

RJH60A81RDPD-A0

600V - 5A - IGBT

Application: Inverter

R07DS1092EJ0200

Rev.2.00

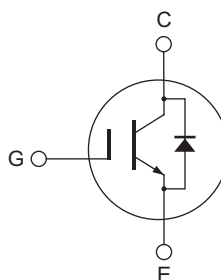
Mar 24, 2015

Features

- Reverse conducting IGBT with monolithic diode
- Short circuit withstand time (5 μ s typ.)
- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 2.0$ 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
 $t_f = 75$ 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 (IGBT)	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

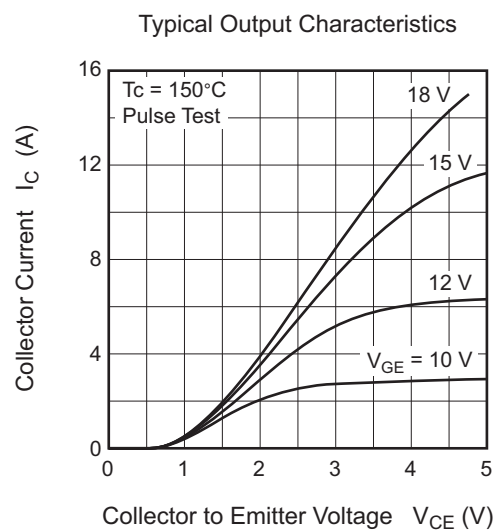
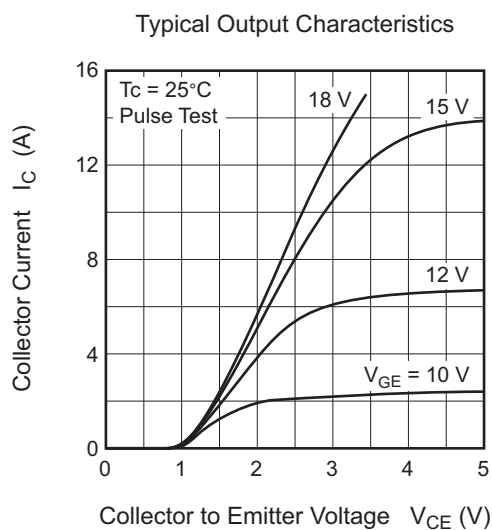
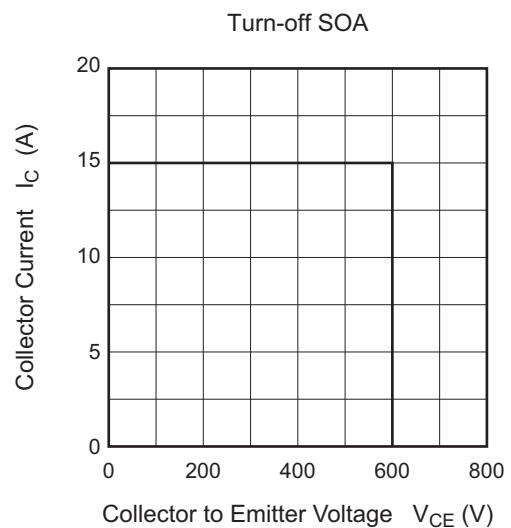
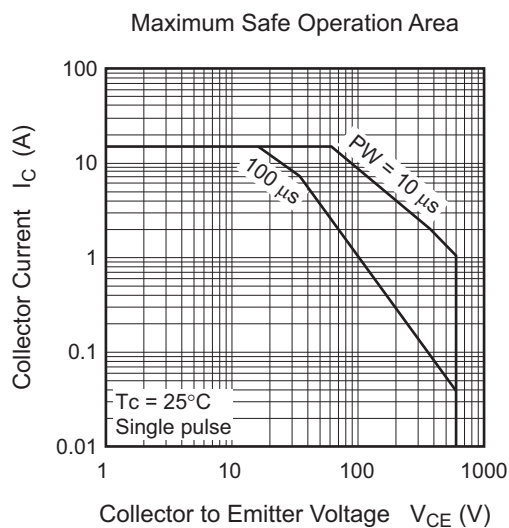
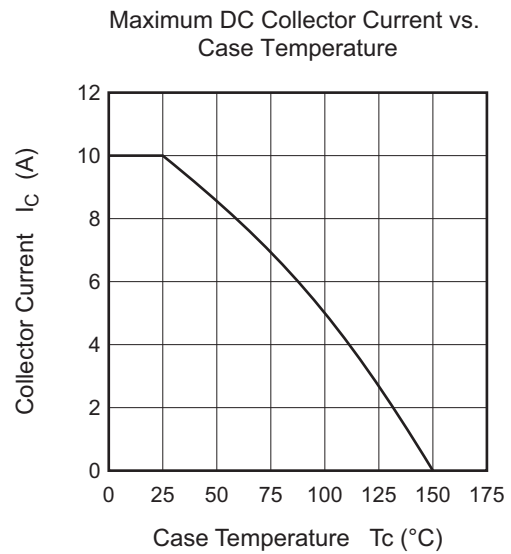
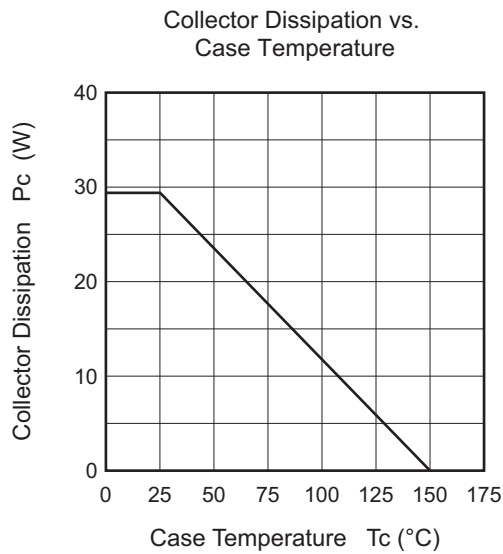
(Ta = 25°C)

