

RJH60V3BDPP-M0

600V - 17A - IGBT

Application: Inverter

R07DS0761EJ0100

Rev.1.00

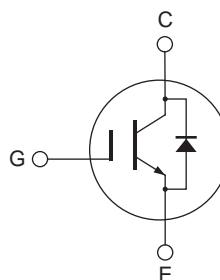
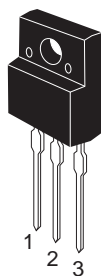
May 25, 2012

Features

- Short circuit withstand time (6 μ s typ.)
- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.6$ V typ. (at $I_C = 17$ A, $V_{GE} = 15$ V, $T_a = 25^\circ\text{C}$)
- Built in fast recovery diode (25 ns typ.) in one package
- Trench gate and thin wafer technology
- High speed switching
 $t_f = 75$ ns typ. (at $V_{CC} = 300$ V, $V_{GE} = 15$ V, $I_C = 17$ A, $R_g = 5 \Omega$, $T_a = 25^\circ\text{C}$, 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	35	A
	$T_c = 100^\circ\text{C}$	I_C	17	A
Collector peak current	$i_{c(peak)}$ ^{Note1}	70	A	
Collector to emitter diode forward current	i_{DF}	17	A	
Collector to emitter diode forward peak current	$i_{DF(peak)}$ ^{Note1}	70	A	
Collector dissipation	P_C ^{Note2}	40	W	
Junction to case thermal resistance (IGBT)	θ_{j-c} ^{Note2}	3.15	$^\circ\text{C} / \text{W}$	
Junction to case thermal resistance (Diode)	θ_{j-cd} ^{Note2}	2.5	$^\circ\text{C} / \text{W}$	
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 $T_c = 25^\circ\text{C}$

