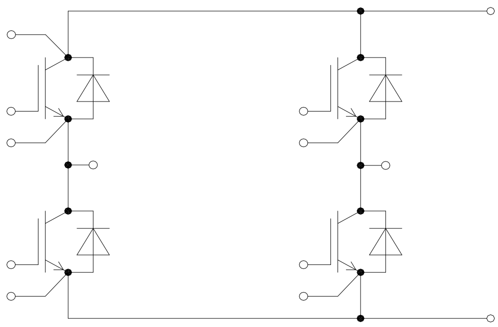
F4-100R17ME4_B11

EconoDUAL™3 模块 采用第四代沟槽栅/场终止IGBT4和第三代发射极控制二极管
EconoDUAL™3 module with Trench/Fieldstop IGBT4 and Emitter Controlled 3 diode

Typical Appearance



V_{CES} = 1700V
$I_{C\ nom}$ = 100A / I_{CRM} = 200A

潜在应用
- 中压变流器
- 大功率变流器
- 风力发电机

电气特性
- $T_{vj\ op}$ = 150°C
- V_{CEsat} 带正温度系数
- 低 V_{CEsat}
- 沟槽栅IGBT4
- 高直流电压稳定性
- 高短路能力

机械特性
- PressFIT 压接技术
- 低热阻的三氧化二铝 Al_2O_3 衬底
- 绝缘的基板

Potential Applications
- Medium voltage converters
- High power converters
- Wind turbines

Electrical Features
- $T_{vj\ op}$ = 150°C
- V_{CEsat} with positive temperature coefficient
- Low V_{CEsat}
- Trench IGBT 4
- High DC stability
- High short-circuit capability

Mechanical Features
- PressFIT contact technology
- Al_2O_3 substrate with low thermal resistance
- Isolated base plate

Module Label Code

Barcode Code 128

Sample
00000123456000000000000

DMX - Code

Sample

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°C	V_{CES}	1700	V
连续集电极直流电流 Continuous DC collector current	T_C = 80°C, $T_{vj\,max}$ = 175°C T_C = 25°C, $T_{vj\,max}$ = 175°C	$I_{C\,nom}$ I_C	100 155	A A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	200	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 = 100 A, V_{GE} = 15 V I_C = 100 A, V_{GE} = 15 V I_C = 100 A, V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$V_{CE\,sat}$		1,95 2,35 2,45	2,30	V V V
栅极阈值电压 Gate threshold voltage	I_C = 9,40 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	5,20	5,80	6,40	V
栅极电荷 Gate charge	V_{GE} = -15 V ... +15 V		Q_G		1,20		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		7,5		Ω
输入电容 Input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		9,00		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}		0,29		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 1700 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			3,0	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}			300	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	I_C = 100 A, V_{CE} = 900 V V_{GE} = ±15 V R_{Gon} = 1,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,on}$		0,19 0,21 0,21		µs µs µs
上升时间(电感负载) Rise time, inductive load	I_C = 100 A, V_{CE} = 900 V V_{GE} = ±15 V R_{Gon} = 1,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		0,04 0,05 0,05		µs µs µs
关断延迟时间(电感负载) Turn-off delay time, inductive load	I_C = 100 A, V_{CE} = 900 V V_{GE} = ±15 V R_{Goff} = 1,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,off}$		0,42 0,57 0,61		µs µs µs
下降时间(电感负载) Fall time, inductive load	I_C = 100 A, V_{CE} = 900 V V_{GE} = ±15 V R_{Goff} = 1,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		0,10 0,16 0,18		µs µs µs
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I_C = 100 A, V_{CE} = 900 V, L_S = 20 nH V_{GE} = ±15 V, di/dt = 2100 A/µs (T_{vj} = 150°C) R_{Gon} = 1,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		26,0 34,0 36,5		mJ mJ mJ
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I_C = 100 A, V_{CE} = 900 V, L_S = 20 nH V_{GE} = ±15 V, du/dt = 2900 V/µs (T_{vj} = 150°C) R_{Goff} = 1,0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		21,5 33,5 37,5		mJ mJ mJ
短路数据 SC data	$V_{GE} \leq$ 15 V, V_{CC} = 15 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	$t_P \leq$ 10 µs, T_{vj} = 150°C	I_{SC}		460		A
结 - 外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		R_{thJC}			0,236	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}		0,100		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\,op}$	-40		150	°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}	1700	V
连续正向直流电流 Continuous DC forward current		I_F	100	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}	200	A
I2t-值 I^2t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C V_R = 0 V, t_P = 10 ms, T_{vj} = 150°C	I^2t	4500 2000	A^2s A^2s

