RJH60D1DPE

Silicon N Channel IGBT
Application: Inverter

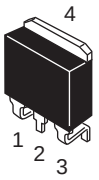
R07DS0157EJ0300
Rev.3.00
Nov 16, 2010

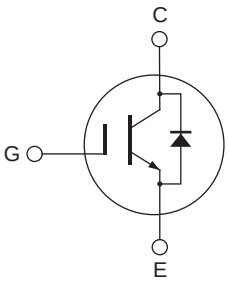
Features

- Short circuit withstand time (5 μs typ.)
- Low collector to emitter saturation voltage
  $V_{CE(sat)}$ = 1.9 V typ. (at I_C = 10 A, V_{GE} = 15 V, Ta = 25°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, Rg = 5 Ω, , inductive load)

Outline

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





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

Absolute Maximum Ratings

(Ta = 25°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		ic(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 (IGBT)		θj-c Note2	2.4	°C/ W
Junction to case thermal resistance (Diode)		θj-cd Note2	4.2	°C/ W
Junction temperature		Tj	150	°C
Storage temperature		Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
2. Value at Tc = 25°C

Electrical Characteristics

(Ta = 25°C)

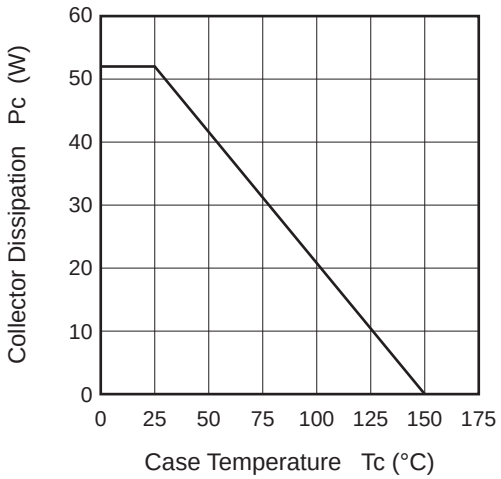
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current / Diode reverse current	I_{CES} / I_R	—	—	5	μA	V_{CE} = 600 V, V_{GE} = 0
Gate to emitter leak current	I_{GES}	—	—	±1	μA	V_{GE} = ±30 V, V_{CE} = 0
Gate to emitter cutoff voltage	$V_{GE(off)}$	4.0	—	6.0	V	V_{CE} = 10 V, I_C = 1 mA
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.9	2.5	V	I_C = 10 A, V_{GE} = 15 V Note3
	$V_{CE(sat)}$	—	2.6	—	V	I_C = 20 A, V_{GE} = 15 V Note3
Input capacitance	Cies	—	275	—	pF	V_{CE} = 25 V V_{GE} = 0 f = 1 MHz
Output capacitance	Coes	—	25	—	pF	
Reveres transfer capacitance	Cres	—	7.5	—	pF	
Total gate charge	Qg	—	12.0	—	nC	V_{GE} = 15 V V_{CE} = 300 V I_C = 10 A
Gate to emitter charge	Qge	—	2.0	—	nC	
Gate to collector charge	Qgc	—	6.0	—	nC	
Switching time	$t_{d(on)}$	—	30	—	ns	V_{CC} = 300V, V_{GE} = 15 V I_C = 10 A, Rg = 5 Ω Inductive load
	t_r	—	13	—	ns	
	$t_{d(off)}$	—	80	—	ns	
	t_f	—	90	—	ns	
Short circuit withstand time	t_{sc}	3.0	5.0	—	μs	V_{CC} ≤ 360V, V_{GE} = 15 V

FRD forward voltage	V_F	—	1.4	1.9	V	I_F = 10 A Note3
FRD reverse recovery time	t_{rr}	—	100	—	ns	I_F = 10 A di_F/dt = 100 A/μs

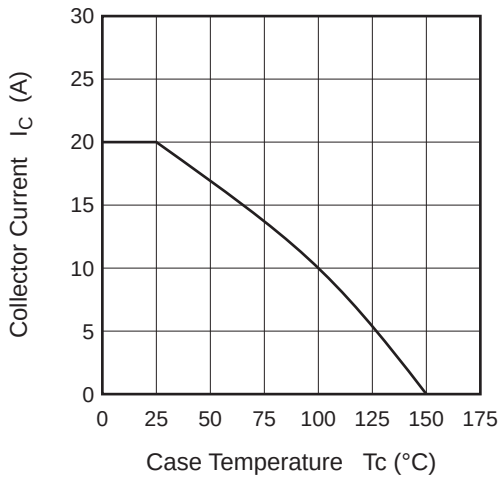
Notes: 3. Pulse test.

