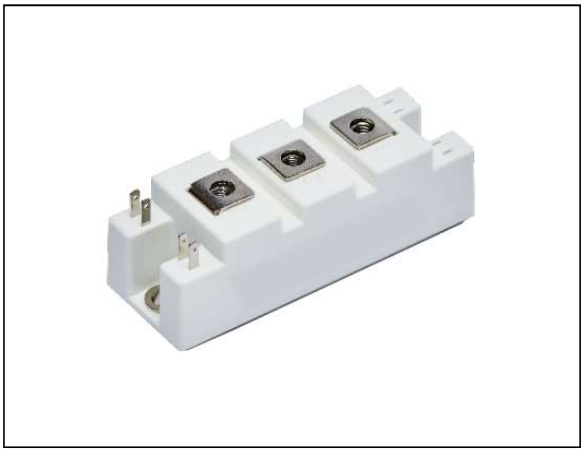
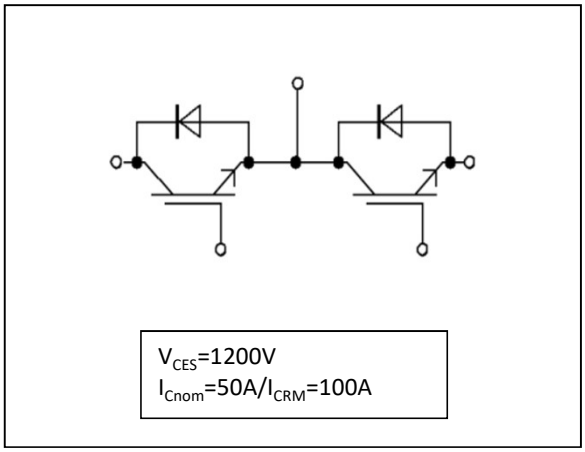
1200V 50A IGBT Half Bridge Module

1200V 50A IGBT 半桥模块





Features:

- ☐ 1200V Trench+ Field Stop technology
- ☐ Freewheeling diodes with fast and soft reverse recovery
- ☐ $V_{CE(sat)}$ with positive temperature coefficient
- ☐ Low switching losses

产品特性：

- ☐ 1200V沟槽栅+场截止技术
- ☐ 快速的软恢复特性续流二极管
- ☐ 导通压降具有正温度系数
- ☐ 低开关损耗

Typical Applications:

- ☐ Welding
- ☐ Inductive Heating
- ☐ High Frequency Switching application
- ☐ Inverter

典型应用：

- ☐ 电焊机
- ☐ 感应加热
- ☐ 高频开关应用
- ☐ 逆变器

Package / 封装

Item	Symbol	Conditions	Values	Unit
绝缘测试电压 Isolation test voltage	V_{ISOL}	RMS, f = 50 Hz, t =1 min	4.0	kV
模块基板材料 Material of module baseplate			Cu	
内部绝缘 Internal isolation		基本绝缘 (class 1, IEC 61140) Basic insulation (class 1, IEC 61140)	Al_2O_3	
爬电距离 Creepage distance	d_{Creep}	端子-散热片/terminal to heatsink	17.0	mm
	d_{Creep}	端子-端子/terminal to terminal	20.0	
电气间隙 Clearance	d_{Clear}	端子-散热片/terminal to heatsink	17.0	mm
	d_{Clear}	端子-端子/terminal to terminal	9.5	
相对电痕指数 Comparative tracking index	CTI		＞200	

Item	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
杂散电感，模块 Stray inductance module	L_{sCE}			20		nH
模块引线电阻,端子-芯片 Module lead resistance, terminals - chip	$R_{CC'+EE'}$	T_C=25°C		0.65		mΩ
储存温度 Storage temperature	T_{stg}		-40		125	°C
模块安装的安装扭矩 Mounting torque for module mounting	M6		3.0		5.0	Nm
端子联接扭矩 Terminal connection torque	M5		2.5		5.0	Nm
重量 Weight	G			155		g