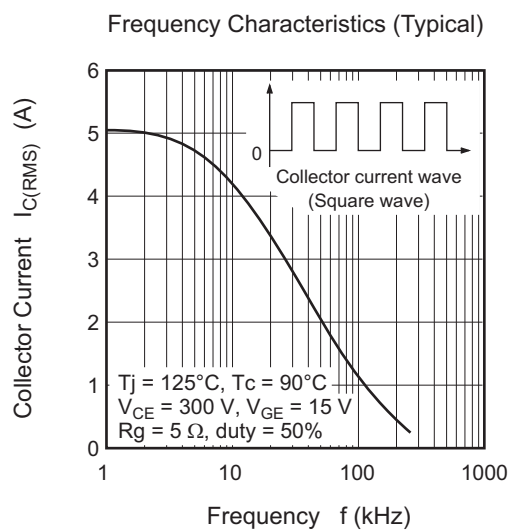
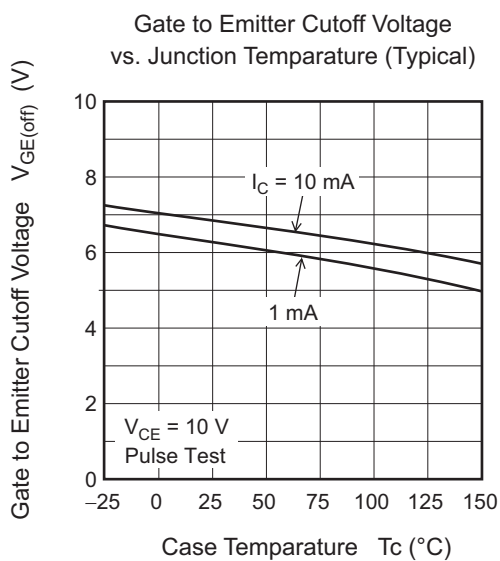
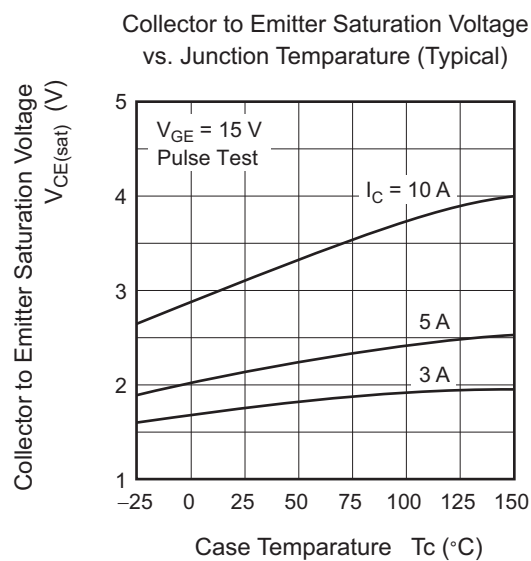
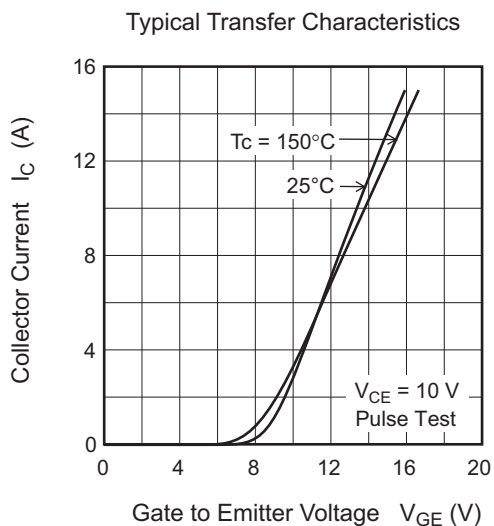
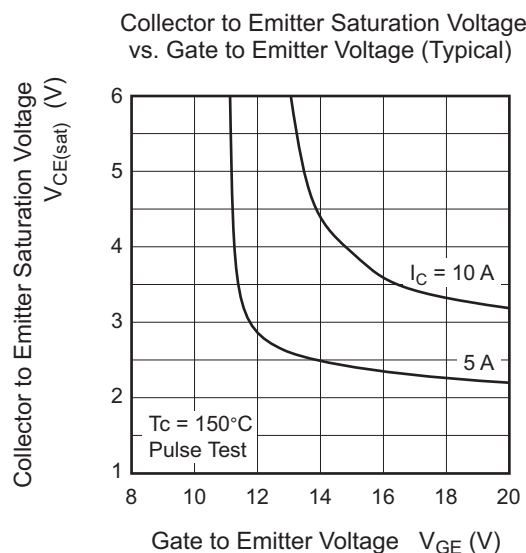
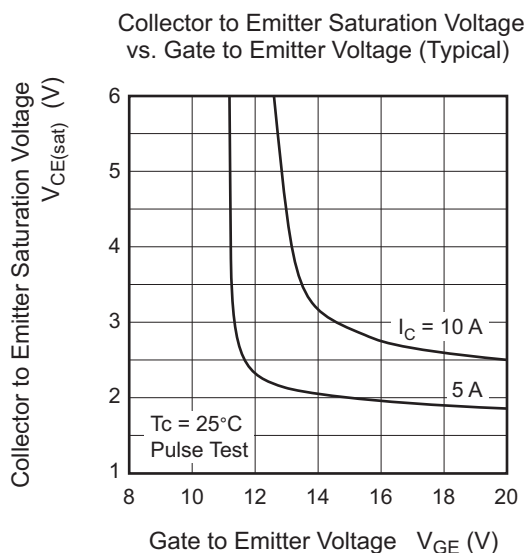
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current / diode reverse current	I_{CES} / I_R	—	—	1	μA	$V_{CE} = 600 V, V_{GE} = 0 V$
Gate to emitter leak current	I_{GES}	—	—	± 100	nA	$V_{GE} = \pm 30 V, V_{CE} = 0 V$
Gate to emitter cutoff voltage	$V_{GE(off)}$	4.5	—	7.5	V	$V_{CE} = 10 V, I_C = 1 mA$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	2.0	2.4	V	$I_C = 5 A, V_{GE} = 15 V$ Note3
	$V_{CE(sat)}$	—	2.9	—	V	$I_C = 10 A, V_{GE} = 15 V$ Note3
