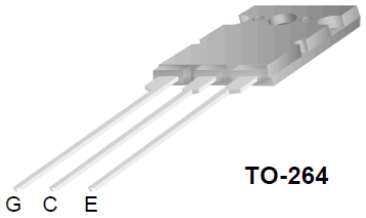
IGBT

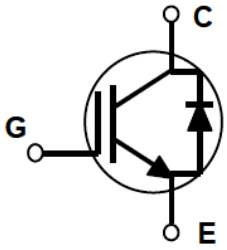
Features

- 1200V,75A
- $V_{CE(sat)(typ.)}$= 1.9V@V_{GE}= 15V,I_C= 75A
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms



General Description

JIAEN Trench IGBTs offer lower losses and higher energy efficiency for application such as induction heating，UPS, AC & DC motor controls and general purpose inverter .



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Continuous Collector Current (T_C=25℃)	115	A
	Continuous Collector Current (T_C=100℃)	75	A
I_{CM}	Pulsed Collector Current (Note 1)	230	A
I_F	Diode Continuous Forward Current (T_C=100℃)	75	A
I_{FM}	Diode Maximum Forward Current (Note 1)	250	A
t_{sc}	Short Circuit Withstand Time VGE=15V, Vcc≤960V, Tj≤150℃	10	us
P_D	Maximum Power Dissipation (T_C=25℃)	625	W
	Maximum Power Dissipation (T_C=100℃)	250	W
T_J	Operating Junction Temperature Range	-40 to +150	℃
T_{STG}	Storage Temperature Range	-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for IGBT	0.2	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	0.4	℃/ W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	25	℃/ W

Electrical Characteristics (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE}= 0V, I_C= 250uA	1200	-	-	V
I_{CES}	Collector-Emitter Leakage Current	V_{CE}= 1200V, V_{GE}= 0V	-	-	100	uA
I_{GES}	Gate Leakage Current, Forward	V_{GE}=30V, V_{CE}= 0V	-	-	100	nA
	Gate Leakage Current, Reverse	V_{GE}= -30V, V_{CE}= 0V	-	-	-100	nA
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}= V_{CE}, I_C= 250uA	4.5	-	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C= 75A	-	1.9	2.5	V
		V_{GE}=15V, I_C= 75A Tc = 125 ℃		2.3		
		V_{GE}=15V, I_C= 75A Tc = 150 ℃		2.6		
		V_{GE}=15V, I_C= 115A		2.2		
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=15V I_C=75A R_G=10Ω Inductive Load T_C=25 ℃	-	205	-	ns
t_r	Turn-on Rise Time		-	470	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	130	-	ns
t_f	Turn-off Fall Time		-	295	-	ns
Eon	Turn-on Switching Loss		-	19.1	-	mJ
Eoff	Turn-off Switching Loss		-	6	-	mJ
Ets	Total Switching Loss		-	25.1	-	mJ
t d(on)	Turn-on Delay Time	V_{CC} =600V V_{GE} =15V I_C =75A R_G =10Ω Inductive Load T_C =125 ℃	-	190	-	ns
t r	Turn-on Rise Time			365	-	ns
t d(off)	Turn-off Delay Time		-	170	-	ns
t f	Turn-off Fall Time		-	345	-	ns
Eon	Turn-on Switching Loss		-	15.7	-	mJ
Eoff	Turn-off Switching Loss		-	7.4	-	mJ
Ets	Total Switching Loss		-	23.1	-	mJ
C_{ies}	Input Capacitance	V_{CE}=30V V_{GE}=0V f = 1MHz	-	7348	-	pF
C_{oes}	Output Capacitance		-	312	-	pF
C_{res}	Reverse Transfer Capacitance		-	38	-	pF
Qg	Total Gate Charge	V_{CC} =600V V_{GE} =15V I_C = 75A	-	270		nC
Qge	Gate-Emitter Charge		-	105		nC
Qgc	Gate-Collector Charge		-	140		nC

Notes：

1. Repetitive Rating: Pulse width limited by maximum junction temperature

Electrical Characteristics of Diode (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F= 75A	-	2.1	3.2	V
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 400V	-	530		ns
I_{rr}	Diode peak Reverse Recovery Current	I_F= 75A	-	8.5		A
Q_{rr}	Diode Reverse Recovery Charge	dI_F/dt = 200A/us	-	1890		nC

