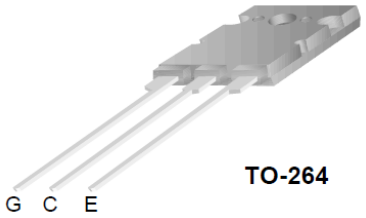
IGBT

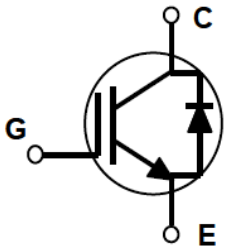
Features

- 600V,80A
- $V_{CE(sat)(typ.)}$= 1.55V@V_{GE}= 15V,I_C= 80A
- 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	600	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Continuous Collector Current (T_C=25℃)	120	A
	Continuous Collector Current (T_C=100℃)	80	A
I_{CM}	Pulsed Collector Current (Note 1)	240	A
I_F	Diode Continuous Forward Current (T_C=100℃)	80	A
I_{FM}	Diode Maximum Forward Current (Note 1)	250	A
t_{sc}	Short Circuit Withstand Time	10	us
P_D	Maximum Power Dissipation (T_C=25℃)	500	W
	Maximum Power Dissipation (T_C=100℃)	200	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	0.25	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	0.5	℃/ 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	600	-	-	V
I_{CES}	Collector-Emitter Leakage Current	V_{CE}= 600V, 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= 80A	-	1.55	2.15	V
		V_{GE}=15V, I_C= 80A Tc = 125℃		1.7		
		V_{GE}=15V, I_C= 120A		2.1		
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=400V V_{GE}=15V I_C=80A R_G=10Ω Inductive Load T_C=25℃	-	208	-	ns
t_r	Turn-on Rise Time		-	548	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	136	-	ns
t_f	Turn-off Fall Time		-	184	-	ns
Eon	Turn-on Switching Loss		-	15.8	-	mJ
Eoff	Turn-off Switching Loss		-	3.2	-	mJ
Ets	Total Switching Loss		-	19	-	mJ
t d(on)	Turn-on Delay Time	V_{CC} =400V V_{GE} =15V I_C =80A R_G =10Ω Inductive Load T_C =125 ℃	-	188	-	ns
t r	Turn-on Rise Time		-	406	-	ns
t d(off)	Turn-off Delay Time		-	164	-	ns
t f	Turn-off Fall Time		-	264	-	ns
Eon	Turn-on Switching Loss		-	11.7	-	mJ
Eoff	Turn-off Switching Loss		-	4.2	-	mJ
Ets	Total Switching Loss		-	15.9	-	mJ
C_{ies}	Input Capacitance	V_{CE}=30V V_{GE}=0V f = 1MHz	-	7090	-	pF
C_{oes}	Output Capacitance		-	470	-	pF
C_{res}	Reverse Transfer Capacitance		-	60	-	pF
Qg	Total Gate Charge	V_{CC} =300V V_{GE} =15V I_C = 80A	-	300		nC
Qge	Gate-Emitter Charge		-	105		nC
Qgc	Gate-Collector Charge		-	175		nC

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= 80A	-	1.5	2.1	V

t_{rr}	Diode Reverse Recovery Time	V_{CE} = 400V I_F= 80A dIF/dt = 200A/us	-	85		ns
I_{rr}	Diode peak Reverse Recovery Current		-	6.5		A
Q_{rr}	Diode Reverse Recovery Charge		-	290		nC

