

RJH60T04DPQ-A1

600V - 30A - IGBT

R07DS1191EJ0200

Application: Current resonance circuit

Rev.2.00

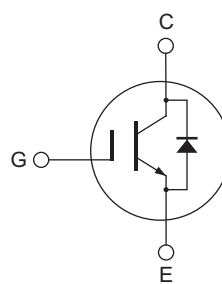
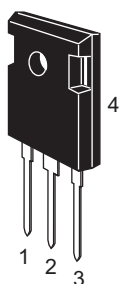
Apr 02, 2014

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	I_C ^{Note1}	$T_c = 25^\circ\text{C}$	60	A
		$T_c = 100^\circ\text{C}$	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 $\leq 1\%$

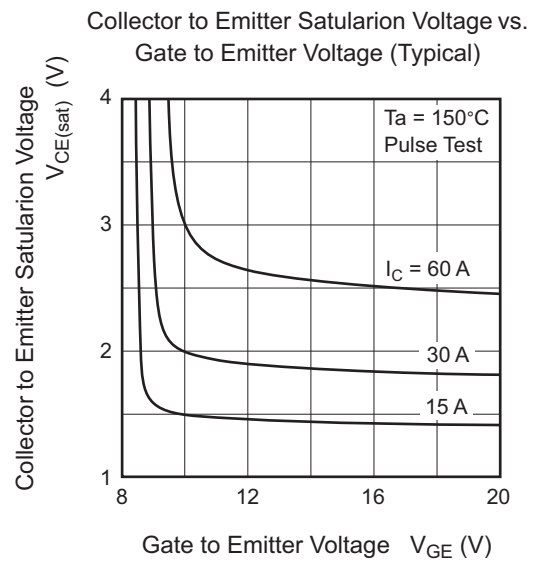
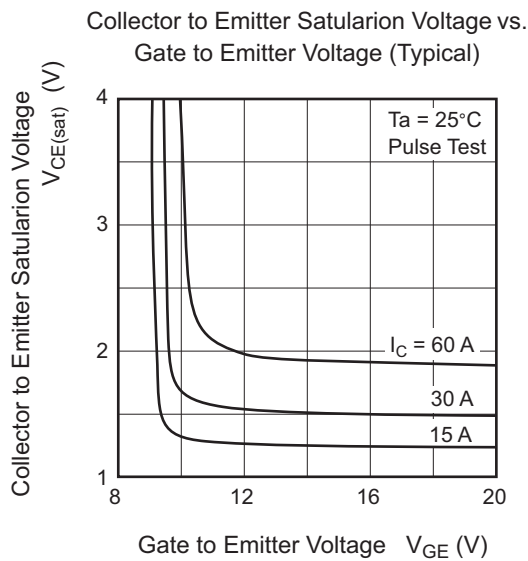
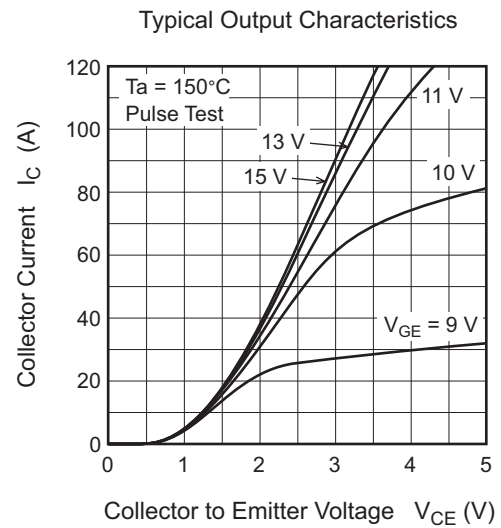
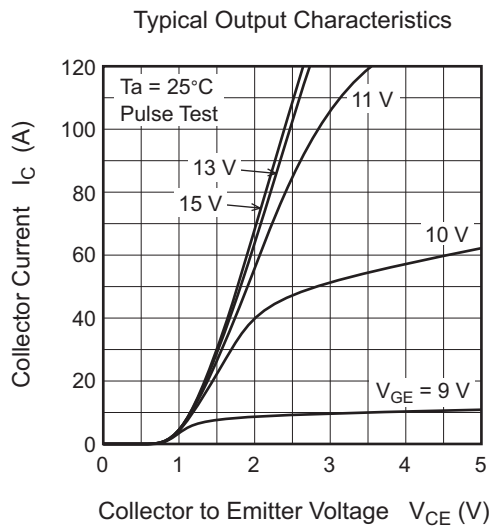
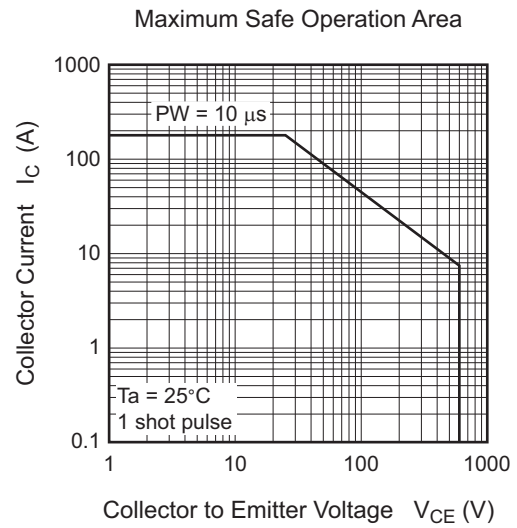
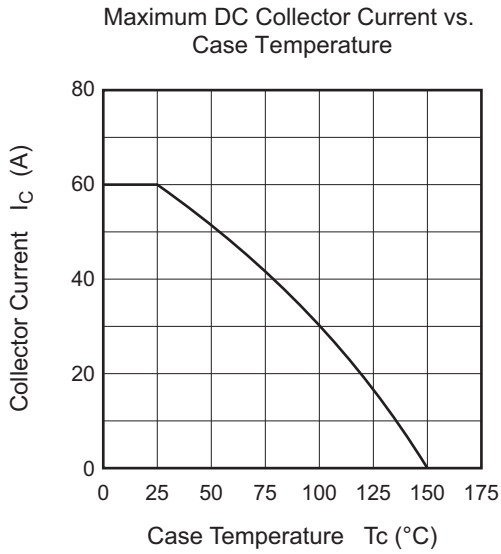
Electrical Characteristics

