

# RJH60A83RDPD-A0

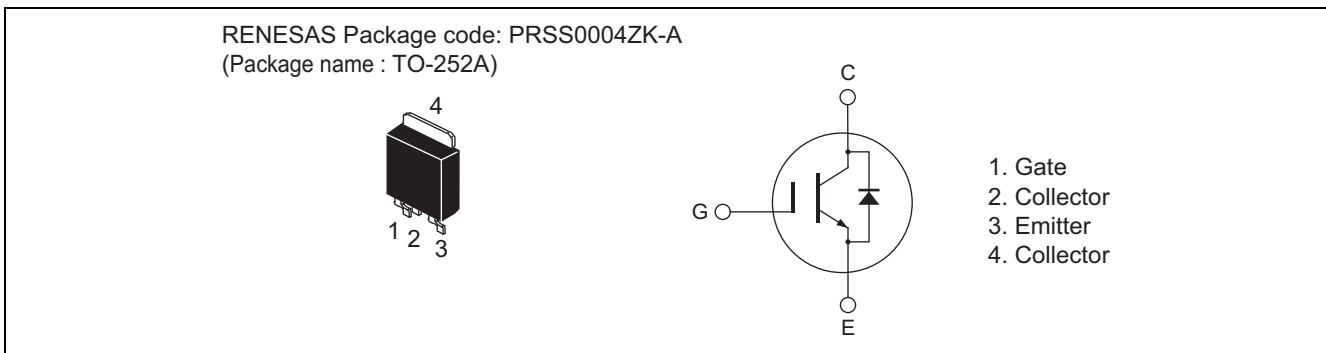
600V - 10A - IGBT  
Application: Inverter

R07DS1093EJ0200  
Rev.2.00  
Mar 24, 2015

## Features

- Reverse conducting IGBT with monolithic diode
- Short circuit withstand time (5  $\mu$ s typ.)
- Low collector to emitter saturation voltage  
 $V_{CE(sat)} = 2.1$  V typ. (at  $I_C = 10$  A,  $V_{GE} = 15$  V,  $T_a = 25^\circ\text{C}$ )
- Built-in fast recovery diode ( $t_{rr} = 130$  ns typ.) in one package
- Trench gate and thin wafer technology
- High speed switching  
 $t_f = 45$  ns typ. (at  $V_{CC} = 300$  V,  $V_{GE} = 15$  V,  $I_C = 10$  A,  $R_g = 5 \Omega$ ,  $T_a = 25^\circ\text{C}$ , inductive load)

## Outline



## 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	$T_c = 25^\circ\text{C}$	$I_C$	20	A
	$T_c = 100^\circ\text{C}$	$I_C$	10	A
Collector peak current	$I_{c(peak)}$ <sup>Note1</sup>	40	A	
Collector to emitter diode forward current	$i_{DF}$	10	A	
Collector to emitter diode forward peak current	$i_{DF(peak)}$ <sup>Note1</sup>	40	A	
Collector dissipation	$P_C$ <sup>Note2</sup>	51	W	
Junction to case thermal resistance	$\theta_{j-c}$ <sup>Note2</sup>	2.45	$^\circ\text{C}/\text{W}$	
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

