RJH60F6DPQ-A0

Silicon N Channel IGBT
High Speed Power Switching

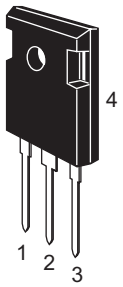
R07DS0327EJ0100
Rev.1.00
Apr 06, 2011

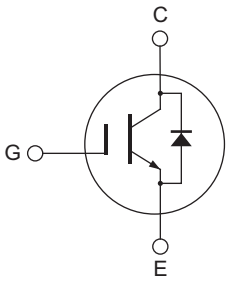
Features

- Low collector to emitter saturation voltage
  $V_{CE(sat)}$ = 1.35 V typ. (at I_C = 45 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 = 74 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	85	A
	Tc = 100 °C	I_C	45	A
Collector peak current		ic(peak) Note1	170	A
Collector to emitter diode forward peak current		i_{DF}(peak) Note2	100	A
Collector dissipation		P_C	297.6	W
Junction to case thermal impedance (IGBT)		θj-c	0.42	°C/W
Junction to case thermal impedance (Diode)		θj-cd	2.0	°C/W
Junction 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

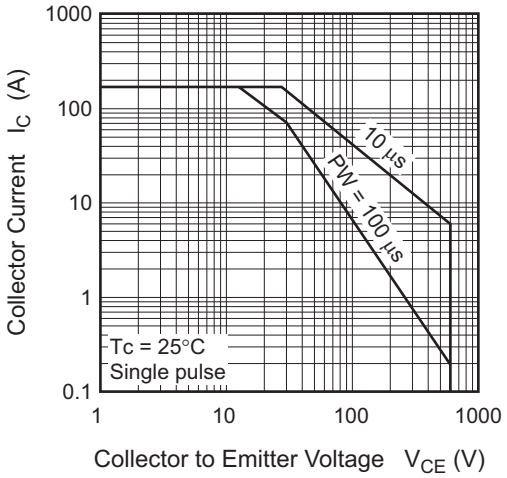
(Tj = 25°C)

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} = 10V, I_C = 1 mA
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.35	1.75	V	I_C = 45 A, V_{GE} = 15V Note3
Input capacitance	Cies	—	3800	—	pF	V_{CE} = 25 V V_{GE} = 0 V f = 1 MHz
Output capacitance	Coes	—	150	—	pF	
Reverse transfer capacitance	Cres	—	65	—	pF	
Switching time	$t_{d(on)}$	—	58	—	ns	I_C = 30 A, V_{CE} = 400 V, V_{GE} = 15 V Rg = 5 Ω Note3, Inductive load
	t_f	—	80	—	ns	
	$t_{d(off)}$	—	131	—	ns	
	t_f	—	74	—	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

