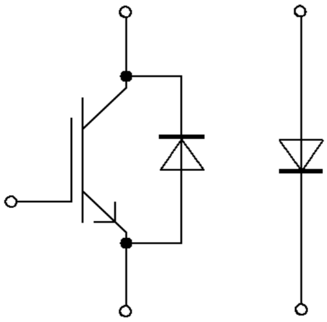
技术信息 / Technical Information

IGBT-模块
IGBT-modules

FD800R33KF2C-K

IHM-A 模块
IHM-A module

初步数据 / Preliminary Data



V_{CES} = 3300V
$I_{C\ nom}$ = 800A / I_{CRM} = 1600A

典型应用
- 斩波应用
- 牵引变流器

Typical Applications
- Chopper Applications
- Traction Drives

机械特性
- 碳化硅铝（AlSiC）基板提供更高的温度循环能力

Mechanical Features
- AlSiC Base Plate for increased Thermal Cycling Capability

Module Label Code

Barcode Code 128

00000123456000000000000

DMX - 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

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初步数据
Preliminary Data

IGBT, 制动-斩波器 / IGBT, Brake-Chopper

最大额定值 / Maximum Rated Values

集电极 - 发射极电压 Collector-emitter voltage	T_{vj} = 25°C T_{vj} = -25°C	V_{CES}	3300 3300	V
连续集电极直流电流 Continuous DC collector current	T_C = 80°C, $T_{vj\,max}$ = 150°C T_C = 25°C, $T_{vj\,max}$ = 150°C	$I_{C\,nom}$ I_C	800 1300	A A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	1600	A
总功率损耗 Total power dissipation	T_C = 25°C, $T_{vj\,max}$ = 150°C	P_{tot}	9,60	kW
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 = 800 A, V_{GE} = 15 V I_C = 800 A, V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C	$V_{CE\,sat}$		3,40 4,30	4,25 5,00	V V
栅极阈值电压 Gate threshold voltage	I_C = 80,0 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	4,2	5,1	6,0	V
栅极电荷 Gate charge	V_{GE} = -15 V ... +15 V, V_{CE} = 1800V		Q_G		15,0		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		0,63		Ω
输入电容 Input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		100		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}		5,40		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 3300 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			5,0	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}			400	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	I_C = 800 A, V_{CE} = 1800 V V_{GE} = ±15 V R_{Gon} = 1,4 Ω, C_{GE} = 150 nF	T_{vj} = 25°C T_{vj} = 125°C	$t_{d\,on}$		0,28 0,28		µs µs
上升时间(电感负载) Rise time, inductive load	I_C = 800 A, V_{CE} = 1800 V V_{GE} = ±15 V R_{Gon} = 1,4 Ω, C_{GE} = 150 nF	T_{vj} = 25°C T_{vj} = 125°C	t_r		0,18 0,20		µs µs
关断延迟时间(电感负载) Turn-off delay time, inductive load	I_C = 800 A, V_{CE} = 1800 V V_{GE} = ±15 V R_{Goff} = 1,8 Ω, C_{GE} = 150 nF	T_{vj} = 25°C T_{vj} = 125°C	$t_{d\,off}$		1,55 1,70		µs µs
下降时间(电感负载) Fall time, inductive load	I_C = 800 A, V_{CE} = 1800 V V_{GE} = ±15 V R_{Goff} = 1,8 Ω, C_{GE} = 150 nF	T_{vj} = 25°C T_{vj} = 125°C	t_f		0,20 0,20		µs µs
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I_C = 800 A, V_{CE} = 1800 V, L_S = 40 nH V_{GE} = ±15 V R_{Gon} = 1,4 Ω, C_{GE} = 150 nF	T_{vj} = 25°C T_{vj} = 125°C	E_{on}		930 1450		mJ mJ
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I_C = 800 A, V_{CE} = 1800 V, L_S = 40 nH V_{GE} = ±15 V R_{Goff} = 1,8 Ω, C_{GE} = 150 nF	T_{vj} = 25°C T_{vj} = 125°C	E_{off}		870 1000		mJ mJ
短路数据 SC data	$V_{GE} \leq$ 15 V, V_{CC} = 2500 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	$t_P \leq$ 10 µs, T_{vj} = 125°C	I_{SC}		4000		A
结 - 外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		R_{thJC}			13,0	K/kW
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}		8,00		K/kW
在开关状态下温度 Temperature under switching conditions			$T_{vj\,op}$	-40		125	°C

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初步数据
Preliminary Data

二极管，制动-斩波器 / Diode, Brake-Chopper

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_{vj} = 25°C T_{vj} = -25°C	V_{RRM}	3300 3300	V
连续正向直流电流 Continuous DC forward current		I_F	800	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}	1600	A
I2t-值 I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C	I^2t	220	kA²s
最大损耗功率 Maximum power dissipation	T_{vj} = 125°C	P_{RQM}	1600	kW
最小开通时间 Minimum turn-on time		$t_{on\ min}$	10,0	µs

