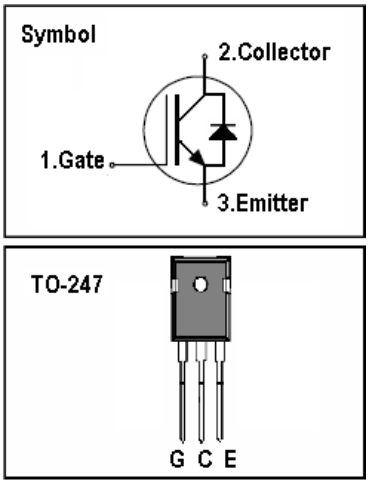
IGBT



Features

- 1200V, 25A ,$V_{CE(sat)(typ.)}$=2.3 V@V_{GE}=15V
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA

General Description

DAXIN's IGBTs offer lower losses and higher energy for application such as motor drive ,UPS, inverter and other soft switching applications.

Absolute Maxinmun 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℃)	50	A
	Continuous Collector Current (T_C=100℃)	25	A
I_{CM}	Pulsed Collector Current (Note 1)	100	A
I_F	Diode Continuous Forward Current (T_C=100 ℃)	25	A
I_{FM}	Diode Maximum Forward Current (Note 1)	100	A
t_{sc}	Short Circuit Withstand Time	10	us
$t_{sc\ (Max)}$	Maximum Short Circuit Withstand Time	>23	us
Isc	Short Circuit Current	140	A
P_D	Maximum Power Dissipation (T_C=25 ℃)	255	W
	Maximum Power Dissipation (T_C=100℃)	102	W
T_J	Operating Junction Temperature Range	-55 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	0.49	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	1.31	℃/ W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	40	℃/ 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	-	-	250	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	5.0	5.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C= 25A	-	2.3	2.6	V
Qg	Total Gate Charge	V_{CC}=960V V_{GE}=15V I_C=25A	-	141		nC
Qge	Gate-Emitter Charge		-	14		nC
Qgc	Gate-Collector Charge		-	90		nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=15V I_C=25A R_G=10Ω Inductive Load T_C=25℃	-	20	-	ns
t_r	Turn-on Rise Time		-	43	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	270	-	ns
t_f	Turn-off Fall Time		-	168	-	ns
Eon	Turn-on Switching Loss		-	1.35	-	mJ
Eoff	Turn-off Switching Loss		-	2.05	-	mJ
Ets	Total Switching Loss		-	3.40	-	mJ
C_{ies}	Input Capacitance	V_{CE}=25V V_{GE}=0V f = 1MHz	-	1080	-	pF
C_{oes}	Output Capacitance		-	175	-	pF
C_{res}	Reverse Transfer Capacitance		-	120	-	pF
R_{Gint}	Integrated gate resistor	f=1M;Vpp=1V		8.0		Ω

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=25A	-	2.1	2.5	V
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 600V I_F= 25A dI_F/dt = 500A/us	-	100	120	ns
I_{rr}	Diode peak Reverse Recovery Current		-	17	20	A
Q_{rr}	Diode Reverse Recovery Charge		-	1100	1300	nC

Notes:

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

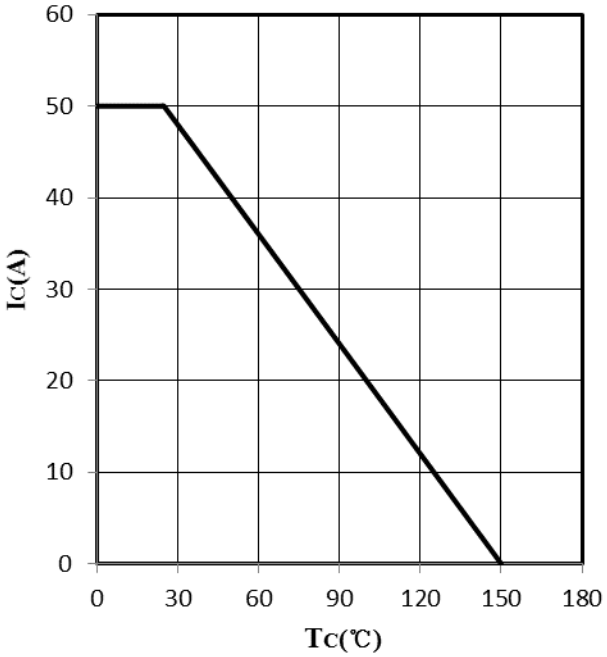


Fig 1. DC Collector current as a function of case temperature (VGE≥15V , Tj≤150℃)

