

RJH60A01RDPD-A0

600V - 5A - IGBT

Application: Inverter

R07DS1091EJ0200

Rev.2.00

Mar 24, 2015

Features

- Reverse conducting IGBT with monolithic diode
- Short circuit withstand time (5 μ s typ.)
- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.9$ V typ. (at $I_C = 5$ A, $V_{GE} = 15$ V, $T_a = 25^\circ\text{C}$)
- Built-in fast recovery diode ($t_{tr} = 100$ ns typ.) in one package
- Trench gate and thin wafer technology
- High speed switching
 $t_f = 85$ ns typ. (at $V_{CC} = 300$ V, $V_{GE} = 15$ V, $I_C = 5$ A, $R_g = 5$ Ω , $T_a = 25^\circ\text{C}$, inductive load)

Outline

RENESAS Package code: PRSS0004ZK-A
 (Package name : TO-252A)

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

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}	± 30	V
Collector current	$T_c = 25^\circ\text{C}$	I_C	10
	$T_c = 100^\circ\text{C}$	I_C	5
Collector peak current	$I_{C(peak)}$ ^{Note1}	15	A
Collector to emitter diode forward current	I_{DF}	5	A
Collector to emitter diode forward peak current	$I_{DF(peak)}$ ^{Note1}	15	A
Collector dissipation	P_C ^{Note2}	29.4	W
Junction to case thermal resistance	θ_{j-c} ^{Note2}	4.25	$^\circ\text{C}/\text{W}$
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Notes: 1. $PW \leq 10$ μ s, duty cycle $\leq 1\%$

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

Electrical Characteristics

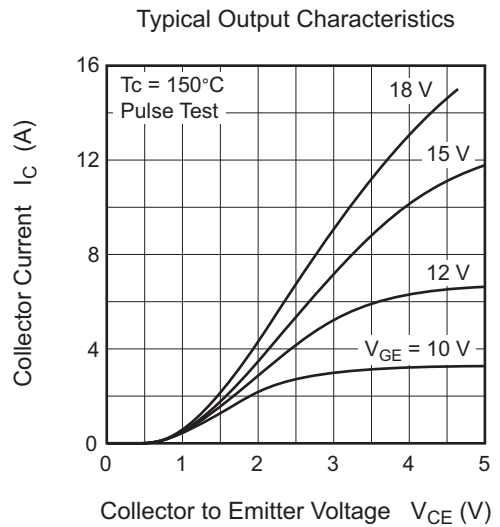
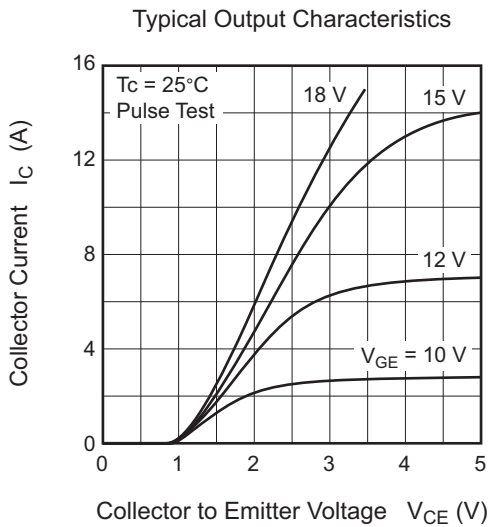
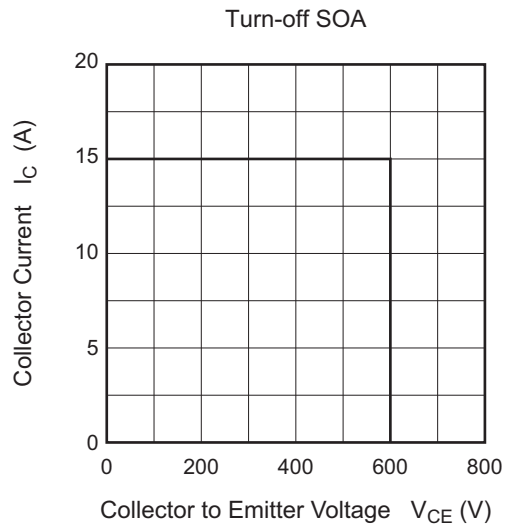
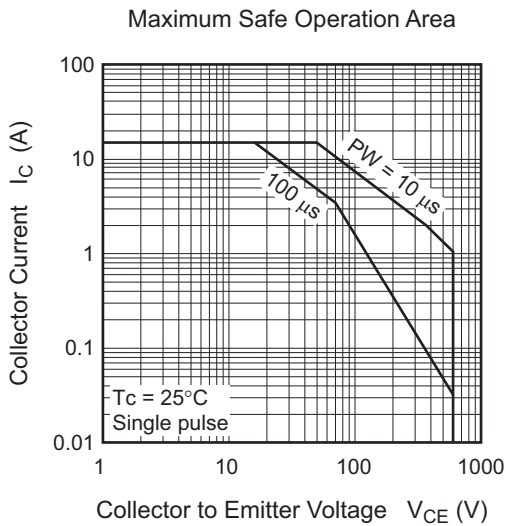
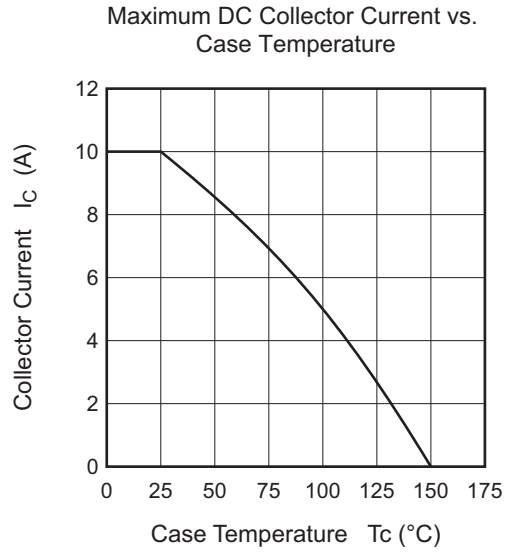
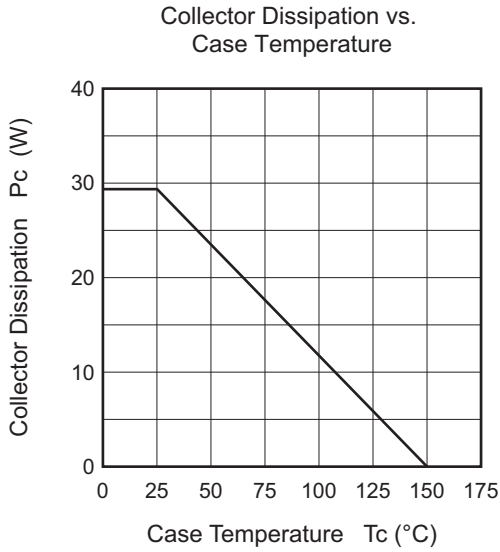
(Ta = 25°C)

