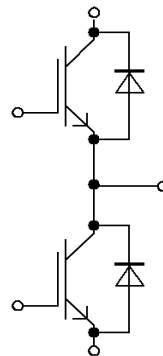


62mm C-Series 模块 采用第四代沟槽栅/场终止IGBT4和HE型发射极控制二极管 和预涂导热介质  
 62mm C-Series module with Trench/Fieldstop IGBT4 and Emitter Controlled HE diode and pre-applied Thermal Interface Material



$V_{CES} = 1200V$   
 $I_{C\ nom} = 300A / I_{CRM} = 600A$

### 典型应用

- 大功率变流器
- 电机传动
- UPS系统
- 风力发电机

### 电气特性

- 低开关损耗
- 无与伦比的坚固性
- $V_{CEsat}$  带正温度系数

### 机械特性

- 封装的 CTI > 400
- 高爬电距离和电气间隙
- 高功率密度
- 绝缘的基板
- 标准封装
- 预涂导热介质

### Typical Applications

- High power converters
- Motor drives
- UPS systems
- Wind turbines

### Electrical Features

- Low switching losses
- Unbeatable robustness
- $V_{CEsat}$  with positive temperature coefficient

### Mechanical Features

- Package with CTI > 400
- High creepage and clearance distances
- High power density
- Isolated base plate
- Standard housing
- Pre-applied Thermal Interface Material

## Module Label Code

Barcode Code 128



DMX - Code



### Content of the Code

Content of the Code	Digit
Module Serial Number	1 - 5
Module Material Number	6 - 11
Production Order Number	12 - 19
Datecode (Production Year)	20 - 21
Datecode (Production Week)	22 - 23

## IGBT, 逆变器 / IGBT, Inverter

## 最大额定值 / Maximum Rated Values

集电极 - 发射极电压 Collector-emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	$V_{CES}$	1200	V
连续集电极直流电流 Continuous DC collector current	$T_H = 80^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	$I_{C\text{nom}}$	300	A
集电极重复峰值电流 Repetitive peak collector current	$t_P = 1\text{ ms}$	$I_{CRM}$	600	A
栅极 - 发射极峰值电压 Gate-emitter peak voltage		$V_{GES}$	+/-20	V

## 特征值 / Characteristic Values

		min.	typ.	max.		
集电极 - 发射极饱和电压 Collector-emitter saturation voltage	$I_C = 300\text{ A}, V_{GE} = 15\text{ V}$		1,75	2,15	V	
	$I_C = 300\text{ A}, V_{GE} = 15\text{ V}$		2,00		V	
	$I_C = 300\text{ A}, V_{GE} = 15\text{ V}$		2,05		V	
栅极阈值电压 Gate threshold voltage	$I_C = 11,5\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$	$V_{GEth}$	5,20	5,80	6,40	V
栅极电荷 Gate charge	$V_{GE} = -15\text{ V} \dots +15\text{ V}$	$Q_G$		2,50		$\mu\text{C}$
内部栅极电阻 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$	$R_{Gint}$		2,5		$\Omega$
输入电容 Input capacitance	$f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$	$C_{ies}$		19,0		nF
反向传输电容 Reverse transfer capacitance	$f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$	$C_{res}$		0,70		nF
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$	$I_{CES}$			5,0	mA
栅极-发射极漏电流 Gate-emitter leakage current	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$	$I_{GES}$			400	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	$I_C = 300\text{ A}, V_{CE} = 600\text{ V}$			0,20		$\mu\text{s}$
	$V_{GE} = \pm 15\text{ V}$			0,25		$\mu\text{s}$
	$R_{Gon} = 1,8\ \Omega$			0,27		$\mu\text{s}$
上升时间(电感负载) Rise time, inductive load	$I_C = 300\text{ A}, V_{CE} = 600\text{ V}$			0,045		$\mu\text{s}$
	$V_{GE} = \pm 15\text{ V}$			0,05		$\mu\text{s}$
	$R_{Gon} = 1,8\ \Omega$			0,055		$\mu\text{s}$
关断延迟时间(电感负载) Turn-off delay time, inductive load	$I_C = 300\text{ A}, V_{CE} = 600\text{ V}$			0,50		$\mu\text{s}$
	$V_{GE} = \pm 15\text{ V}$			0,60		$\mu\text{s}$
	$R_{Goff} = 1,8\ \Omega$			0,62		$\mu\text{s}$
下降时间(电感负载) Fall time, inductive load	$I_C = 300\text{ A}, V_{CE} = 600\text{ V}$			0,10		$\mu\text{s}$
	$V_{GE} = \pm 15\text{ V}$			0,16		$\mu\text{s}$
	$R_{Goff} = 1,8\ \Omega$			0,18		$\mu\text{s}$
开通损耗能量(每脉冲) Turn-on energy loss per pulse	$I_C = 300\text{ A}, V_{CE} = 600\text{ V}, L_S = 30\text{ nH}$			16,5		mJ
	$V_{GE} = \pm 15\text{ V}, di/dt = 6000\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$			25,0		mJ
	$R_{Gon} = 1,8\ \Omega$			30,0		mJ
关断损耗能量(每脉冲) Turn-off energy loss per pulse	$I_C = 300\text{ A}, V_{CE} = 600\text{ V}, L_S = 30\text{ nH}$			23,5		mJ
	$V_{GE} = \pm 15\text{ V}, du/dt = 4000\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$			35,0		mJ
	$R_{Goff} = 1,8\ \Omega$			39,0		mJ
短路数据 SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 900\text{ V}$ $V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$	$I_{SC}$		1200		A
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个 IGBT / per IGBT valid with IFX pre-applied thermal interface material	$R_{thJH}$			0,121	K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\text{op}}$	-40		150	$^{\circ}\text{C}$