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

Tc=25 ℃

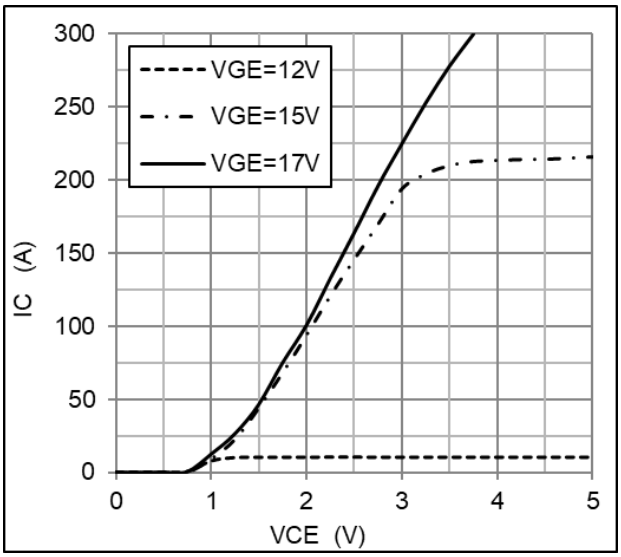


Figure 2. Typical Saturation Voltage Characteristics VG=15V

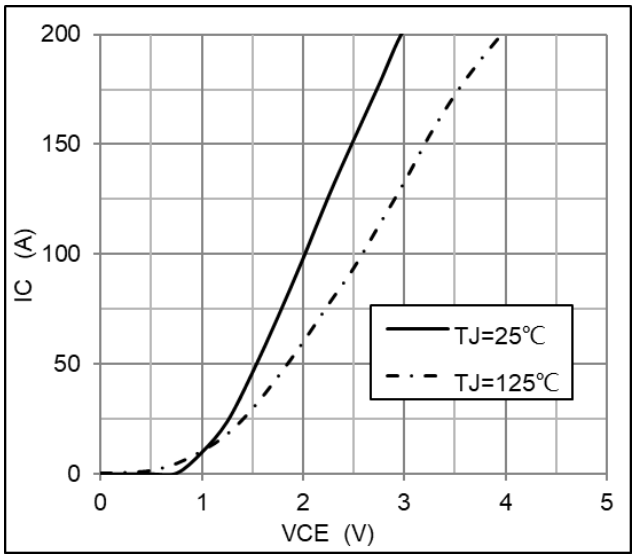


Figure 3. Saturation Voltage vs. Case Temperature at Variant Current Level

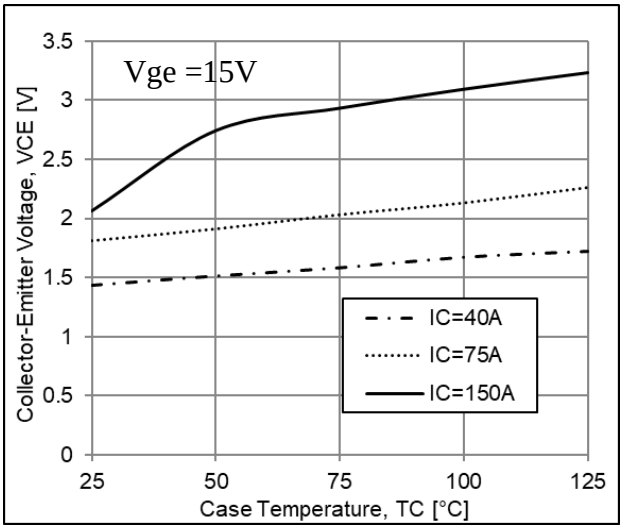


Figure 4. Forward Characteristics

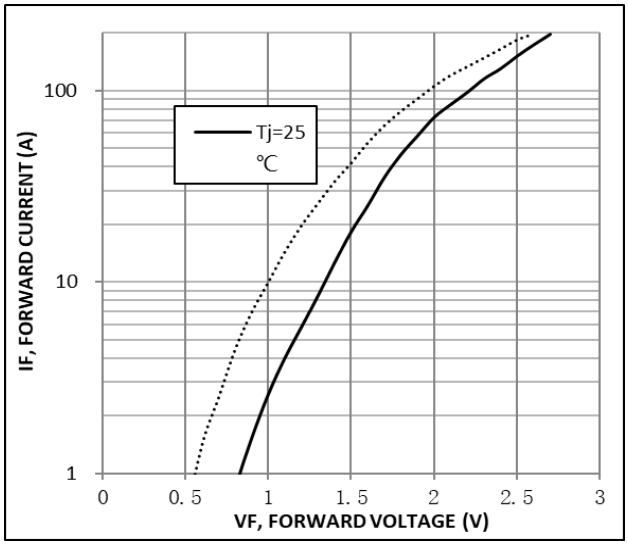


