

RJH60A83RDPE

600V - 10A - IGBT

Application: Inverter

R07DS0806EJ0200

Rev.2.00

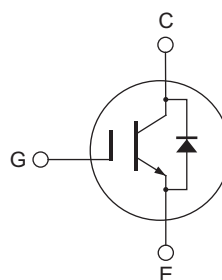
Jul 12, 2012

Features

- Reverse conducting IGBT with monolithic diode
- Short circuit withstand time (5 μ s typ.)
- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 2.1$ 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, $R_g = 5$ Ω , $T_a = 25^\circ\text{C}$, inductive load)

Outline

RENESAS Package code: PRSS0004AE-B
(Package name: LDKPAK (S)-(1))



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	Tc = 25°C	I_C	20	A
	Tc = 100°C	I_C	10	A
Collector peak current		$I_{C(peak)}$ ^{Note1}	40	A
Collector to emitter diode forward current		i_{DF}	10	A
Collector to emitter diode forward peak current		$i_{DF(peak)}$ ^{Note1}	40	A
Collector dissipation		P_C ^{Note2}	52	W
Junction to case thermal resistance		θ_{j-c} ^{Note2}	2.38	°C/ W
Junction temperature		T_j	150	°C
Storage temperature		T_{stg}	−55 to +150	°C