## 二极管, 逆变器 / Diode, Inverter 最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	$T_{vj} = 25^{\circ}\text{C}$	$V_{RRM}$	1200	V
连续正向直流电流 Continuous DC forward current		$I_F$	300	A
正向重复峰值电流 Repetitive peak forward current	$t_P = 1\text{ ms}$	$I_{FRM}$	600	A
$I^2t$ -值 $I^2t$ - value	$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$ $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	$I^2t$	19000 18000	$\text{A}^2\text{s}$ $\text{A}^2\text{s}$

## 特征值 / Characteristic Values

		min.	typ.	max.		
正向电压 Forward voltage	$I_F = 300\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 300\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 300\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_F$	1,65 1,65 1,65	2,15	V V V
反向恢复峰值电流 Peak reverse recovery current	$I_F = 300\text{ A}, -di_F/dt = 6000\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 600\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$I_{RM}$	360 400 410		A A A
恢复电荷 Recovered charge	$I_F = 300\text{ A}, -di_F/dt = 6000\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 600\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$Q_r$	30,0 56,0 66,0		$\mu\text{C}$ $\mu\text{C}$ $\mu\text{C}$
反向恢复损耗 (每脉冲) Reverse recovery energy	$I_F = 300\text{ A}, -di_F/dt = 6000\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 600\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$E_{rec}$	14,0 26,0 28,0		mJ mJ mJ
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个二极管 / per diode valid with IFX pre-applied thermal interface material		$R_{thJH}$		0,167	K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

## 模块 / Module

绝缘测试电压 Isolation test voltage	RMS, $f = 50\text{ Hz}, t = 1\text{ min.}$	$V_{ISOL}$	2,5	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)		$\text{Al}_2\text{O}_3$	
爬电距离 Creepage distance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		29,0 23,0	mm
电气间隙 Clearance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		23,0 11,0	mm
相对电痕指数 Comperative tracking index		CTI	> 400	