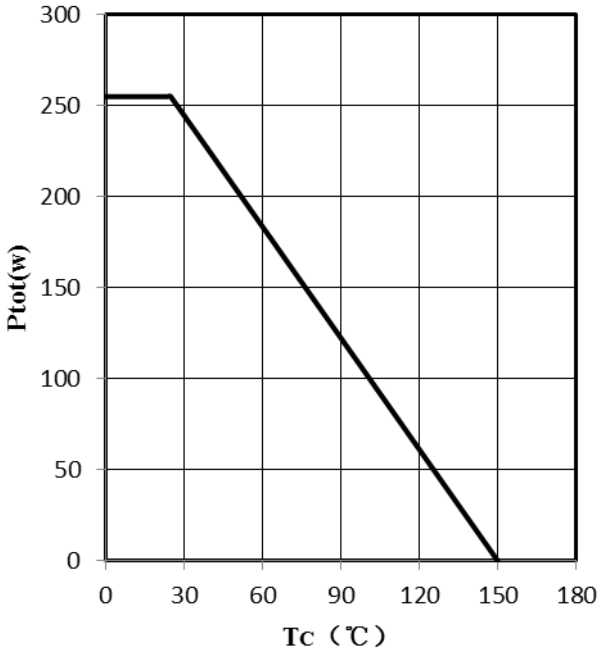


Fig 2. Power dissipation as a function of case temperature (Tj≤150℃)