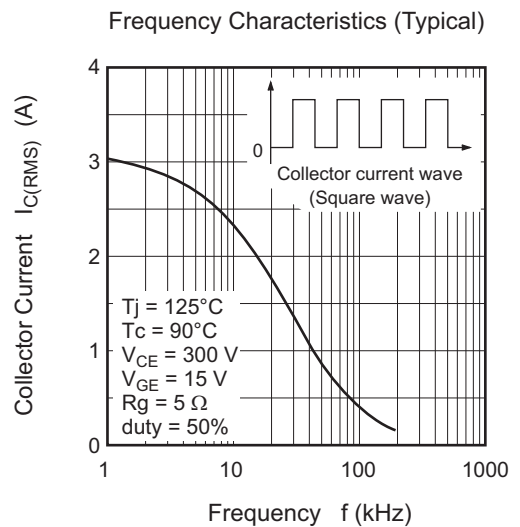
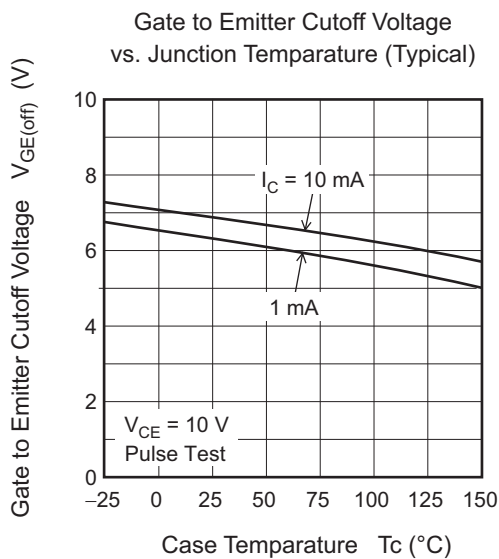
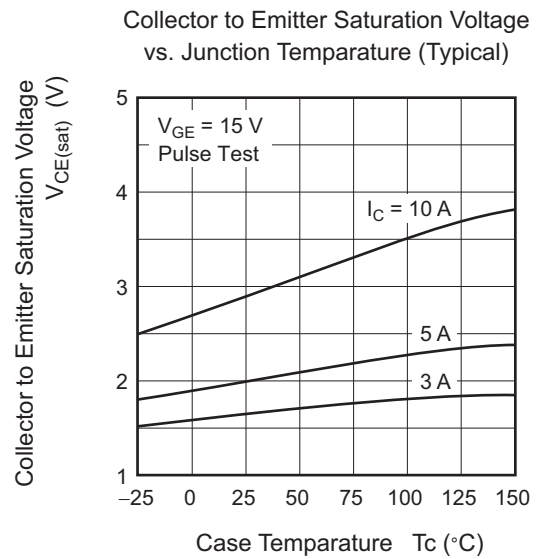
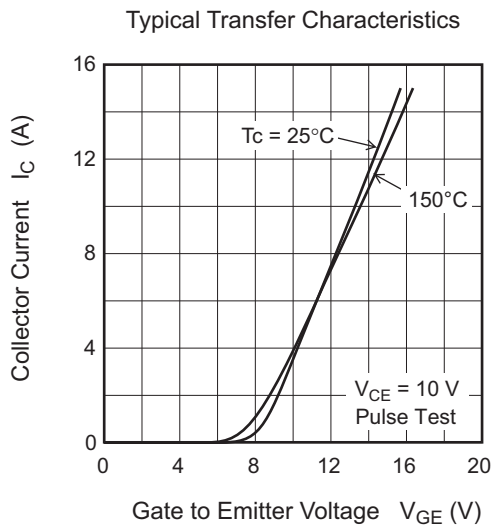
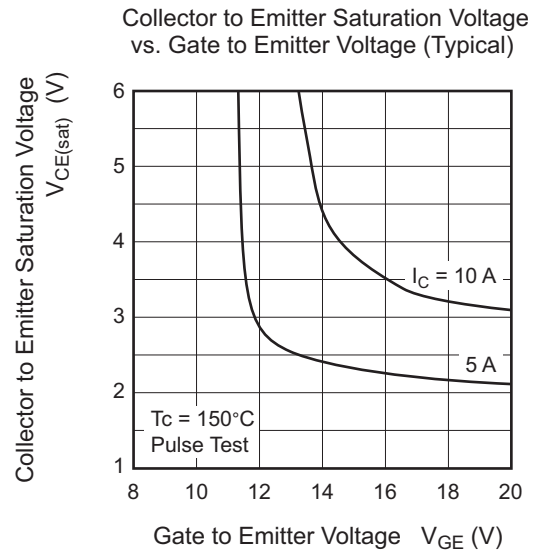
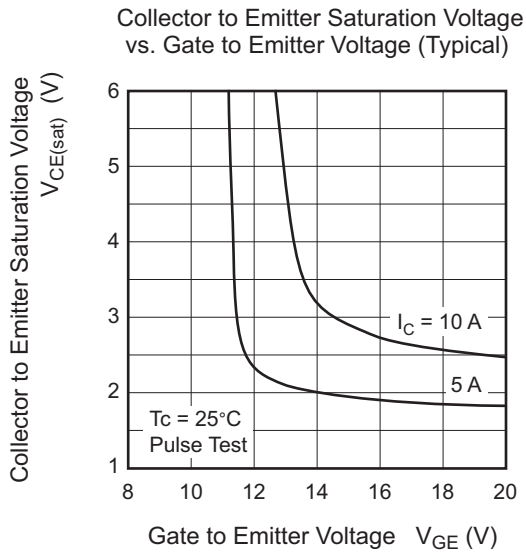
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current / diode reverse current	I_{CES} / I_R	—	—	1	μA	$V_{CE} = 600 \text{ V}, V_{GE} = 0 \text{ V}$
Gate to emitter leak current	I_{GES}	—	—	± 100	nA	$V_{GE} = \pm 30 \text{ V}, V_{CE} = 0 \text{ V}$
Gate to emitter cutoff voltage	$V_{GE(off)}$	4.5	—	7.5	V	$V_{CE} = 10 \text{ V}, I_C = 1 \text{ mA}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.9	2.3	V	$I_C = 5 \text{ A}, V_{GE} = 15 \text{ V}$ Note3
	$V_{CE(sat)}$	—	2.8	—	V	$I_C = 10 \text{ A}, V_{GE} = 15 \text{ V}$ Note3
Input capacitance	C_{ies}	—	160	—	pF	$V_{CE} = 25 \text{ V}$
Output capacitance	C_{oes}	—	12	—	pF	$V_{GE} = 0 \text{ V}$
Reveres transfer capacitance	C_{res}	—	6	—	pF	$f = 1 \text{ MHz}$
Total gate charge	Q_g	—	11	—	nC	$V_{GE} = 15 \text{ V}$
Gate to emitter charge	Q_{ge}	—	2.5	—	nC	$V_{CE} = 300 \text{ V}$
Gate to collector charge	Q_{gc}	—	6.7	—	nC	$I_C = 5 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	30	—	ns	$V_{CC} = 300 \text{ V}$
Rise time	t_r	—	10	—	ns	$V_{GE} = 15 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	40	—	ns	$I_C = 5 \text{ A},$
Fall time	t_f	—	85	—	ns	$R_g = 5 \Omega$
Turn-on energy	E_{on}	—	0.13	—	mJ	Inductive load
Turn-off energy	E_{off}	—	0.07	—	mJ	
Total switching energy	E_{total}	—	0.20	—	mJ	
Short circuit withstand time	t_{sc}	3	5	—	μs	$V_{CE} \leq 360 \text{ V}, V_{GE} = 15 \text{ V}$ $T_j = 100^\circ\text{C}$

