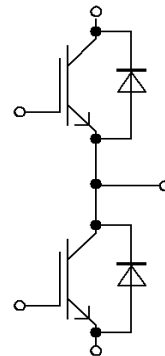


62mm C-Series 模块 采用第二高速IGBT和碳化硅二极管针对高频应用 和预涂导热介质

62mm C-Series module with the fast IGBT2 for high-frequency switching and pre-applied Thermal Interface Material



$V_{CES} = 1200V$

$I_{C\ nom} = 200A / I_{CRM} = 400A$

潜在应用

- UPS系统
- 伺服驱动器
- 医疗应用
- 电机传动
- 谐振逆变器应用
- 高频开关应用

电气特性

- V_{CESat} 带正温度系数
- 低开关损耗
- 无与伦比的坚固性
- 高短路能力

机械特性

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

Potential Applications

- UPS systems
- Servo drives
- Medical applications
- Motor drives
- Resonant inverter applications
- High Frequency Switching application

Electrical Features

- V_{CESat} with positive temperature coefficient
- Low switching losses
- Unbeatable robustness
- High short-circuit capability

Mechanical Features

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

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	$T_H = 45^{\circ}\text{C}, T_{vj\max} = 150^{\circ}\text{C}$	I_{CDC}	200	A
集电极重复峰值电流 Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	400	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	$I_C = 200\text{ A}$ $V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	$V_{CE\text{ sat}}$	3,20 3,85	3,70	V V
栅极阈值电压 Gate threshold voltage	$I_C = 8,00\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{GEth}	4,50	5,50	6,50 V
栅极电荷 Gate charge	$V_{GE} = -15 / 15\text{ V}$		Q_G	2,10		μC
内部栅极电阻 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	2,5		Ω
输入电容 Input capacitance	$f = 1000\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{ies}	13,0		nF
反向传输电容 Reverse transfer capacitance	$f = 1000\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{res}	0,85		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	$I_C = 200\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 4,7\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	t_{don}	0,10 0,11		μs μs
上升时间(电感负载) Rise time, inductive load	$I_C = 200\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 4,7\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	t_r	0,06 0,07		μs μs
关断延迟时间(电感负载) Turn-off delay time, inductive load	$I_C = 200\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 4,7\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	t_{doff}	0,53 0,55		μs μs
下降时间(电感负载) Fall time, inductive load	$I_C = 200\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 4,7\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	t_f	0,03 0,04		μs μs
开通损耗能量(每脉冲) Turn-on energy loss per pulse	$I_C = 200\text{ A}, V_{CE} = 600\text{ V}, L_{\sigma} = 60\text{ nH}$ $di/dt = 3500\text{ A}/\mu\text{s}$ $V_{GE} = -15 / 15\text{ V}, R_{Gon} = 4,7\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	E_{on}	19,0		mJ mJ
关断损耗能量(每脉冲) Turn-off energy loss per pulse	$I_C = 200\text{ A}, V_{CE} = 600\text{ V}, L_{\sigma} = 60\text{ nH}$ $du/dt = 7000\text{ V}/\mu\text{s}$ $V_{GE} = -15 / 15\text{ V}, R_{Goff} = 4,7\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	E_{off}	12,0		mJ mJ
短路数据 SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 900\text{ V}$ $V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 125^{\circ}\text{C}$		I_{SC}	1300		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}		0,113	K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	125	$^{\circ}\text{C}$