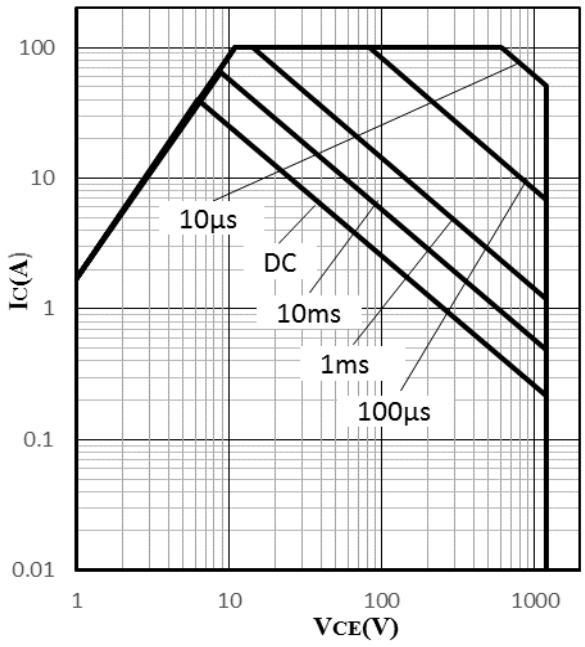


Fig 3. IGBT Forward safe operation area

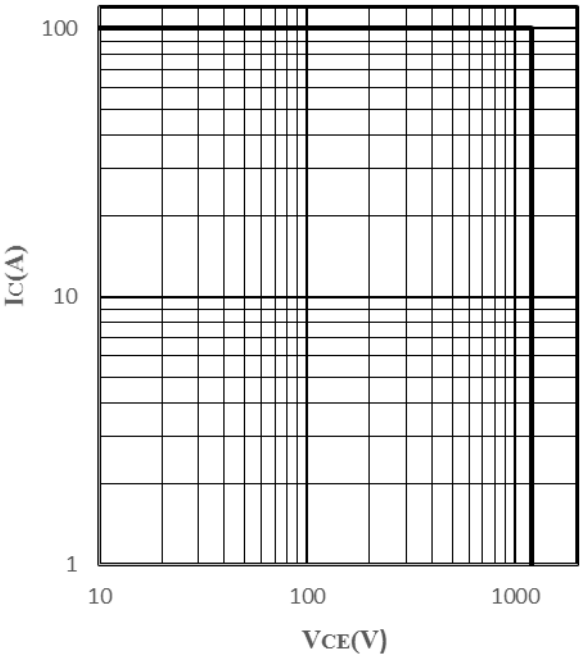


Fig 4. IGBT Reverse safe operation area

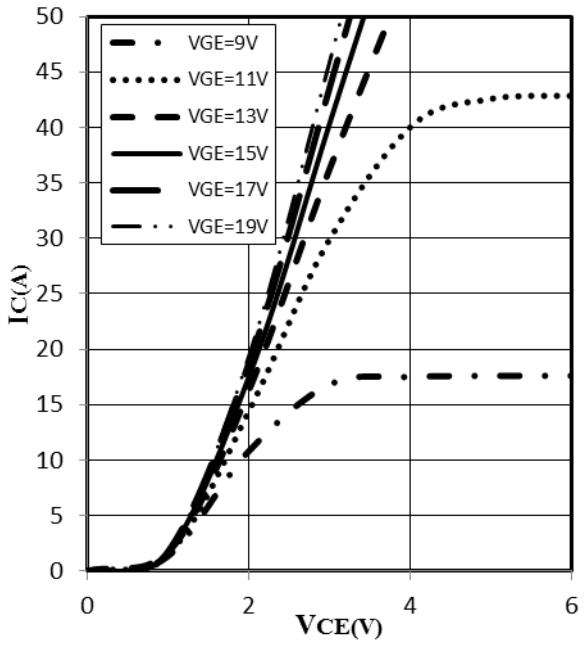


Fig 5. Typical output characteristic （Tj=25℃）

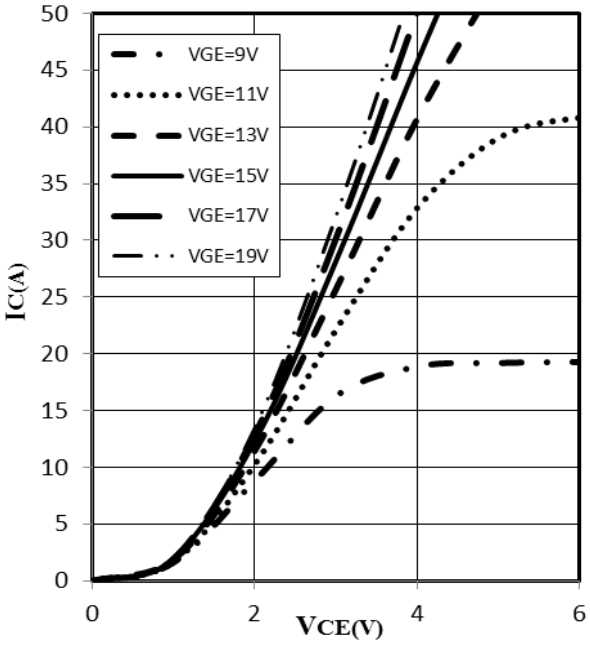


Fig 6. Typical output characteristic （Tj=125℃）

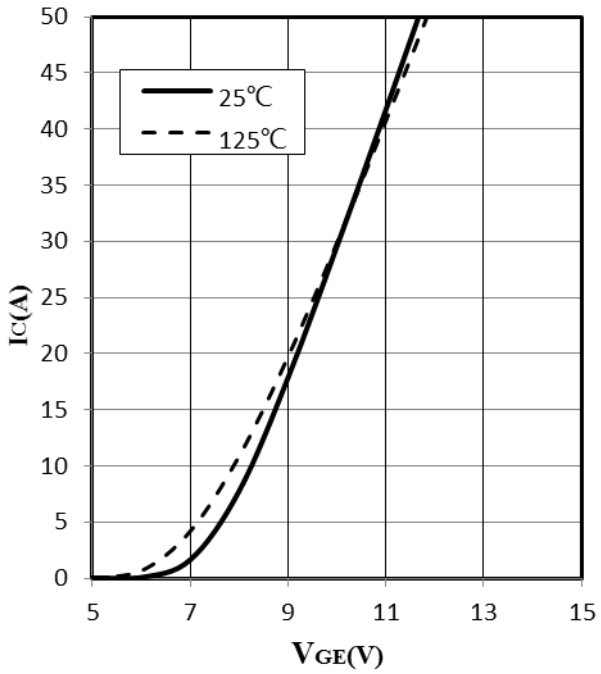


Fig 7. Typical transfer characteristic （V_{CE}=20V）