特征值 / Characteristic Values

				min.	typ.	max.	
正向电压 Forward voltage	I_F = 800 A, V_{GE} = 0 V I_F = 800 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C	V_F		2,80 2,80	3,50 3,50	V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 800 A, - di_F/dt = 4500 A/µs (T_{vj}=125°C) V_R = 1800 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C	I_{RM}		1100 1300		A A
恢复电荷 Recovered charge	I_F = 800 A, - di_F/dt = 4500 A/µs (T_{vj}=125°C) V_R = 1800 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C	Q_r		500 900		µC µC
反向恢复损耗（每脉冲） Reverse recovery energy	I_F = 800 A, - di_F/dt = 4500 A/µs (T_{vj}=125°C) V_R = 1800 V V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C	E_{rec}		490 1150		mJ mJ
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		R_{thJC}			26,0	K/kW
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}		16,0		K/kW
在开关状态下温度 Temperature under switching conditions			$T_{vj\ op}$	-40		125	°C

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反向二极管 / Diode, Reverse

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_{vj} = 25°C T_{vj} = -25°C	V_{RRM}	3300 3300	V
连续正向直流电流 Continuous DC forward current		I_F	800	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}	1600	A
I2t-值 I^2t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C	I^2t	220	kA²s
最大损耗功率 Maximum power dissipation	T_{vj} = 125°C	P_{RQM}	1600	kW
最小开通时间 Minimum turn-on time		$t_{on\ min}$	10,0	µs

特征值 / Characteristic Values

				min.	typ.	max.	
正向电压 Forward voltage	I_F = 800 A, V_{GE} = 0 V I_F = 800 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C	V_F		2,80 2,80	3,50 3,50	V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 800 A, - di_F/dt = 4500 A/µs (T_{vj}=125°C) V_R = 1800 V	T_{vj} = 25°C T_{vj} = 125°C	I_{RM}		1100 1300		A A
恢复电荷 Recovered charge	I_F = 800 A, - di_F/dt = 4500 A/µs (T_{vj}=125°C) V_R = 1800 V	T_{vj} = 25°C T_{vj} = 125°C	Q_r		500 900		µC µC
反向恢复损耗（每脉冲） Reverse recovery energy	I_F = 800 A, - di_F/dt = 4500 A/µs (T_{vj}=125°C) V_R = 1800 V	T_{vj} = 25°C T_{vj} = 125°C	E_{rec}		490 1150		mJ mJ
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		R_{thJC}			26,0	K/kW
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}		16,0		K/kW
在开关状态下温度 Temperature under switching conditions			$T_{vj\ op}$	-40		125	°C

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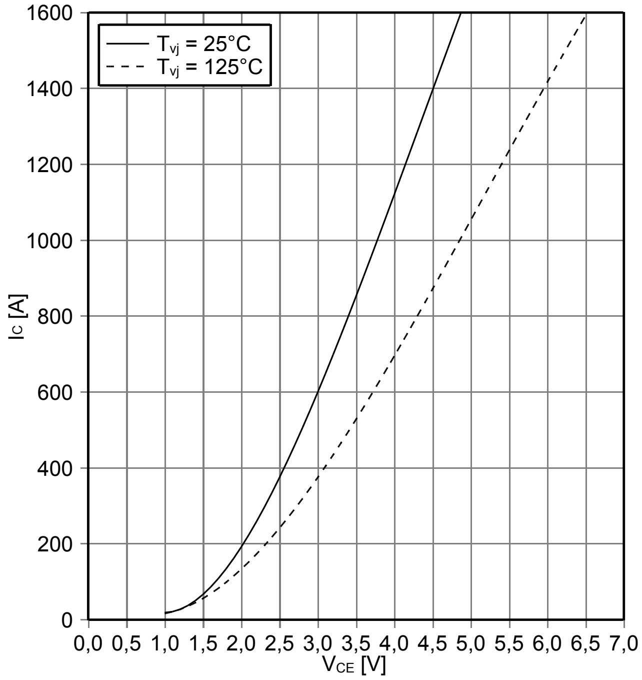
模块 / Module

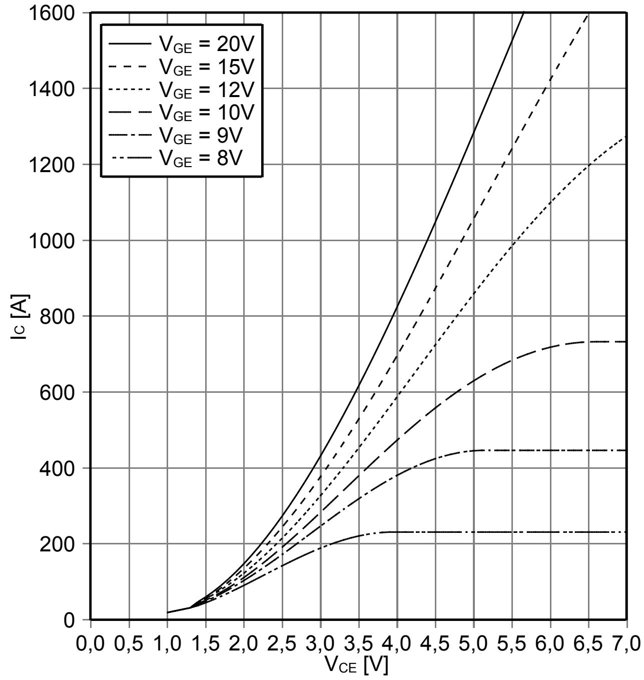
绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}		6,0		kV
局部放电停止电压 Partial discharge extinction voltage	RMS, f = 50 Hz, $Q_{PD} \leq$ 10 pC (acc. to IEC 1287)	V_{ISOL}		2,6		kV
DC 稳定性 DC stability	T_{vj} = 25°C, 100 fit	$V_{CE\ D}$		1800		V
模块基板材料 Material of module baseplate				AlSiC		
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) basic insulation (class 1, IEC 61140)			AlN		
爬电距离 Creepage distance	端子- 散热片 / terminal to heatsink 端子- 端子 / terminal to terminal			32,2 32,2		mm
电气间隙 Clearance	端子- 散热片 / terminal to heatsink 端子- 端子 / terminal to terminal			19,1 19,1		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}		12		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	$R_{CC'+EE'}$ $R_{AA'+CC'}$		0,19 0,34		mΩ
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	4,25	-	5,75	Nm
端子联接扭距 Terminal connection torque	螺丝 M4 根据相应的应用手册进行安装 Screw M4 - Mounting according to valid application note 螺丝 M8 根据相应的应用手册进行安装 Screw M8 - Mounting according to valid application note	M	1,8 8,0	- -	2,1 10	Nm Nm
重量 Weight		G		1500		g