Input capacitance	C_{ies}	—	160	—	pF	$V_{CE} = 25 V$ $V_{GE} = 0 V$ $f = 1 MHz$
Output capacitance	C_{oes}	—	12	—	pF	
Reveres transfer capacitance	C_{res}	—	6	—	pF	
Total gate charge	Q_g	—	11	—	nC	$V_{GE} = 15 V$ $V_{CE} = 300 V$ $I_C = 5 A$
Gate to emitter charge	Q_{ge}	—	2.5	—	nC	
Gate to collector charge	Q_{gc}	—	6.7	—	nC	
Turn-on delay time	$t_{d(on)}$	—	30	—	ns	$V_{CC} = 300V$ $V_{GE} = 15 V$ $I_C = 5 A,$ $R_g = 5 \Omega$ Inductive load
Rise time	t_r	—	10	—	ns	
Turn-off delay time	$t_{d(off)}$	—	40	—	ns	
Fall time	t_f	—	75	—	ns	
Turn-on energy	E_{on}	—	0.13	—	mJ	
Turn-off energy	E_{off}	—	0.06	—	mJ	
Total switching energy	E_{total}	—	0.19	—	mJ	
Short circuit withstand time	t_{sc}	3.0	5.0	—	μs	$V_{CE} \leq 360 V, V_{GE} = 15 V$ $T_j = 100^\circ C$

