

# RJH30H1DPP-M0

Silicon N Channel IGBT  
High speed power switching

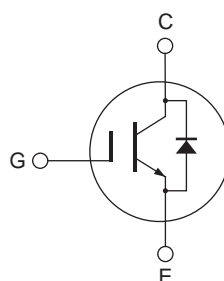
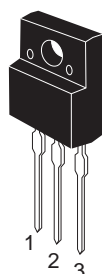
R07DS0463EJ0200  
Rev.2.00  
Jun 15, 2011

## Features

- Trench gate and thin wafer technology (G6H-II series)
- High speed switching:  $t_r = 80$  ns typ.,  $t_f = 150$  ns typ.
- Low collector to emitter saturation voltage:  $V_{CE(sat)} = 1.5$  V typ.
- Low leak current:  $I_{CES} = 1$   $\mu$ A max.
- Built-in Fast Recovery Diode:  $V_F = 1.4$  V typ.,  $t_{rr} = 23$  ns typ.
- Isolated package: TO-220FL

## Outline

RENESAS Package code: PRSS0003AF-A  
(Package name: TO-220FL)



1. Gate
2. Collector
3. Emitter

## Absolute Maximum Ratings

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

Item	Symbol	Ratings	Unit
Collector to emitter voltage	$V_{CES}$	360	V
Gate to emitter voltage	$V_{GES}$	$\pm 30$	V
Collector current	$I_C$	30	A
Collector peak current	$i_{c(peak)}$ <sup>Note1</sup>	200	A
Collector to emitter diode Forward peak current	$i_{DF(peak)}$ <sup>Note1</sup>	100	A
Collector dissipation	$P_C$ <sup>Note2</sup>	20	W
Junction to case thermal impedance	$\theta_{j-c}$	6.25	$^\circ\text{C}/\text{W}$
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