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

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

Electrical Characteristics

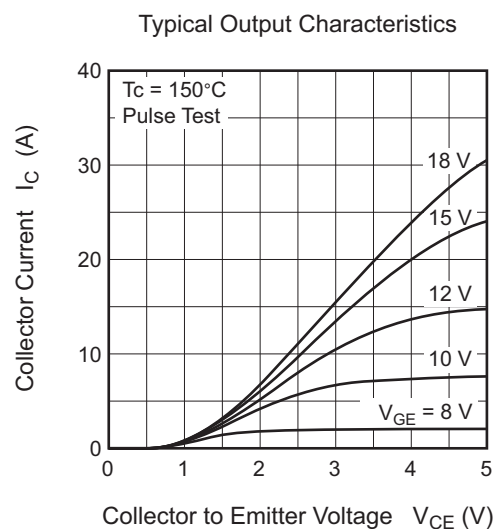
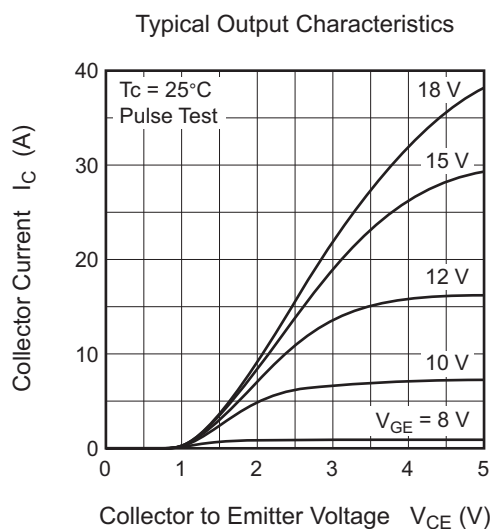
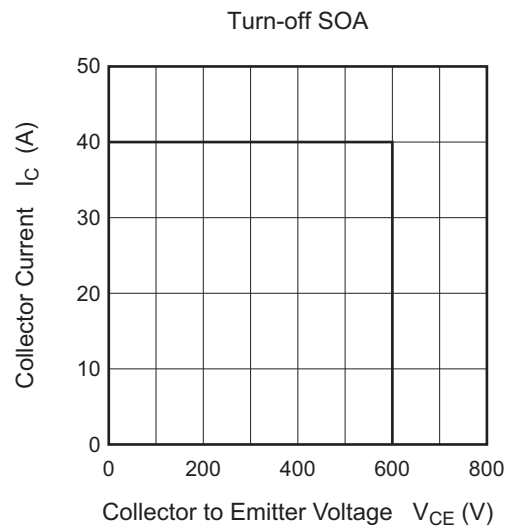
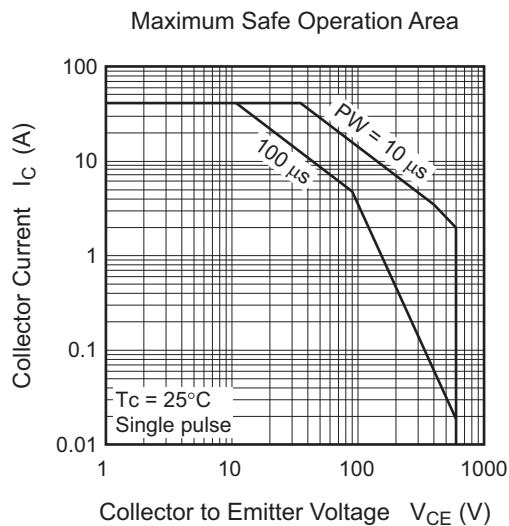
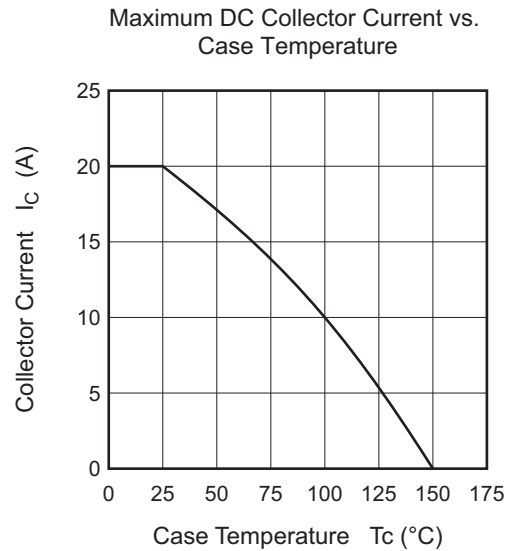
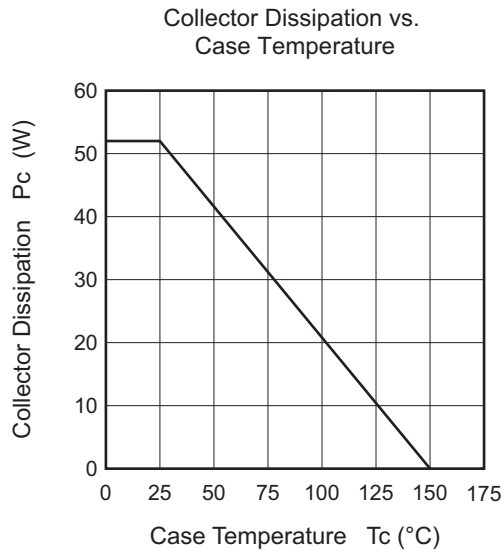
(Ta = 25°C)

