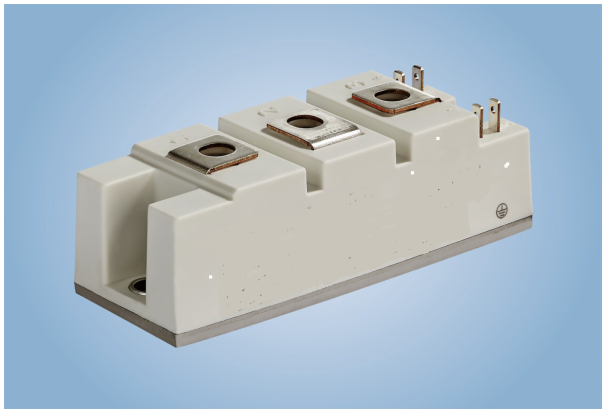
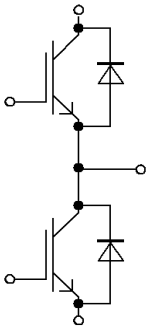
技术信息 / Technical Information

IGBT-模块
IGBT-Module

目标数据 / Target Data





V_{CES} = 1200V
$I_{C\ nom}$ = 100A / I_{CRM} = 200A

典型应用
• 工业焊机

Typical Applications
• Welding

电气特性
• 低开关损耗
• $T_{vj\ op}$ = 125°C
• 超快速IGBT芯片

Electrical Features
• Low Switching Losses
• $T_{vj\ op}$ = 125°C
• Ultra fast IGBT Chips

机械特性
• 铜基板
• 标准封装

Mechanical Features
• Copper Base Plate
• Standard Housing

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°C	V_{CES}	1200	V
连续集电极直流电流 Continuous DC collector current	T_C = 70°C, $T_{vj\,max}$ = 125°C	$I_{C\,nom}$	100	A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	200	A
总功率损耗 Total power dissipation	T_C = 25°C, $T_{vj\,max}$ = 125°C	P_{tot}	285	W
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 = 100 A, V_{GE} = 15 V I_C = 100 A, V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C	$V_{CE\,sat}$		2,15 2,50	2,40	V V
栅极阈值电压 Gate threshold voltage	I_C = 3,80 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	5,05	5,80	6,45	V
栅极电荷 Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0,80		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		0,0		Ω
输入电容 Input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		6,00		nF
反向传输电容 Reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,50		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1,0	mA
栅极-发射极漏电流 Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	I_C = 100 A, V_{CE} = 1200 V V_{GE} = ±15 V R_{Gon} = 7,5 Ω	T_{vj} = 25°C T_{vj} = 125°C	$t_{d\,on}$		0,21 0,24		µs µs
上升时间(电感负载) Rise time, inductive load	I_C = 100 A, V_{CE} = 1200 V V_{GE} = ±15 V R_{Gon} = 7,5 Ω	T_{vj} = 25°C T_{vj} = 125°C	t_r		0,05 0,06		µs µs
关断延迟时间(电感负载) Turn-off delay time, inductive load	I_C = 100 A, V_{CE} = 1200 V V_{GE} = ±15 V R_{Goff} = 7,5 Ω	T_{vj} = 25°C T_{vj} = 125°C	$t_{d\,off}$		0,39 0,45		µs µs
下降时间(电感负载) Fall time, inductive load	I_C = 100 A, V_{CE} = 1200 V V_{GE} = ±15 V R_{Goff} = 7,5 Ω	T_{vj} = 25°C T_{vj} = 125°C	t_f		0,02 0,045		µs µs
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I_C = 100 A, V_{CE} = 1200 V, L_S = 35 nH V_{GE} = ±15 V R_{Gon} = 7,5 Ω	T_{vj} = 25°C T_{vj} = 125°C	E_{on}		13,0 17,0		mJ mJ
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I_C = 100 A, V_{CE} = 1200 V, L_S = 35 nH V_{GE} = ±15 V R_{Goff} = 7,5 Ω	T_{vj} = 25°C T_{vj} = 125°C	E_{off}		3,40 5,30		mJ mJ
短路数据 SC data	V_{GE} ≤ 15 V, V_{CC} = 800 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	t_P ≤ 10 µs, T_{vj} = 125°C	I_{SC}		300		A
结 - 外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		R_{thJC}			0,350	K/W
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个 IGBT / per IGBT λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)		R_{thCH}		0,0900		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\,op}$	-40		125	°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°C	V_{RRM}	1200	V
连续正向直流电流 Continuous DC forward current		I_F	35	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}	100	A
I2t-值 I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C	I²t	280	A²s