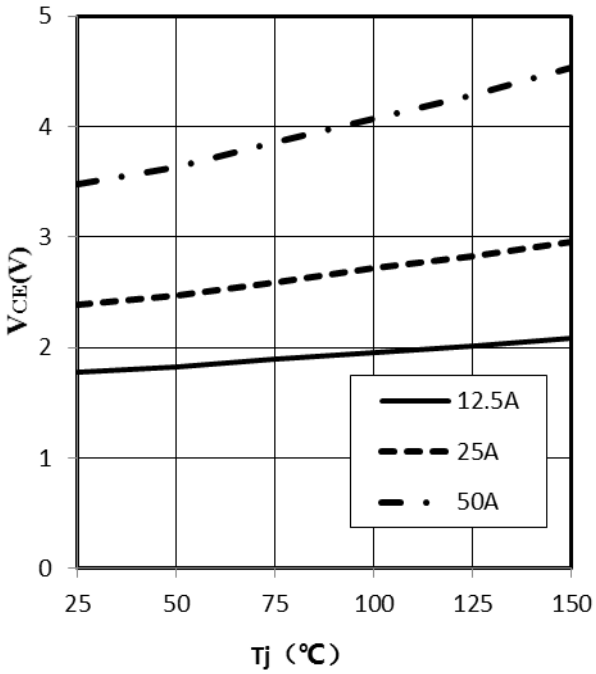


Fig 8. Typical collector-emitter saturation voltage as a function of junction temperature (VGE=15V)

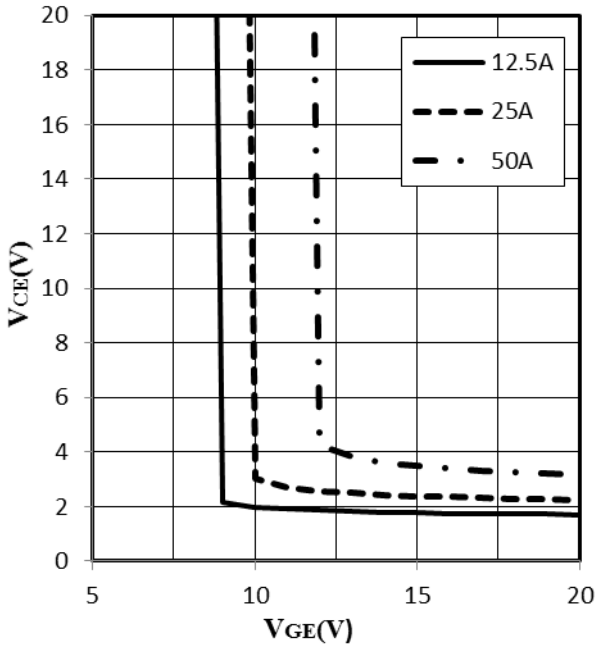


Fig 9. Typical collector-emitter saturation voltage as a function of V_{GE} (Tj=25℃)

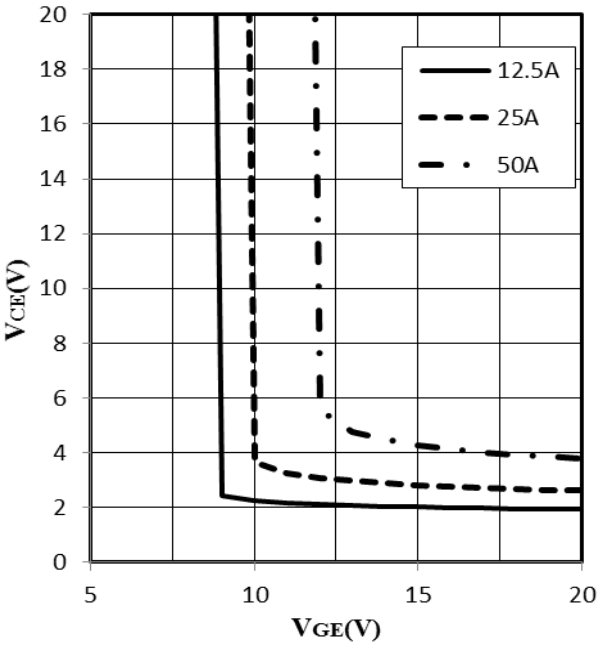


Fig 10. Typical collector-emitter saturation voltage as a function of V_{GE} (Tj=125℃)