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

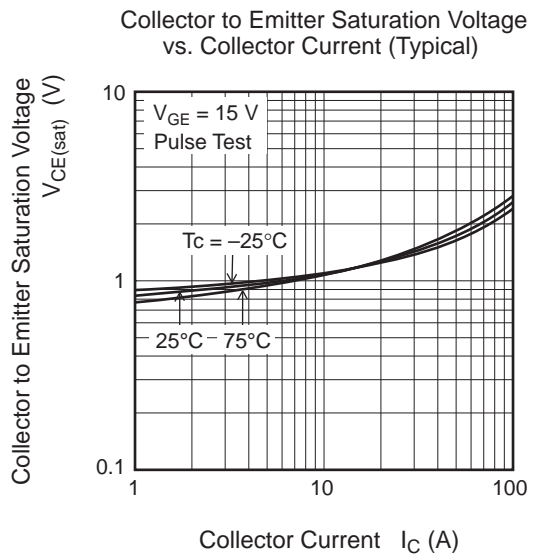
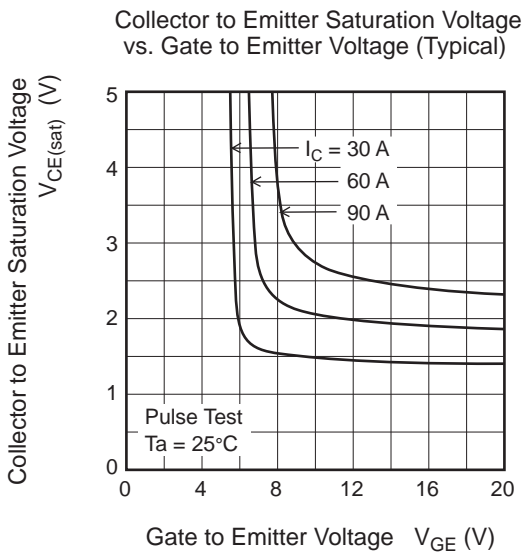
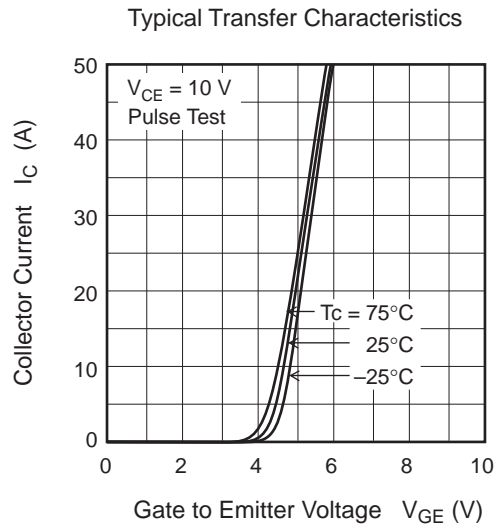
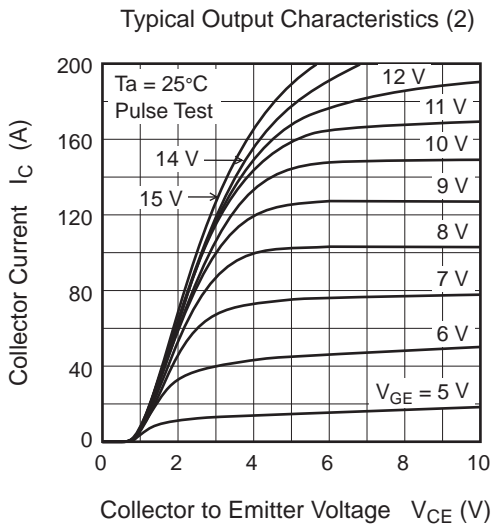
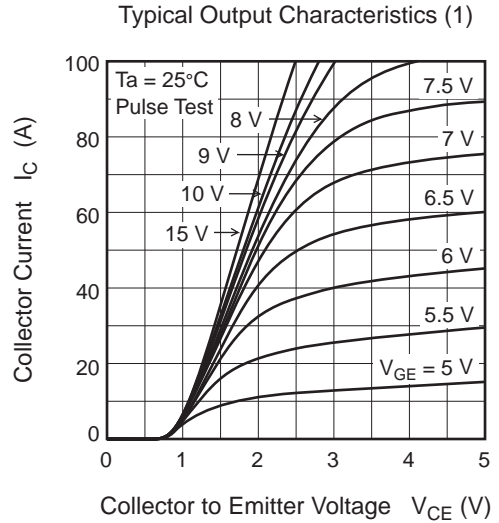
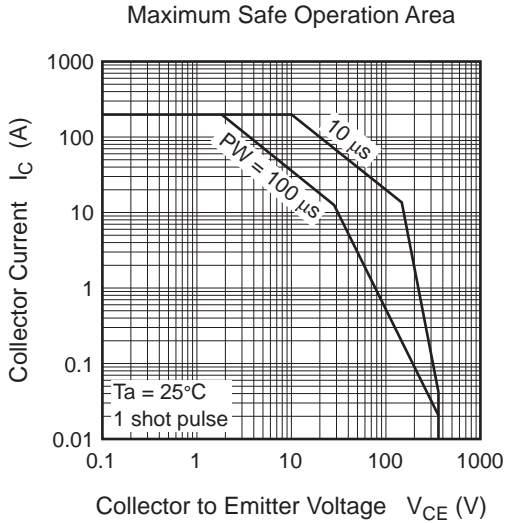
## Electrical Characteristics

(T<sub>j</sub> = 25°C)

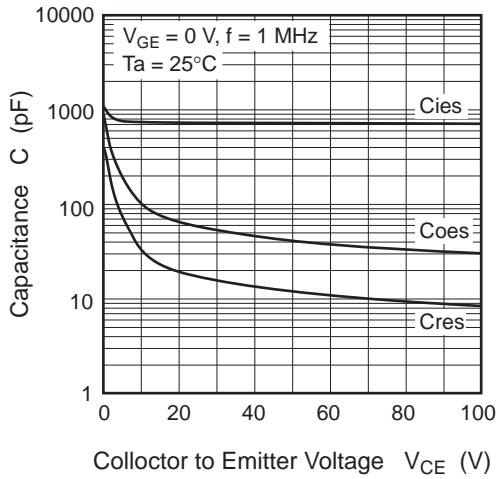
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	I <sub>CEs</sub>	—	—	1	μA	V <sub>CE</sub> = 360 V, V <sub>GE</sub> = 0
Gate to emitter leak current	I <sub>GES</sub>	—	—	±100	nA	V <sub>GE</sub> = ± 30 V, V <sub>CE</sub> = 0
Gate to emitter cutoff voltage	V <sub>GE(off)</sub>	2.5	—	5	V	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 1 mA
Collector to emitter saturation voltage	V <sub>CE(sat)</sub>	—	1.5	2	V	I <sub>C</sub> = 30A, V <sub>GE</sub> = 15 V <sup>Note3</sup>
Input capacitance	C <sub>ies</sub>	—	740	—	pF	V <sub>CE</sub> = 25 V V <sub>GE</sub> = 0 f = 1 MHz
Output capacitance	C <sub>oes</sub>	—	60	—	pF	
Reveres transfer capacitance	C <sub>res</sub>	—	17	—	pF	
Total gate charge	Q <sub>g</sub>	—	23	—	nC	V <sub>GE</sub> = 15 V V <sub>CE</sub> = 150 V I <sub>C</sub> = 30 A
Gate to emitter charge	Q <sub>ge</sub>	—	4	—	nC	
Gate to collector charge	Q <sub>gc</sub>	—	8	—	nC	
Switching time	t <sub>d(on)</sub>	—	0.02	—	μs	I <sub>C</sub> = 30 A R <sub>L</sub> = 5 Ω V <sub>GE</sub> = 15 V R <sub>G</sub> = 5 Ω
	t <sub>r</sub>	—	0.08	—	μs	
	t <sub>d(off)</sub>	—	0.04	—	μs	
	t <sub>f</sub>	—	0.15	—	μs	
FRD Forward voltage	V <sub>F</sub>	—	1.4	1.7	V	I <sub>F</sub> = 20 A <sup>Note3</sup>
FRD Reverse recovery time	t <sub>rr</sub>	—	23	—	ns	I <sub>F</sub> = 20 A di <sub>F</sub> /dt = 100 A/μs

