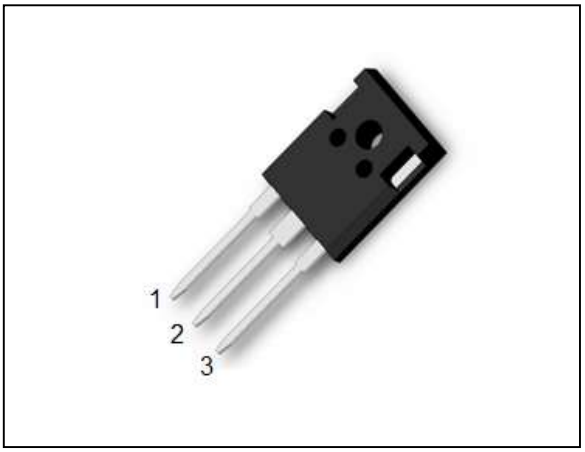
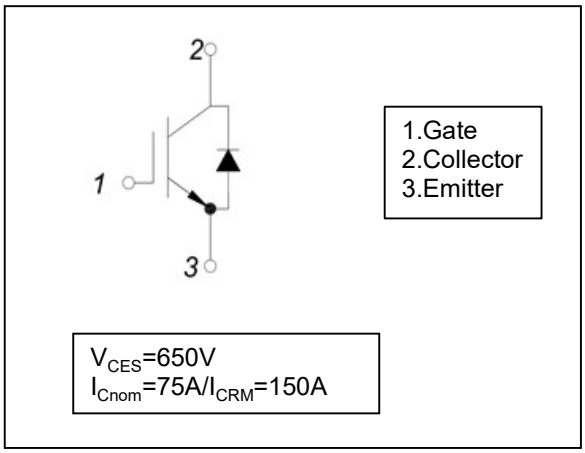
650V 75A IGBT Discrete

650V 75A IGBT 单管





Features:

- ☐ 650V IGBT chip in trench FS-technology
- ☐ Very low $V_{CE(sat)}$
- ☐ $V_{CE(sat)}$ with positive temperature coefficient
- ☐ Low switching losses
- ☐ Fast switching and short tail current

产品特性：

- ☐ 650V 沟槽栅+场截止技术
- ☐ 低导通压降
- ☐ 导通压降具有正温度系数
- ☐ 低开关损耗
- ☐ 开关速度快且拖尾电流小

Typical Applications:

- ☐ Air condition
- ☐ Motor drives
- ☐ Inverters

典型应用：

- ☐ 空调
- ☐ 电机驱动
- ☐ 逆变器

Package / 封装

Item	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
存储温度 Storage Temperature	T_{stg}		-55		150	℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_{SLD}				260	℃
安装扭矩 Mounting torque	M	Recommended（M3）			0.6	Nm
结-环境热阻 Thermal resistance,junction-ambient	R_{thJA}				40	K/W

IGBT

Maximum Rated Values / 最大额定值

Item	Symbol	Conditions		Values	Unit
集电极－发射极电压 Collector-emitter Voltage	V_{CES}		T_{vj}=25°C	650	V
栅极－发射极电压 Maximum gate-emitter voltage	V_{GES}			±20	V
瞬态栅极－发射极电压 Transient gate-emitter voltage	V_{GES}	t_p≤10μs,D=0.01		±30	V
连续集电极直流电流 Continuous DC collector current	I_C		T_{vj}=25°C	100	A
			T_{vj}=100°C	75	
最大脉冲集电极电流 Pulsed collector current,tp limited by T_{jmax}	I_{Cpulse}			150	A
功率损耗 Power dissipation	P_{tot}			468	W

Characteristic Values / 特征值

Item	Symbol	Conditions		Values			Unit
				Min.	Typ.	Max.	
集电极－发射极饱和电压 Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C=75A, V_{GE}=15V	T_{vj}=25°C		1.65	1.90	V
			T_{vj}=125°C		1.90		
			T_{vj}=150°C		1.95		
栅极阈值电压 Gate threshold voltage	$V_{GE(th)}$	V_{CE}=V_{GE}, I_C=3.0mA		4.0	4.8	6.0	V
集电极-发射极截止电流 Collector-emitter cut-off current	I_{CES}	V_{CE}=650V, V_{GE}=0V	T_{vj}=25°C			100	μA
			T_{vj}=150°C			5	mA
栅极-发射极漏电流 Gate-emitter leakage current	I_{GES}	V_{CE}=0V,V_{GE}=±20V, T_{vj}=25°C		-200		200	nA
跨导 Transconductance	g_{fs}	V_{CE}=20V, I_C=75A, T_{vj}=25°C			50		S
栅极电荷 Gate Charge	Q_G	V_{CE}=400V, I_C=75A , V_{GE}=15V			0.28		μC
输入电容 Input Capacitance	C_{ies}	V_{CE}=25V, V_{GE}=0V, f =1MHz			6900		pF
输出电容 Output Capacitance	C_{oes}				260		
反向传输电容 Reverse Transfer Capacitance	C_{res}				135		
开通延迟时间（电感负载） Turn-on delay time,inductive load	$t_{d(on)}$	V_{CC}=400V,I_C=75A R_G=7.5Ω, V_{GE}=15V	T_{vj}=25°C		20		ns
			T_{vj}=125°C		20		ns
			T_{vj}=150°C		20		ns
上升时间（电感负载） Rise Time,inductive load	t_r		T_{vj}=25°C		24		ns
			T_{vj}=125°C		24		ns
			T_{vj}=150°C		24		ns
关断延迟时间（电感负载） Turn-off delay time,inductive load	$t_{d(off)}$	V_{CC}=400V,I_C=75A R_G=7.5Ω, V_{GE}=15V	T_{vj}=25°C		90		ns
			T_{vj}=125°C		94		ns
			T_{vj}=150°C		96		ns
下降时间（电感负载） Fall time,inductive load	t_f		T_{vj}=25°C		84		ns
			T_{vj}=125°C		92		ns
			T_{vj}=150°C		94		ns
开通损耗能量（每脉冲） Turn-on energy loss per pulse	E_{on}	V_{CC}=400V,I_C=75A R_G=7.5Ω, V_{GE}=15V	T_{vj}=25°C		0.91		mJ
			T_{vj}=125°C		1.37		mJ
			T_{vj}=150°C		1.6		mJ
关断损耗能量（每脉冲） Turn off Energy loss per pulse	E_{off}		T_{vj}=25°C		0.98		mJ
			T_{vj}=125°C		1.24		mJ
			T_{vj}=150°C		1.3		mJ
IGBT结-外壳热阻 IGBT thermal resistance,junction-case	R_{thJC}					0.32	K /W
工作温度 Operating Temperature	T_{Jop}			-40		175	℃

