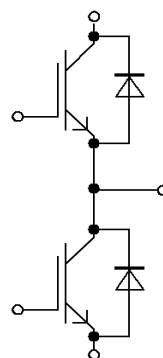


62mm C-Series 模块 采用第四代沟槽栅/场终止IGBT4和发射极控制二极管
 62mm C-Series module with Trench/Fieldstop IGBT4 and Emitter Controlled diode

初步数据 / Preliminary Data



$V_{CES} = 1700V$

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

潜在应用

- UPS系统
- 大功率变流器
- 电机传动
- 风力发电机

电气特性

- V_{CESat} 带正温度系数
- 低 V_{CESat}
- 提高工作结温 $T_{vj\ op}$
- 无与伦比的坚固性

机械特性

- 4 kV 交流 1分钟 绝缘
- 封装的 CTI > 400
- 标准封装
- 绝缘的基板
- 高爬电距离和电气间隙

Potential Applications

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

Electrical Features

- V_{CESat} with positive temperature coefficient
- Low V_{CESat}
- Extended operating temperature $T_{vj\ op}$
- Unbeatable robustness

Mechanical Features

- 4 kV AC 1min insulation
- Package with CTI > 400
- Standard housing
- Isolated base plate
- 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

初步数据
Preliminary Data

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}	1700	V
连续集电极直流电流 Continuous DC collector current	$T_C = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	$I_{C\text{nom}}$	150	A
集电极重复峰值电流 Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	300	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	$I_C = 150\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 150\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 150\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{sat}}$	1,95 2,35 2,45	2,30	V V V
栅极阈值电压 Gate threshold voltage	$I_C = 6,00\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		V_{GEth}	5,20	5,80	6,40 V
栅极电荷 Gate charge	$V_{GE} = -15 / 15\text{ V}$		Q_G	1,50		μC
内部栅极电阻 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	4,3		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}	12,0		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}	0,41		nF
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE} = 1700\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$		I_{CES}		1,0	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}		100	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	$I_C = 150\text{ A}, V_{CE} = 900\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 4,8\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{don}	0,24 0,28 0,30		μs μs μs
上升时间(电感负载) Rise time, inductive load	$I_C = 150\text{ A}, V_{CE} = 900\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 4,8\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,05 0,055 0,055		μs μs μs
关断延迟时间(电感负载) Turn-off delay time, inductive load	$I_C = 150\text{ A}, V_{CE} = 900\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 4,8\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_{doff}	0,70 0,74 0,78		μs μs μs
下降时间(电感负载) Fall time, inductive load	$I_C = 150\text{ A}, V_{CE} = 900\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 4,8\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,08 0,13 0,15		μs μs μs
开通损耗能量(每脉冲) Turn-on energy loss per pulse	$I_C = 150\text{ A}, V_{CE} = 900\text{ V}, L_{\sigma} = 60\text{ nH}$ $di/dt = 3000\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Gon} = 4,8\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	47,0 58,0 63,0		mJ mJ mJ
关断损耗能量(每脉冲) Turn-off energy loss per pulse	$I_C = 150\text{ A}, V_{CE} = 900\text{ V}, L_{\sigma} = 60\text{ nH}$ $du/dt = 3600\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Goff} = 4,8\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	28,0 44,0 49,0		mJ mJ mJ
短路数据 SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 1000\text{ V}$ $V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$	$t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$	I_{SC}	680		A
结 - 外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		R_{thJC}		0,135	K/W
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个 IGBT / per IGBT $\lambda_{\text{Paste}} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{\text{grease}} = 1\text{ W}/(\text{m}\cdot\text{K})$		R_{thCH}	0,0370		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{op}}$	-40	150	$^{\circ}\text{C}$

初步数据 Preliminary Data

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}	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 Repetitive peak forward current	$t_P = 1\text{ ms}$	I_{FRM}	300	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}	10000 9500	A^2s A^2s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	$I_F = 150\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 150\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 150\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	V_F	1,65 1,70 1,75	2,05	V V V
反向恢复峰值电流 Peak reverse recovery current	$I_F = 150\text{ A}, -di_F/dt = 3000\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 900\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	I_{RM}	180 220 240		A A A
恢复电荷 Recovered charge	$I_F = 150\text{ A}, -di_F/dt = 3000\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 900\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	Q_r	45,0 80,0 85,0		μC μC μC
反向恢复损耗 (每脉冲) Reverse recovery energy	$I_F = 150\text{ A}, -di_F/dt = 3000\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 900\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{rec}	20,0 40,0 44,0		mJ mJ mJ
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		R_{thJC}		0,160	K/W
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个二极管 / per diode $\lambda_{\text{Paste}} = 1\text{ W}/(\text{m}\cdot\text{K}) / \lambda_{\text{grease}} = 1\text{ W}/(\text{m}\cdot\text{K})$		R_{thCH}	0,0440		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