初步数据
Preliminary Data

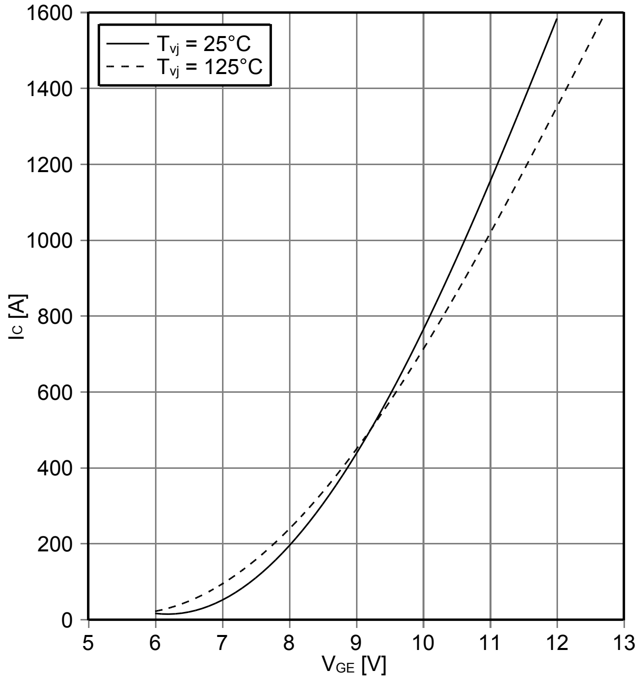
输出特性 IGBT, 制动-斩波器 （典型)
output characteristic IGBT, Brake-Chopper (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15$ V



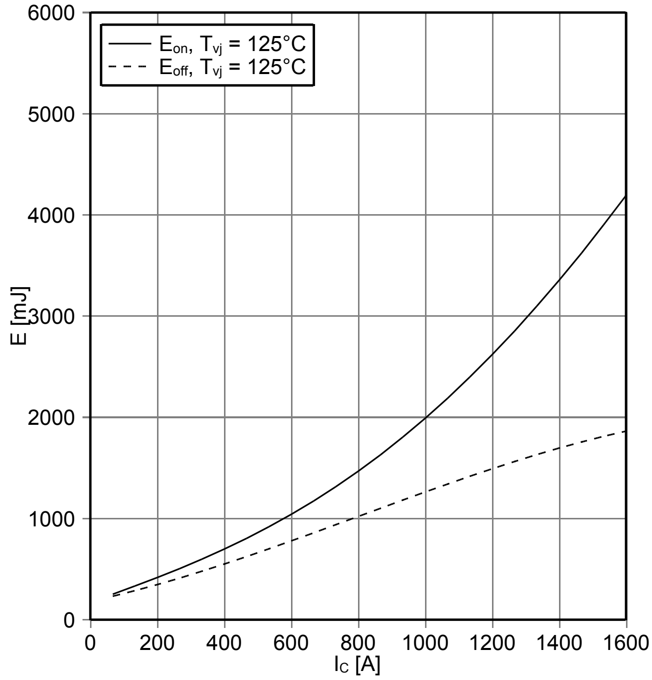
输出特性 IGBT, 制动-斩波器 （典型)
output characteristic IGBT, Brake-Chopper (typical)
$I_C = f(V_{CE})$
$T_{vj} = 125°C$



传输特性 IGBT, 制动-斩波器 (典型)
transfer characteristic IGBT, Brake-Chopper (typical)
$I_C = f(V_{GE})$
$V_{CE} = 20$ V



开关损耗 IGBT, 制动-斩波器 （典型)
switching losses IGBT, Brake-Chopper (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm15$ V, $R_{Gon} = 1.4\ \Omega$, $R_{Goff} = 1.8\ \Omega$, $V_{CE} = 1800$ V, $C_{GE} = 150$ nF



