

RJH60F3DPK

Silicon N Channel IGBT High Speed Power Switching

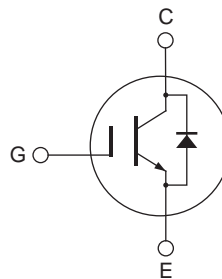
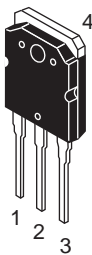
R07DS0199EJ0200
Rev.2.00
Dec 01, 2010

Features

- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.4 \text{ V typ. (} I_C = 20 \text{ A, } V_{GE} = 15 \text{ V, } T_a = 25^\circ\text{C)}$
- Built in fast recovery diode in one package
- Trench gate and thin wafer technology
- High speed switching
 $t_f = 92 \text{ ns typ. (at } I_C = 30 \text{ A, } V_{CE} = 400 \text{ V, } V_{GE} = 15 \text{ V, } R_g = 5 \Omega, T_a = 25^\circ\text{C, inductive load)}$

Outline

RENESAS Package code: PRSS0004ZE-A
(Package name: TO-3P)



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

Absolute Maximum Ratings

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

Item	Symbol	Ratings	Unit	
Collector to Emitter voltage	V_{CES}	600	V	
Gate to Emitter voltage	V_{GES}	± 30	V	
Collector current	$T_c = 25^\circ\text{C}$	I_C	40	A
	$T_c = 100^\circ\text{C}$	I_C	20	A
Collector peak current	$i_{c(peak)}$ ^{Note1}	80	A	
Collector to emitter diode forward peak current	$i_{DF(peak)}$ ^{Note2}	80	A	
Collector dissipation	P_C	178.5	W	
Junction to case thermal impedance (IGBT)	θ_{j-c}	0.7	$^\circ\text{C/W}$	
Junction to case thermal impedance (Diode)	θ_{j-c}	2.0	$^\circ\text{C/W}$	
Channel temperature	T_j	150	$^\circ\text{C}$	
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$	

- Notes: 1. Pulse width limited by safe operating area.
2. $PW \leq 5 \mu\text{s}$, duty cycle $\leq 1\%$

