

# RJH60F7BDPQ-A0

600V - 50A - IGBT  
High Speed Power Switching

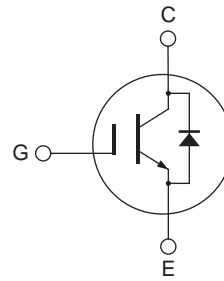
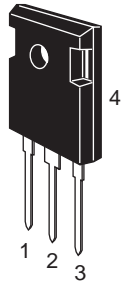
R07DS0633EJ0100  
Rev.1.00  
Feb 17, 2012

## Features

- Low collector to emitter saturation voltage  
 $V_{CE(sat)} = 1.35 \text{ V typ. (at } I_C = 50 \text{ A, } V_{GE} = 15 \text{ V, } T_a = 25^\circ\text{C)}$
- Built in fast recovery diode in one package
- Trench gate and thin wafer technology
- High speed switching  
 $t_f = 74 \text{ ns typ. (at } I_C = 30 \text{ A, } V_{CE} = 400 \text{ V, } V_{GE} = 15 \text{ V, } R_g = 5 \Omega, T_a = 25^\circ\text{C, inductive load)}$

## Outline

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



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

## 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	$V_{GES}$	$\pm 30$	V	
Collector current	$T_c = 25^\circ\text{C}$	$I_C$	90	A
	$T_c = 100^\circ\text{C}$	$I_C$	50	A
Collector peak current	$i_{c(peak)}$ <sup>Note1</sup>	180	A	
Collector to emitter diode forward peak current	$i_{DF(peak)}$ <sup>Note2</sup>	100	A	
Collector dissipation	$P_C$	328.9	W	
Junction to case thermal impedance (IGBT)	$\theta_{j-c}$	0.38	$^\circ\text{C/W}$	
Junction to case thermal impedance (Diode)	$\theta_{j-cd}$	1.1	$^\circ\text{C/W}$	
Junction 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  $\leq 1\%$

