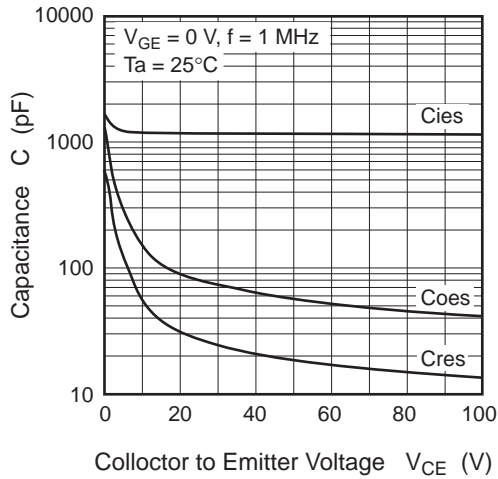
Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage (Typical)



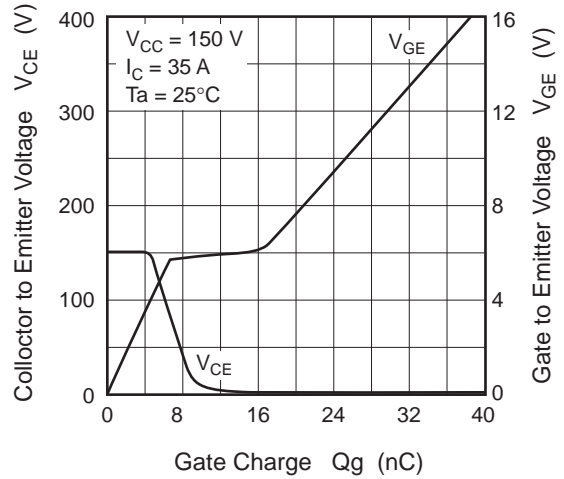
Collector to Emitter Saturation Voltage vs. Collector Current (Typical)



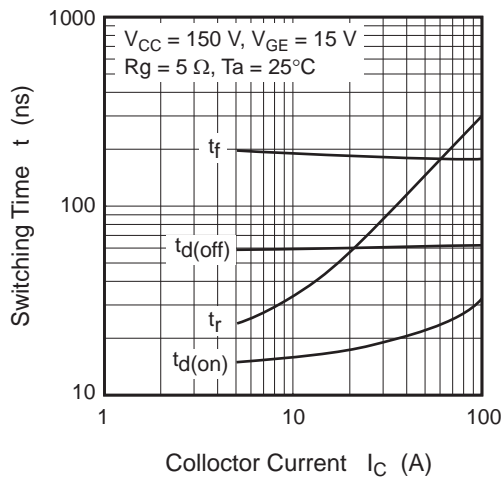
Typical Capacitance vs. Collector to Emitter Voltage



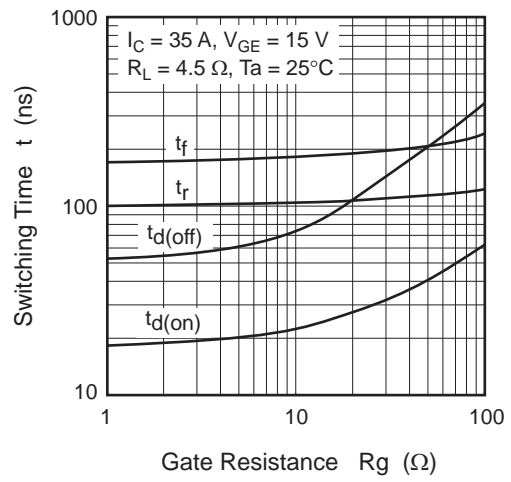
Dynamic Input Characteristics (Typical)



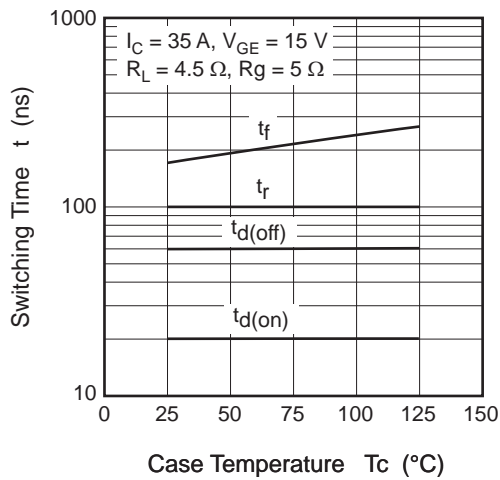
Switching Characteristics (Typical) (1)



