RJH60F3DPQ-A0

600 V - 20 A - IGBT
High Speed Power Switching

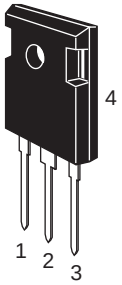
R07DS0391EJ0200
Rev.2.00
Jul 22, 2011

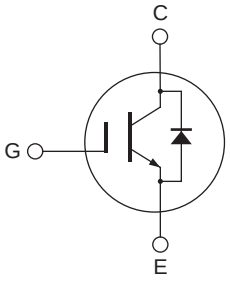
Features

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

Outline

RENESAS Package code: PRSS0003ZH-A
(Package name: TO-247A)





1. Gate
2. Collector
3. Emitter
4. Collector

Absolute Maximum Ratings

(Tc = 25°C)

Item		Symbol	Ratings	Unit
Collector to Emitter voltage		V_{CES}	600	V
Gate to Emitter voltage		V_{GES}	±30	V
Collector current	Tc = 25 °C	I_C	40	A
	Tc = 100 °C	I_C	20	A
Collector peak current		ic(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)		θj-c	0.7	°C/W
Junction to case thermal impedance (Diode)		θj-c	2.0	°C/W
Channel temperature		Tj	150	°C
Storage temperature		Tstg	–55 to +150	°C

Notes: 1. Pulse width limited by safe operating area.
2. PW ≤ 5 μs, duty cycle ≤ 1%

Electrical Characteristics

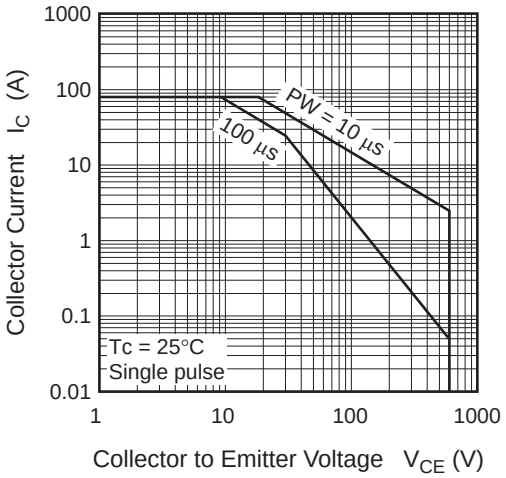
(Tj = 25°C)

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	Cies	—	1260	—	pF	V_{CE} = 25 V V_{GE} = 0 f = 1 MHz
Output capacitance	Coes	—	73	—	pF	
Reverse transfer capacitance	Cres	—	21	—	pF	
Switching time	$t_{d(on)}$	—	44	—	ns	I_C = 30 A V_{CE} = 400 V, V_{GE} = 15 V Rg = 5 Ω Note3 Inductive Load
	t_r	—	96	—	ns	
	$t_{d(off)}$	—	65	—	ns	
	t_f	—	92	—	ns	
C-E diode forward voltage	V_{ECF1}	—	1.2	2.1	V	I_F = 20 A Note3
	V_{ECF2}	—	1.5	—	V	I_F = 40 A Note3
C-E diode reverse recovery time	t_{rr}	—	90	—	ns	I_F = 20 A di_F/dt = 100 A/μs