Diode / 二极管

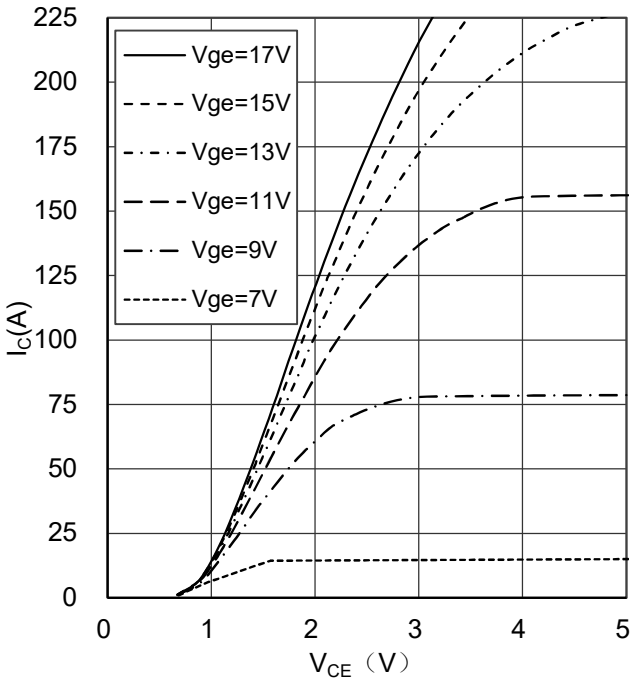
Maximum Rated Values / 最大额定值

Item	Symbol	Conditions		Values	Unit
反向重复峰值电压 Repetitive reverse voltage	V_{RRM}		T_{vj}=25°C	650	V
连续正向直流电流 Continuous DC forward current	I_F		T_{vj}=25°C	75	A
			T_{vj}=100°C	100	
二极管正向不重复峰值电流 Diode pulsed current,tp limited by T_{Jmax}	I_{Fpulse}			150	

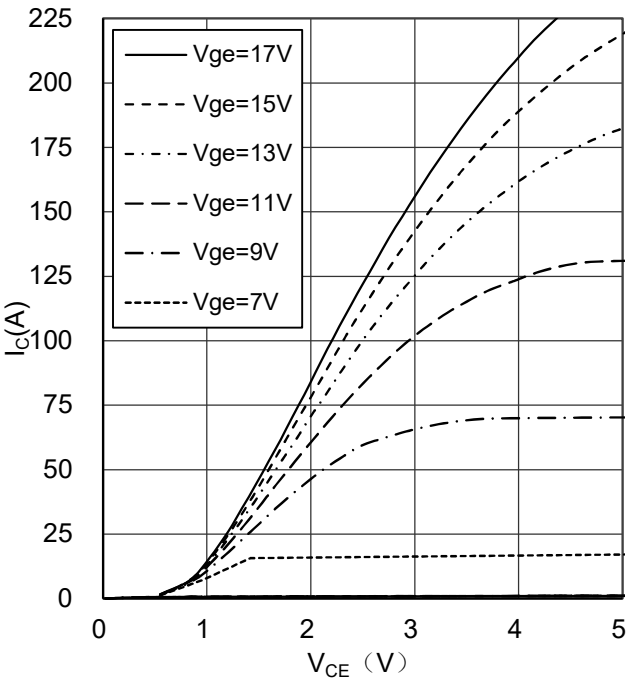
Characteristic Values / 特征值

Item	Symbol	Conditions		Values			Unit
				Min.	Typ.	Max.	
正向电压 Forward voltage	V_F	I_F=75A , V_{GE}=0V	T_{vj}=25°C		1.67	2.30	V
			T_{vj}=125°C		1.58		
			T_{vj}=150°C		1.55		
反向恢复时间 Reverse recovery time	t_{rr}	I_F=75A dI_F/dt=-4200A/μs (T_{vj}=150°C) V_R=400V, V_{GE}=-15V	T_{vj}=25°C		68		ns
			T_{vj}=125°C		72		
			T_{vj}=150°C		86		
反向恢复峰值电流 Peak reverse recovery current	I_{RRM}		T_{vj}=25°C		115		A
			T_{vj}=125°C		130		
			T_{vj}=150°C		135		
反向恢复电荷 Reverse recovery charge	Q_{RR}		T_{vj}=25°C		4.5		μC
			T_{vj}=125°C		6.5		
			T_{vj}=150°C		7.0		
反向恢复损耗（每脉冲） Reverse recovery energy loss per pulse	E_{rec}		T_{vj}=25°C		1.1		mJ
			T_{vj}=125°C		1.4		
			T_{vj}=150°C		1.6		
二极管结-外壳热阻 Diode thermal resistance,junction-case	R_{thJCD}					1.41	K /W
工作温度 Operating Temperature	T_{Jop}			-40		175	℃