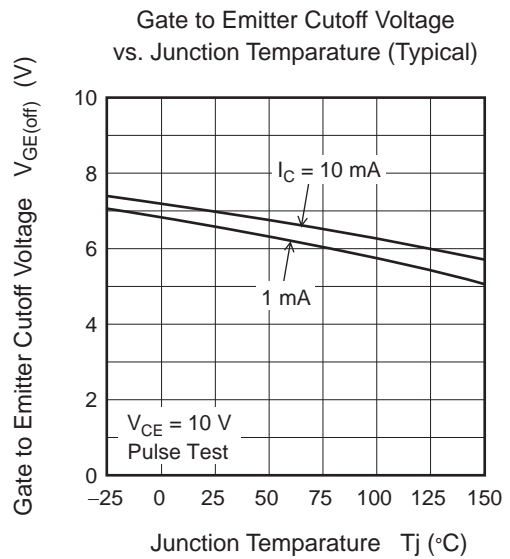
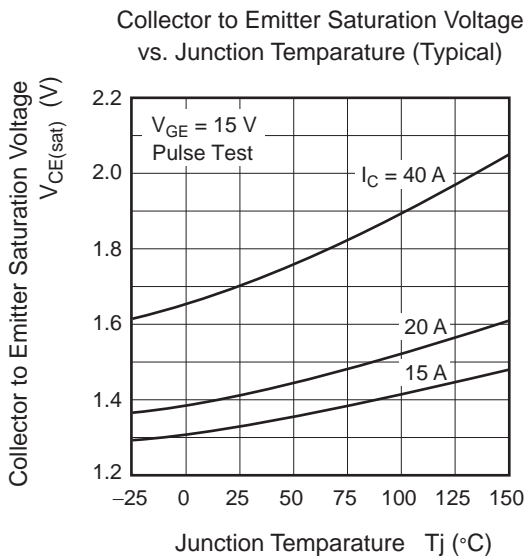
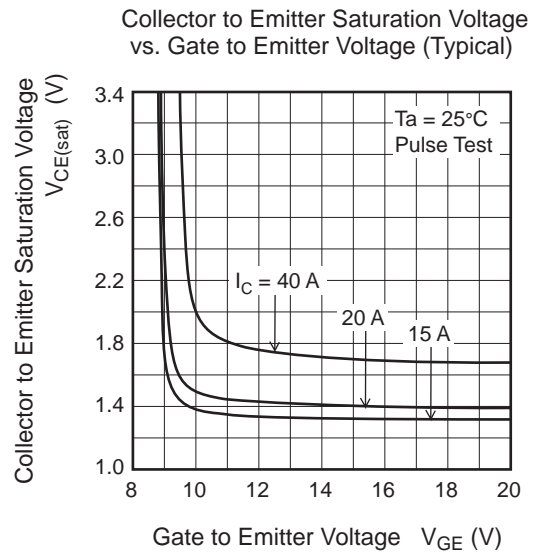
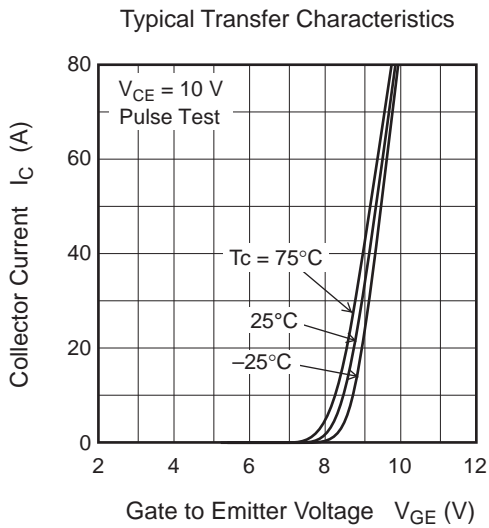
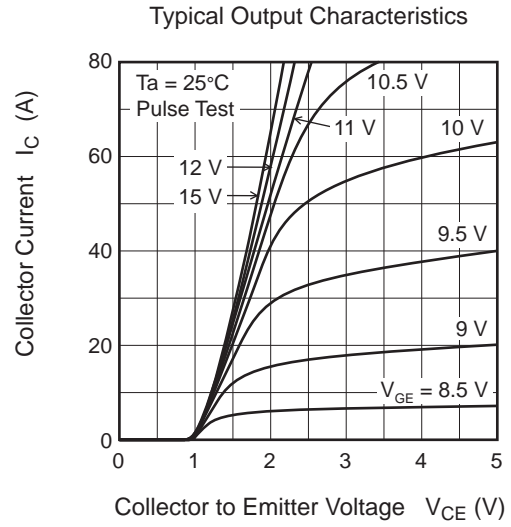
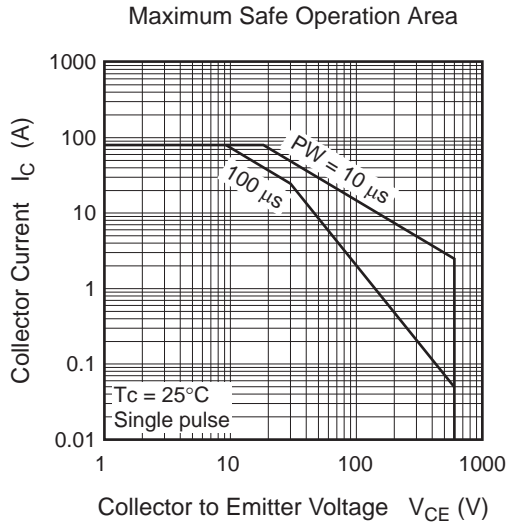
Electrical Characteristics

(T_j = 25°C)