Figure 5. Saturation Voltage vs. VGE

Tc=25C

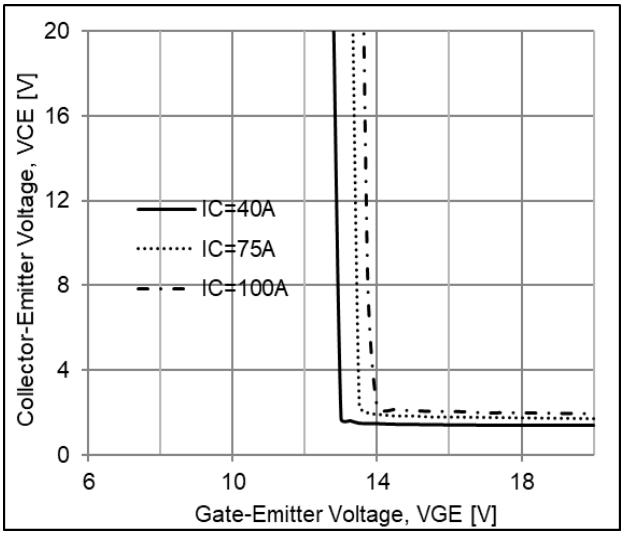


Figure 6. Saturation Voltage vs. VGE

Tc=125C

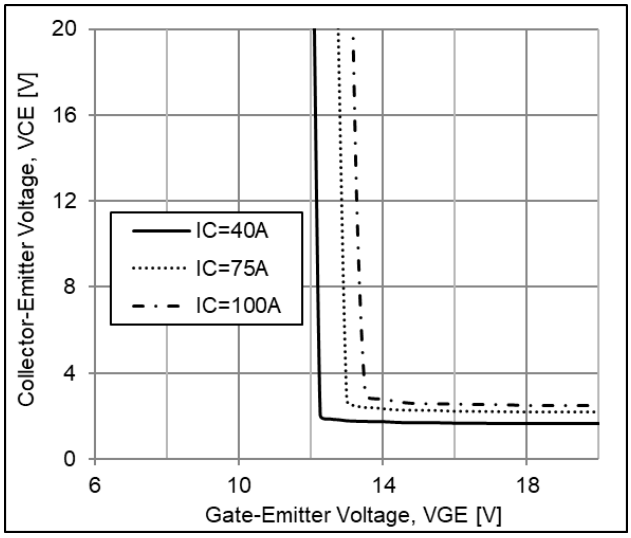


Figure 7.Switching Loss vs. Gate Resistance

（VCC=600V, VGE= ±15V, IC=75A,）

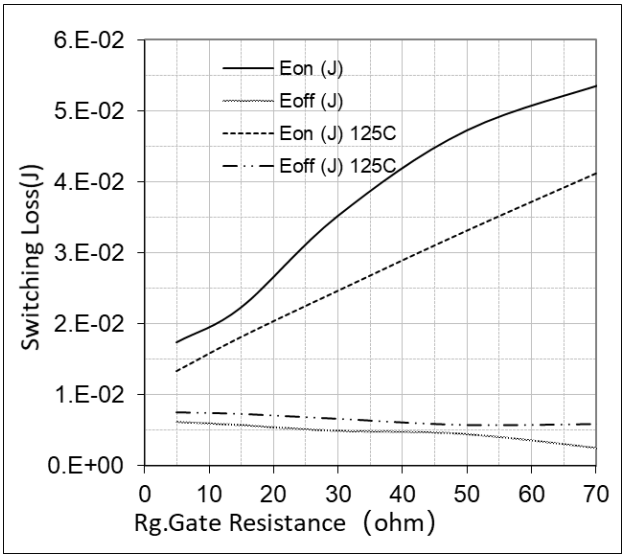


Figure 8. Turn-On Characteristics vs. Gate Resistance（VCC=600V, VGE= ±15V, IC=75A ）