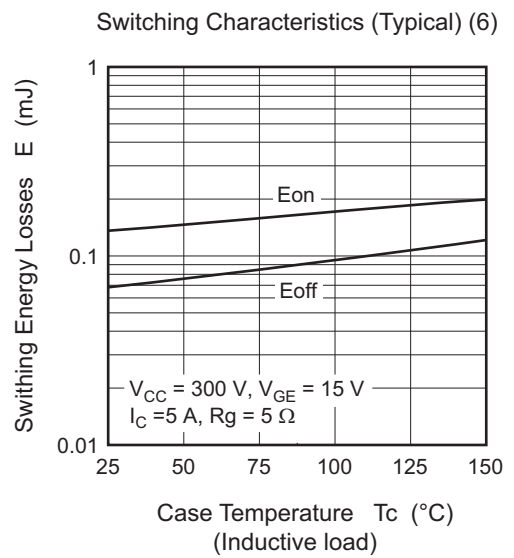
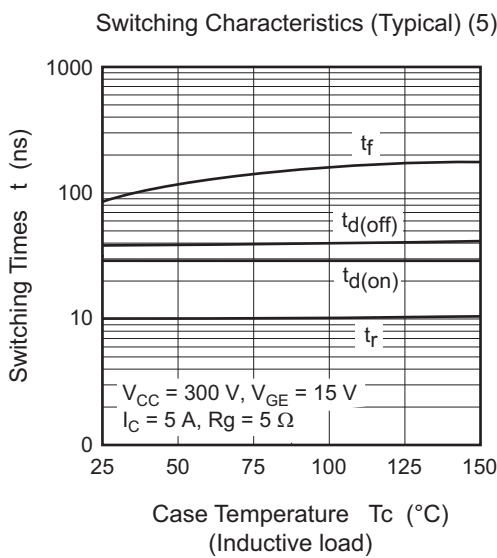
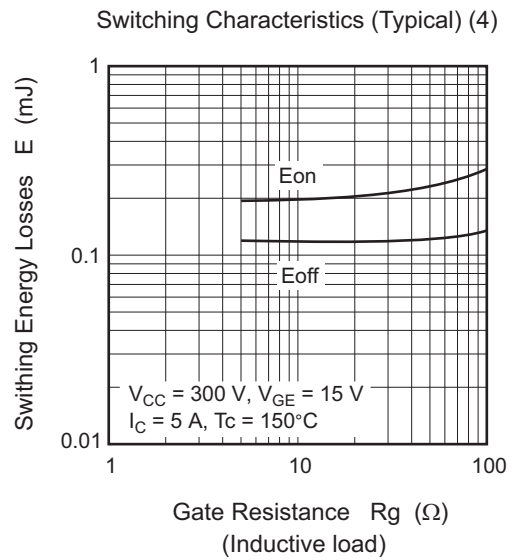
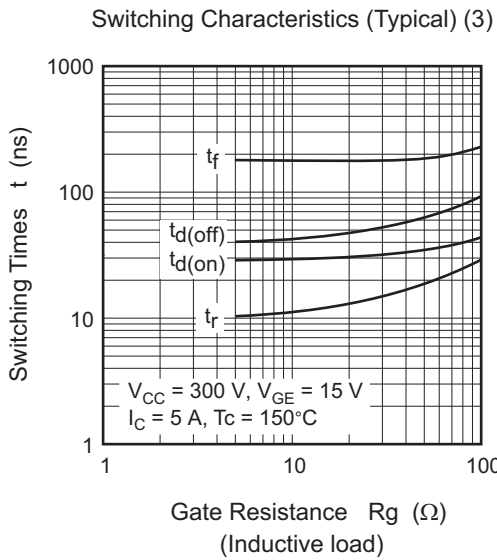
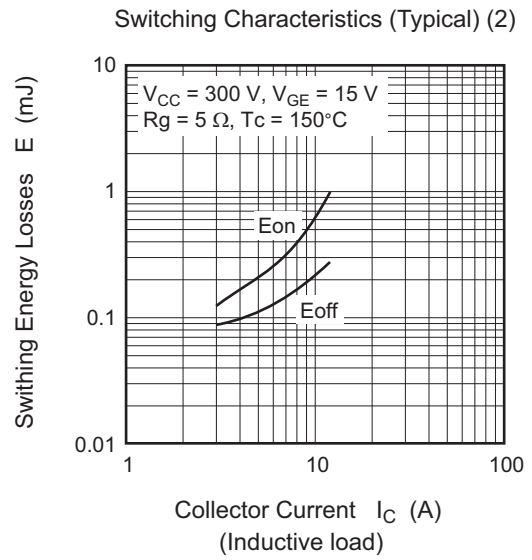
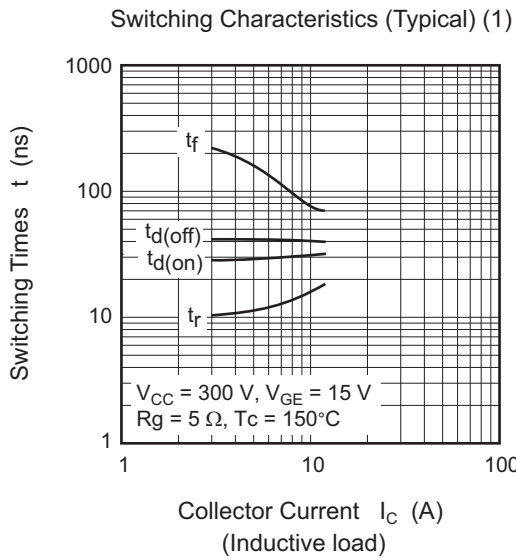
FRD Forward voltage	V_F	—	2.0	—	V	$I_F = 5 \text{ A}$ Note3
FRD reverse recovery time	t_{rr}	—	100	—	ns	$I_F = 5 \text{ A}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$
FRD reverse recovery charge	Q_{rr}	—	0.25	—	μC	
FRD peak reverse recovery current	I_{rr}	—	5	—	A	

