

RJH60D1DPP-M0

Silicon N Channel IGBT

Application: Inverter

R07DS0158EJ0300

Rev.3.00

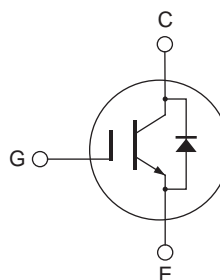
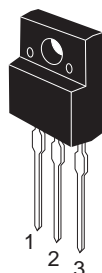
Nov 16, 2010

Features

- Short circuit withstand time (5 μ s typ.)
- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.9$ V typ. (at $I_C = 10$ A, $V_{GE} = 15$ V, $T_a = 25^\circ\text{C}$)
- Built in fast recovery diode (100 ns typ.) in one package
- Trench gate and thin wafer technology
- High speed switching
 $t_f = 90$ ns typ. (at $V_{CC} = 300$ V, $V_{GE} = 15$ V, $I_C = 10$ A, $R_g = 5 \Omega$, inductive load)

Outline

RENESAS Package code: PRSS0003AF-A
 (Package name: TO-220FL)



1. Gate
2. Collector
3. Emitter

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	20	A
	$T_c = 100^\circ\text{C}$	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	$i_{D(peak)}$ ^{Note1}	40	A	
Collector dissipation	P_C ^{Note2}	20.8	W	
Junction to case thermal resistance (IGBT)	θ_{j-c} ^{Note2}	6.0	$^\circ\text{C} / \text{W}$	
Junction to case thermal resistance (Diode)	θ_{j-cd} ^{Note2}	7.2	$^\circ\text{C} / \text{W}$	
Junction temperature	T_j	150	$^\circ\text{C}$	
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$	

Notes: 1. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$

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

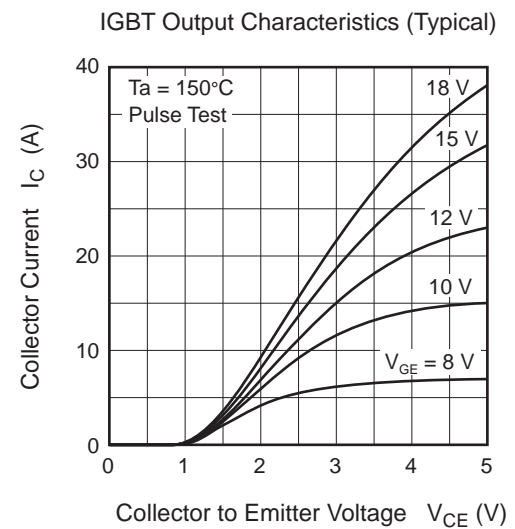
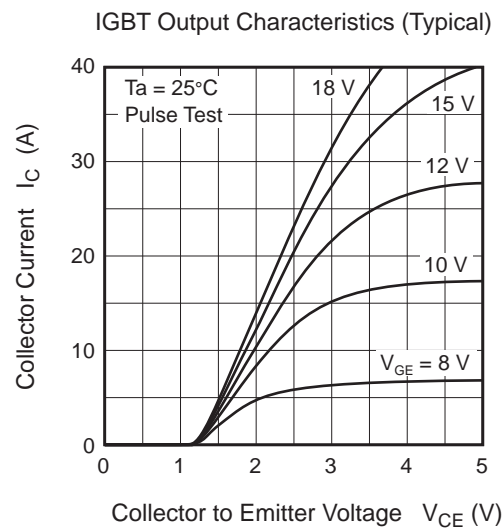
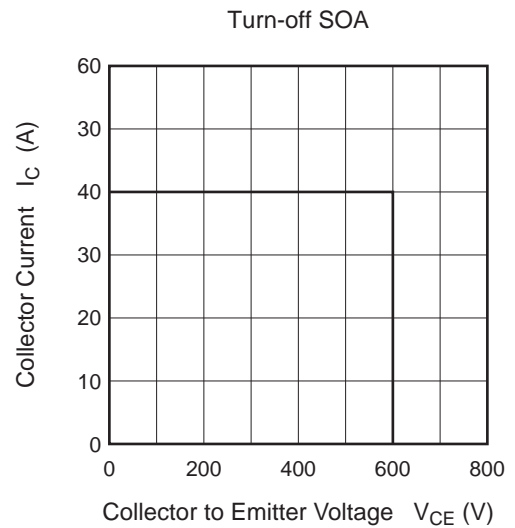
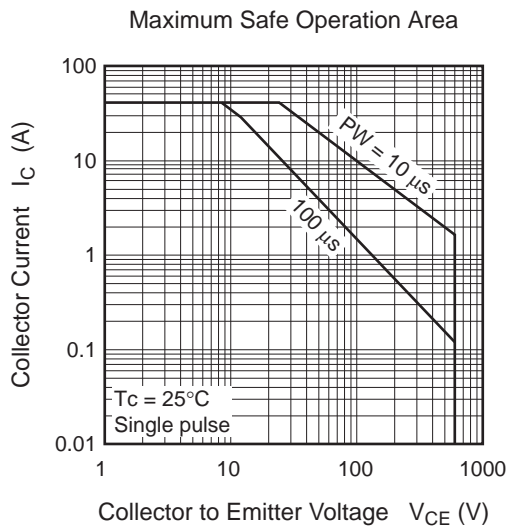
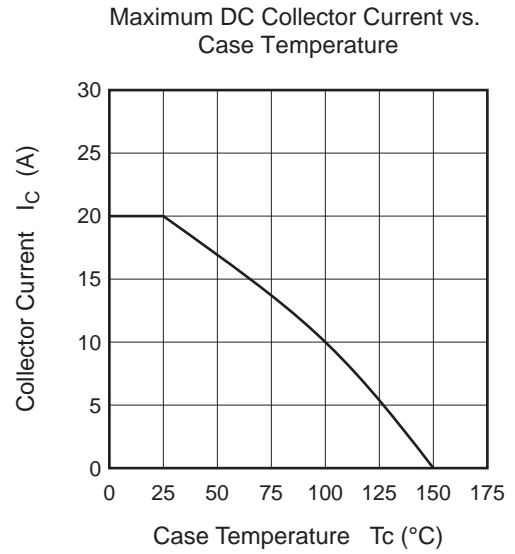
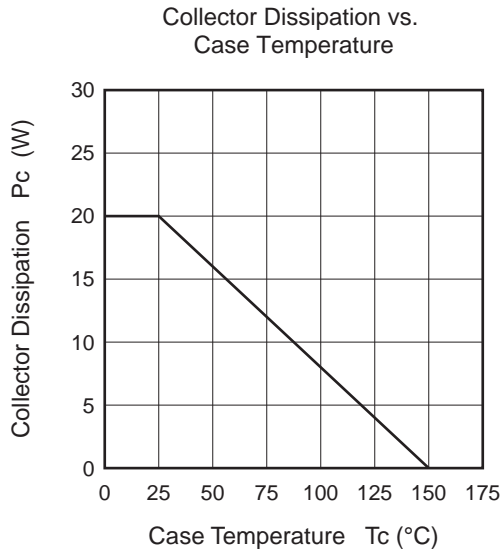
Electrical Characteristics