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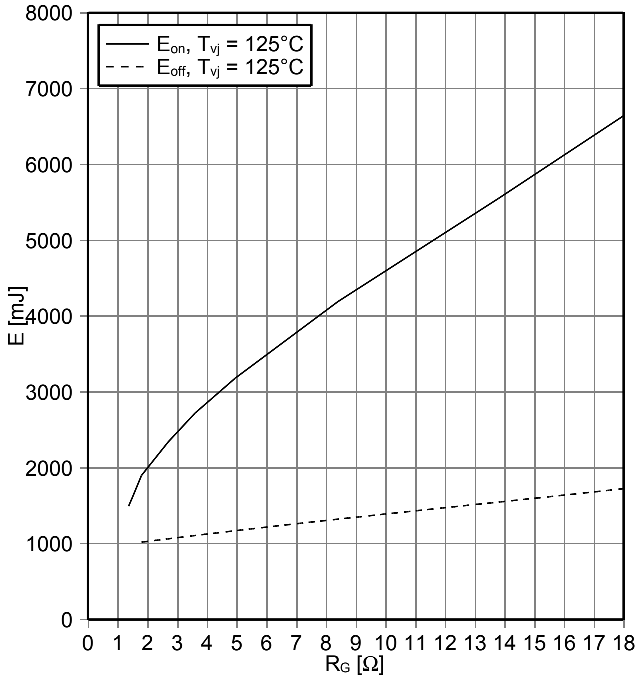
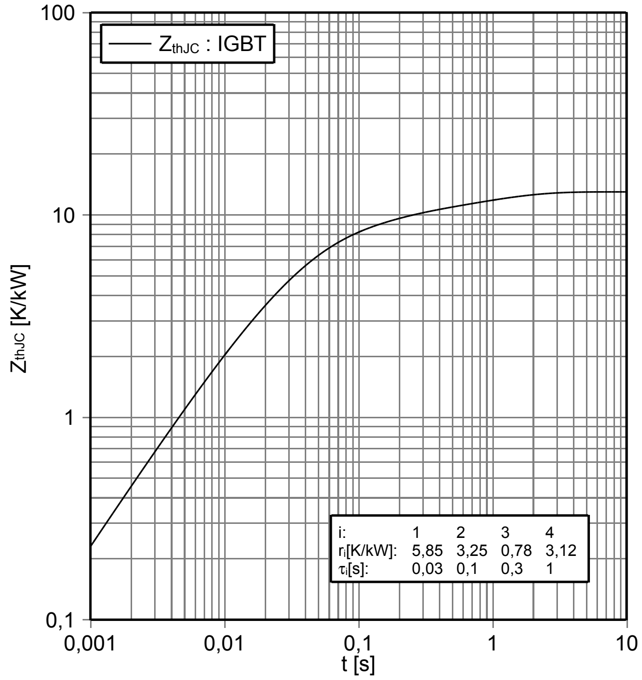
初步数据
Preliminary Data

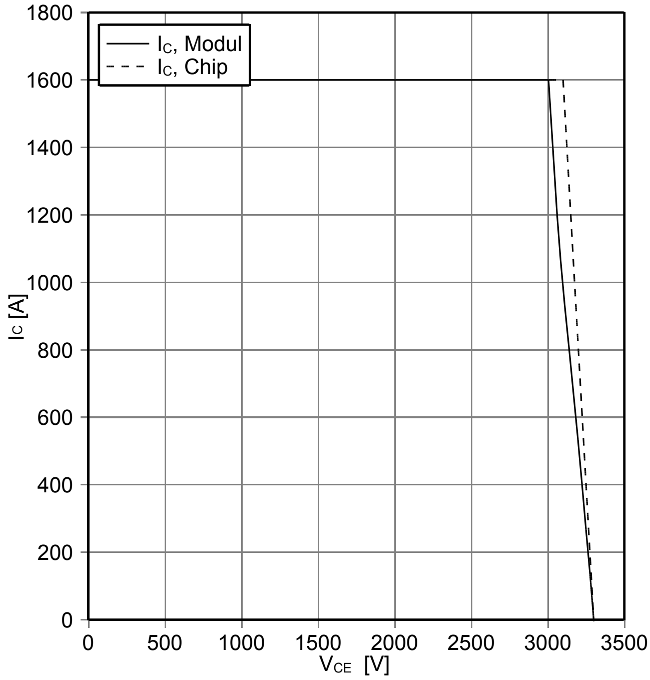
开关损耗 IGBT, 制动-斩波器 （典型)
switching losses IGBT, Brake-Chopper (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm15$ V, $I_C = 800$ A, $V_{CE} = 1800$ V, $C_{GE} = 150$ nF



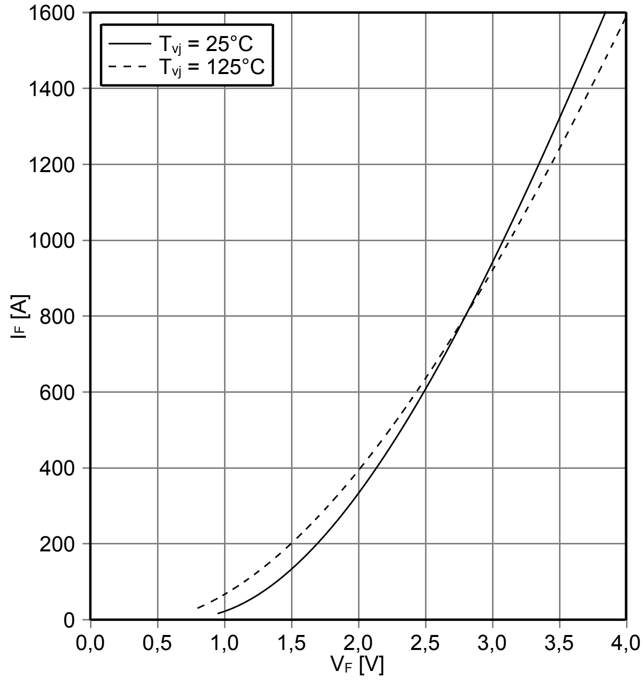
瞬态热阻抗 IGBT, 制动-斩波器
transient thermal impedance IGBT, Brake-Chopper
$Z_{thJC} = f(t)$