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	1200	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}	$t_p \leq 10\mu s$,D=0.01		±30	V
连续集电极直流电流 Continuous DC collector current	I_C		T_C=25°C	80	A
			T_C=100°C	50	
最大脉冲集电极电流 Pulsed collector current,tp limited by T_{jmax}	I_{Cpulse}			100	A
功率损耗 Power dissipation	P_{tot}			326	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=50A, V_{GE}=15V	T_{vj}=25°C		2.18	2.65	V
			T_{vj}=125°C		2.75		
			T_{vj}=150°C		2.87		
栅极阈值电压 Gate threshold voltage	$V_{GE(th)}$	V_{CE}=V_{GE}, I_C=2mA		5.2	5.8	6.4	V
集电极-发射极截止电流 Collector-emitter cut-off current	I_{CES}	V_{CE}=1200V, 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
栅极电荷 Gate Charge	Q_G	V_{CE}=600V, I_C=50A , V_{GE}=±15V			0.27		μC
输入电容 Input Capacitance	C_{ies}	V_{CE}=25V, V_{GE}=0V, f =1MHz			3.0		nF
反向传输电容 Reverse Transfer Capacitance	C_{res}				0.14		
内部栅极电阻 Internal gate resistor	R_{Gint}	T_{vj}=25°C			2.7		Ω
开通延迟时间（电感负载） Turn-on delay time,inductive load	$t_{d(on)}$	V_{CC}=600V,I_C=50A R_G=15Ω, V_{GE}=±15V	T_{vj}=25°C		60		ns
			T_{vj}=125°C		64		ns
			T_{vj}=150°C		64		ns
上升时间（电感负载） Rise Time,inductive load	t_r		T_{vj}=25°C		36		ns
			T_{vj}=125°C		42		ns
			T_{vj}=150°C		45		ns
关断延迟时间（电感负载） Turn-off delay time,inductive load	$t_{d(off)}$	V_{CC}=600V,I_C=50A R_G=15Ω, V_{GE}=±15V	T_{vj}=25°C		158		ns
			T_{vj}=125°C		181		ns
			T_{vj}=150°C		209		ns
下降时间（电感负载） Fall time,inductive load	t_f		T_{vj}=25°C		111		ns
			T_{vj}=125°C		129		ns
			T_{vj}=150°C		199		ns
开通损耗能量（每脉冲） Turn-on energy loss per pulse	E_{on}	V_{CC}=600V,I_C=50A R_G=15Ω, V_{GE}=±15V	T_{vj}=25°C		3.3		mJ
			T_{vj}=125°C		5.0		mJ
			T_{vj}=150°C		6.3		mJ
关断损耗能量（每脉冲） Turn off Energy loss per pulse	E_{off}		T_{vj}=25°C		1.9		mJ
			T_{vj}=125°C		2.4		mJ
			T_{vj}=150°C		2.7		mJ
短路数据 SC data	I_{SC}	V_{GE}≤15V, V_{CC}=800V	tp≤10μs T_{vj}=150°C			164	A
IGBT结-外壳热阻 IGBT thermal resistance,junction-case	R_{thJC}					0.46	K /W
工作温度 Operating Temperature	T_{Jop}			-40		150	°C

Diode / 二极管

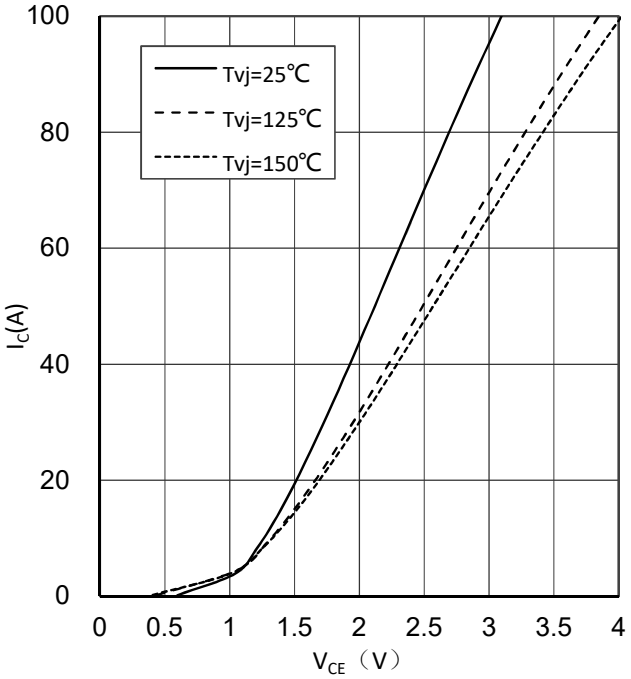
Maximum Rated Values / 最大额定值

Item	Symbol	Conditions		Values	Unit
反向重复峰值电压 Repetitive reverse voltage	V_{RRM}		T_{vj}=25°C	1200	V
连续正向直流电流 Continuous DC forward current	I_F			50	A
二极管正向不重复峰值电流 Diode pulsed current,tp limited by T_{Jmax}	I_{Fpulse}			100	A
I^2t值 I^2t-value	I^2t			613	A^2t

