

# RJH60D3DPP-M0

600V - 17A - IGBT

Application: Inverter

R07DS0162EJ0400

Rev.4.00

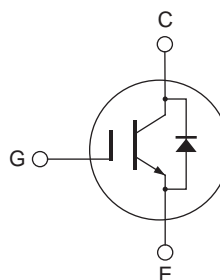
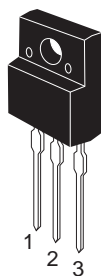
Apr 19, 2012

## Features

- Short circuit withstand time (5  $\mu$ s typ.)
- Low collector to emitter saturation voltage  
 $V_{CE(sat)} = 1.6$  V typ. (at  $I_C = 17$  A,  $V_{GE} = 15$  V,  $T_a = 25^\circ\text{C}$ )
- Built in fast recovery diode (100 ns typ.) in one package
- Trench gate and thin wafer technology
- High speed switching  
 $t_f = 70$  ns typ. (at  $V_{CC} = 300$  V,  $V_{GE} = 15$  V,  $I_C = 17$  A,  $R_g = 5 \Omega$ ,  $T_a = 25^\circ\text{C}$ )

## Outline

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



1. Gate
2. Collector
3. Emitter

## Absolute Maximum Ratings

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

Item	Symbol	Ratings	Unit
Collector to emitter voltage / diode reverse voltage	$V_{CES} / V_R$	600	V
Gate to emitter voltage	$V_{GES}$	$\pm 30$	V
Collector current	$T_c = 25^\circ\text{C}$	$I_C$	35
	$T_c = 100^\circ\text{C}$	$I_C$	17
Collector peak current	$i_{c(peak)}$ <sup>Note1</sup>	70	A
Collector to emitter diode forward current	$i_{DF}$	17	A
Collector to emitter diode forward peak current	$i_{DF(peak)}$ <sup>Note1</sup>	70	A
Collector dissipation	$P_C$ <sup>Note2</sup>	40	W
Junction to case thermal resistance (IGBT)	$\theta_{j-c}$ <sup>Note2</sup>	3.15	$^\circ\text{C}/\text{W}$
Junction to case thermal resistance (Diode)	$\theta_{j-cd}$ <sup>Note2</sup>	4.9	$^\circ\text{C}/\text{W}$
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

