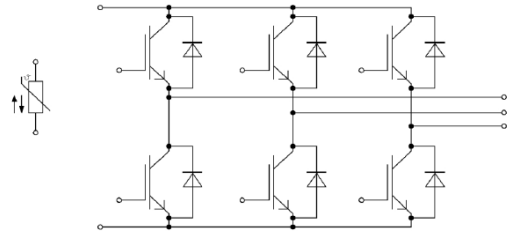


EconoPACK2 package: 1200V 50A IGBT module



Equivalent Circuit Schematic

Features:

- 1200V 50A, $V_{CE(sat)} = 1.75V$
- High RBSOA capability
- Trench/FS Technology
- Low turn-off losses

产品特性:

- 1200V 50A, $V_{CE(sat)} = 1.75V$
- 高 RBSOA 能力
- 沟槽栅/场终止技术
- 低关断损耗

Typical Applications:

- Motor Drives
- Servo Drives

典型应用:

- 电机驱动
- 伺服驱动

IGBT, Inverter / IGBT, 逆变部分
Maximum Rated Values / 最大标称参数

Collector-emitter Voltage 集电极-发射极电压	$T_{vj}=25^{\circ}$	V_{CES}	1200	V
Continuous DC collector current 集电极连续直流电流		$I_{C\ nom}$	50	A
Continuous DC collector current 集电极连续直流电流	$T_C=90^{\circ}, T_{vj\ max}=175^{\circ}$	I_C	95	A
Repetitive Peak collector current 集电极可重复峰值电流	$I_{CRM}=2 \times I_{C\ nom}$	I_{CRM}	100	A
Gate-emitter peak voltage 门极-发射极峰值电压		V_{GES}	± 20	V

Characteristic Values / 性能参数

			min.	typ.	max.	
Collector-emitter saturation Voltage 集电极-发射极饱和压降	$I_C=50A, V_{GE}=15V$ $I_C=50A, V_{GE}=15V$ $I_C=50A, V_{GE}=15V$	$T_{vj}=25^{\circ}$ $T_{vj}=125^{\circ}$ $T_{vj}=150^{\circ}$	V_{CESat}	1.75 2.00 2.03	2.3	V
Gate Threshold Voltage 门极阈值电压	$V_{CE}=10V, I_C=1.7mA, T_{vj}=25^{\circ}$		V_{GEth}	5.0	5.32	6.5
Internal Gate Resistor 内置门极电阻	$T_{vj}=25^{\circ}$		R_{Gint}	4		Ω
Input Capacitance 输入电容	$V_{CE}=25V, V_{GE}=0V, f=1MHz$		C_{ies}	3800		pF
Reverse Transfer Capacitance 反向传输电容	$V_{CE}=25V, V_{GE}=0V, f=1MHz$		C_{res}	140		pF
Collector-emitter Cutoff Current 集电极-发射极关断漏电流	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25^{\circ}$		I_{CES}		1	mA
Gate-emitter Leakage Current 门极-发射极漏电流	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}$		I_{GES}		500	nA
Turn-on Delay Time, Inductive Load 开通延迟时间, 感性负载	$I_C=50A, V_{CE}=600V$ $V_{GE}= -8V/15V$ $R_{Gon}=10.0\Omega$	$T_{vj}=25^{\circ}$ $T_{vj}=125^{\circ}$ $T_{vj}=150^{\circ}$	t_{don}	40.00 41.76 40.48		ns
Rise Time, Inductive Load 上升时间, 感性负载	$I_C=50A, V_{CE}=600V$ $V_{GE}= -8V/15V$ $R_{Gon}=10.0\Omega$	$T_{vj}=25^{\circ}$ $T_{vj}=125^{\circ}$ $T_{vj}=150^{\circ}$	t_r	15.36 17.28 17.6		ns
Turn-off Delay Time, Inductive Load 关断延迟时间, 感性负载	$I_C=50A, V_{CE}=600V$ $V_{GE}= -8V/15V$ $R_{Goff}=10.0\Omega$	$T_{vj}=25^{\circ}$ $T_{vj}=125^{\circ}$ $T_{vj}=150^{\circ}$	t_{doff}	198.9 254.2 279.3		ns
Fall Time, Inductive Load 下降时间, 感性负载	$I_C=50A, V_{CE}=600V$ $V_{GE}= -8V/15V$ $R_{Goff}=10.0\Omega$	$T_{vj}=25^{\circ}$ $T_{vj}=125^{\circ}$ $T_{vj}=150^{\circ}$	t_f	196.6 315.8 362.7		ns
Turn-on energy loss per pulse 开通损耗	$I_C=50A, V_{CE}=600V$ $V_{GE}= -8V/15V$ $R_{Gon}=10.0\Omega$	$T_{vj}=25^{\circ}$ $T_{vj}=125^{\circ}$ $T_{vj}=150^{\circ}$	E_{on}	2.75 3.74 4.07		mJ
Turn-off energy loss per pulse 关断损耗	$I_C=50A, V_{CE}=600V, L_s=80nH$ $V_{GE}=-8V / 15V$ $V_{GE}= -8V/15V, R_{Goff}=10.0\Omega$	$T_{vj}=25^{\circ}$ $T_{vj}=125^{\circ}$ $T_{vj}=150^{\circ}$	E_{off}	3.09 4.80 5.60		mJ
SC Data 短路耐受	$V_{ce}=600V, V_{ge}=15V/-8V,$ $T_{vj}=25^{\circ}$		t_{psc}	10		μs