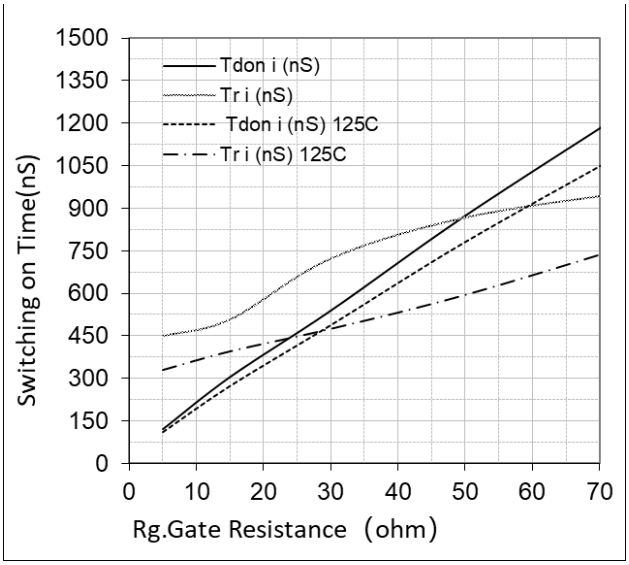


Figure 9. Turn-Off Characteristics vs. Gate Resistance（VCC=600V, VGE=±15V, IC=75A）

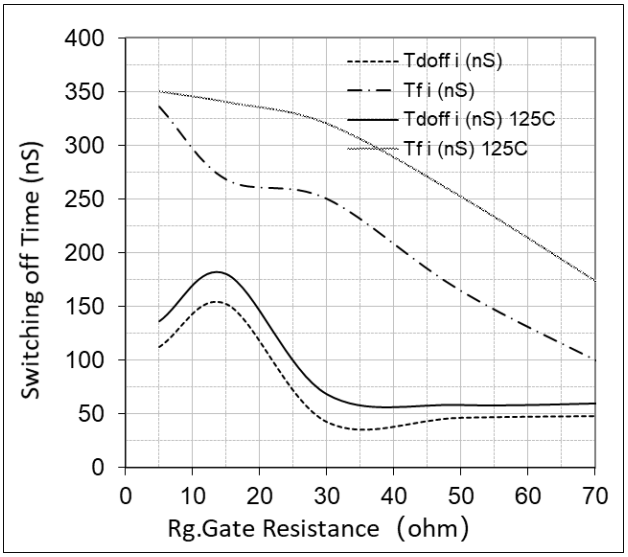


Figure 10. Switching Loss vs. Collector Current（VGE=±15V, RG= 10 ohm, VCC=600V）

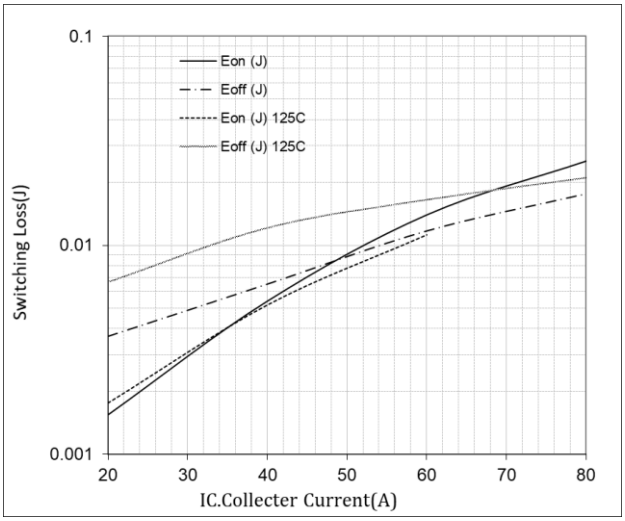


Figure 11. Turn-On Characteristics vs. Collector Current（VGE=±15V, RG=5 OHM, VCC=600V）

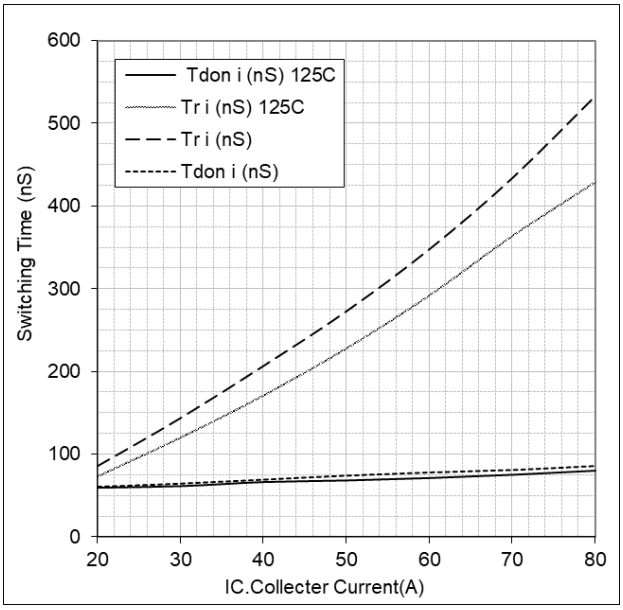


Figure 12. Turn-Off Characteristics vs. Collector Current（VGE=±15V, RG=5 OHM, VCC=600V）