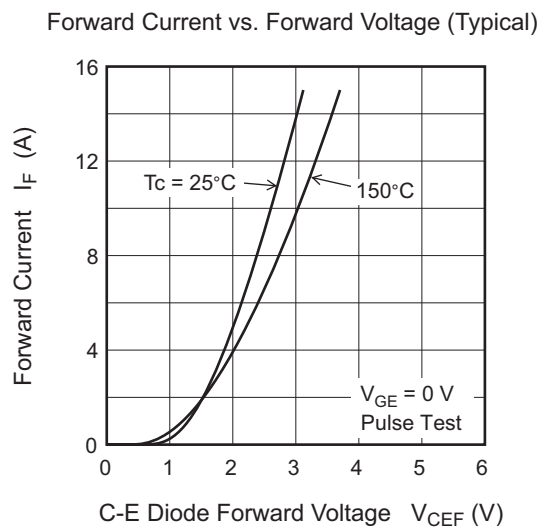
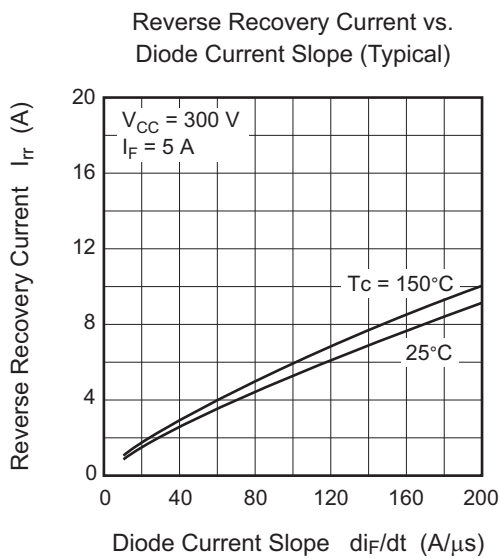
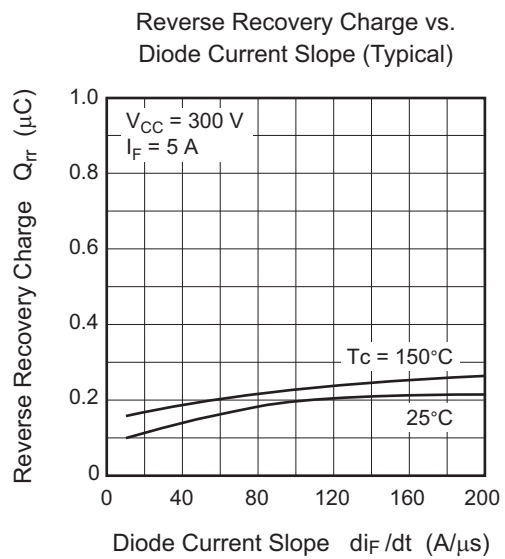
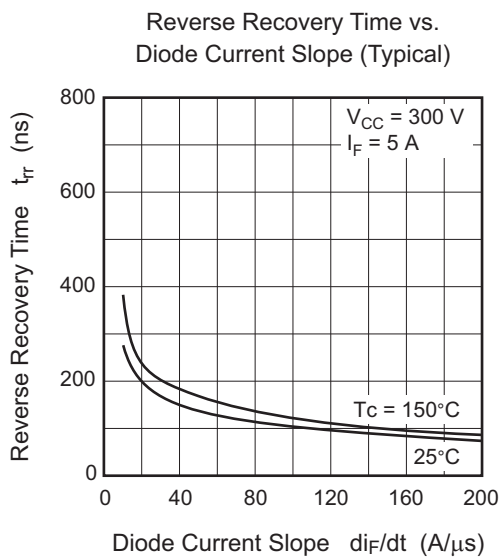
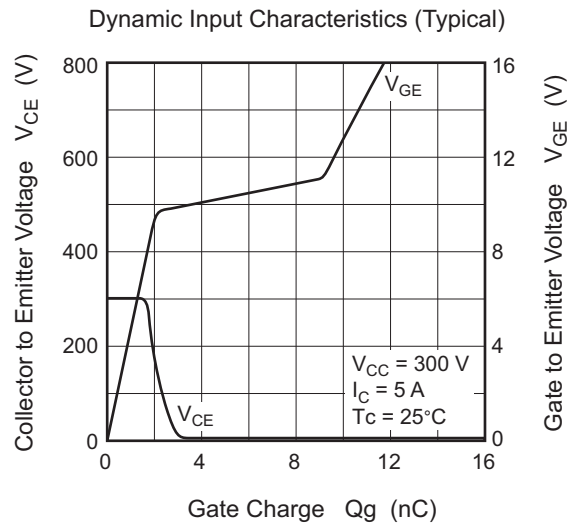
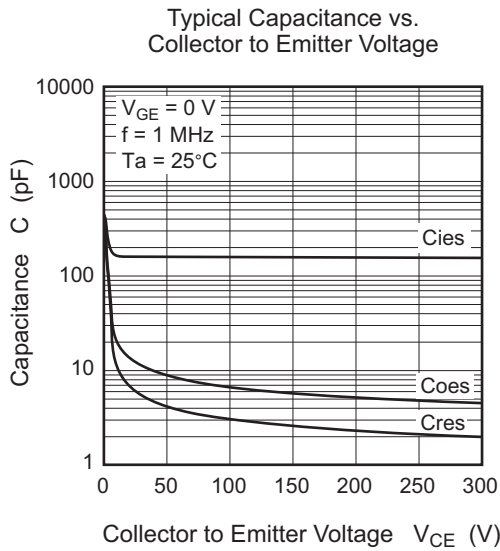
Notes: 3. Pulse test.