Main Characteristics

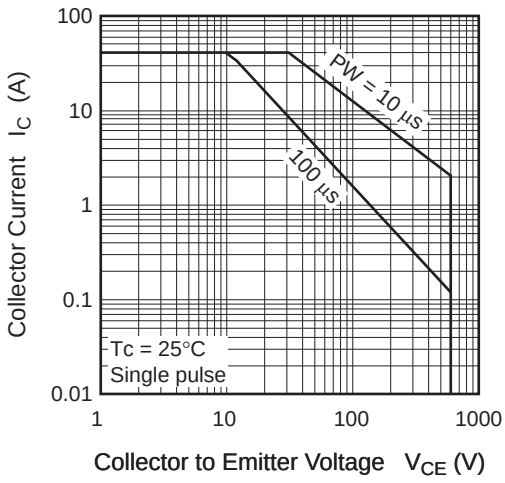
Collector Dissipation vs. Case Temperature



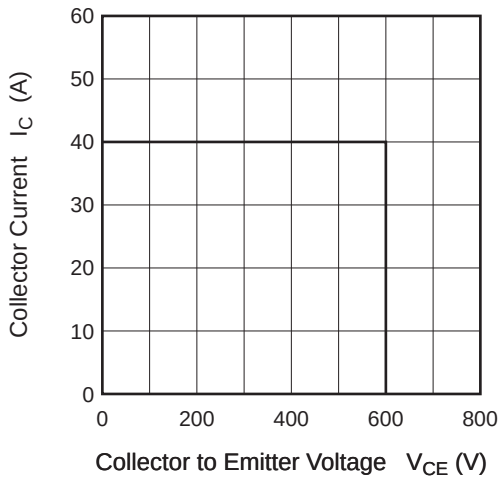
Maximum DC Collector Current vs. Case Temperature