Notes: 1.  $PW \leq 10 \mu\text{s}$ , duty cycle  $\leq 1\%$

2. Value at  $T_c = 25^\circ\text{C}$

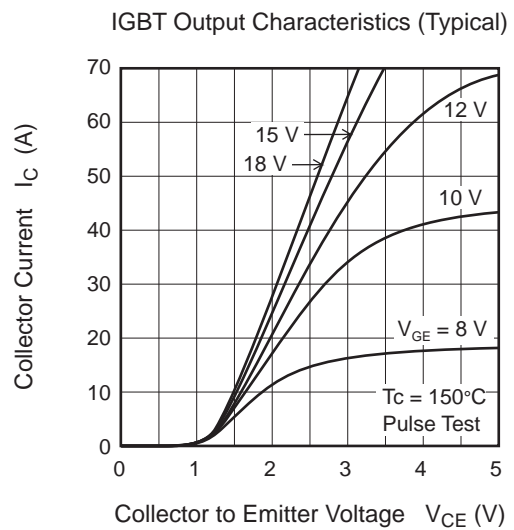
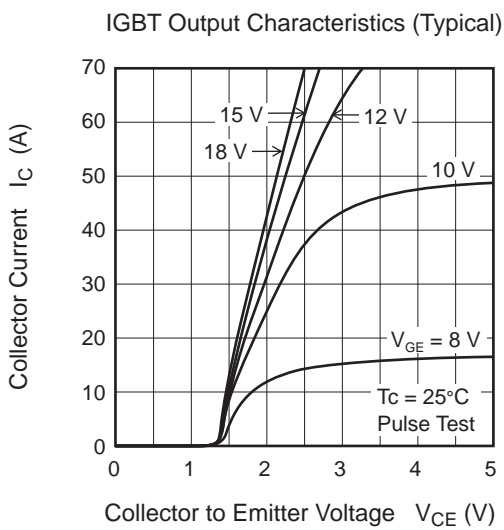
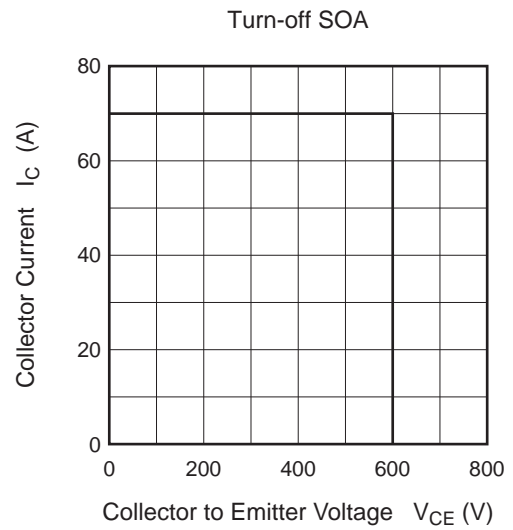
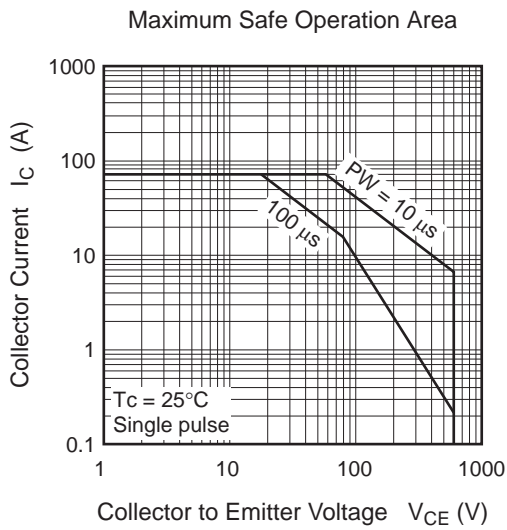
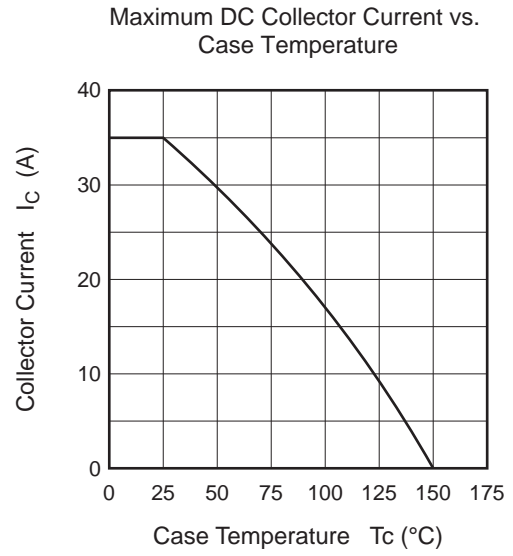
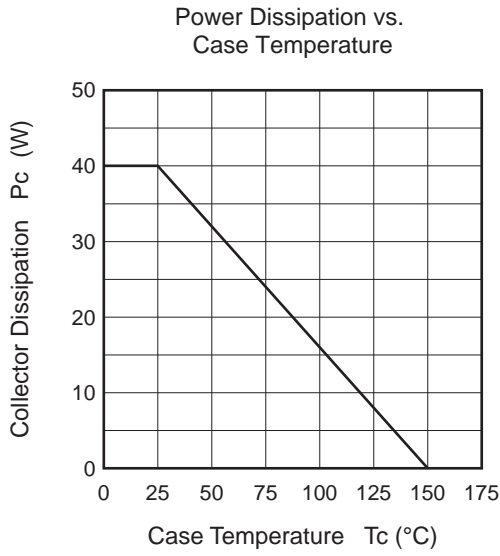
## Electrical Characteristics