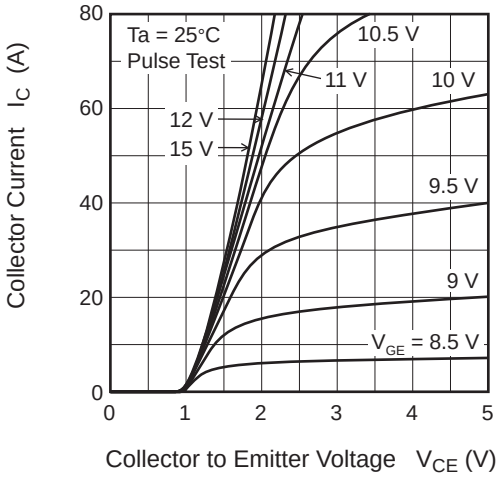
Notes: 3. Pulse test

Main Characteristics

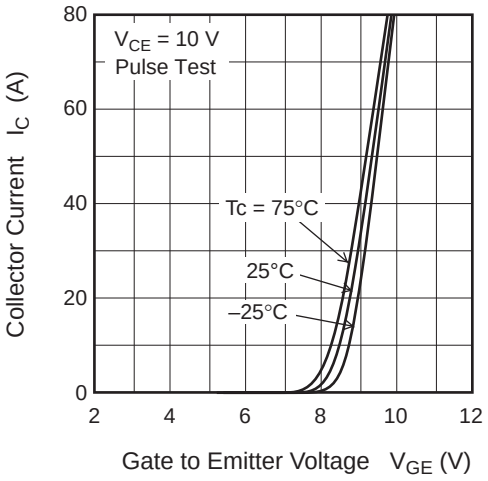
Maximum Safe Operation Area



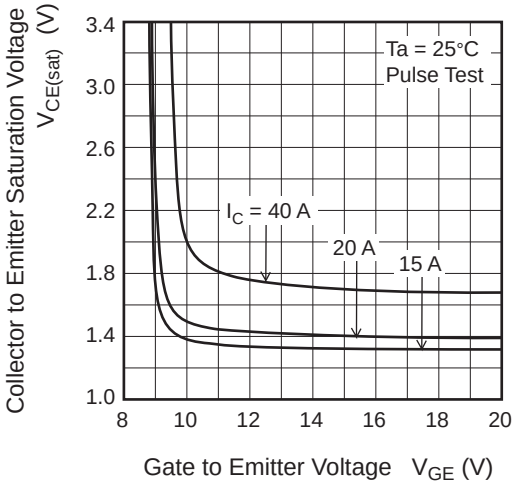
Typical Output Characteristics



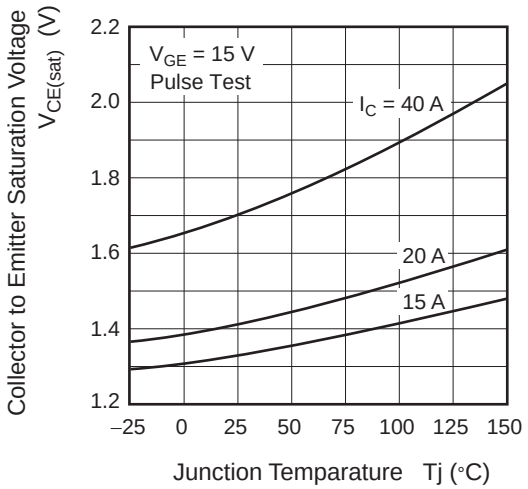
Typical Transfer Characteristics



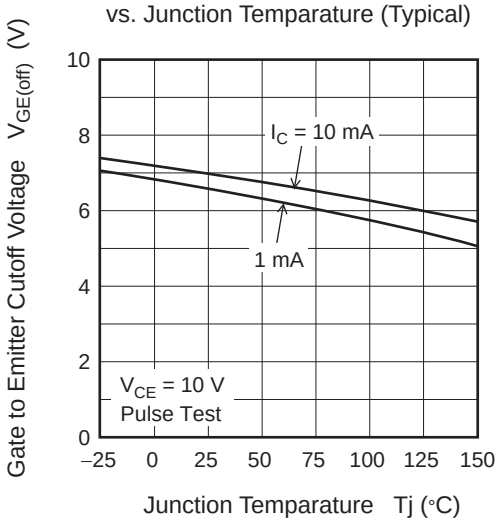
Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage (Typical)



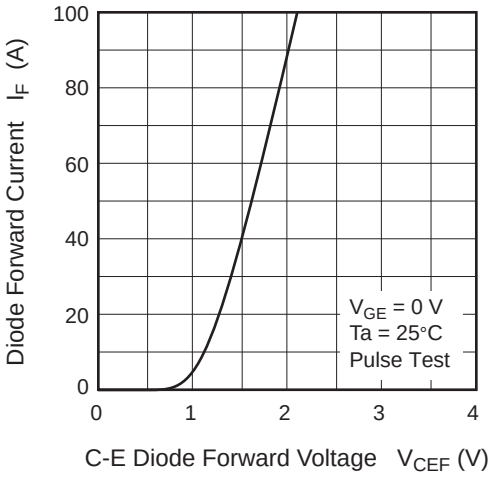
Collector to Emitter Saturation Voltage vs. Junction Temparature (Typical)



