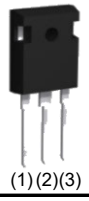
RGC80TSX8R

1800V 40A Field Stop Trench IGBT Datasheet

V_{CES}	1800V
$I_{C\ (100°C)}$	40A
$V_{CE(sat)\ (Typ.)}$	2.2V
P_D	535W

●Outline

TO-247N



●Features

1) Low Collector - Emitter Saturation Voltage

2) High Speed Switching

3) Low Switching Loss & Soft Switching

4) Monolithic Body Diode
with Low Forward Voltage

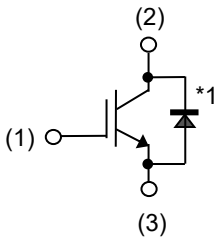
5) Pb - free Lead Plating ; RoHS Compliant

●Application

Voltage - resonance Inverter

IH

●Inner Circuit



(1) Gate
(2) Collector
(3) Emitter

*1 Monolithic Body Diode

●Packaging Specifications

Type	Packaging	Tube
	Reel Size (mm)	-
	Tape Width (mm)	-
	Basic Ordering Unit (pcs)	450
	Packing Code	C11
	Marking	RGC80TSX8R

●Absolute Maximum Ratings (at T_C = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Collector - Emitter Voltage		V_{CES}	1800	V
Gate - Emitter Voltage		V_{GES}	±30	V
Collector Current	T_C = 25°C	I_C	80	A
	T_C = 100°C	I_C	40	A
Pulsed Collector Current		I_{CP} *1	120	A
Diode Forward Current	T_C = 25°C	I_F	80	A
	T_C = 100°C	I_F	40	A
Diode Pulsed Forward Current		I_{FP} *1	80	A
Power Dissipation	T_C = 25°C	P_D	535	W
	T_C = 100°C	P_D	267	W
Operating Junction Temperature		T_j	-40 to +175	°C
Storage Temperature		T_{stg}	-55 to +175	°C

*1 Pulse width limited by $T_{jmax.}$

●Thermal Resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal Resistance IGBT Junction - Case	$R_{\theta(j-c)}$	-	-	0.28	°C/W
Thermal Resistance Diode Junction - Case	$R_{\theta(j-c)}$	-	-	0.28	°C/W

●IGBT Electrical Characteristics (at T_j = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Collector - Emitter Breakdown Voltage	BV_{CES}	I_C = 10μA, V_{GE} = 0V	1800	-	-	V
Collector Cut - off Current	I_{CES}	V_{CE} = 1860V, V_{GE}= 0V	-	-	10	μA
Gate - Emitter Leakage Current	I_{GES}	V_{GE} = ±30V, V_{CE} = 0V	-	-	±200	nA
Gate - Emitter Threshold Voltage	$V_{GE(th)}$	V_{CE} = 5V, I_C = 120.7mA	5.0	6.0	7.0	V
Collector - Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 40A, V_{GE} = 15V				V
		T_j = 25°C	-	2.2	5.0	
		T_j = 175°C	-	2.9	-	

●**IGBT Electrical Characteristics** (at T_j = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{ies}	V_{CE} = 30V	-	9550	-	pF
Output Capacitance	C_{oes}	V_{GE} = 0V	-	115	-	
Reverse transfer Capacitance	C_{res}	f = 1MHz	-	102	-	
Total Gate Charge	Q_g	V_{CE} = 600V	-	468	-	nC
Gate - Emitter Charge	Q_{ge}	I_C = 40A	-	93	-	
Gate - Collector Charge	Q_{gc}	V_{GE} = 15V	-	155	-	
Turn - on Delay Time	$t_{d(on)}$	I_C = 40A, V_{CC} = 600V, V_{GE} = 15V, R_G = 10Ω, T_j = 25°C Inductive Load *E_{on} include diode reverse recovery	-	80	-	ns
Rise Time	t_r		-	53	-	
Turn - off Delay Time	$t_{d(off)}$		-	565	-	
Fall Time	t_f		-	55	-	
Turn - on Switching Loss	E_{on}		-	1.85	-	mJ
Turn - off Switching Loss	E_{off}		-	1.60	2.15	
Turn - on Delay Time	$t_{d(on)}$	I_C = 40A, V_{CC} = 600V, V_{GE} = 15V, R_G = 10Ω, T_j = 175°C Inductive Load *E_{on} include diode reverse recovery	-	68	-	ns
Rise Time	t_r		-	52	-	
Turn - off Delay Time	$t_{d(off)}$		-	670	-	
Fall Time	t_f		-	55	-	
Turn - on Switching Loss	E_{on}		-	1.95	-	mJ
Turn - off Switching Loss	E_{off}		-	2.00	-	