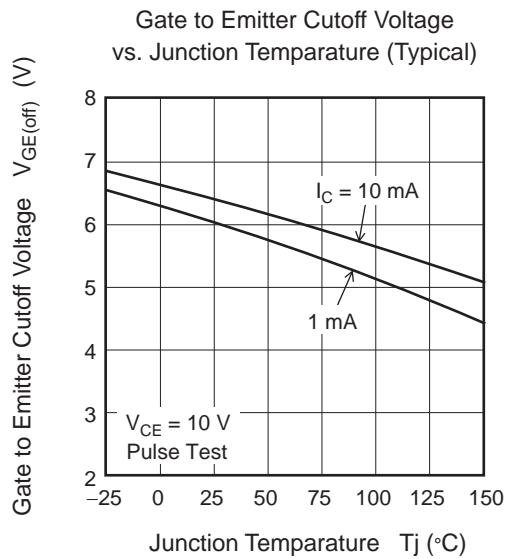
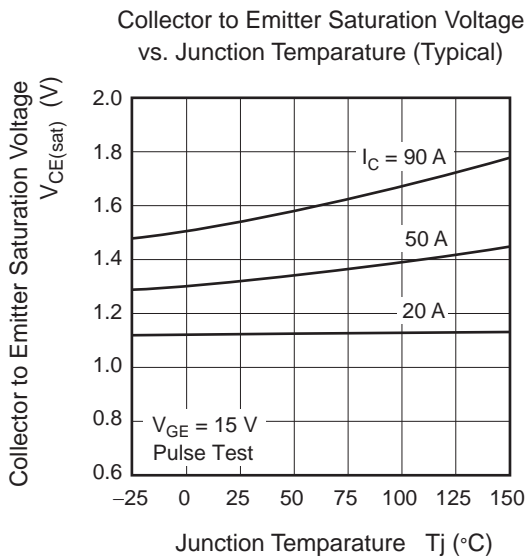
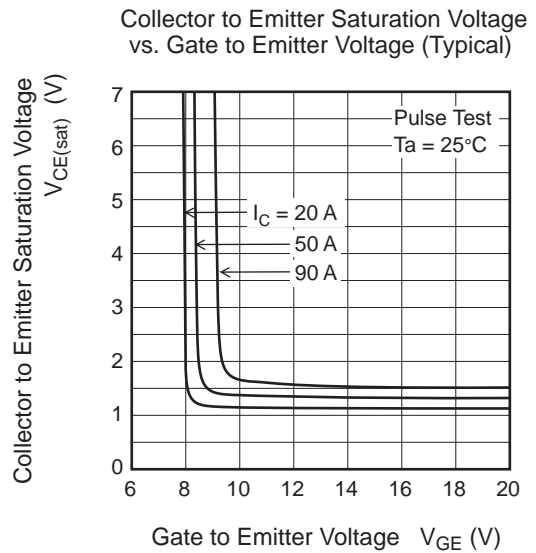
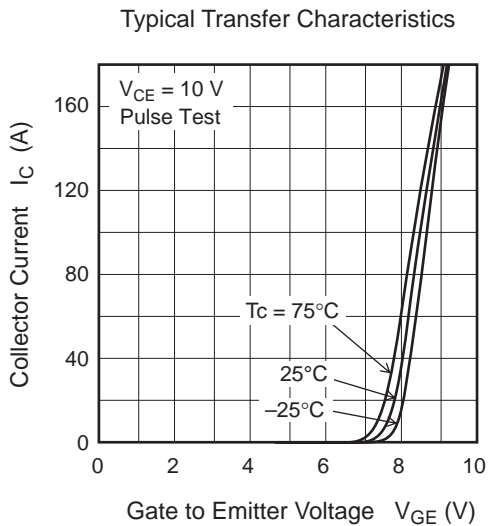
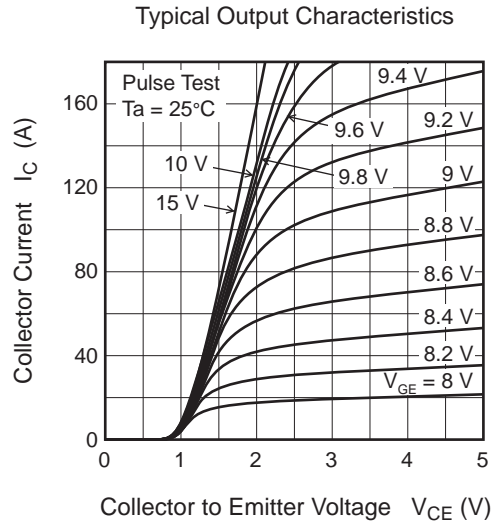
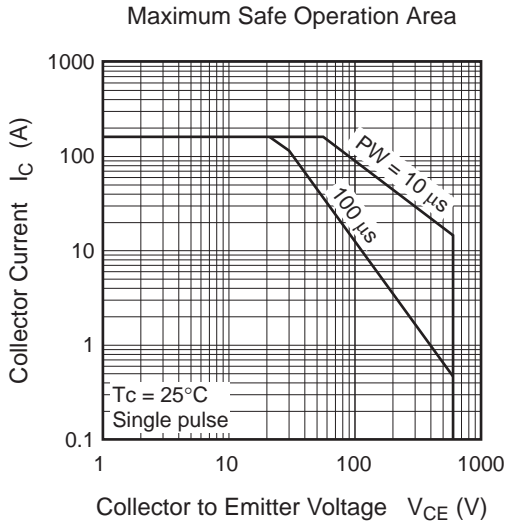
## Electrical Characteristics

(T<sub>j</sub> = 25°C)

