

RJH60T04DPQ-A1

600V - 30A - IGBT

Application: Current resonance circuit

R07DS1191EJ0200

Rev.2.00

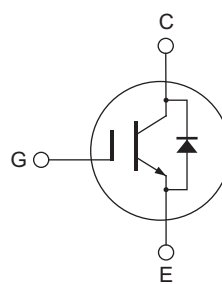
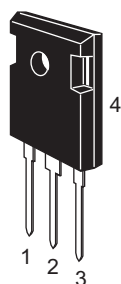
Apr 02, 2014

Features

- Optimized for current resonance application
- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.5 \text{ V typ. (at } I_C = 30 \text{ A, } V_{GE} = 15 \text{ V, } T_a = 25^\circ\text{C)}$
- Built in fast recovery diode in one package
- Trench gate and thin wafer technology
- High speed switching
 $t_f = 45 \text{ ns typ. (at } V_{CC} = 400 \text{ V, } V_{GE} = 15 \text{ V, } I_C = 30 \text{ A, } R_g = 10 \Omega, T_a = 25^\circ\text{C, Inductive load)}$
- Low tail loss
 $E_{tail} = 160 \mu\text{J typ. (at } V_{CC} = 300 \text{ V, } V_{GE} = 20 \text{ V, } I_C = 50 \text{ A, } R_g = 15 \Omega, T_c = 125^\circ\text{C, current resonance circuit)}$

Outline

RENESAS Package code: PRSS0003ZH-A
(Package name: TO-247A)



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

Absolute Maximum Ratings

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

Item		Symbol	Ratings	Unit
Collector to emitter voltage		V_{CES}	600	V
Gate to emitter voltage		V_{GES}	± 30	V
Collector current	$T_c = 25^\circ\text{C}$	I_C ^{Note1}	60	A
	$T_c = 100^\circ\text{C}$	I_C ^{Note1}	30	A
Collector peak current		$I_{C(peak)}$ ^{Note1}	180	A
Collector to emitter diode forward peak current		$I_{DF(peak)}$ ^{Note2}	80	A
Collector dissipation		P_C	208.3	W
Junction to case thermal impedance (IGBT)		θ_{j-c}	0.6	$^\circ\text{C/W}$
Junction to case thermal impedance (Diode)		θ_{j-cd}	2.1	$^\circ\text{C/W}$
Junction temperature		T_j	150	$^\circ\text{C}$
Storage temperature		T_{stg}	-55 to +150	$^\circ\text{C}$

Notes: 1. Pulse width limited by safe operating area.