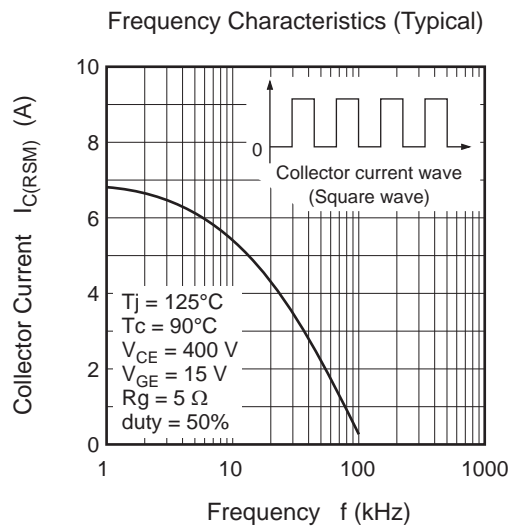
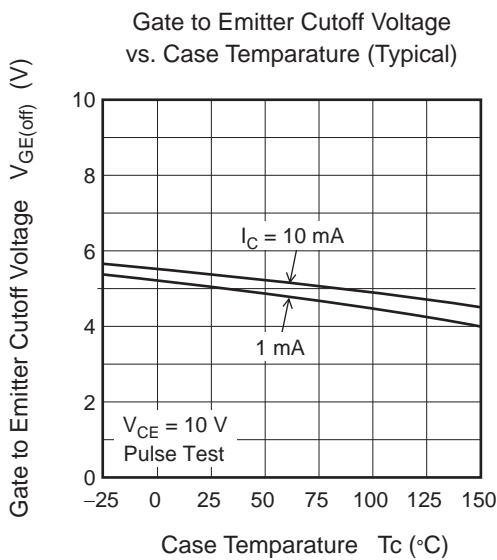
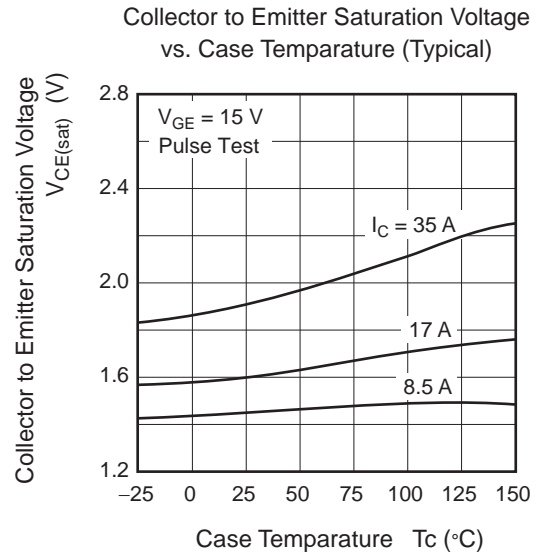
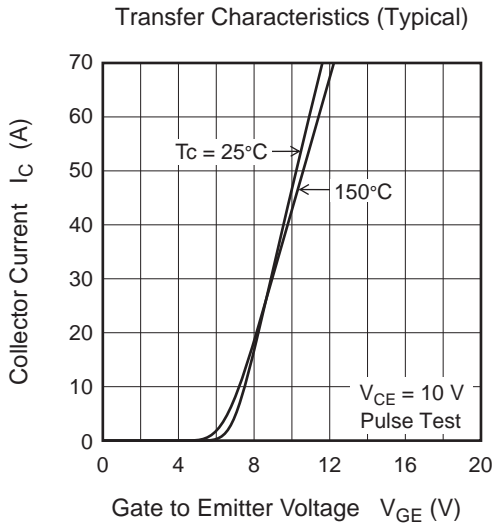
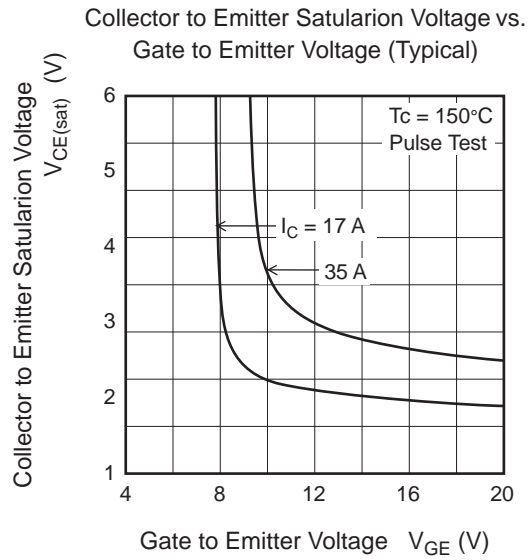
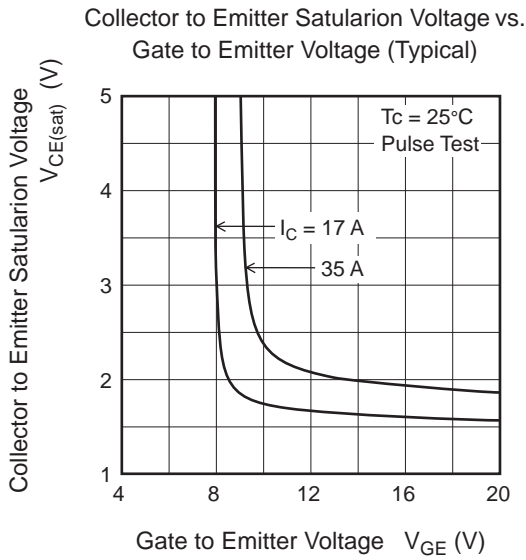
(Ta = 25°C)