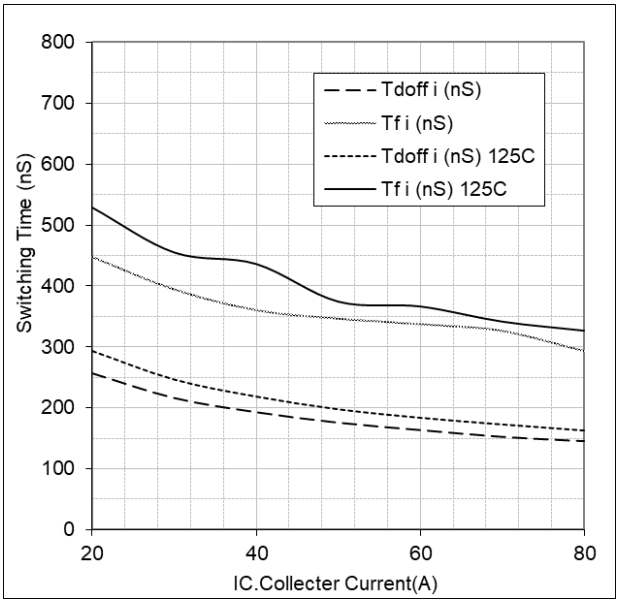


Figure 13. Gate Charge Characteristics

RL=10 ohm TC=25C ,Vcc=600, 400V 200V

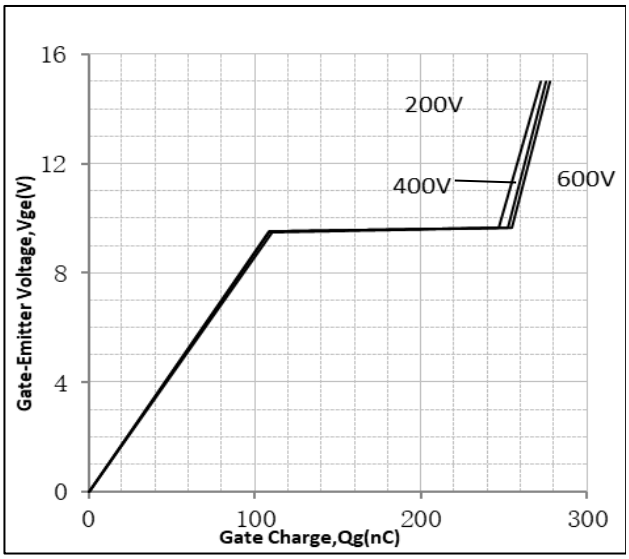


Figure 14. Reverse Recovery Current

VCC=400V, RG=10 ohm, VG=±15V IL=500uH