Notes：

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

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

Tc=25 ℃

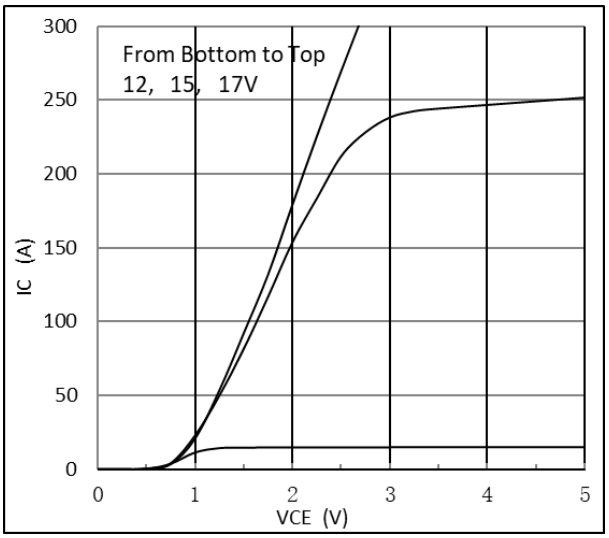


Figure 2. Typical Saturation Voltage Characteristics VG=15V

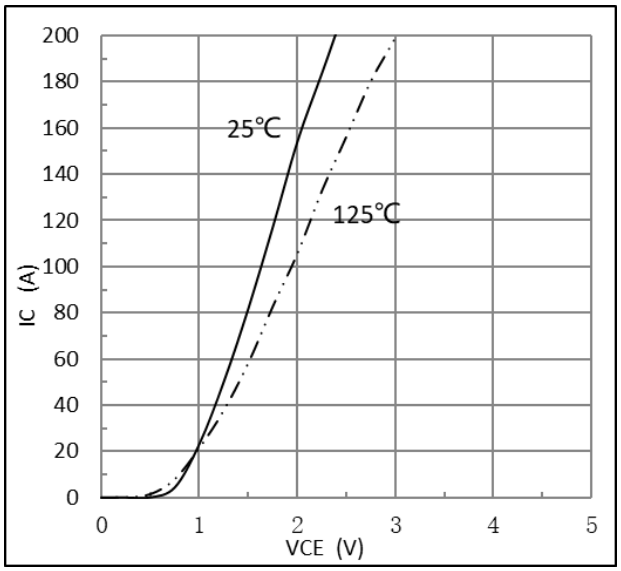


Figure 3. Saturation Voltage vs. Case Temperature at Variant Current Level

Vge= 15V

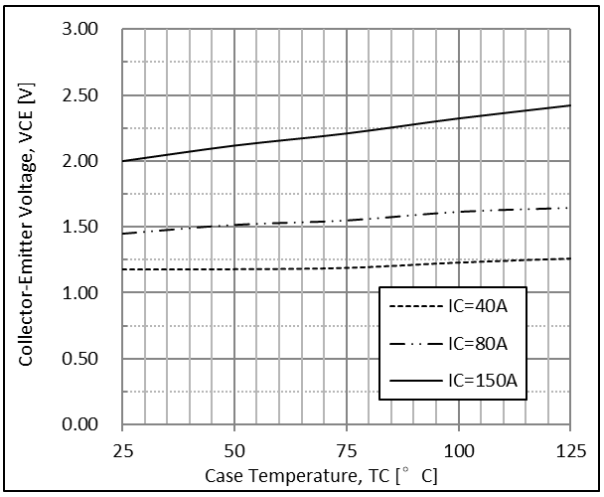


Figure 4. Forward Characteristics