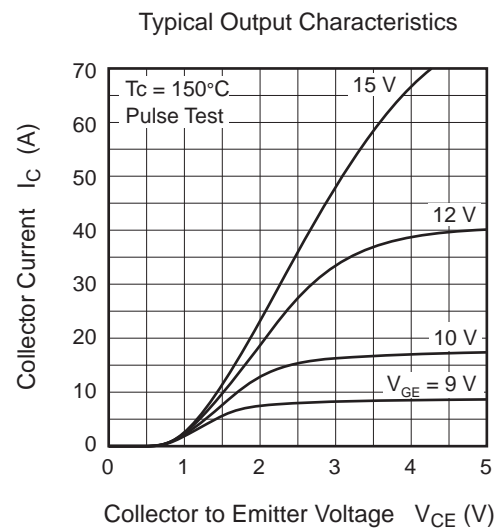
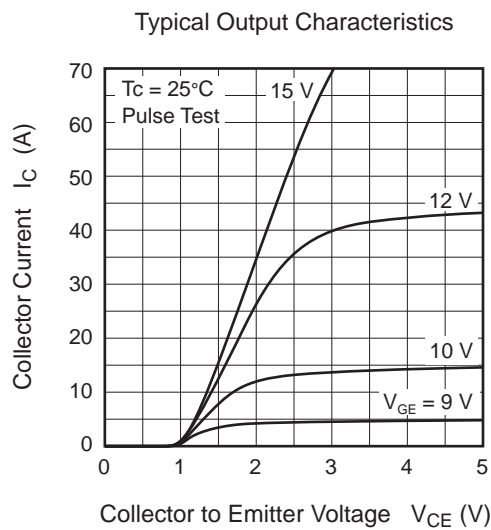
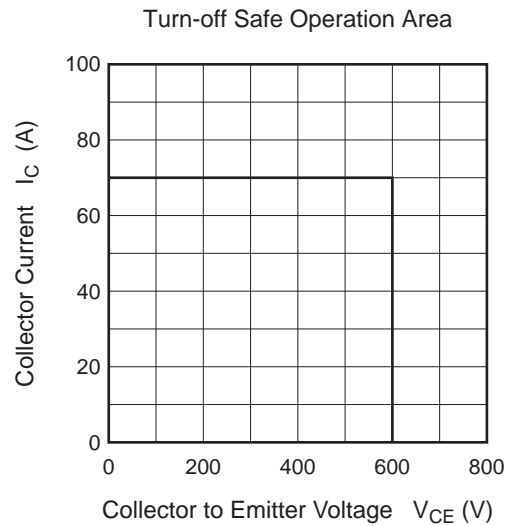
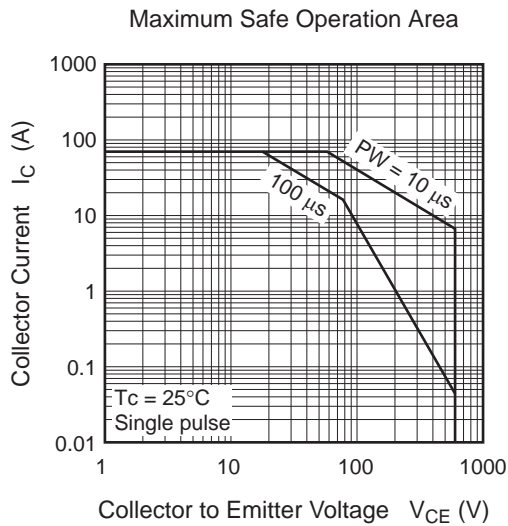
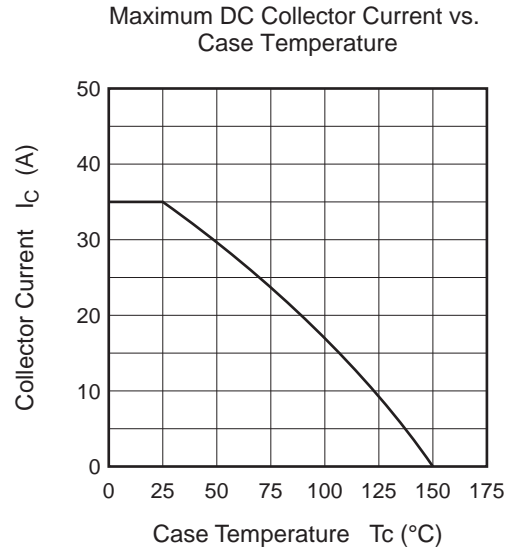
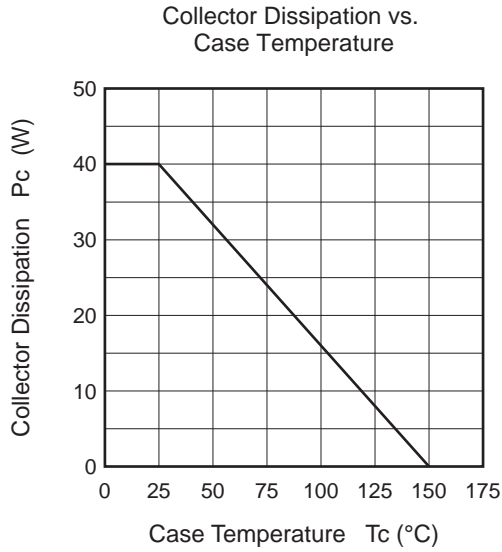
Electrical Characteristics