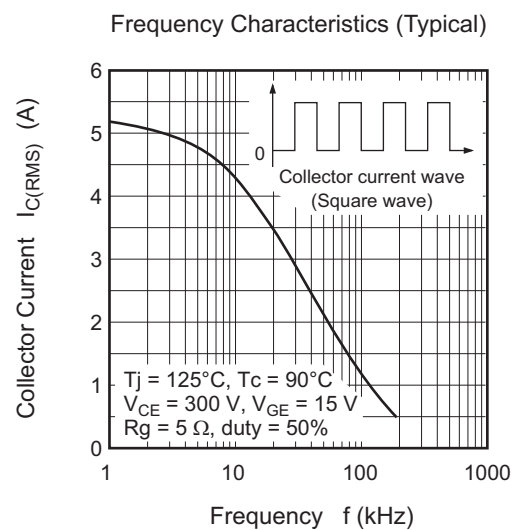
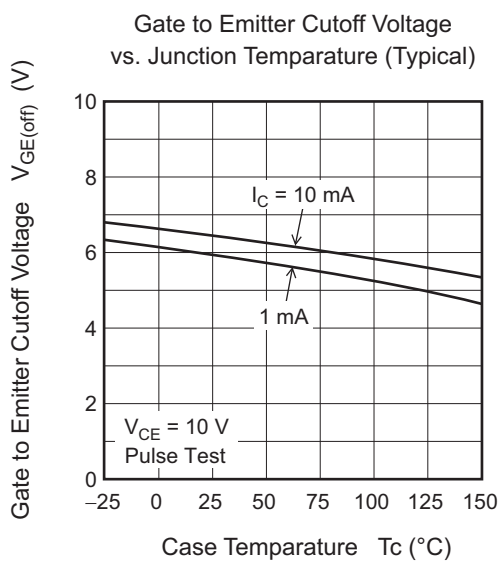
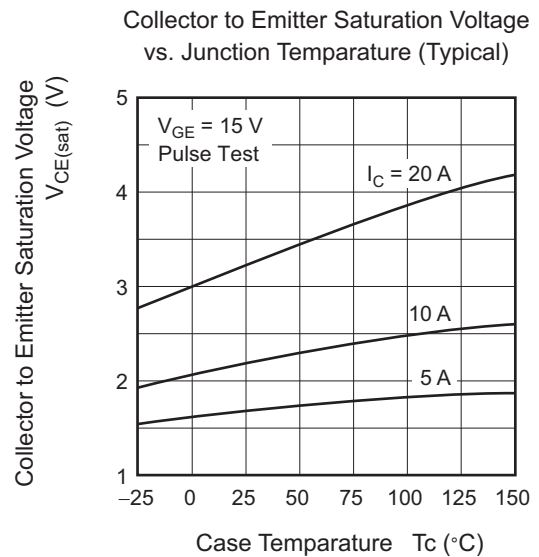
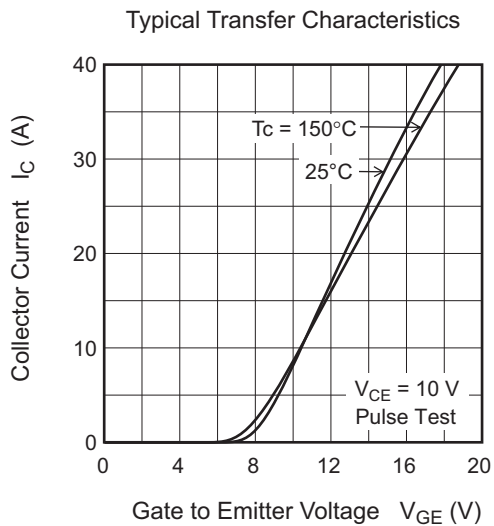
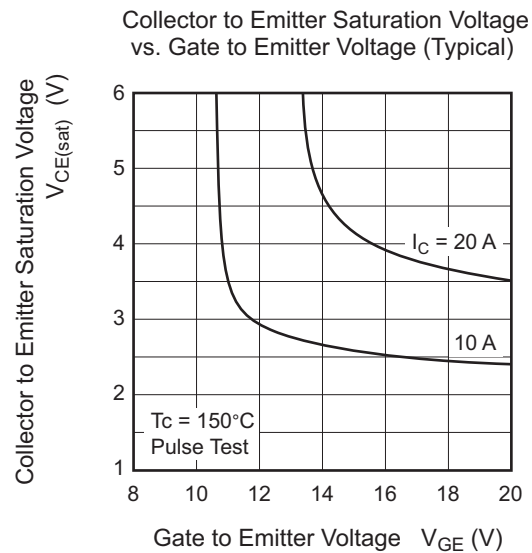
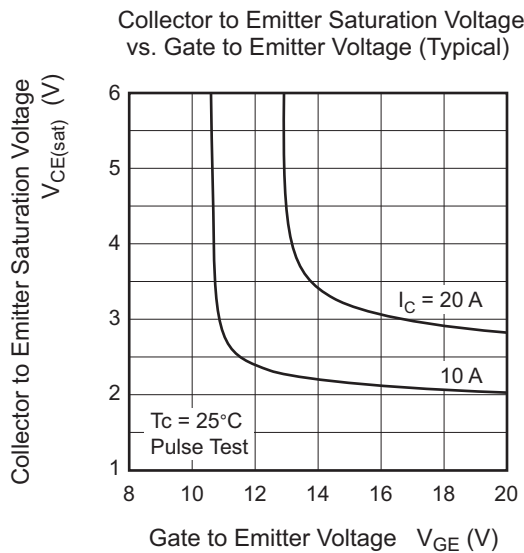
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to emitter breakdown voltage	$V_{(BR)CES}$	600	—	—	V	$I_C = 10 \mu A$, $V_{GE} = 0$
Zero gate voltage collector current / diode reverse current	I_{CES} / I_R	—	—	1	μA	$V_{CE} = 600 V$, $V_{GE} = 0 V$
Gate to emitter leak current	I_{GES}	—	—	± 100	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	$V_{CE(sat)}$	—	2.1	2.6	V	$I_C = 10 A$, $V_{GE} = 15 V$ ^{Note3}
	$V_{CE(sat)}$	—	3.1	—	V	$I_C = 20 A$, $V_{GE} = 15 V$ ^{Note3}
Input capacitance	C_{ies}	—	280	—	pF	$V_{CE} = 25 V$
Output capacitance	C_{oes}	—	19	—	pF	$V_{GE} = 0 V$
Reveres transfer capacitance	C_{res}	—	11	—	pF	$f = 1 MHz$
Total gate charge	Q_g	—	19.7	—	nC	$V_{GE} = 15 V$
Gate to emitter charge	Q_{ge}	—	3.4	—	nC	$V_{CE} = 300 V$
Gate to collector charge	Q_{gc}	—	12.0	—	nC	$I_C = 10 A$
Turn-on delay time	$t_{d(on)}$	—	31	—	ns	$V_{CC} = 300V$
Rise time	t_r	—	14	—	ns	$V_{GE} = 15 V$
Turn-off delay time	$t_{d(off)}$	—	54	—	ns	$I_C = 10 A$,
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	—	μs	$V_{CE} \leq 360 V$, $V_{GE} = 15 V$ $T_j = 100^\circ C$

