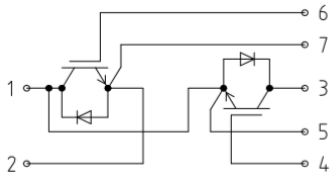
IGBT 34mm 半桥模块

Features 产品特性



- 1200V 150A $V_{CE(sat)(typ.)}$= 2.5V
- Planar Field-stop Technology 平面栅场截止技术
- High RBSOA Capability 高 RBSOA 性能
- Low Turn-off Losses 低关断损耗

Typical Application 典型应用

- Inductive Heating 感应加热
- Welding 电焊机
- High Frequency Switch Application 高频开关应用

IGBT Maximum Rated Values

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage（T_{vj}=25℃） 集电极-发射极电压	1200	V
V_{GES}	Gate-Emitter Voltage 栅极-发射极峰值电压	± 20	V
I_C	Continuous Collector Current （T_C=80℃,$T_{vj\ max}$=150℃） 集电极连续直流电流	150	A
I_{CRM}	Repetitive Peak Collector Current 集电极可重复峰值电流	300	A
P_D	Maximum Power Dissipation (T_C=25℃,$T_{vj\ max}$=150℃) 总功率损耗	1040	W

IGBT Characteristics

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage 集电极-发射极饱和压降	V_{GE}=15V, I_C=150A T_{vj}=25℃	-	2.5	3.0	V

		V_{GE}=15V, I_C=150A T_{vj}=125℃		2.9		
		V_{GE}=15V, I_C=150A T_{vj}=150℃	-	3.0	-	
$V_{GE(th)}$	Gate Threshold Voltage 栅极阈值电压	V_{GE}=V_{CE}, I_C=2mA T_{vj}=25℃	5.0	6.0	7.0	V
Q_g	Total Gate Charge 栅极电荷	V_{GE}=-15V…+15V	-	1.1		uC
R_{Gint}	Internal Gate Resistor 内置栅极电阻	T_{vj}=25℃		5		Ω
C_{ies}	Input Capacitance 输入电容	V_{CE}=25V V_{GE}=0V f=1MHz	-	6.4	-	nF
C_{res}	Reverse Transfer Capacitance 反向传输电容		-	0.31	-	nF
I_{CES}	Collector-Emitter Leakage Current 集电极-发射极关断漏电流	V_{CE}=1200V, V_{GE}=0V T_{vj}=25℃	-	-	1.0	mA
I_{GES}	Gate-Emitter Leakage Current, Forward 栅极发射极漏电流	V_{GE}=20V, V_{CE}=0V T_{vj}=25℃	-	-	200	nA
	Gate-Emitter Leakage Current, Reverse 栅极发射极反向漏电流	V_{GE}=-20V, V_{CE}=0V T_{vj}=25℃	-	-	-200	nA
$t_{d(on)}$	Turn-on Delay Time 开通延迟时间，感性负载	V_{CE} = 600V I_C = 150A V_{GE} = ±15V R_{Gon} = 5.1Ω	T_{vj}=25℃ 125℃ 150℃	- 95 105 110	-	ns
t_r	Turn-on Rise Time 上升时间，感性负载		T_{vj}=25℃ 125℃ 150℃	- 75 85 90	-	ns
$t_{d(off)}$	Turn-off Delay Time 关断延迟时间，感性负载	V_{CE} = 600V I_C = 150A V_{GE} = ±15V R_{Goff} = 10Ω	T_{vj}=25℃ 125℃ 150℃	- 460 525 530	-	ns
t_f	Turn-off Fall Time 下降时间，感性负载		T_{vj}=25℃ 125℃ 150℃	- 30 35 35	-	ns
Eon	Turn-on Switching Loss 开通损耗，感性负载	V_{CE} = 600V I_C = 150A V_{GE} = ±15V R_{Gon} = 5.1Ω R_{Goff} = 10Ω L_σ = 80nH	T_{vj}=25℃ 125℃ 150℃	- 17 23 23.5	-	mJ
Eoff	Turn-off Switching Loss 关断损耗，感性负载		T_{vj}=25℃ 125℃ 150℃	- 6.3 8.5 9.0	-	mJ

$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to Case 结-壳热阻	Per IGBT/单个 IGBT	-	0.12	-	K/W
$T_{vj\ op}$	Temperature Under Switching Condition 工作温度		-40	-	150	℃

Diode Maximum Rated Values

Symbol	Parameter	Value	Units
V_{RRM}	Repetitive Peak Reverse Voltage 可重复反向峰值电压	1200	V
I_F	Continuous DC Forward Current 可连续正向直流电流	150	A
I_{FRM}	Repetitive Peak Collector Current 可重复正向峰值电流	300	A