Notes: 3. Pulse test

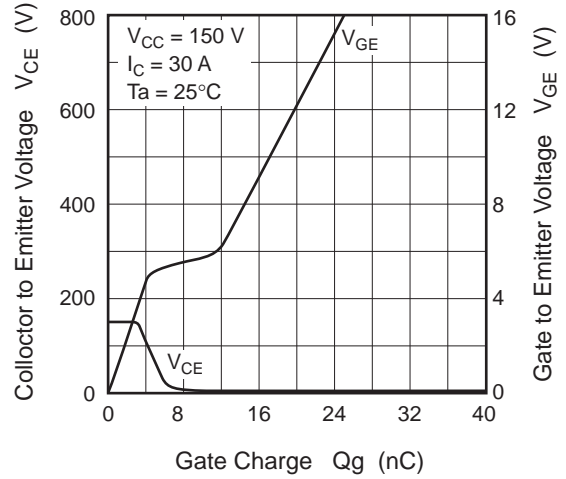
Main Characteristics



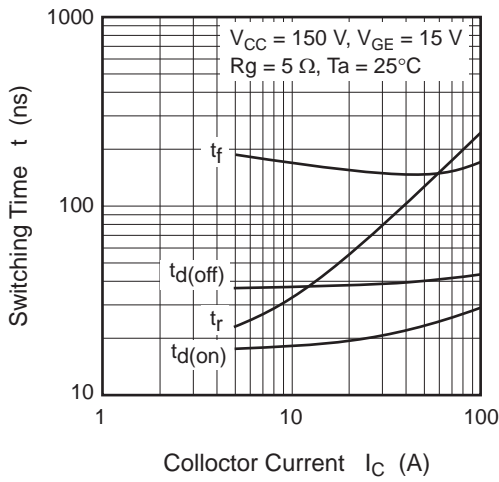
Typical Capacitance vs. Collector to Emitter Voltage



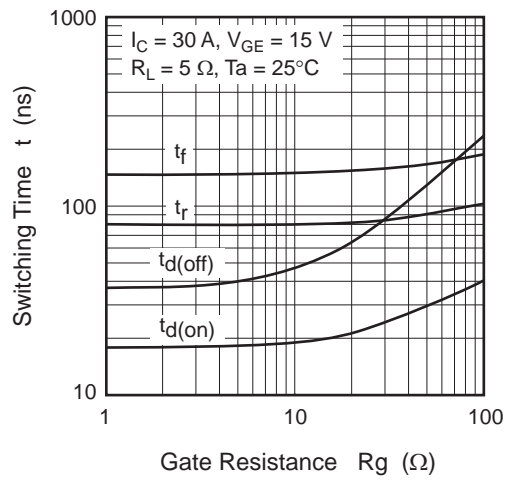
Dynamic Input Characteristics (Typical)