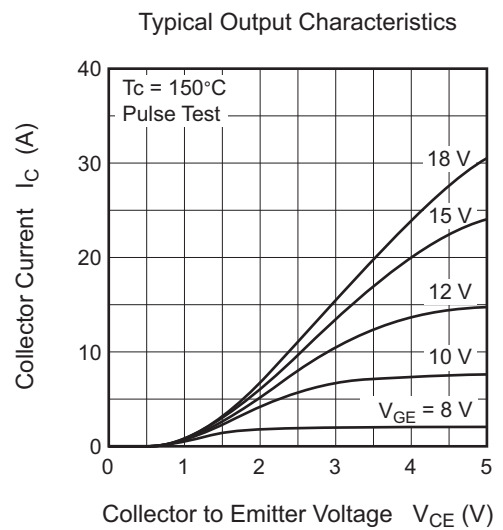
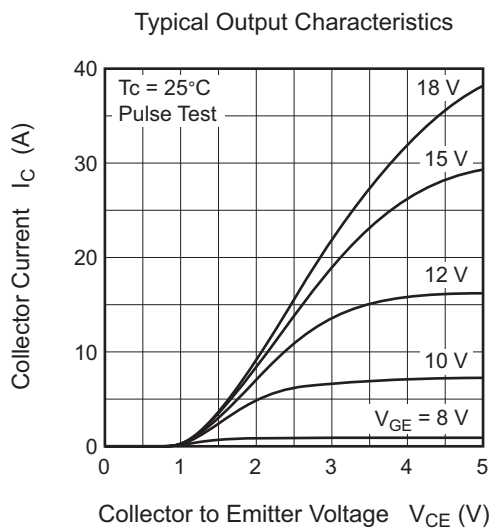
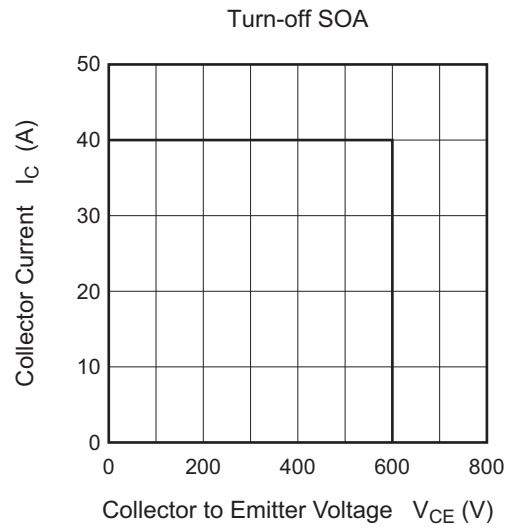
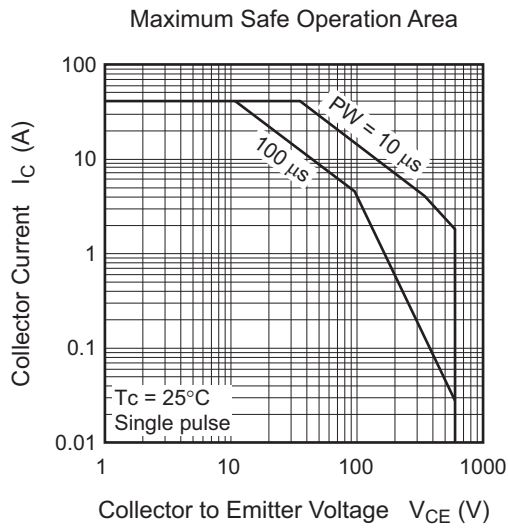
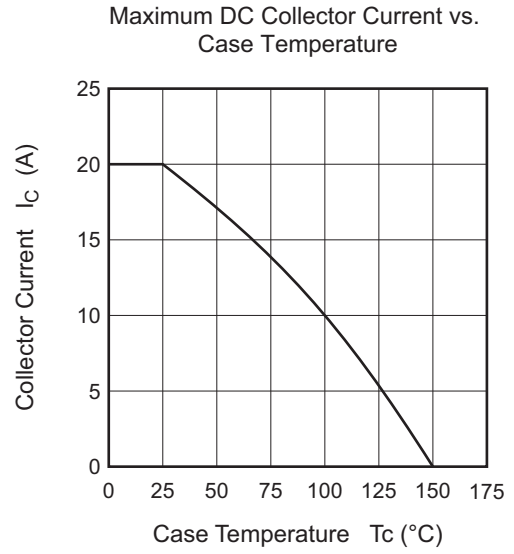
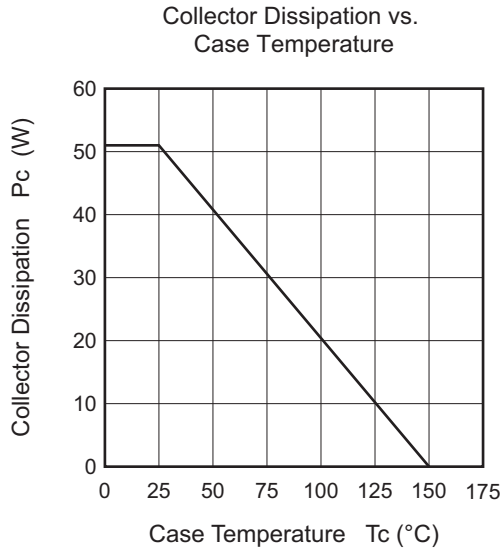
(Ta = 25°C)