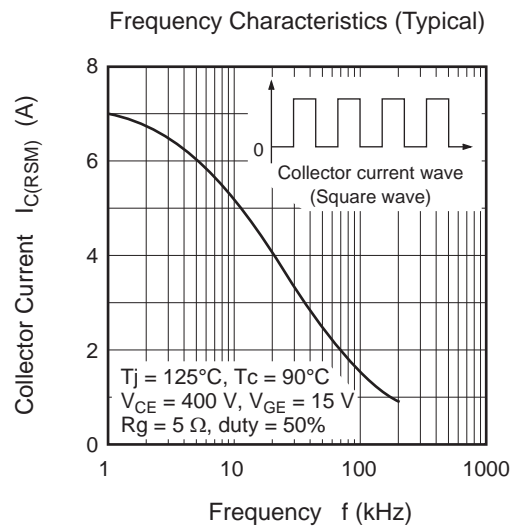
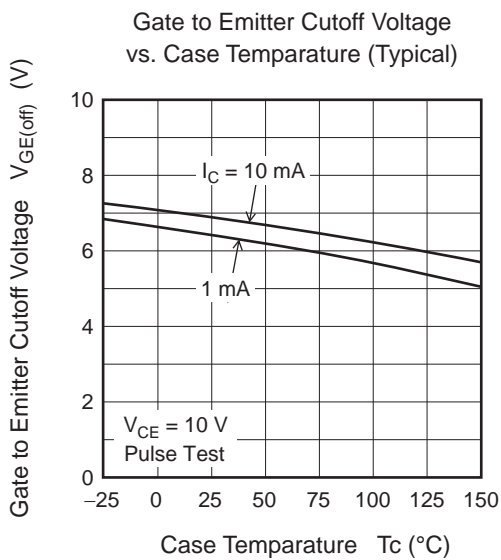
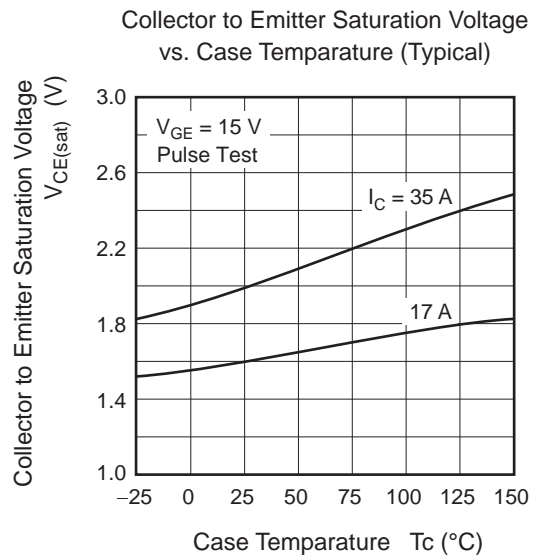
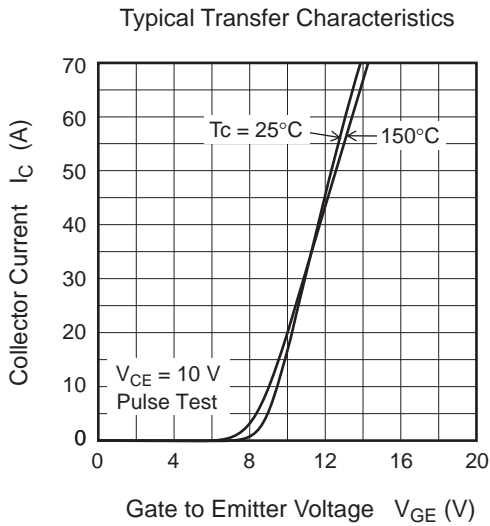
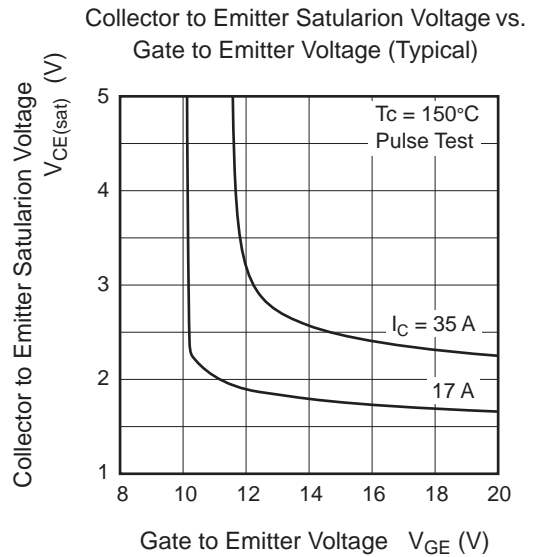
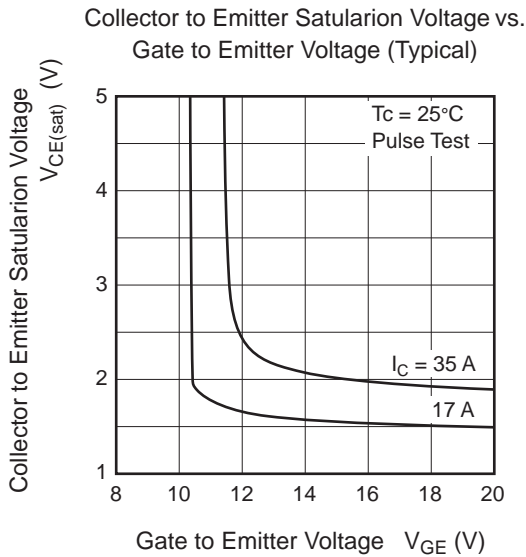
(Ta = 25°C)