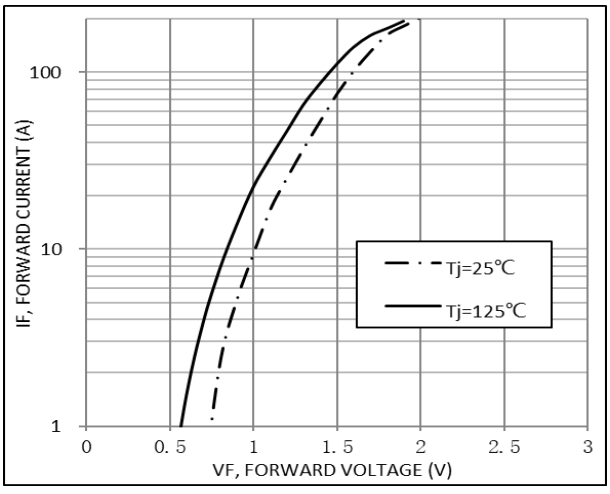


Figure 5. Saturation Voltage vs. VGE

Tc=25C

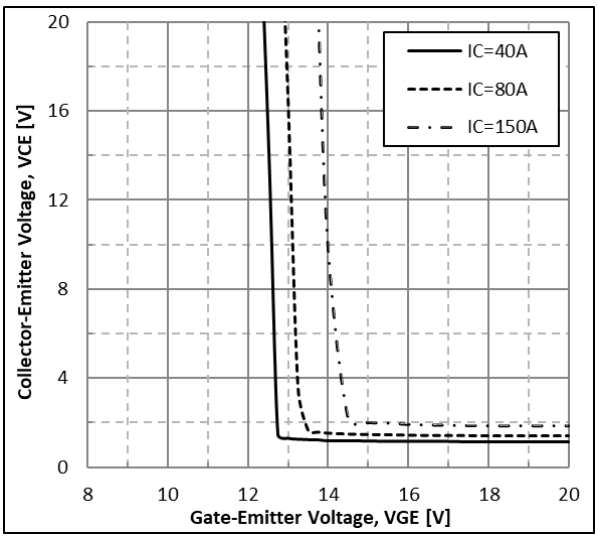


Figure 6. Saturation Voltage vs. VGE

Tc=125C

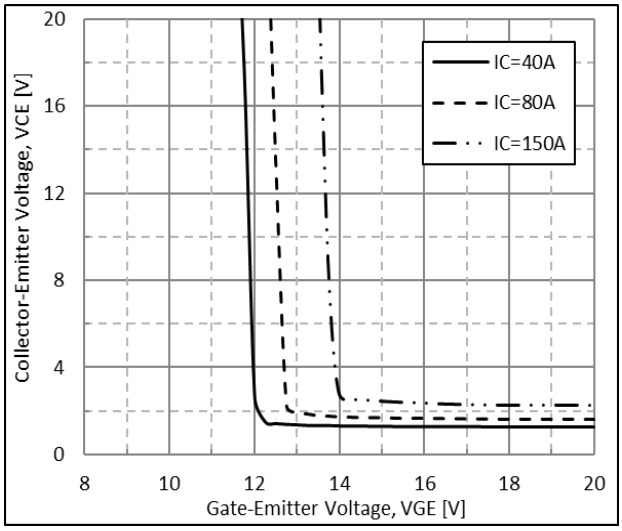


Figure 7.Switching Loss vs. Gate Resistance

（VCC=400V, VGE= ±15V, IC=80A）

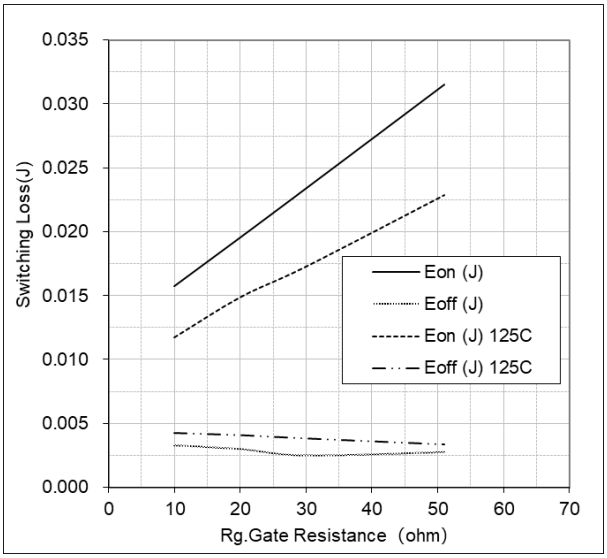


Figure 8. Turn-On Characteristics vs. Gate Resistance（VCC=400V, VGE= ±15V, IC=80A,）