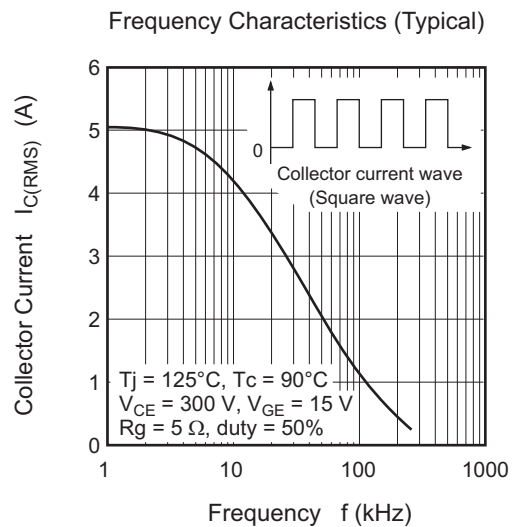
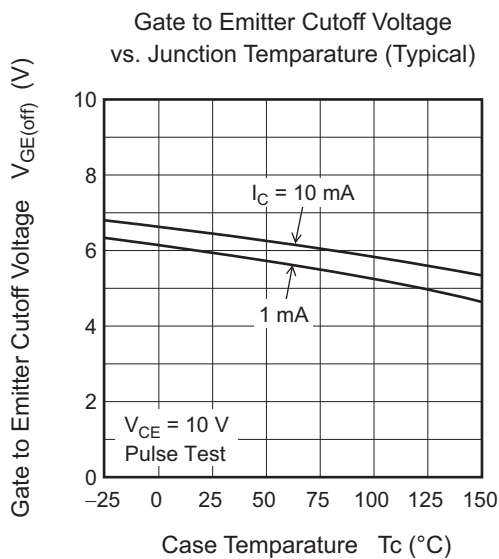
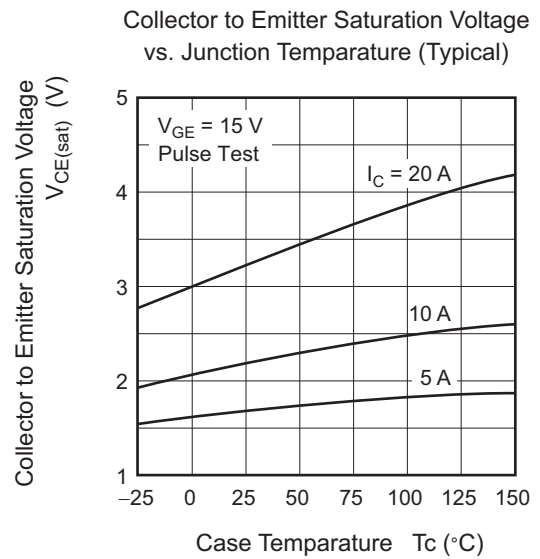
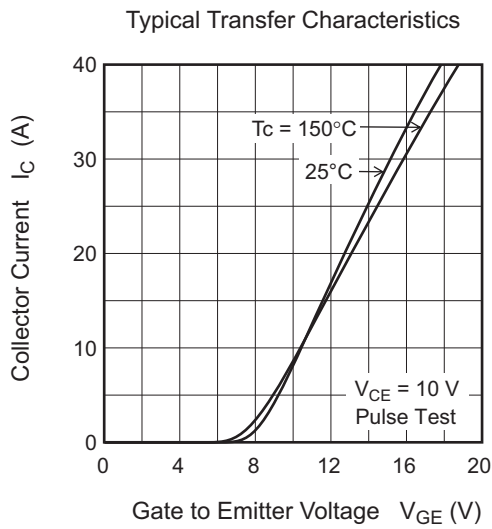
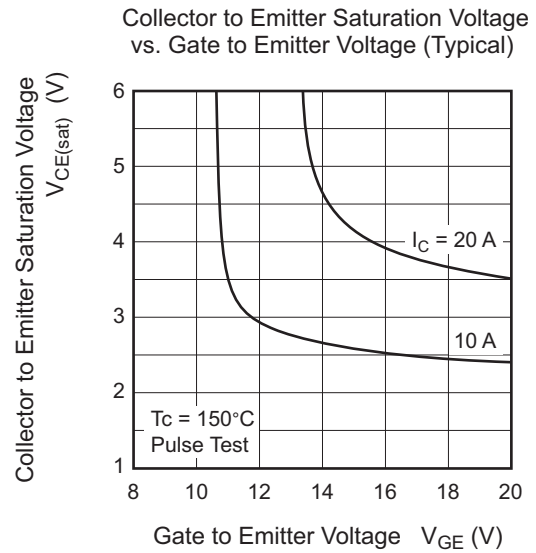
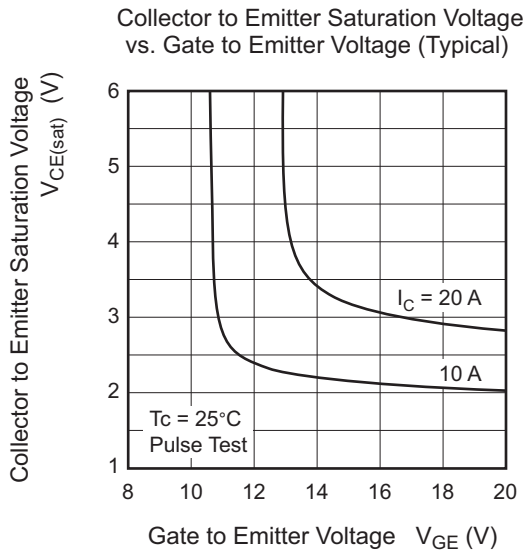
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current / diode reverse current	$I_{CES} / I_R$	—	—	1	$\mu\text{A}$	$V_{CE} = 600 \text{ V}, V_{GE} = 0 \text{ V}$
Gate to emitter leak current	$I_{GES}$	—	—	$\pm 100$	nA	$V_{GE} = \pm 30 \text{ V}, V_{CE} = 0 \text{ V}$
Gate to emitter cutoff voltage	$V_{GE(off)}$	4.5	—	7.5	V	$V_{CE} = 10 \text{ V}, I_C = 1 \text{ mA}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	2.1	2.6	V	$I_C = 10 \text{ A}, V_{GE} = 15 \text{ V}$ Note3
	$V_{CE(sat)}$	—	3.1	—	V	$I_C = 20 \text{ A}, V_{GE} = 15 \text{ V}$ Note3
Input capacitance	$C_{ies}$	—	280	—	pF	$V_{CE} = 25 \text{ V}$