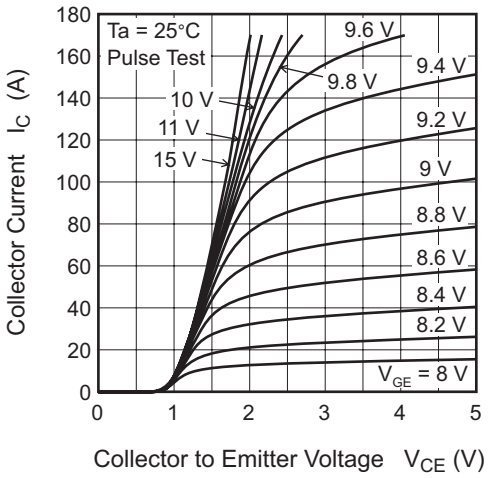
Notes: 3. Pulse test

Main Characteristics

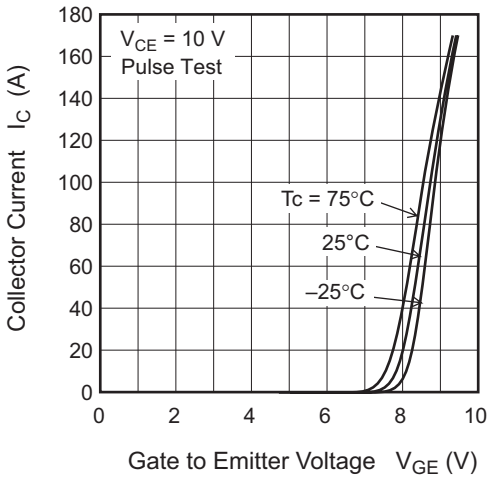
Maximum Safe Operation Area



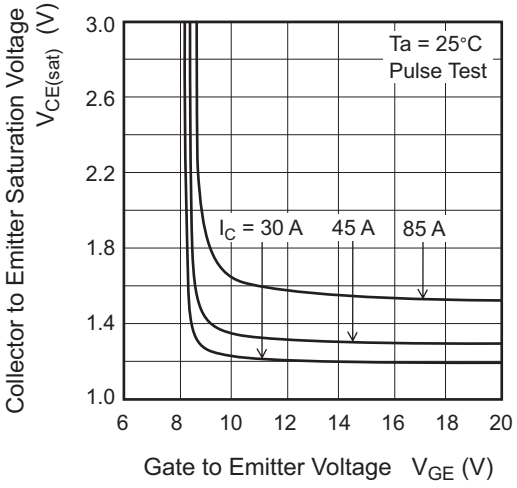
Typical Output Characteristics



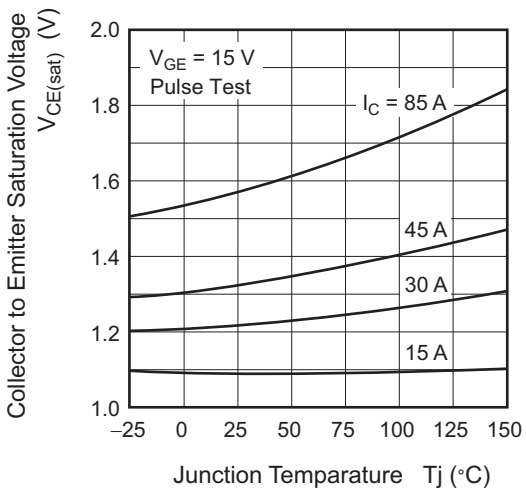
Typical Transfer Characteristics



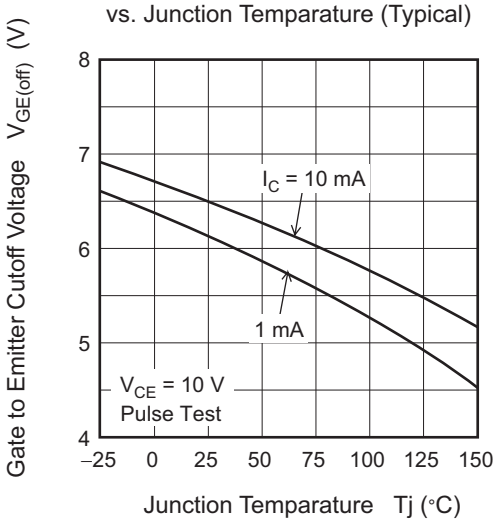
Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage (Typical)



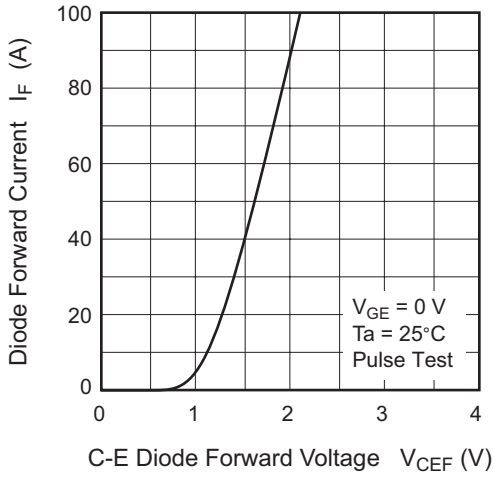
Collector to Emitter Saturation Voltage vs. Junction Temparature (Typical)