●**FRD Electrical Characteristics** (at T_j = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	V_F	I_F = 40A, V_{GE} = 0V T_j = 25°C	-	1.8	2.3	V
		T_j = 175°C	-	2.4	-	

●Electrical Characteristic Curves

Fig.1 Power Dissipation vs. Case Temperature

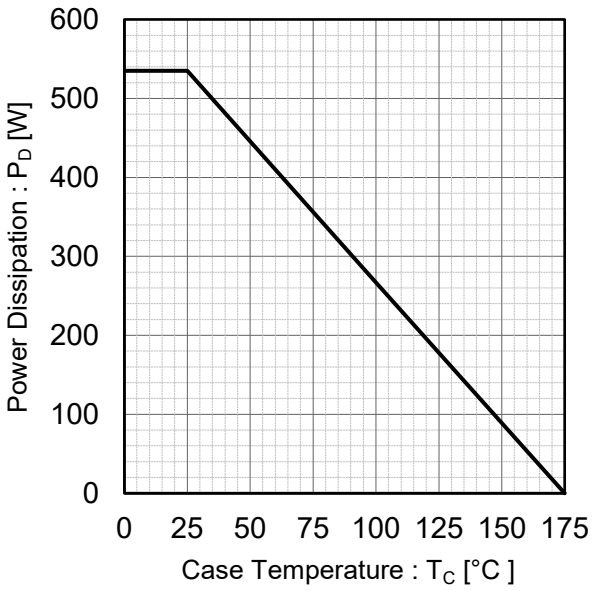


Fig.2 Collector Current vs. Case Temperature

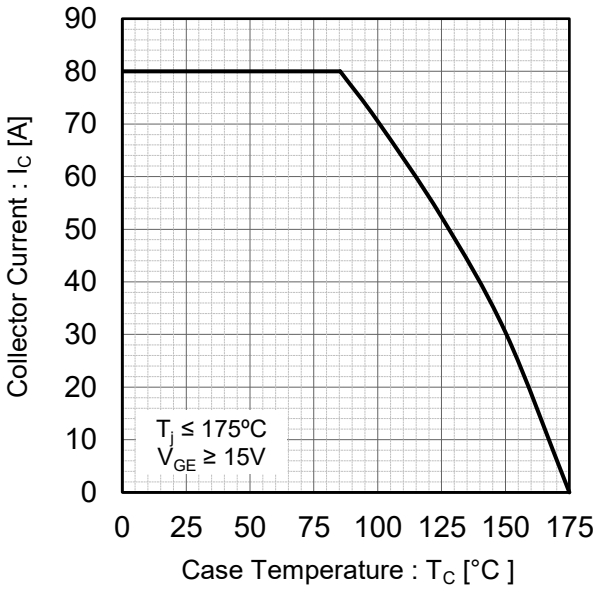


Fig.3 Forward Bias Safe Operating Area

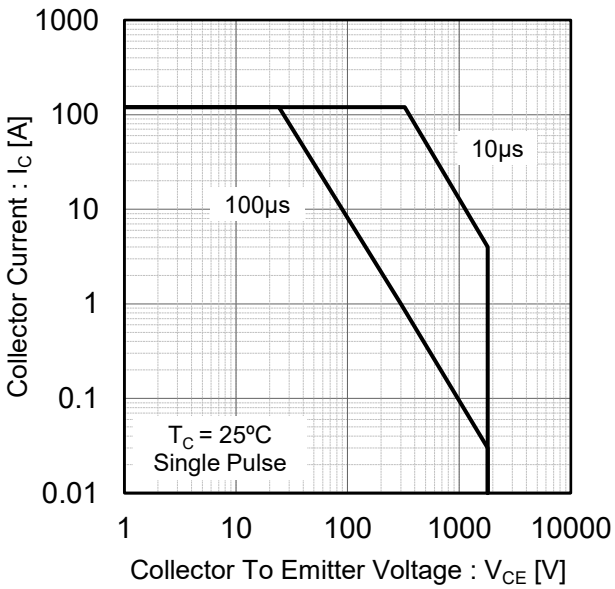
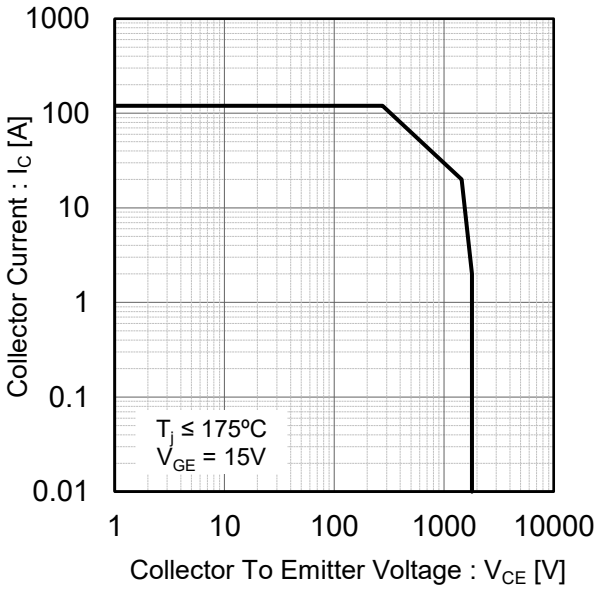