Output capacitance	$C_{oes}$	—	19	—	pF	$V_{GE} = 0 \text{ V}$
Reveres transfer capacitance	$C_{res}$	—	11	—	pF	$f = 1 \text{ MHz}$
Total gate charge	$Q_g$	—	19.7	—	nC	$V_{GE} = 15 \text{ V}$
Gate to emitter charge	$Q_{ge}$	—	3.4	—	nC	$V_{CE} = 300 \text{ V}$
Gate to collector charge	$Q_{gc}$	—	12.0	—	nC	$I_C = 10 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	31	—	ns	$V_{CC} = 300\text{V}$
Rise time	$t_r$	—	14	—	ns	$V_{GE} = 15 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	54	—	ns	$I_C = 10 \text{ A},$
Fall time	$t_f$	—	45	—	ns	$R_g = 5 \Omega$
Turn-on energy	$E_{on}$	—	0.23	—	mJ	Inductive load
Turn-off energy	$E_{off}$	—	0.16	—	mJ	
Total switching energy	$E_{total}$	—	0.39	—	mJ	
Short circuit withstand time	$t_{sc}$	3.0	5.0	—	$\mu\text{s}$	$V_{CE} \leq 360 \text{ V}, V_{GE} = 15 \text{ V}$ $T_j = 100^\circ\text{C}$