FRD Forward voltage	V_F	—	1.9	—	V	$I_F = 5 A$ Note3
FRD reverse recovery time	t_{rr}	—	100	—	ns	$I_F = 5 A$ $di_F/dt = 100 A/\mu s$
FRD reverse recovery charge	Q_{rr}	—	0.26	—	μC	
FRD peak reverse recovery current	I_{rr}	—	5.2	—	A	

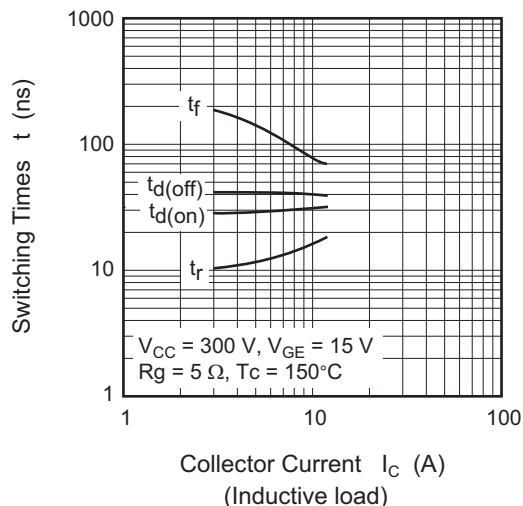
Notes: 3. Pulse test.

Main Characteristics

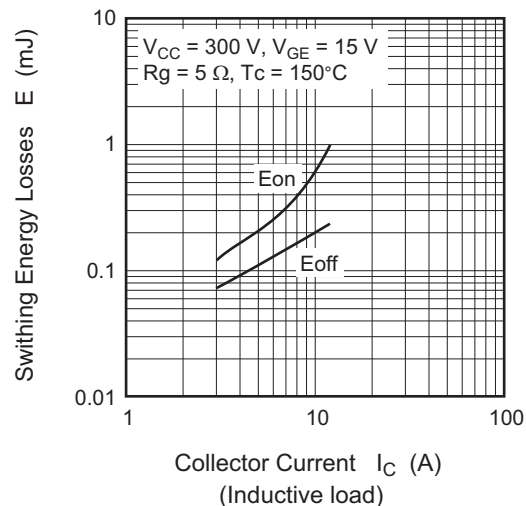




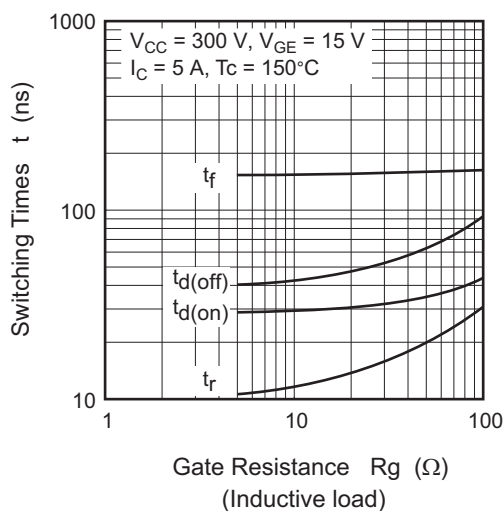
Switching Characteristics (Typical) (1)



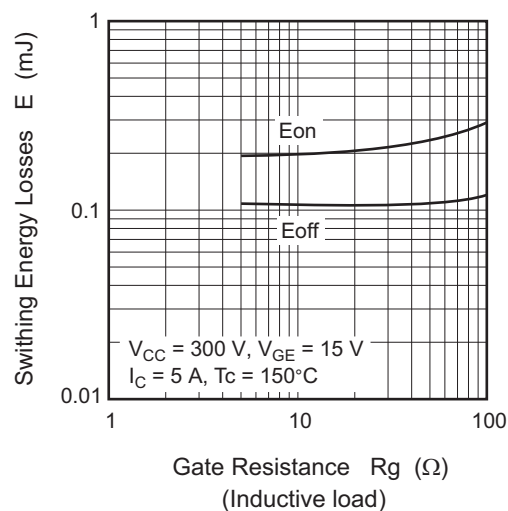
Switching Characteristics (Typical) (2)