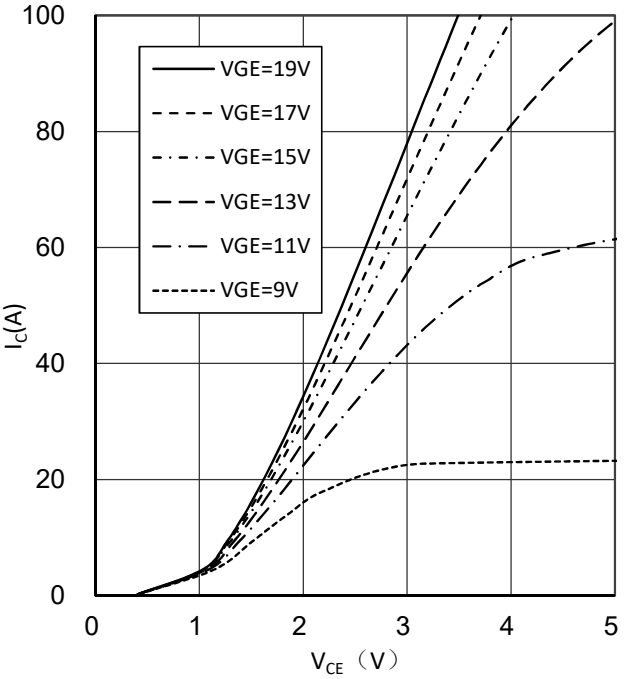
Characteristic Values / 特征值

Item	Symbol	Conditions		Values			Unit
				Min.	Typ.	Max.	
正向电压 Forward voltage	V_F	I_F=50A , V_{GE}=0V	T_{vj}=25°C		2.20	2.70	V
			T_{vj}=125°C		1.75		
			T_{vj}=150°C		1.65		
反向恢复峰值电流 Peak reverse recovery current	I_{RRM}	I_F=50A dI_F/dt=-1230A/μs (T_{vj}=150°C) V_R=600V, V_{GE}=-15V	T_{vj}=25°C		14		A
			T_{vj}=125°C		27		
			T_{vj}=150°C		29		
反向恢复电荷 Reverse recovery charge	Q_{RR}		T_{vj}=25°C		1.9		μC
			T_{vj}=125°C		5.5		
			T_{vj}=150°C		6.6		
反向恢复损耗（每脉冲） Reverse recovery energy loss per pulse	E_{rec}		T_{vj}=25°C		0.6		mJ
			T_{vj}=125°C		1.6		
			T_{vj}=150°C		2.0		
二极管结-外壳热阻 Diode thermal resistance,junction-case	R_{thJCD}					0.95	K /W
工作温度 Operating Temperature	T_{Jop}			-40		150	°C

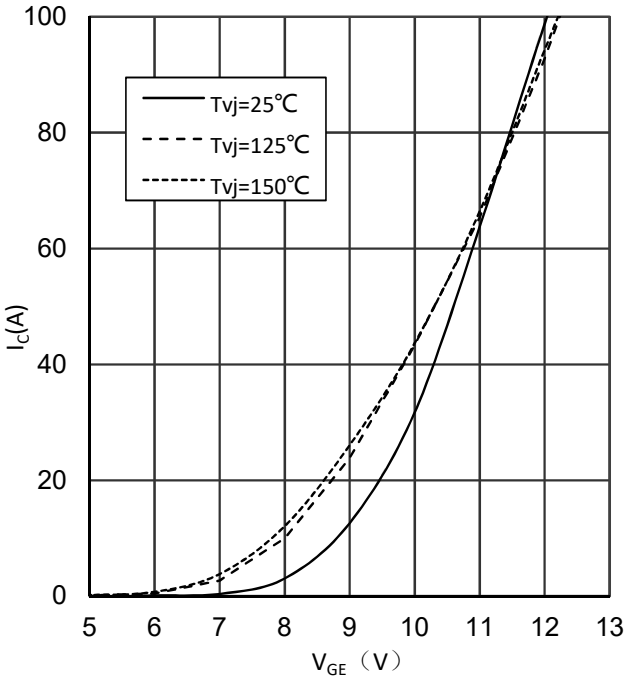
输出特性（典型）
Output characteristic(typical)
$I_C = f(V_{CE})$