2. $PW \leq 5 \mu\text{s}$, duty cycle $\leq 1\%$

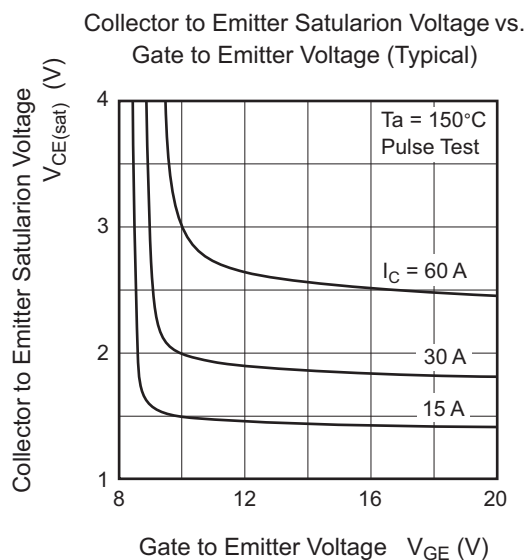
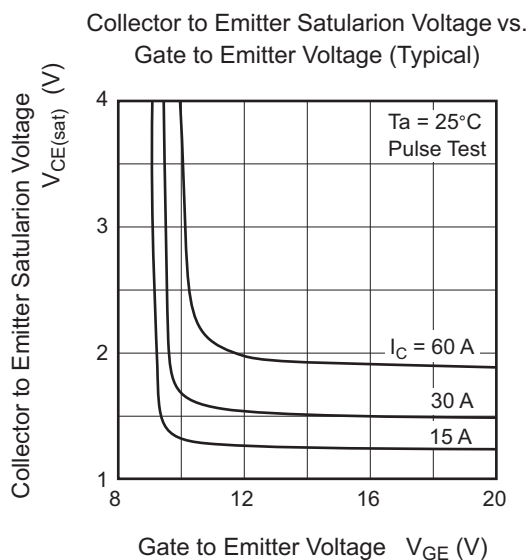
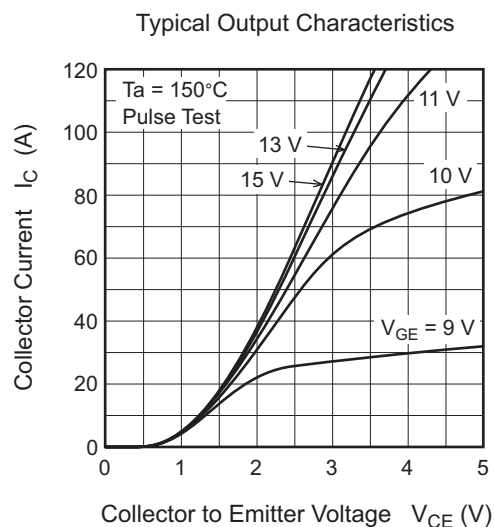
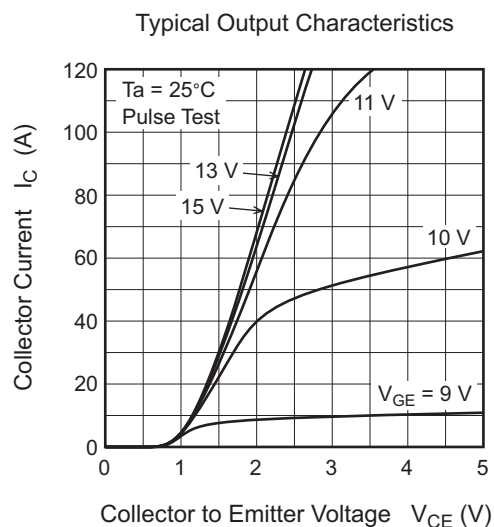
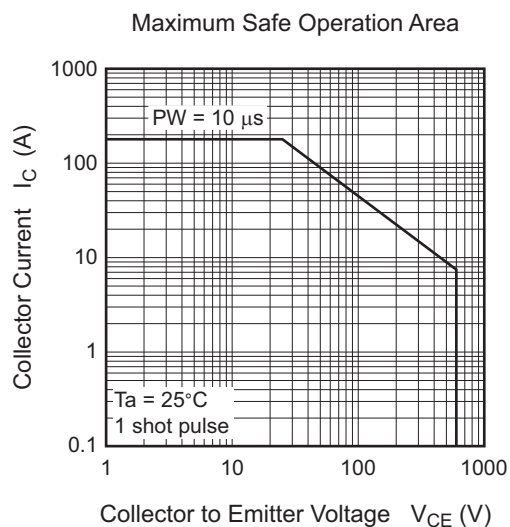
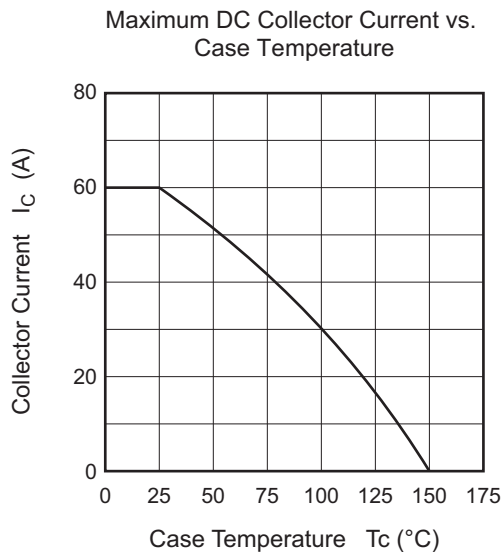
Electrical Characteristics