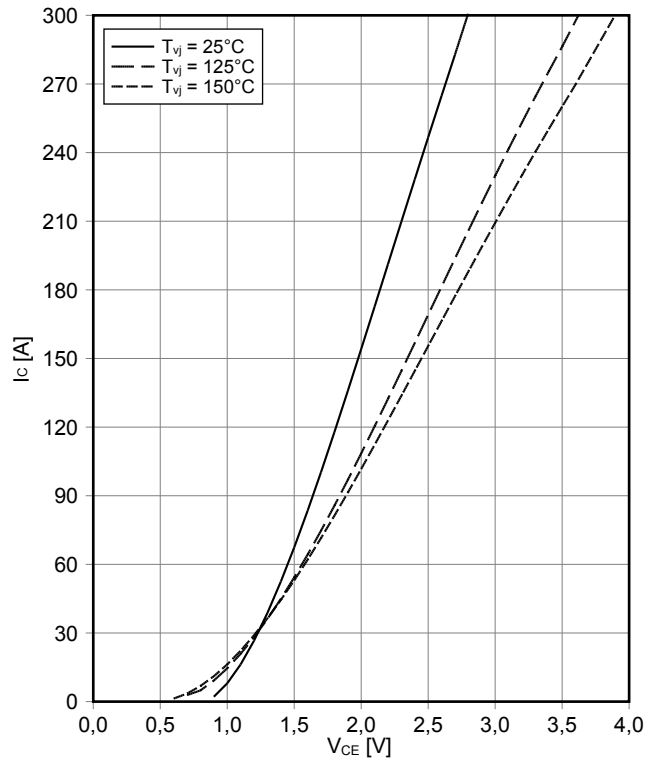
模块 / Module

绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V _{ISOL}	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 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			
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 _C = 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
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

初步数据 Preliminary Data

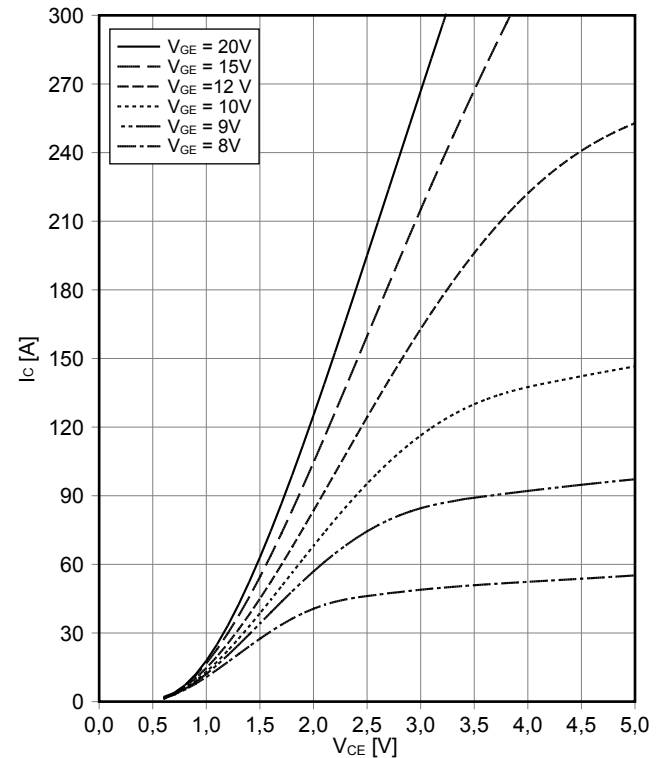
输出特性 IGBT, 逆变器 (典型)
output characteristic IGBT, Inverter (typical)