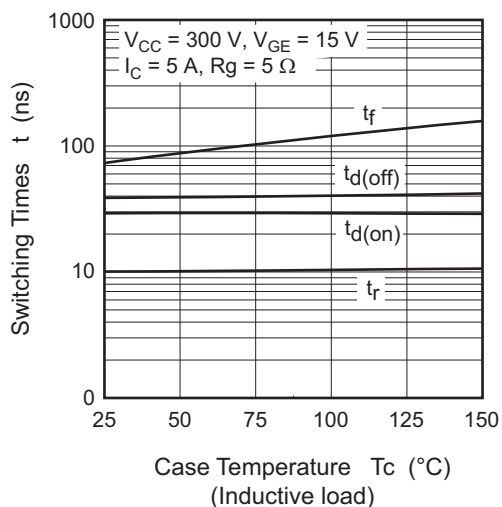
Switching Characteristics (Typical) (3)



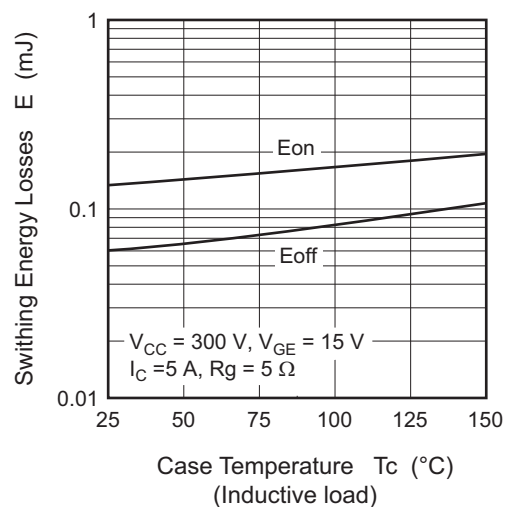
Switching Characteristics (Typical) (4)