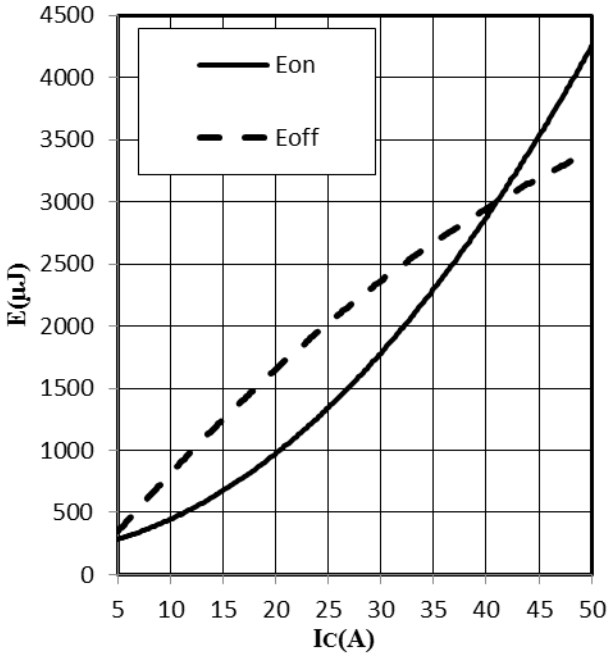


Fig 11. Typical switch energy as a function of Ic (inductive load，T_j=25℃，V_{CE}=600V,V_{GE}=15V,R_G=10Ω)

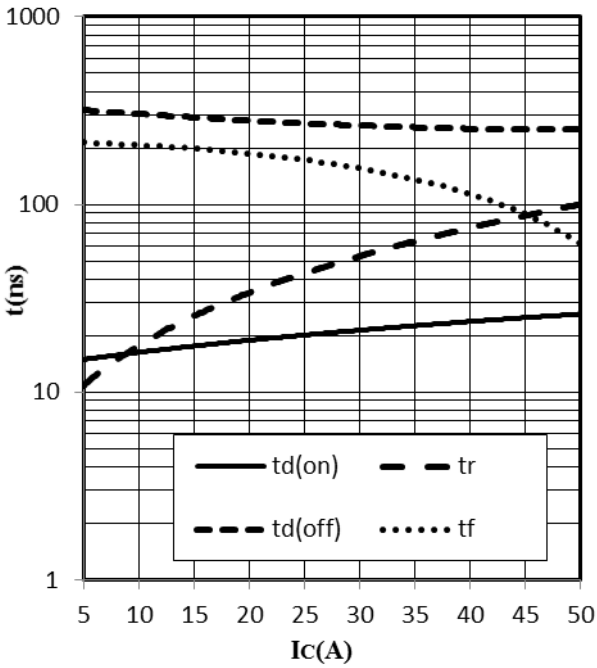


Fig 12. Typical switch time as a function of Ic (inductive load，T_j=25℃，V_{CE}=600V,V_{GE}=15V,R_G=10Ω)

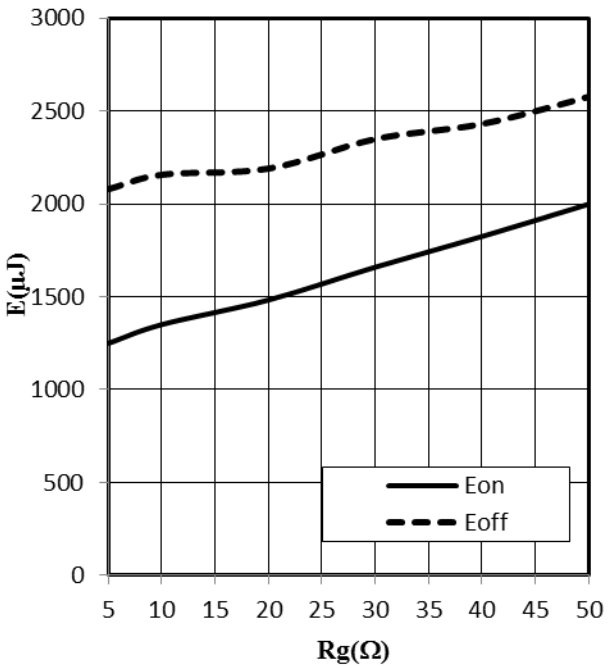


Fig 13. Typical switch energy as a function of R_G

(inductive load，T_j=25℃，V_{CE}=600V,V_{GE}=15V,Ic=25A)