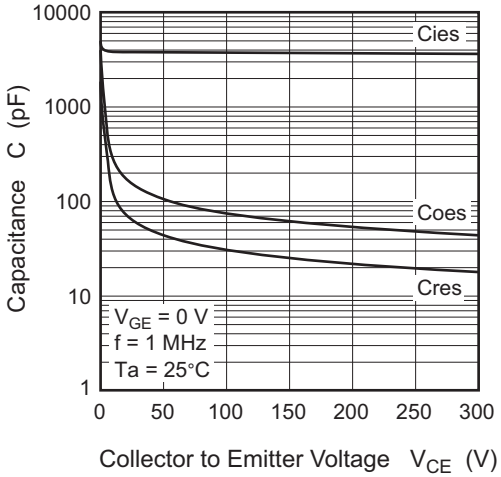
Gate to Emitter Cutoff Voltage vs. Junction Temparature (Typical)



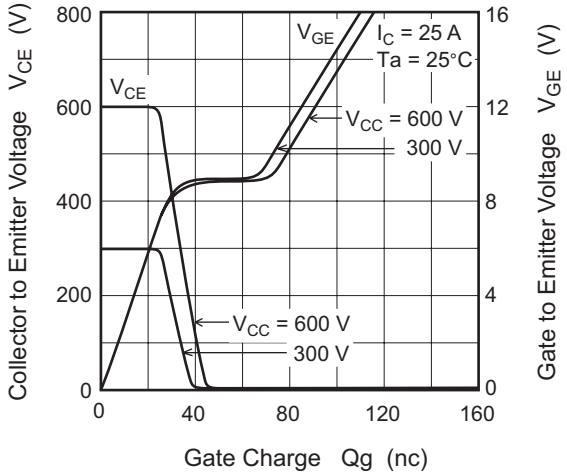
Forward Current vs. Forward Voltage (Typical)



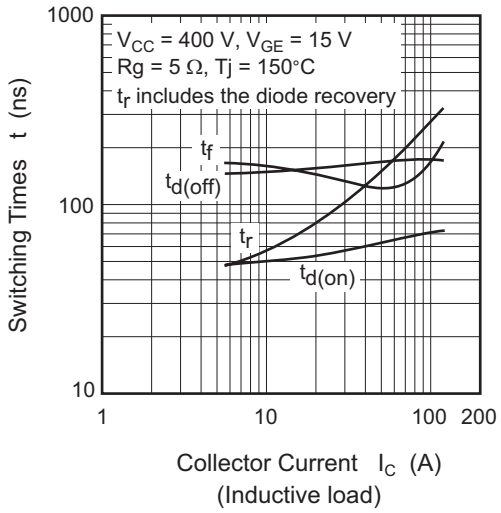
Typical Capacitance vs. Collector to Emitter Voltage



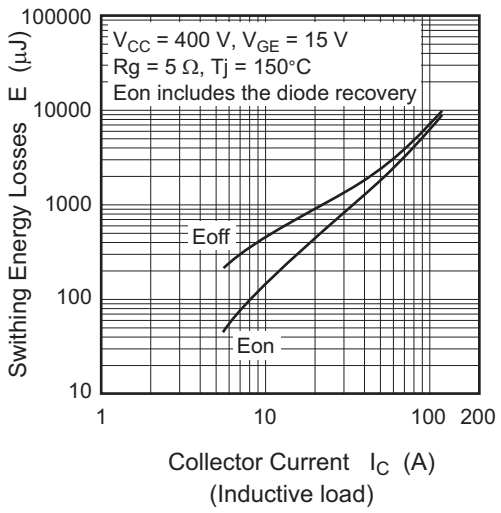
Dynamic Input Characteristics (Typical)



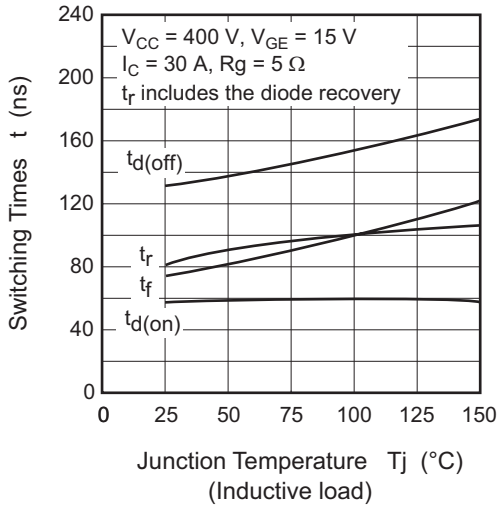
Switching Characteristics (Typical) (1)