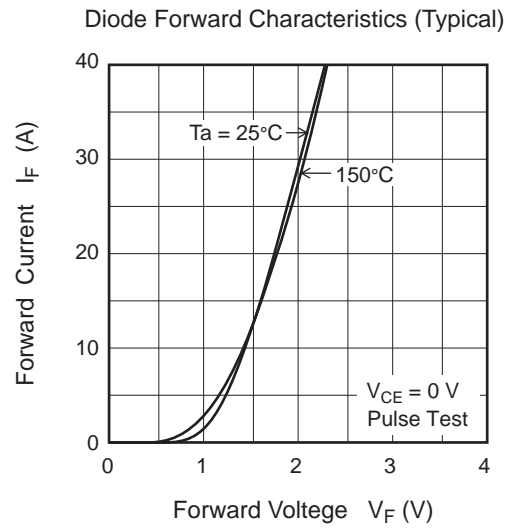
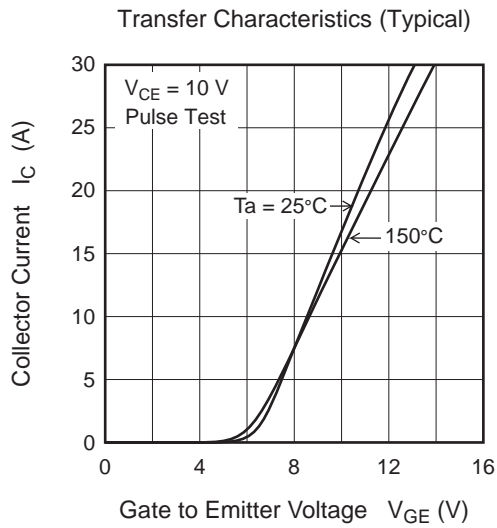
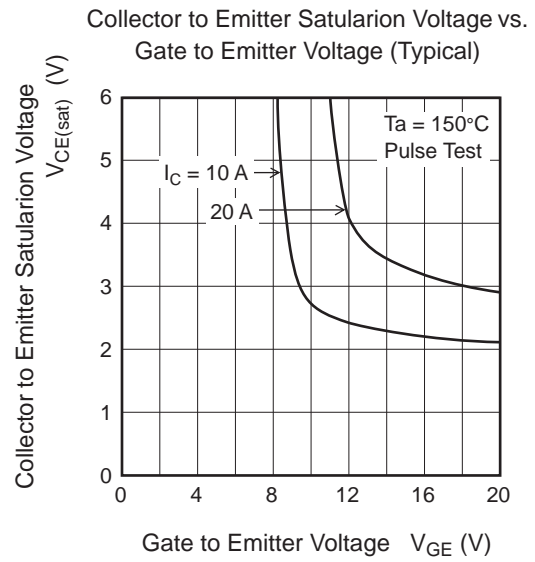
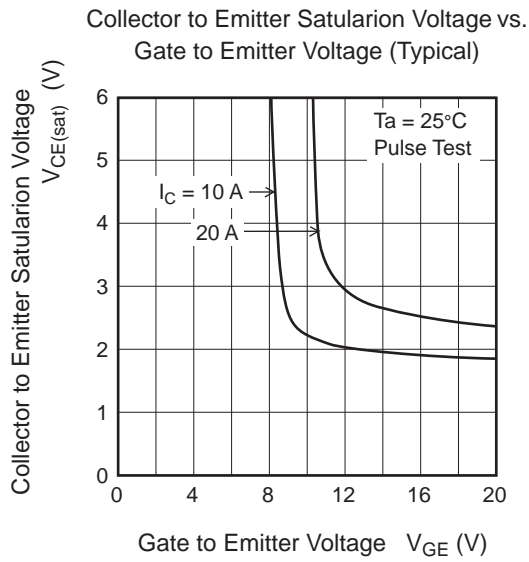
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current / Diode reverse current	I_{CES} / I_R	—	—	5	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	$V_{GE(off)}$	4.0	—	6.0	V	$V_{CE} = 10 \text{ V}, I_C = 1 \text{ mA}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.9	2.5	V	$I_C = 10 \text{ A}, V_{GE} = 15 \text{ V}$ ^{Note3}
	$V_{CE(sat)}$	—	2.6	—	V	$I_C = 20 \text{ A}, V_{GE} = 15 \text{ V}$ ^{Note3}
Input capacitance	C_{ies}	—	275	—	pF	$V_{CE} = 25 \text{ V}$
Output capacitance	C_{oes}	—	25	—	pF	$V_{GE} = 0$
Reveres transfer capacitance	C_{res}	—	7.5	—	pF	$f = 1 \text{ MHz}$
Total gate charge	Q_g	—	12.0	—	nC	$V_{GE} = 15 \text{ V}$
Gate to emitter charge	Q_{ge}	—	2.0	—	nC	$V_{CE} = 300 \text{ V}$
Gate to collector charge	Q_{gc}	—	6.0	—	nC	$I_C = 10 \text{ A}$
Switching time	$t_{d(on)}$	—	30	—	ns	$V_{CC} = 300 \text{ V}, V_{GE} = 15 \text{ V}$
	t_r	—	13	—	ns	$I_C = 10 \text{ A}$
	$t_{d(off)}$	—	80	—	ns	$R_g = 5 \Omega$
	t_f	—	90	—	ns	(Inductive load)
Short circuit withstand time	t_{sc}	3.0	5.0	—	μs	$V_{GE} \leq 360 \text{ V}, V_{GE} = 15 \text{ V}$
FRD Forward voltage	V_F	—	1.4	1.9	V	$I_F = 10 \text{ A}$ ^{Note3}
FRD reverse recovery time	t_{rr}	—	100	—	ns	$I_F = 10 \text{ A}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