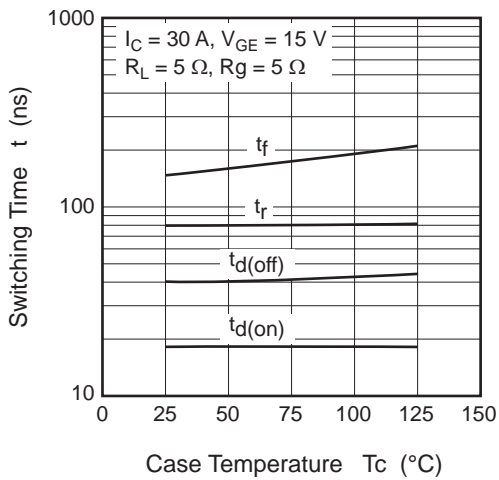
Switching Characteristics (Typical) (1)



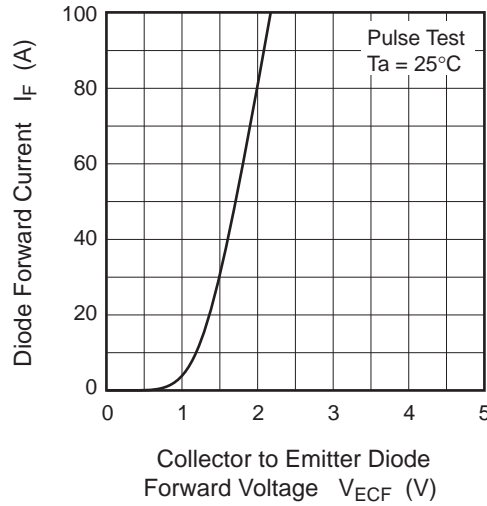
Switching Characteristics (Typical) (2)



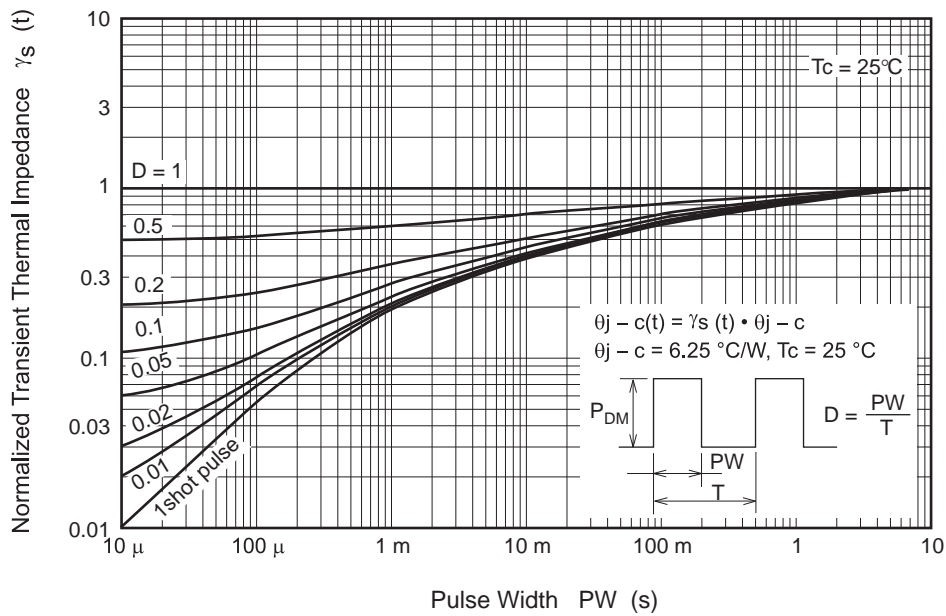
Switching Characteristics (Typical) (3)



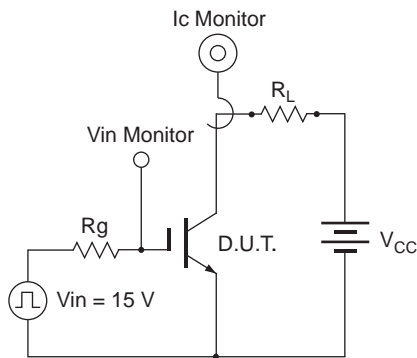
Collector to Emitter Diode Forward Voltage vs. Diode Forward Current



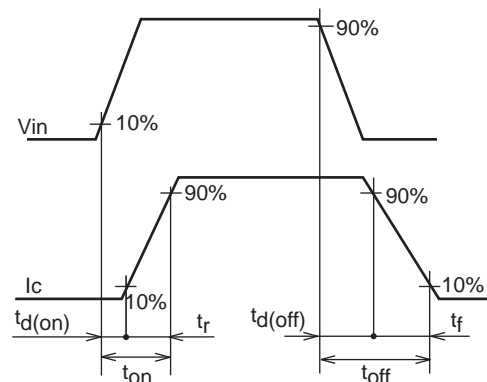
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveform





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