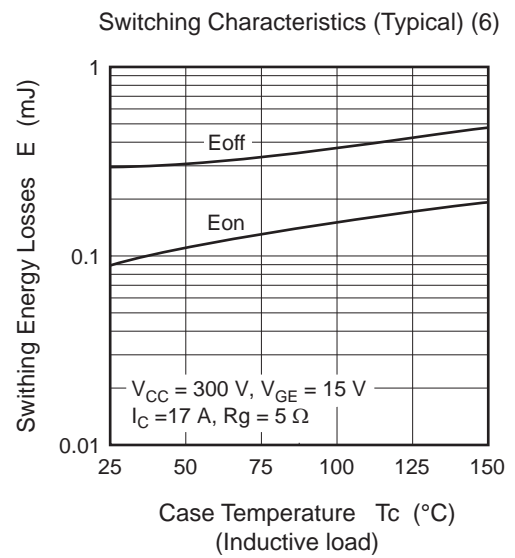
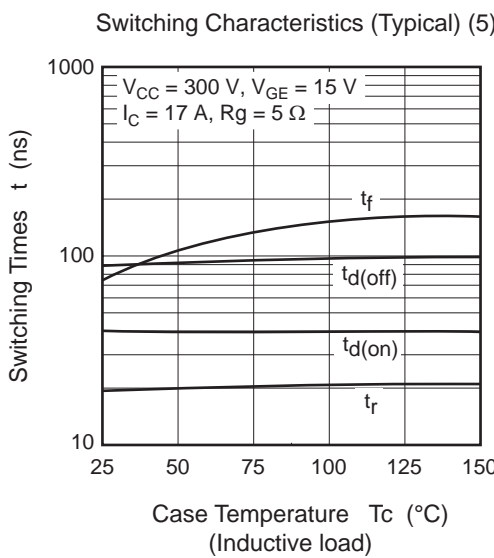
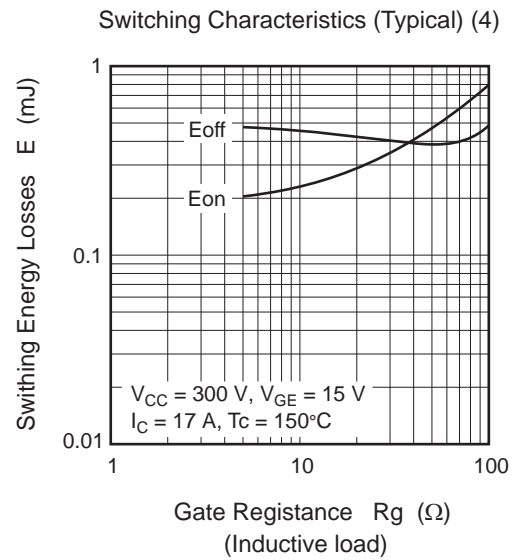
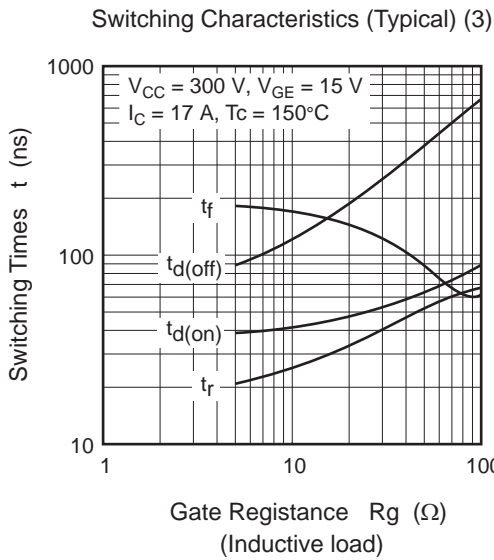
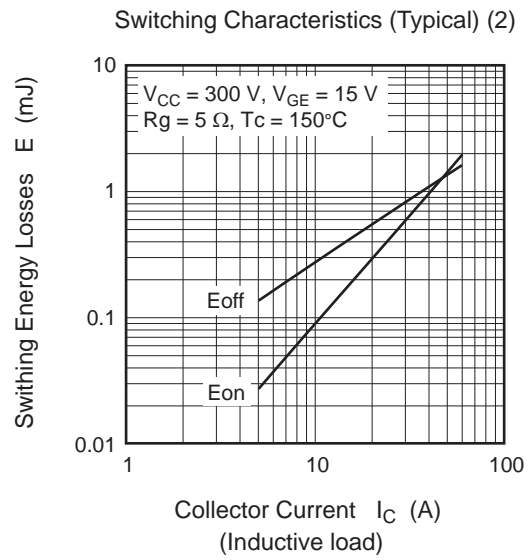
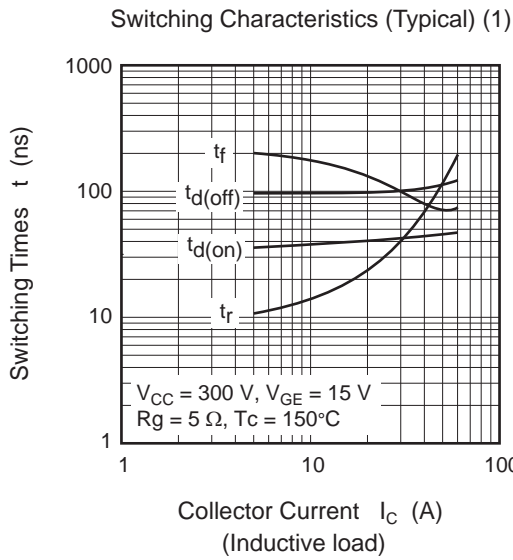
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to emitter breakdown voltage	$V_{(BR)CES}$	600	—	—	V	$I_C = 10 \mu A, V_{GE} = 0$
Zero gate voltage collector current / Diode reverse current	I_{CES} / I_R	—	—	5	μA	$V_{CE} = 600 V, V_{GE} = 0$
Gate to emitter leak current	I_{GES}	—	—	± 1	μA	$V_{GE} = \pm 30 V, V_{CE} = 0$
Gate to emitter cutoff voltage	$V_{GE(off)}$	5.5	—	7.5	V	$V_{CE} = 10 V, I_C = 1 mA$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.6	2.2	V	$I_C = 17 A, V_{GE} = 15 V$ ^{Note3}
	$V_{CE(sat)}$	—	2.0	—	V	$I_C = 35 A, V_{GE} = 15 V$ ^{Note3}
Input capacitance	C_{ies}	—	880	—	pF	$V_{CE} = 25 V$
Output capacitance	C_{oes}	—	60	—	pF	$V_{GE} = 0$