反偏安全工作区 IGBT, 制动-斩波器 （RBSOA）
reverse bias safe operating area IGBT, Brake-Chopper (RBSOA)
$I_C = f(V_{CE})$
$V_{GE} = \pm15$ V, $R_{Goff} = 1.8\ \Omega$, $T_{vj} = 125°C$, $C_{GE} = 150$ nF



正向偏压特性 二极管，制动-斩波器 （典型)
forward characteristic of Diode, Brake-Chopper (typical)
$I_F = f(V_F)$



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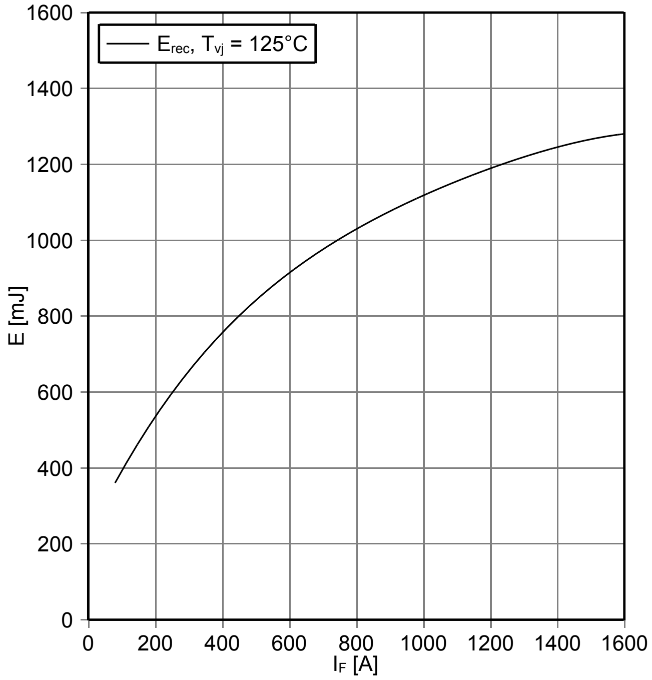
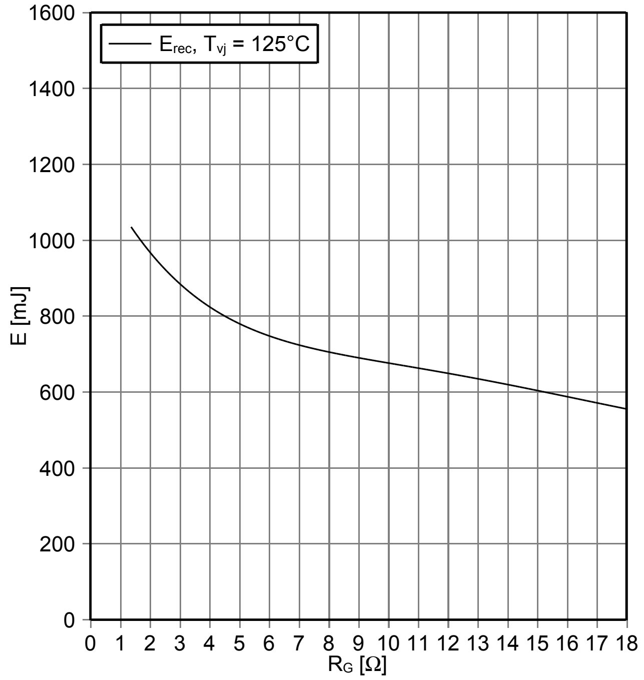
初步数据
Preliminary Data

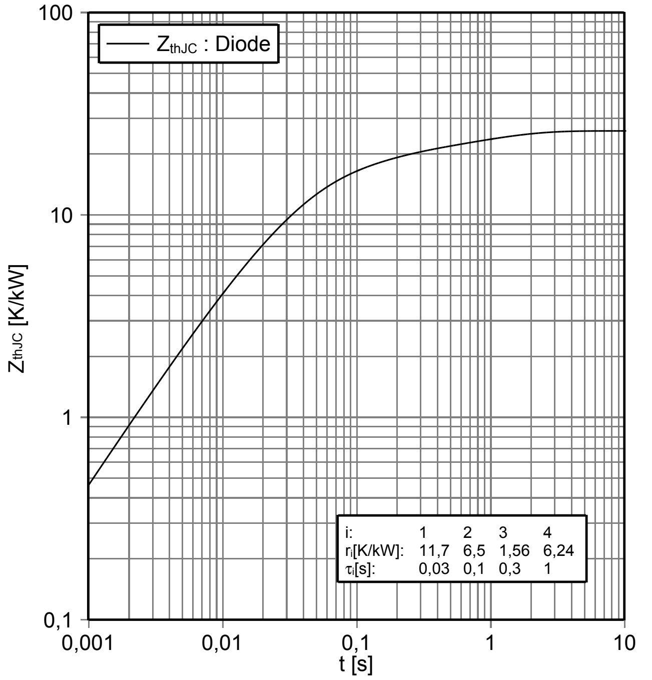
开关损耗 二极管，制动-斩波器 (典型)
switching losses Diode, Brake-Chopper (typical)
$E_{rec} = f(I_F)$
$R_{Gon} = 1.4\ \Omega$, $V_{CE} = 1800$ V