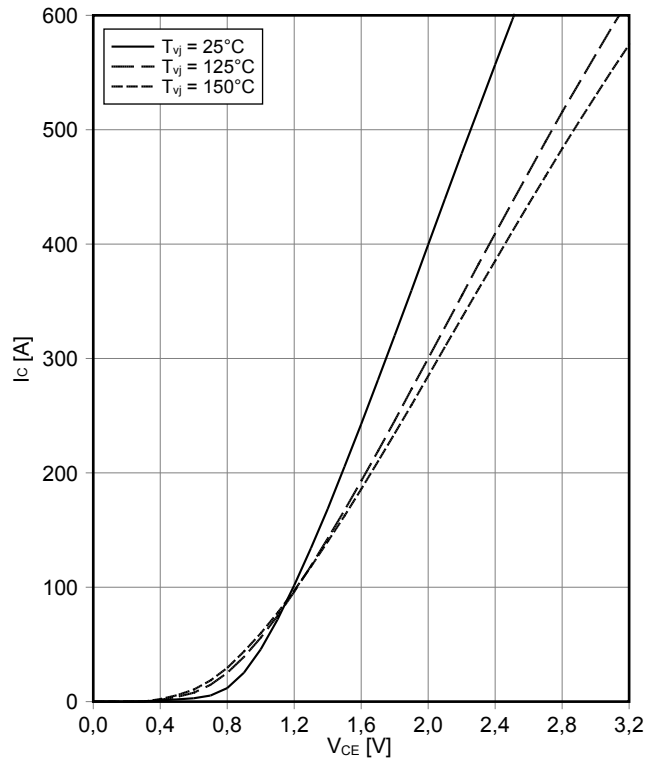
		min.	typ.	max.	
杂散电感, 模块 Stray inductance module		$L_{sCE}$	20		nH
模块引线电阻, 端子-芯片 Module lead resistance, terminals - chip	$T_H = 25^{\circ}\text{C}$ , 每个开关 / per switch	$R_{CC+EE'}$	0,70		m $\Omega$
储存温度 Storage temperature		$T_{stg}$	-40	125	$^{\circ}\text{C}$
最高基板工作温度 Maximum baseplate operation temperature		$T_{BPmax}$		125	$^{\circ}\text{C}$
模块安装的安装扭矩 Mounting torque for modul mounting	螺丝 M6 根据相应的应用手册进行安装 Screw M6 - Mounting according to valid application note	M	3,00	6,00	Nm
端子联接扭矩 Terminal connection torque	螺丝 M6 根据相应的应用手册进行安装 Screw M6 - Mounting according to valid application note	M	2,5	5,0	Nm
重量 Weight		G	340		g

Lagerung und Transport von Modulen mit TIM => siehe AN2012-07  
Storage and shipment of modules with TIM => see AN2012-07

输出特性 IGBT, 逆变器 (典型)

output characteristic IGBT, Inverter (typical)

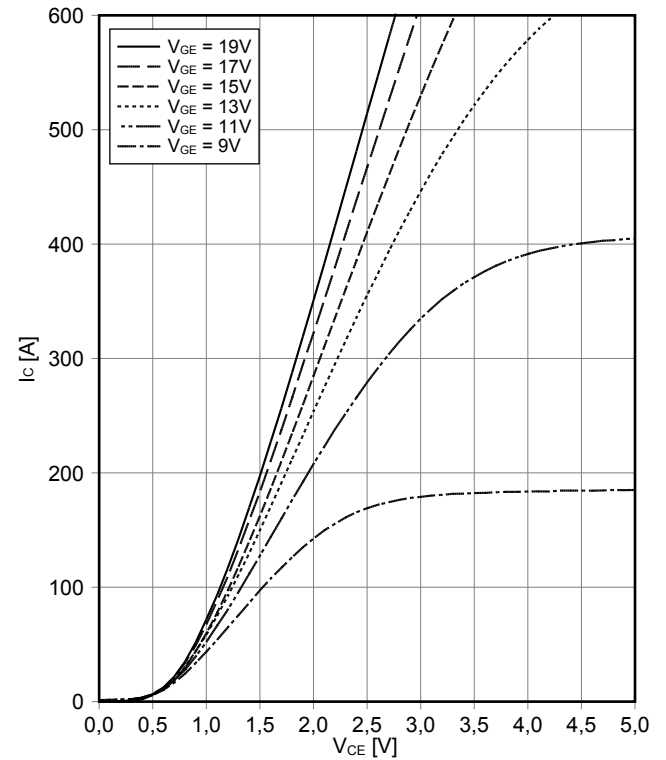
$I_C = f(V_{CE})$   
 $V_{GE} = 15\text{ V}$



输出特性 IGBT, 逆变器 (典型)

output characteristic IGBT, Inverter (typical)