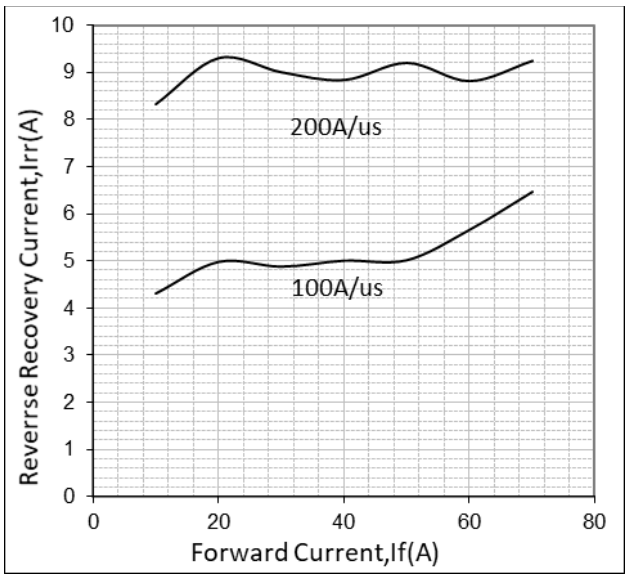


Figure 15. Stored Charge

VCC=600V, RG= 10 ohm, VG=±15V IL=500uH

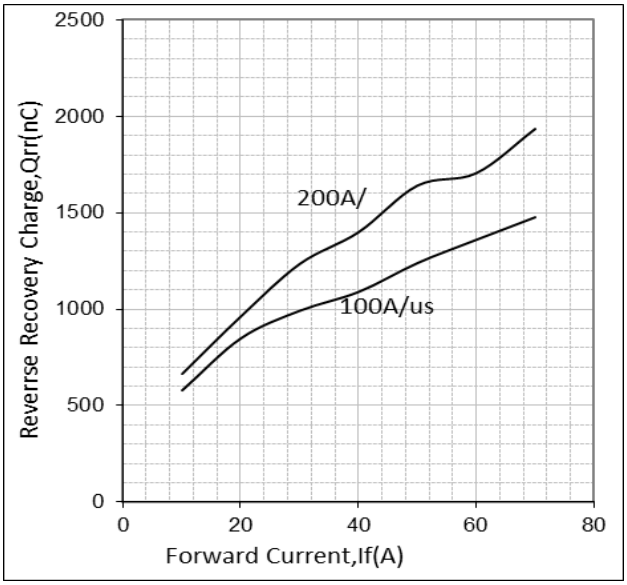


Figure 16. Reverse Recovery Time

VCC=400V, RG=10 ohm, VG=±15V IL=500uH