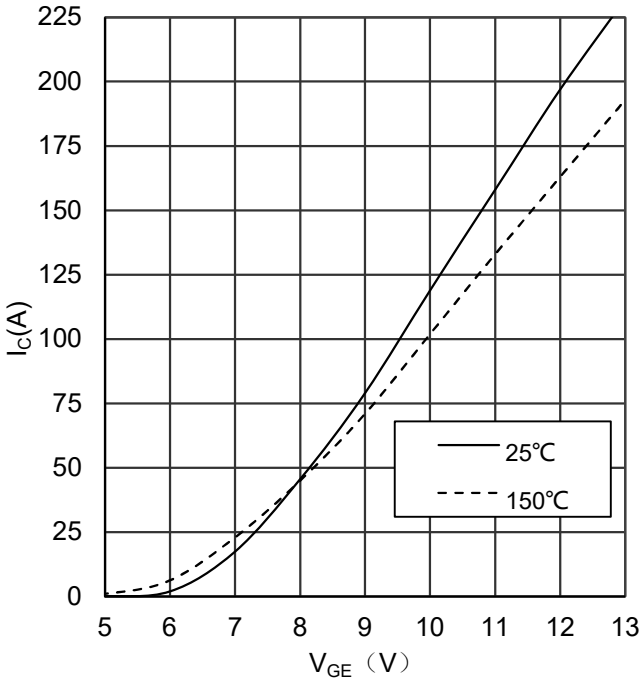
输出特性（典型）
Output characteristic(typical)
$I_C = f(V_{CE})$
T_{vj}= 25°C



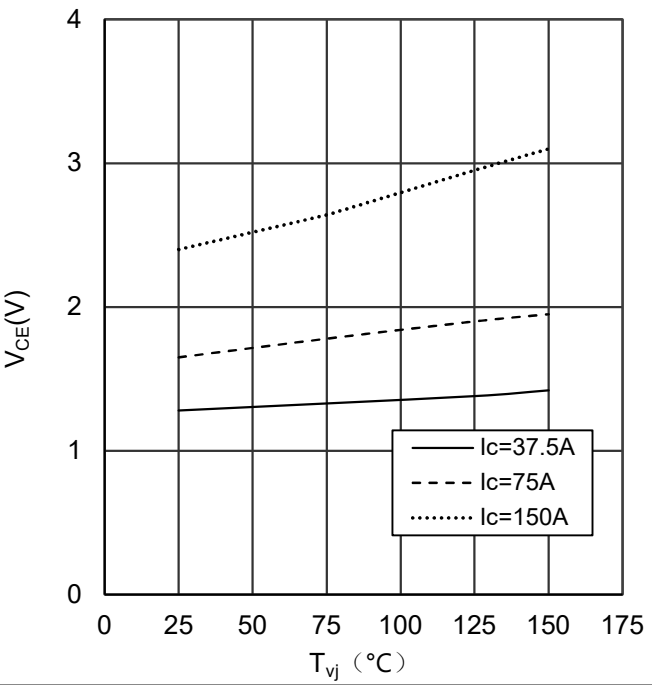
输出特性（典型）
Output characteristic(typical)
$I_C = f(V_{CE})$
T_{vj}= 150°C



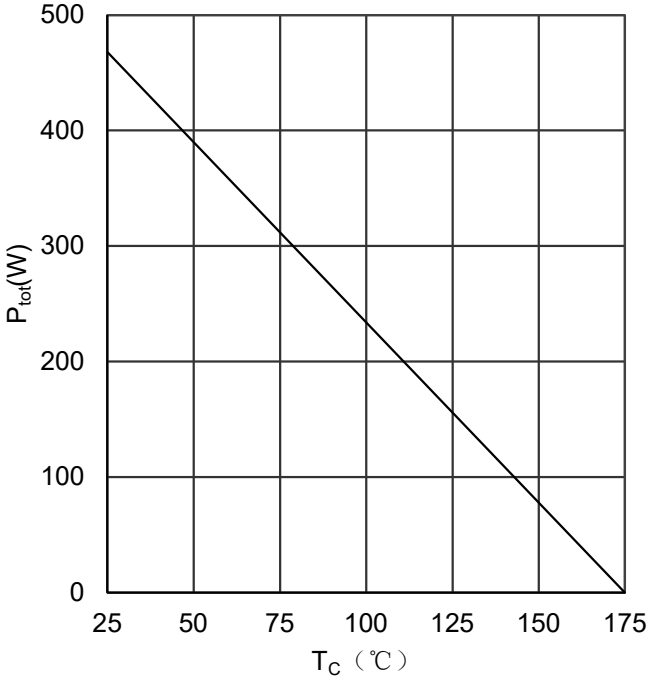
传输特性（典型）
Transfer characteristic(typical)
$I_C = f(V_{GE})$
V_{CE} = 20V