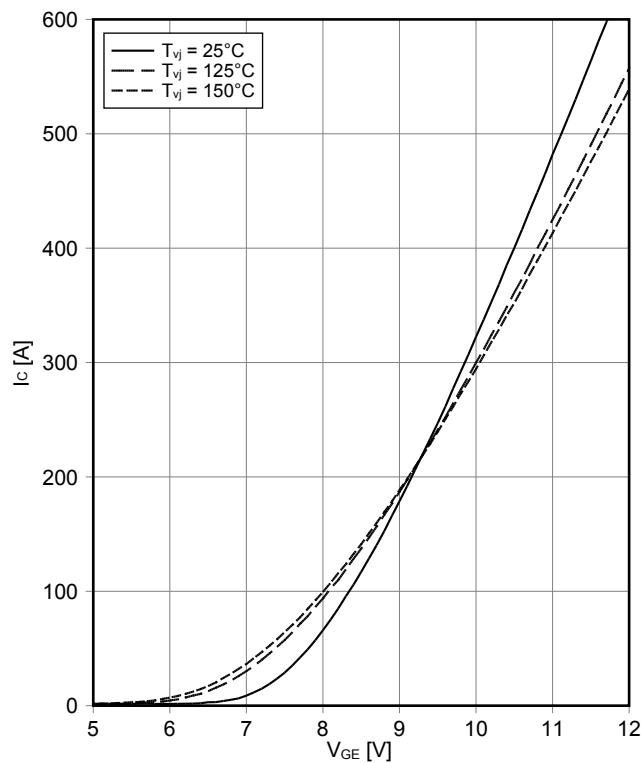
$I_C = f(V_{CE})$   
 $T_{vj} = 150^\circ\text{C}$



传输特性 IGBT, 逆变器 (典型)

transfer characteristic IGBT, Inverter (typical)

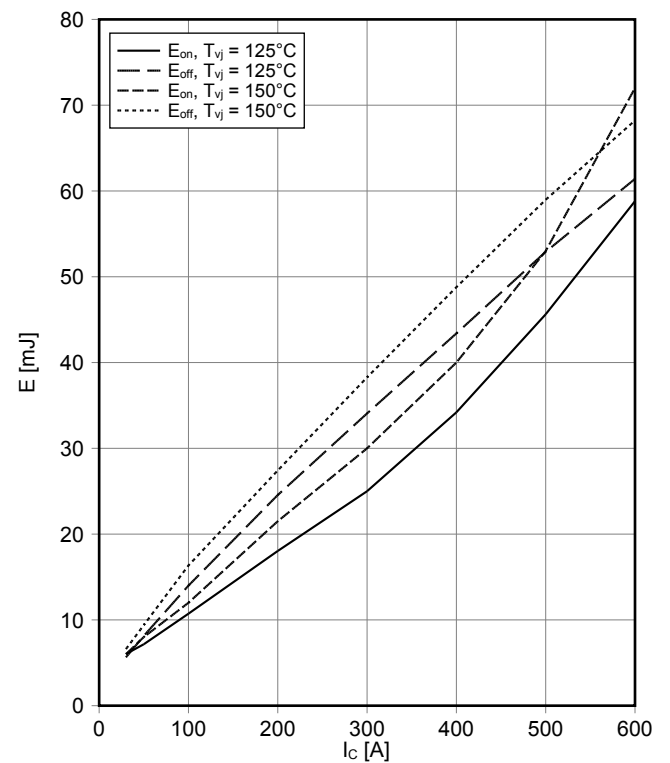
$I_C = f(V_{GE})$   
 $V_{CE} = 20\text{ V}$



开关损耗 IGBT, 逆变器 (典型)

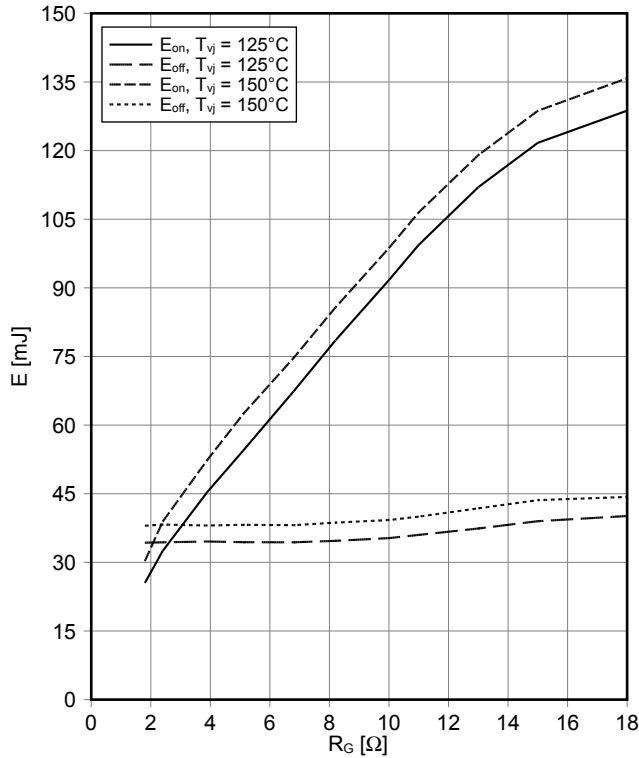
switching losses IGBT, Inverter (typical)