Diode Characteristics

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage 正向通态压降	I_F = 150A V_{GE} = 0V	T_{vj}=25℃ 125℃ 150℃	-	2.1 2.2 2.2	3.0	V
I_{RM}	Peak Reverse Recovery Current 反向恢复峰值电流	I_C = 150A V_R=600V -di/dt=2400A/us V_{GE} = -15V	T_{vj}=25℃ 125℃ 150℃	-	75 75 75	-	A
Q_{rr}	Reverse Recovery Charge 反向恢复电荷		T_{vj}=25℃ 125℃ 150℃	-	7.0 12.5 13.5	-	uC
E_{rec}	Reverse Recovery Energy 反向恢复损耗		T_{vj}=25℃ 125℃ 150℃	-	3.5 5.5 6.2	-	mJ
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to Case 结-壳热阻	Per Diode/ 单个 Diode		-	0.24		K/W
$T_{vj\ op}$	Temperature Under Switching Condition 工作温度			-40	-	150	℃

Module

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
R_{thc-h}	Thermal Resistance，Case to Heatsink 外壳-散热片热阻	Per Module/每个模块		0.05		K/W
L_{sCE}	Stray Inductance Module 模块杂散电感			30		nH
$R_{CC'+EE'}$ $R_{AA'+CC'}$	Module Lead Resistance，Terminals-Chip 模块引脚电阻，端子-芯片	T_C = 25℃， Per Switch 每个开关		0.65		mΩ
T_{stg}	Storage Temperature 存储温度		-40		125	℃
M	Module Mounting Torque 模块安装扭矩	M6 screws	3.0		5.0	Nm
M	Terminal Mounting Torque 端子安装扭矩	M5 screws	2.5		6.0	Nm
G	Weight 重量			145		g

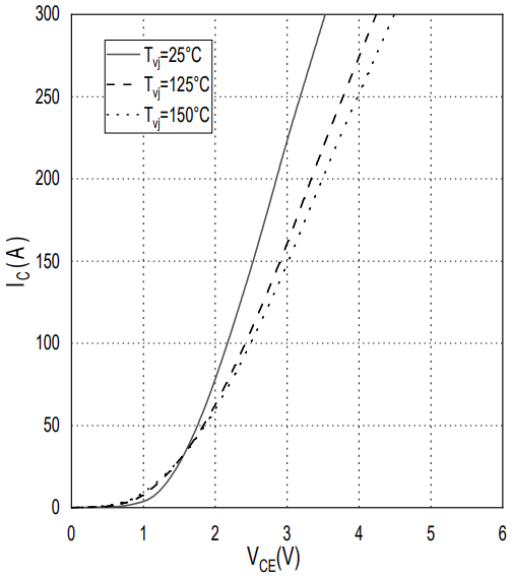
V_{ISO}	Isolation Test Voltage 绝缘测试电压	RMS, f=50 Hz, t=1 min	3.0	kV
	Material of Module Baseplate 模块底板材料		Cu	
	Internal Isolation 内部绝缘	basic insulation (class 1, IEC 61140) 基本绝缘(class 1, IEC 61140)	Al_2O_3	
	Clearance Distance in Air 电气间隙	Terminal to heatsink 端子-散热片 Terminal to terminal 端子-端子	17 9.5	mm
	Surface Creepage Distance 爬电距离	Terminal to heatsink 端子-散热片 Terminal to terminal 端子-端子	17 20	mm
CTI	Comparative Tracking Index 相对漏电起痕指数		>200	