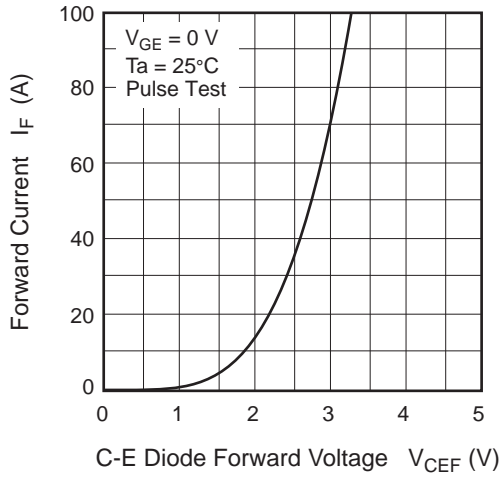
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	I <sub>CES</sub>	—	—	100	μA	V <sub>CE</sub> = 600V, V <sub>GE</sub> = 0
Gate to emitter leak current	I <sub>GES</sub>	—	—	±1	μA	V <sub>GE</sub> = ±30 V, V <sub>CE</sub> = 0
Gate to emitter cutoff voltage	V <sub>GE(off)</sub>	4	—	8	V	V <sub>CE</sub> = 10V, I <sub>C</sub> = 1 mA
Collector to emitter saturation voltage	V <sub>CE(sat)</sub>	—	1.35	1.75	V	I <sub>C</sub> = 50 A, V <sub>GE</sub> = 15V <sup>Note3</sup>
	V <sub>CE(sat)</sub>	—	1.6	—	V	I <sub>C</sub> = 90 A, V <sub>GE</sub> = 15V <sup>Note3</sup>
Input capacitance	C <sub>ies</sub>	—	4700	—	pF	V <sub>CE</sub> = 25 V
Output capacitance	C <sub>oes</sub>	—	198	—	pF	V <sub>GE</sub> = 0 V
Reverse transfer capacitance	C <sub>res</sub>	—	83	—	pF	f = 1 MHz
Switching time	t <sub>d(on)</sub>	—	63	—	ns	I <sub>C</sub> = 30 A, V <sub>CE</sub> = 400 V, V <sub>GE</sub> = 15 V R <sub>g</sub> = 5 Ω <sup>Note3</sup> Inductive load
	t <sub>r</sub>	—	81	—	ns	
	t <sub>d(off)</sub>	—	142	—	ns	
	t <sub>f</sub>	—	74	—	ns	
C-E diode forward voltage	V <sub>ECF</sub>	—	2.5	3.0	V	I <sub>F</sub> = 30 A <sup>Note3</sup>
C-E diode reverse recovery time	t <sub>rr</sub>	—	25	—	ns	I <sub>F</sub> = 30 A di <sub>F</sub> /dt = 100 A/μs

Notes: 3. Pulse test

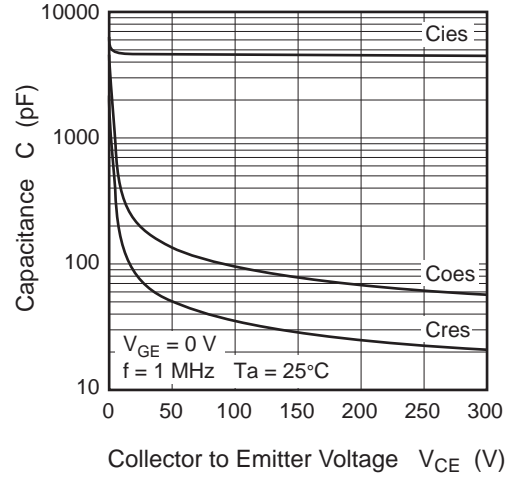
Main Characteristics



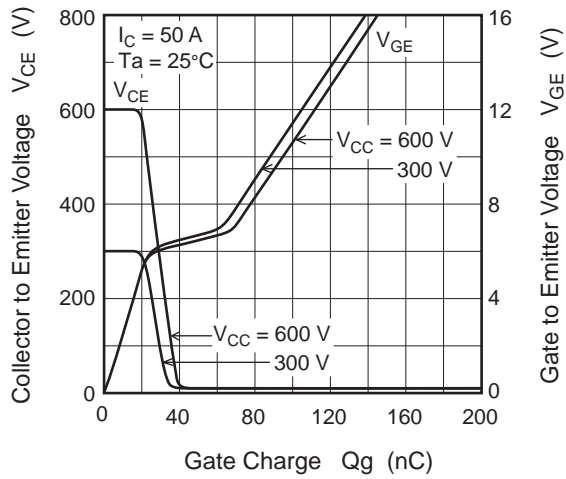
Forward Current vs. Forward Voltage (Typical)