特征值 / Characteristic Values

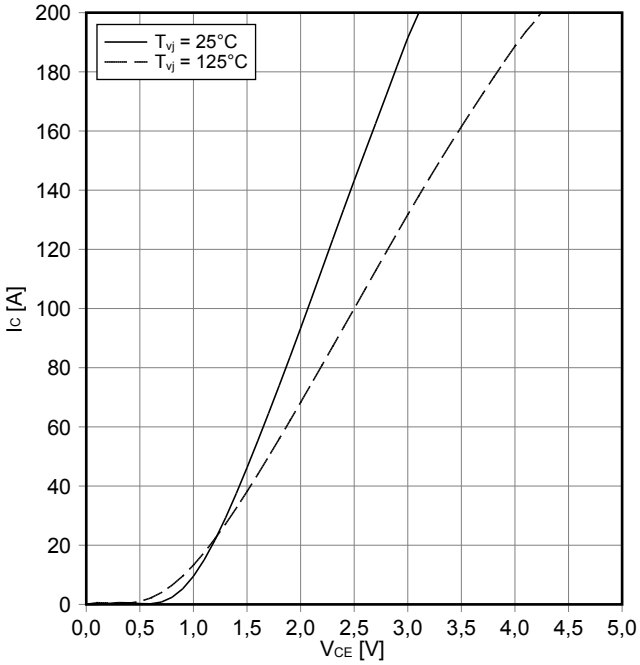
			min.	typ.	max.	
正向电压 Forward voltage	I_F = 35 A, V_{GE} = 0 V T_{vj} = 25°C I_F = 35 A, V_{GE} = 0 V T_{vj} = 125°C	V_F		1,70 1,70	2,15	V V
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R_{thJC}			1,20	K/W
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个二极管 / per diode λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		0,150		K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-40		125	°C

模块 / Module

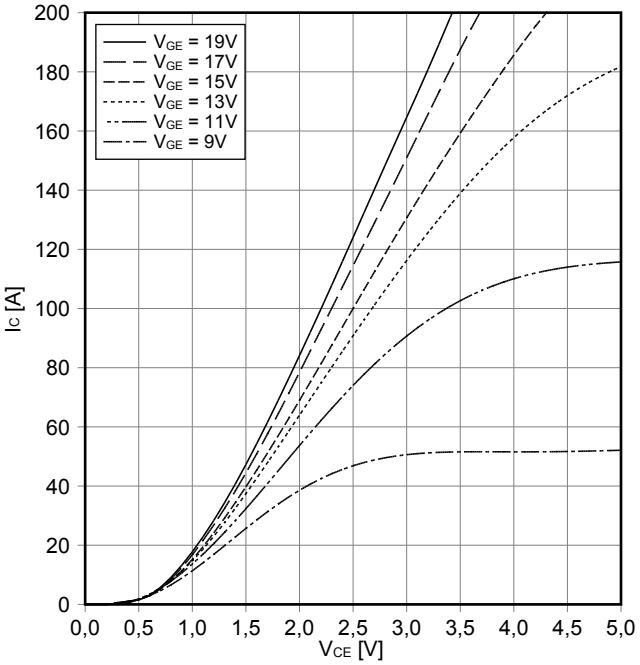
绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}	2,5		kV
模块基板材料 Material of module baseplate			Cu		
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) basic insulation (class 1, IEC 61140)		Al_2O_3		
爬电距离 Creepage distance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		21,5 13,0		mm
电气间隙 Clearance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		21,5 5,0		mm
相对电痕指数 Comperative tracking index		CTI	> 200		

			min.	typ.	max.	
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个模块 / per module λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		0,05		K/W
杂散电感,模块 Stray inductance module		L_{sCE}		30		nH
储存温度 Storage temperature		T_{stg}	-40		125	°C
模块安装的安装扭距 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		5,00	Nm
端子联接扭距 Terminal connection torque	螺丝 M5 根据相应的应用手册进行安装 Screw M5 - Mounting according to valid application note	M	2,5	-	5,0	Nm
重量 Weight		G		160		g