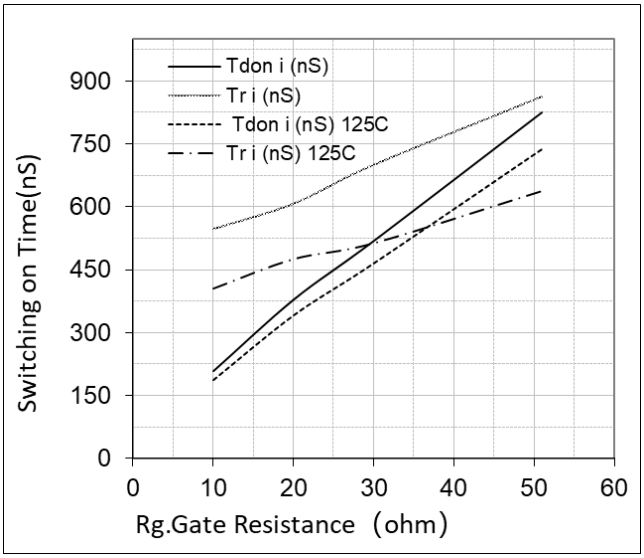


Figure 9. Turn-Off Characteristics vs. Gate Resistance（VCC=400V, VGE=±15V, IC=80A,）

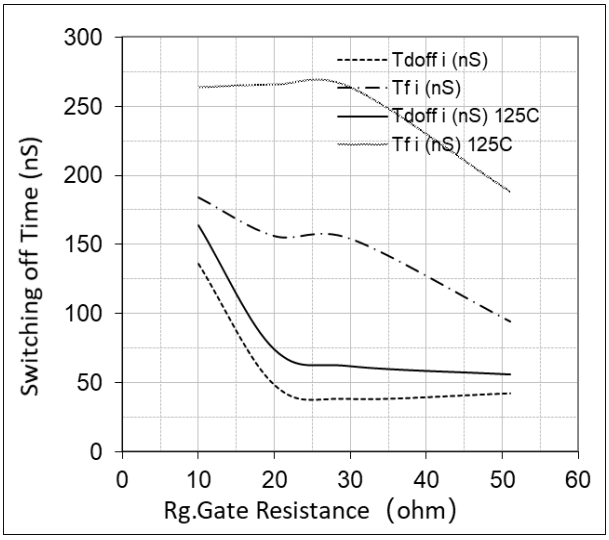


Figure 10. Switching Loss vs. Collector Current（VGE=±15V, RG=5 OHM, VCC=400V）

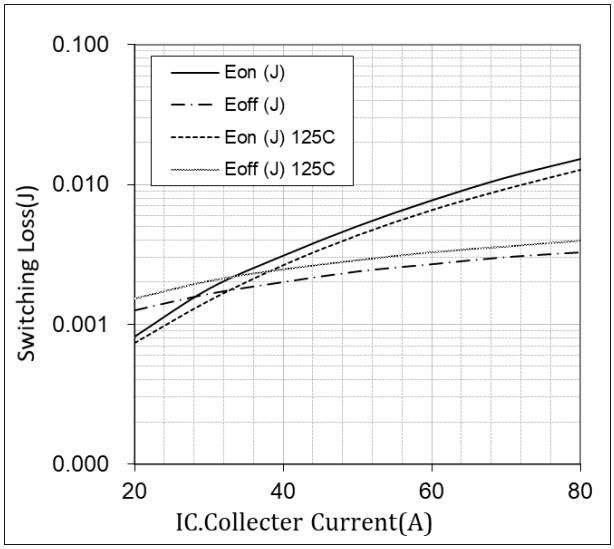


Figure 11. Turn-On Characteristics vs. Collector Current（VGE=±15V, RG=5 OHM, VCC=400V）

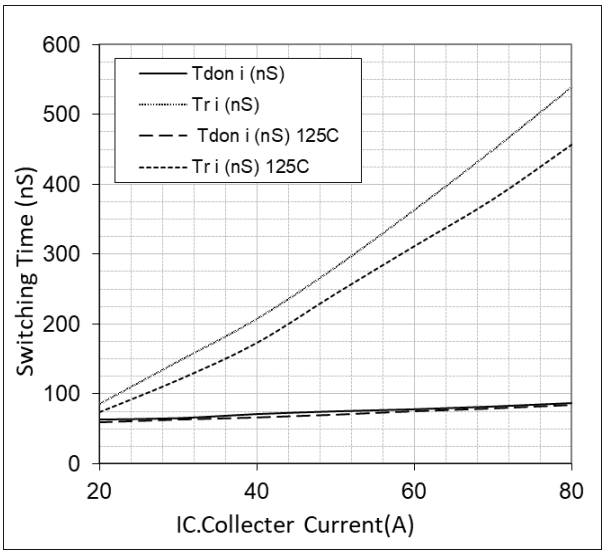


Figure 12. Turn-Off Characteristics vs. Collector Current（VGE=±15V, RG=5 OHM, VCC=400V）