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	200	A
正向重复峰值电流 Repetitive peak forward current	$t_P = 1\text{ ms}$	I_{FRM}	400	A
I^2t -值 I^2t - value	$V_R = 0\text{ V}$, $t_P = 10\text{ ms}$, $T_{vj} = 125^{\circ}\text{C}$	I^2t	8500	A^2s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	$I_F = 200\text{ A}$, $V_{GE} = 0\text{ V}$ $I_F = 200\text{ A}$, $V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	V_F	2,00 1,70	2,40	V V
反向恢复峰值电流 Peak reverse recovery current	$I_F = 200\text{ A}$, $-di_F/dt = 3500\text{ A}/\mu\text{s}$ ($T_{vj}=125^{\circ}\text{C}$) $V_R = 600\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	I_{RM}	140 210		A A
恢复电荷 Recovered charge	$I_F = 200\text{ A}$, $-di_F/dt = 3500\text{ A}/\mu\text{s}$ ($T_{vj}=125^{\circ}\text{C}$) $V_R = 600\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	Q_r	11,7 32,0		μC μC
反向恢复损耗 (每脉冲) Reverse recovery energy	$I_F = 200\text{ A}$, $-di_F/dt = 3500\text{ A}/\mu\text{s}$ ($T_{vj}=125^{\circ}\text{C}$) $V_R = 600\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$	E_{rec}	4,20 11,0		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}		0,180	K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	125	$^{\circ}\text{C}$

模块 / Module

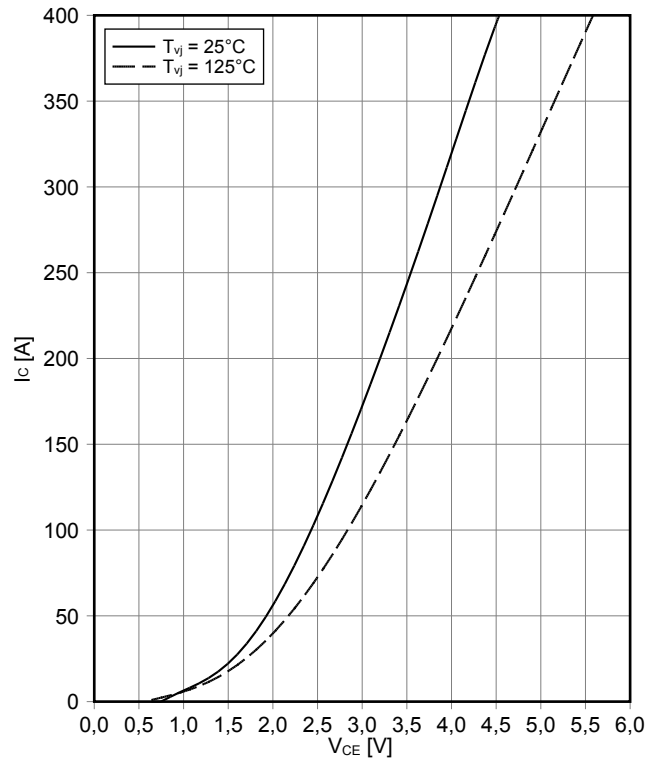
绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V _{ISOL}	2,5	kV
模块基板材料 Material of module baseplate			Cu	
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) basic insulation (class 1, IEC 61140)		Al ₂ O ₃	
爬电距离 Creepage distance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		29,0 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	
相对温度指数 (电) RTI Elec.	住房 housing	RTI	140	°C
min. typ. max.				
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个模块 / per module $\lambda_{\text{Paste}} = 1 \text{ W/(m}\cdot\text{K)} / \lambda_{\text{grease}} = 1 \text{ W/(m}\cdot\text{K)}$	R _{thCH}	0,01	K/W
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°C, 每个开关 / per switch	R _{CC'+EE'}	0,70	mΩ
储存温度 Storage temperature		T _{stg}	-40	125 °C
最高基板工作温度 Maximum baseplate operation temperature		T _{BPmax}		125 °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)