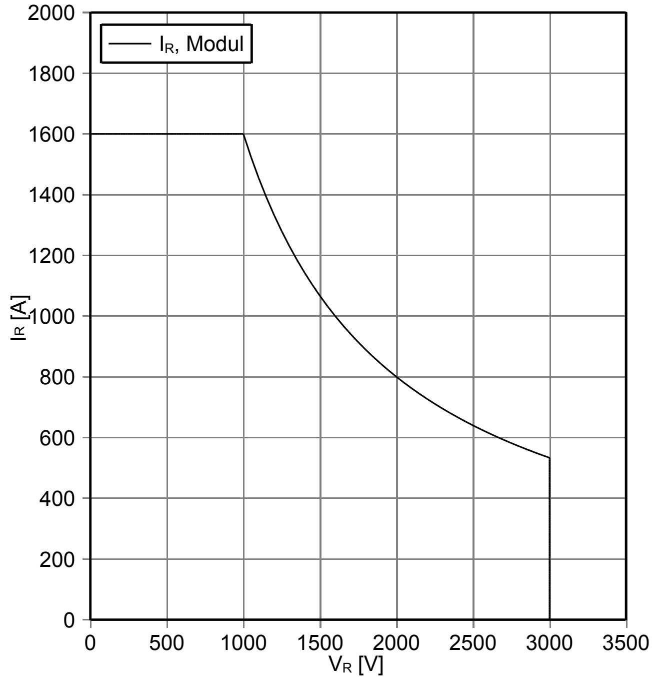
开关损耗 二极管，制动-斩波器 (典型)
switching losses Diode, Brake-Chopper (typical)
$E_{rec} = f(R_G)$
$I_F = 800$ A, $V_{CE} = 1800$ V



瞬态热阻抗 二极管，制动-斩波器
transient thermal impedance Diode, Brake-Chopper
$Z_{thJC} = f(t)$



安全工作区 二极管，制动-斩波器 (SOA)
safe operation area Diode, Brake-Chopper (SOA)
$I_R = f(V_R)$
$T_{vj} = 125°C$



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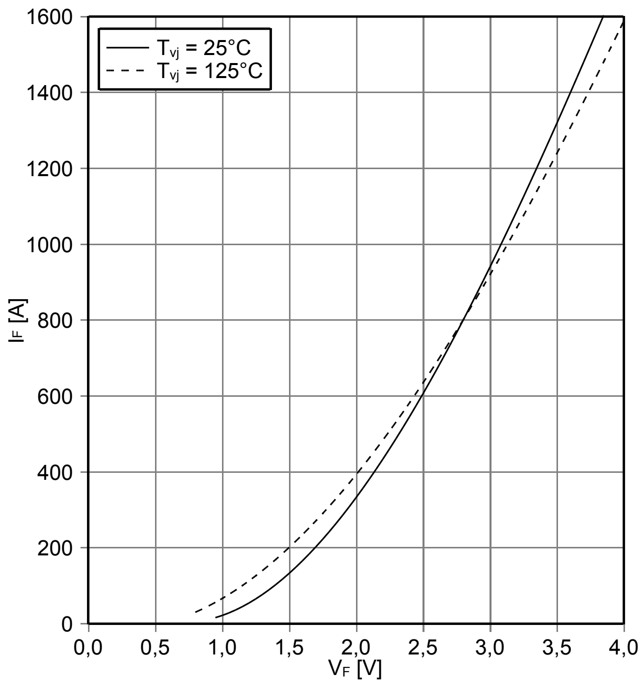
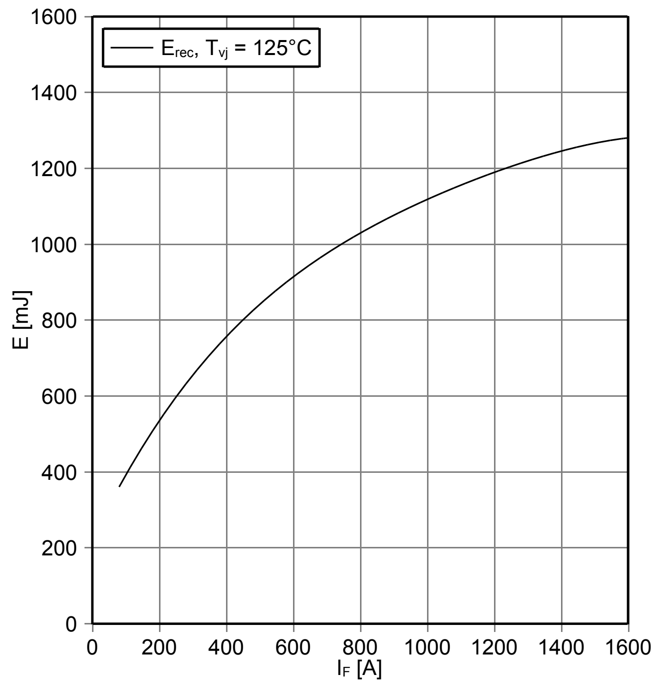
初步数据
Preliminary Data