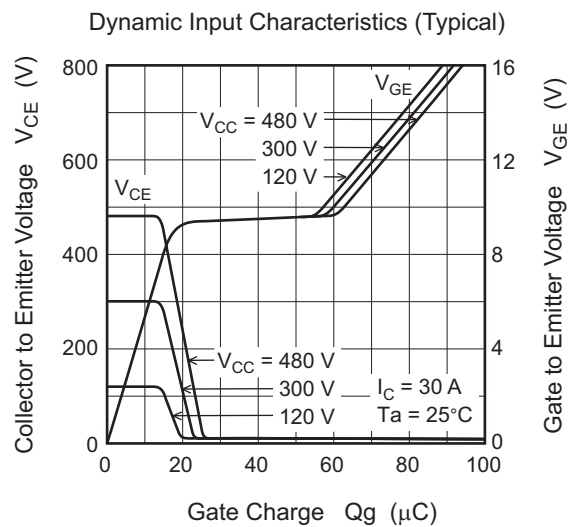
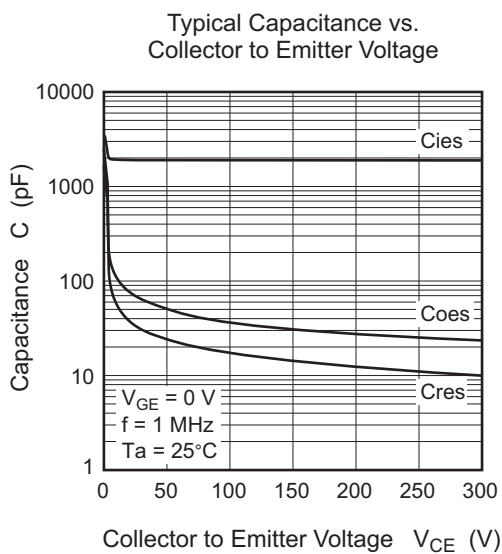
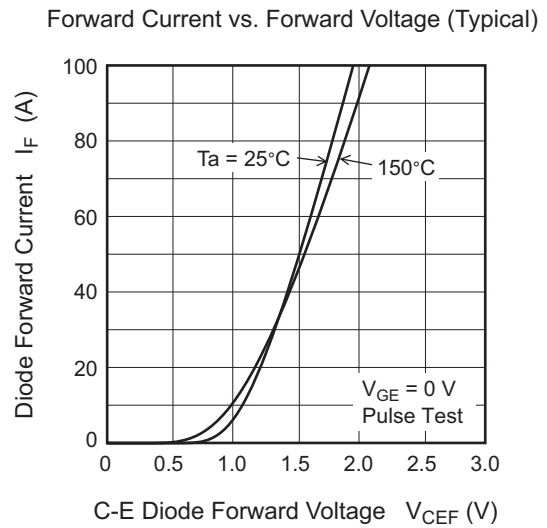
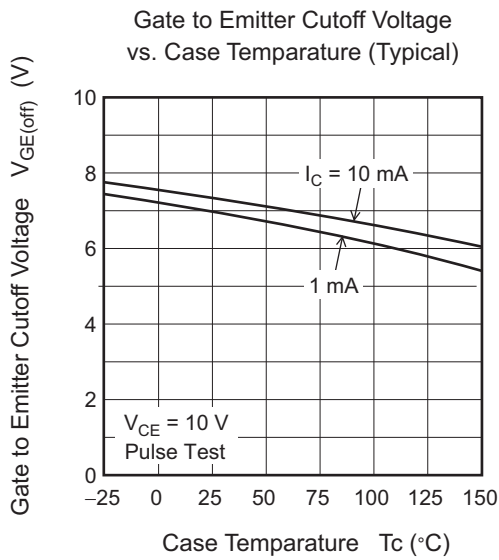
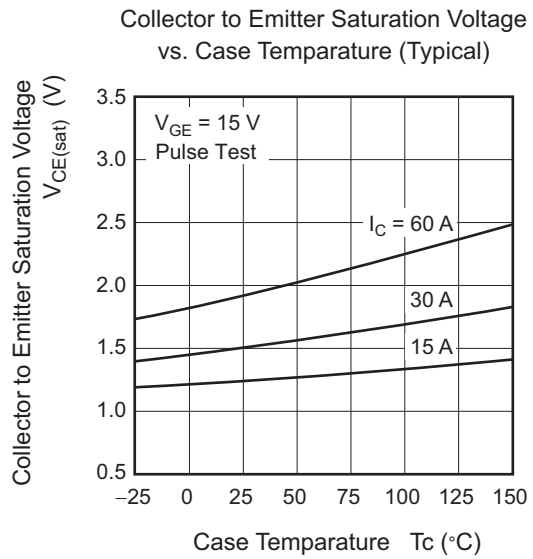
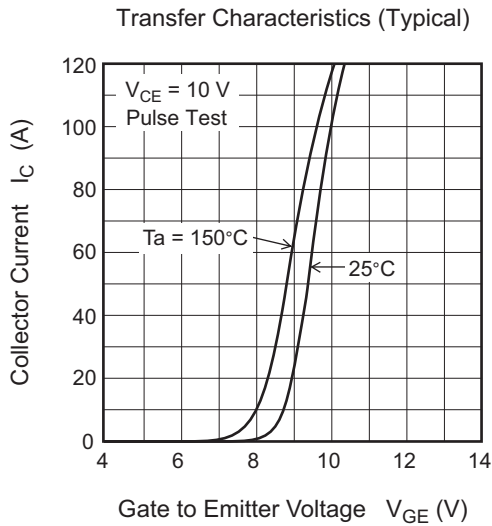
(Ta = 25°C)