$E_{on} = f(I_C)$ ,  $E_{off} = f(I_C)$   
 $V_{GE} = \pm 15\text{ V}$ ,  $R_{Gon} = 1.8\ \Omega$ ,  $R_{Goff} = 1.8\ \Omega$ ,  $V_{CE} = 600\text{ V}$

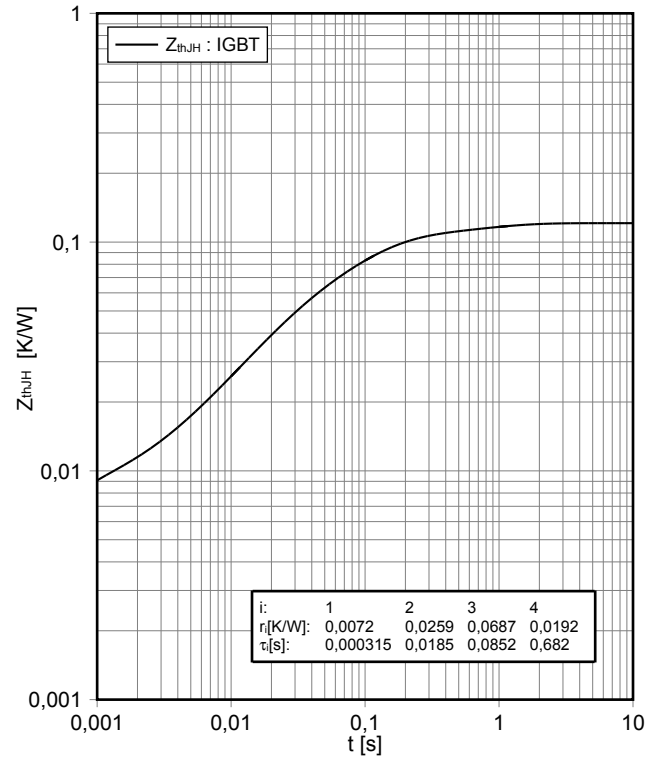


开关损耗 IGBT, 逆变器 (典型)  
**switching losses IGBT, Inverter (typical)**

$E_{on} = f(R_G)$ ,  $E_{off} = f(R_G)$   
 $V_{GE} = \pm 15\text{ V}$ ,  $I_C = 300\text{ A}$ ,  $V_{CE} = 600\text{ V}$

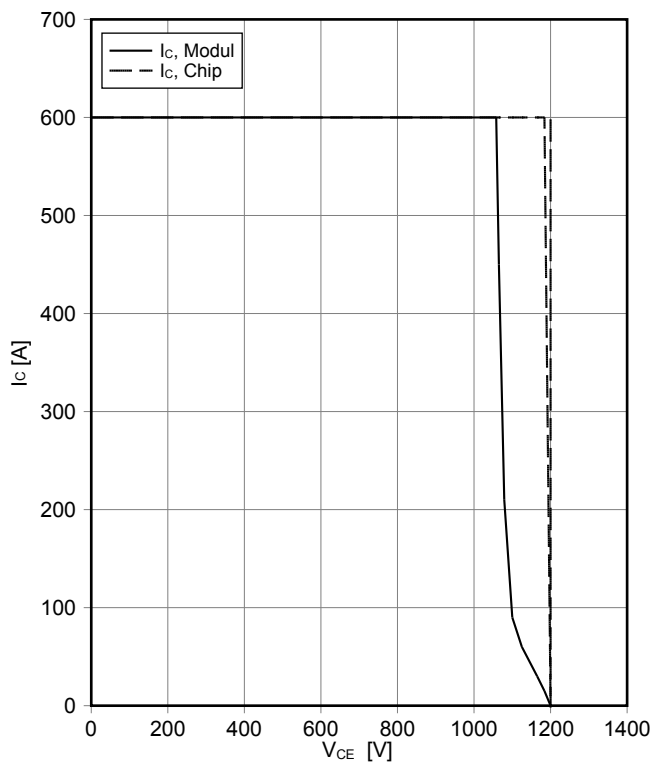


瞬态热阻抗 IGBT, 逆变器  
**transient thermal impedance IGBT, Inverter**  
 $Z_{thJH} = f(t)$