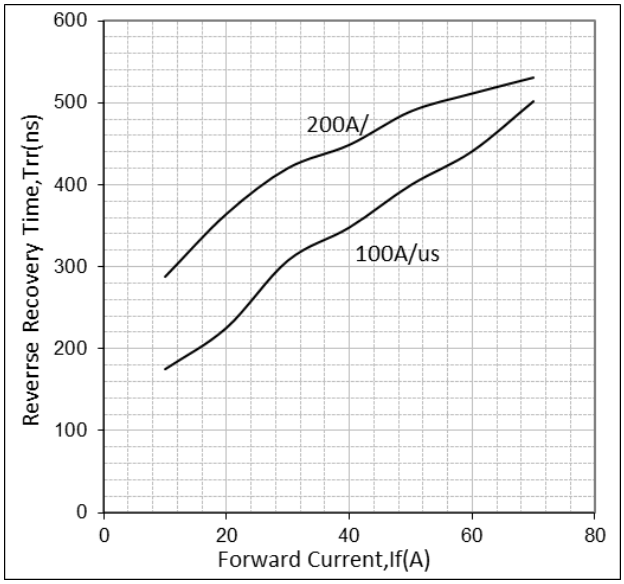


Figure 17. SOA Characteristics

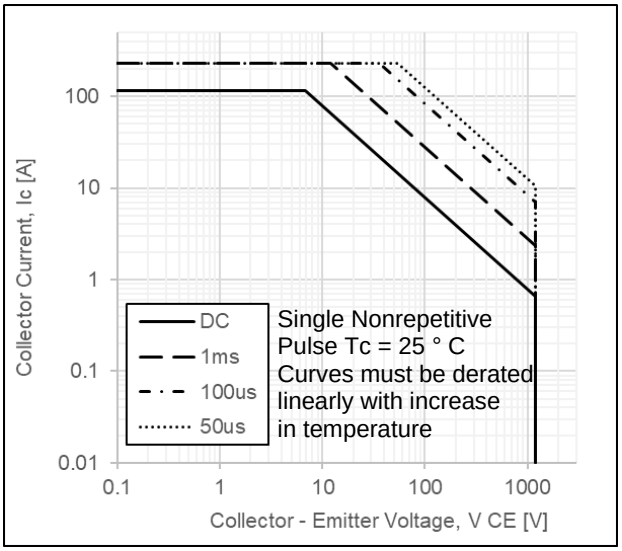


Figure 18. Turn Off SOA

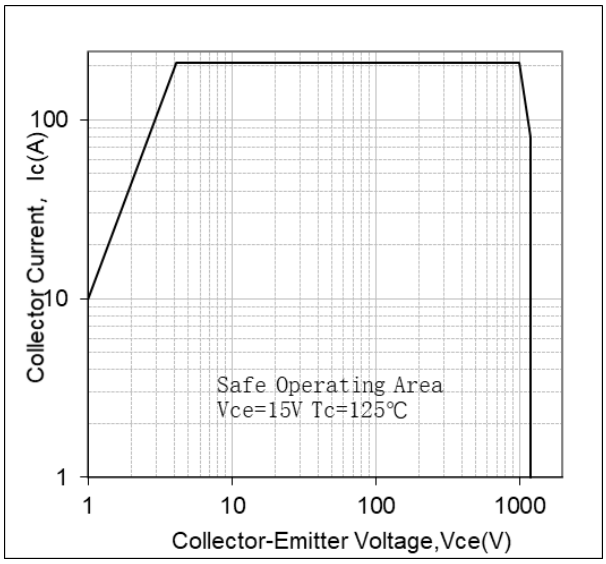


Figure 19. Capacitance Characteristics

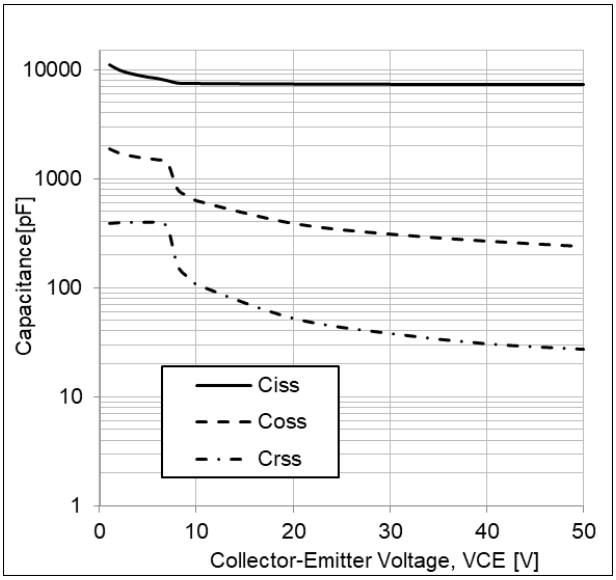