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

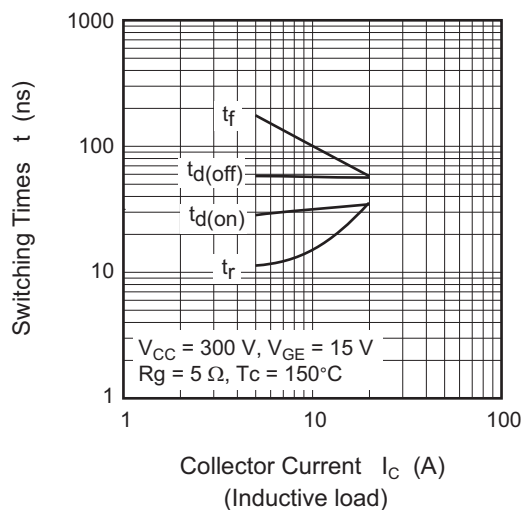
Notes: 3. Pulse test.

Main Characteristics

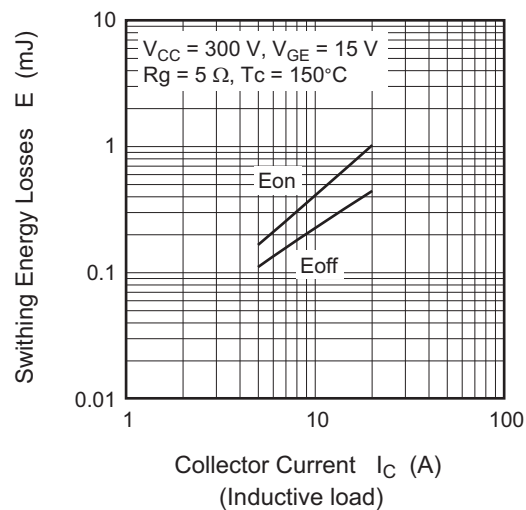




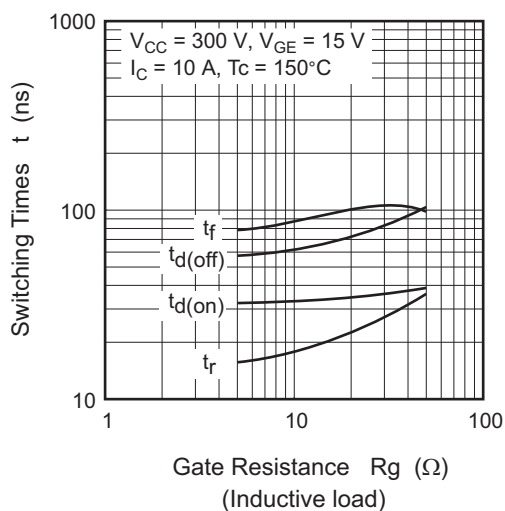
Switching Characteristics (Typical) (1)



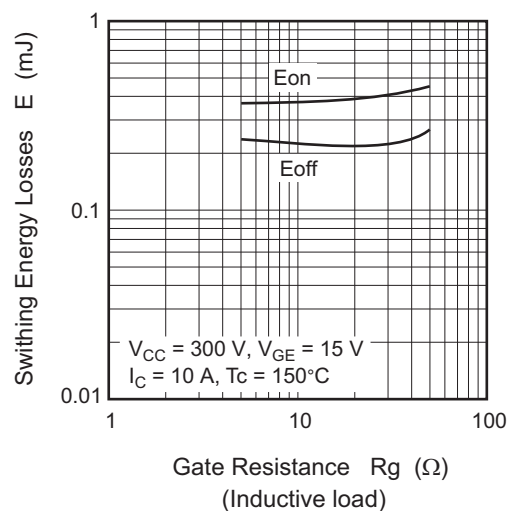
Switching Characteristics (Typical) (2)



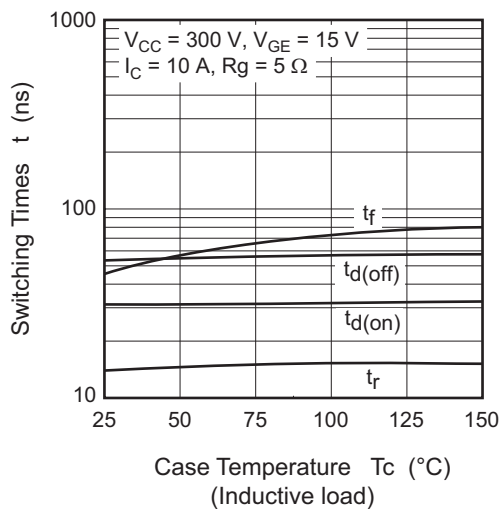
Switching Characteristics (Typical) (3)



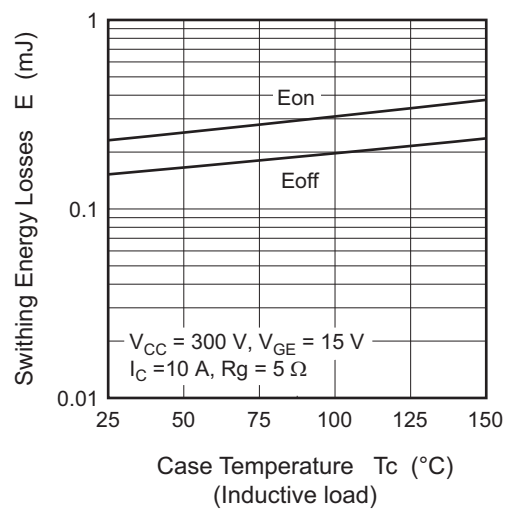
Switching Characteristics (Typical) (4)