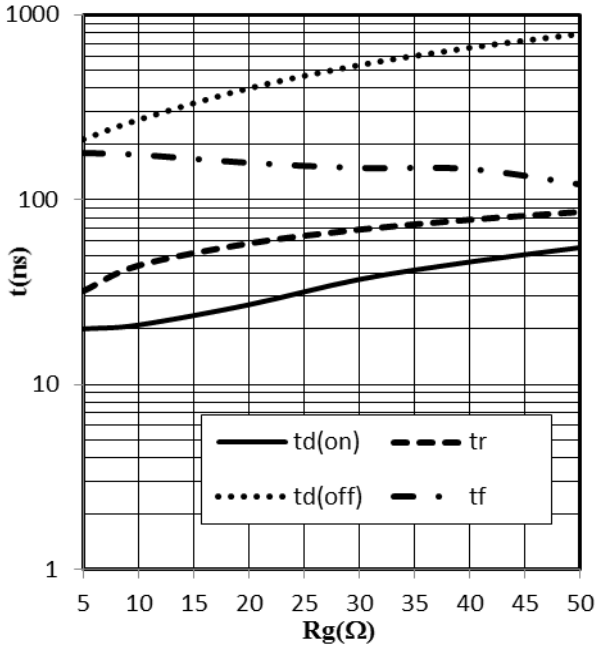


Fig 14. Typical switch time as a function of R_G

(inductive load，T_j=25℃，V_{CE}=600V,V_{GE}=15V,Ic=25A)

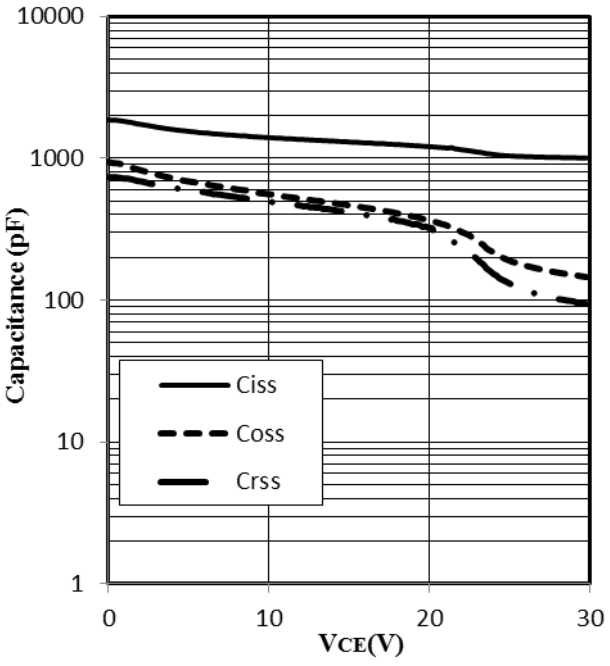


Fig 15. Typical capacitance as a function of collector-emitter voltage (V_{GE}=0V,f=1MHz)

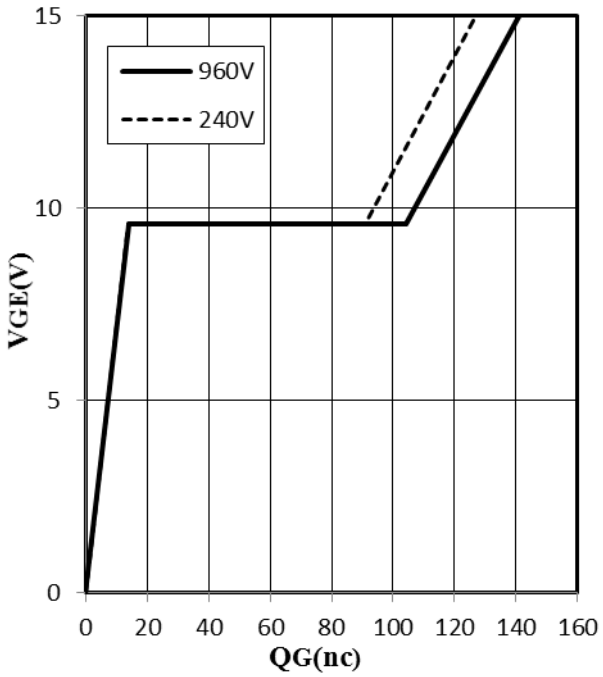


Fig 16. Typical gate charge (I_C=25A)