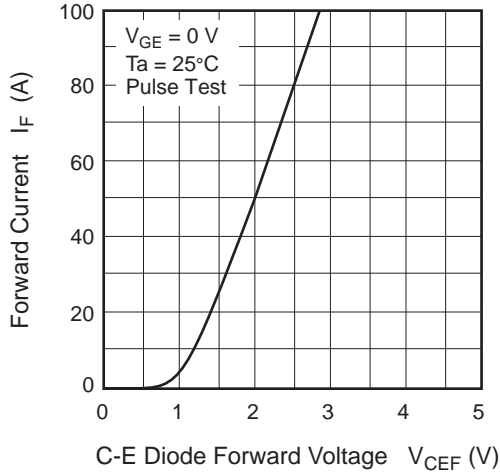
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	I _{CES}	—	—	100	μA	V _{CE} = 600V, V _{GE} = 0
Gate to emitter leak current	I _{GES}	—	—	±1	μA	V _{GE} = ±30 V, V _{CE} = 0
Gate to emitter cutoff voltage	V _{GE(off)}	4	—	8	V	V _{CE} = 10 V, I _C = 1 mA
Collector to emitter saturation voltage	V _{CE(sat)}	—	1.4	1.82	V	I _C = 20 A, V _{GE} = 15 V ^{Note3}
		—	1.6	—	V	I _C = 40 A, V _{GE} = 15 V ^{Note3}
Input capacitance	C _{ies}	—	1260	—	pF	V _{CE} = 25 V
Output capacitance	C _{oes}	—	73	—	pF	V _{GE} = 0
Reverse transfer capacitance	C _{res}	—	21	—	pF	f = 1 MHz
Switching time	t _{d(on)}	—	44	—	ns	I _C = 20 A, Resistive Load V _{CC} = 300 V V _{GE} = 15 V R _g = 5 Ω ^{Note3}
	t _r	—	96	—	ns	
	t _{d(off)}	—	65	—	ns	
	t _f	—	92	—	ns	
C-E diode forward voltage	V _{ECF1}	—	1.6	2.1	V	I _F = 20 A ^{Note3}
	V _{ECF2}	—	1.8	—	V	I _F = 40 A ^{Note3}
C-E diode reverse recovery time	t _{rr}	—	140	—	ns	I _F = 20 A di _F /dt = 100 A/μs

Notes: 3. Pulse test

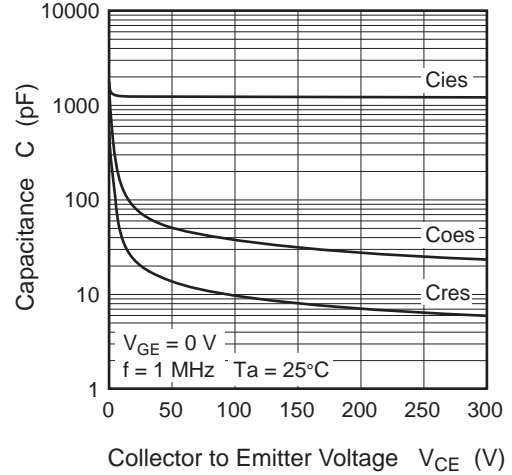
Main Characteristics



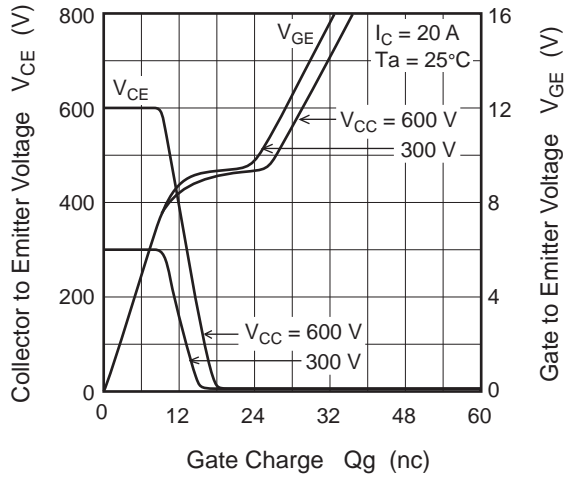
Forward Current vs. Forward Voltage (Typical)