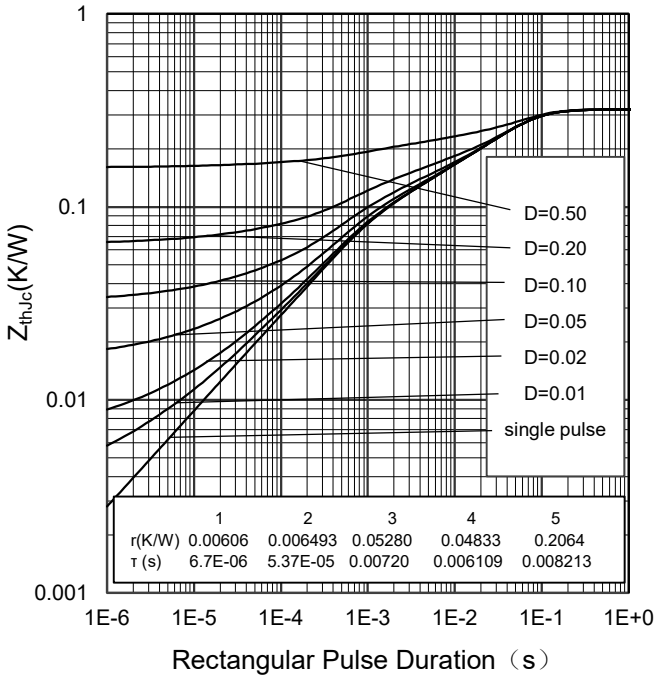
集电极－发射极饱和电压（典型）
Collector-emitter saturation voltage as afunction of junction temperature(typical)
$V_{CEsat} = f(T_{vj})$
V_{GE} = 15V



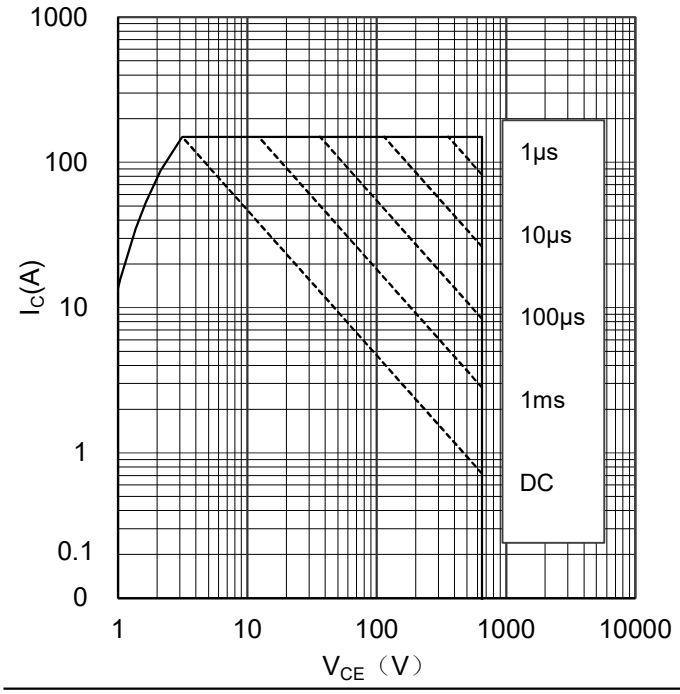
耗散功率
Power dissipation as a function of case temperature
$P_{tot} = f(T_c)$
$T_{vj} \leqslant 175$ °C



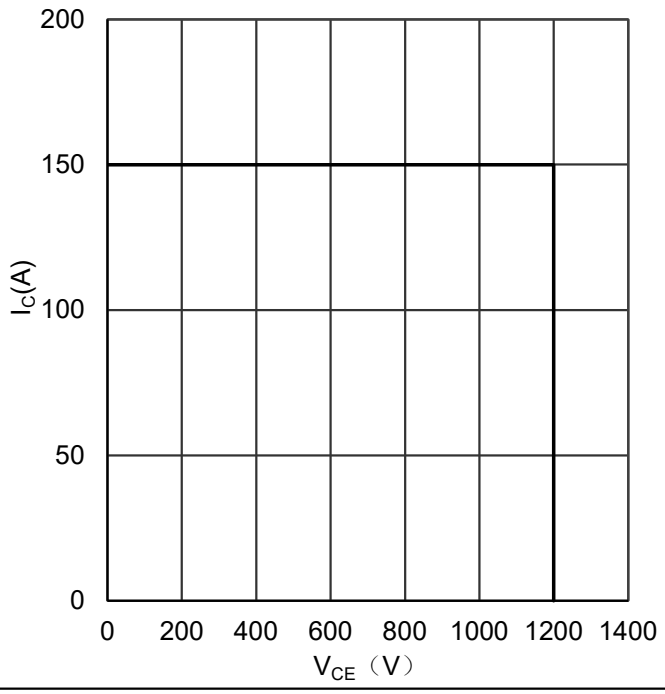
IGBT瞬态热阻抗
IGBT transient thermal impedance as a function of pulse width
$Z_{th(j-c)} = f(t_p)$
$D = t_p/T$