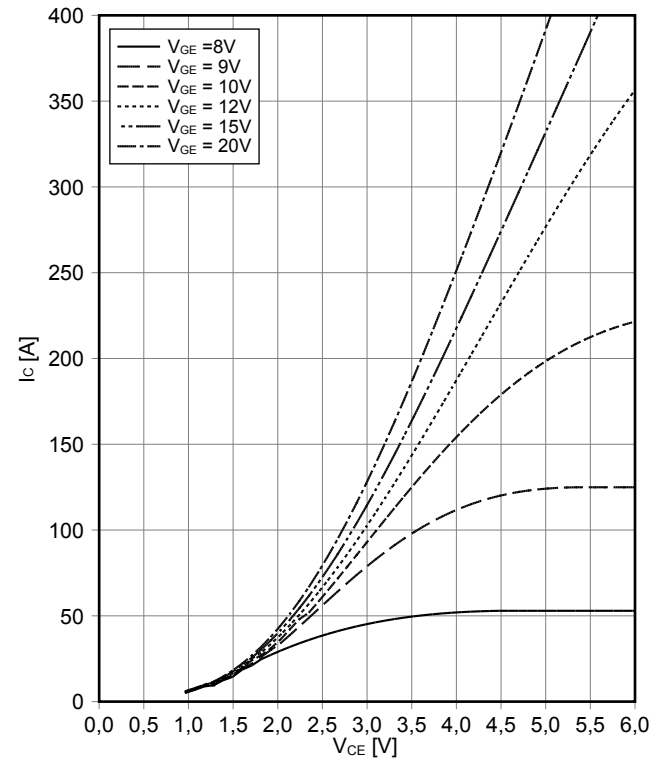
$I_C = f(V_{CE})$
 $V_{GE} = 15 \text{ V}$



输出特性 IGBT, 逆变器 (典型)

output characteristic IGBT, Inverter (typical)

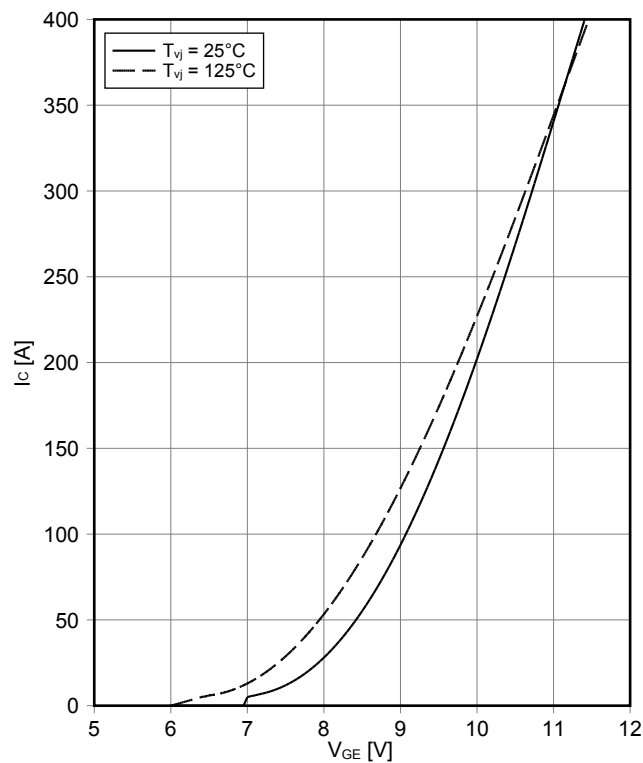
$I_C = f(V_{CE})$
 $T_{vj} = 125^\circ\text{C}$



传输特性 IGBT, 逆变器 (典型)

transfer characteristic IGBT, Inverter (typical)