Thermal Resistance, Junction to Case 结-壳热阻	Per IGBT/单个 IGBT	R_{thJC}		0.39		K/W
Temperature under switching conditions 工作温度		$T_{vj\ op}$	-40		150	°C

Diode, Inverter / 二极管, 逆变部分

Maximum Rated Values / 最大标称参数

Repetitive peak reverse voltage 可重复反向峰值电压	$T_{vj}=25^{\circ}C$	V_{RRM}		1200		V
Continuous DC Forward Current 可连续正向直流电流		I_F		50		A
Repetitive Peak Forward Current 可重复正向峰值电流	$I_{FRM}=2 \times I_F$	I_{FRM}		100		A

Characteristic Values / 性能参数

			min.	typ.	max.	
Forward Voltage 正向通态压降	$I_F=50A, V_{GE}=0V$ $I_F=50A, V_{GE}=0V$ $I_F=50A, V_{GE}=0V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	V_F	1.70 1.80 1.77	2.2	V
Peak Reverse Recovery Current 反向恢复峰值电流	$I_F=50A, V_R=600V$ $-di_f/dt=2500A/\mu s(T_{vj}=150^{\circ}C)$ $V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	I_{RM}	66 64.4 66		A
Recovery Charge 反向恢复电荷	$I_F=50A, V_R=600V$ $-di_f/dt=2500A/\mu s(T_{vj}=150^{\circ}C)$ $V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	Q_R	2.45		μC
Reverse Recovery Energy 反向恢复损耗	$I_F=50A, V_R=600V$ $-di_f/dt=2500A/\mu s(T_{vj}=150^{\circ}C)$ $V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{rec}	1.52 2.66 3.23		mJ
Thermal Resistance, Junction to Case 结-壳热阻	Per IGBT/单个 IGBT	R_{thJC}		0.57		K/W
Temperature under switching conditions 工作温度		$T_{vj\ op}$	-40		150	°C