Fig.4 Reverse Bias Safe Operating Area



●Electrical Characteristic Curves

Fig.5 Typical Output Characteristics

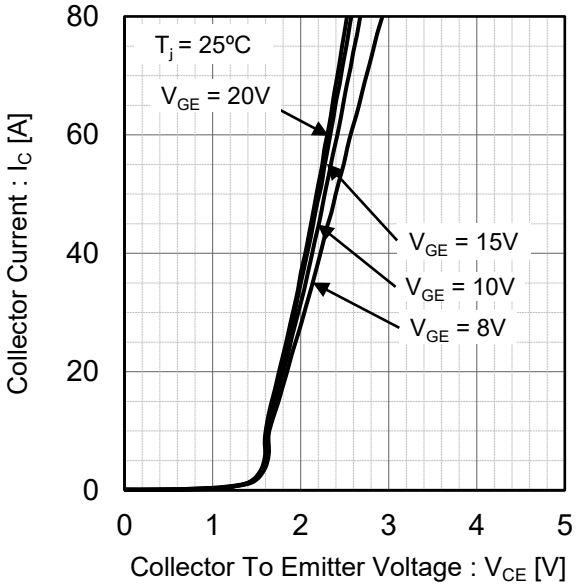


Fig.6 Typical Output Characteristics

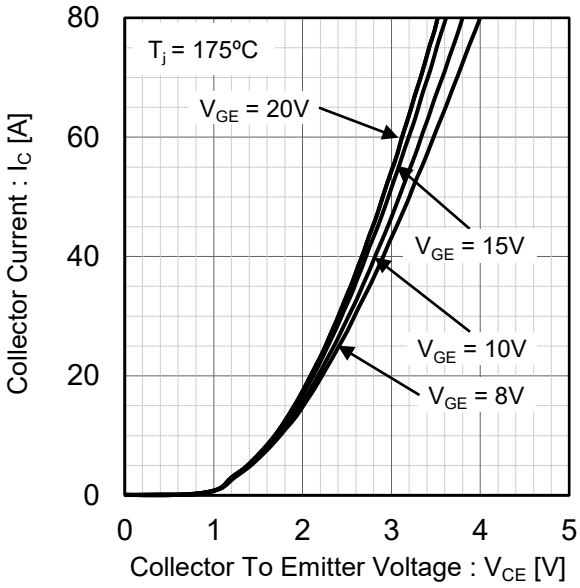


Fig.7 Typical Transfer Characteristics

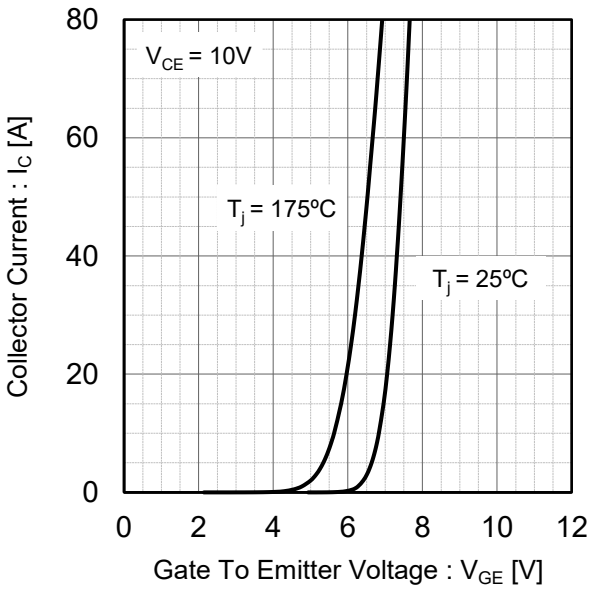