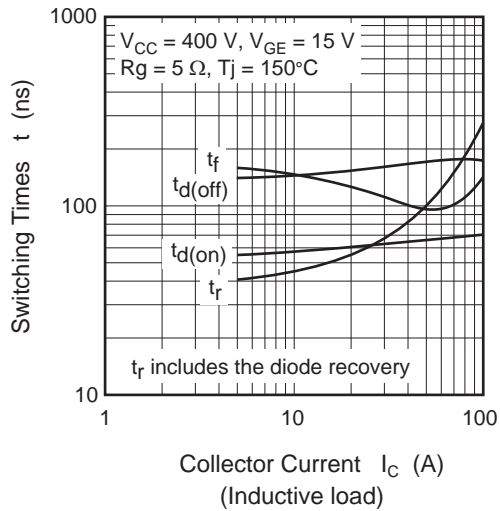
Typical Capacitance vs. Collector to Emitter Voltage



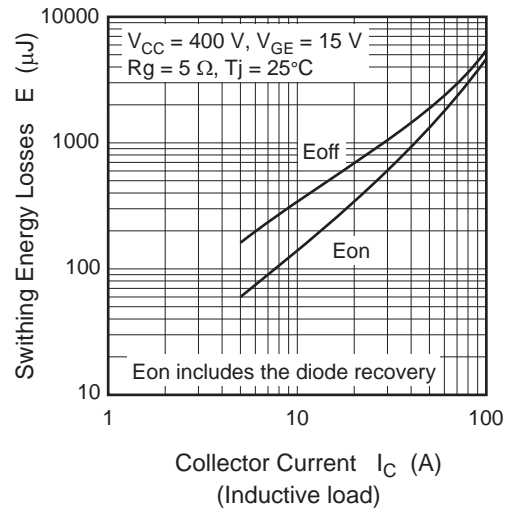
Dynamic Input Characteristics (Typical)



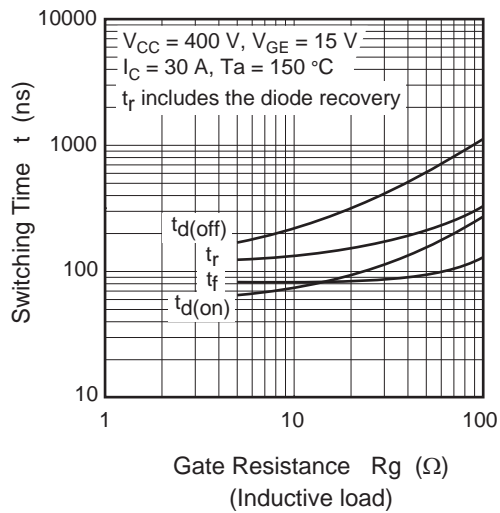
Switching Characteristics (Typical) (1)



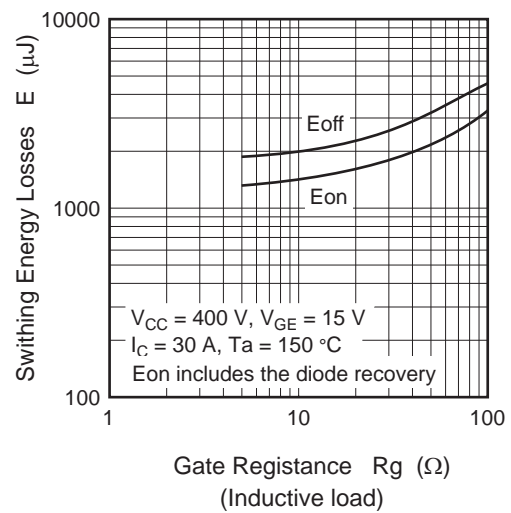
Switching Characteristics (Typical) (2)