NTC-Thermistor/ NTC-热敏电阻
Characteristic Values / 性能参数

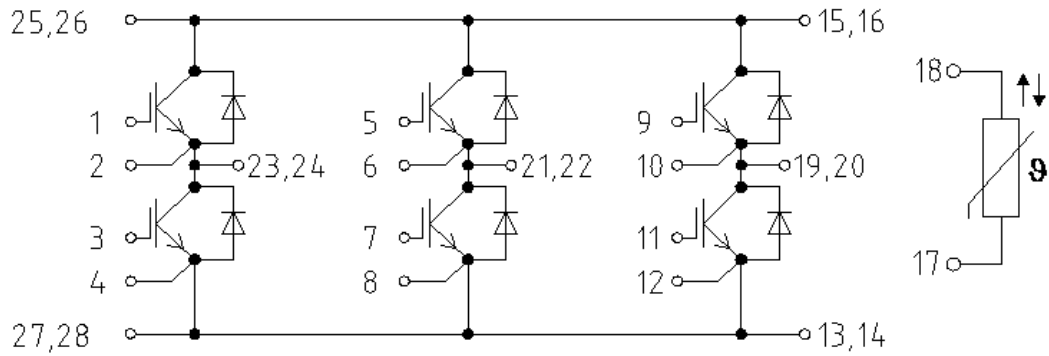
		min.		typ.		max.	
Rated Resistance 标称电阻	$T_{vj}=25^{\circ}\text{C}$	R_{25}		5			$\text{K}\Omega$
Deviation of R100 R100 偏移值	$T_C=100^{\circ}\text{C}$, $R_{100}=481\Omega$	$\Delta R/R$	-5		5		%
Power Dissipation 功率耗散	$T_C=25^{\circ}\text{C}$	P_{25}			10		mW
B-Value B 值	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15\text{K}))]$	$B_{25/50}$		3380			K
B-Value B 值	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15\text{K}))]$	$B_{25/80}$		3440			

Module / 模块

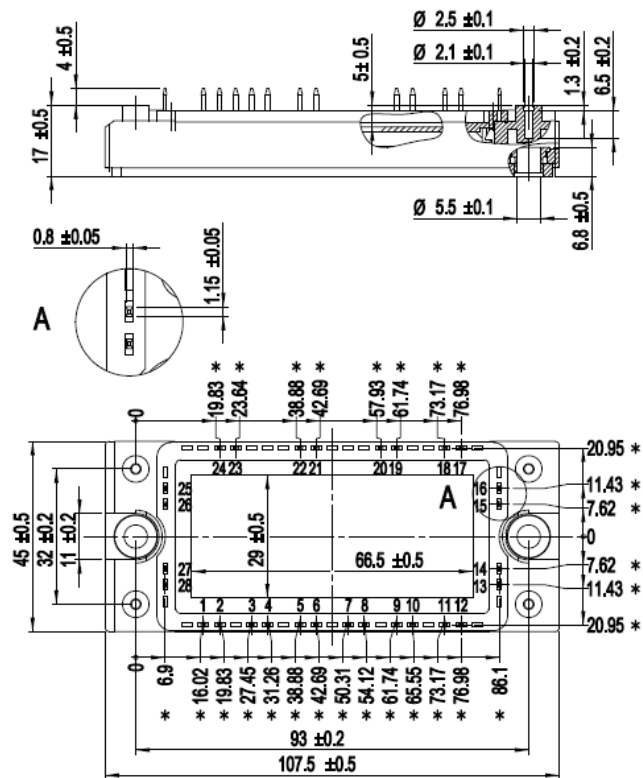
Isolation Test Voltage 绝缘测试电压	RMS, $f=50\text{Hz}$, $t=1\text{min}$	V_{ISOL}		4			KV
Material of Module Baseplate 模块底板材料				Cu			
Internal Isolation 内部绝缘				Al_2O_3			
Creepage Distance 爬电距离				10			mm
Clearance 电气间隙				7.5			mm
Comparative Tracking Index 相对漏电起痕指数		CTI		>200			

		min.		typ.		max.	
Stray Inductance Module 模块杂散电感		L_{sCE}		27			nH
Module Lead Resistance, Terminals-Chip 模块引脚电阻, 端子-芯片		$R_{\text{CC}'+\text{EE}'}$ $R_{\text{AA}'+\text{CC}'}$		TBD TBD			$\text{m}\Omega$
Storage Temperature 贮存温度		T_{stg}	-40		125		$^{\circ}\text{C}$
Mounting Torque for Module Mounting 模块安装力矩		M	3.0		6.0		Nm
Weight 重量		G		177			g

Internal Circuit:



Package Dimension
Dimensions in Millimeters

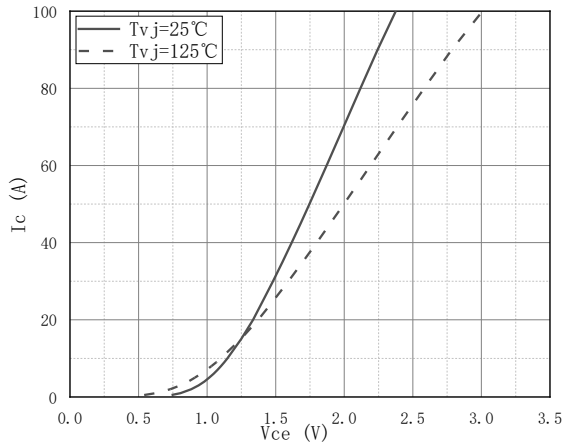


*=all dimensions with tolerance of ± 0.4

Output characteristic IGBT, Inverter(typical)