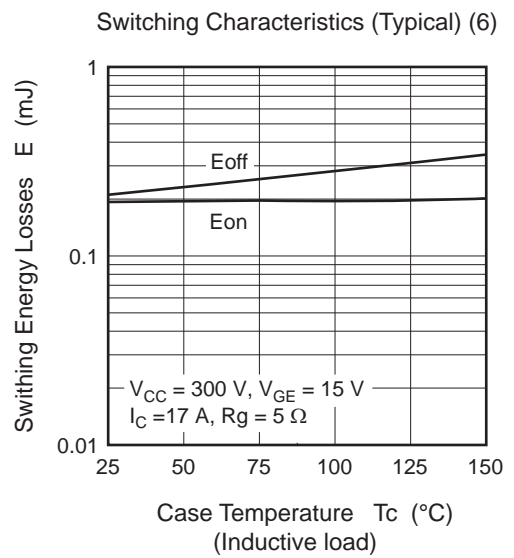
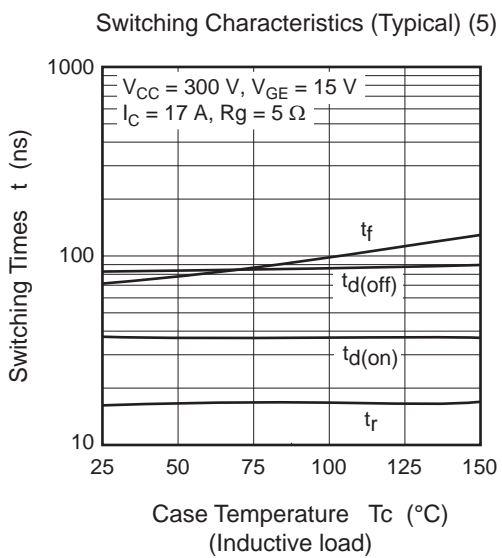
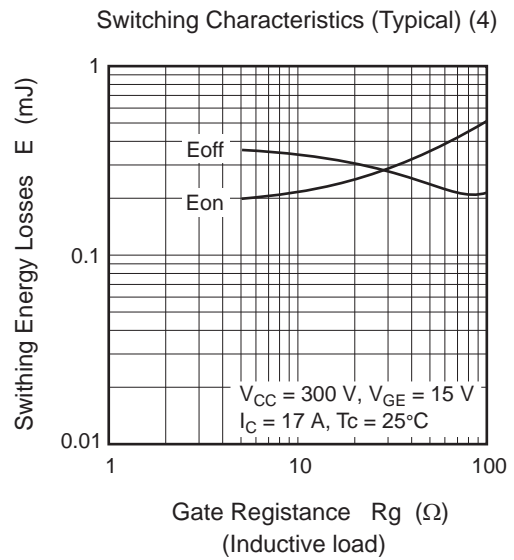
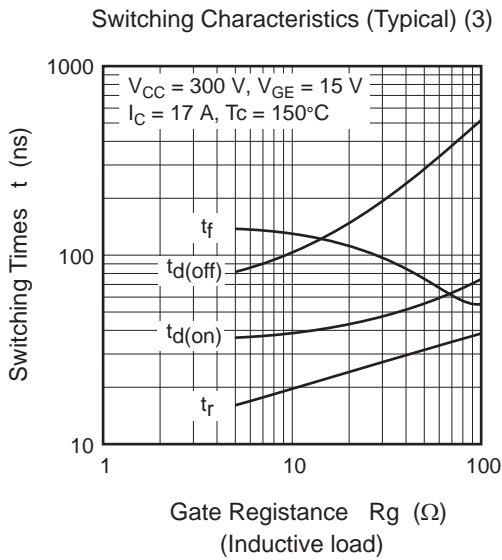
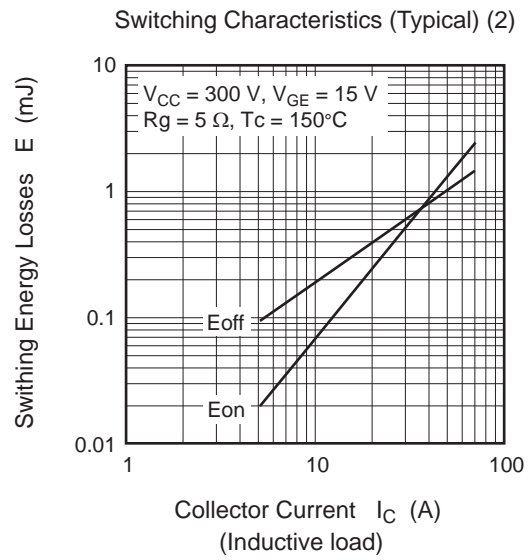
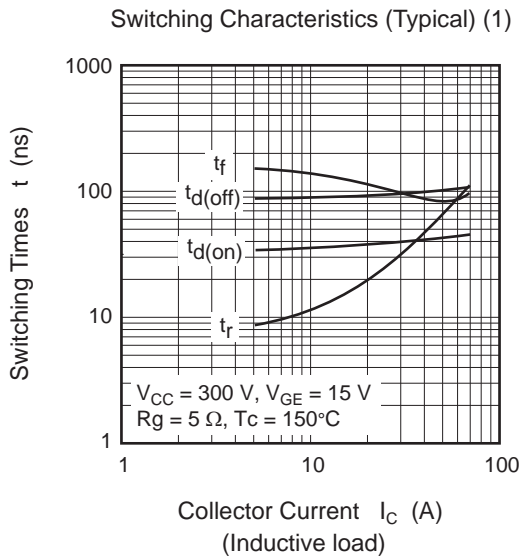
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to emitter breakdown voltage	$V_{BR(CES)}$	600	—	—	V	$I_C = 10 \mu A, V_{GE} = 0$
Zero gate voltage collector current / Diode reverse current	$I_{CES} / I_R$	—	—	5	$\mu A$	$V_{CE} = 600 V, V_{GE} = 0$
Gate to emitter leak current	$I_{GES}$	—	—	$\pm 1$	$\mu A$	$V_{GE} = \pm 30 V, V_{CE} = 0$
Gate to emitter cutoff voltage	$V_{GE(off)}$	4.0	—	6.0	V	$V_{CE} = 10 V, I_C = 1 mA$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.6	2.2	V	$I_C = 17 A, V_{GE} = 15 V$ <sup>Note3</sup>
	$V_{CE(sat)}$	—	2.0	—	V	$I_C = 35 A, V_{GE} = 15 V$ <sup>Note3</sup>
Input capacitance	$C_{ies}$	—	900	—	pF	$V_{CE} = 25 V$
Output capacitance	$C_{oes}$	—	60	—	pF	$V_{GE} = 0$