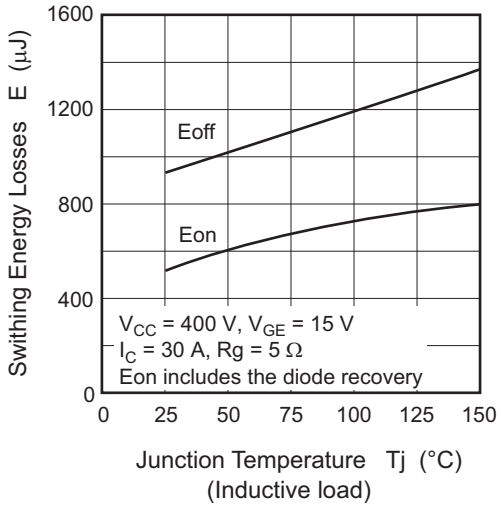
Switching Characteristics (Typical) (2)



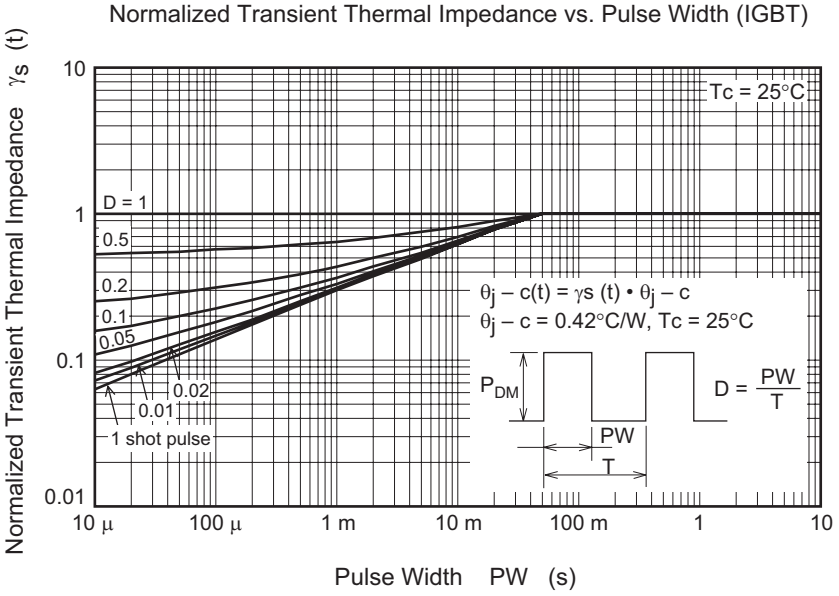
Switching Characteristics (Typical) (3)



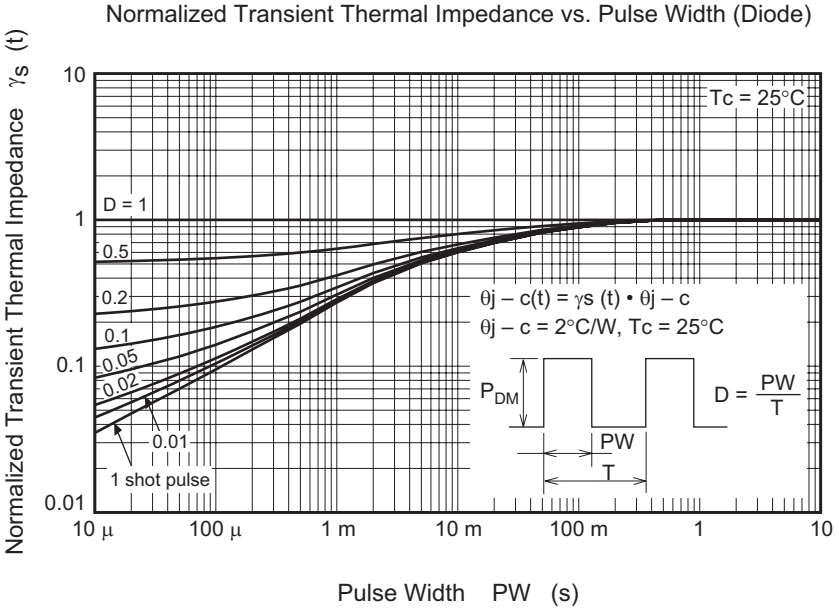
Switching Characteristics (Typical) (4)