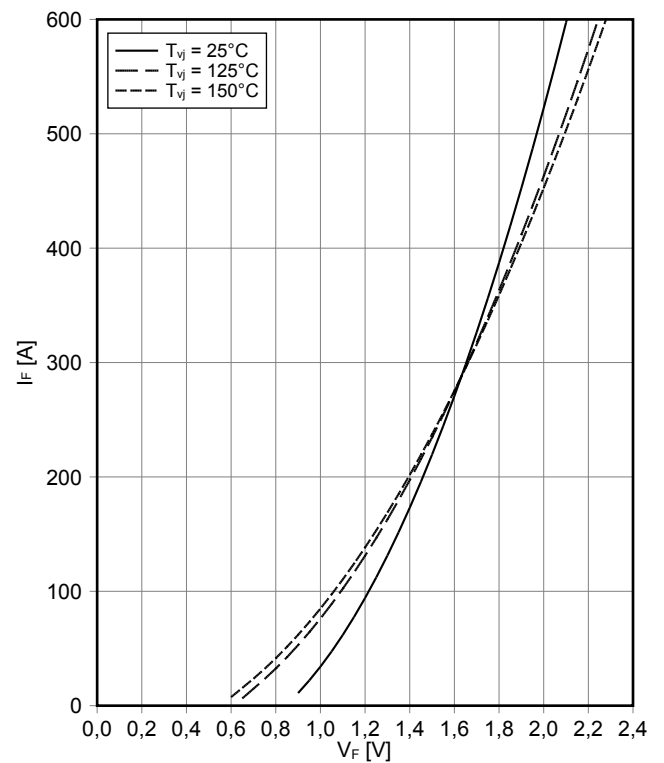


反偏安全工作区 IGBT, 逆变器 (RBSOA)  
**reverse bias safe operating area IGBT, Inverter (RBSOA)**

$I_C = f(V_{CE})$   
 $V_{GE} = \pm 15\text{ V}$ ,  $R_{Goff} = 1.8\ \Omega$ ,  $T_{vj} = 150^\circ\text{C}$

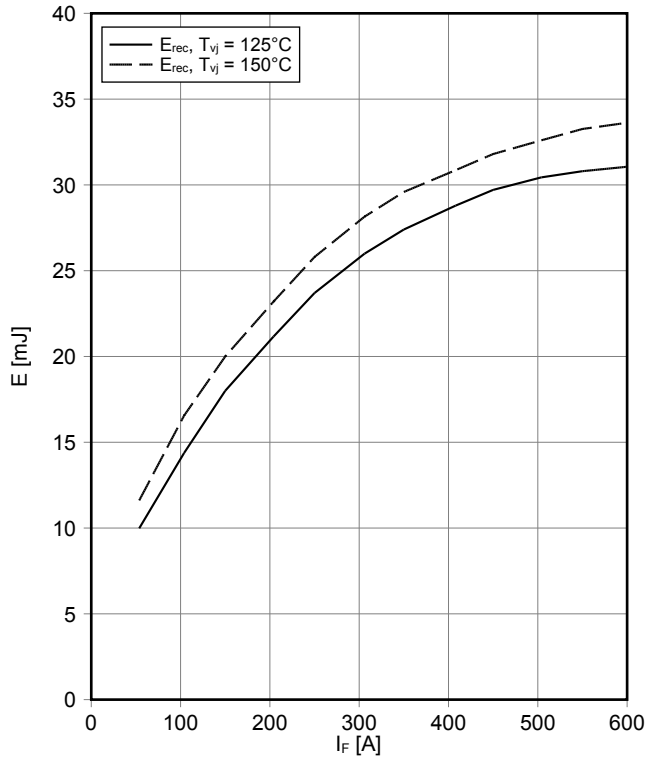


正向偏压特性 二极管, 逆变器 (典型)  
**forward characteristic of Diode, Inverter (typical)**  
 $I_F = f(V_F)$