Reverse transfer capacitance	C_{res}	—	35	—	pF	$f = 1 MHz$
Total gate charge	Q_g	—	60	—	nC	$V_{GE} = 15 V$
Gate to emitter charge	Q_{ge}	—	9	—	nC	$V_{CE} = 300 V$
Gate to collector charge	Q_{gc}	—	35	—	nC	$I_C = 17 A$
Turn-on delay time	$t_{d(on)}$	—	40	—	ns	$V_{CC} = 300 V$
Rise time	t_r	—	20	—	ns	$V_{GE} = 15 V$
Turn-off delay time	$t_{d(off)}$	—	90	—	ns	$I_C = 17 A$
Fall time	t_f	—	75	—	ns	$R_g = 5 \Omega$
Turn-on energy	E_{on}	—	0.09	—	mJ	Inductive load
Turn-off energy	E_{off}	—	0.30	—	mJ	
Total switching energy	E_{total}	—	0.39	—	mJ	
Short circuit withstand time	t_{sc}	3	6	—	μs	$T_C = 100 ^\circ C$ $V_{GC} \leq 360 V, V_{GE} = 15 V$
FRD forward voltage	V_F	—	2.8	—	V	$I_F = 17 A$ ^{Note3}
FRD reverse recovery time	t_{rr}	—	25	—	ns	$I_F = 17 A$
FRD reverse recovery charge	Q_{rr}	—	0.02	—	μC	$di_F/dt = 100 A/\mu s$
FRD peak reverse recovery current	I_{rr}	—	1.2	—	A	

