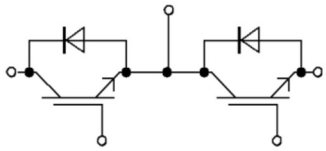
1700V 150A IGBT Half Bridge Module

1700V 150A IGBT 半桥模块



V_{CES}=1700V

$I_{C\ nom}$=150A/I_{CRM}=300A

Features：

- 1700V Trench Gate & Field Stop Structure
- High Short Circuit Capability
- Low Switching Loss
- High Reliability
- Positive Temperature Coefficient

产品特性：

- 1700V沟槽栅及场截止结构
- 高短路耐量
- 低开关损耗
- 高可靠性
- 正温度系数

Typical Applications：

- Motor Drives
- Servo Drives
- Inverter and Power Supplies
- Photovoltaic

典型应用：

- 电机传动
- 伺服驱动器
- 逆变器和电源
- 光伏发电

IGBT, Inverter / IGBT，逆变器

Maximum Rated Values / 最大额定值

Item	Symbol	Conditions	Value	Units
集电极－发射极电压 Collector-emitter voltage	V_{CES}	T_{vj}=25°C	1700	V
连续集电极直流电流 Continuous DC collector current	I_C		150	A
集电极重复峰值电流 Peak repetitive collector current	I_{CRM}	t_p=1ms	300	A
总功率损耗 Total power dissipation	P_{tot}	T_C=25°C, T_{vj}=175°C	880	W
栅极－发射极峰值电压 Maximum gate-emitter voltage	V_{GES}		±20	V
最高结温 Maximum junction temperature	$T_{vj,max}$		175	°C

Characteristic Values / 特征值

Item	Symbol	Conditions		Min.	Typ.	Max.	Units
集电极－发射极饱和电压 Collector-emitter saturation voltage	$V_{CE（sat）}$	I_C=150A,V_{GE}=15V	T_{vj}=25°C		1.67	1.90	V
			T_{vj}=125°C		1.90		V
			T_{vj}=150°C		1.96		V
栅极阈值电压 Gate threshold voltage	$V_{GE(th)}$	I_C=17mA, V_{CE}=V_{GE}, T_{vj}=25°C		5.0	6.0	6.8	V
栅极电荷 Gate charge	Q_G	V_{GE}=-15V…+15V			0.86		uC
内部栅极电阻 Internal gate resistor	R_{Gint}	T_{vj}=25°C			7.2		Ω
输入电容 Input capacitance	C_{ies}	f=1MHz, T_{vj}=25°C, V_{CE}=25V, V_{GE}=0V			12.6		nF
反向传输电容 Reverse transfer capacitance	C_{res}	f=1MHz, T_{vj}=25°C, V_{CE}=10V, V_{GE}=0V			0.20		nF
集电极-发射极截止电流 Collector-emitter cut-off current	I_{CES}	V_{CE}=1700V, V_{GE}=0V, T_{vj}=25°C				3.00	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				400	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	$t_{d（on）}$	I_C=150A, V_{CE}=900V V_{GE}=±15V R_{Gon}=5Ω R_{Goff}=5Ω Inductive Load,	T_{vj}=25°C		326		ns
			T_{vj}=125°C		339		ns
			T_{vj}=150°C		345		ns
上升时间(电感负载) Rise time, inductive load	t_r		T_{vj}=25°C		106		ns
			T_{vj}=125°C		118		ns
			T_{vj}=150°C		126		ns
关断延迟时间(电感负载) Turn-off delay time, inductive load	$t_{d（off）}$		T_{vj}=25°C		165		ns
			T_{vj}=125°C		189		ns
			T_{vj}=150°C		213		ns
下降时间(电感负载) Fall time, inductive load	t_f		T_{vj}=25°C		757		ns
			T_{vj}=125°C		924		ns
			T_{vj}=150°C		950		ns
开通损耗能量(每脉冲) Turn-on energy loss per pulse	E_{on}		T_{vj}=25°C		47.1		mJ
			T_{vj}=125°C		58.9		mJ
			T_{vj}=150°C		63.7		mJ
关断损耗能量(每脉冲） Turn-off energy loss per pulse	E_{off}		T_{vj}=25°C		31.2		mJ
			T_{vj}=125°C		39.9		mJ
			T_{vj}=150°C		42.5		mJ
短路数据 SC data	I_{SC}	V_{GE}≤15V, V_{CC}=1000V V_{CEmax}=V_{CES}-L_{sCE}·di/dt, t_p=10μs, T_{vj}=150°C			600		A