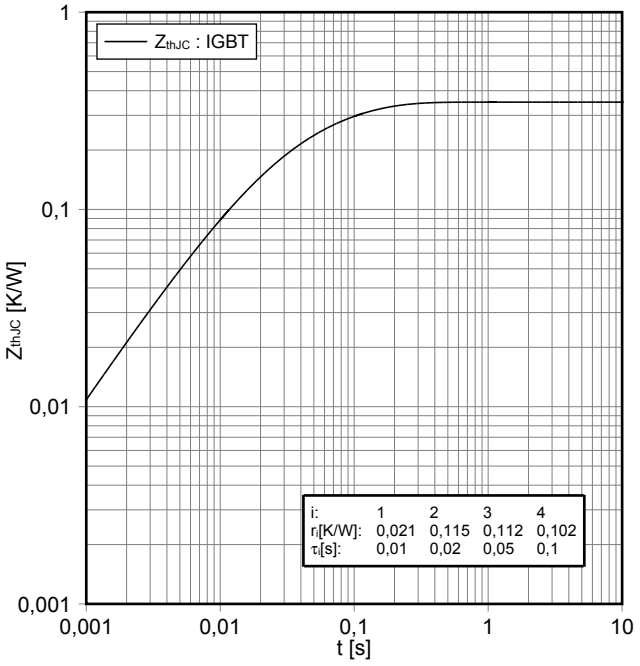
输出特性 IGBT, 逆变器 （典型)
output characteristic IGBT,Inverter (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



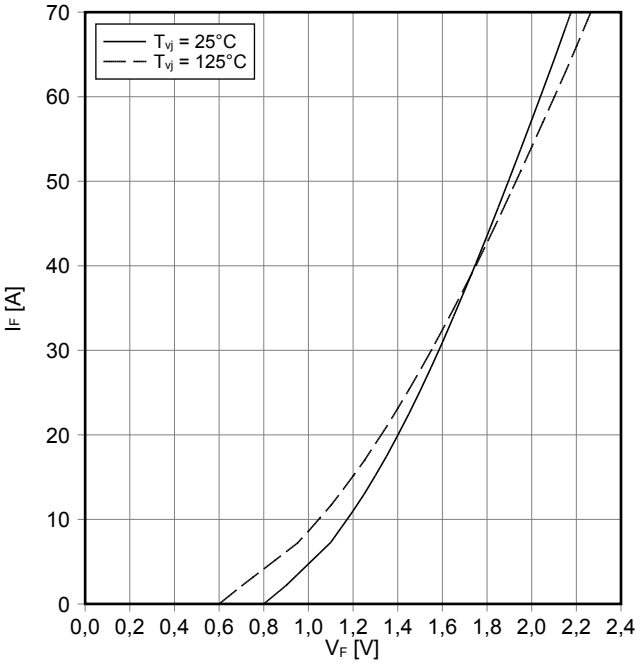
输出特性 IGBT, 逆变器 （典型)
output characteristic IGBT,Inverter (typical)
$I_C = f(V_{CE})$
T_{vj} = 125°C



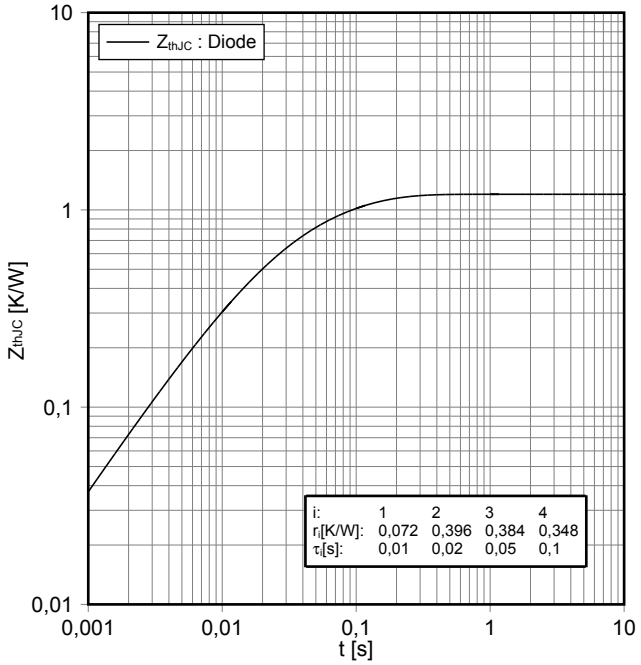
瞬态热阻抗 IGBT, 逆变器
transient thermal impedance IGBT,Inverter
$Z_{thJC} = f(t)$



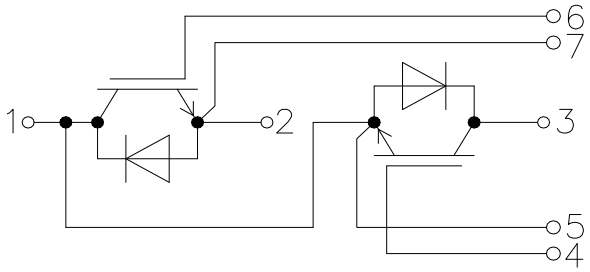
正向偏压特性 二极管,逆变器 （典型)
forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



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



封装尺寸 / Package outlines