特征值 / Characteristic Values

				min.	typ.	max.	
正向电压 Forward voltage	I_F = 100 A, V_{GE} = 0 V I_F = 100 A, V_{GE} = 0 V I_F = 100 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		1,80 1,90 1,95	2,20	V V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 100 A, - di_F/dt = 2100 A/µs (T_{vj}=150°C) V_R = 900 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		120 130 135		A A A
恢复电荷 Recovered charge	I_F = 100 A, - di_F/dt = 2100 A/µs (T_{vj}=150°C) V_R = 900 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		26,5 43,5 49,0		µC µC µC
反向恢复损耗（每脉冲） Reverse recovery energy	I_F = 100 A, - di_F/dt = 2100 A/µs (T_{vj}=150°C) V_R = 900 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		13,0 24,5 27,5		mJ mJ mJ
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		R_{thJC}			0,440	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}		0,123		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\ op}$	-40		150	°C

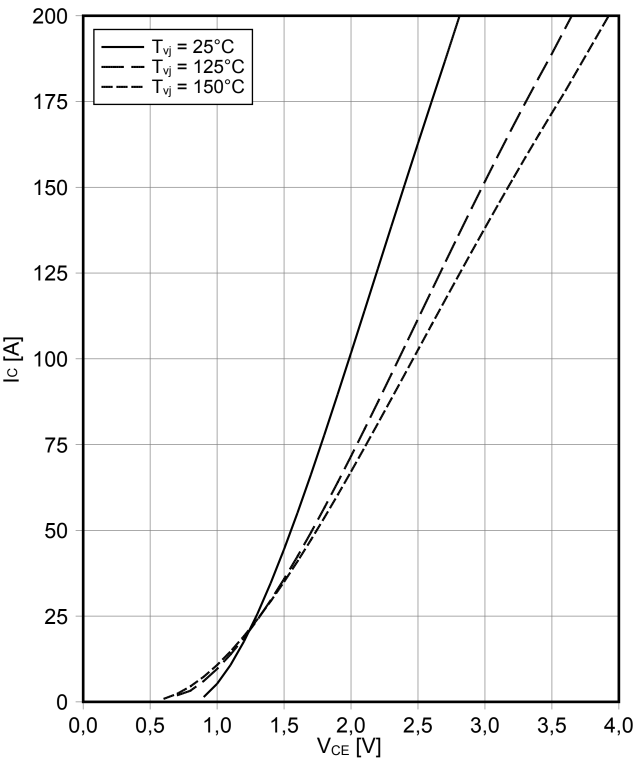
模块 / Module

绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}	3,4	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		14,5 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		12,5 10,0	mm
相对电痕指数 Comperative tracking index		CTI	> 200	