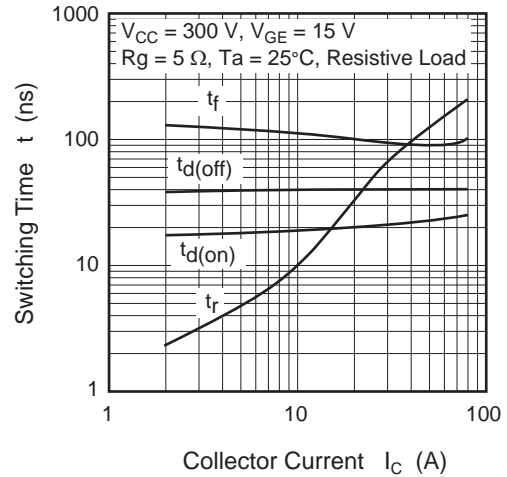
Typical Capacitance vs. Collector to Emitter Voltage



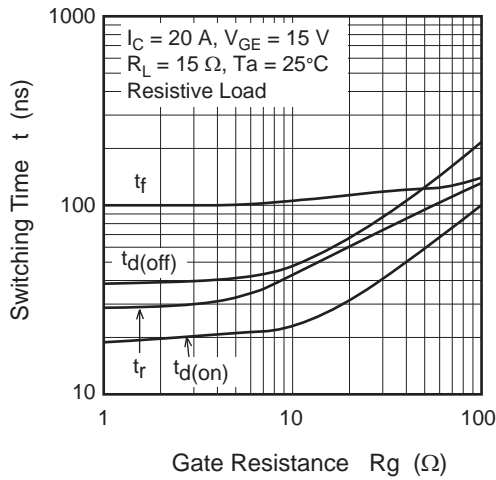
Dynamic Input Characteristics (Typical)



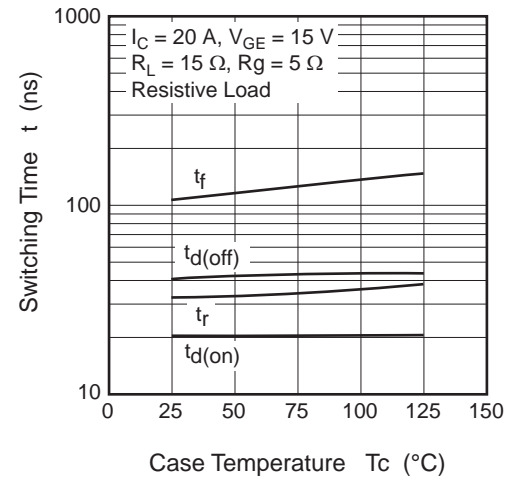
Switching Characteristics (Typical) (1)



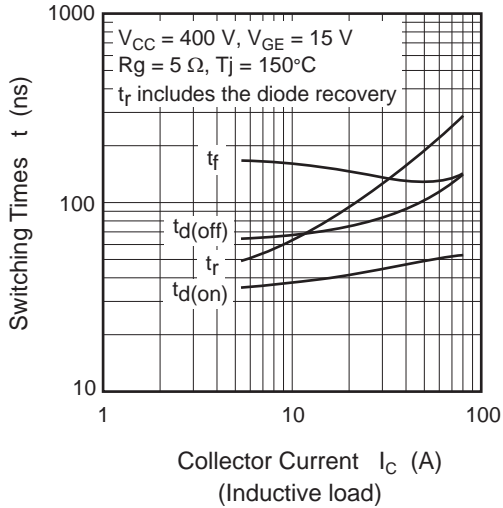
Switching Characteristics (Typical) (2)