Reveres transfer capacitance	$C_{res}$	—	25	—	pF	$f = 1 MHz$
Total gate charge	$Q_g$	—	37	—	nC	$V_{GE} = 15 V$
Gate to emitter charge	$Q_{ge}$	—	6.5	—	nC	$V_{CE} = 300 V$
Gate to collector charge	$Q_{gc}$	—	15	—	nC	$I_C = 17 A$
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	$V_{CC} = 300 V$
Rise time	$t_r$	—	16	—	ns	$V_{GE} = 15 V$
Turn-off delay time	$t_{d(off)}$	—	80	—	ns	$I_C = 17 A$
Fall time	$t_f$	—	70	—	ns	$R_g = 5 \Omega$
Turn-on energy	$E_{on}$	—	0.20	—	mJ	Inductive load
Turn-off energy	$E_{off}$	—	0.21	—	mJ	
Total switching energy	$E_{total}$	—	0.41	—	mJ	
Short circuit withstand time	$t_{sc}$	3.0	5.0	—	$\mu s$	$V_{CC} \leq 360 V, V_{GE} = 15 V$
FRD Forward voltage	$V_F$	—	1.3	1.7	V	$I_F = 17 A$ <sup>Note3</sup>
FRD reverse recovery time	$t_{rr}$	—	100	—	ns	$I_F = 17 A$
FRD reverse recovery charge	$Q_{rr}$	—	0.15	—	$\mu C$	$di_F/dt = 100 A/\mu s$
FRD peak reverse recovery current	$I_{rr}$	—	4.2	—	A	