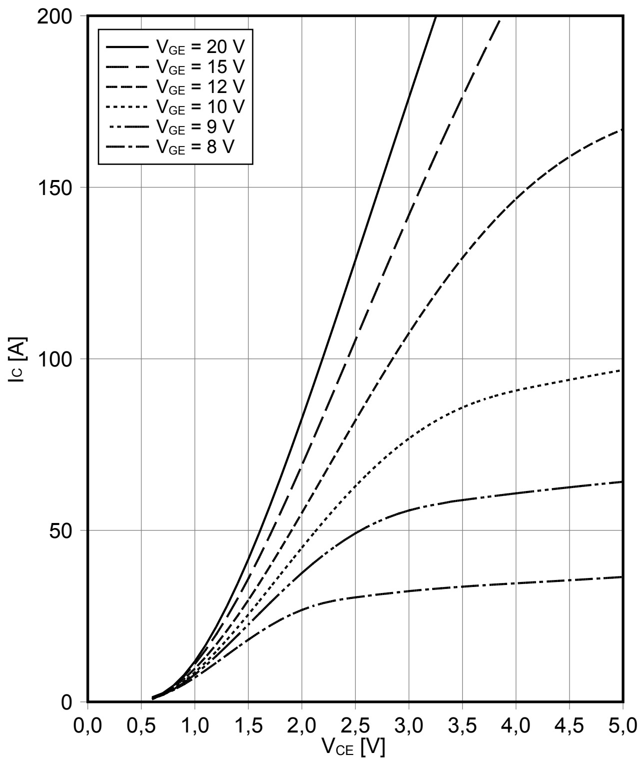
			min.	typ.	max.	
杂散电感,模块 Stray inductance module		L_{sCE}		26		nH
储存温度 Storage temperature		T_{stg}	-40		125	°C
模块安装的安装扭距 Mounting torque for modul mounting	螺丝 M5 根据相应的应用手册进行安装 Screw M5 - Mounting according to valid application note	M	3,00		6,00	Nm
端子联接扭距 Terminal connection torque	螺丝 M6 根据相应的应用手册进行安装 Screw M6 - Mounting according to valid application note	M	3,0	-	6,0	Nm
重量 Weight		G		345		g

The labels AC and DC on the housing do not have relevance.
Die Bezeichnungen AC und DC auf dem Rahmen haben keine Bedeutung.

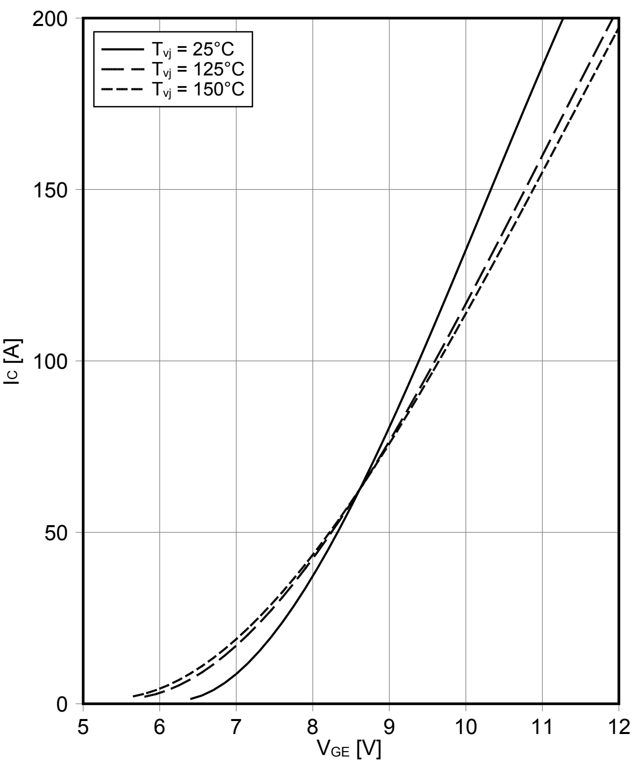
输出特性 IGBT, 逆变器 （典型)
output characteristic IGBT,Inverter (typical)
I_C = f (V_{CE})
V_{GE} = 15 V



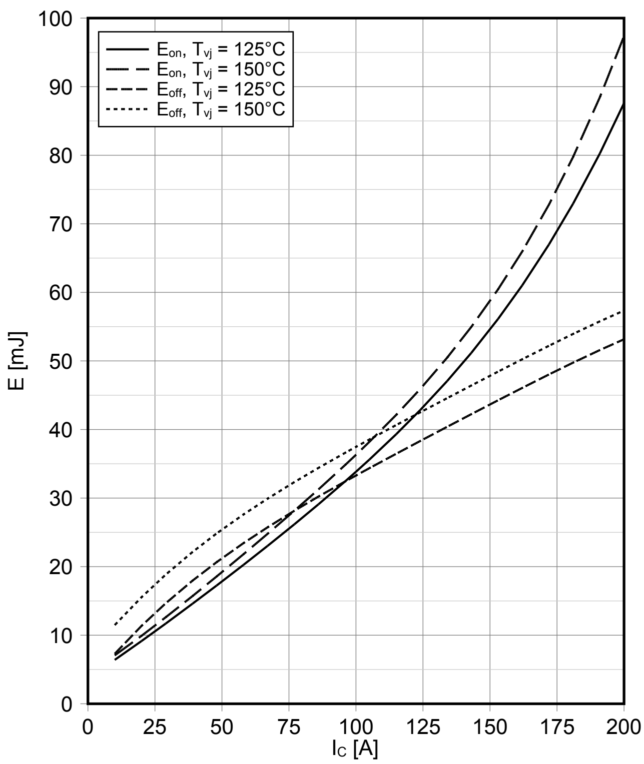
输出特性 IGBT, 逆变器 （典型)
output characteristic IGBT,Inverter (typical)
I_C = f (V_{CE})
T_{vj} = 150°C