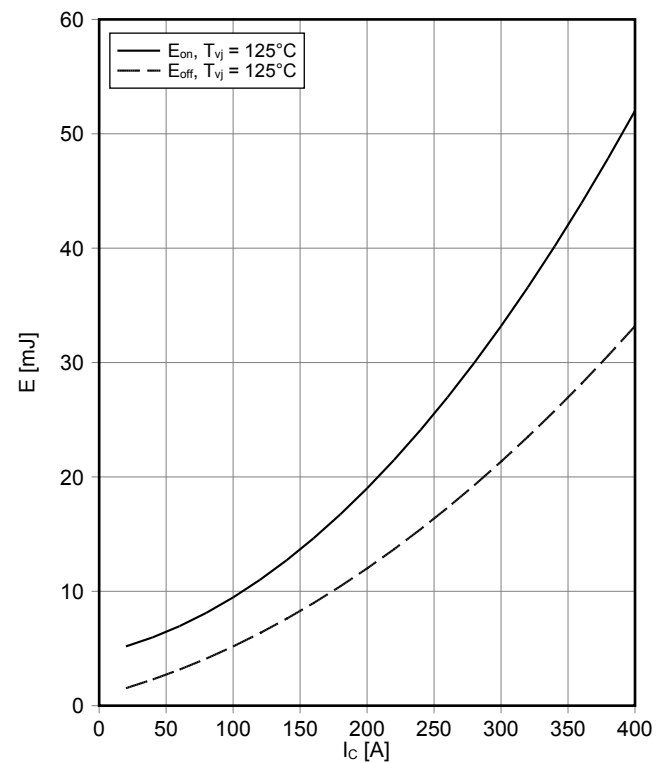
$I_C = f(V_{GE})$
 $V_{CE} = 20 \text{ V}$



开关损耗 IGBT, 逆变器 (典型)

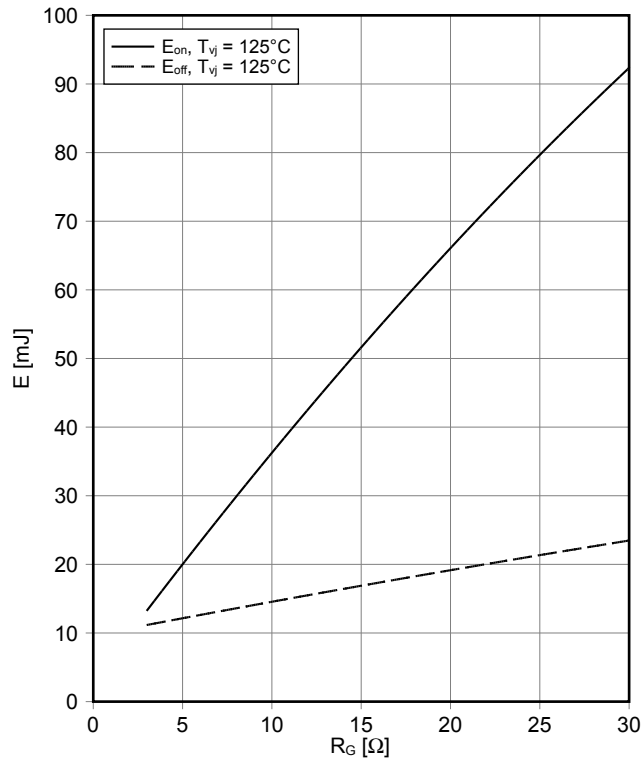
switching losses IGBT, Inverter (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15 \text{ V}$, $R_{Gon} = 4.7 \Omega$, $R_{Goff} = 4.7 \Omega$, $V_{CE} = 600 \text{ V}$