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



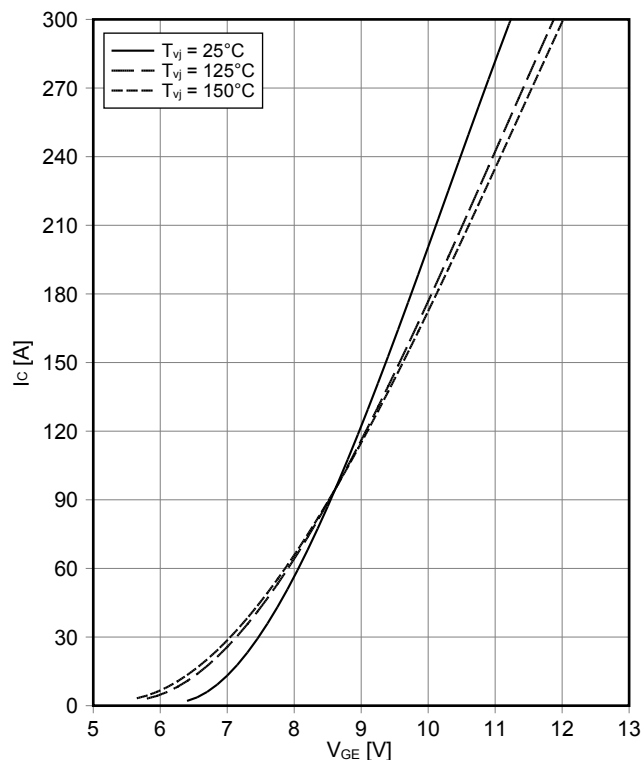
输出特性 IGBT, 逆变器 (典型)
output characteristic IGBT, Inverter (typical)

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



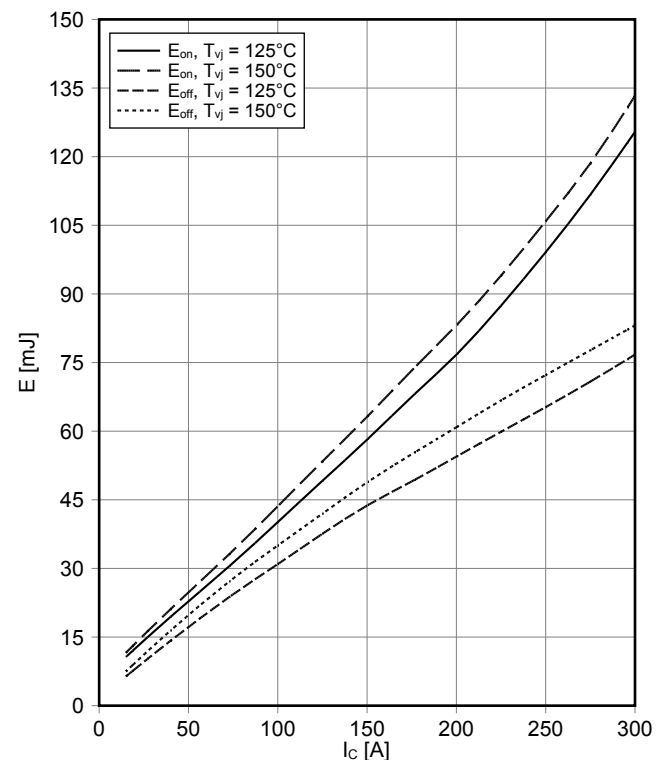
传输特性 IGBT, 逆变器 (典型)
transfer characteristic IGBT, Inverter (typical)