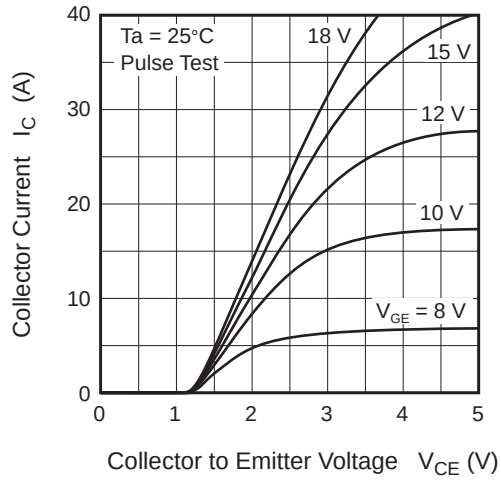
Maximum Safe Operation Area



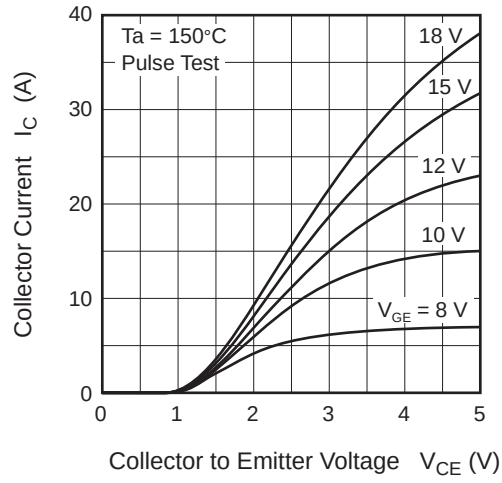
Turn-off SOA



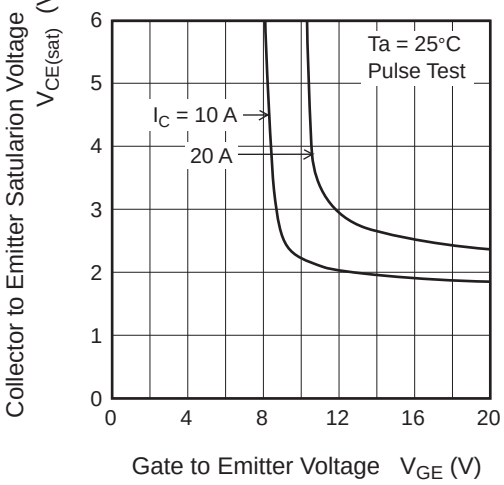
IGBT Output Characteristics (Typical)



IGBT Output Characteristics (Typical)



Collector to Emitter Satularion Voltage vs.
Gate to Emitter Voltage (Typical)



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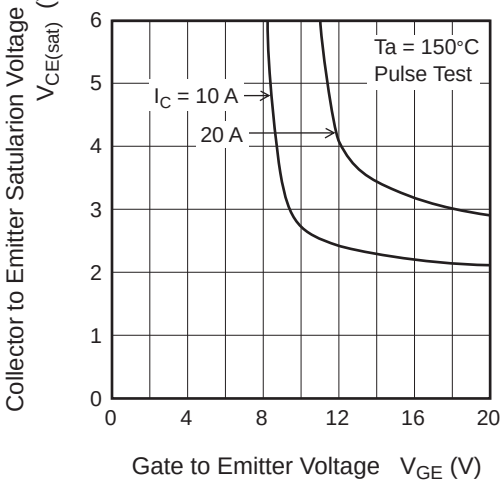
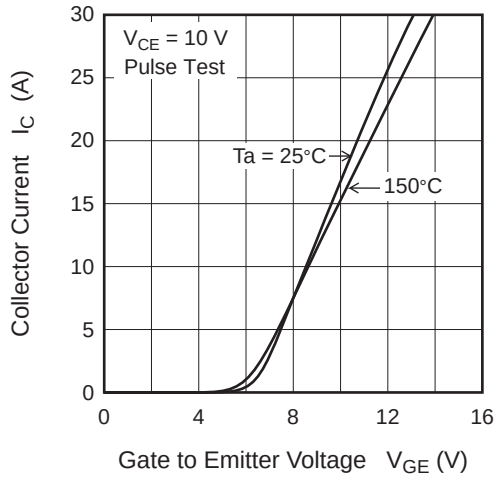
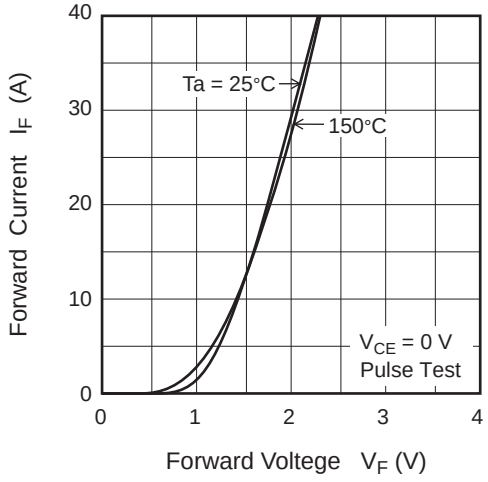


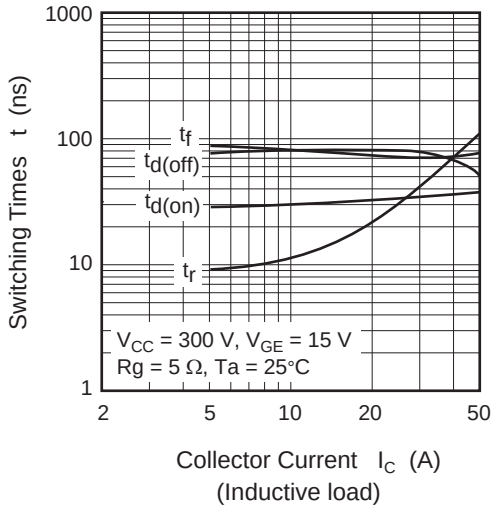
Transfer Characteristics (Typical)