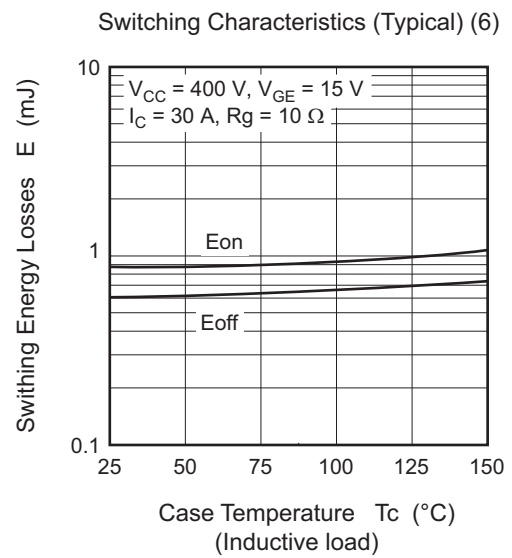
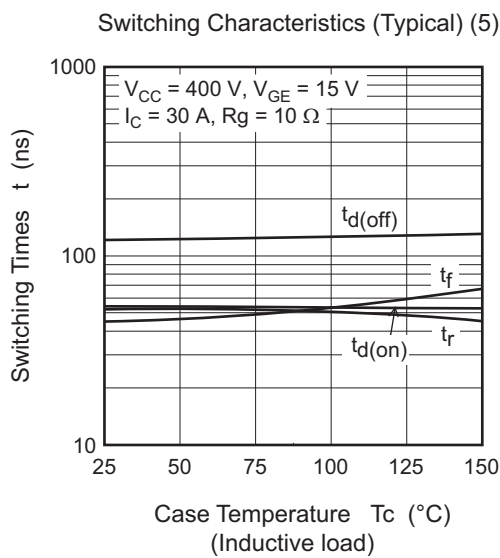
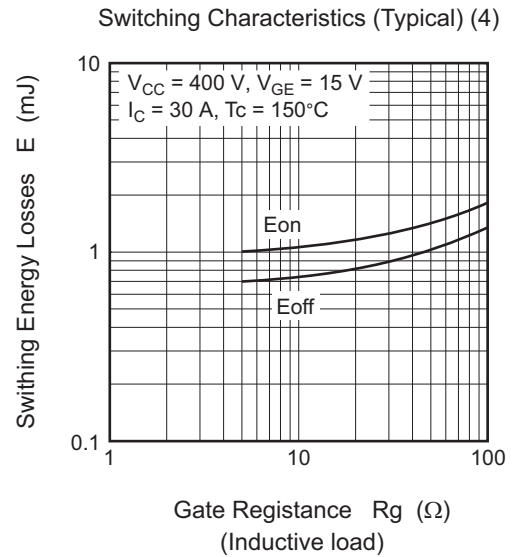
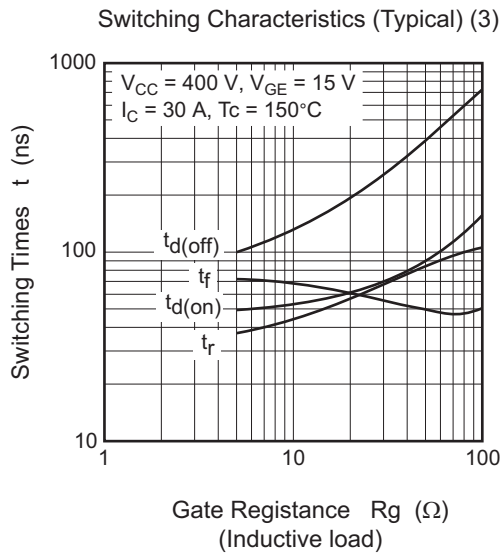
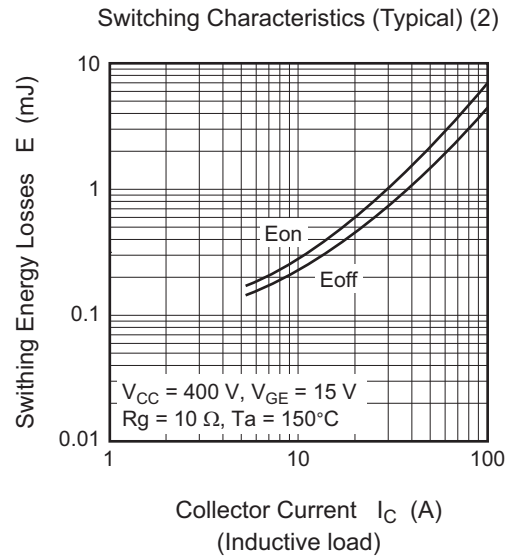
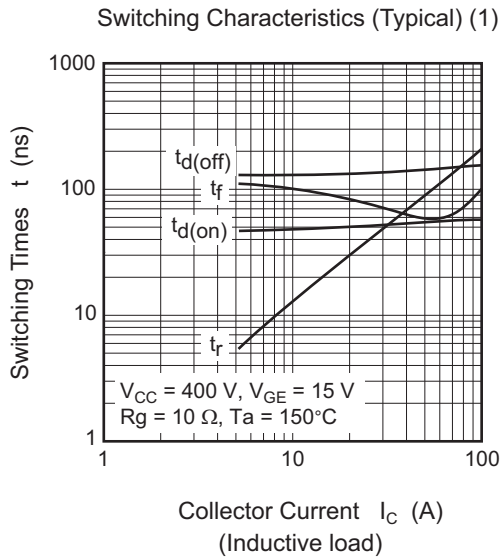
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	I_{CES}	—	—	100	μA	$V_{CE} = 600\text{ V}, V_{GE} = 0$
Gate to emitter leak current	I_{GES}	—	—	± 1	μA	$V_{GE} = \pm 30\text{ V}, V_{CE} = 0$
Gate to emitter cutoff voltage	$V_{GE(off)}$	4	—	8	V	$V_{CE} = 10\text{ V}, I_C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