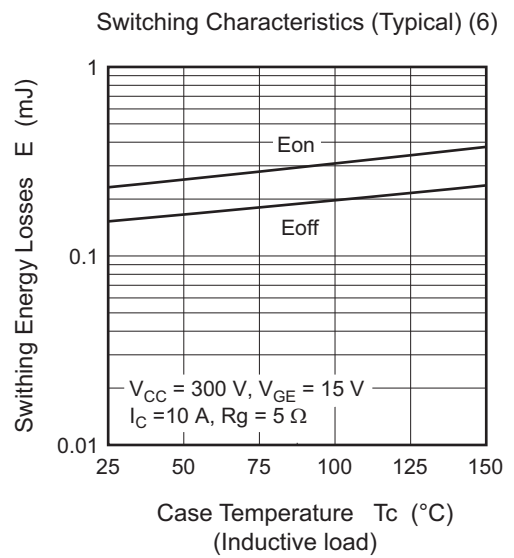
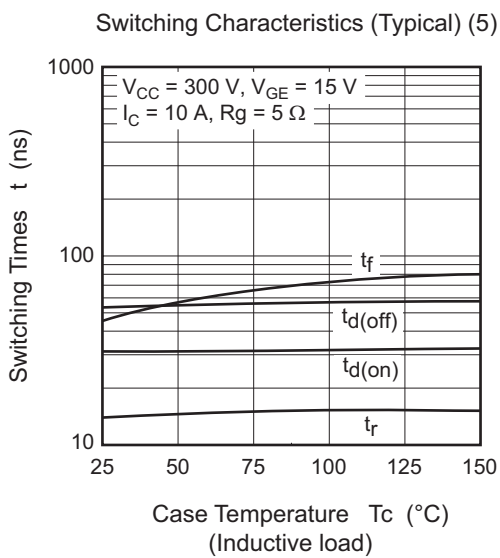
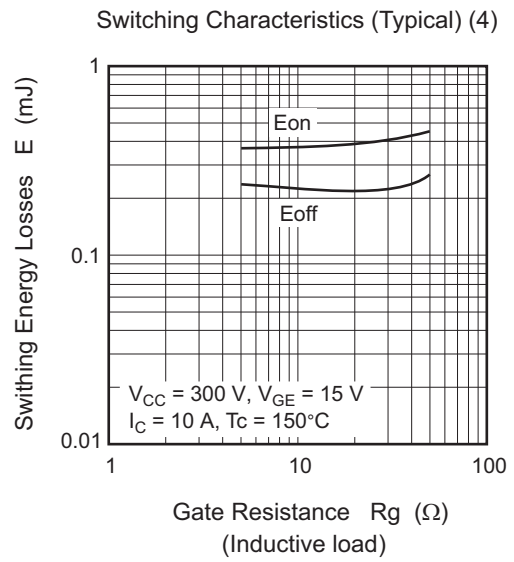
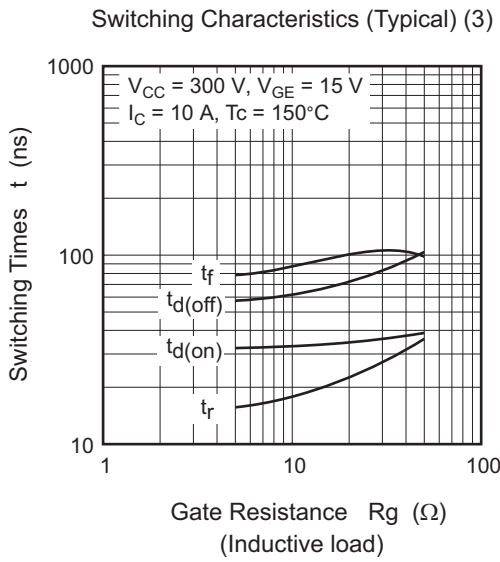
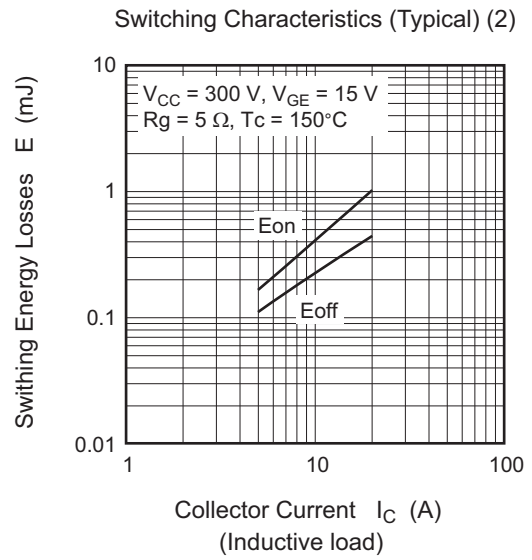
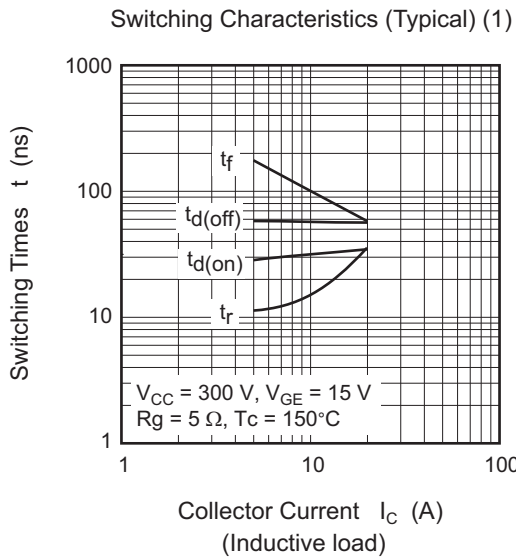
FRD Forward voltage	$V_F$	—	2.3	—	V	$I_F = 10 \text{ A}$ Note3
FRD reverse recovery time	$t_{rr}$	—	130	—	ns	$I_F = 10 \text{ A}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$
FRD reverse recovery charge	$Q_{rr}$	—	0.28	—	$\mu\text{C}$	
FRD peak reverse recovery current	$I_{rr}$	—	5.9	—	A	