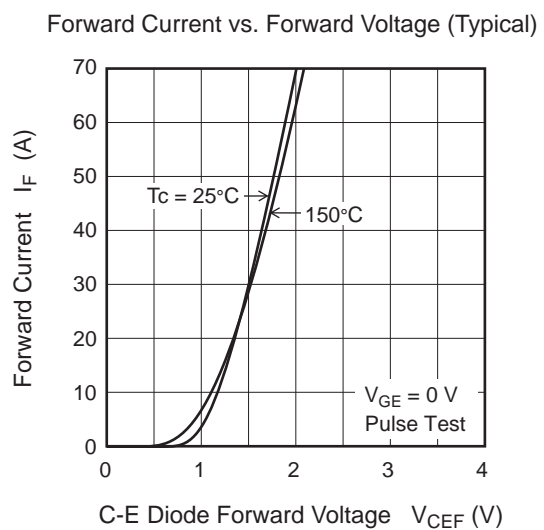
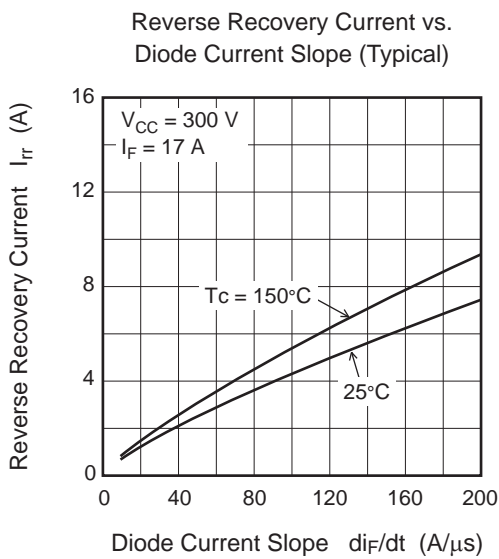
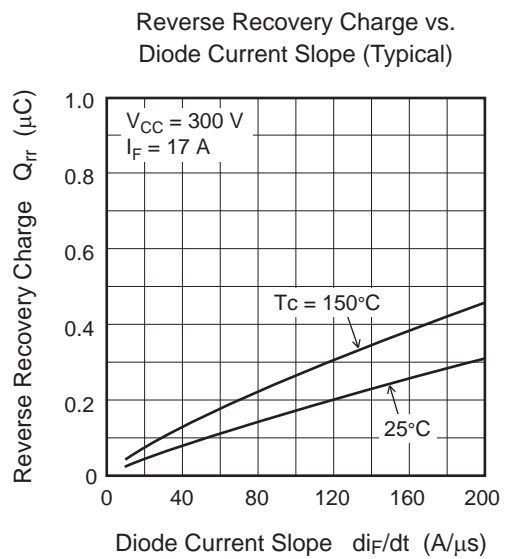
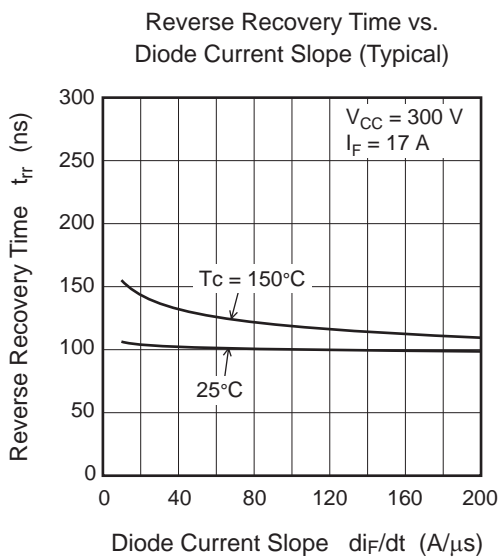
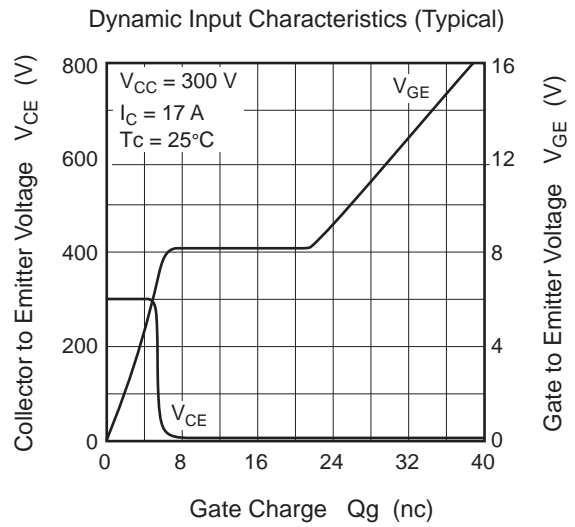
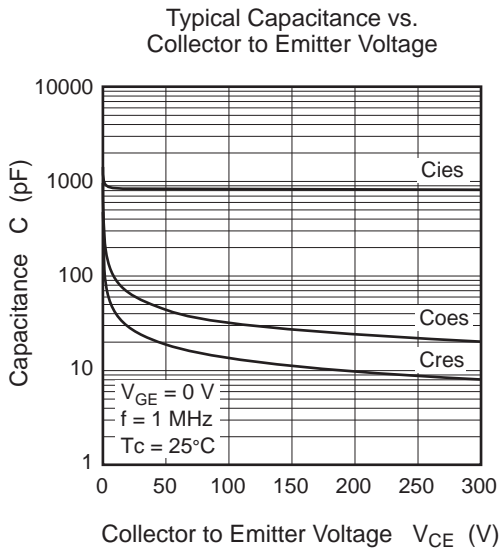
Notes: 3. Pulse test.