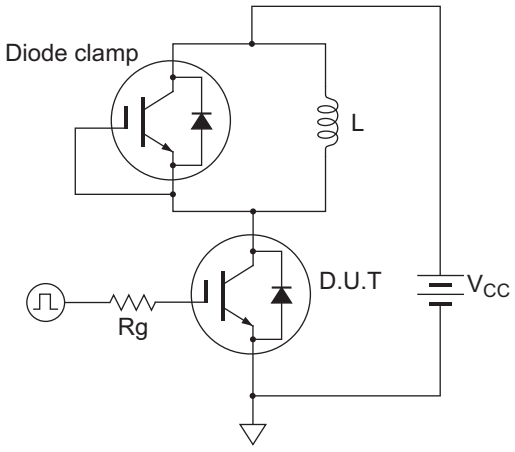
Normalized Transient Thermal Impedance vs. Pulse Width (IGBT)



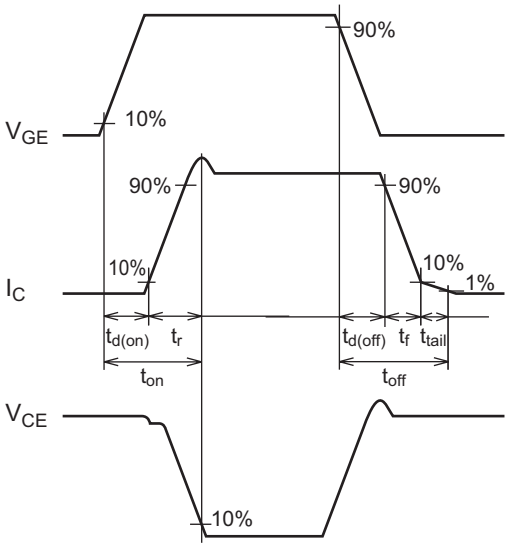
Normalized Transient Thermal Impedance vs. Pulse Width (Diode)



Switching Time Test Circuit



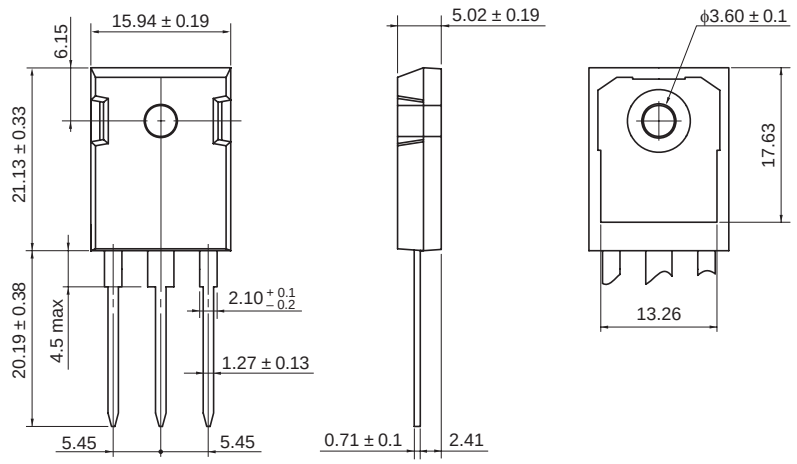
Waveform



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
RJH60F6DPQ-A0-T0	240 pcs	Box (Tube)

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
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
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
1 harbourFront Avenue, #06-10, keppel Bay Tower, Singapore 098632
Tel: +65-6213-0200, Fax: +65-6278-8001

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

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