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



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

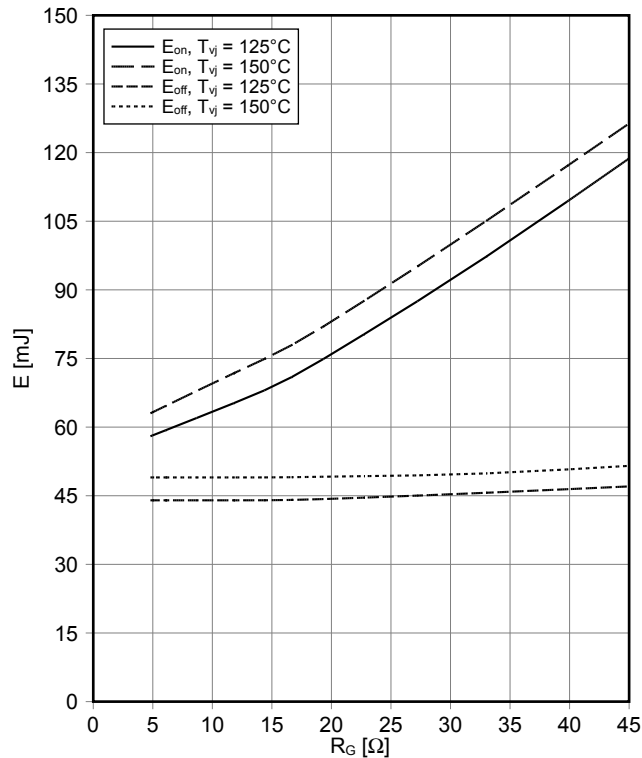
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 4.8\ \Omega$, $R_{Goff} = 4.8\ \Omega$, $V_{CE} = 900\text{ V}$



初步数据 Preliminary Data

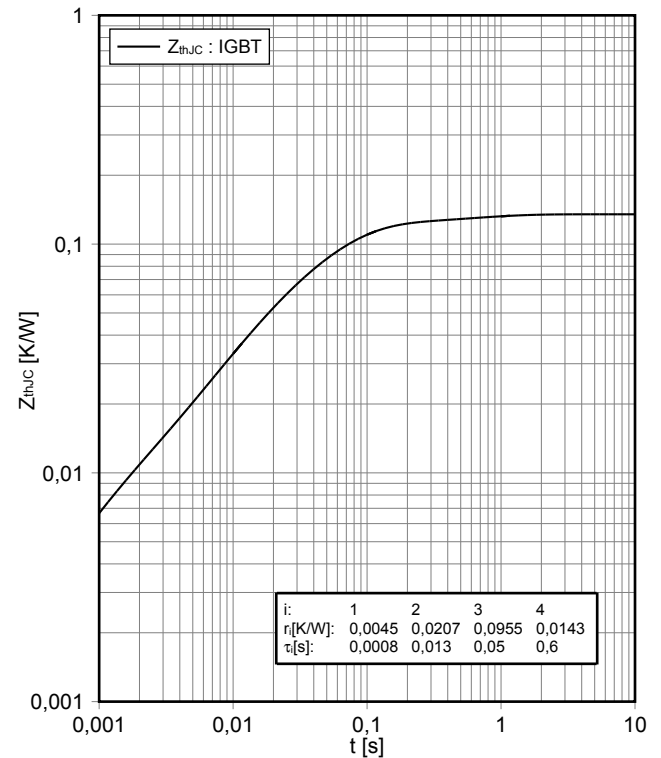
开关损耗 IGBT, 逆变器 (典型) switching losses IGBT, Inverter (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
 $V_{GE} = \pm 15 \text{ V}$, $I_C = 150 \text{ A}$, $V_{CE} = 900 \text{ V}$



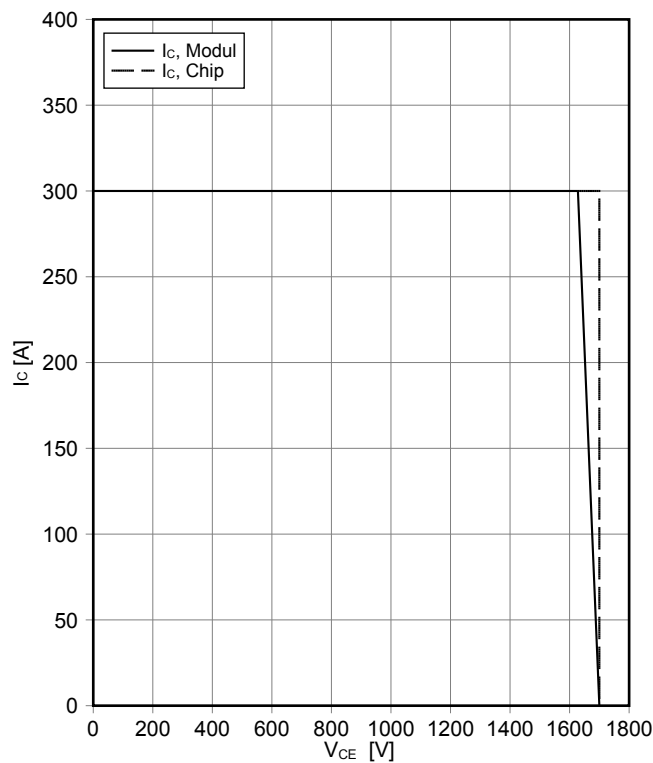
瞬态热阻抗 IGBT, 逆变器 transient thermal impedance IGBT, Inverter