Typical Performance Characteristics

IGBT output characteristics（typical）

$I_C = f(V_{CE})$

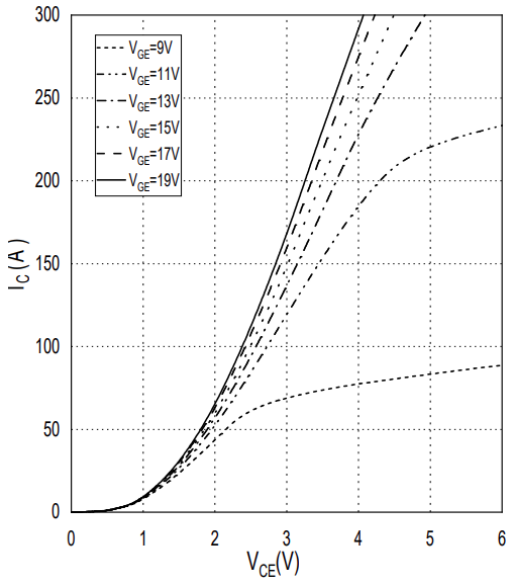
V_{GE} = 15V



IGBT output characteristics（typical）

$I_C = f(V_{CE})$

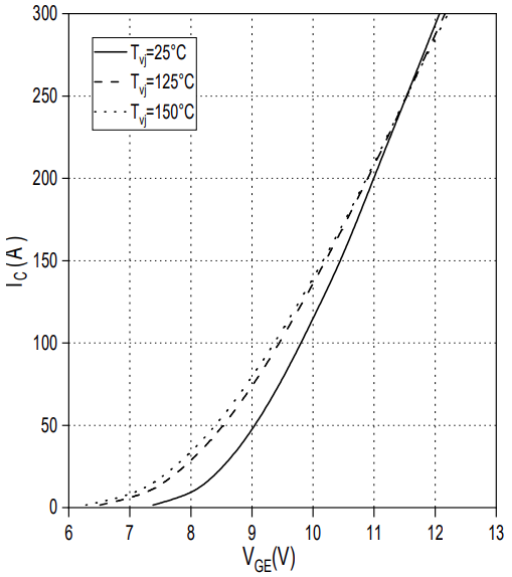
T_{vj} = 150℃



IGBT Transfer characteristics（typical）

$I_C = f(V_{CE})$

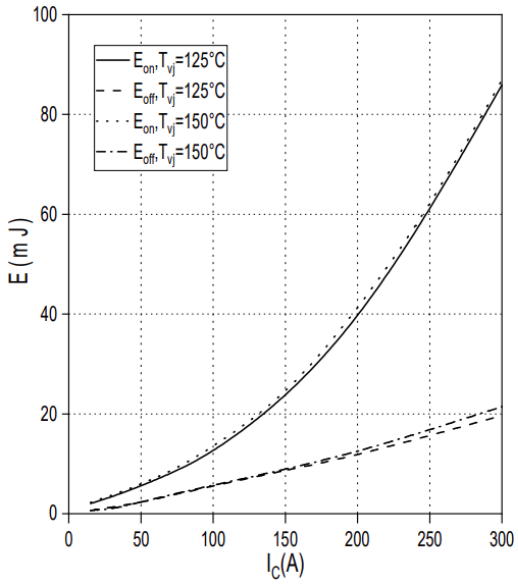
V_{CE} = 20V



IGBT Switching losses（typical）

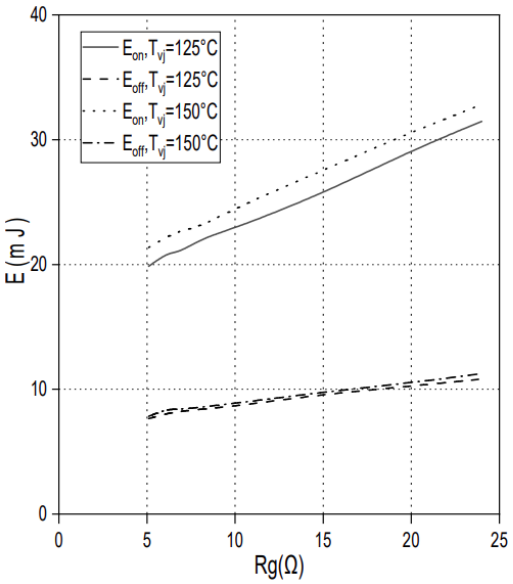
$E_{on} = f(I_C), E_{off} = f(I_C), V_{GE} = \pm 15V$