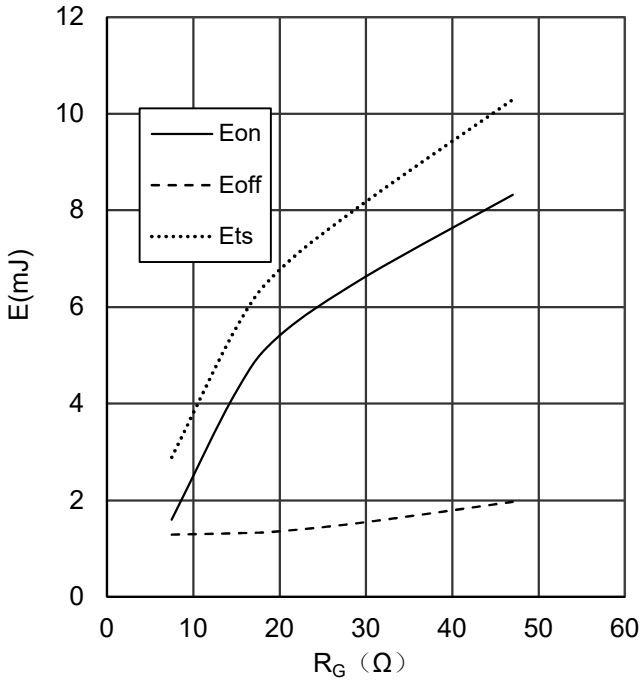
正向安全工作区（FBSOA）
Forward bias safe operating area(FBSOA)
$I_C = f(V_{CE})$
single pulse, $T_{vj} < 175$°C, $T_C = 25$°C, $V_{GE} = 15$V



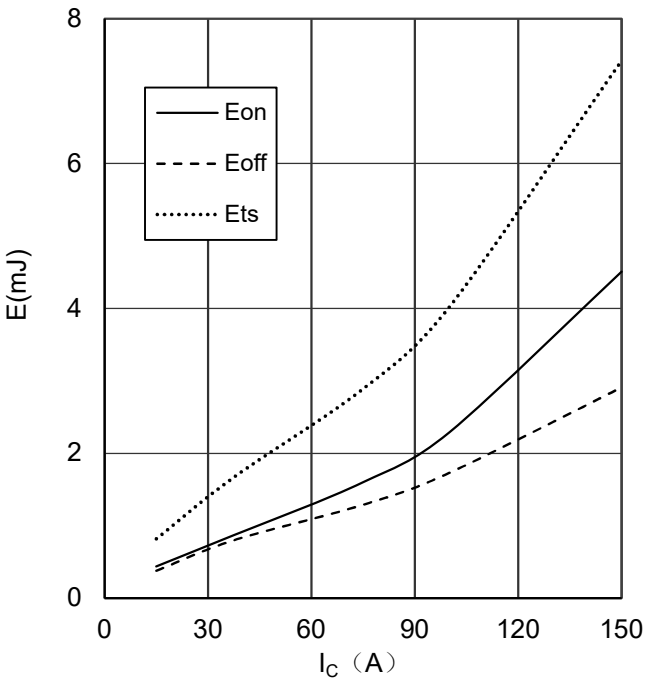
反偏安全工作区（RBSOA）
Reverse bias safe operating area(RBSOA)
$I_C = f(V_{CE})$
$V_{GE} = \pm 15$V, $R_{goff} = 7.5\Omega$, $T_{vj} = 150$°C



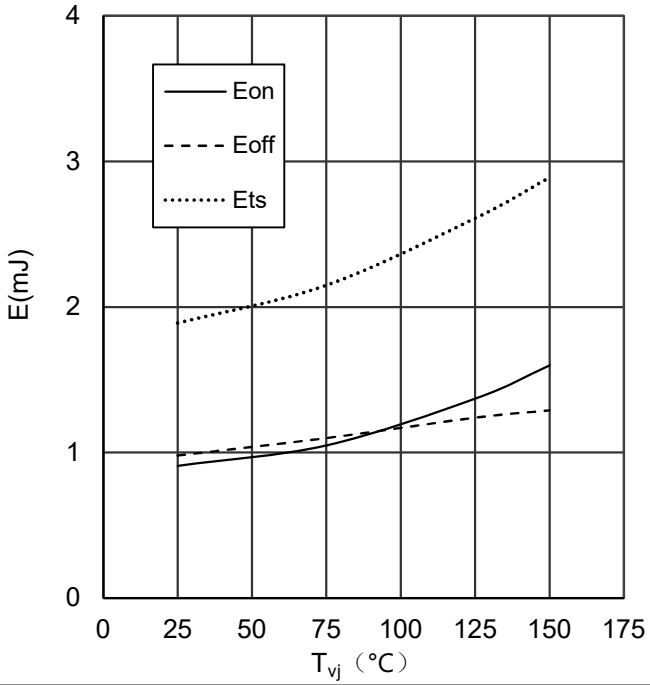
IGBT开关损耗（典型）
Switching losses IGBT (typical)
E = f (R_G)
V_{GE} = ±15V, I_C = 75A, V_{CE} = 400V, T_{vj} = 150°C



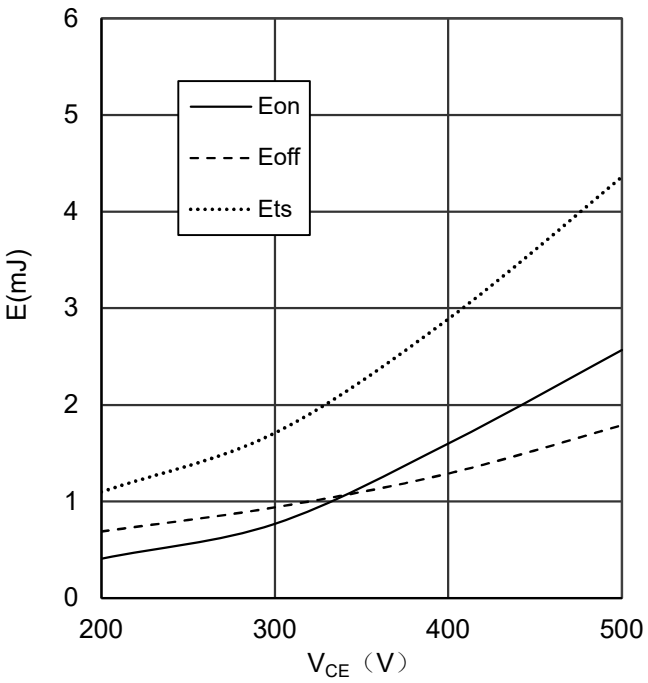
IGBT开关损耗（典型）
Switching losses IGBT (typical)
E = f (I_C)
V_{GE} = ±15V, R_G = 7.5Ω , V_{CE} = 400V, T_{vj} = 150°C