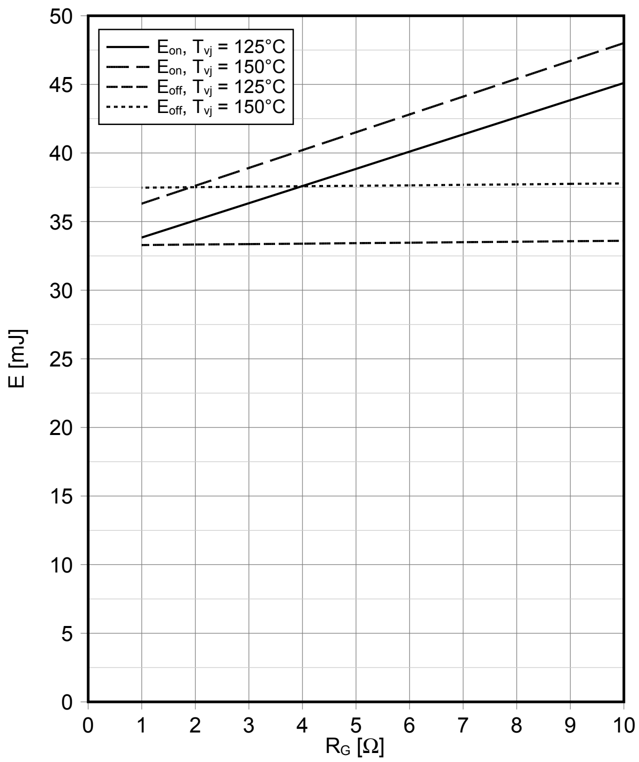
传输特性 IGBT, 逆变器 (典型)
transfer characteristic IGBT,Inverter (typical)
I_C = f (V_{GE})
V_{CE} = 20 V



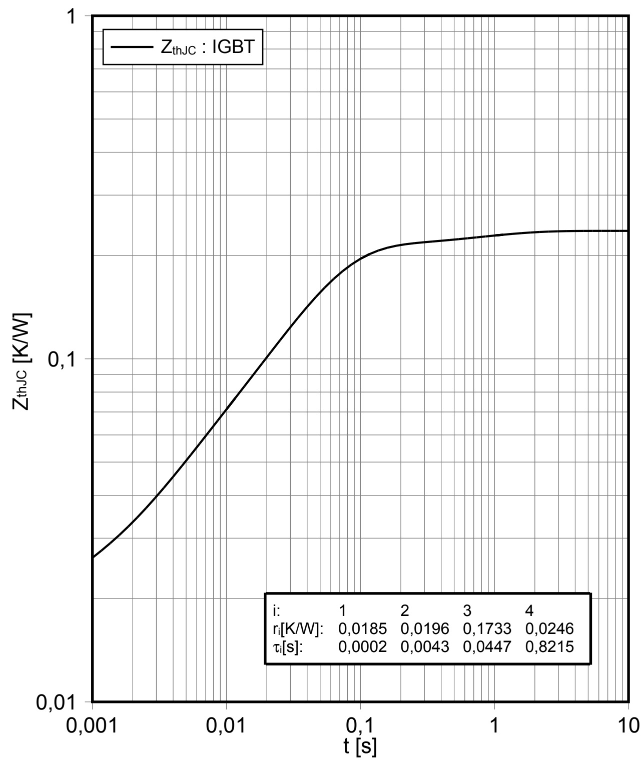
开关损耗 IGBT, 逆变器 （典型)
switching losses IGBT,Inverter (typical)
E_{on} = f (I_C), E_{off} = f (I_C)
V_{GE} = ±15 V, R_{Gon} = 1 Ω, R_{Goff} = 1 Ω, V_{CE} = 900 V