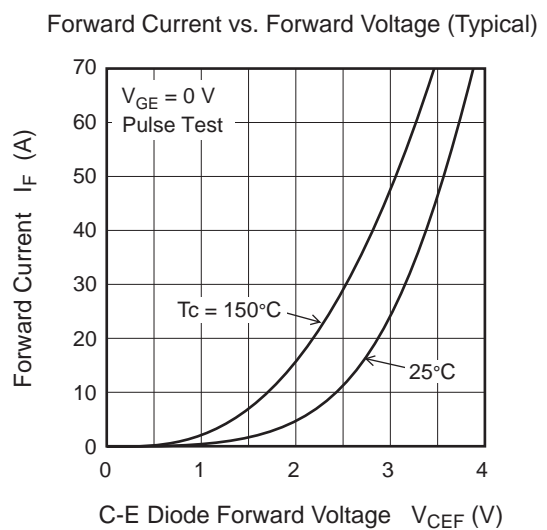
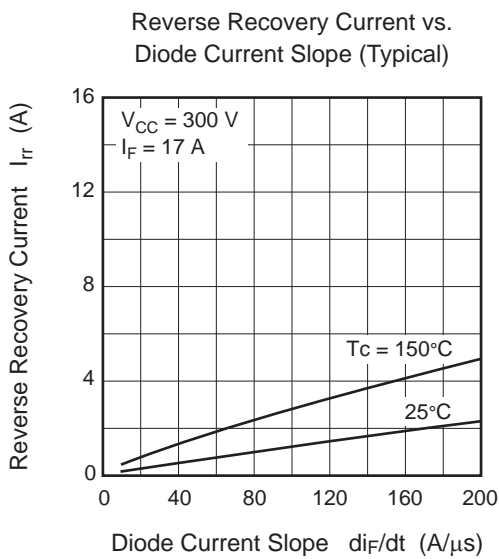
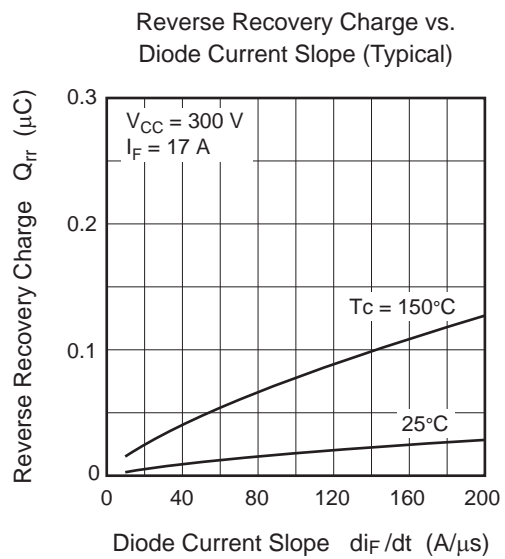
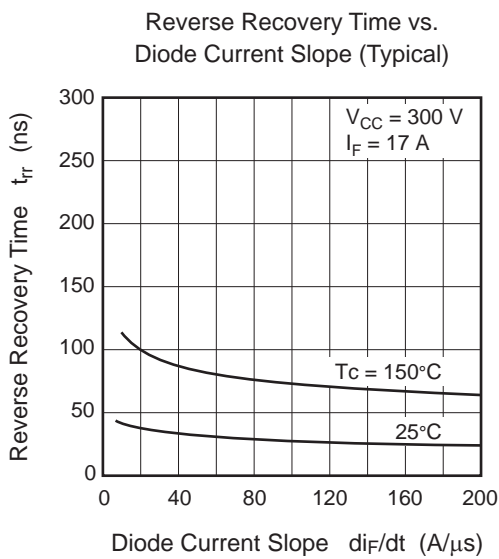
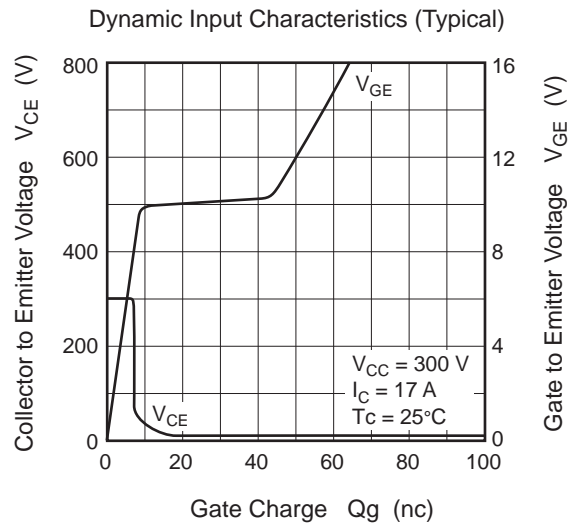
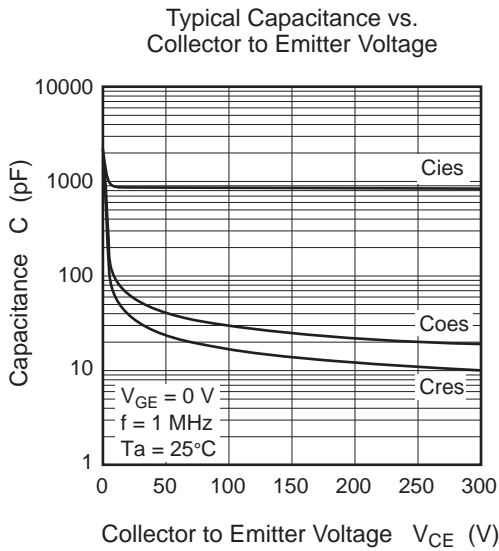
Notes: 3. Pulse test.