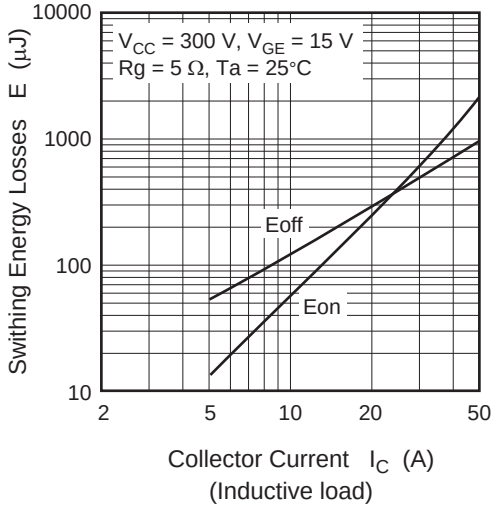
Diode Forward Characteristics (Typical)



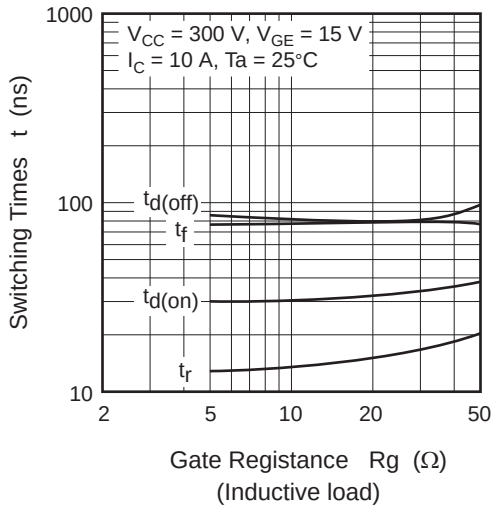
Switching Characteristics (Typical) (1)



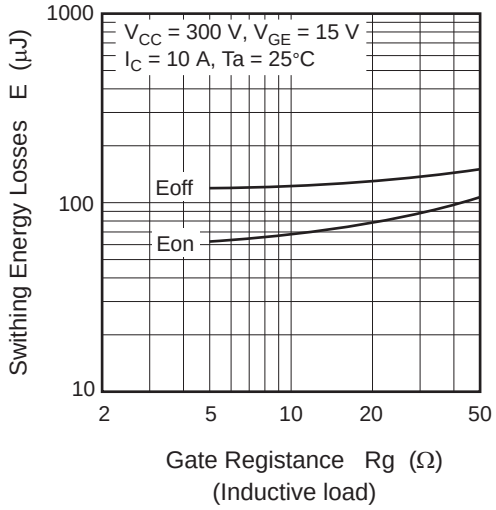
Switching Characteristics (Typical) (2)



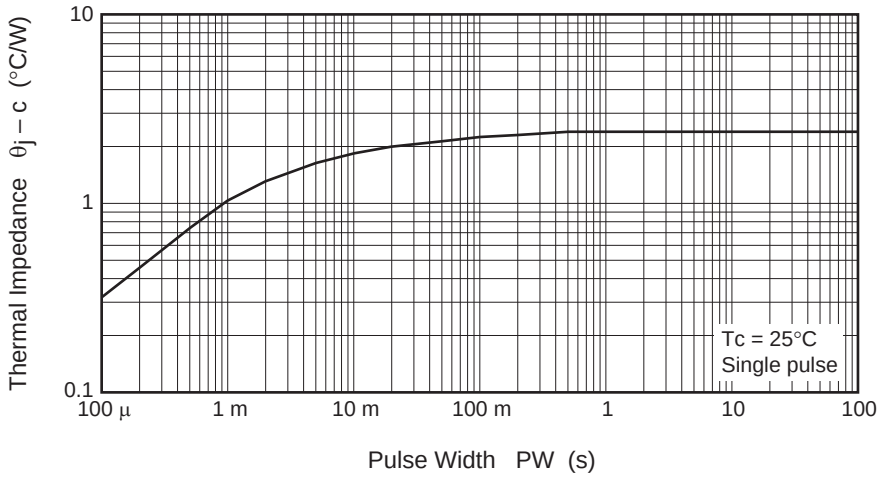
Switching Characteristics (Typical) (3)