结－外壳热阻 Thermal resistance, junction to case	R_{thJC}	Per IGBT / 每个 IGBT		0.17	K/W
工作温度 Temperature under switching conditions	T_{vjop}		-40	150	°C

Diode, Inverter / 二极管，逆变器

Maximum Rated Values /最大额定值

Item	Symbol	Conditions	Value	Units
反向重复峰值电压 Peak repetitive reverse voltage	V_{RRM}	T_{vj}=25°C	1700	V
连续正向直流电流 Continuous DC forward current	I_F		150	A
正向重复峰值电流 Peak repetitive forward current	I_{FRM}	t_p=1ms	300	A

Characteristic Values / 特征值

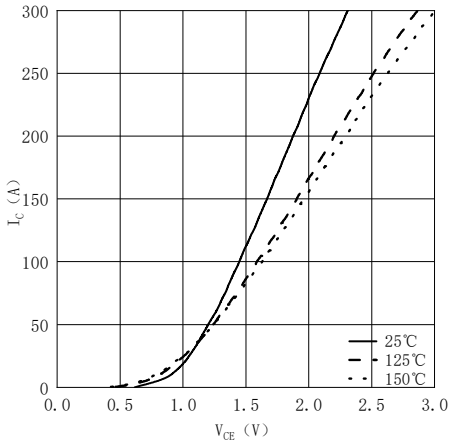
Item	Symbol	Conditions		Min.	Typ.	Max.	Units
正向电压 Forward voltage	V_F	I_F=150A	T_{vj}=25°C		1.92	2.30	V
			T_{vj}=125°C		2.11		V
			T_{vj}=150°C		2.09		V
反向恢复峰值电流 Peak reverse recovery current	I_{RM}	I_F=150A $-di_F/dt_{off}$=2000A/μs V_R =900 V V_{GE}=-15V	T_{vj}=25°C		98		A
			T_{vj}=125°C		119		A
			T_{vj}=150°C		119		A
恢复电荷 Recovery charge	Q_r		T_{vj}=25°C		21.4		uC
			T_{vj}=125°C		36.7		uC
			T_{vj}=150°C		42.0		uC
反向恢复损耗（每脉冲） Reverse recovery energy (per pulse)	E_{rec}		T_{vj}=25°C		10.6		mJ
			T_{vj}=125°C		19.5		mJ
			T_{vj}=150°C		21.9		mJ
结－外壳热阻 Thermal resistance, junction to case	R_{thJC}	Per diode / 每个二极管				0.30	K/W
工作温度 Temperature under switching conditions	T_{vjop}			-40		150	°C

Module / 模块

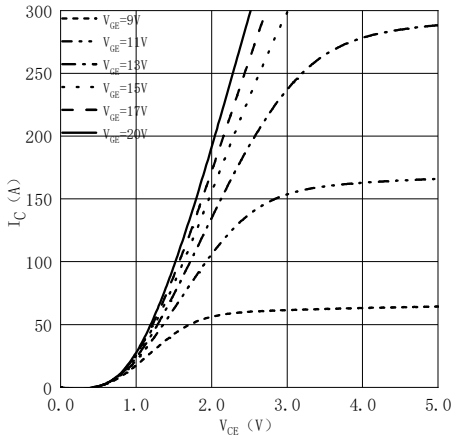
Item	Symbol	Conditions	Value	Units
绝缘测试电压 Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=1min	4.0	kV
模块基板材料 Material of module baseplate			Cu	
内部绝缘 Internal isolation		基本绝缘 (class 1, IEC 61140) Basic insulation (class 1, IEC 61140)	Al_2O_3	
爬电距离 Cree page distance		端子-散热片 / terminal to heat sink 端子-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

Item	Symbol	Conditions	Min.	Typ.	Max.	Units
杂散电感，模块 Stray inductance module	L_{sCE}			30		nH
模块引脚电阻，端子-芯片 Module Lead Resistance，Terminals-Chip	$R_{CC'+EE'}$ $R_{AA'+CC}$			0.65		mΩ
储存温度 Storage temperature	T_{stg}		-40		125	°C
模块安装的安装扭距 Mounting torque for module mounting	M	M6	3.00		5.00	Nm
模块安装的安装扭距 Mounting torque for module mounting	M	M5	2.50		5.00	Nm
重量 Weight	G			160		g