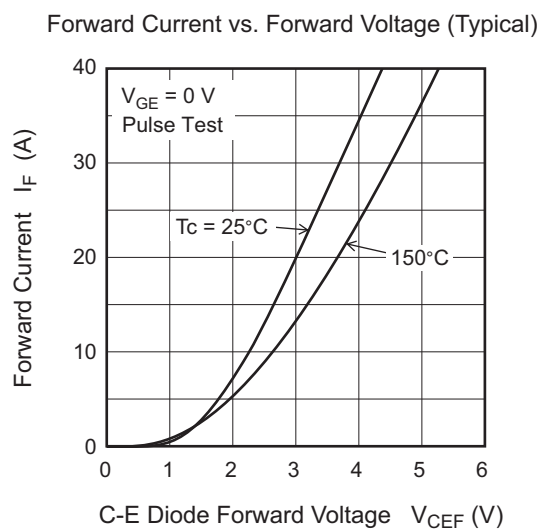
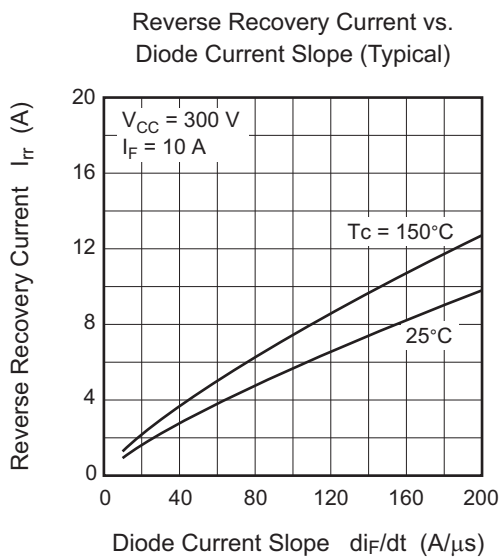
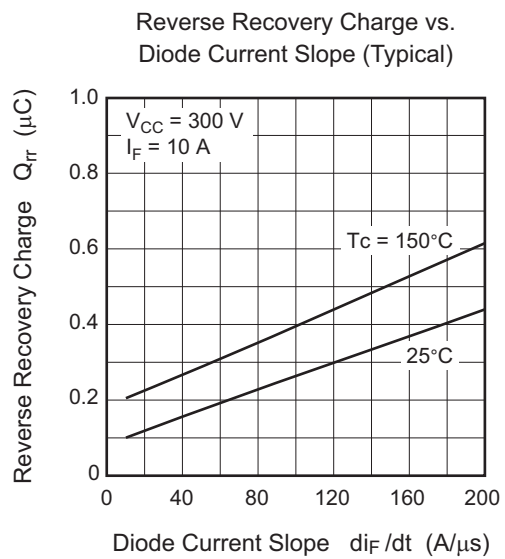
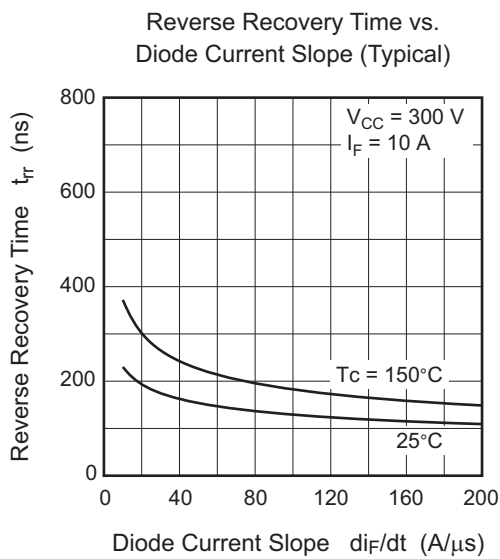
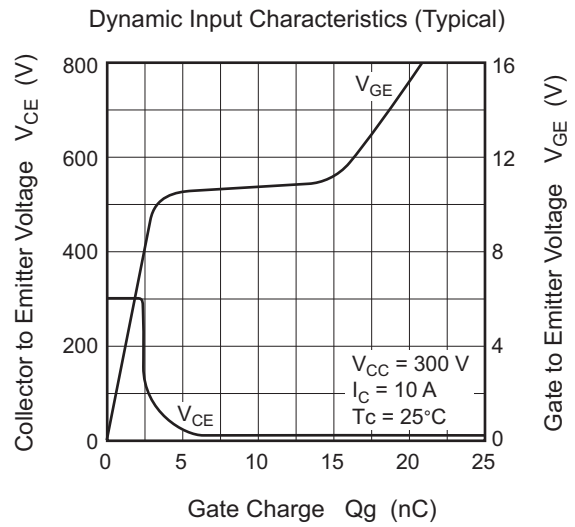
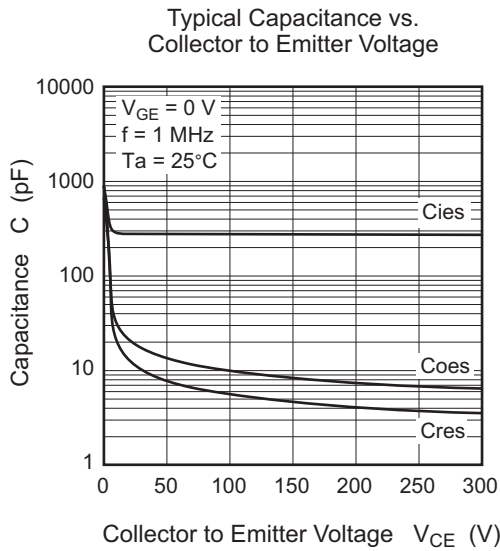
Notes: 3. Pulse test.