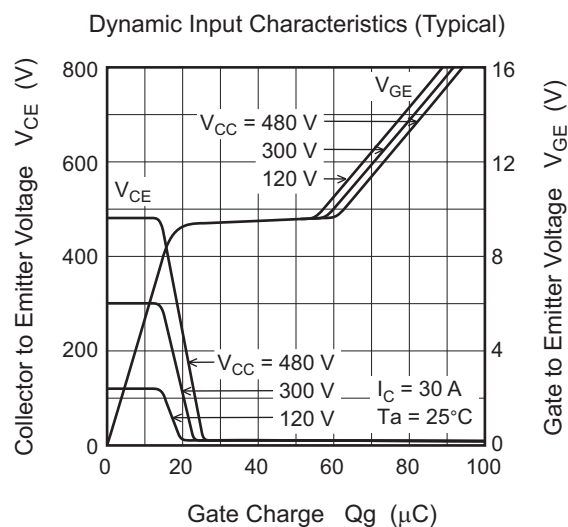
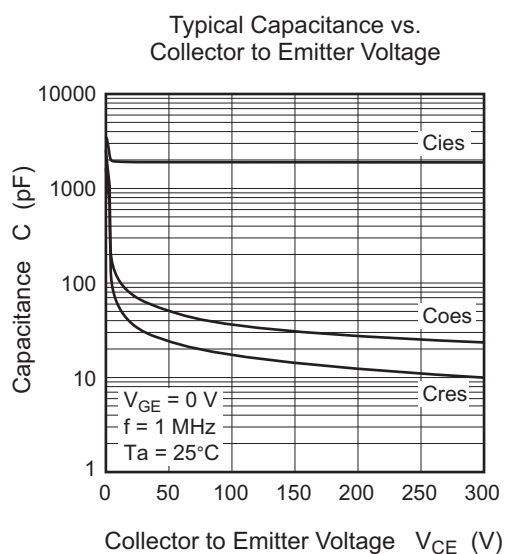
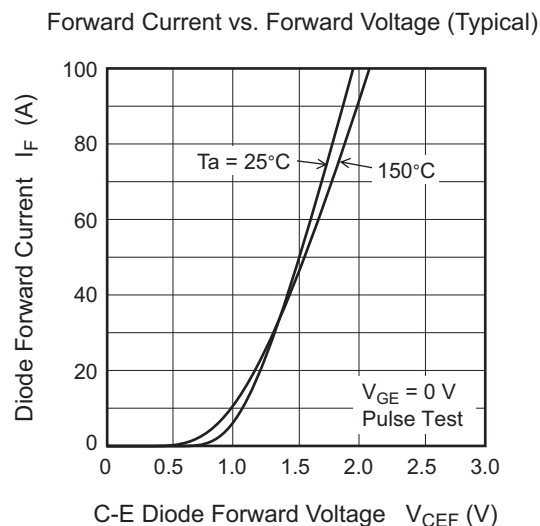
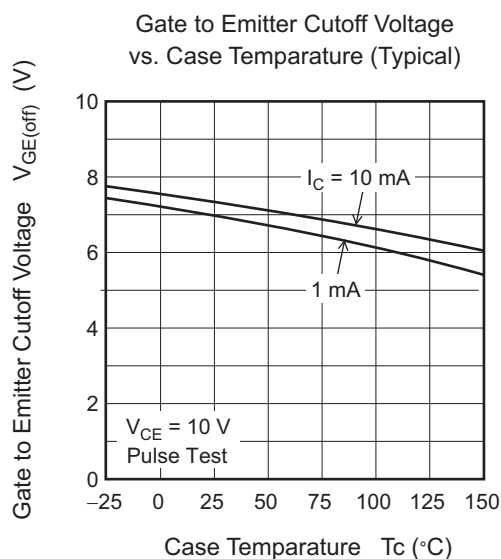
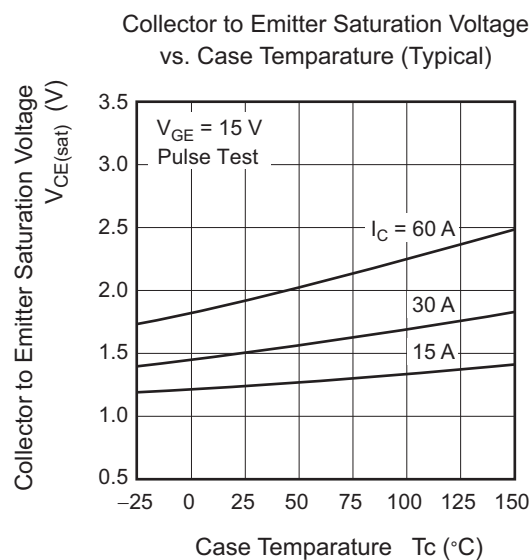
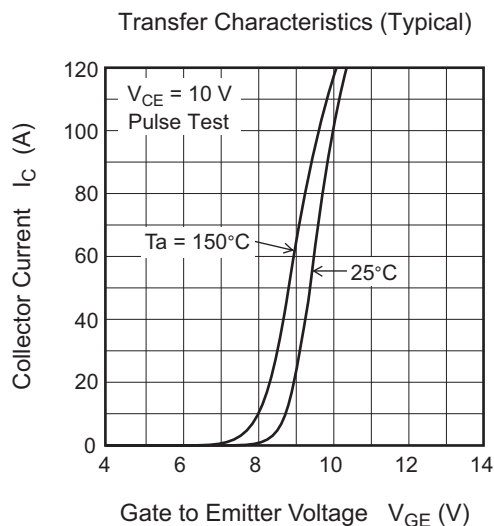
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	I_{CES}	—	—	100	μA	$V_{CE} = 600 V, V_{GE} = 0$
Gate to emitter leak current	I_{GES}	—	—	± 1	μA	$V_{GE} = \pm 30 V, V_{CE} = 0$
Gate to emitter cutoff voltage	$V_{GE(off)}$	4	—	8	V	$V_{CE} = 10 V, I_C = 1 mA$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.50	1.95	V	$I_C = 30 A, V_{GE} = 15 V$ ^{Note3}
Input capacitance	C_{ies}	—	1910	—	pF	$V_{CE} = 25 V$ $V_{GE} = 0$ $f = 1 MHz$
Output capacitance	C_{oes}	—	69	—	pF	
Reveres transfer capacitance	C_{res}	—	34	—	pF	
Total gate charge	Q_g	—	87	—	nC	$V_{GE} = 15 V$ $V_{CE} = 300 V$ $I_C = 30 A$
Gate to emitter charge	Q_{ge}	—	18	—	nC	
Gate to collector charge	Q_{gc}	—	41	—	nC	
Turn-on delay time	$t_{d(on)}$	—	54	—	ns	$V_{CC} = 400 V$ $V_{GE} = 15 V$ $I_C = 30 A, R_g = 10 \Omega$ Inductive load
Rise time	t_r	—	52	—	ns	
Turn-off delay time	$t_{d(off)}$	—	136	—	ns	
Fall time	t_f	—	45	—	ns	$V_{CC} = 300 V, V_{GE} = 20 V$ $I_C = 50 A, R_g = 15 \Omega$ $T_c = 125^\circ C$ Current resonance circuit
Tail loss	E_{tail}	—	160	—	μJ	
C-E diode forward voltage	V_{ECF}	—	1.2	1.6	V	$I_F = 20 A$ ^{Note3}
C-E diode reverse recovery time	t_{rr}	—	100	—	ns	$I_F = 10 A$ $di_F/dt = -100 A/\mu s$