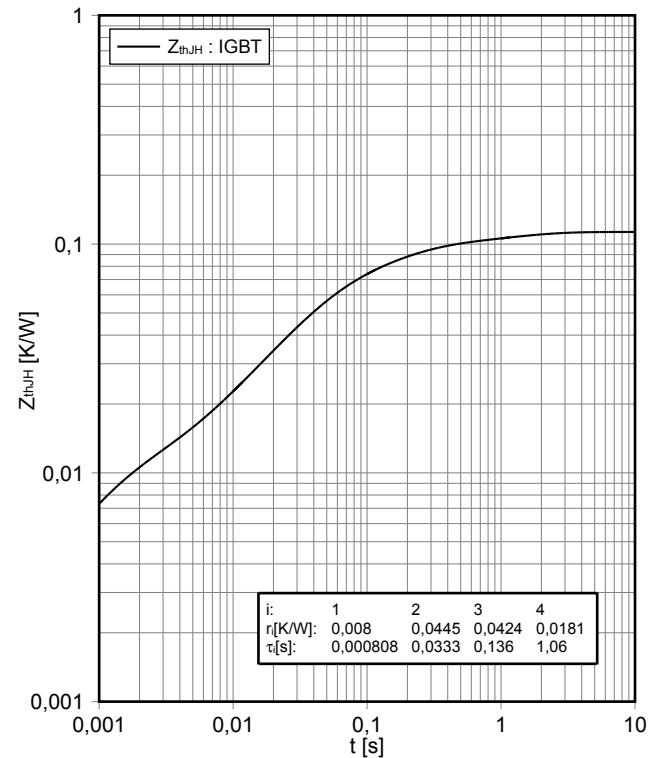
开关损耗 IGBT, 逆变器 (典型) switching losses IGBT, Inverter (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
 $V_{GE} = \pm 15 \text{ V}$, $I_C = 200 \text{ A}$, $V_{CE} = 600 \text{ V}$



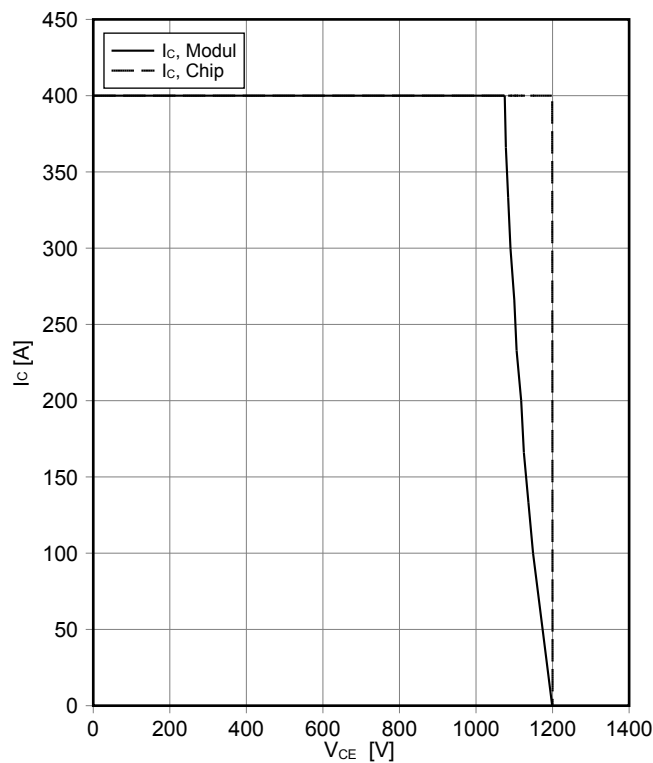
瞬态热阻抗 IGBT, 逆变器 transient thermal impedance IGBT, Inverter

$Z_{thJH} = f(t)$



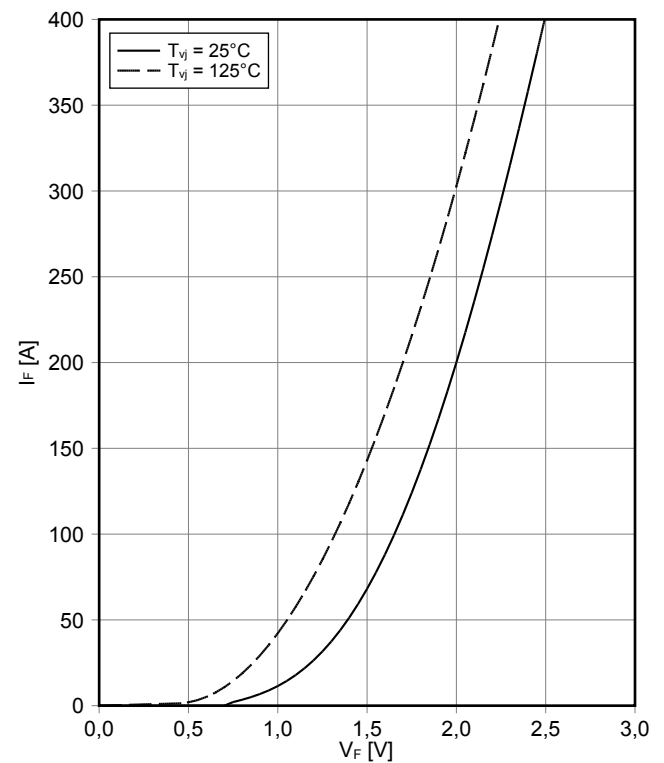
反偏安全工作区 IGBT, 逆变器 (RBSOA) reverse bias safe operating area IGBT, Inverter (RBSOA)