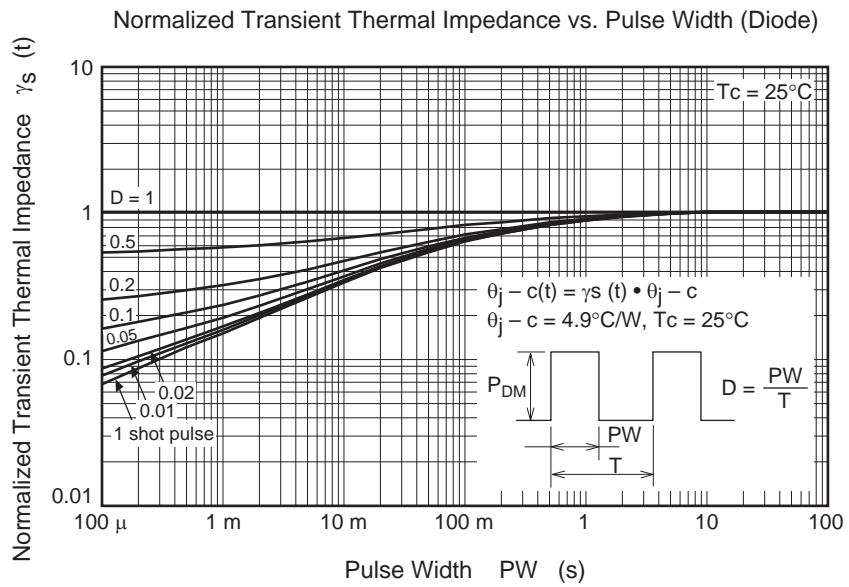
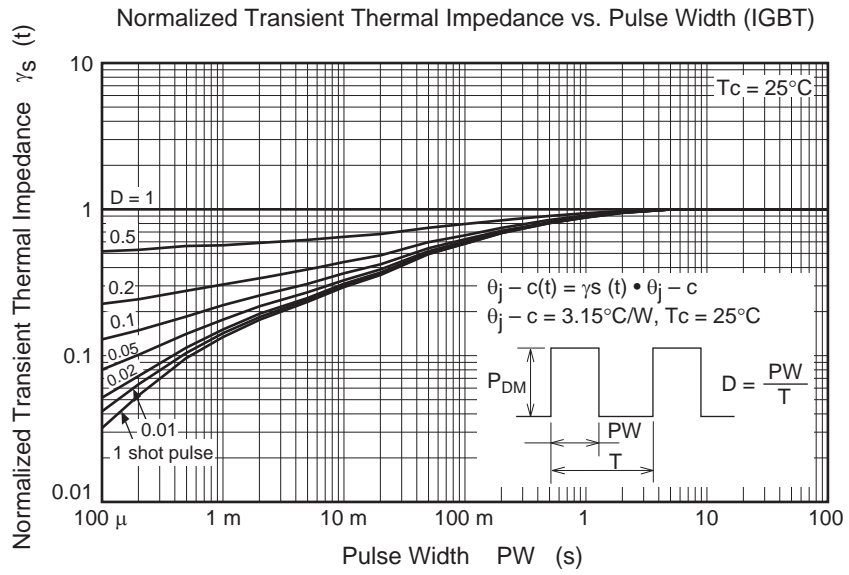
Main Characteristics