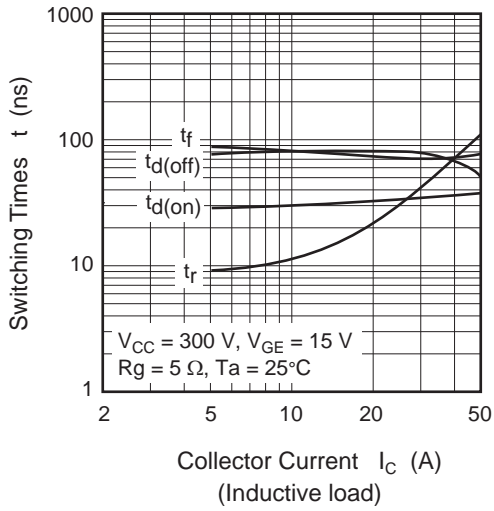
Notes: 3. Pulse test.

Main Characteristics

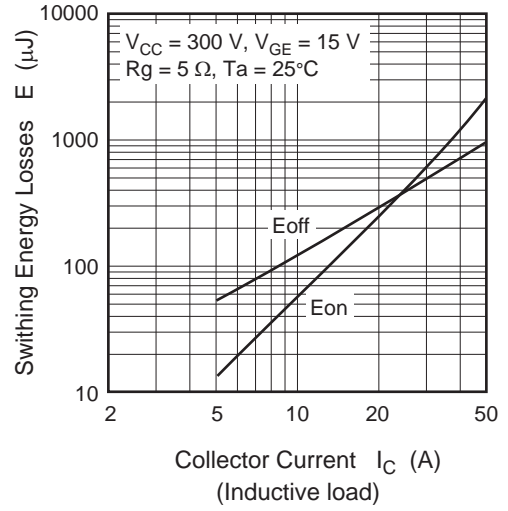




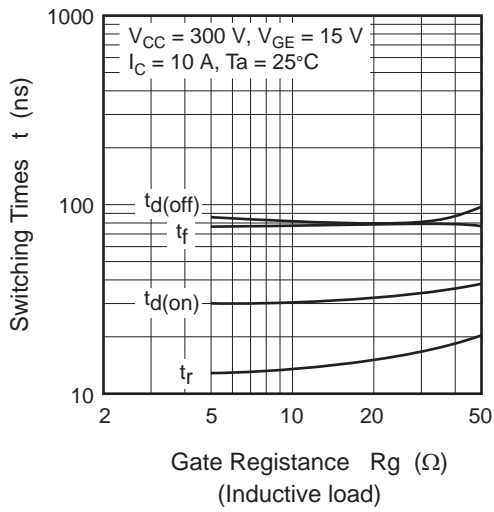
Switching Characteristics (Typical) (1)



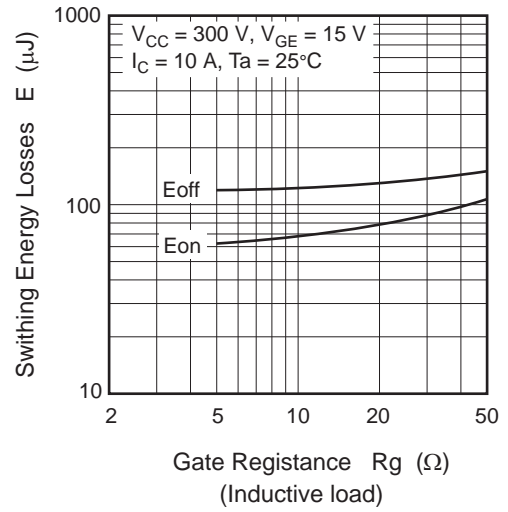
Switching Characteristics (Typical) (2)



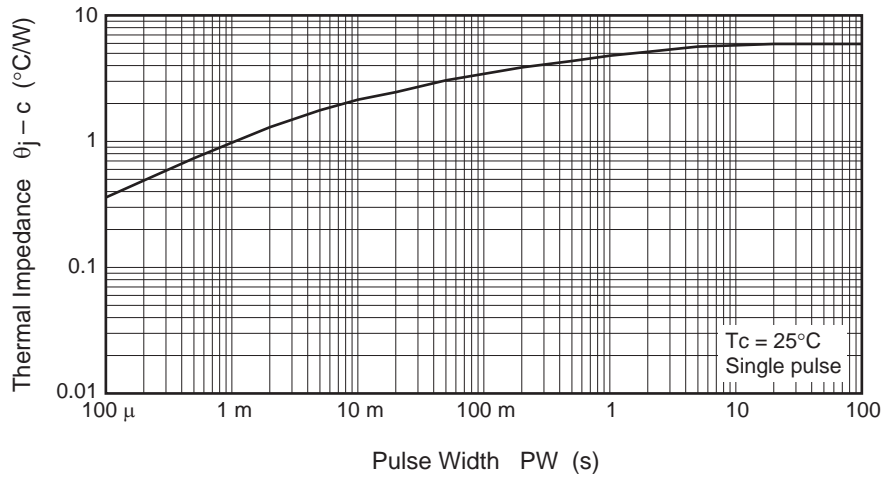
Switching Characteristics (Typical) (3)