$I_C = f(V_{CE})$
 $V_{GE} = \pm 15 \text{ V}$, $R_{Goff} = 4.7 \Omega$, $T_{vj} = 125^\circ\text{C}$



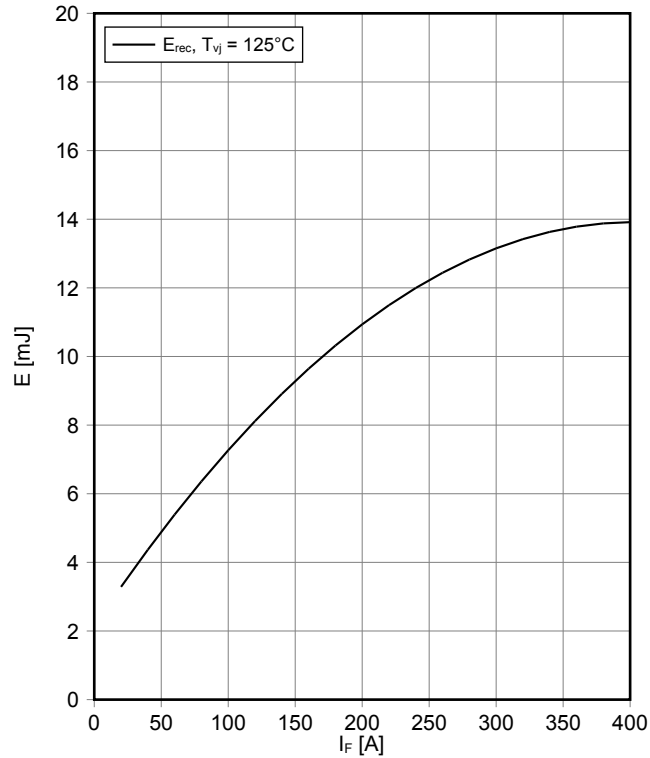
正向偏压特性 二极管, 逆变器 (典型) forward characteristic of Diode, Inverter (typical)

$I_F = f(V_F)$



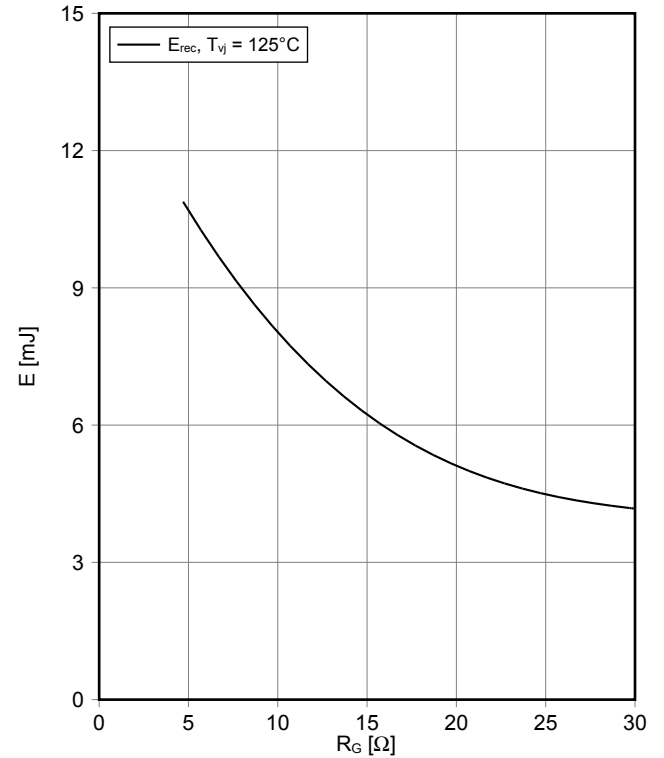
开关损耗 二极管,逆变器 (典型)