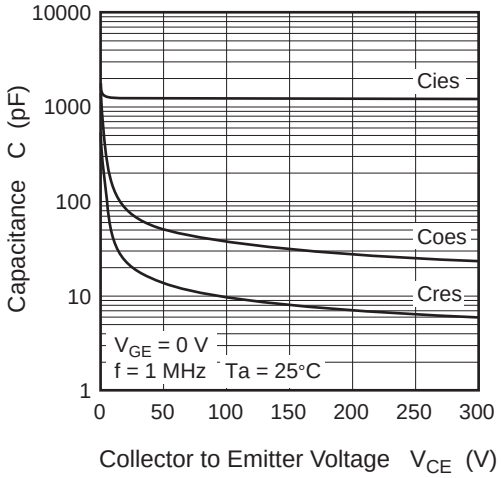
Gate to Emitter Cutoff Voltage vs. Junction Temparature (Typical)



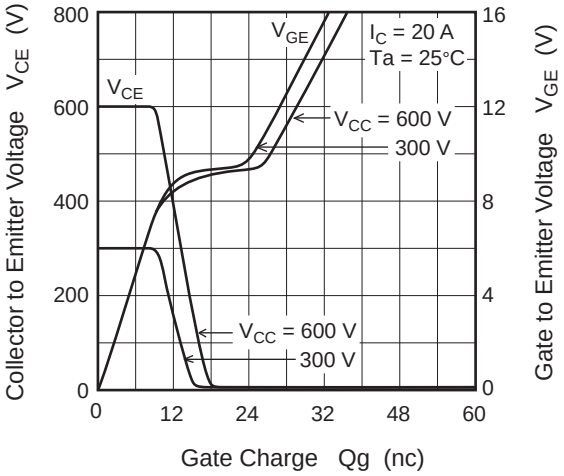
Forward Current vs. Forward Voltage (Typical)



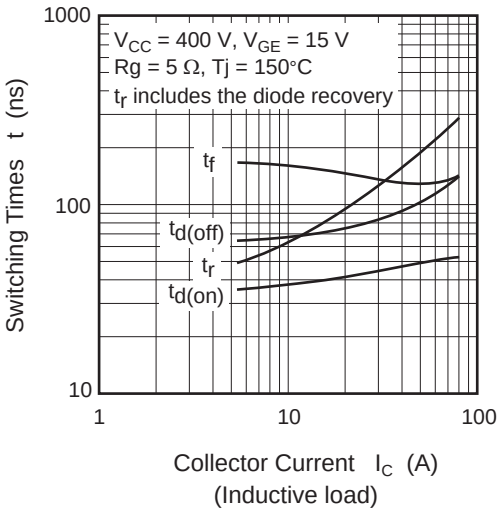
Typical Capacitance vs.
Collector to Emitter Voltage



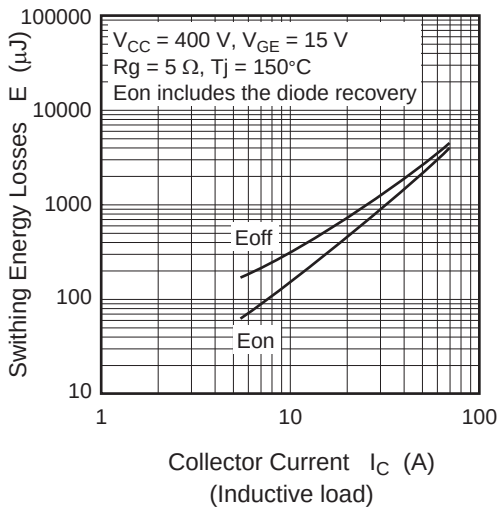
Dynamic Input Characteristics (Typical)