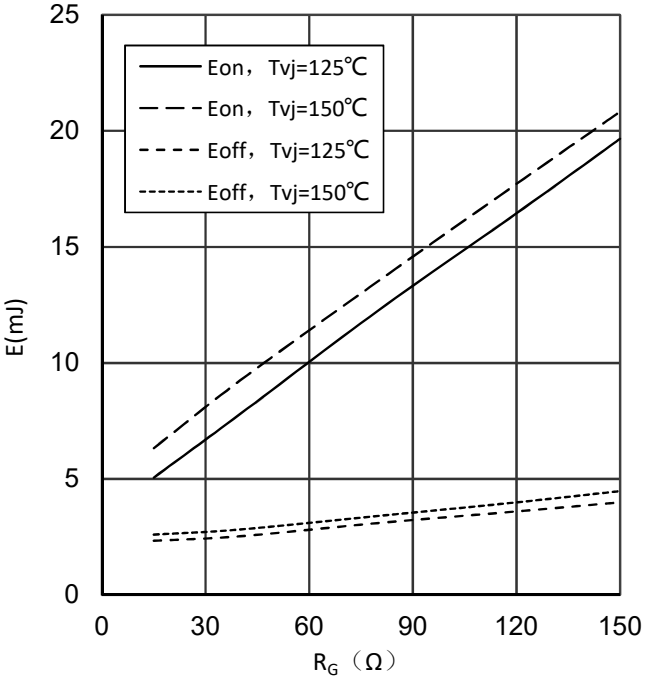
输出特性（典型）
Output characteristic(typical)
$I_C = f(V_{CE})$
T_{vj}= 150°C



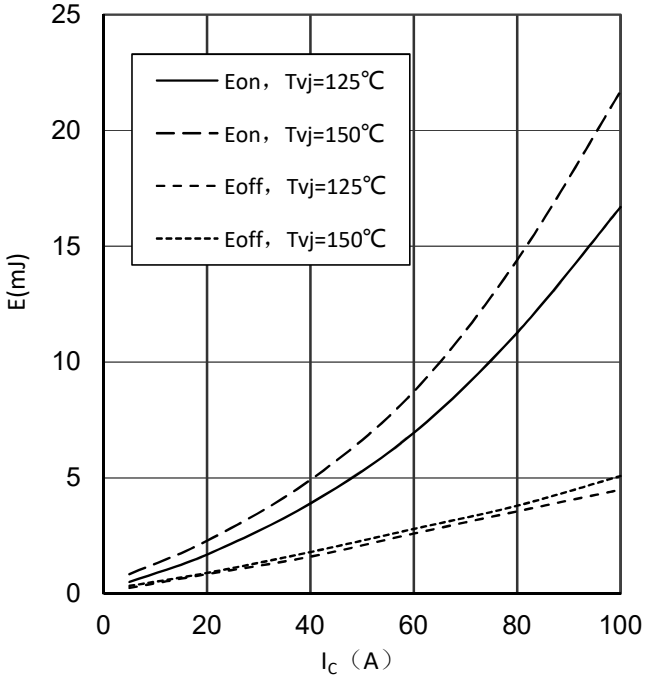
传输特性（典型）
Transfer characteristic(typical)
$I_C = f(V_{GE})$
V_{CE} = 20V