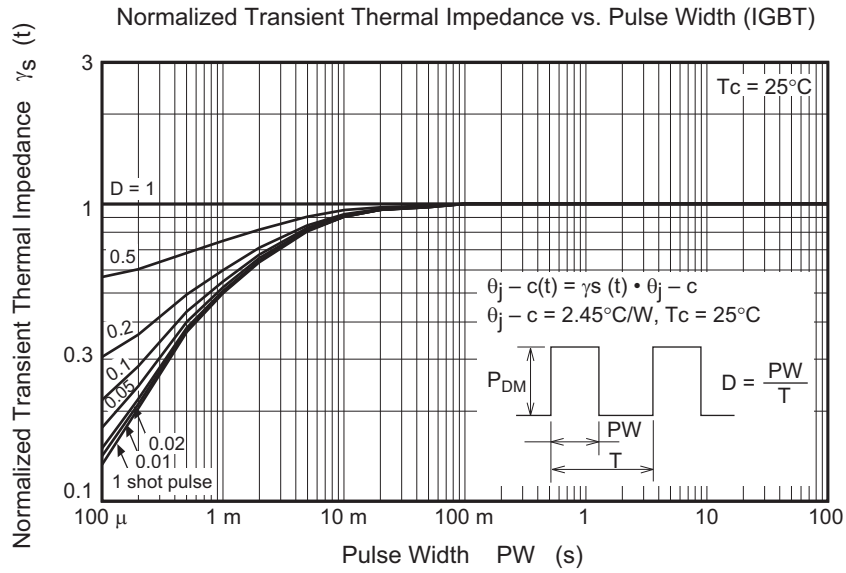
### Main Characteristics



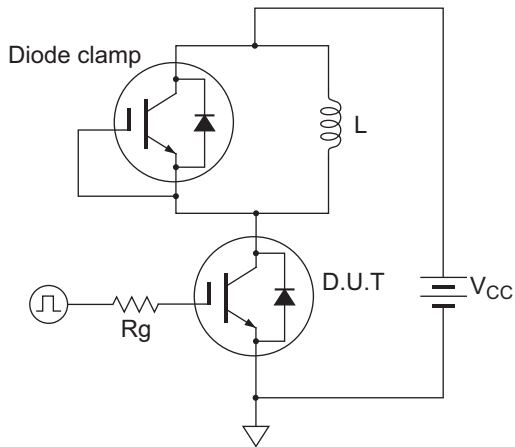




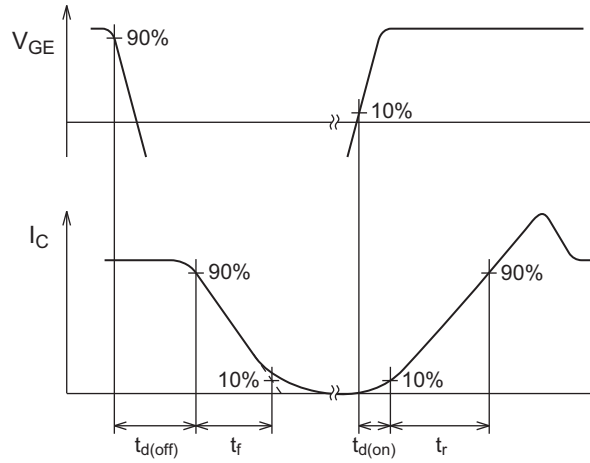




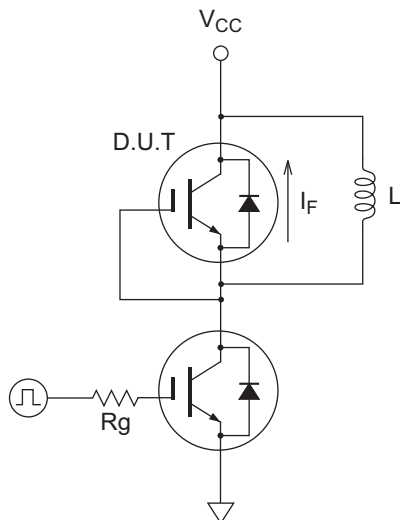
Switching Time Test Circuit



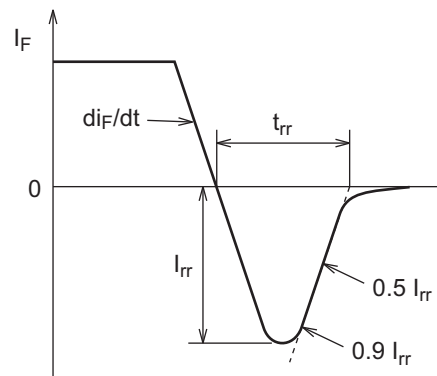
Waveform