输出特性, 逆变 IGBT

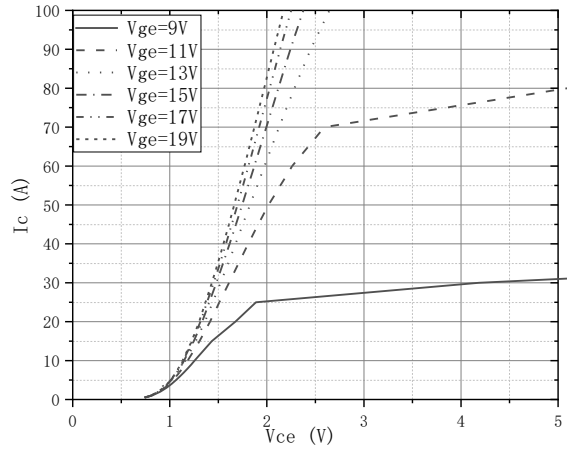
$I_C=f(V_{CE}), V_{GE}=15V$



Output characteristic IGBT, Inverter(typical)

输出特性, 逆变 IGBT

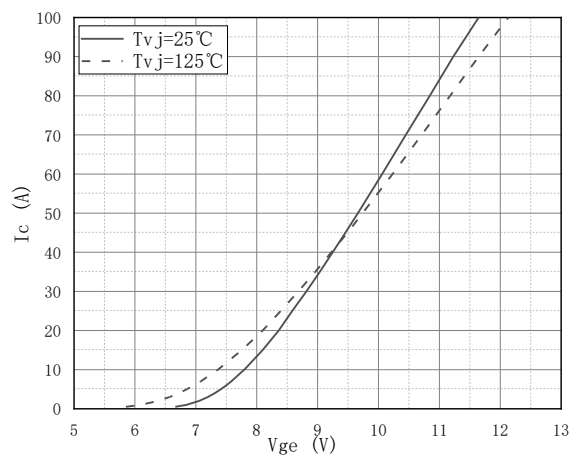
$I_C=f(V_{CE}), T_{vj}=150^{\circ}C$



Transfer characteristic IGBT, Inverter(typical)

转移特性, 逆变 IGBT

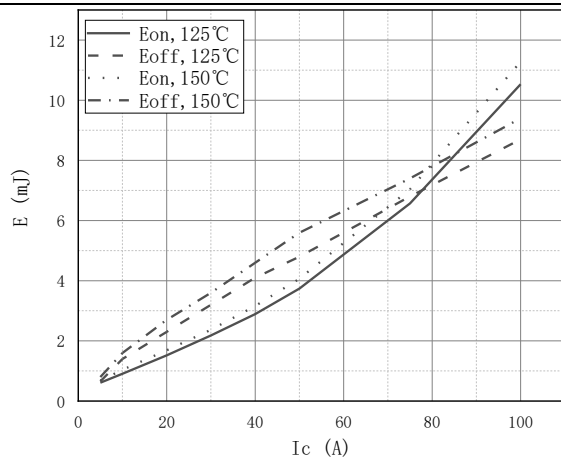
$I_C=f(V_{GE}), V_{CE}=20V$



Switching loss IGBT, Inverter(typical)