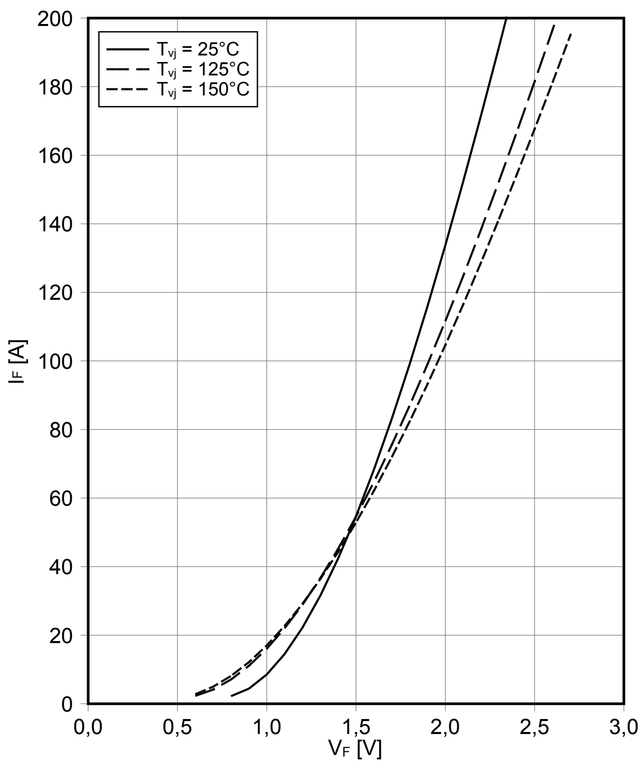
开关损耗 IGBT, 逆变器 （典型)
switching losses IGBT,Inverter (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm 15$ V, $I_C = 100$ A, $V_{CE} = 900$ V



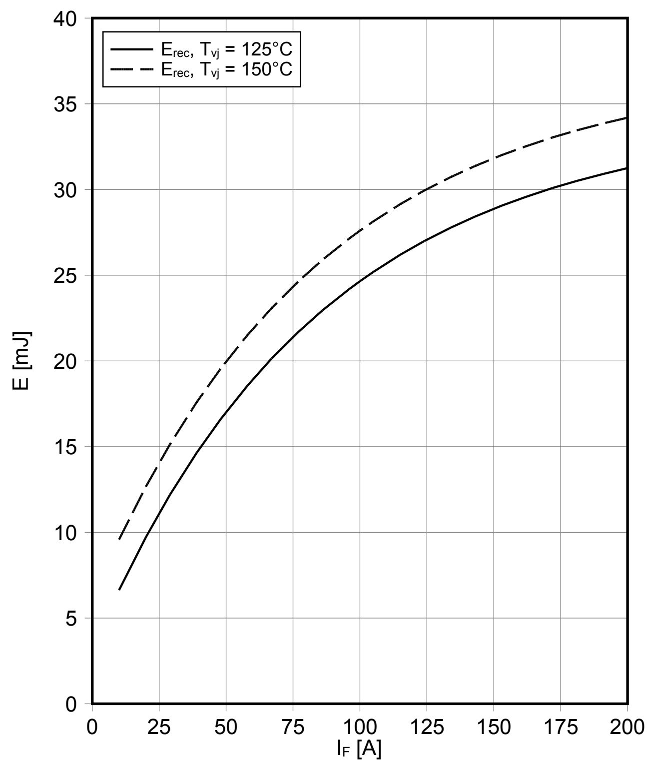
瞬态热阻抗 IGBT, 逆变器
transient thermal impedance IGBT,Inverter
$Z_{thJC} = f(t)$