R_{Gon} = 5.1 Ω,, R_{Goff} = 10Ω, V_{CE} = 600V



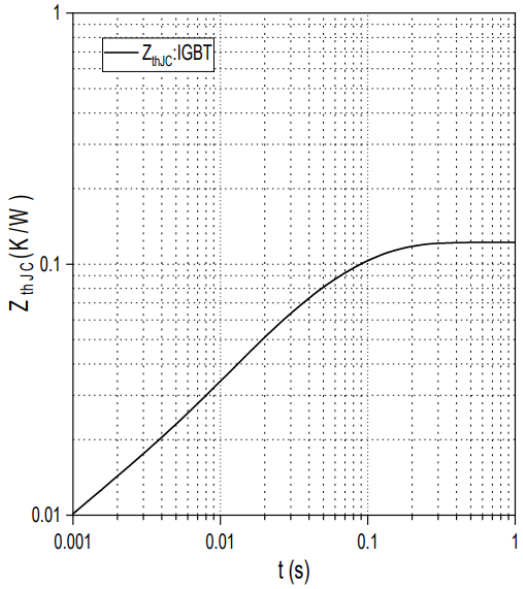
IGBT Switching losses（typical）

V_{GE} = ±15V,IC = 150A, V_{CE} = 600V



IGBT Transient thermal impedance

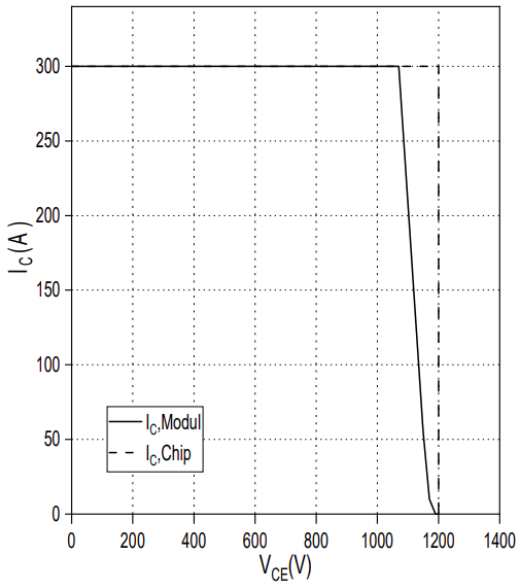
Z_{thJC} = f(t)



IGBT Reverse bias safe operating area (RBSOA)

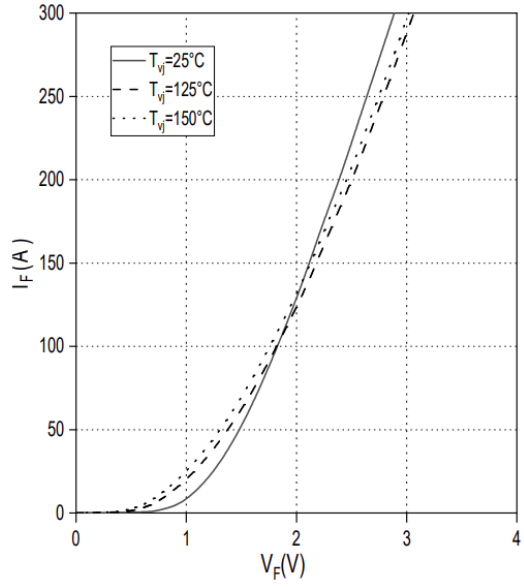
I_C = f(V_{CE})

V_{GE} = ±15V, R_{Goff} = 10Ω, Tvj = 150℃



Diode Forward characteristics

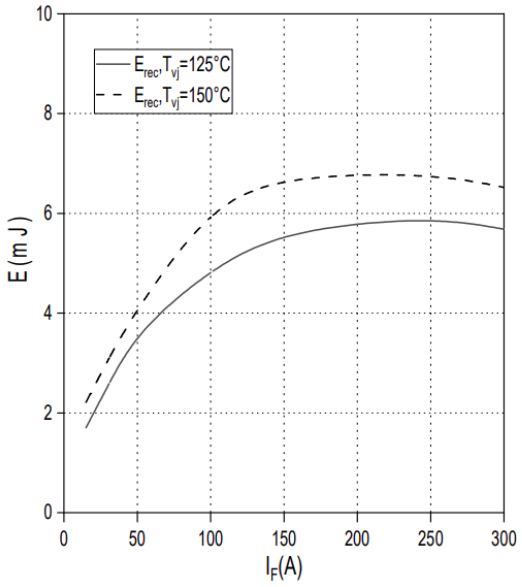
I_F = f(V_F)



Diode Switching losses (typical)

$E_{rec} = f(I_F)$

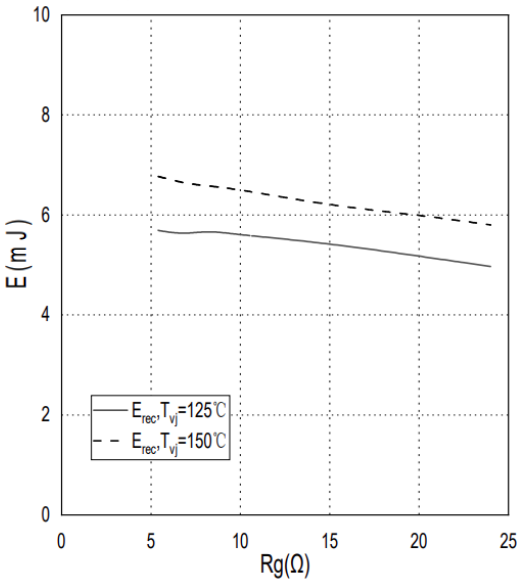
$R_{on} = 5.1\Omega$, $V_{CE} = 600V$



Diode Switching losses (typical)