$Z_{thJC} = f(t)$



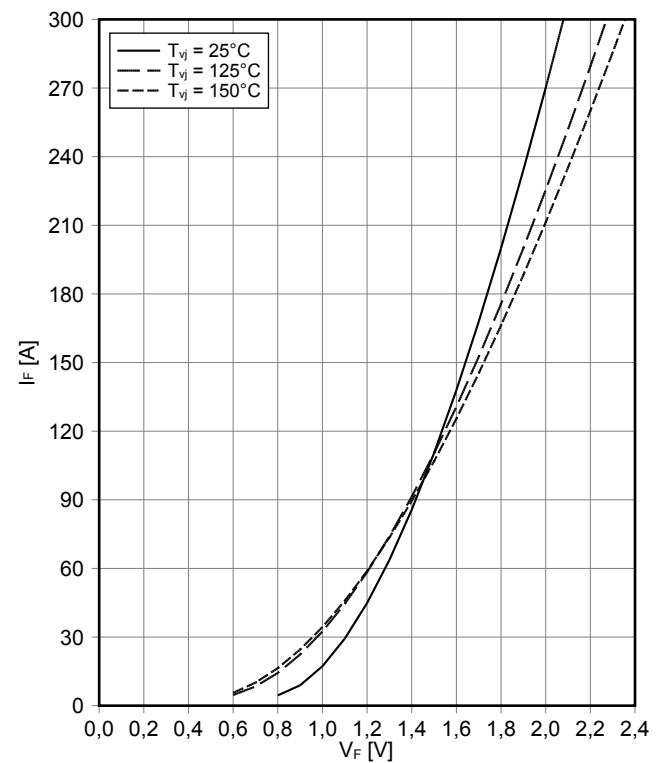
反偏安全工作区 IGBT, 逆变器 (RBSOA) reverse bias safe operating area IGBT, Inverter (RBSOA)

$I_C = f(V_{CE})$
 $V_{GE} = \pm 15 \text{ V}$, $R_{Goff} = 4.8 \Omega$, $T_{vj} = 150^\circ\text{C}$