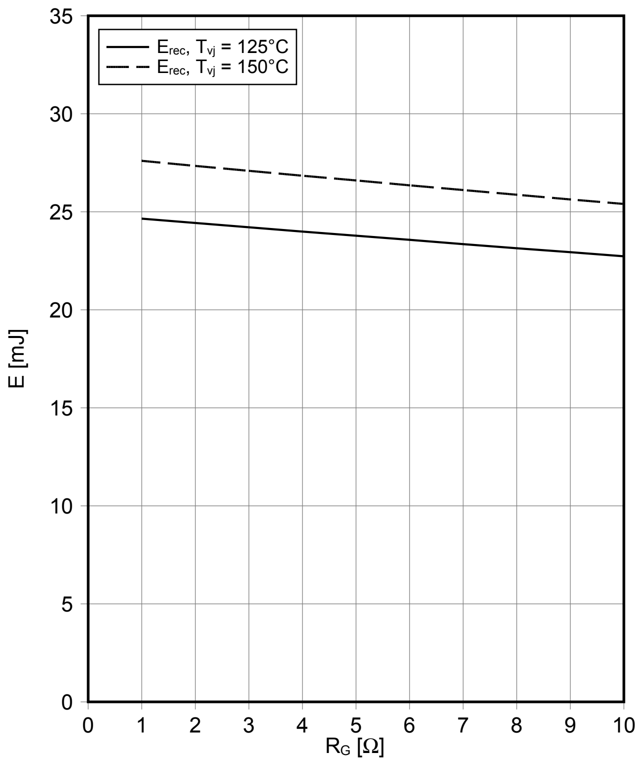
正向偏压特性 二极管,逆变器 （典型)
forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



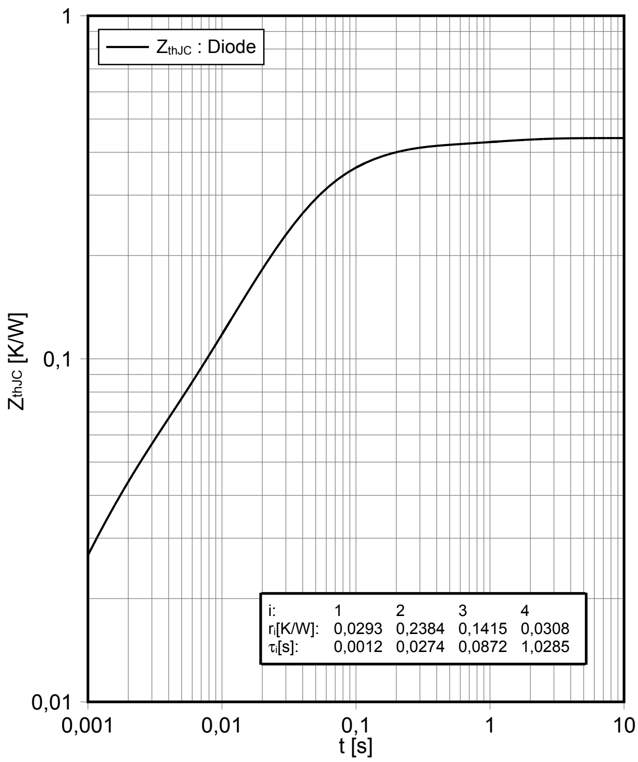
开关损耗 二极管,逆变器 （典型)
switching losses Diode, Inverter (typical)
$E_{rec} = f(I_F)$
$R_{Gon} = 1\ \Omega$, $V_{CE} = 900$ V



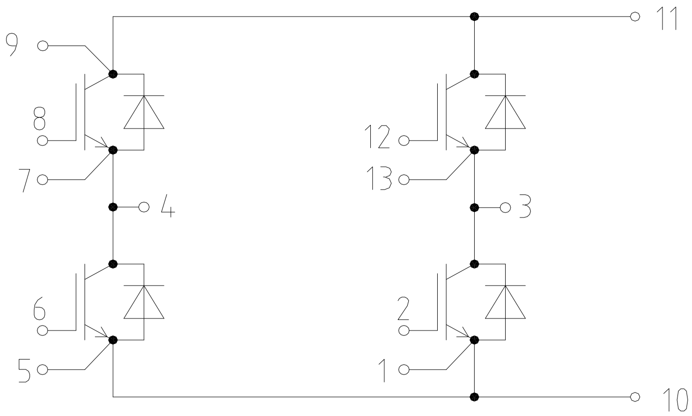
开关损耗 二极管,逆变器 （典型)
switching losses Diode, Inverter (typical)
$E_{rec} = f\ (R_G)$
$I_F = 100\ A,\ V_{CE} = 900\ V$