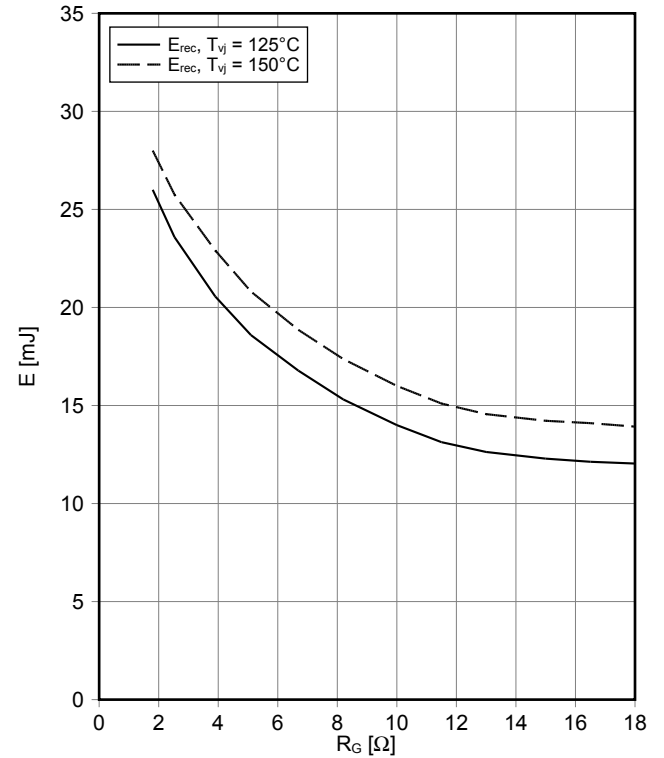
开关损耗 二极管,逆变器 (典型)  
**switching losses Diode, Inverter (typical)**

$E_{rec} = f(I_F)$   
 $R_{Gon} = 1.8 \Omega, V_{CE} = 600 V$



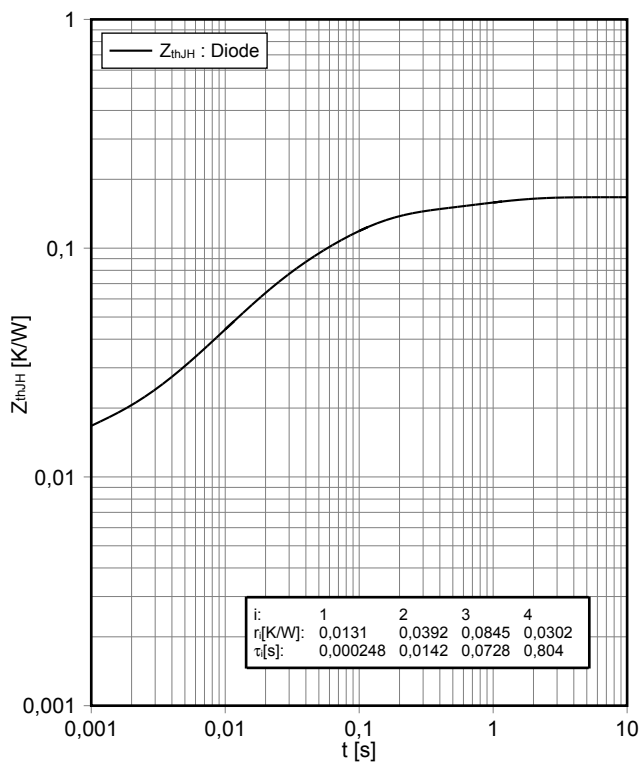
开关损耗 二极管,逆变器 (典型)  
**switching losses Diode, Inverter (typical)**