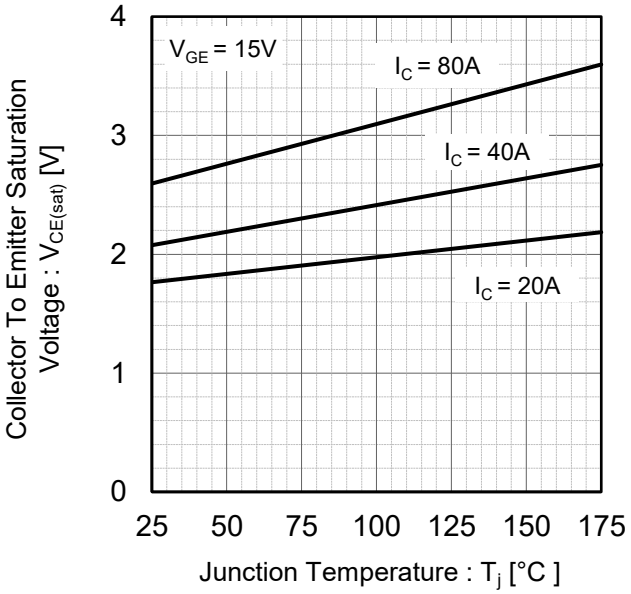


Fig.8 Typical Collector to Emitter Saturation Voltage vs. Junction Temperature



●Electrical Characteristic Curves

Fig.9 Typical Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage

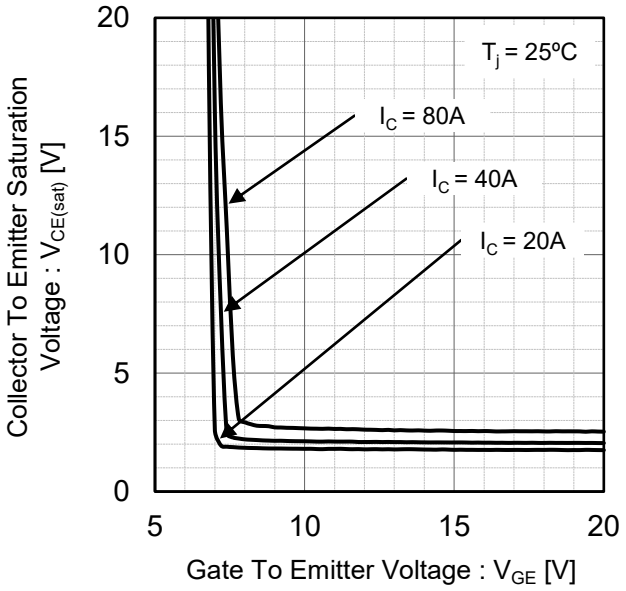


Fig.10 Typical Collector to Emitter Saturation Voltage vs. Gate to Emitter Voltage