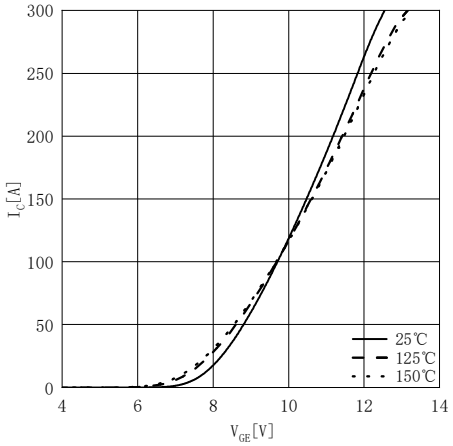
输出特性 IGBT，逆变器（典型）
Output characteristic IGBT, Inverter (typical)
$I_C=f(V_{CE})$
V_{GE}=15V



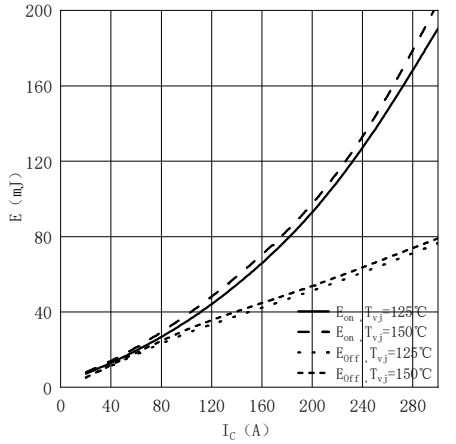
输出特性 IGBT，逆变器（典型）
Output characteristic IGBT, Inverter (typical)
$I_C=f(V_{CE})$
T_{vj}=150°C



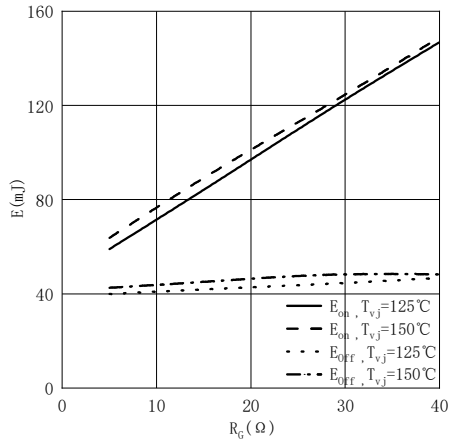
传输特性 IGBT，逆变器(典型)
Transfer characteristic IGBT, Inverter (typical)
$I_C=f(V_{GE})$
V_{CE}=20V



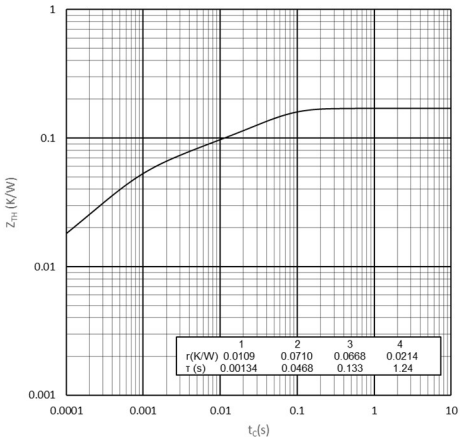
开关损耗 IGBT，逆变器（典型）
Switching losses IGBT, Inverter (typical)
$E=f(I_C)$
V_{GE}=±15V, R_G=5 Ω, V_{CE}=900V



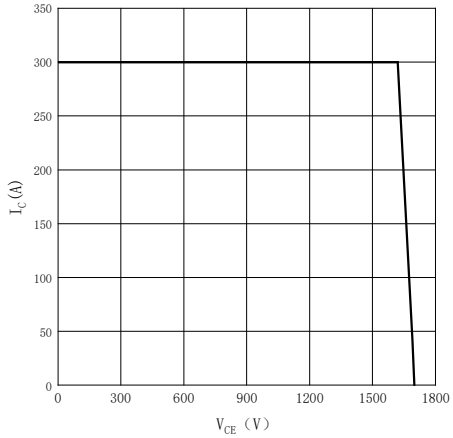
开关损耗 IGBT，逆变器（典型）
Switching losses IGBT, Inverter (typical)
$E=f(R_G)$
V_{GE}=±15V, I_C=150A, V_{CE}=900V



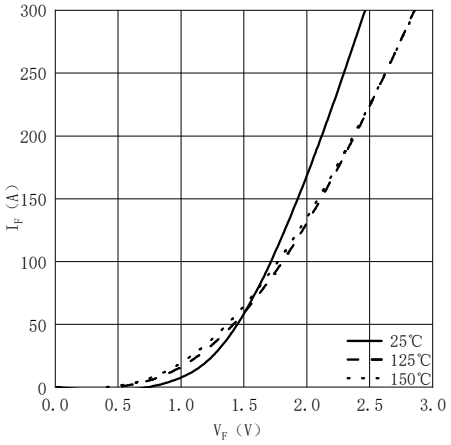
瞬态热阻抗 IGBT,逆变器
Transient thermal impedance IGBT, Inverter
$Z_{thJC}=f(t)$