switching losses Diode, Inverter (typical)

 $E_{rec} = f(I_F)$ $R_{Gon} = 4.7 \Omega$, $V_{CE} = 600 V$ 

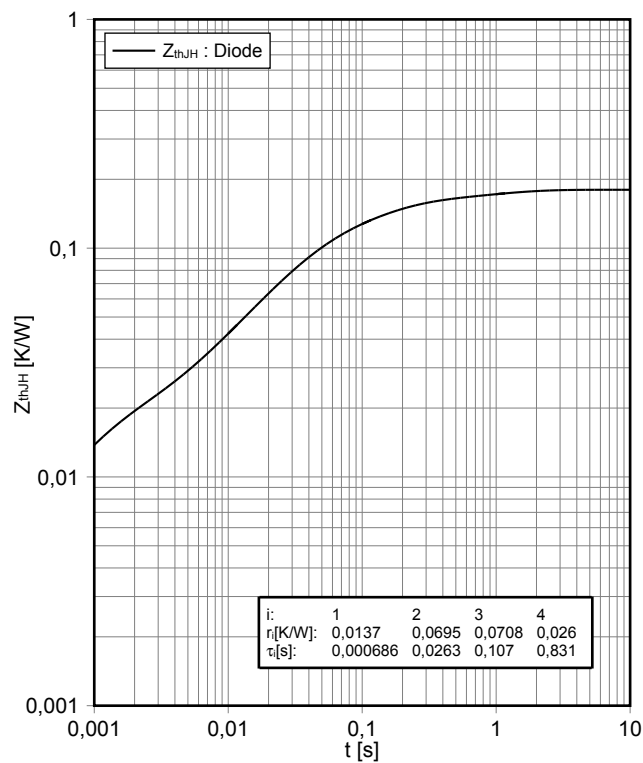
开关损耗 二极管,逆变器 (典型)

switching losses Diode, Inverter (typical)

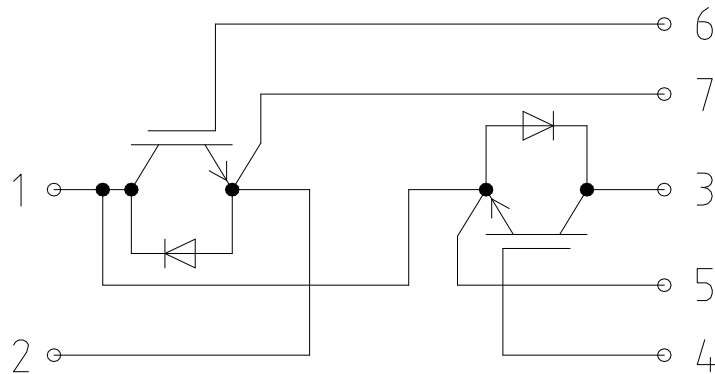
 $E_{rec} = f(R_G)$ $I_F = 200 A$, $V_{CE} = 600 V$ 