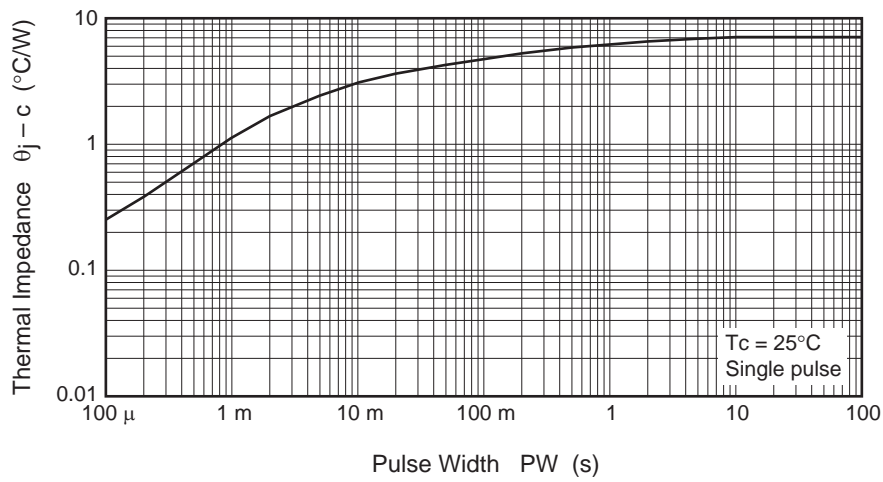
Switching Characteristics (Typical) (4)



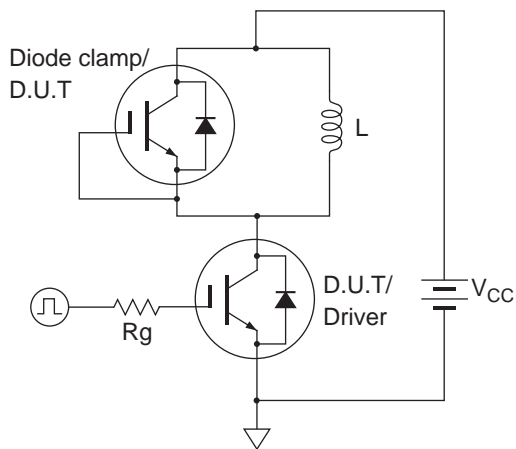
Thermal Impedance vs. Pulse Width (IGBT)



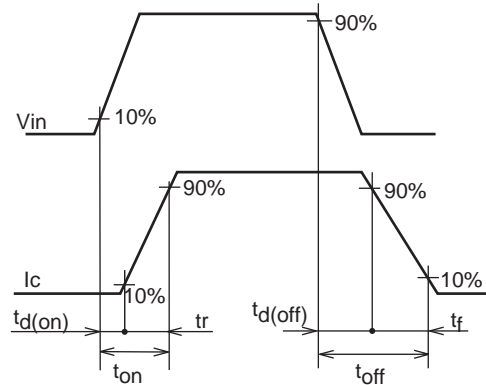
Thermal Impedance vs. Pulse Width (Diode)



Switching Time Test Circuit



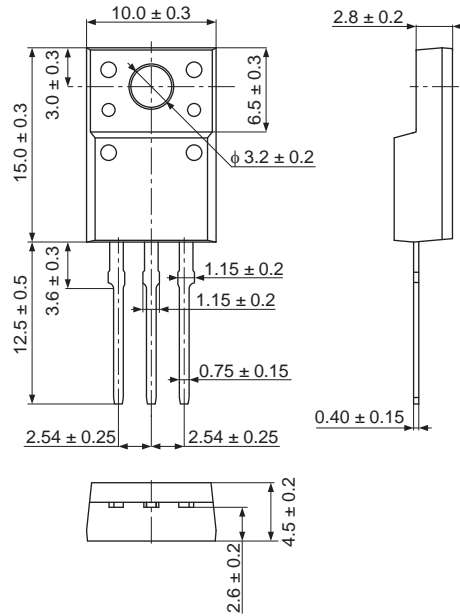
Waveform



Package Dimension

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-220FL	—	PRSS0003AF-A	TO-220FL	1.5g

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJH60D1DPP-M0-T2	1050 pcs	Box (Tube)

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