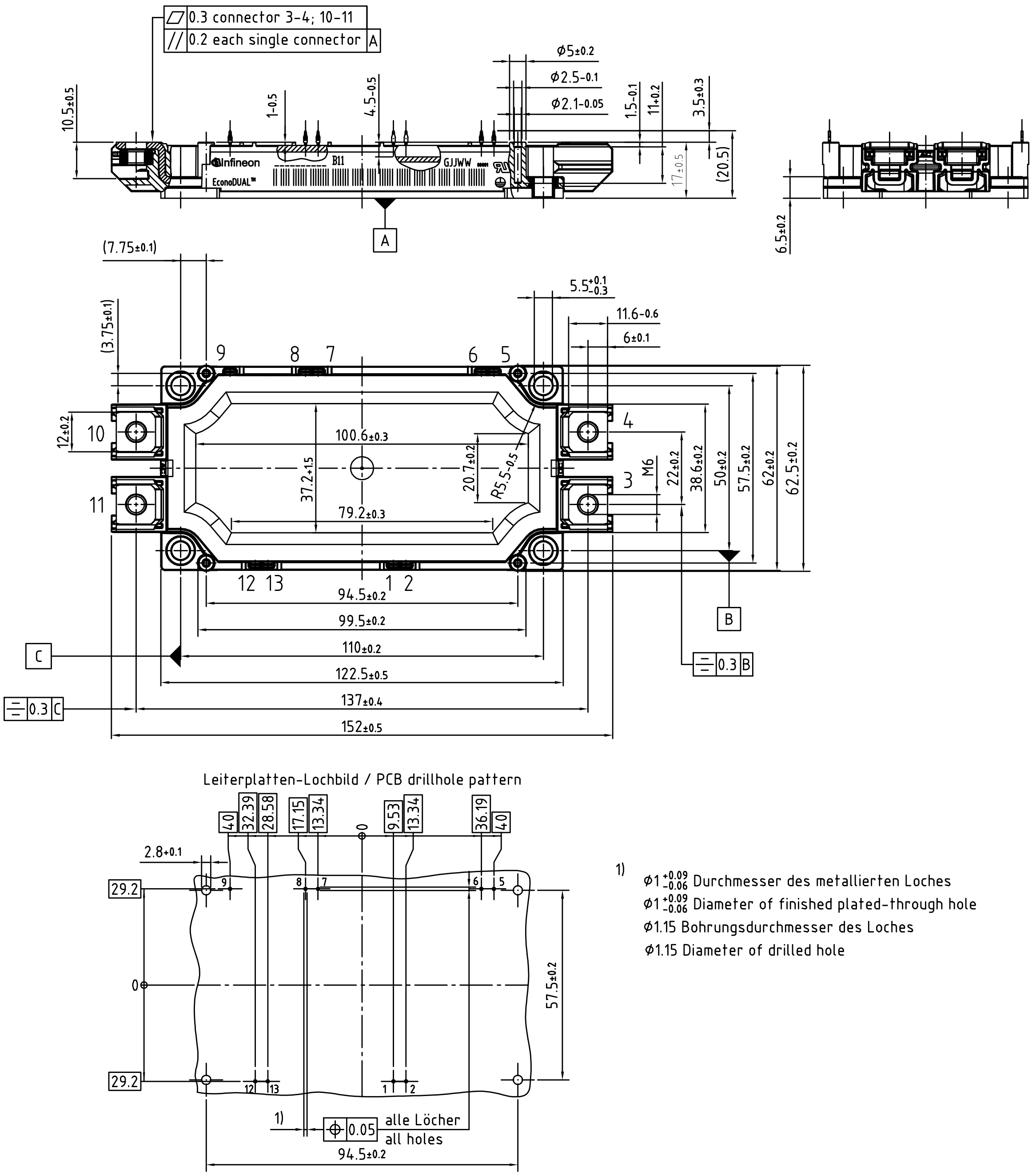
瞬态热阻抗 二极管,逆变器
transient thermal impedance Diode, Inverter
$Z_{thJC} = f\ (t)$



接线图 / Circuit diagram



封装尺寸 / Package outlines



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