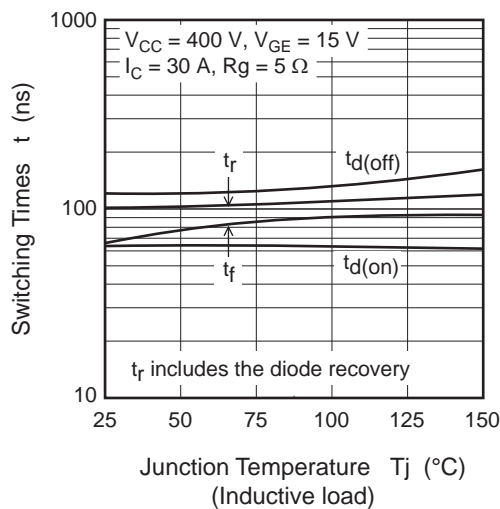
Switching Characteristics (Typical) (3)



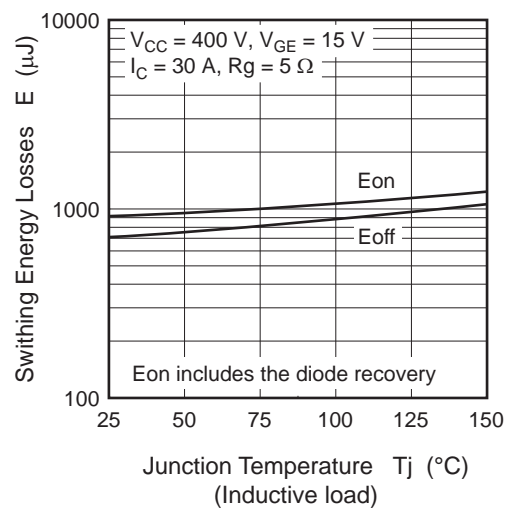
Switching Characteristics (Typical) (4)

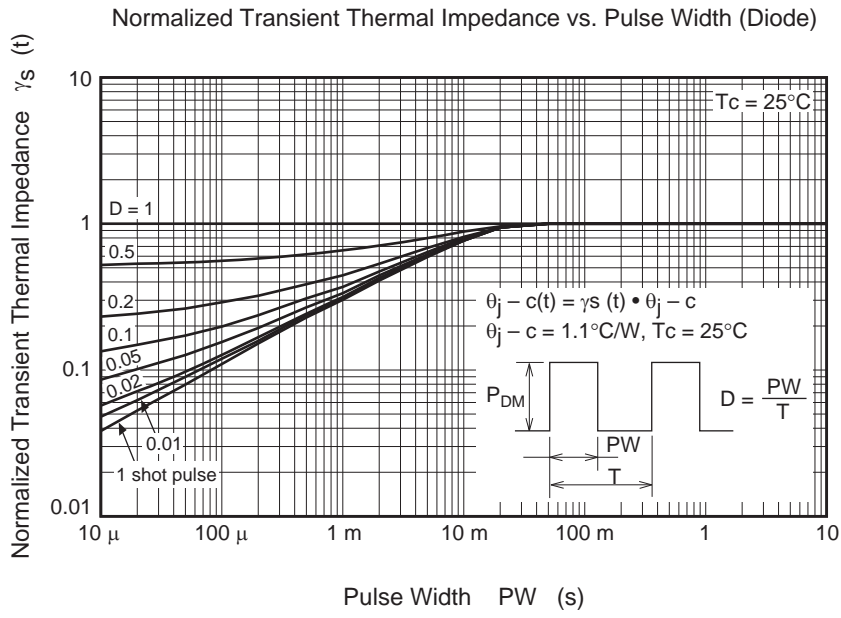
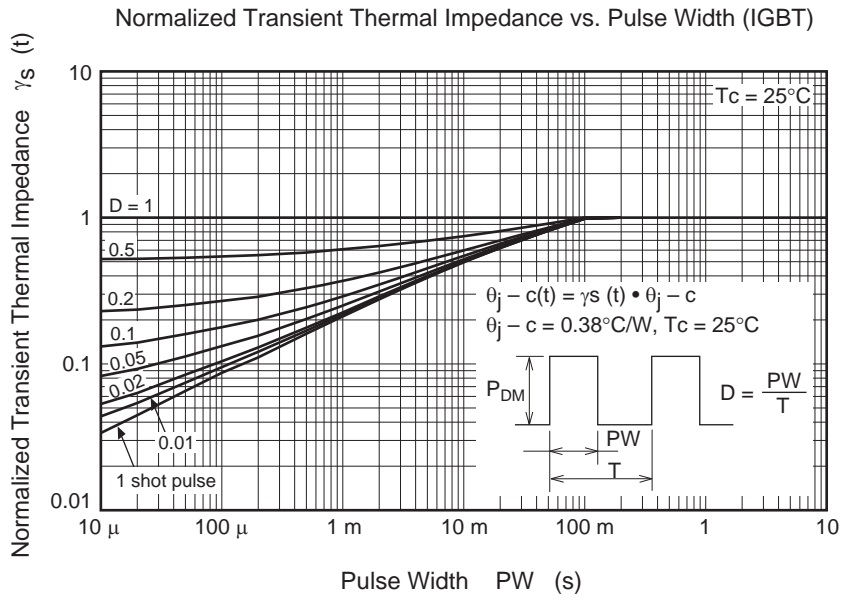