瞬态热阻抗 二极管,逆变器

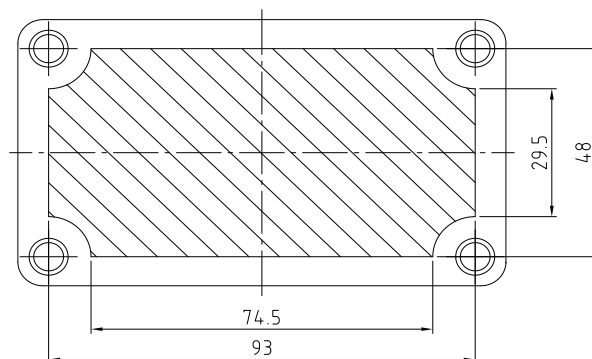
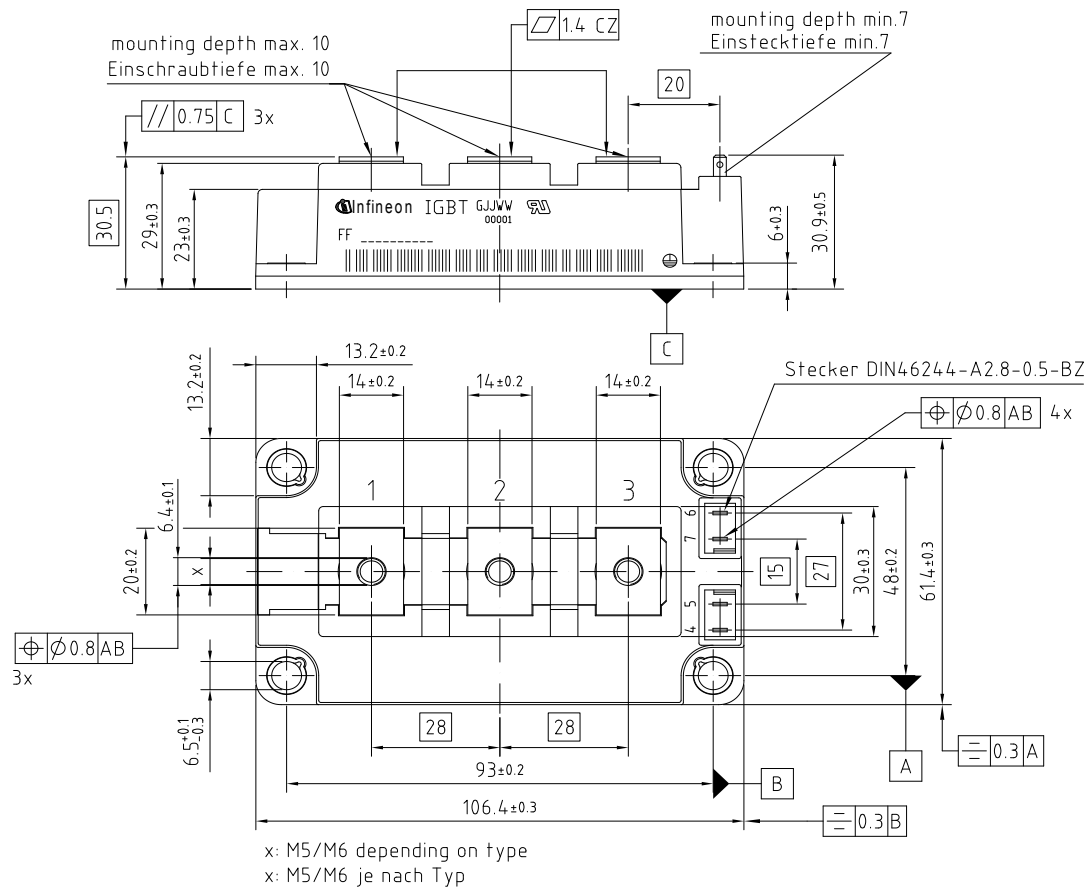
transient thermal impedance Diode, Inverter

 $Z_{thJH} = f(t)$ 

接线图 / Circuit diagram



封装尺寸 / Package outlines



Sperrfläche für Thermisches Interface Material
restricted area for Thermal Interface Material

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