$E_{rec} = f(R_G)$   
 $I_F = 300 A, V_{CE} = 600 V$

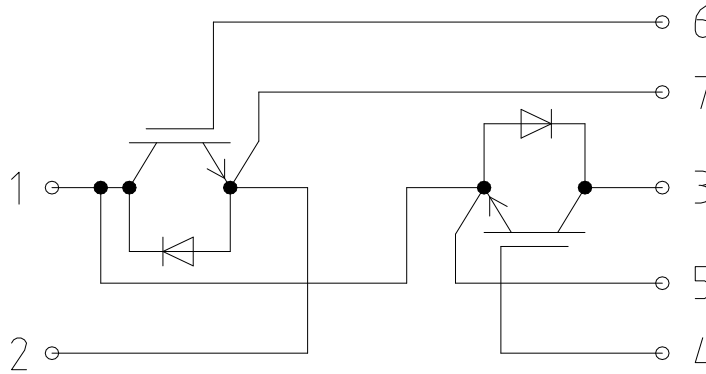


瞬态热阻抗 二极管,逆变器  
**transient thermal impedance Diode, Inverter**

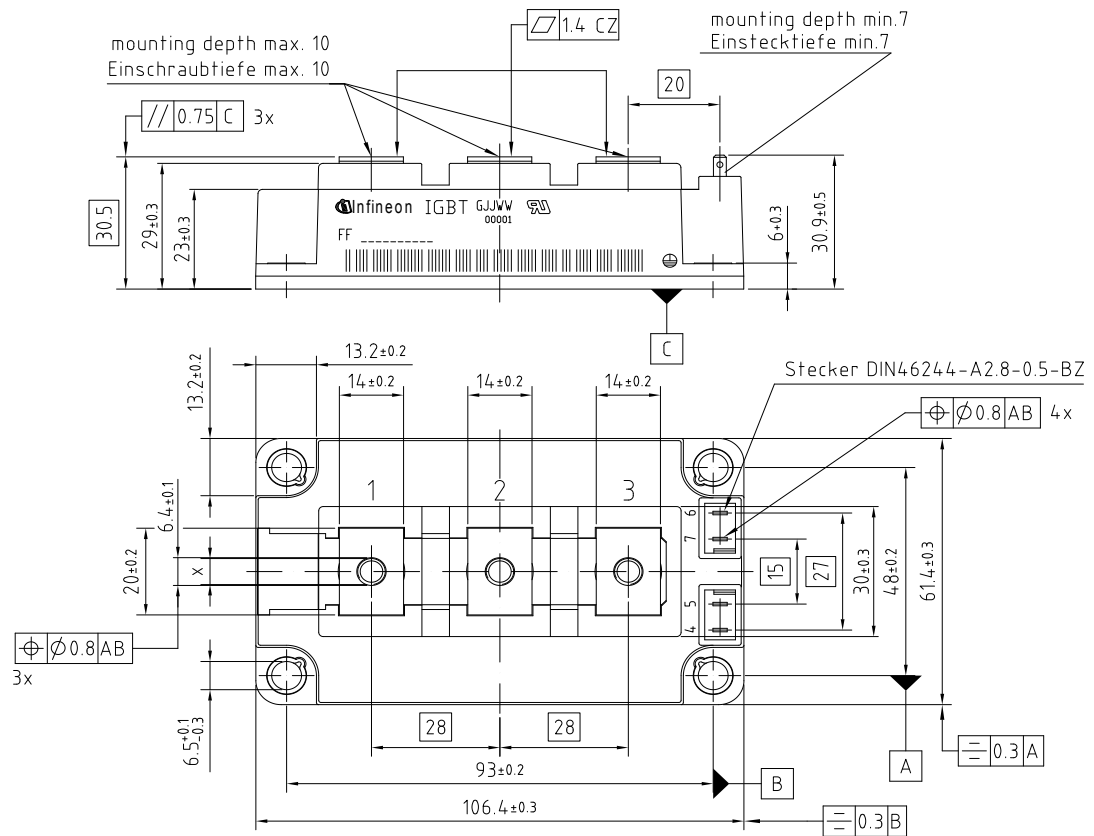
$Z_{thJH} = f(t)$



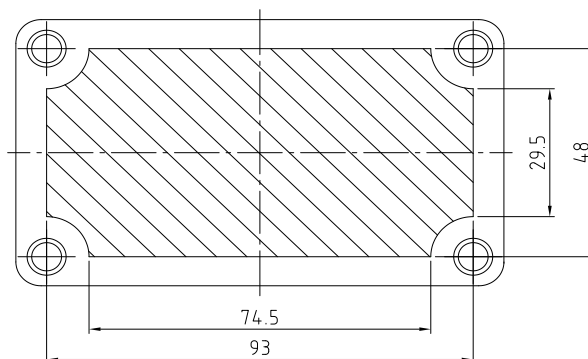
## 接线图 / Circuit diagram



## 封装尺寸 / Package outlines



x: M5/M6 depending on type  
x: M5/M6 je nach Typ



Sperrfläche für Thermisches Interface Material  
restricted area for Thermal Interface Material