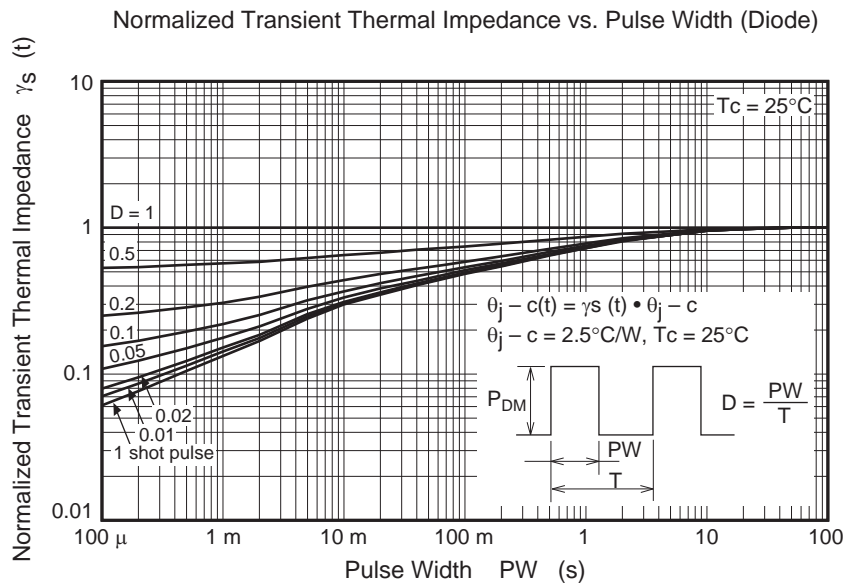
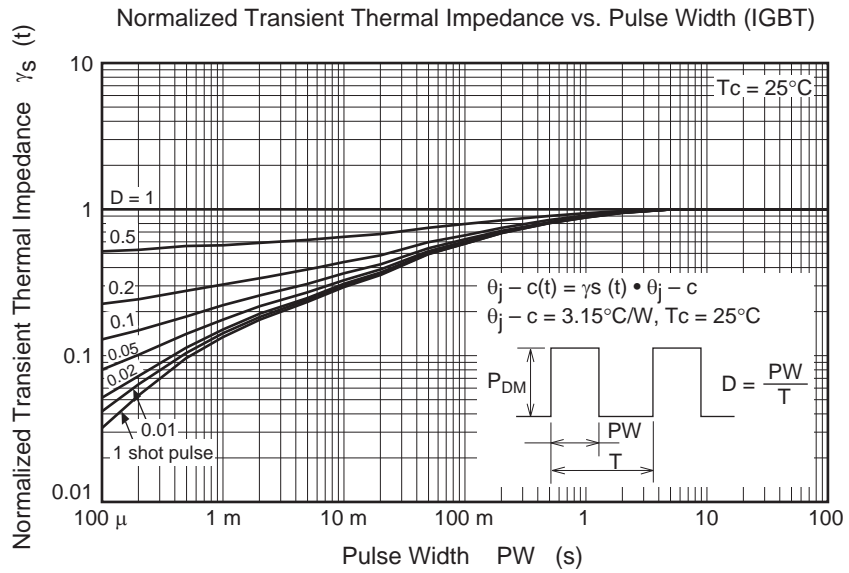
Main Characteristics