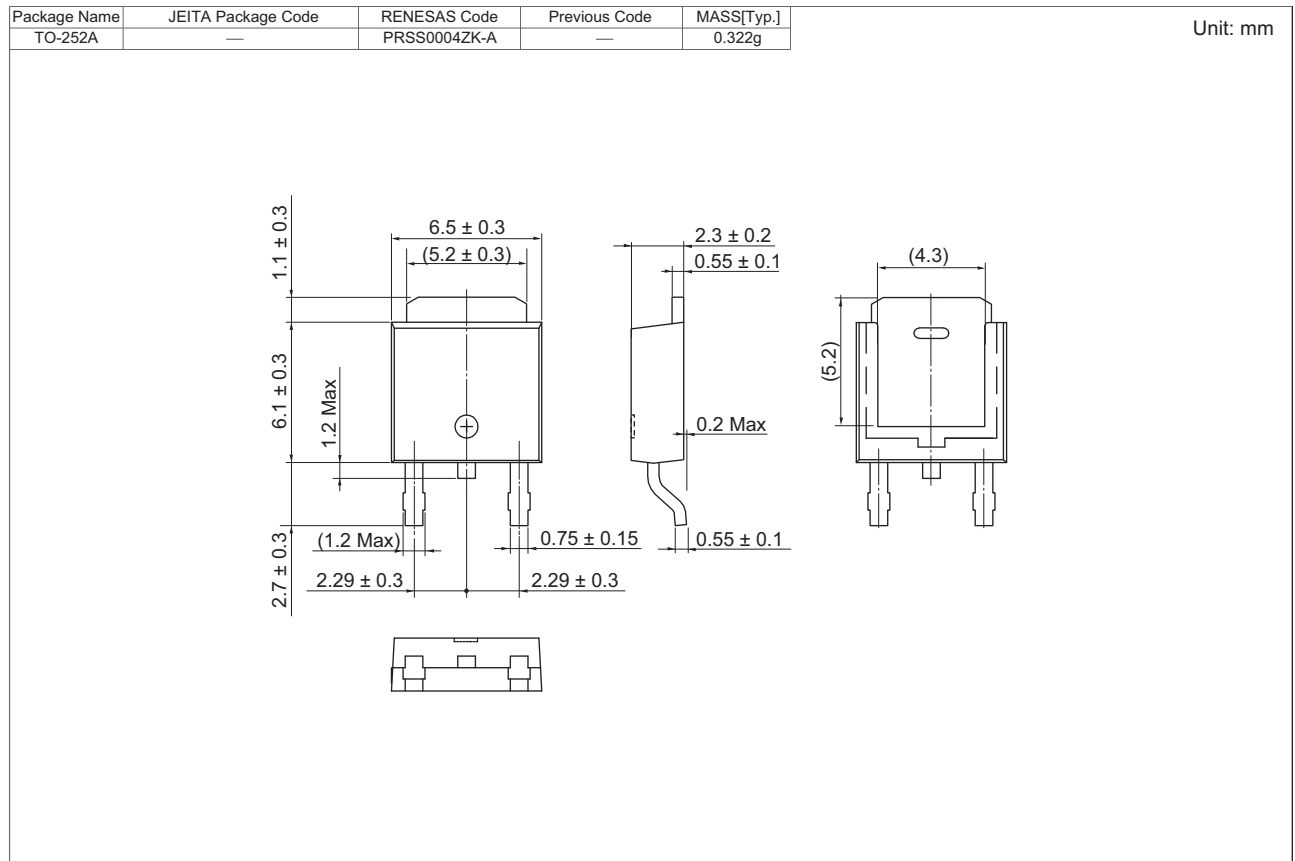
Diode Reverse Recovery Time Test Circuit



Waveform



### Package Dimension



### Ordering Information

Orderable Part No.	Quantity	Shipping Container
RJH60A83RDPD-A0#J2	3000 pcs	Taping



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