Switching Characteristics (Typical) (5)

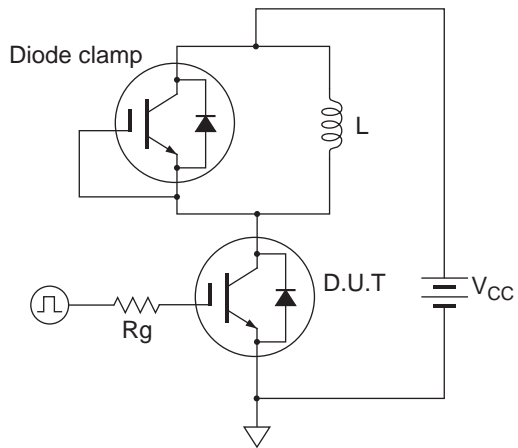


Switching Characteristics (Typical) (6)

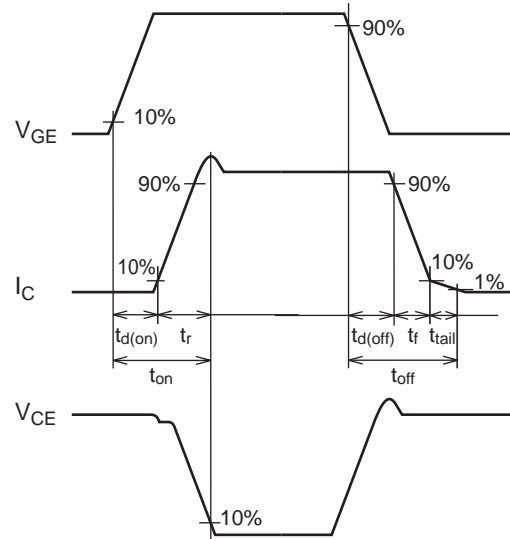




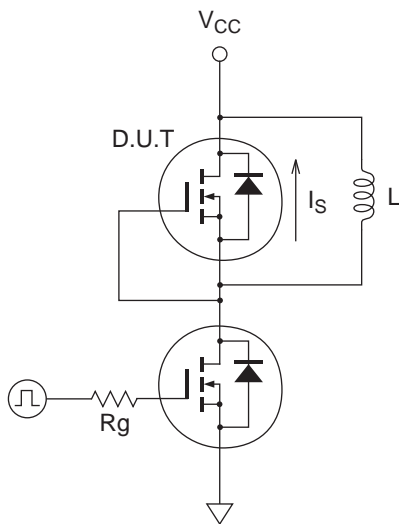
Switching Time Test Circuit



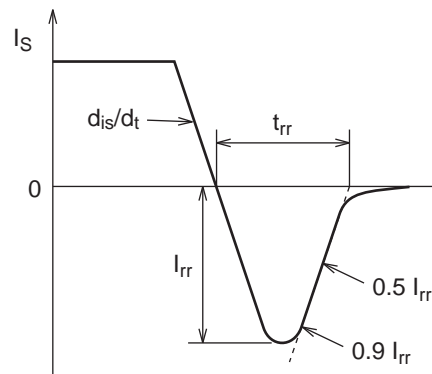
Waveform



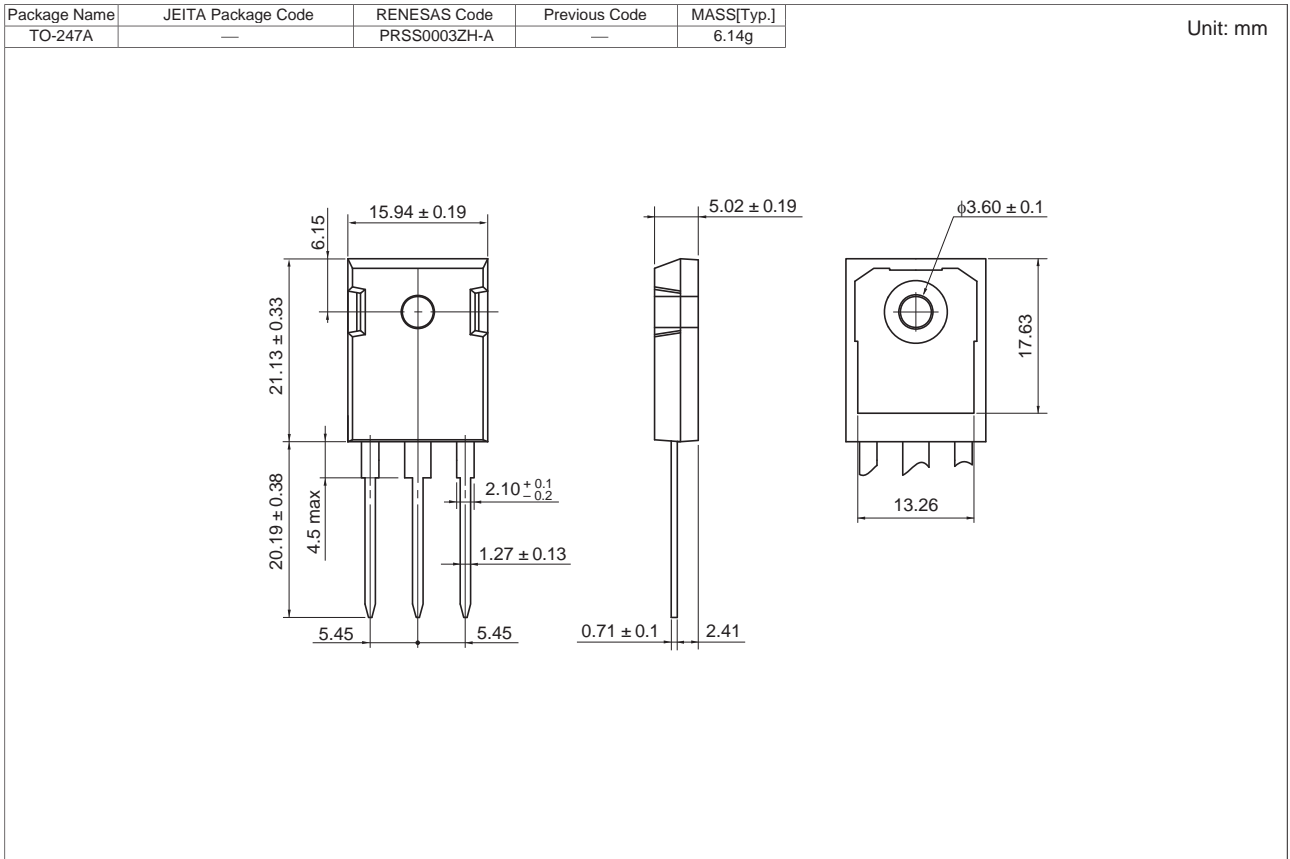
Diode Reverse Recovery Time Test Circuit



Waveform



### Package Dimensions



### Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJH60F7BDPQ-A0#T0	240 pcs	Box (Tube)



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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.**  
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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.**  
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Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

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Tel: +65-6213-0200, Fax: +65-6278-8001

**Renesas Electronics Malaysia Sdn.Bhd.**  
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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