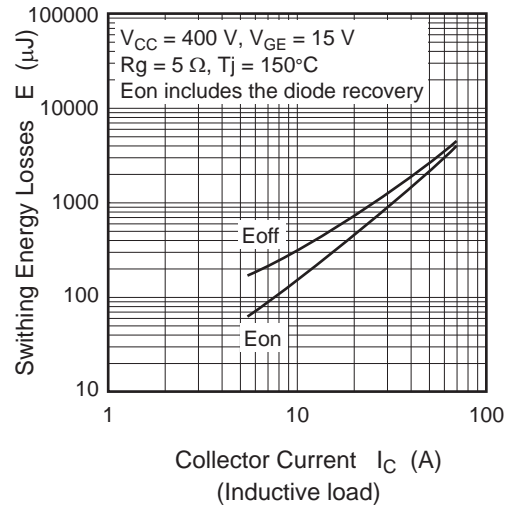
Switching Characteristics (Typical) (3)



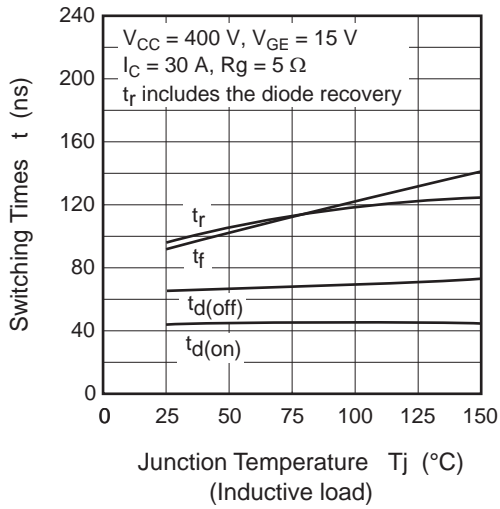
Switching Characteristics (Typical) (1)



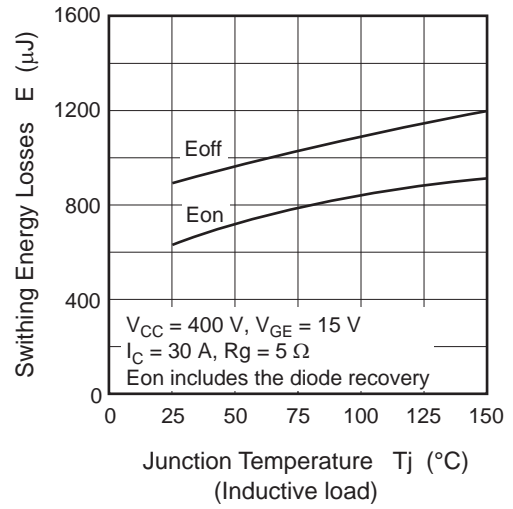
Switching Characteristics (Typical) (2)