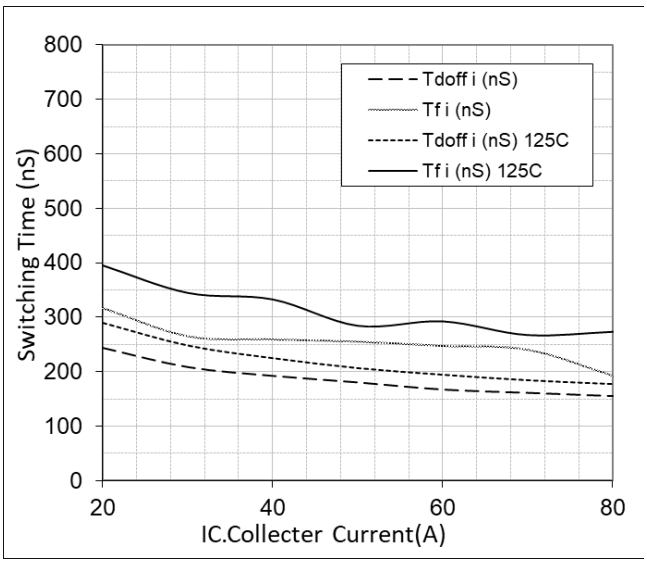


Figure 13. Gate Charge Characteristics

RL=10 ohm TC=25C IC=80A

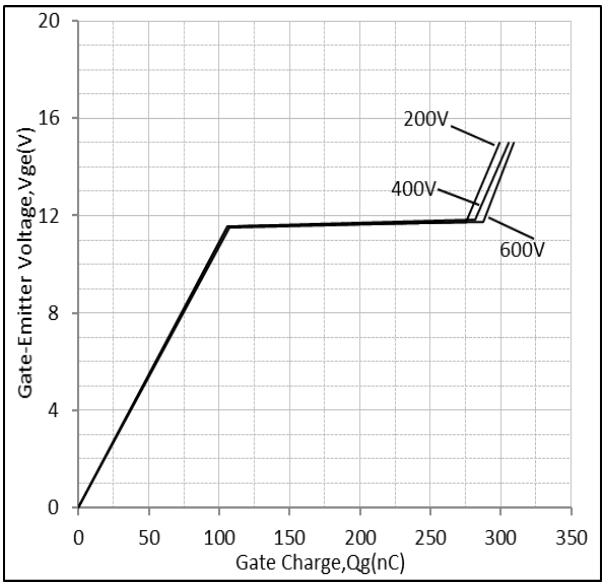


Figure 14. Reverse Recovery Current

VCC=400V, RG=10 ohm, VG=±15V IL=500uH