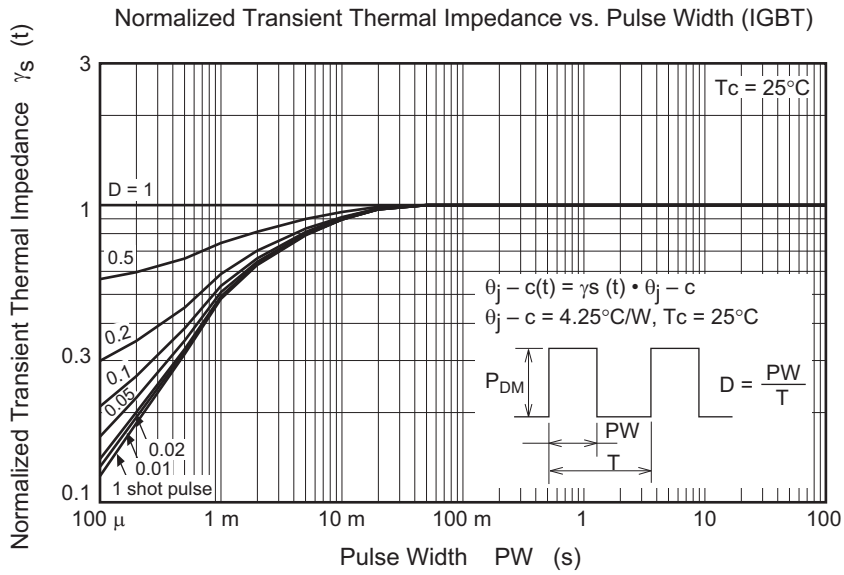
Main Characteristics



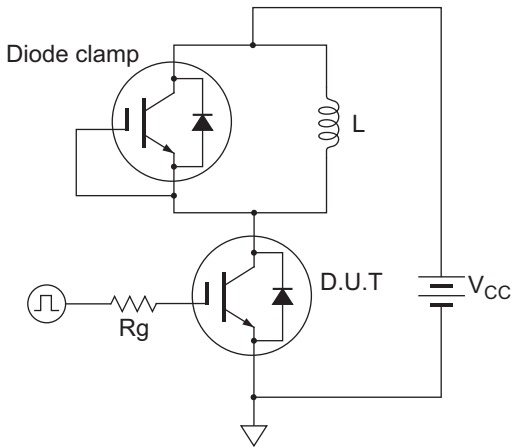




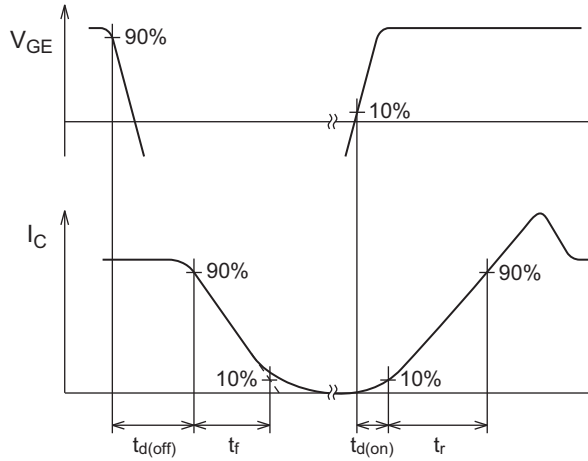




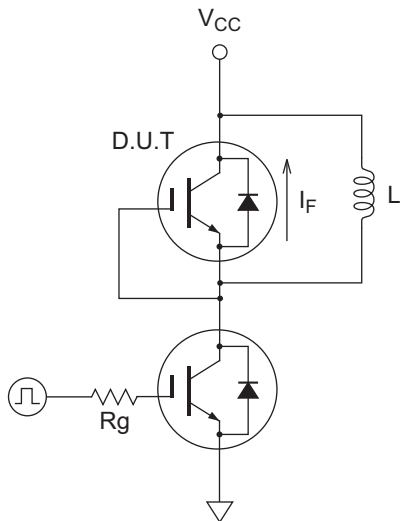
Switching Time Test Circuit



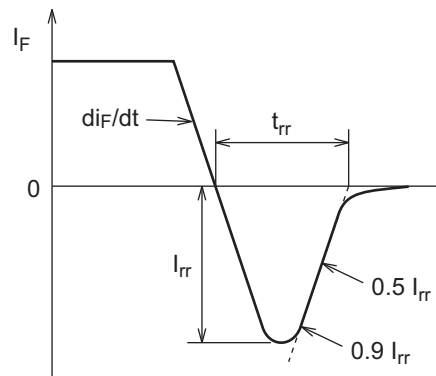