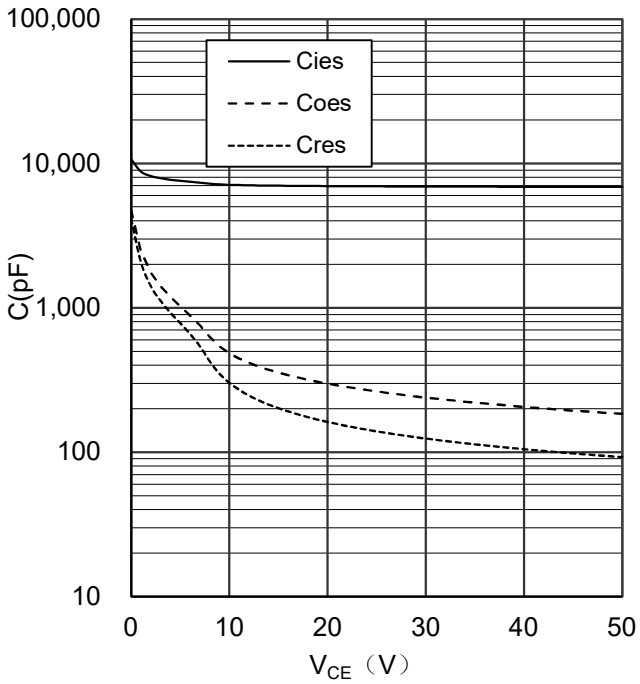
IGBT开关损耗（典型）
Switching losses IGBT (typical)
E = f (T_{vj})
V_{GE} = ±15V, I_C = 75A, R_G = 7.5Ω, V_{CE} = 400V



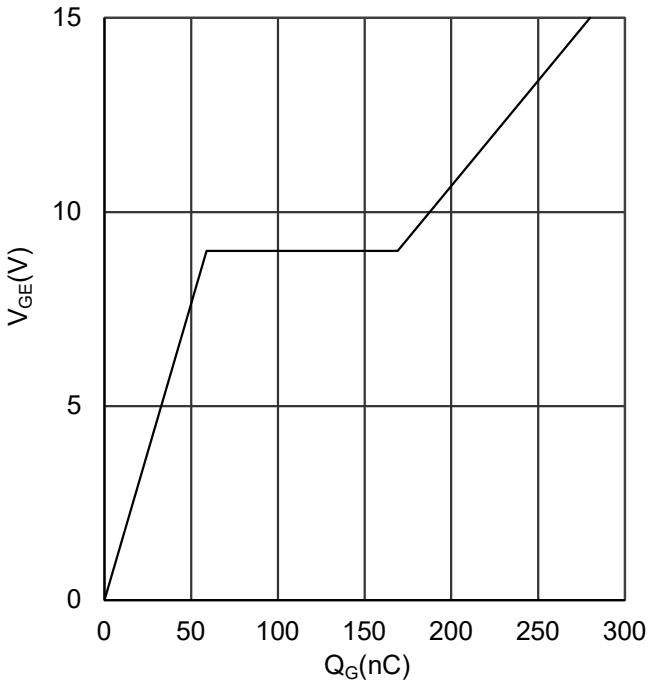
IGBT开关损耗（典型）
Switching losses IGBT (typical)
E = f (V_{CE})
V_{GE} = ±15V, I_C = 75A, R_G = 7.5Ω, T_{vj} = 150°C



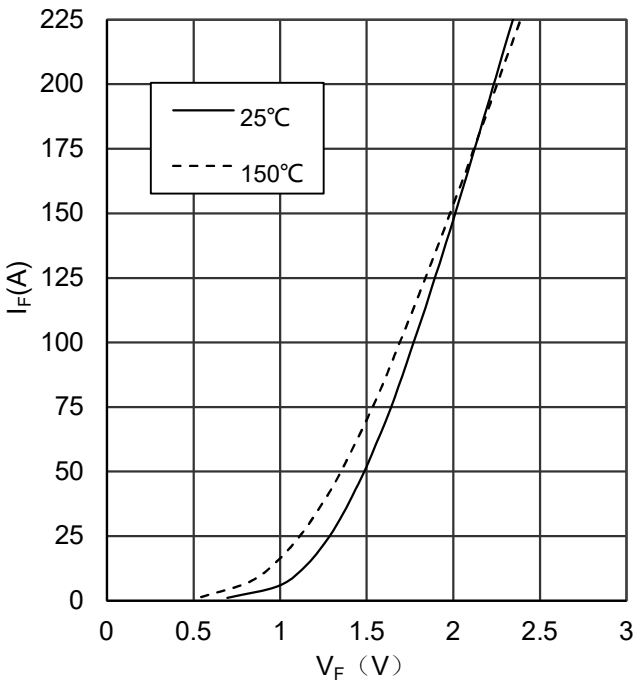
电容（典型）
Typical capacitance as a function of collector-emitter voltage
$C = f(V_{CE})$
$f = 1MHz$, $V_{GE} = 0V$