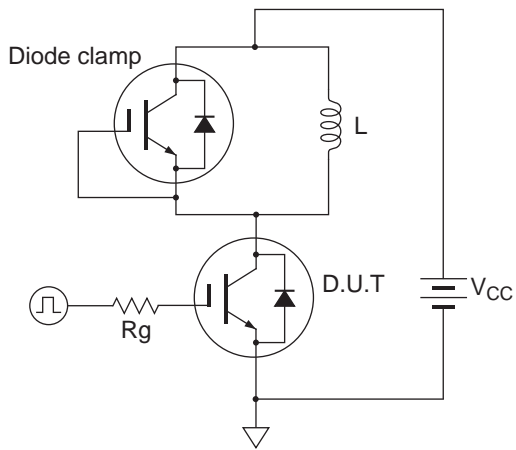




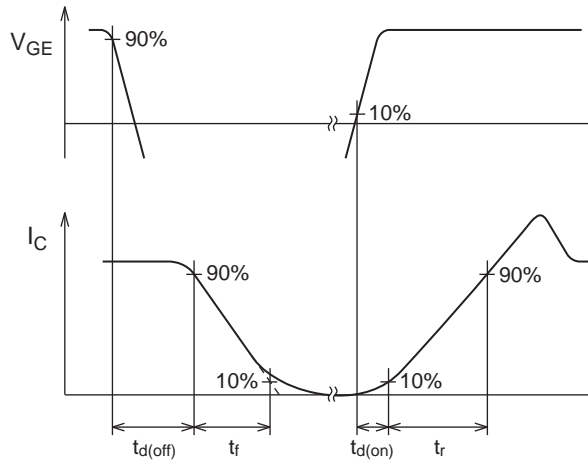




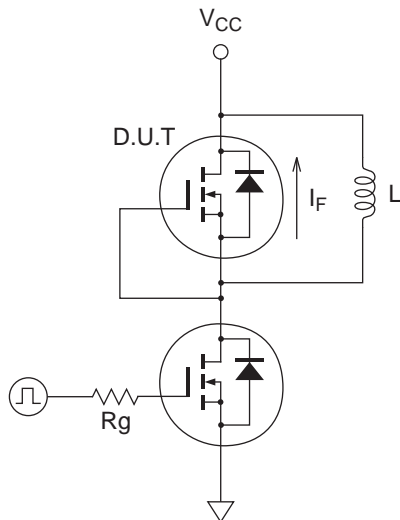
Switching Time Test Circuit



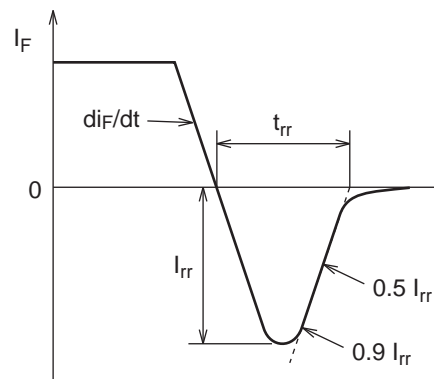
Waveform



Diode Reverse Recovery Time Test Circuit



Waveform



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