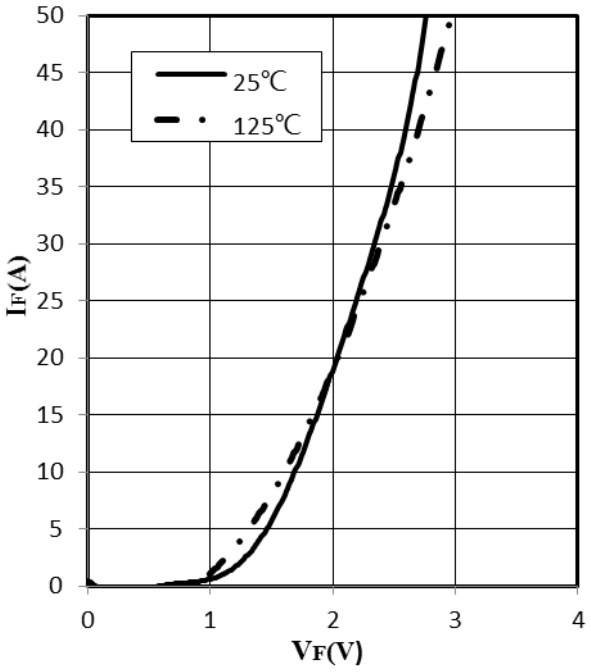


Fig 17. Typical diode forward current as a function of forward voltage

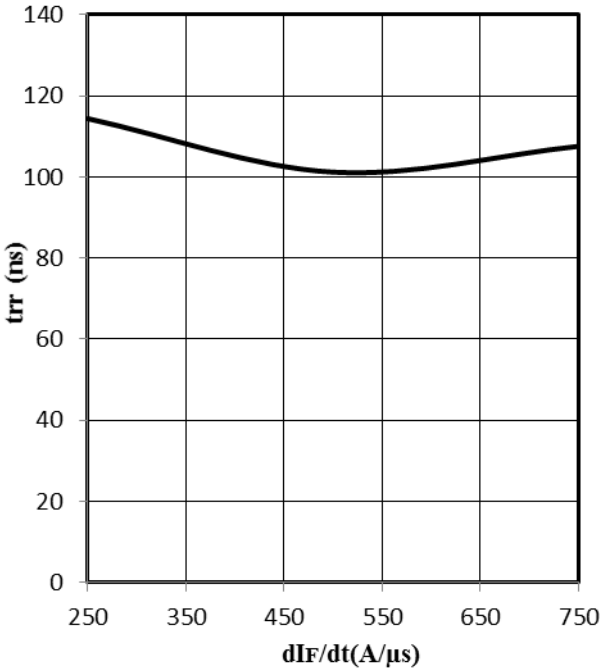


Fig 18. Typical trr as a function of dI_F/dt

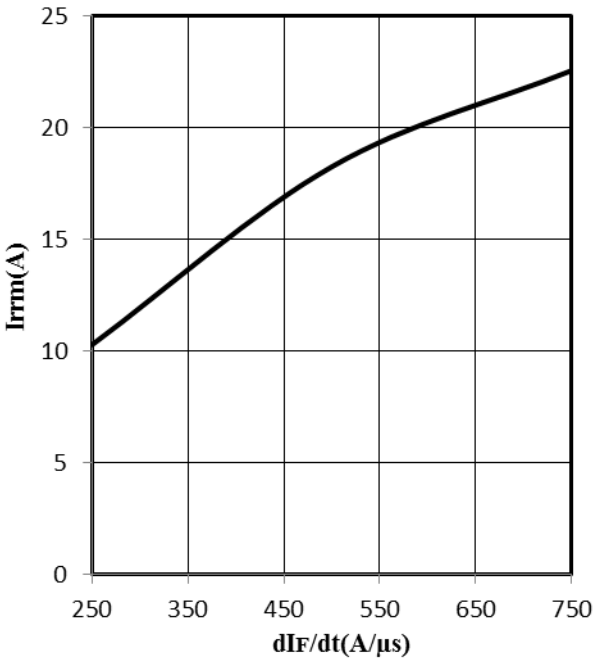