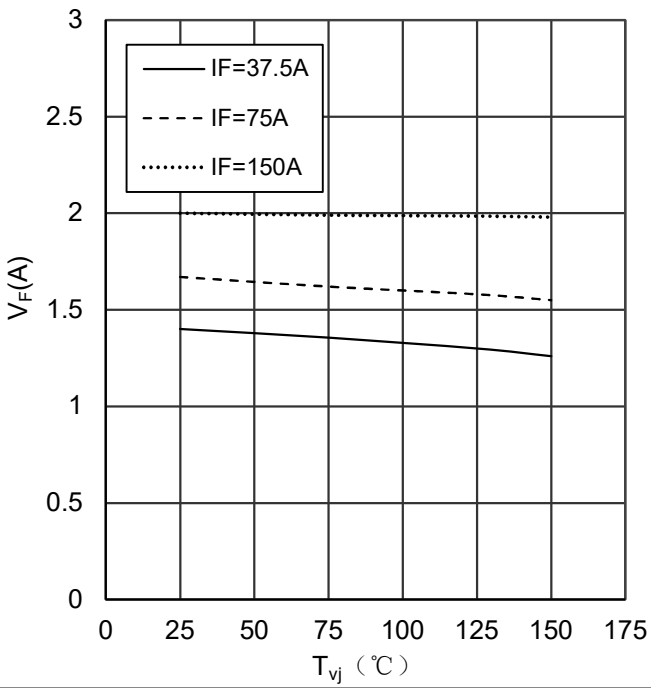
门极电荷（典型）
Gate charge (typical)
$V_{GE} = f(Q_G)$
$I_C = 75A$, $V_{CE} = 400V$



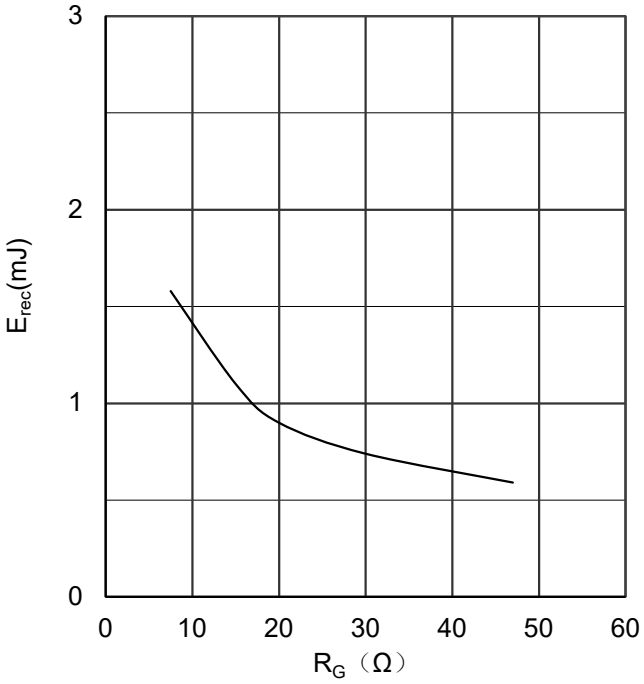
正向偏压特性 二极管（典型）
Forward characteristic of Diode (typical)
$I_F = f(V_F)$



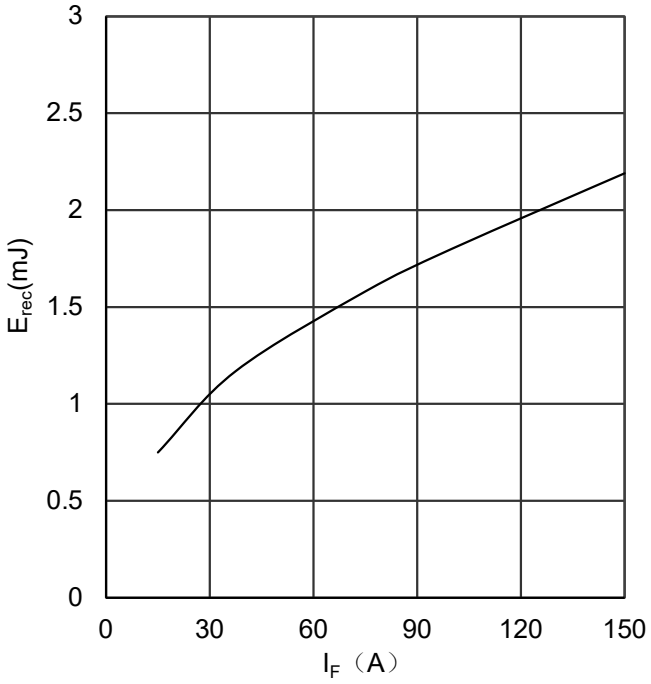
正向偏压特性 二极管（典型）
Forward characteristic of Diode (typical)
$V_F = f(T_{vj})$