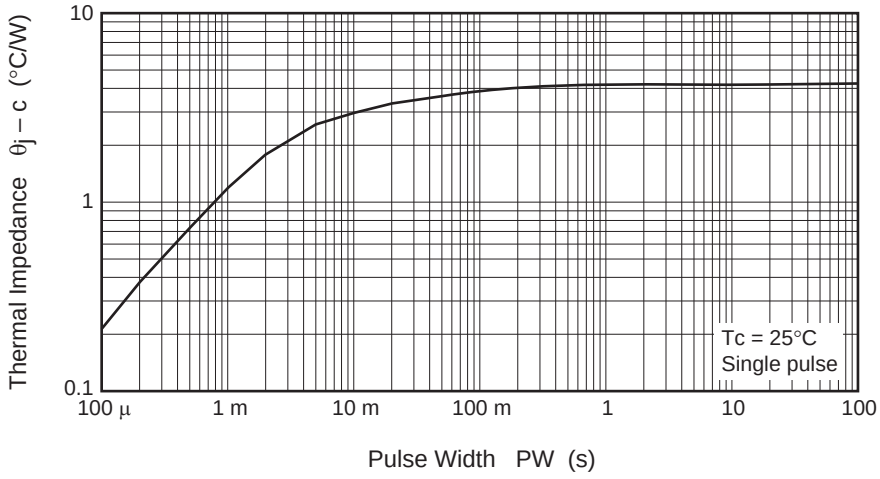
Switching Characteristics (Typical) (4)



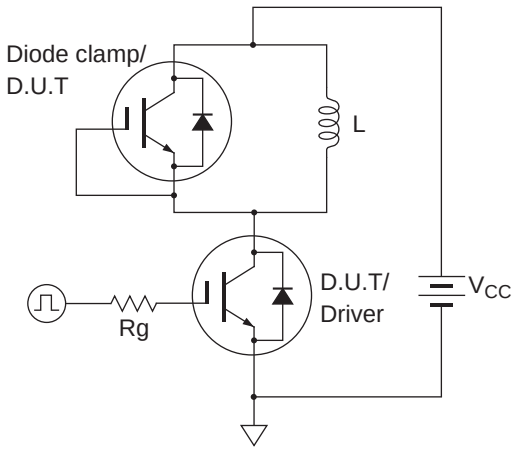
Thermal Impedance vs. Pulse Width (IGBT)



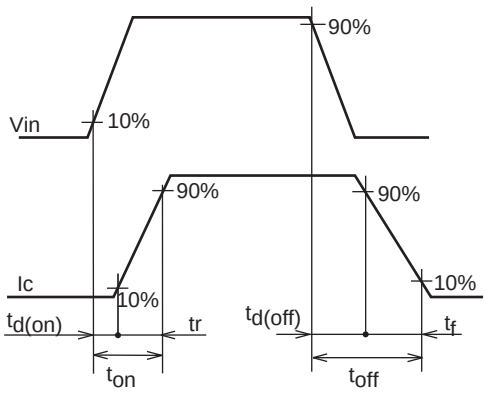
Thermal Impedance vs. Pulse Width (Diode)



Switching Time Test Circuit



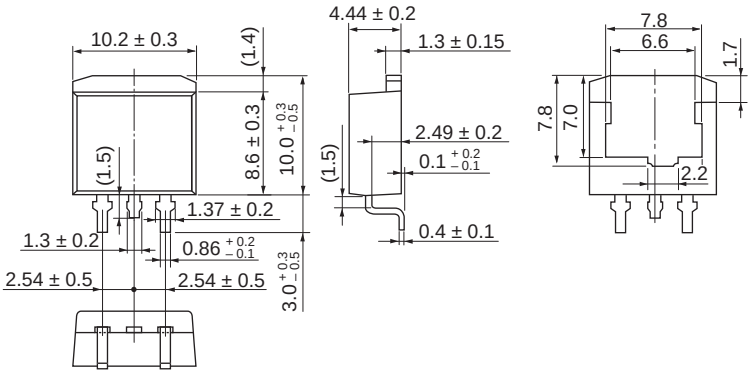
Waveform



Package Dimension

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

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJH60D1DPE-00-J3	1000 pcs	Taping

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