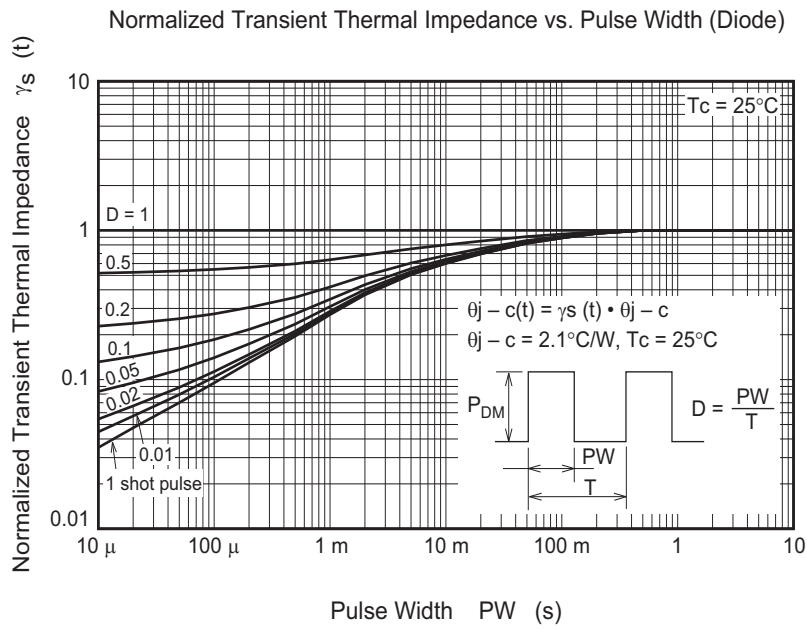
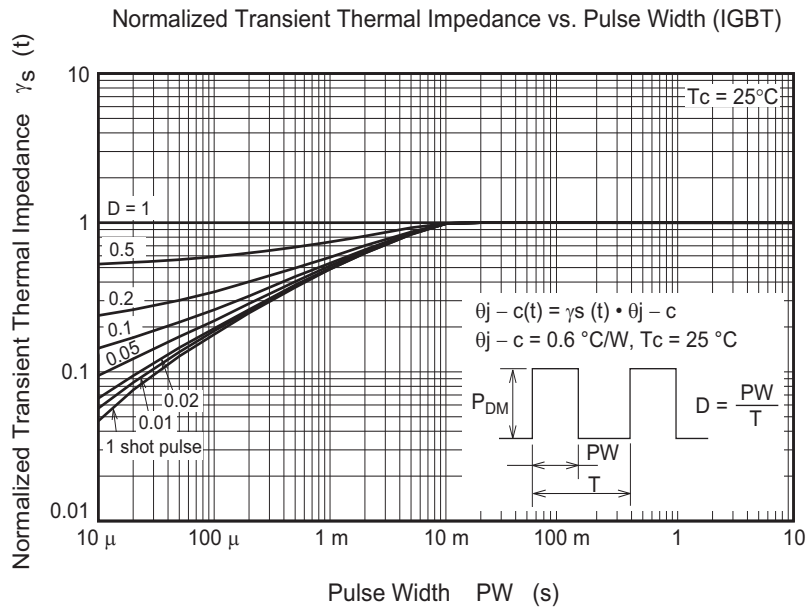
Notes: 3. Pulse test