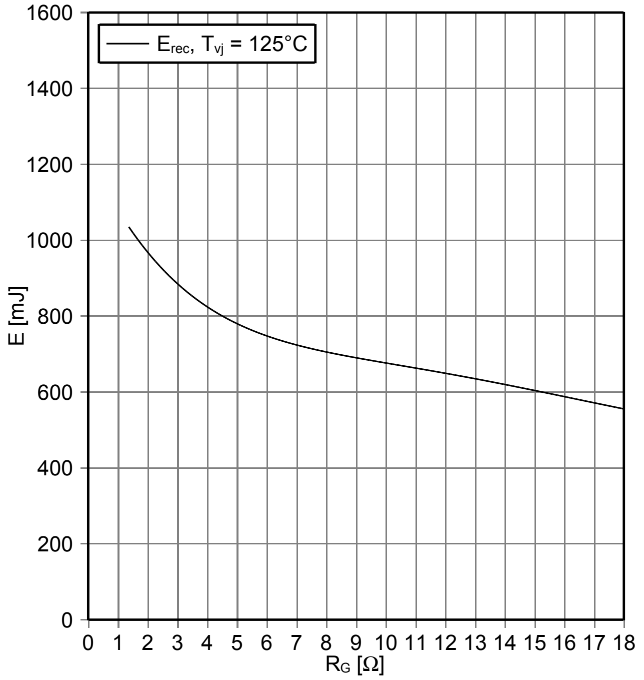
正向偏压特性 反向二极管 （典型)
forward characteristic of Diode, Reverse (typical)
$I_F = f(V_F)$



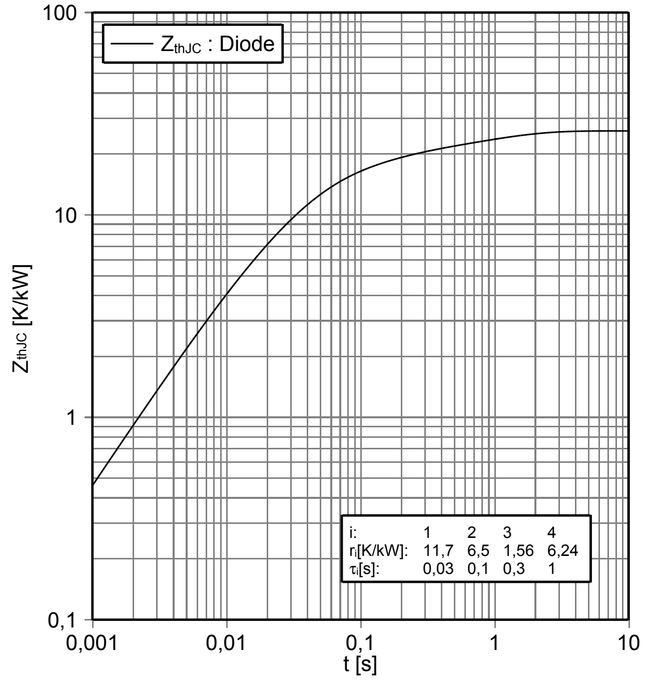
开关损耗 反向二极管 （典型)
switching losses Diode, Reverse (typical)
$E_{rec} = f(I_F)$
R_{Gon} = 1.4 Ω, V_{CE} = 1800 V



开关损耗 反向二极管 （典型)
switching losses Diode, Reverse (typical)
$E_{rec} = f(R_G)$
I_F = 800 A, V_{CE} = 1800 V



瞬态热阻抗 反向二极管
transient thermal impedance Diode, Reverse
$Z_{thJC} = f(t)$



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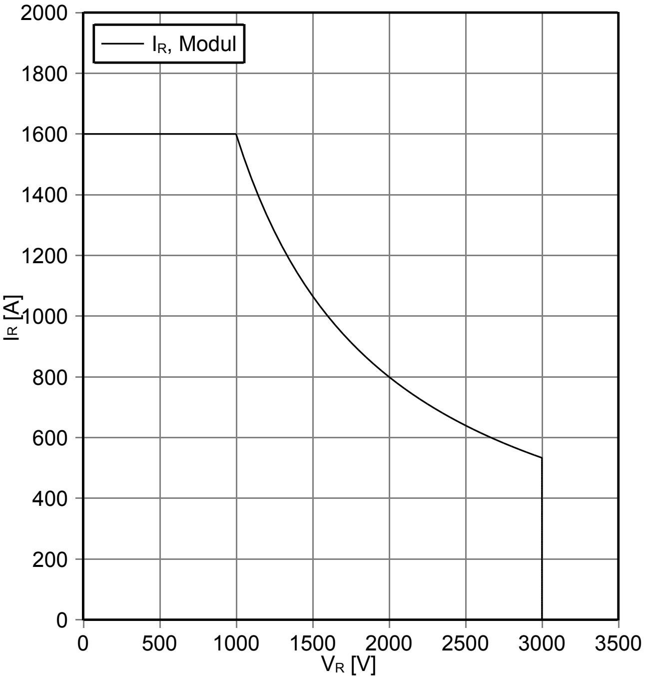
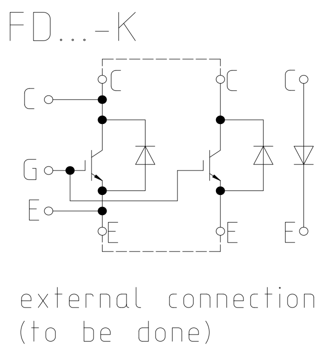
初步数据
Preliminary Data

安全工作区 反向二极管 (SOA)
safe operation area Diode, Reverse (SOA)
$I_R = f(V_R)$
$T_{vj} = 125°C$