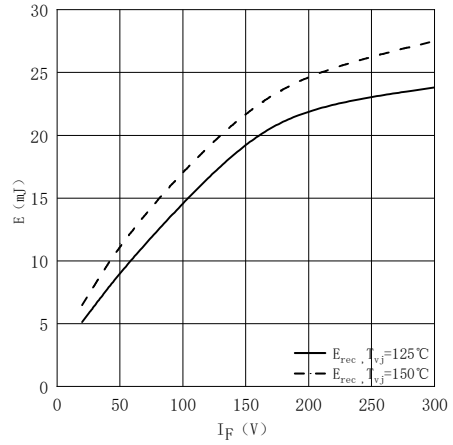
反偏安全工作区 IGBT，逆变器 （RBSOA）
Reverse bias safe operating area IGBT, Inverter (RBSOA)
$I_C=f(V_{CE})$
$V_{GE}=\pm15V$, $R_{Goff}=5\Omega$, $T_{vj}=150°C$



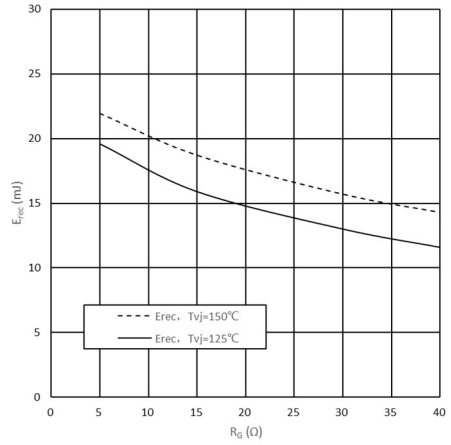
正向偏压特性 二极管，逆变器（典型)
Forward characteristic of Diode, Inverter (typical)
$I_F=f(V_F)$



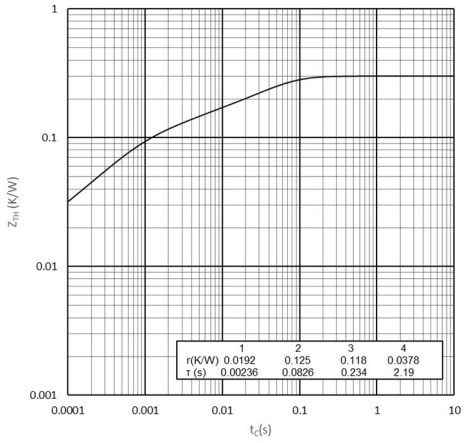
开关损耗 二极管，逆变器（典型）
Switching losses Diode, Inverter (typical)
$E_{rec}=f(I_F)$
$R_G=5\ \Omega$, $V_{CE}=900V$



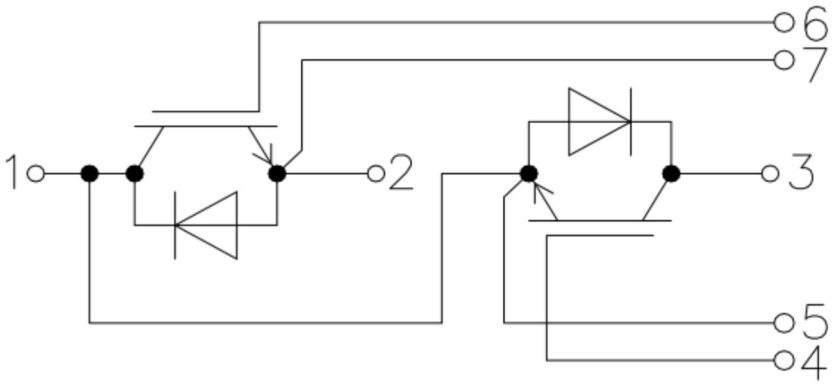
开关损耗 二极管，逆变器（典型）
Switching losses Diode, Inverter (typical)
$E_{rec}=f(R_G)$
$I_F=150A$, $V_{CE}=900V$



瞬态热阻抗二极管,逆变器
Transient thermal impedance Diode, Inverter
$Z_{thJC}=f(t)$



Circuit diagram headline / 接线图



Package outlines / 封装尺寸