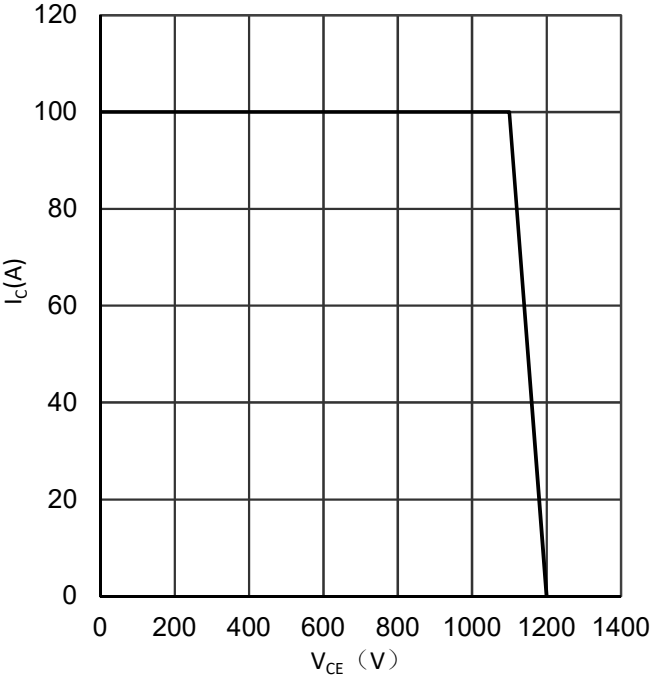
IGBT开关损耗（典型）
Switching losses IGBT (typical)
$E = f(R_G)$
V_{GE} = ±15V, I_C = 50A, V_{CE} = 600V



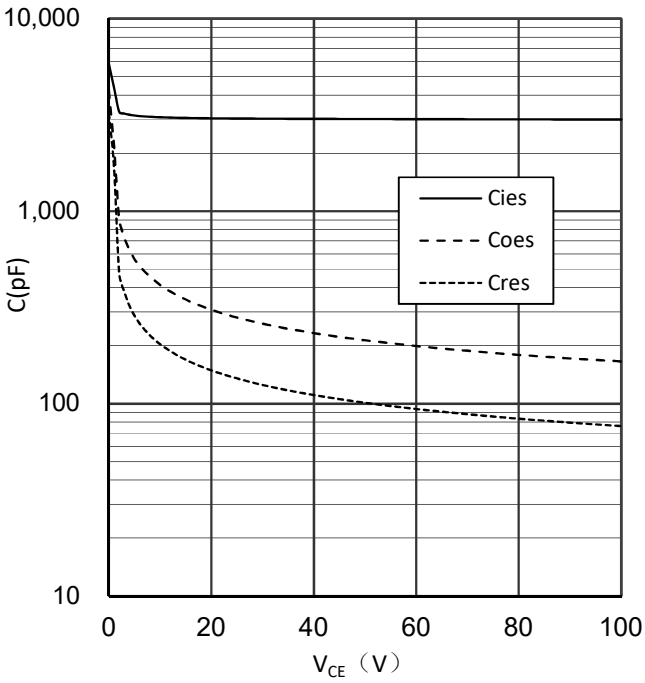
IGBT开关损耗（典型）
Switching losses IGBT (typical)
$E = f(I_C)$
V_{GE} = ±15V, R_G = 15Ω , V_{CE} = 600V



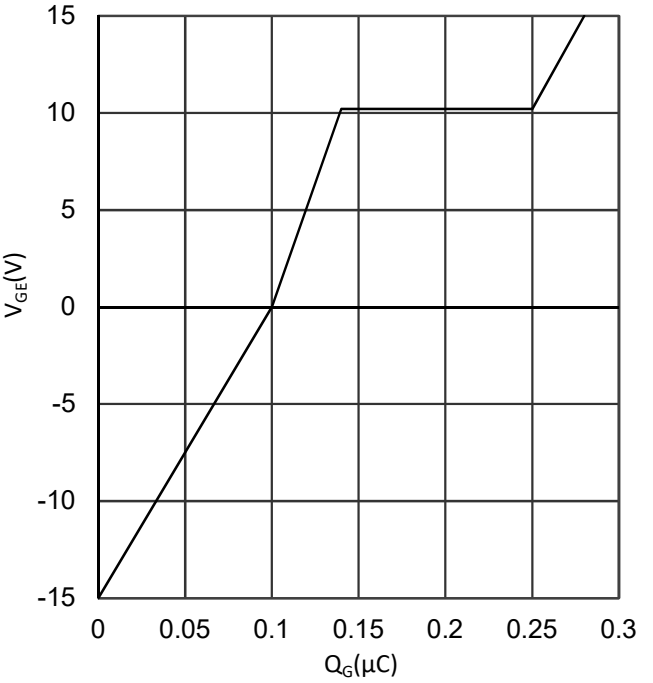
反偏安全工作区（RBSOA）
Reverse bias safe operating area(RBSOA)
$I_C = f(V_{CE})$
V_{GE} = ±15V, R_{goff} = 15Ω, T_{vj} = 150°C