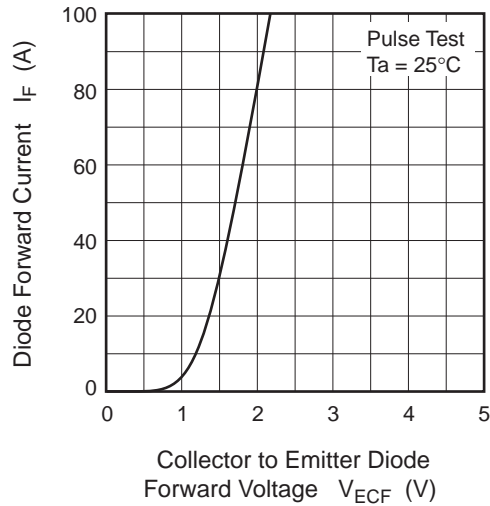
Switching Characteristics (Typical) (2)



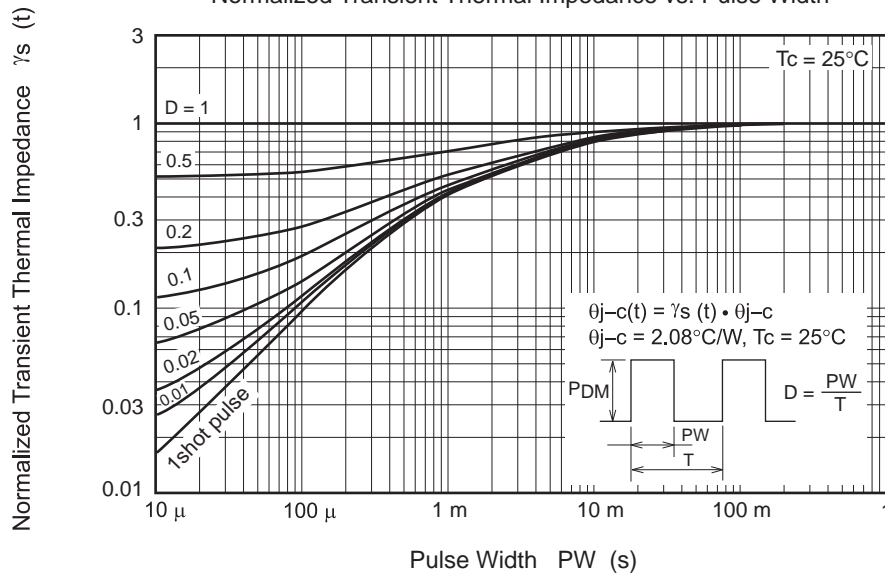
Switching Characteristics (Typical) (3)



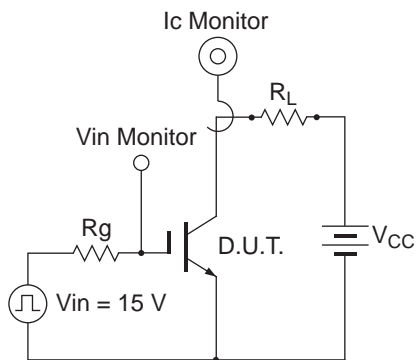
Collector to Emitter Diode Forward Voltage vs. Diode Forward Current



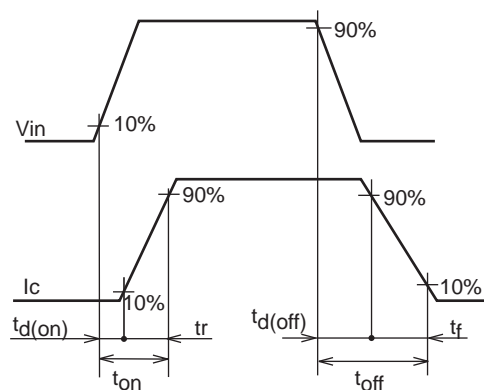
Normalized Transient Thermal Impedance vs. Pulse Width