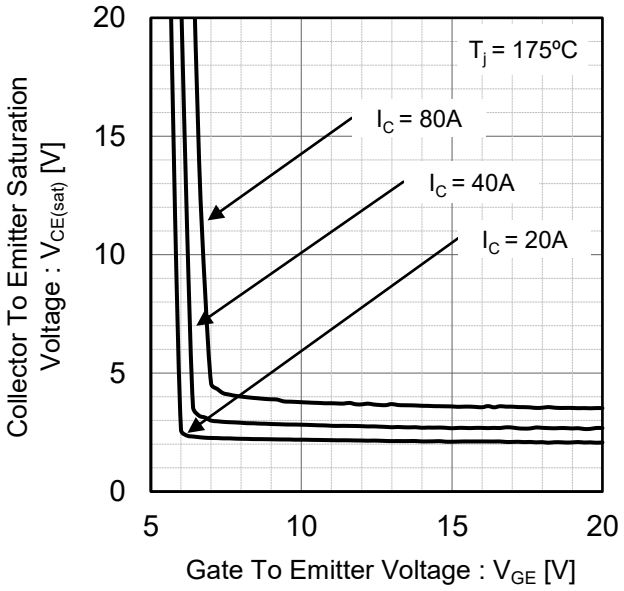


Fig.11 Typical Switching Time vs. Collector Current

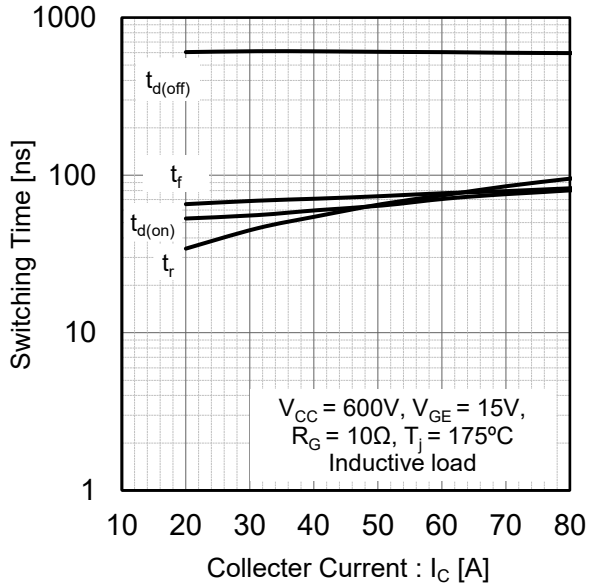
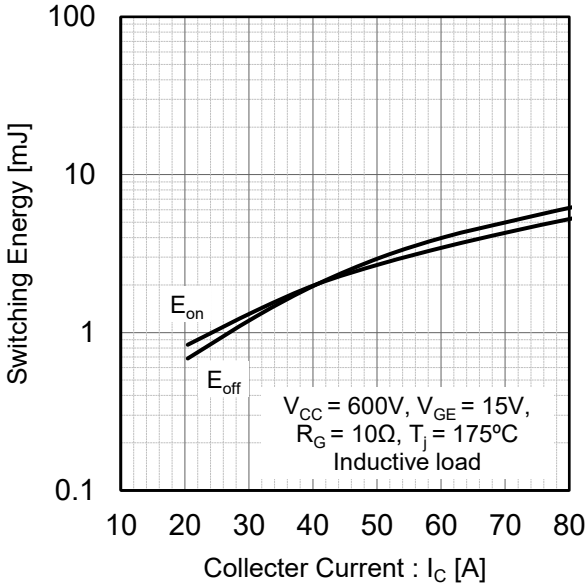