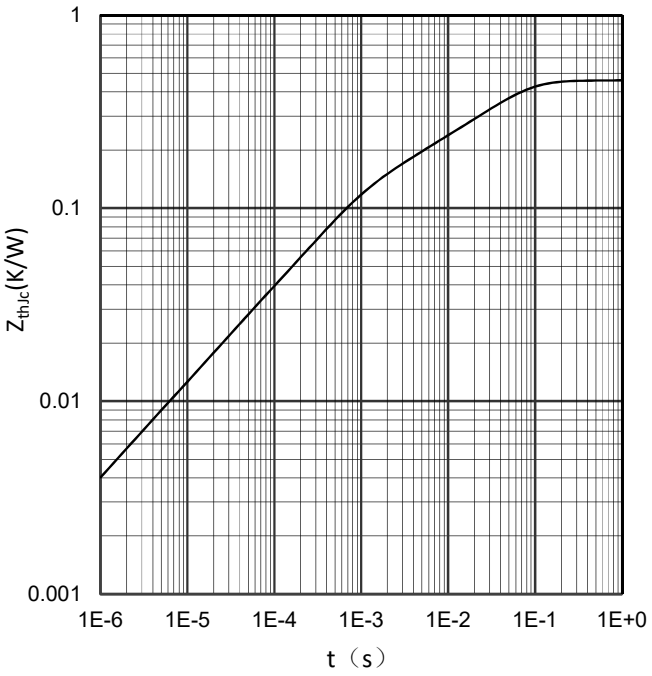
电容（典型）
Typical capacitance as a function of collector-emitter voltage
$C = f(V_{CE})$
f = 100 kHz, V_{GE} = 0V



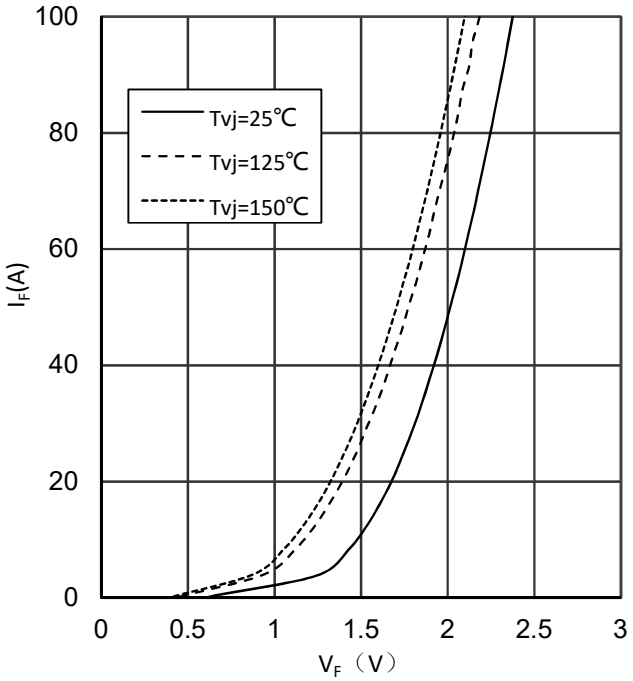
门极电荷（典型）
Gate charge (typical)
$V_{GE} = f(Q_G)$
I_C = 50A, V_{CE} = 600V