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

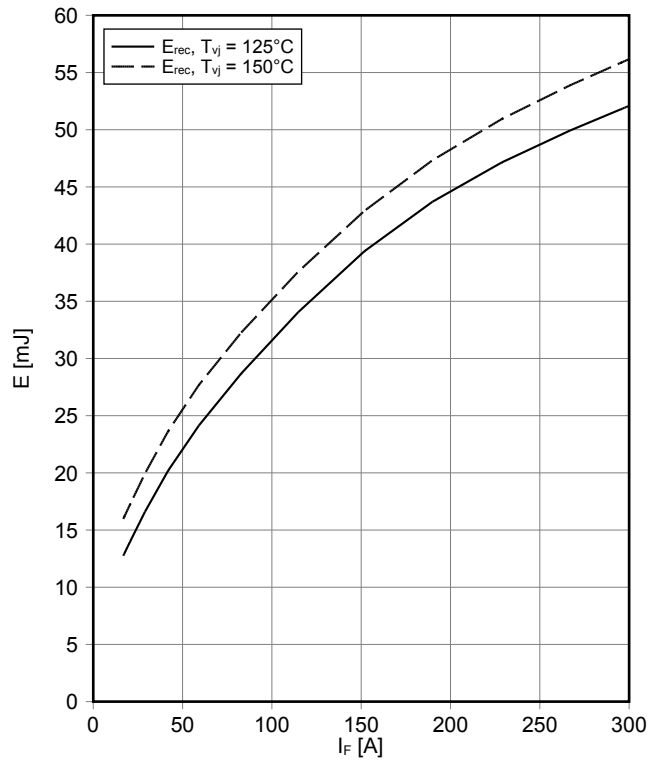
$I_F = f(V_F)$



初步数据 Preliminary Data

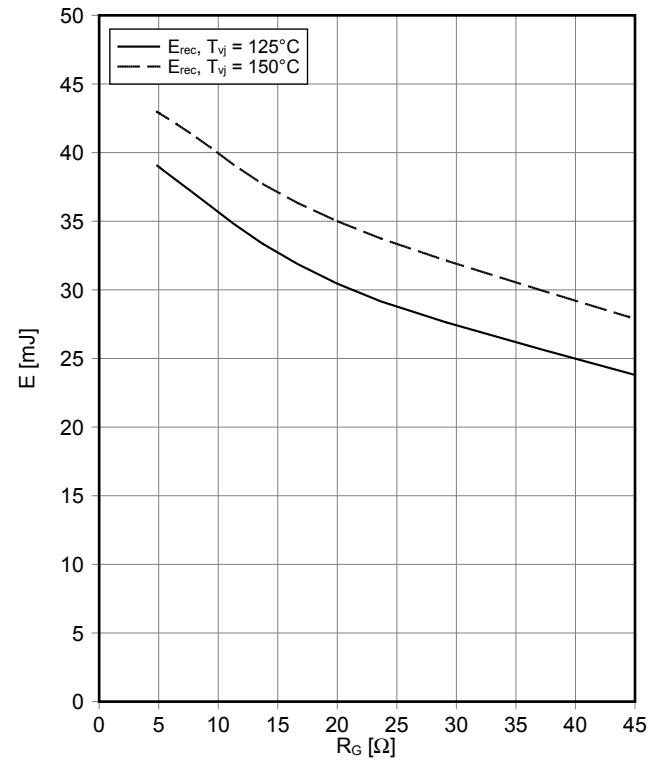
开关损耗 二极管,逆变器 (典型)
switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$
 $R_{Gon} = 4.8 \Omega$, $V_{CE} = 900 V$



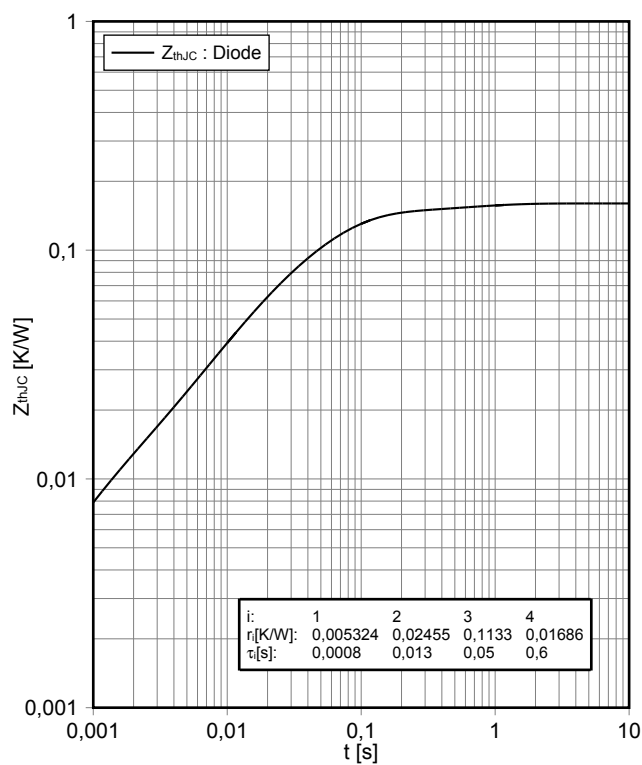
开关损耗 二极管,逆变器 (典型)
switching losses Diode, Inverter (typical)

$E_{rec} = f(R_G)$
 $I_F = 150 A$, $V_{CE} = 900 V$



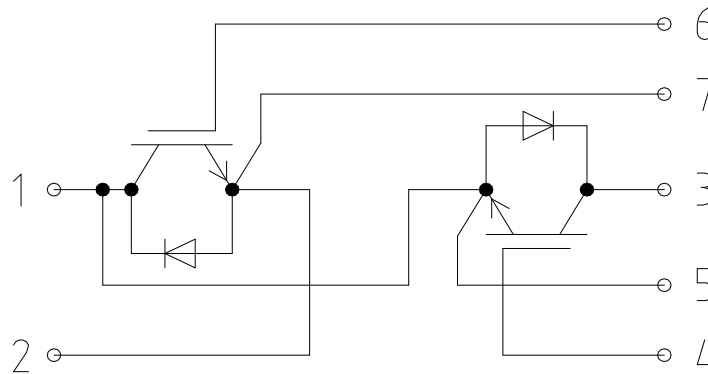
瞬态热阻抗 二极管,逆变器
transient thermal impedance Diode, Inverter