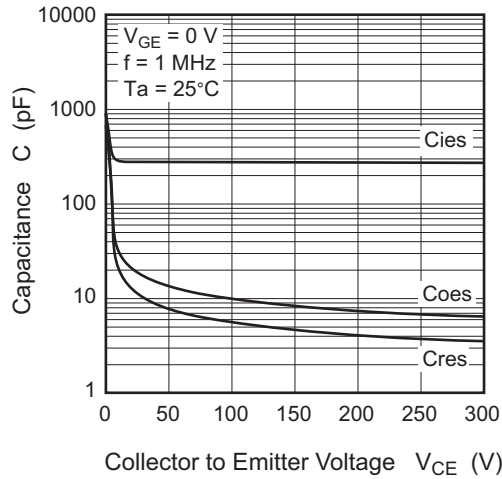
Switching Characteristics (Typical) (5)



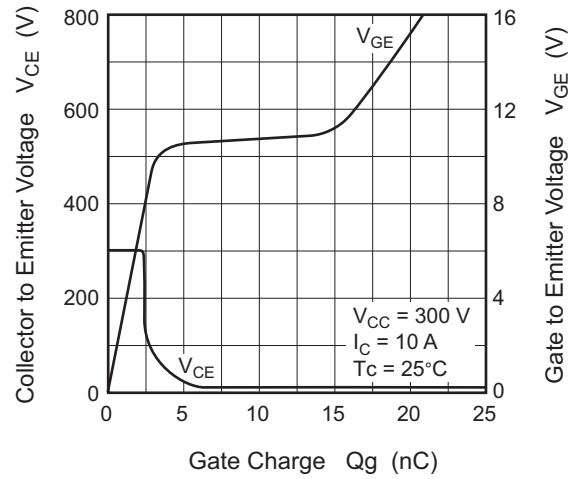
Switching Characteristics (Typical) (6)



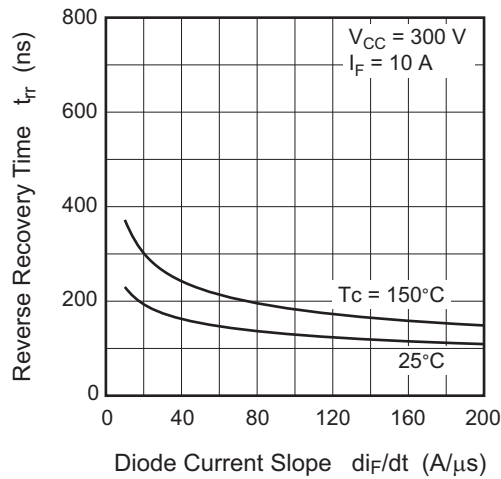
Typical Capacitance vs.
Collector to Emitter Voltage



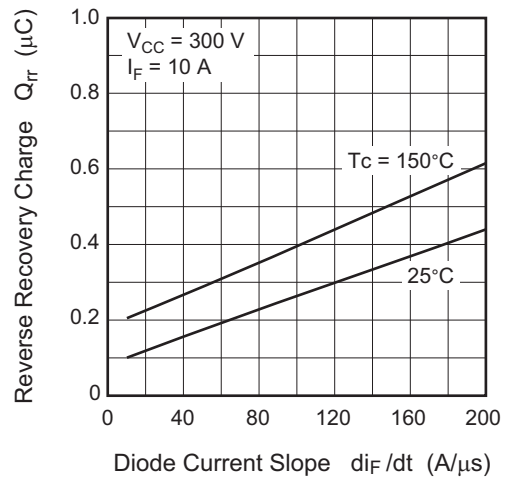
Dynamic Input Characteristics (Typical)