Main Characteristics

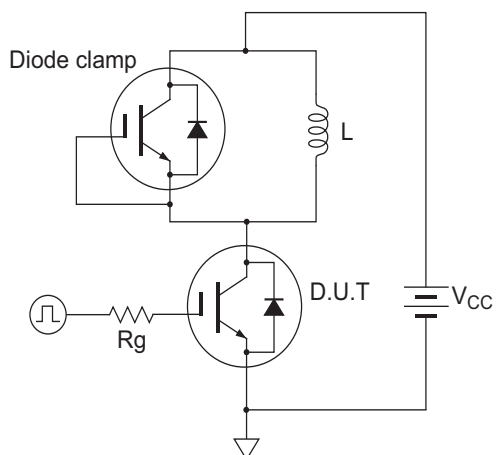




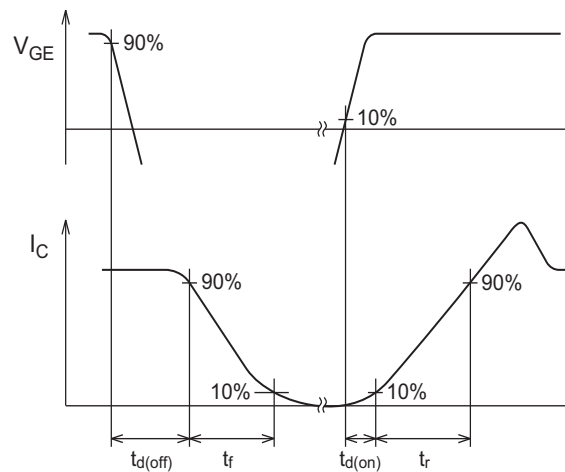




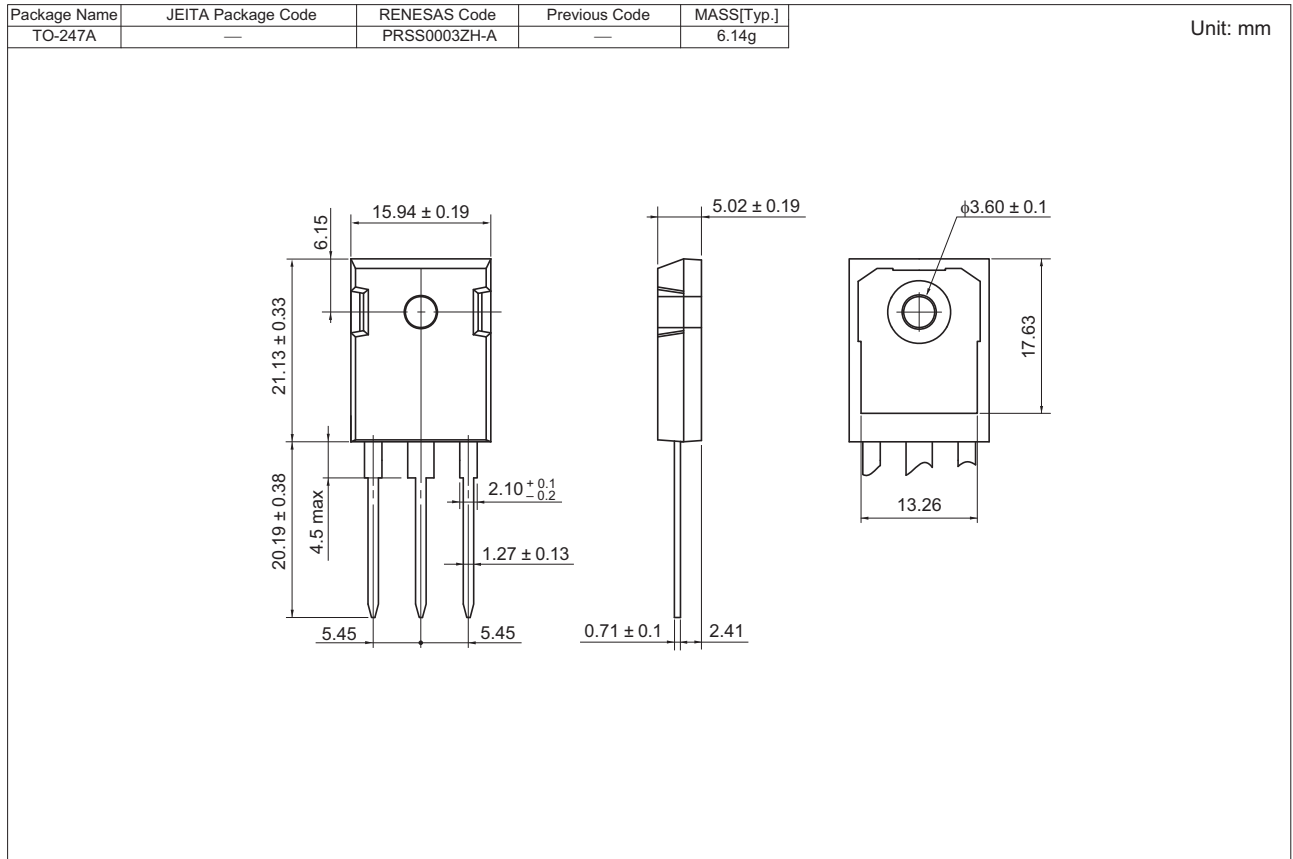
Switching Time Test Circuit



Waveform



Package Dimensions



Ordering Information

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

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