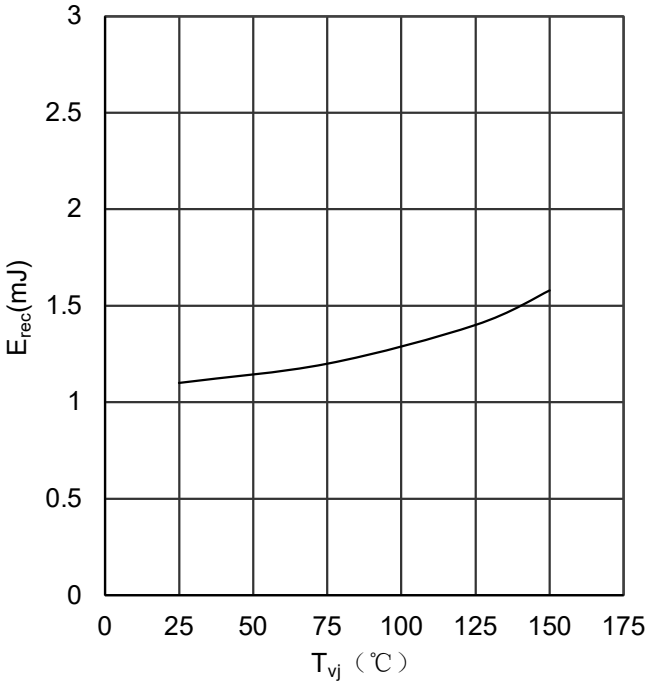
开关损耗 二极管（典型）
Switching losses Diode(typical)
$E_{rec} = f(R_G)$
$I_F = 75A$, $V_{CE} = 400V$, $T_{vj} = 150°C$



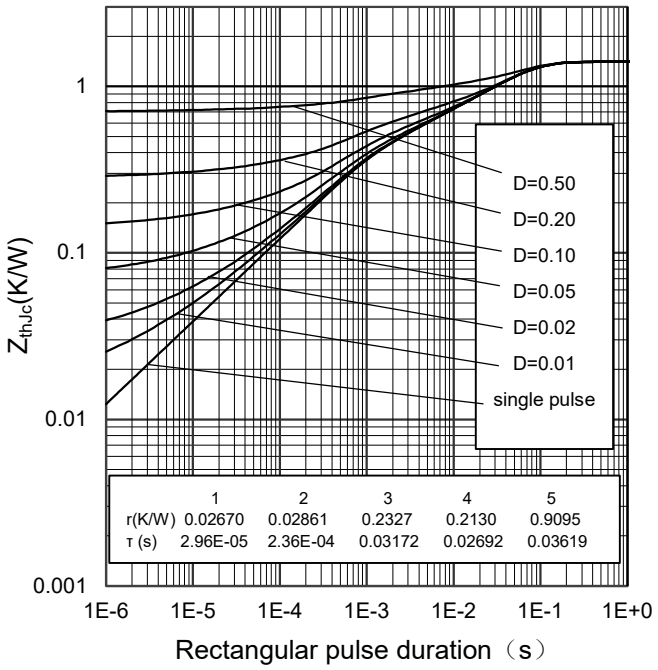
开关损耗 二极管（典型）
Switching losses Diode(typical)
$E_{rec} = f(I_F)$
$R_G = 7.5Ω$, $V_{CE} = 400V$, $T_{vj} = 150°C$



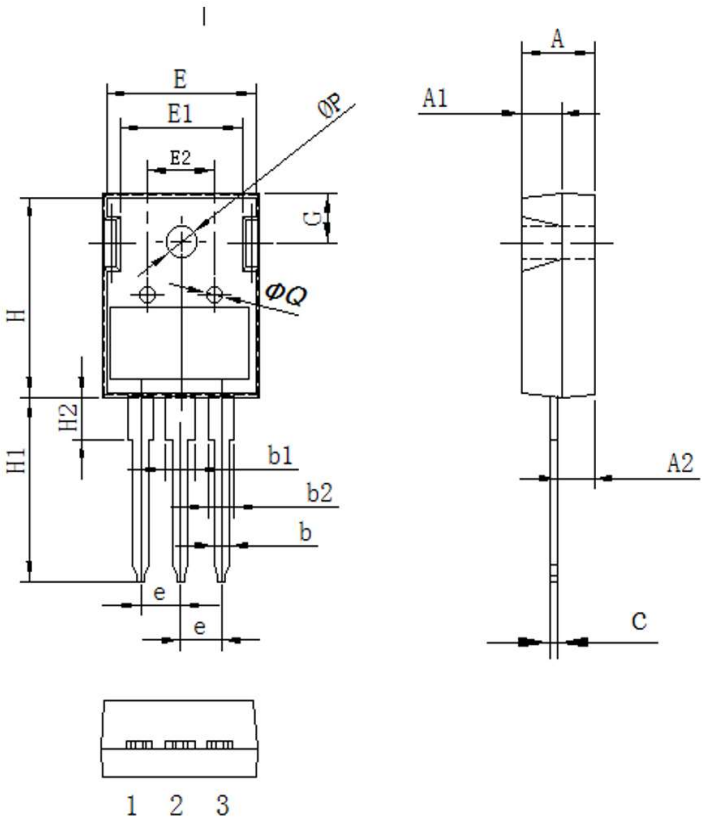
开关损耗 二极管（典型）
Switching losses Diode(typical)
$E_{rec} = f(T_{vj})$
$I_F = 75A$, $R_G = 7.5Ω$, $V_{CE} = 400V$



二极管瞬态热阻抗
Diode transient thermal impedance as a function of pulse width
$Z_{th(j-c)} = f(t_p)$
$D = t_p/T$



Package outlines / 封装尺寸



Symbol	单位 mm		
	Min	Nom	Max
A	4.80	5.00	5.20
A1	2.80	3.00	3.20
A2	2.20	2.40	2.60
b	1.05	1.20	1.35
b1	2.80	3.00	3.20
b2	1.80	2.00	2.20
c	0.50	0.60	0.70
e	5.35	5.45	5.75
E	15.6	15.80	16.0
E1	12.3	12.50	12.7
E2	6.00	6.20	6.40
H	20.5	21.0	21.5
H1	19.0	20.0	21.0
H2	3.00	4.00	5.00
G	5.70	5.90	6.10
ΦP	3.30	3.50	3.50
ΦQ	2.30	2.50	2.70