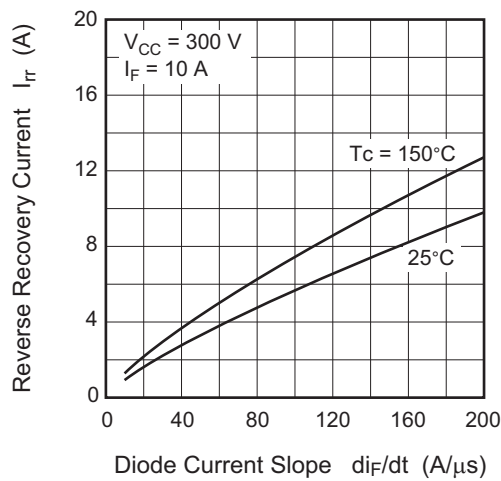
Reverse Recovery Time vs.
Diode Current Slope (Typical)



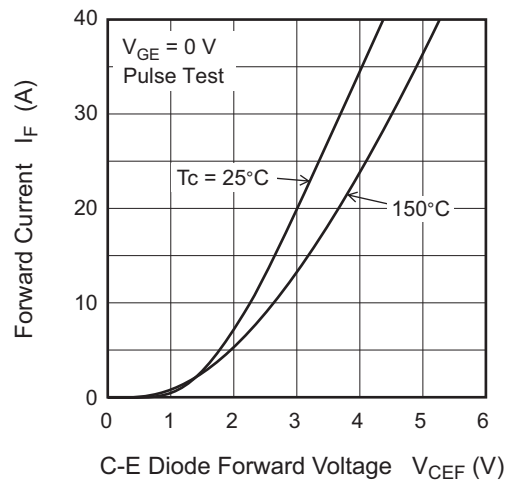
Reverse Recovery Charge vs.
Diode Current Slope (Typical)

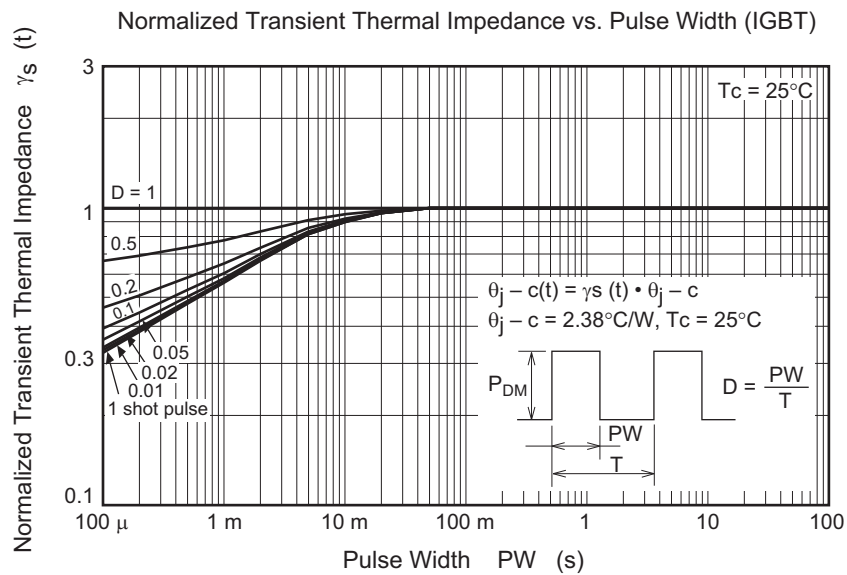


Reverse Recovery Current vs.
Diode Current Slope (Typical)

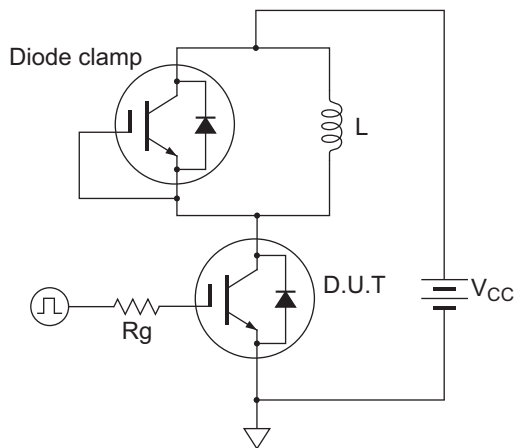


Forward Current vs. Forward Voltage (Typical)