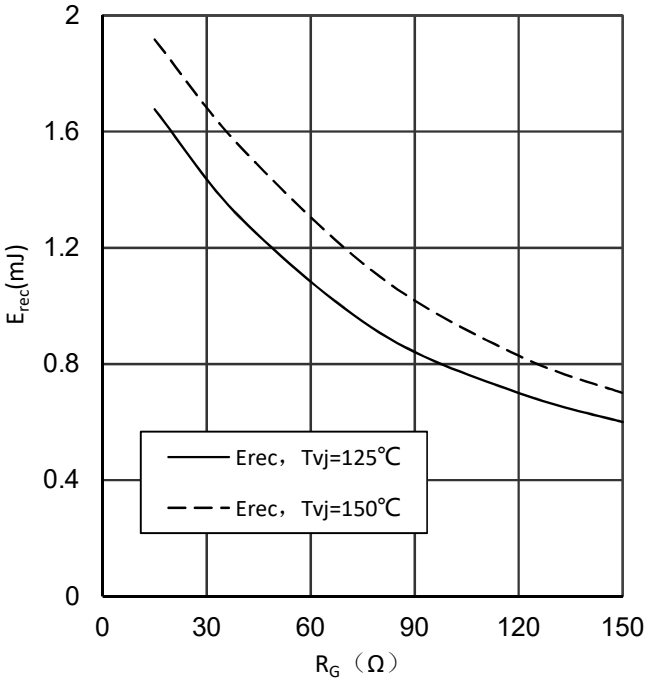
IGBT瞬态热阻抗
IGBT transient thermal impedance as a function of pulse width
$Z_{th(j-c)} = f(t)$



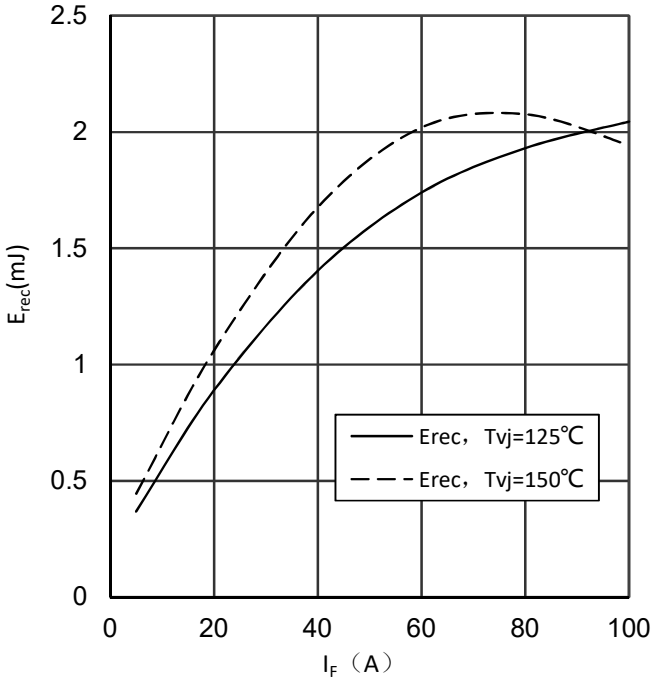
正向偏压特性 二极管（典型）
Forward characteristic of Diode (typical)
$I_F = f(V_F)$



开关损耗 二极管（典型）
Switching losses Diode(typical)
$E_{rec} = f(R_G)$
I_F = 50A, V_{CE} = 600V



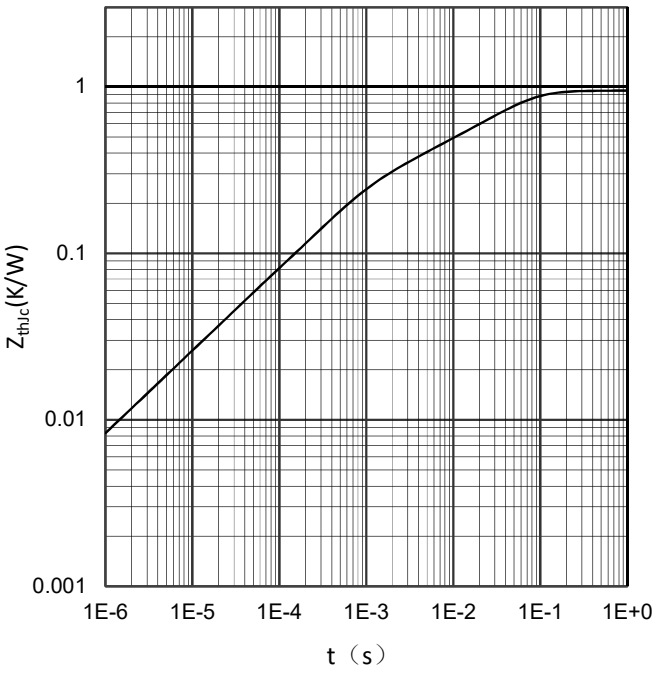
开关损耗 二极管（典型）
Switching losses Diode(typical)
$E_{rec} = f(I_F)$
R_G = 15Ω, V_{CE} = 600V