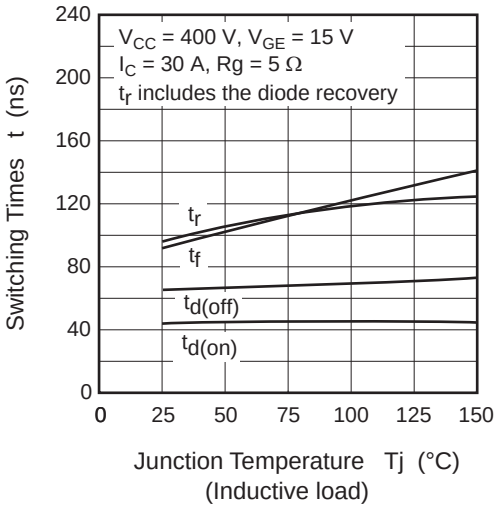
Switching Characteristics (Typical) (1)



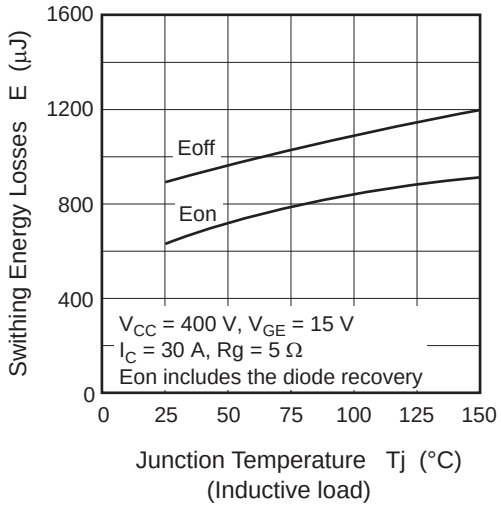
Switching Characteristics (Typical) (2)



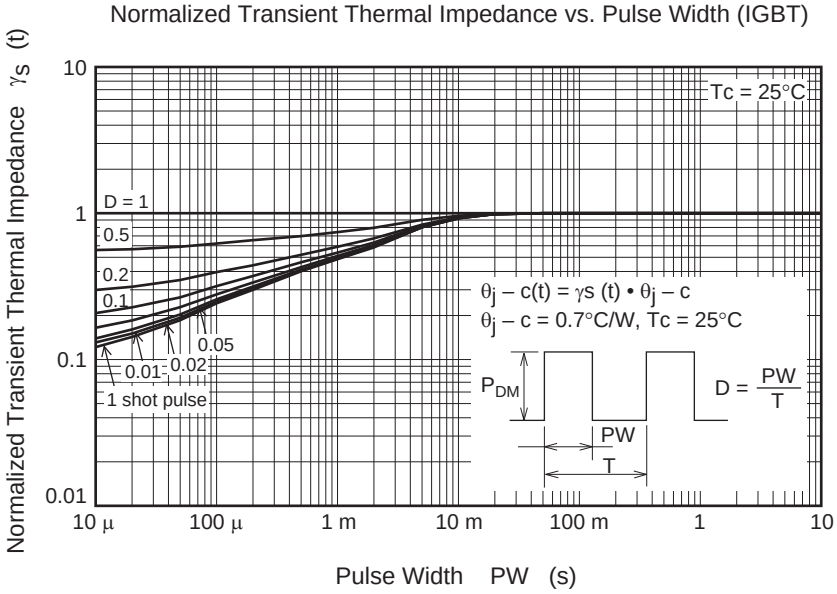
Switching Characteristics (Typical) (3)



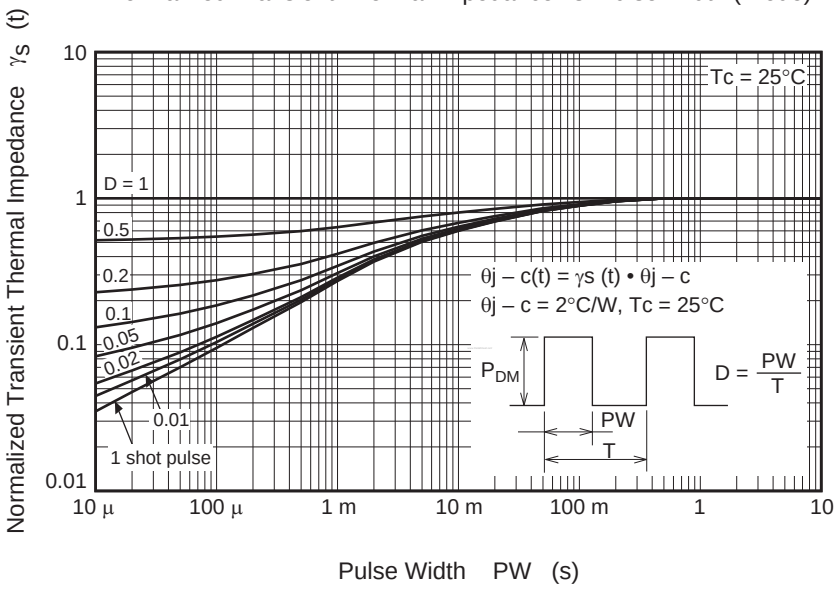
Switching Characteristics (Typical) (4)