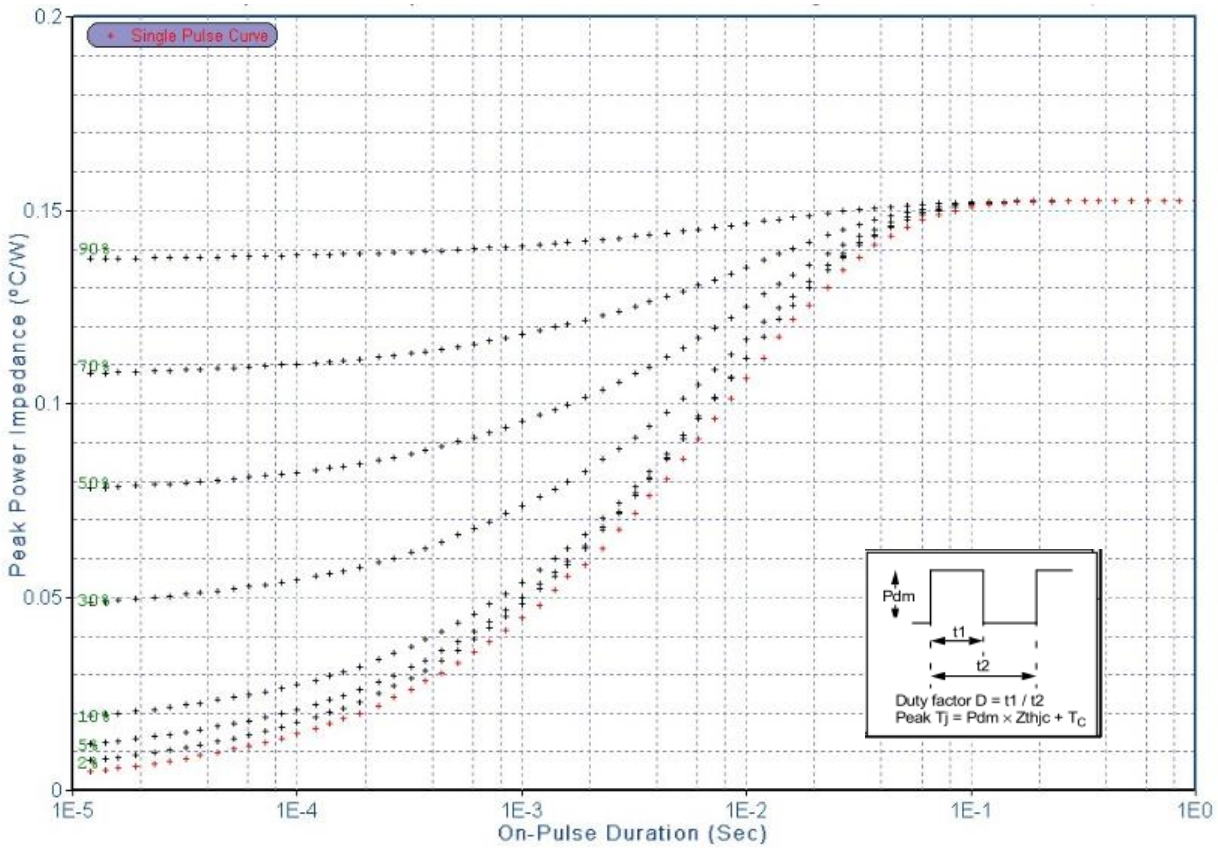
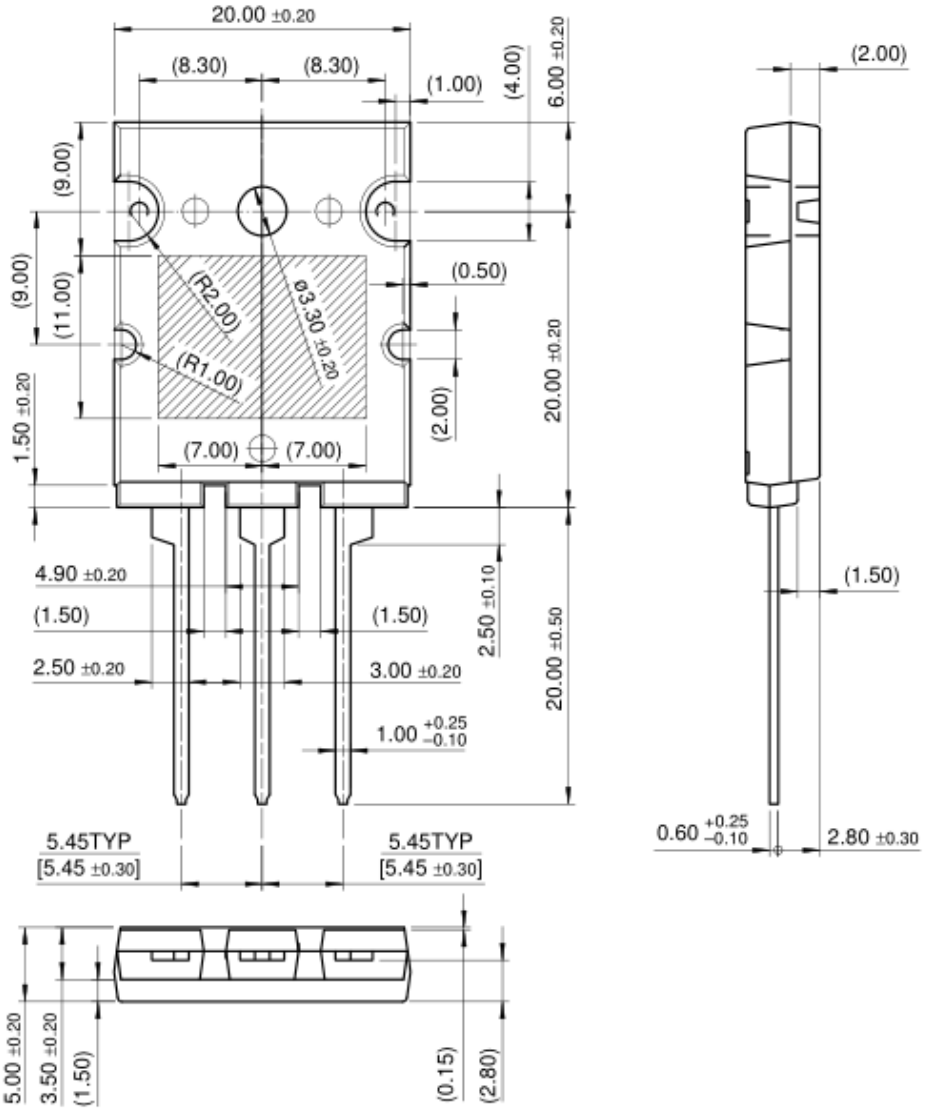


Figure 20. Transient Thermal Impedance of IGBT



Mechanical Dimensions

TO-264



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