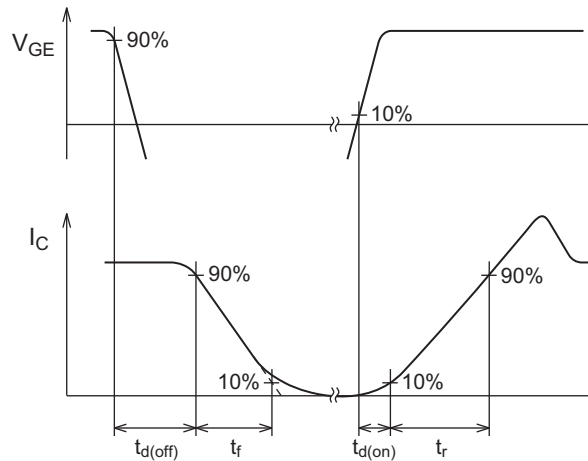




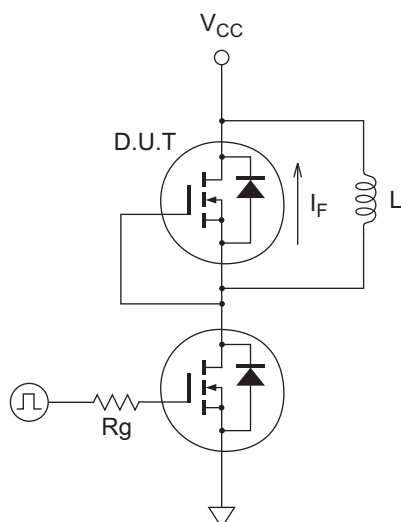
Switching Time Test Circuit



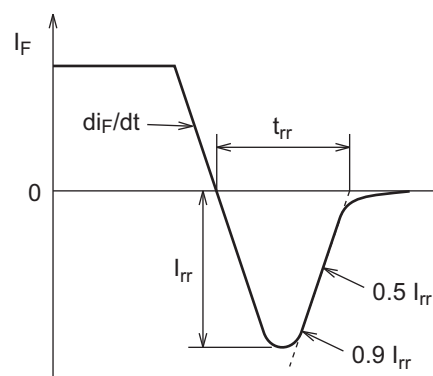
Waveform



Diode Reverse Recovery Time Test Circuit



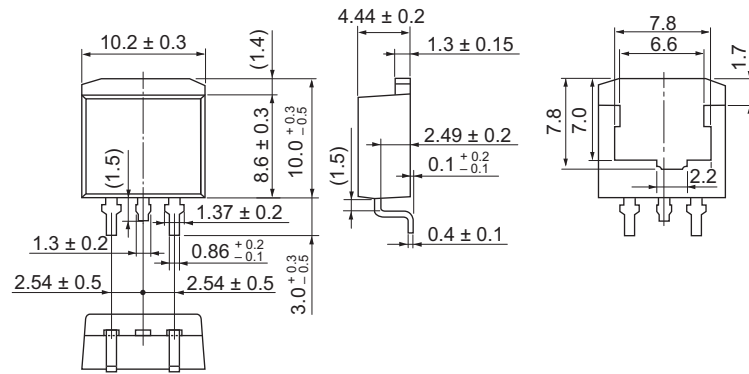
Waveform



Package Dimension

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
LDBAK(S)-(1)	SC-83	PRSS0004AE-B	LDBAK(S)-(1) / LDBAK(S)-(1)V	1.30g

Unit: mm



Ordering Information

Orderable Part No.	Quantity	Shipping Container
RJH60A83RDPE-00#J3	1000 pcs	Taping

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