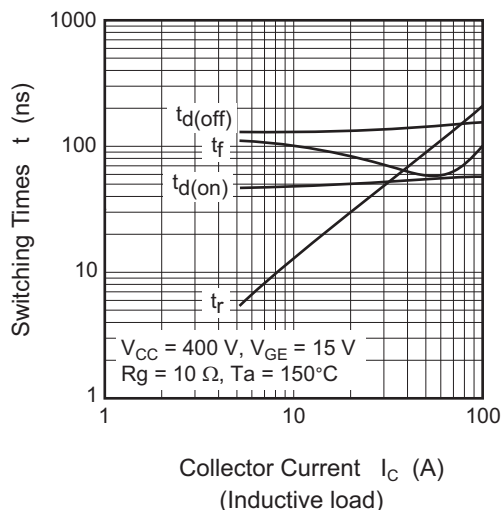
Notes: 3. Pulse test

Main Characteristics

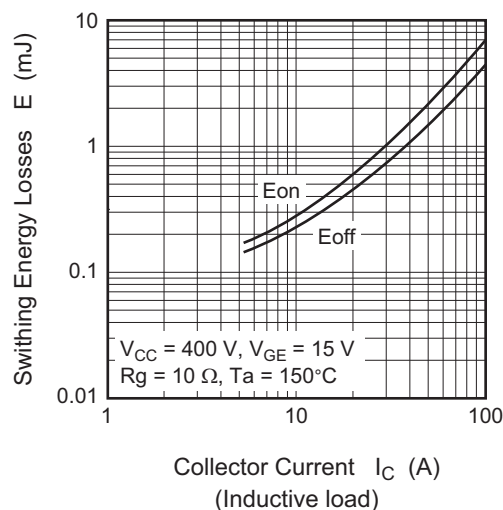




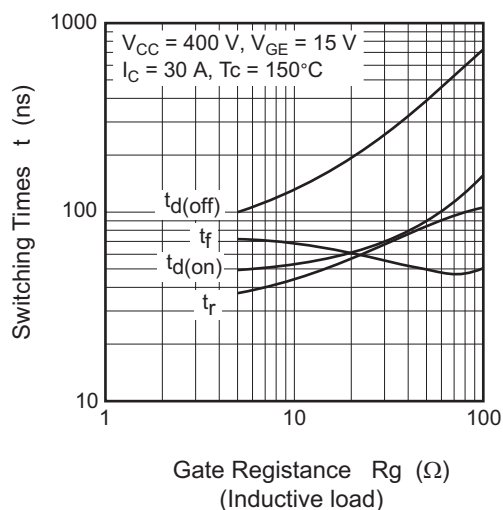
Switching Characteristics (Typical) (1)



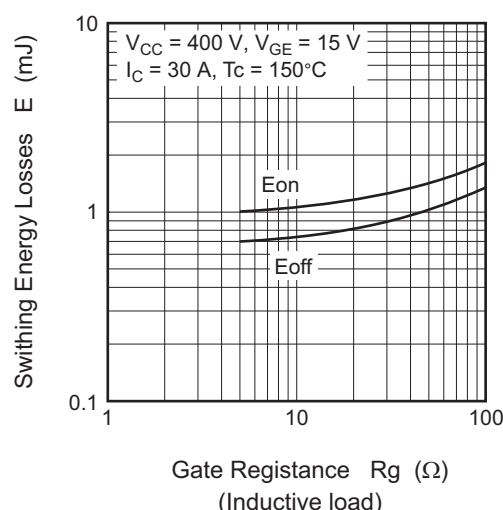
Switching Characteristics (Typical) (2)



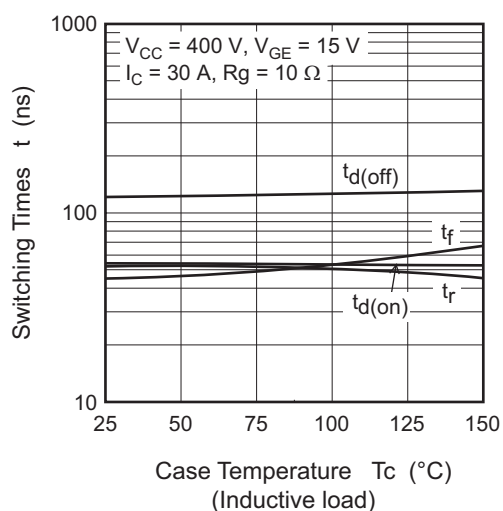
Switching Characteristics (Typical) (3)



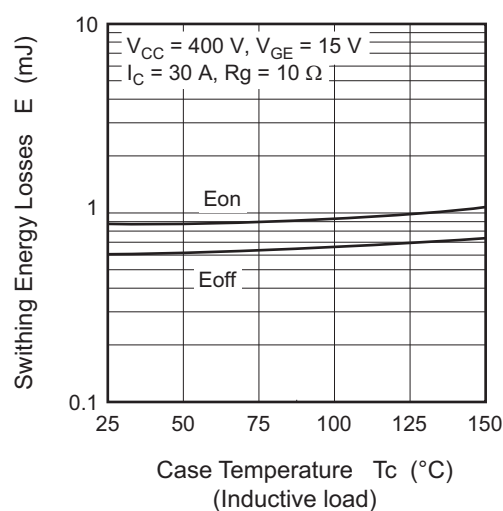
Switching Characteristics (Typical) (4)