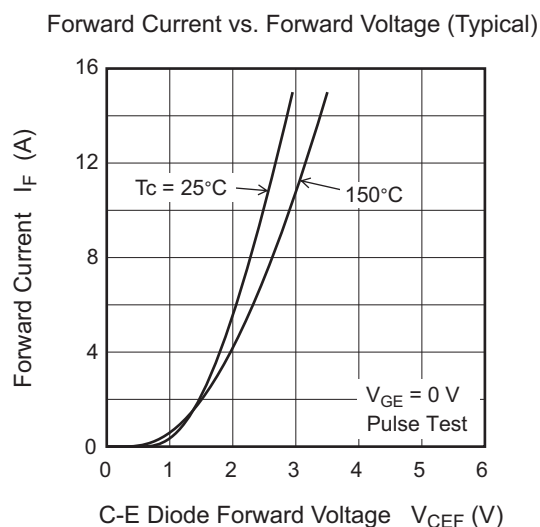
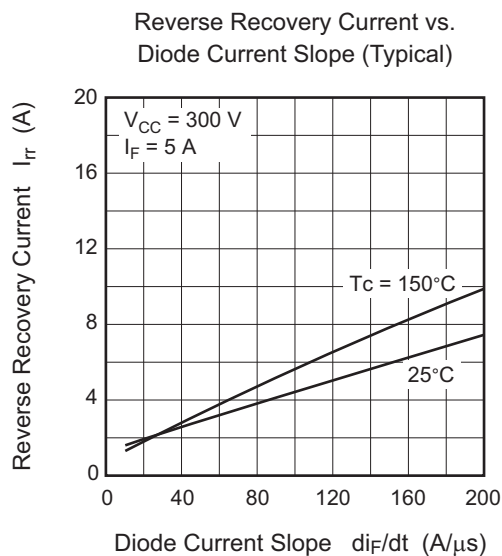
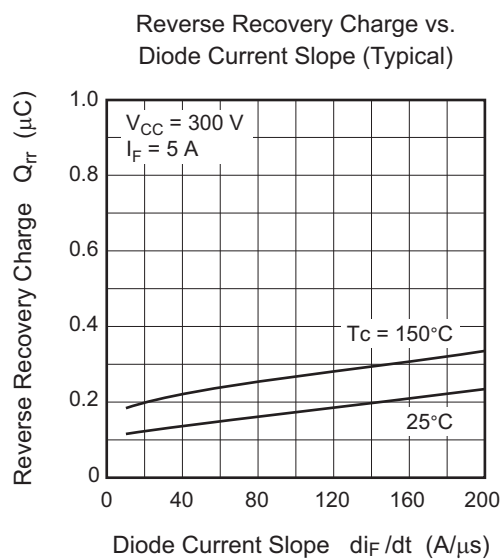
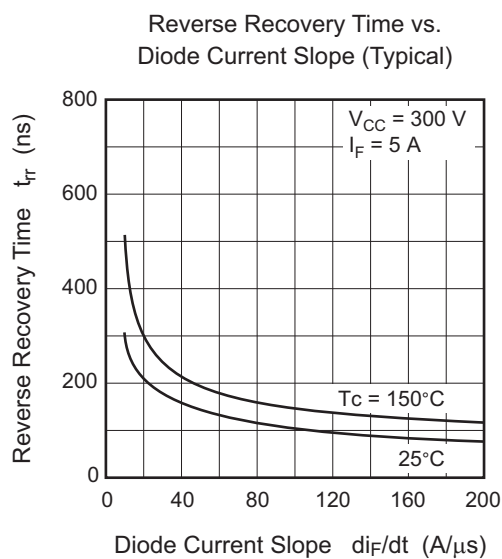
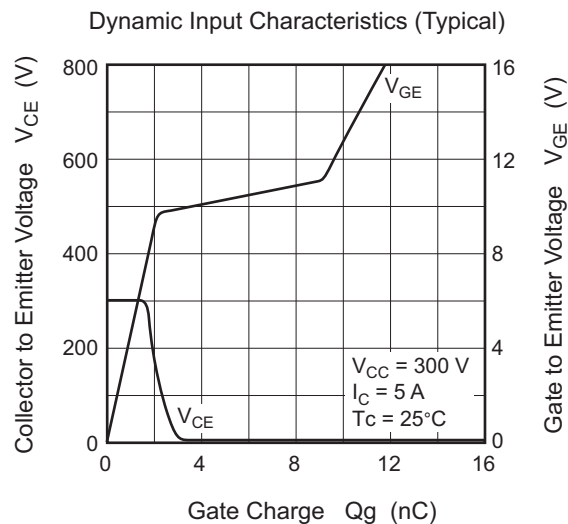
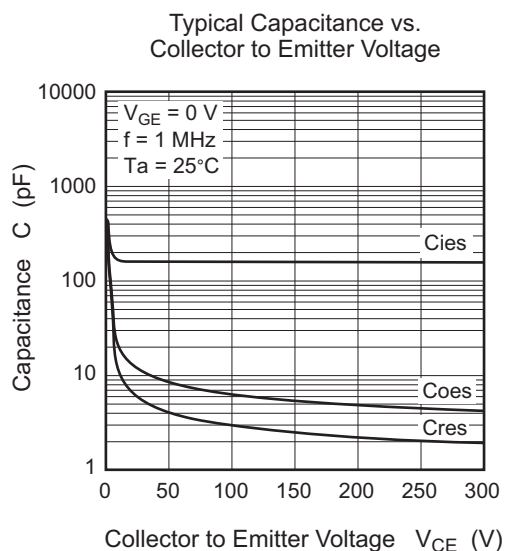


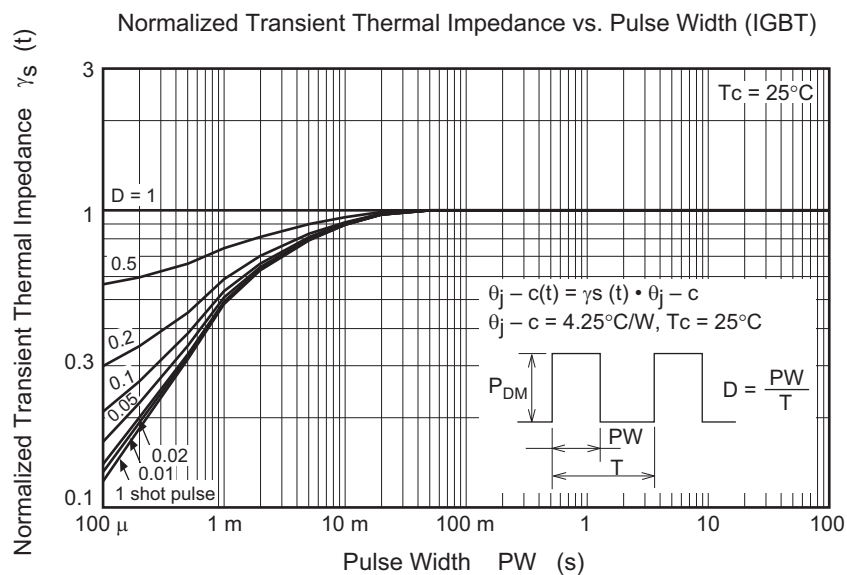
Switching Characteristics (Typical) (5)