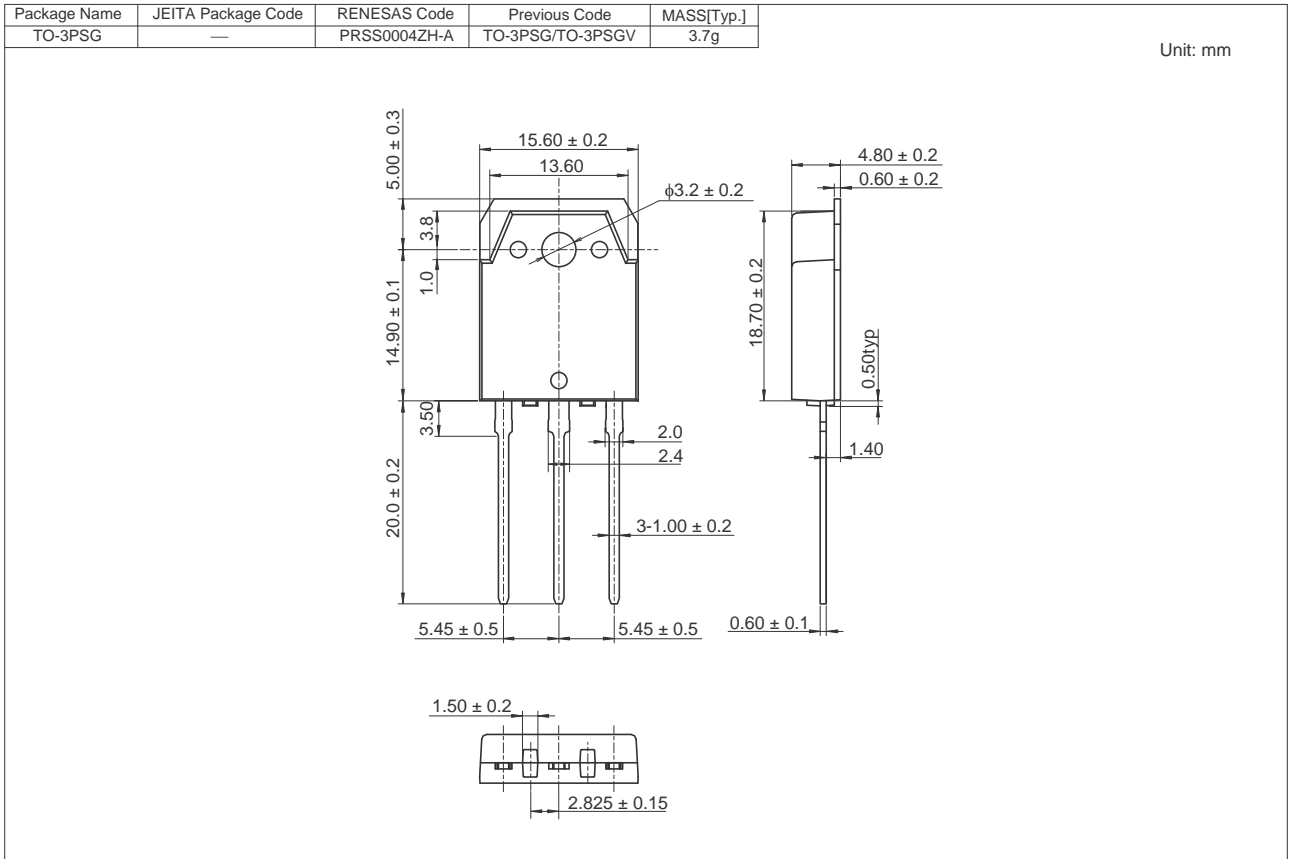
Switching Time Test Circuit



Waveform



Package Dimension



Ordering Information

| Orderable Part Number | Quantity | Shipping Container |
|-----------------------|----------|--------------------|
| RJH30H2DPK-M0-T2      | 360 pcs  | Box (Tube)         |

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