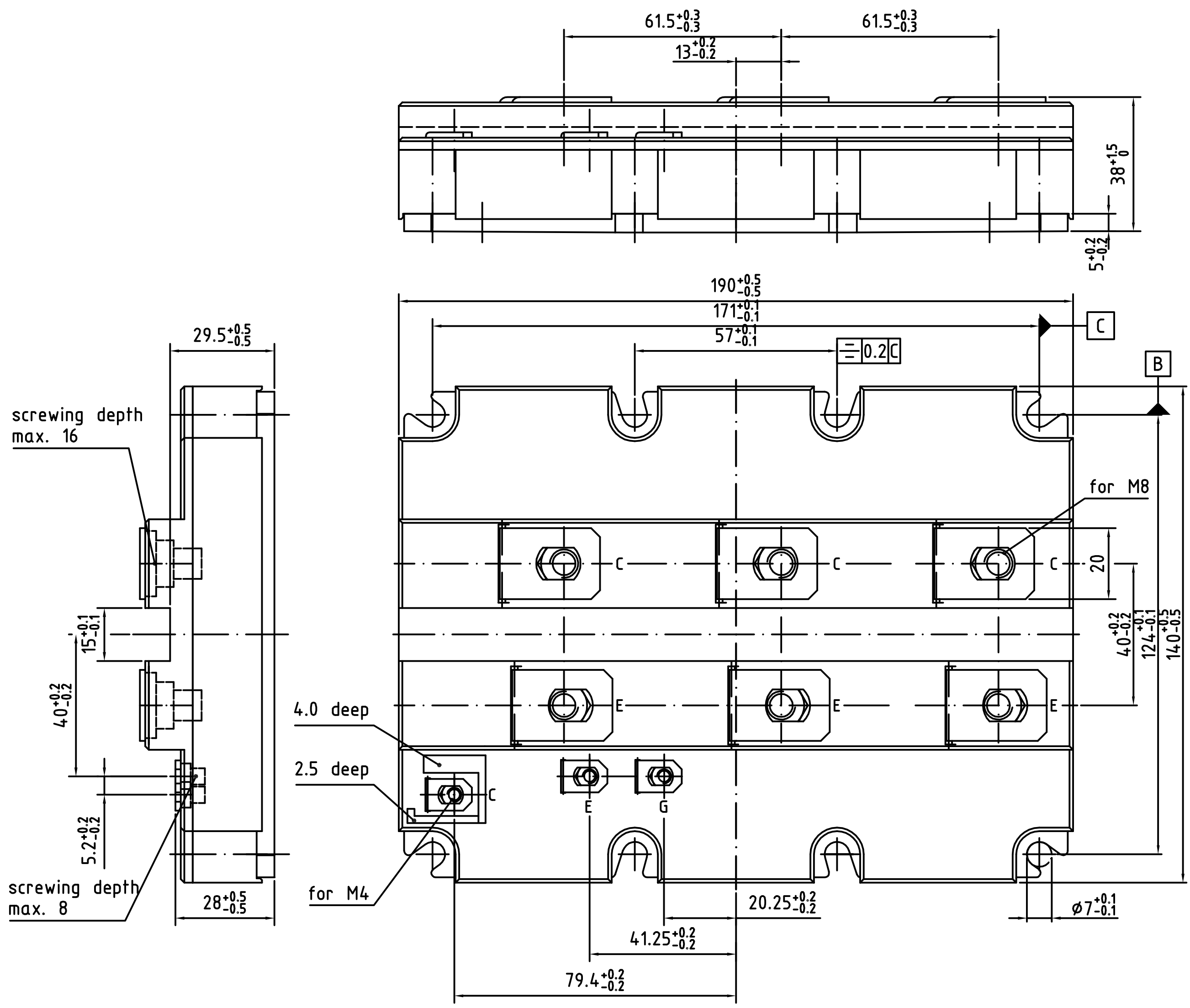


初步数据
Preliminary Data

接线图 / circuit_diagram_headline



封装尺寸 / package outlines



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初步数据
Preliminary Data

使用条件和条款

使用条件和条款
产品规格书中的数据是专门为技术人员提供的，您和您的技术部门应该针对您的应用来评估产品及产品的所有参数是否适合

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请注意安装及应用指南中的信息。

如果您有超出规格书所提供的产品信息的要求或者对我们的产品针对的特殊应用有疑虑的话，请联系我们负责你的销售部门（详情查询 www.infineon.com ）。对那些特别感兴趣的问题我们将提供相应的应用手册
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-得到质量协议的结论
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如果有必要，请根据实际需要将类似的说明给你的客户
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Terms & Conditions of usage

The data contained in this product data sheet is exclusively intended for technically trained staff. You and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application.

This product data sheet is describing the characteristics of this product for which a warranty is granted. Any such warranty is granted exclusively pursuant the terms and conditions of the supply agreement. There will be no guarantee of any kind for the product and its characteristics. The information in the valid application- and assembly notes of the module must be considered.

Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of our product, please contact the sales office, which is responsible for you (see www.infineon.com). For those that are specifically interested we may provide application notes.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

Should you intend to use the Product in aviation applications, in health or live endangering or life support applications, please notify. Please note, that for any such applications we urgently recommend
- to perform joint Risk and Quality Assessments;
- the conclusion of Quality Agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery depended on the realization of any such measures.

If and to the extent necessary, please forward equivalent notices to your customers.

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