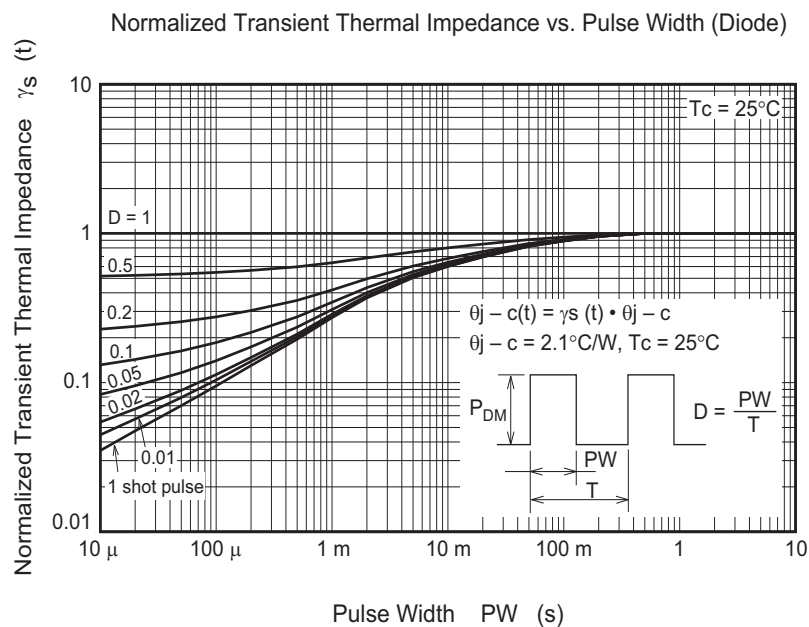
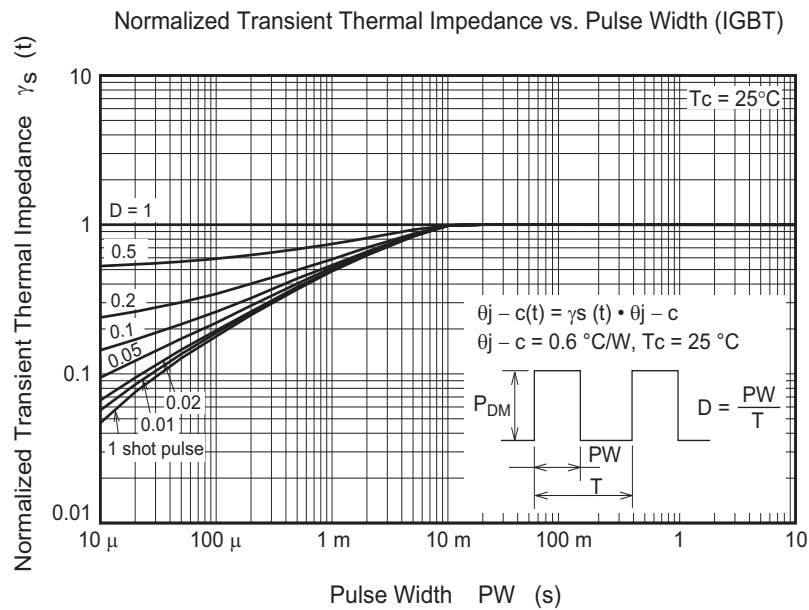


Switching Characteristics (Typical) (5)

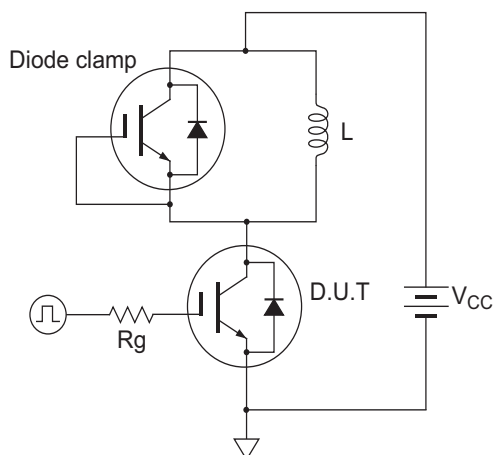


Switching Characteristics (Typical) (6)

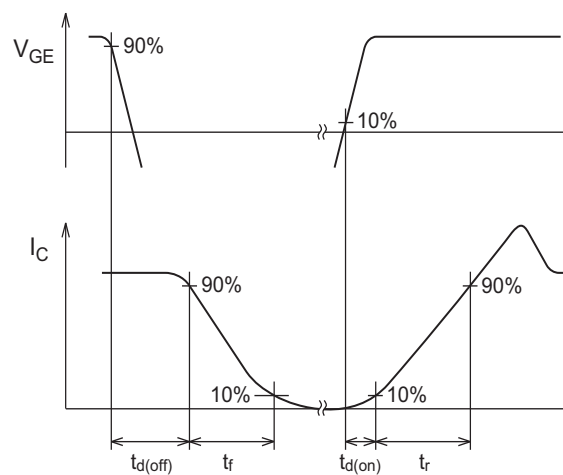




Switching Time Test Circuit



Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
TO-247A	—	PRSS0003ZH-A	—	6.14g	

Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJH60T04DPQ-A1#T0	240 pcs	Box (Tube)

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