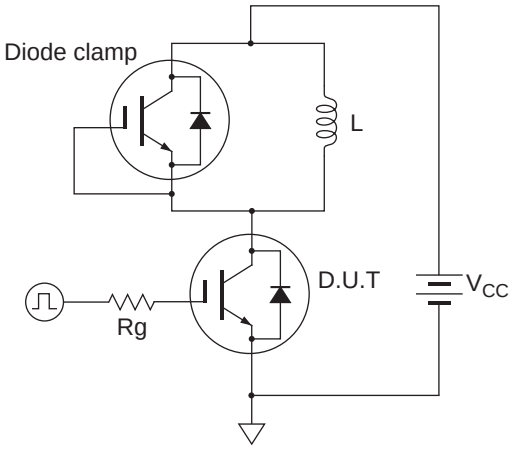
Normalized Transient Thermal Impedance vs. Pulse Width (IGBT)



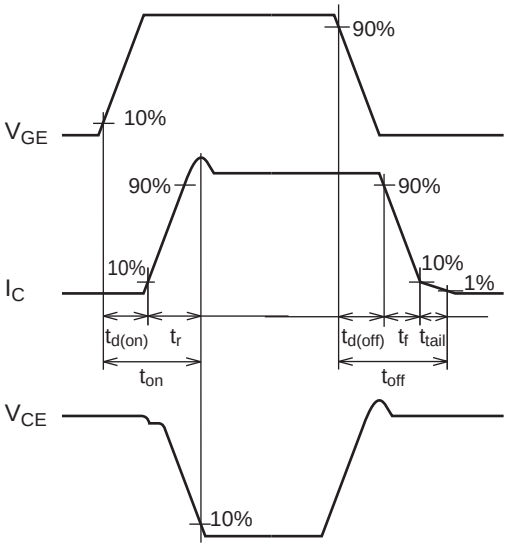
Normalized Transient Thermal Impedance vs. Pulse Width (Diode)



Switching Time Test Circuit



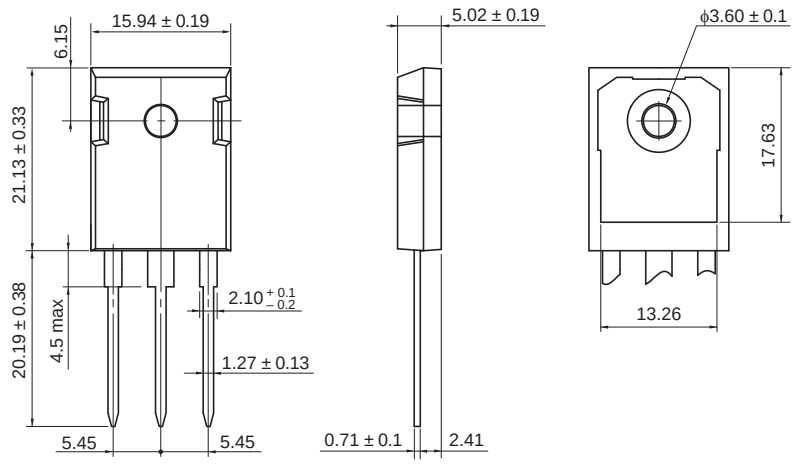
Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-247A	—	PRSS0003ZH-A	—	6.14g

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJH60F3DPQ-A0-T0	240 pcs	Box (Tube)

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