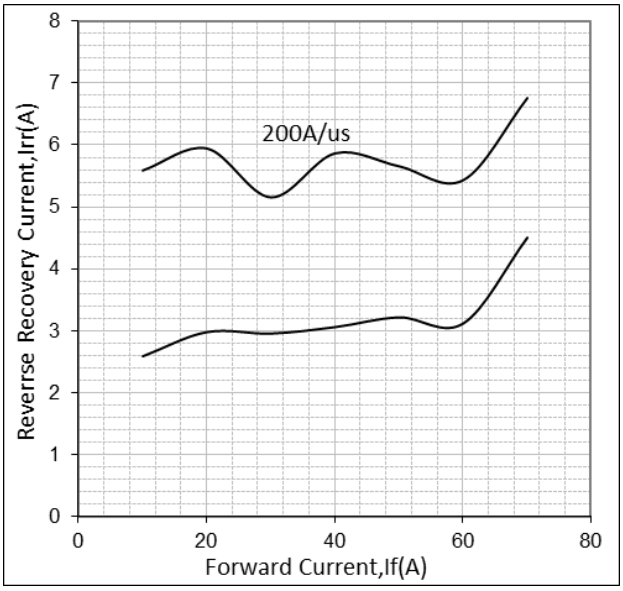


Figure 15. Stored Charge

VCC=400V, RG=10 ohm, VG=±15V IL=500uH

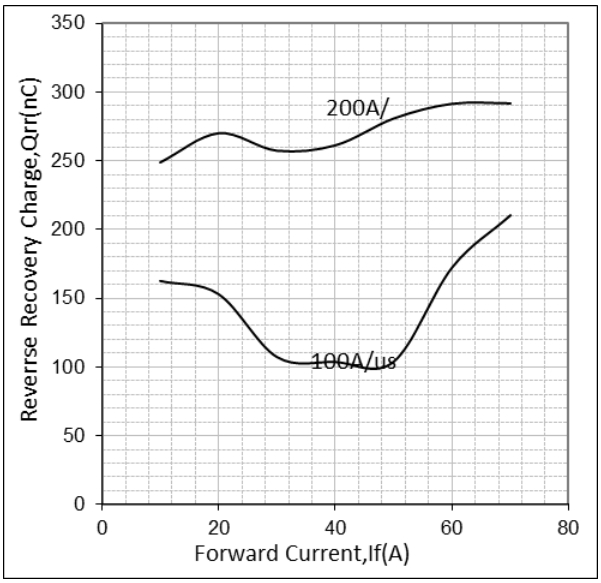


Figure 16. Reverse Recovery Time

VCC=400V, RG=10 ohm, VG=±15V IL=500uH

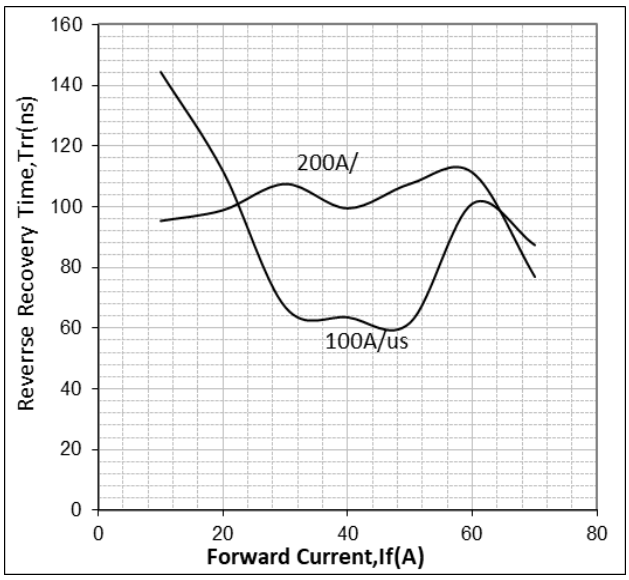