Fig.12 Typical Switching Energy Losses vs. Collector Current



●Electrical Characteristic Curves

Fig.13 Typical Capacitance vs. Collector to Emitter Voltage

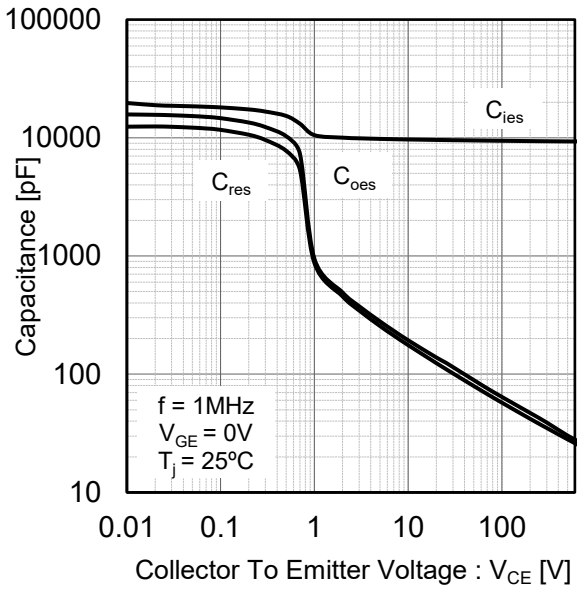


Fig.14 Typical Gate Charge

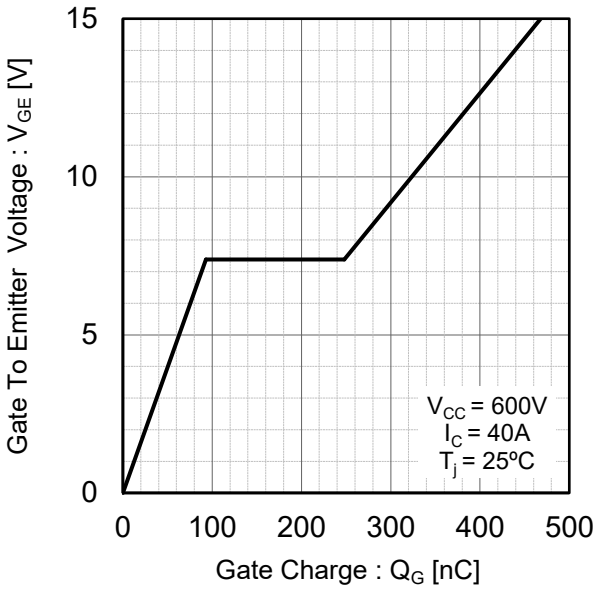
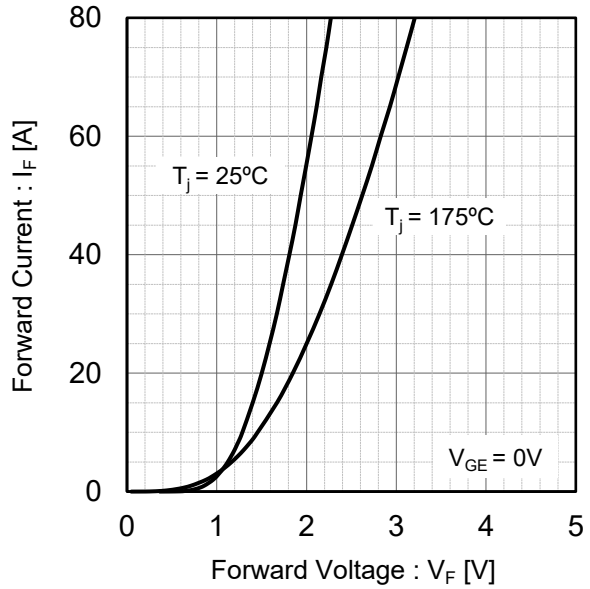
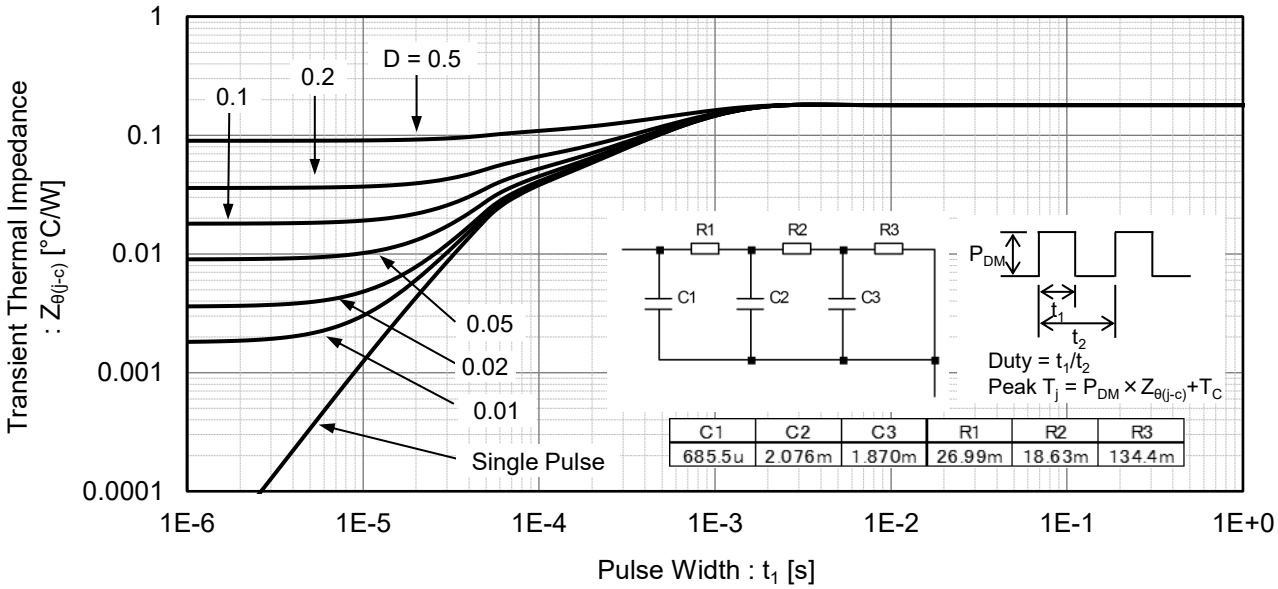