$Z_{thJC} = f(t)$

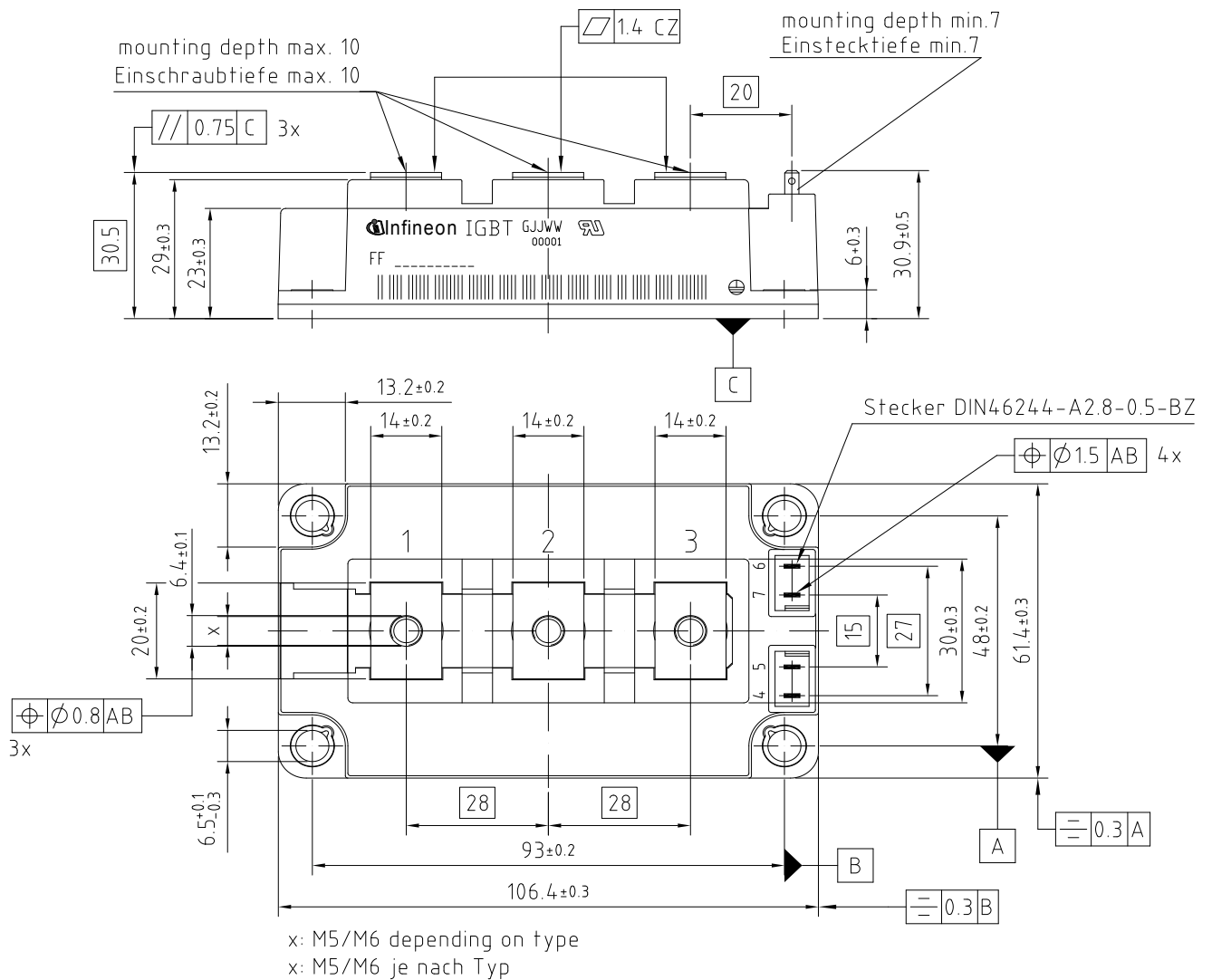


接线图 / Circuit diagram

初步数据
Preliminary Data



封装尺寸 / Package outlines



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