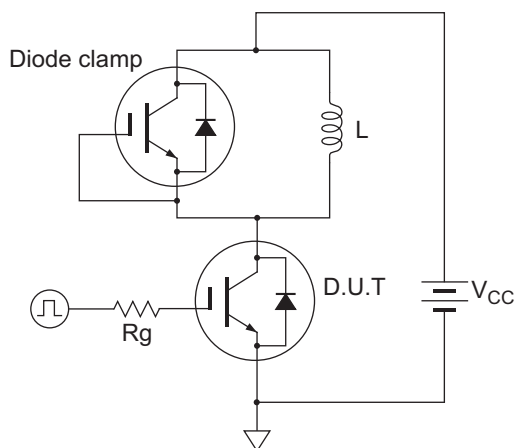
Switching Characteristics (Typical) (6)



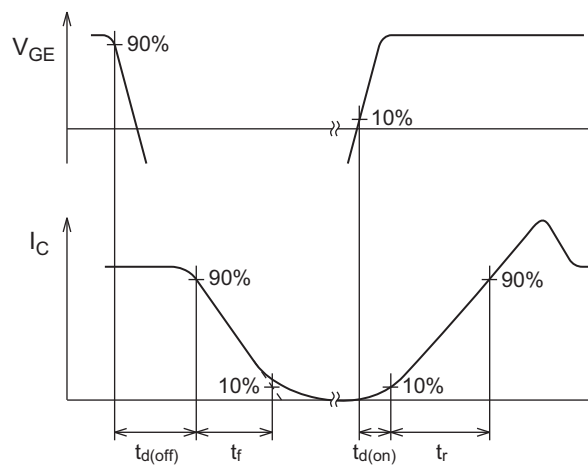




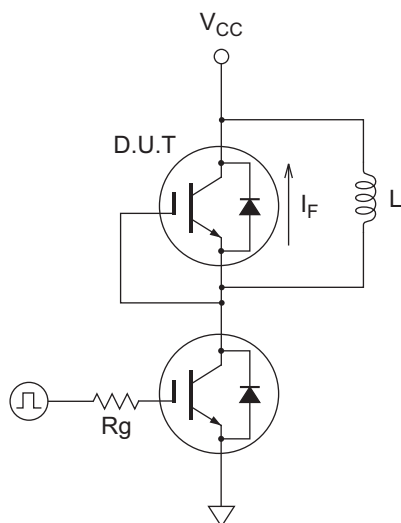
Switching Time Test Circuit



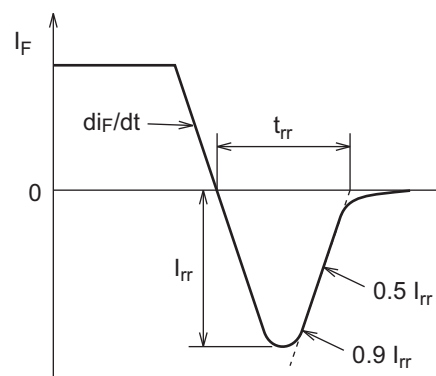
Waveform



Diode Reverse Recovery Time Test Circuit



Waveform



Package Dimension

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
TO-252A	—	PRSS0004ZK-A	—	0.322g	

The drawing shows the mechanical dimensions of the TO-252A package. The top view shows a square body with a width of 6.5 ± 0.3 mm and a height of 6.1 ± 0.3 mm. The distance between the mounting pins is 2.29 ± 0.3 mm. The side view shows a maximum height of 1.1 ± 0.3 mm and a maximum width of 1.2 mm. The bottom view shows a width of 4.3 mm and a height of 5.2 mm. The package is marked with a circled plus sign.

Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJH60A81RDPD-E0#J2	3000 pcs	Taping

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