Figure 17. SOA Characteristics

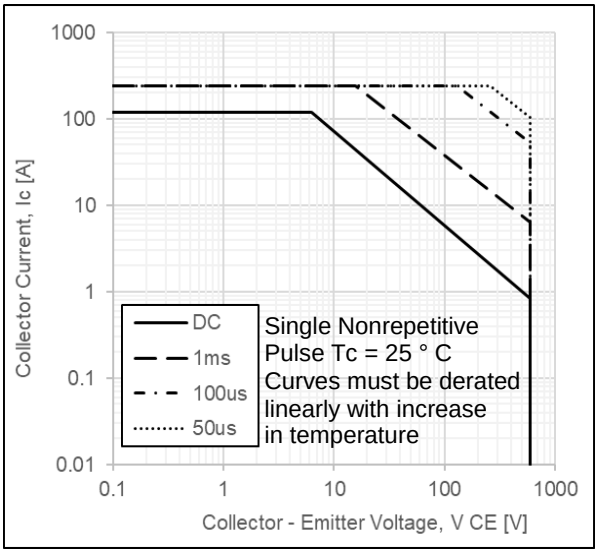


Figure 18. Turn Off SOA

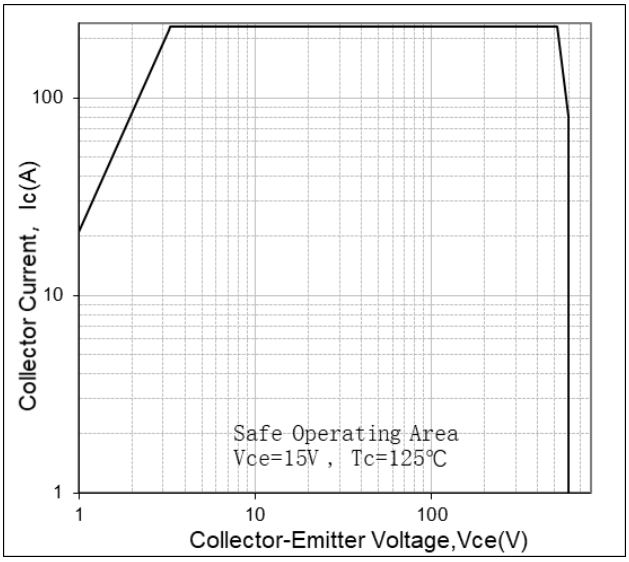


Figure 19. Capacitance Characteristics

Common Emitter, VGE = 0V, f = 1MHz,T C = 25 ° C