Waveform



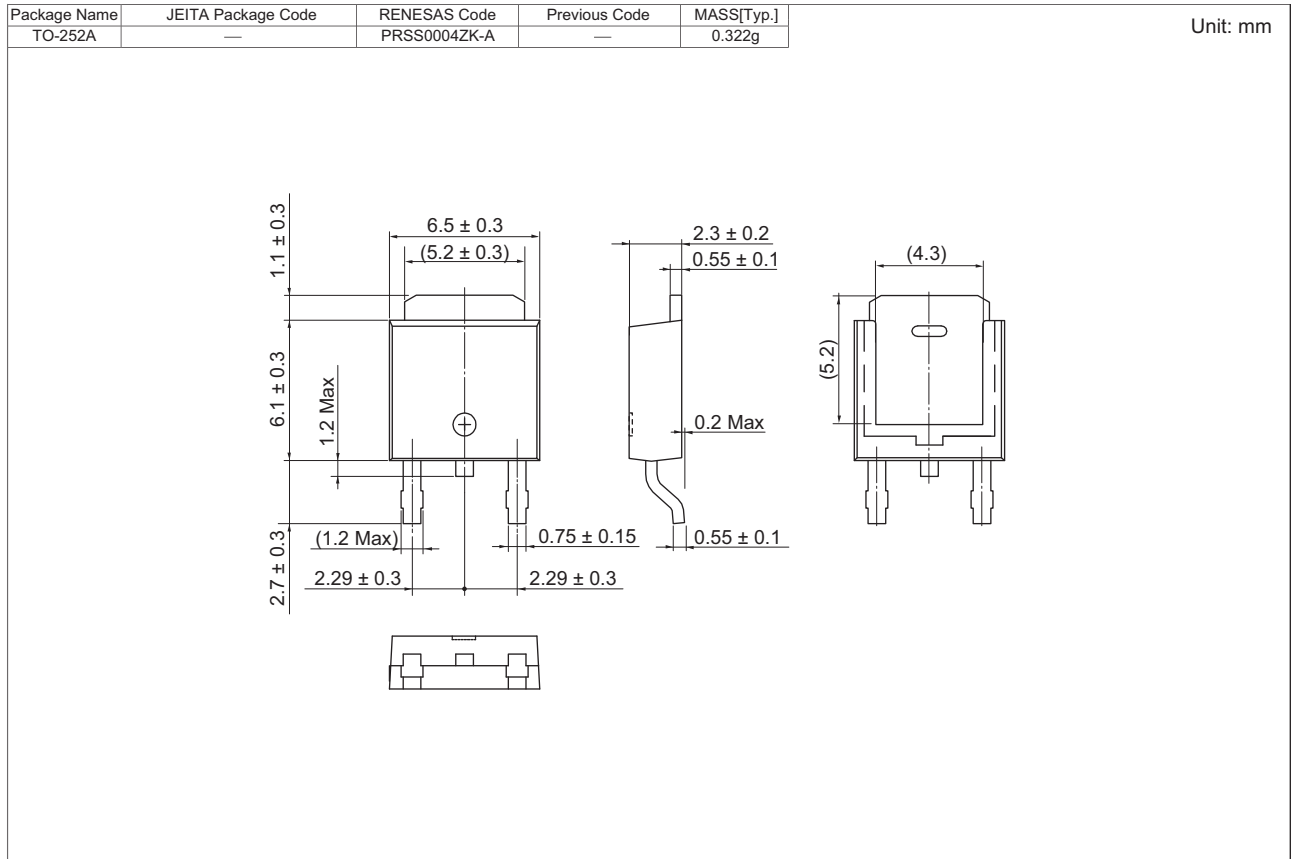
Diode Reverse Recovery Time Test Circuit



Waveform



Package Dimension



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJH60A01RDPD-A0#J2	3000 pcs	Taping

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