Fig 19. Typical I_{rrm} as a function of dI_F/dt

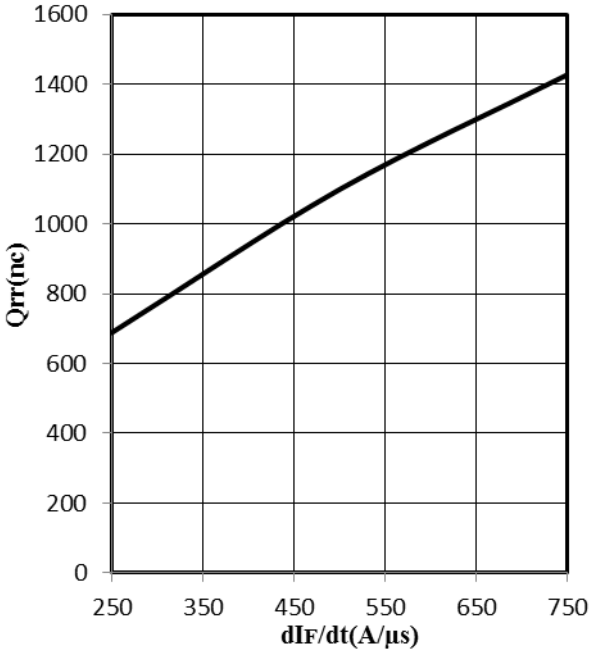


Fig 20. Typical Q_{rr} as a function of dI_F/dt

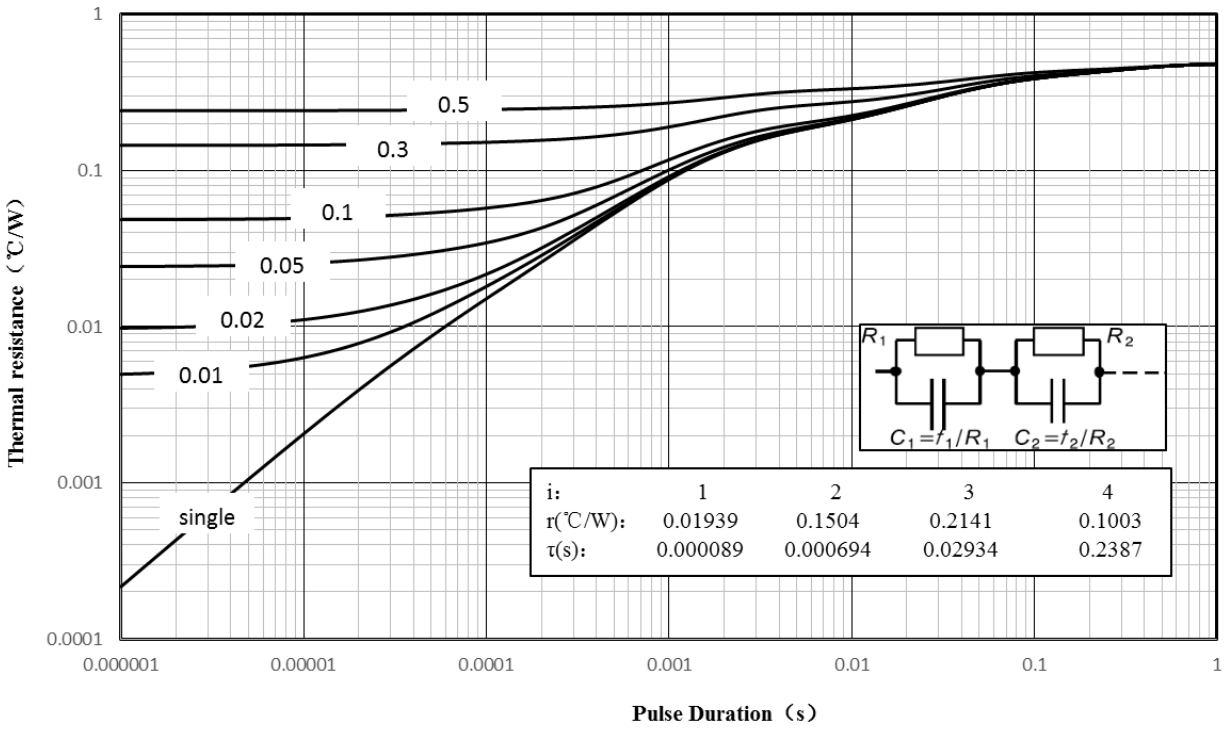


Fig 21. IGBT transient thermal resistance(D=tp/T)