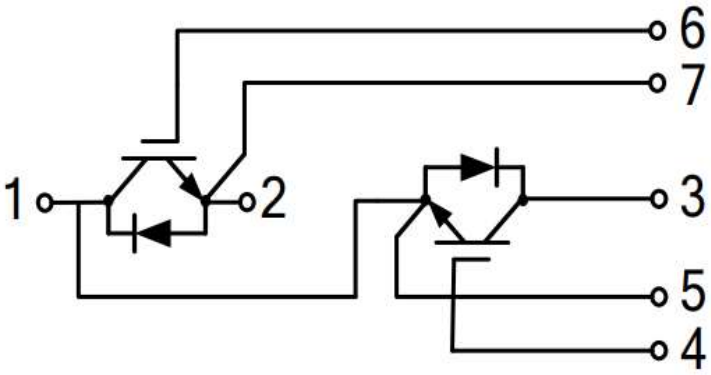
二极管瞬态热阻抗

Diode transient thermal impedance as a function of pulse width

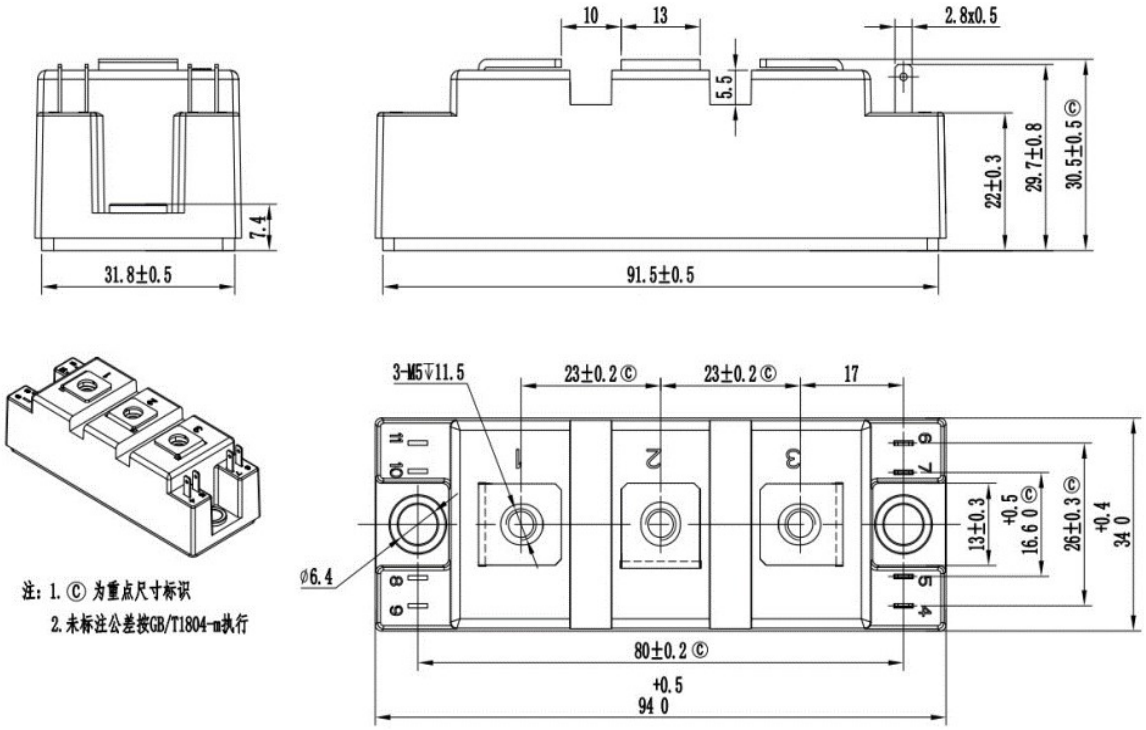
$Z_{th(j-c)} = f(t)$



Circuit diagram headline / 接线图



Package outlines / 封装尺寸



Dimensions in (mm)

单位：mm