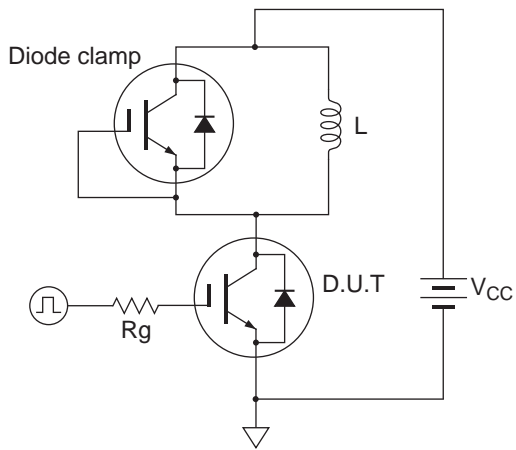




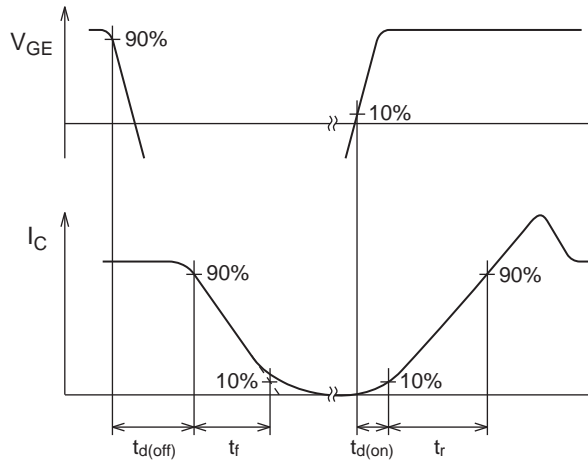




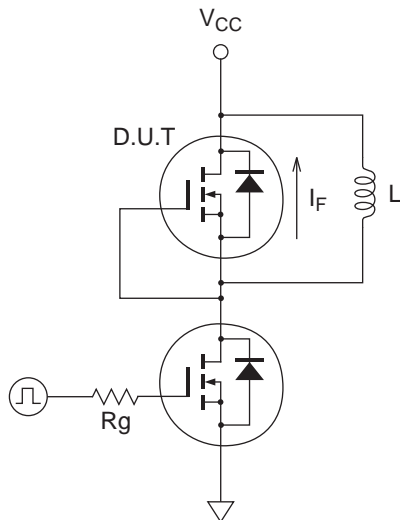
Switching Time Test Circuit



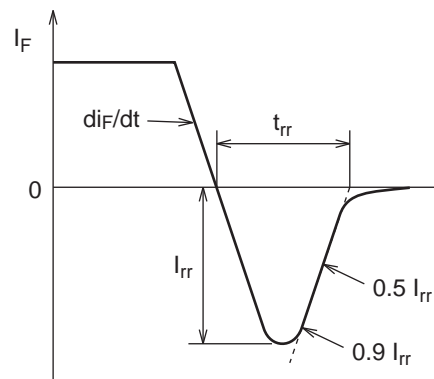
Waveform



Diode Reverse Recovery Time Test Circuit



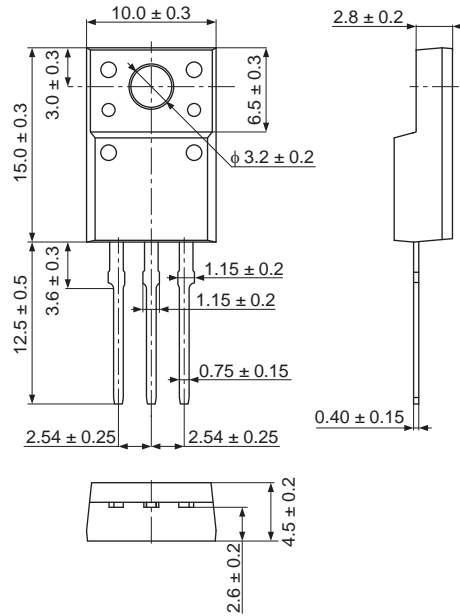
Waveform



### Package Dimension

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-220FL	—	PRSS0003AF-A	TO-220FL	1.5g

Unit: mm



### Ordering Information

Orderable Part No.	Quantity	Shipping Container
RJH60D3DPP-M0#T2	600 pcs	Box (Tube)

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