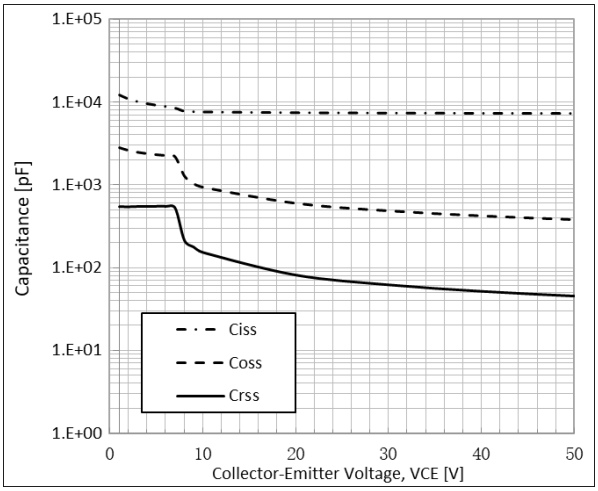
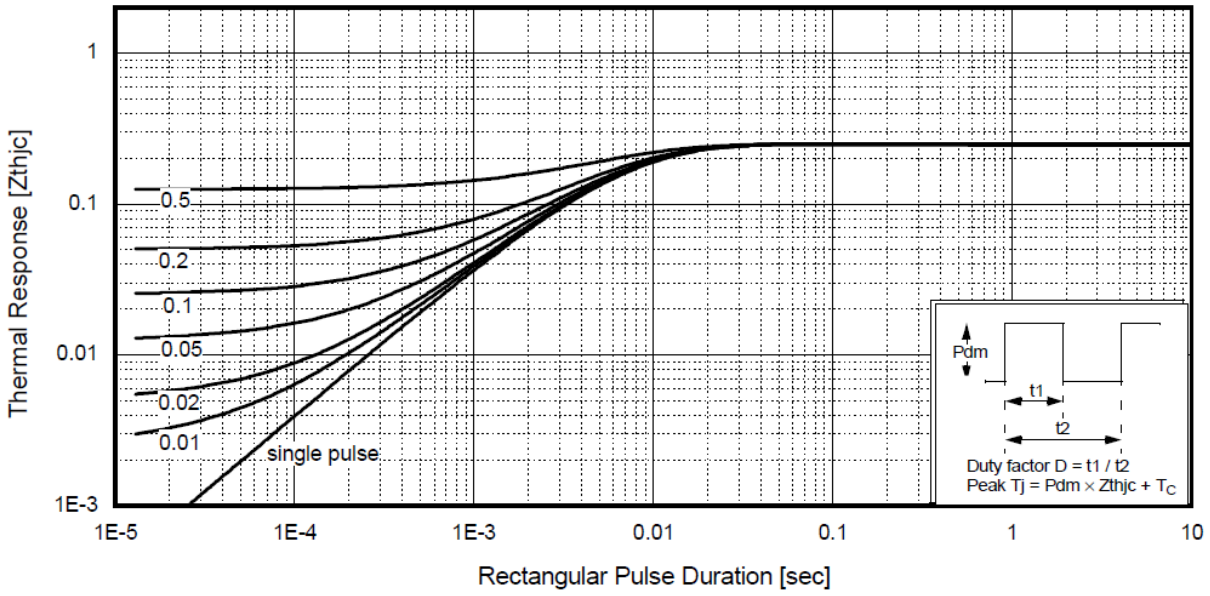
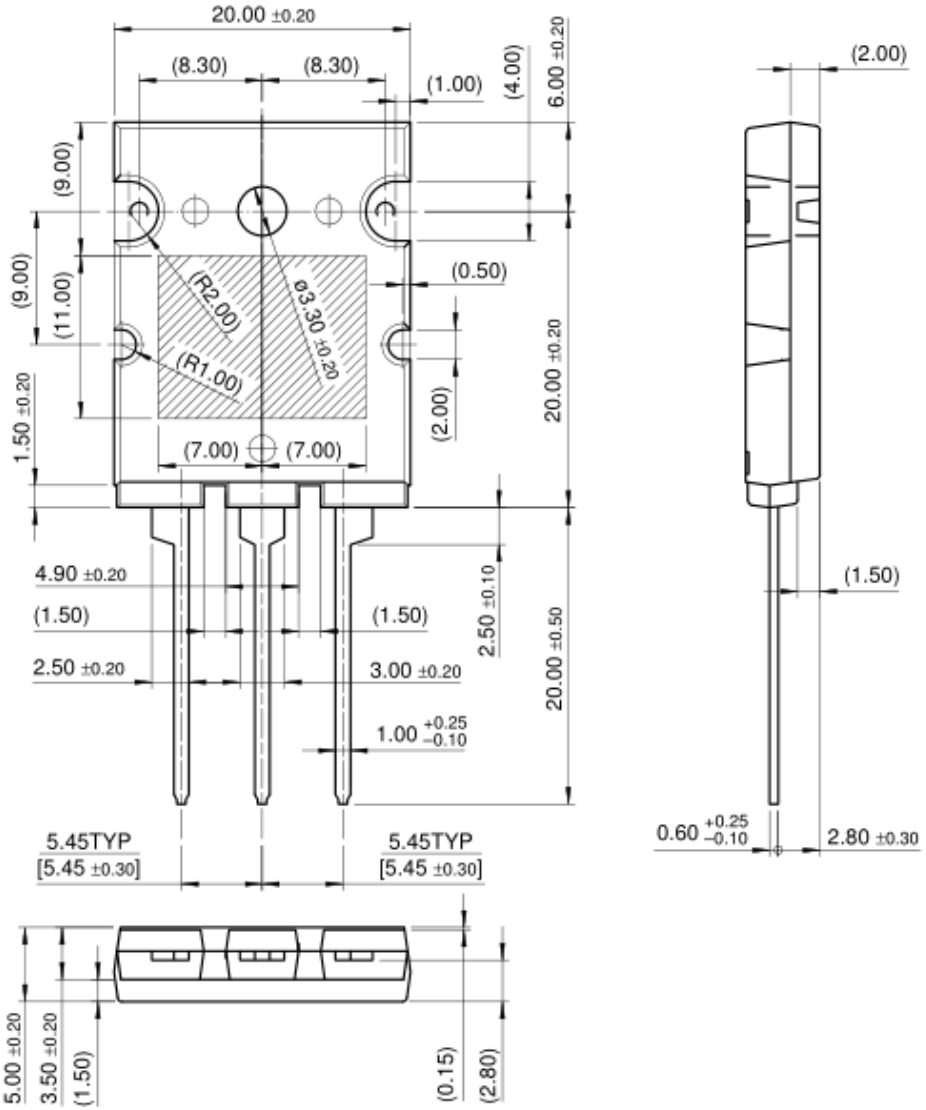


Figure 20. Transient Thermal Impedance of IGBT



Mechanical Dimensions

TO-264



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