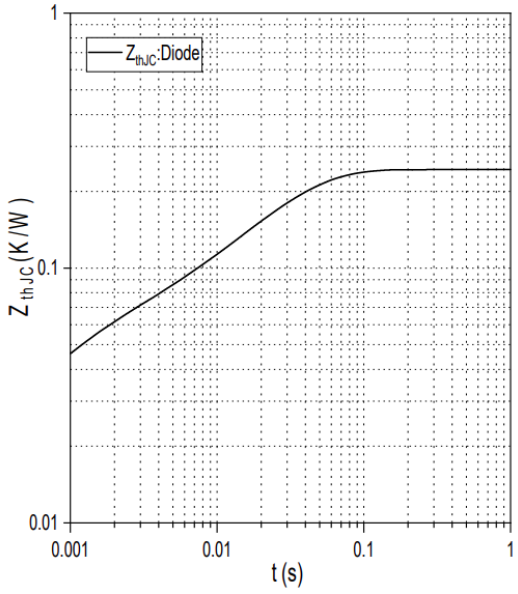
$E_{rec} = f(R_G)$

$I_F = 150A$, $V_{CE} = 600V$

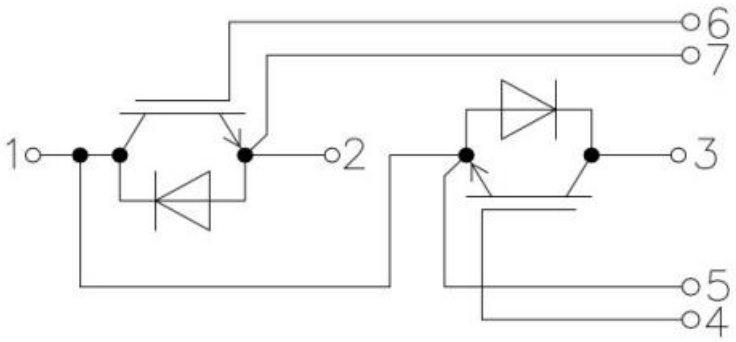


Diode Transient thermal impedance

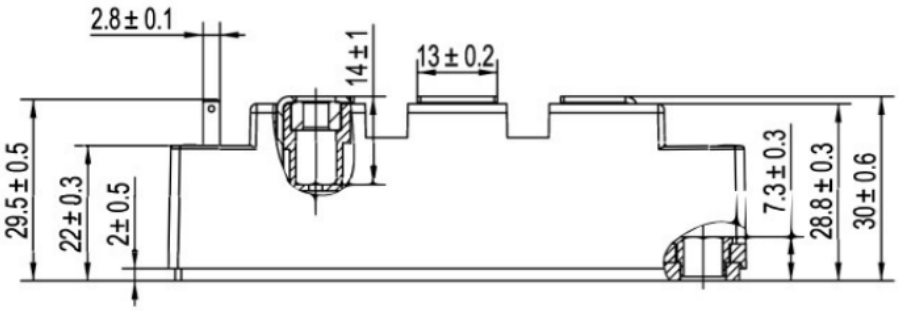
$Z_{thJC} = f(t)$

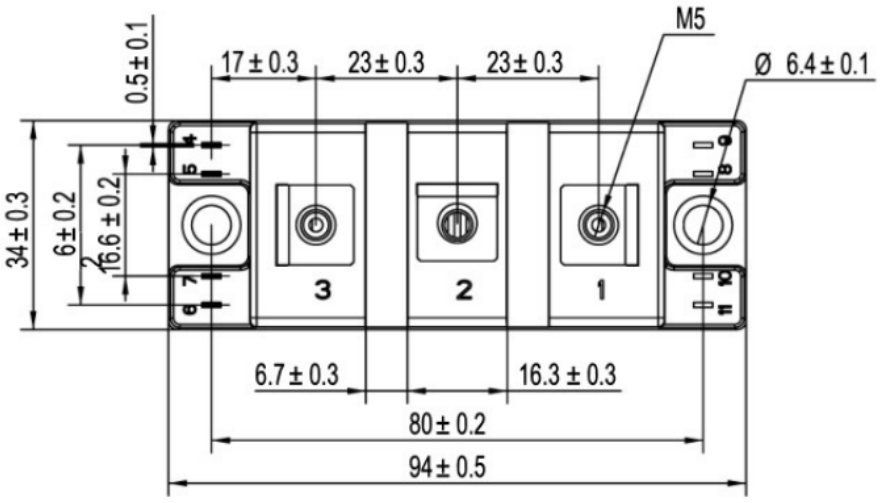


Internal Circuit



Package Dimension(unit：mm)





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