Fig.15 Typical Diode Forward Current vs. Forward Voltage



●Electrical Characteristic Curves

Fig.16 Typical Transient Thermal Impedance



C1	C2	C3	R1	R2	R3
685.5u	2.076m	1.870m	26.99m	18.63m	134.4m

●Inductive Load Switching Circuit and Waveform

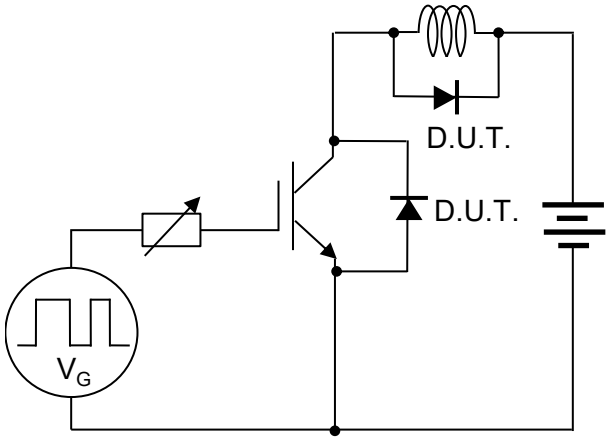


Fig.17 Inductive Load Circuit

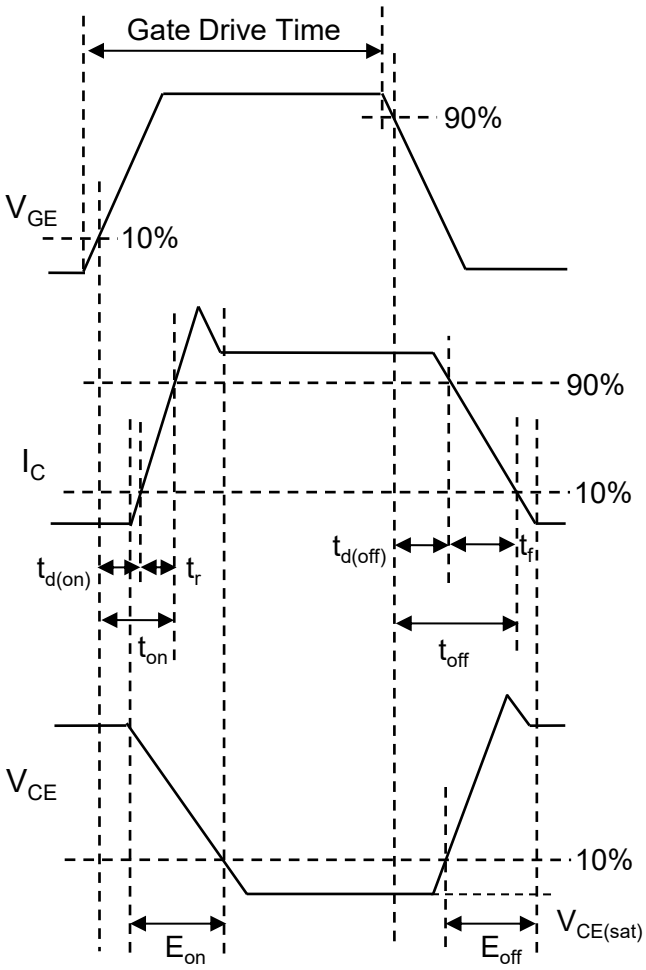


Fig.18 Inductive Load Waveform

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