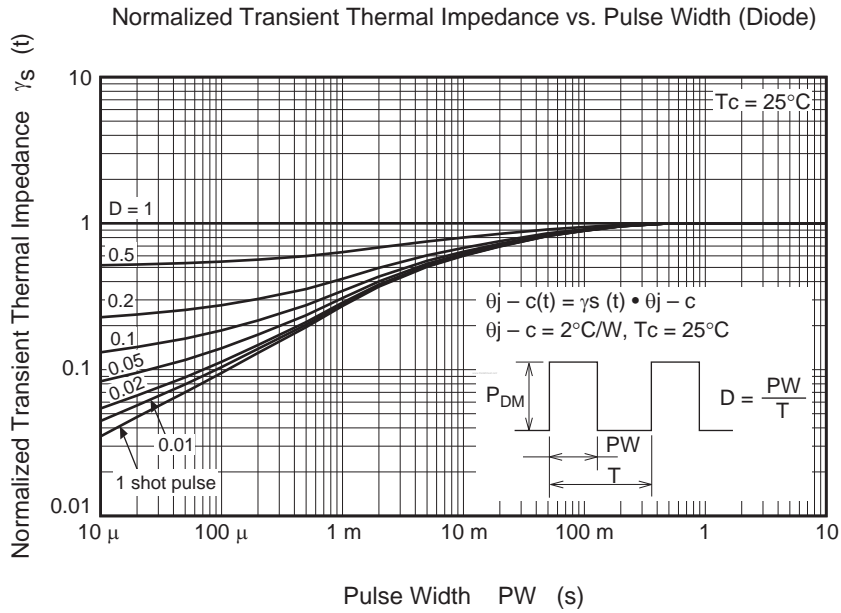
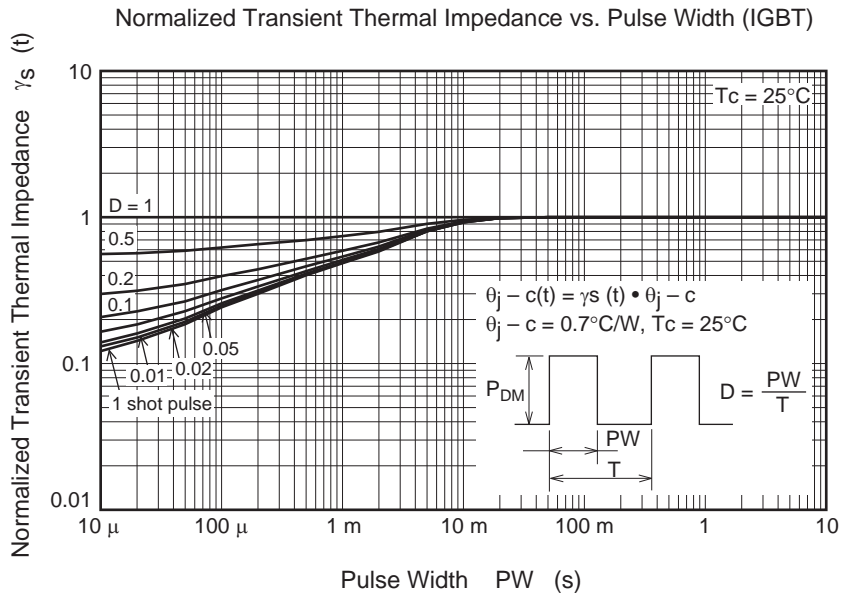


Switching Characteristics (Typical) (3)

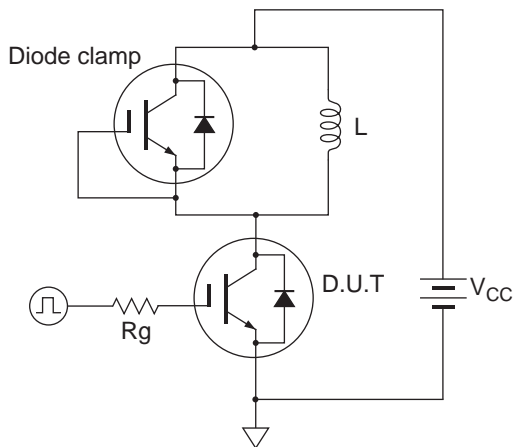


Switching Characteristics (Typical) (4)

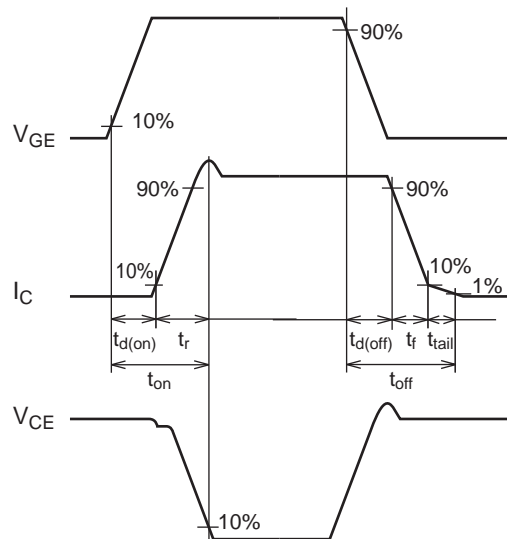




Switching Time Test Circuit



Waveform



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