开关损耗, 逆变 IGBT

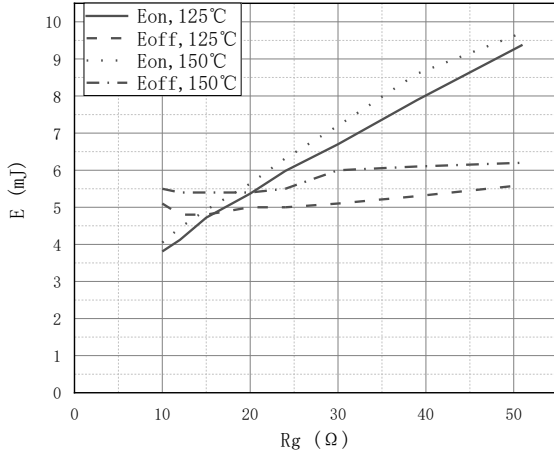
$E_{on}=f(I_C), E_{off}=f(I_C), V_{GE}=+15V/-8V,$
 $R_{g,on}=10\Omega, R_{g,off}=10\Omega, V_{CE}=600V$



Switching loss IGBT, Inverter(typical)

开关损耗，逆变 IGBT

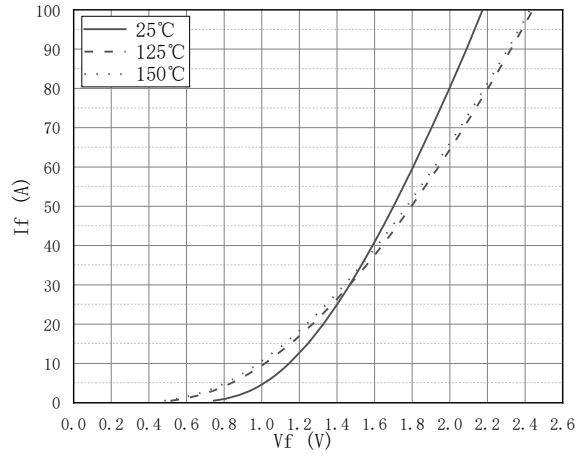
$E_{on}=f(I_c)$, $E_{off}=f(I_c)$, $V_{GE}= + 15V/-8V$,
 $R_{g,on}=10\Omega$, $R_{g,off}=10\Omega$, $V_{CE}=600V$



Output characteristic FRD, Inverter(typical)

输出特性，逆变 FRD

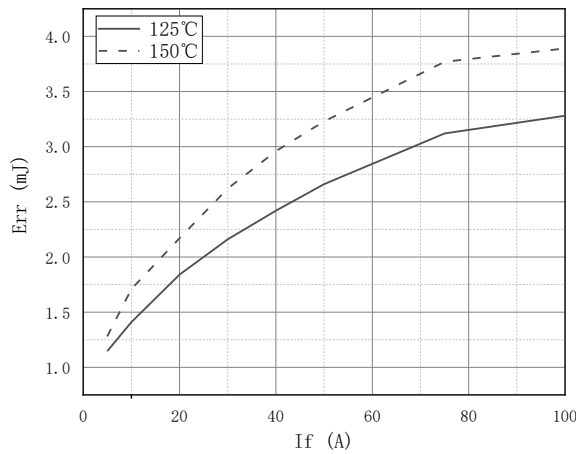
$I_f=f(V_f)$



Switching loss FRD, Inverter ,(typical)

反向恢复损耗，逆变 FRD

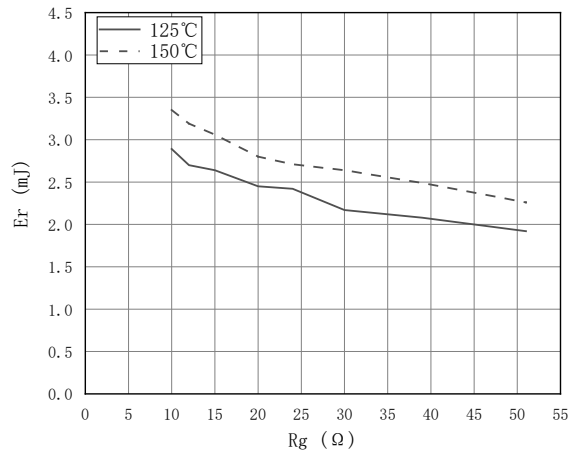
$E_{REC}=f(I_f)$, $R_{g,on}=10\Omega$, $V_{CE}=600V$



Switching loss FRD, Inverter ,(typical)

反向恢复损耗，逆变 FRD

$E_{REC}=f(R_g)$, $R_{g,on}=10\Omega$, $V_{CE}=600V$



NTC Thermistor

NTC 热敏电阻

$R=f(T)$

