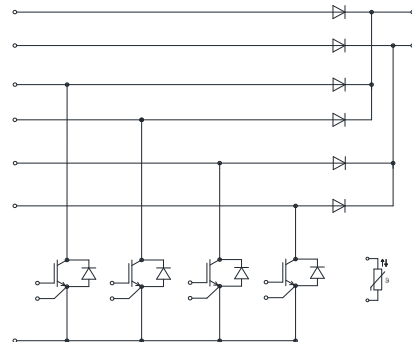
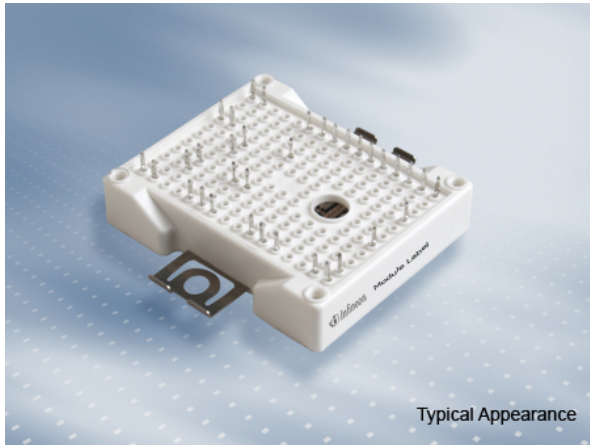


初步数据 / Preliminary Data



$V_{CES} = 1200V$
 $I_{C\ nom} = 160A / I_{CRM} = 320A$

典型应用

- 太阳能应用
- UPS系统

Typical Applications

- Solar Applications
- UPS Systems

电气特性

- 高速IGBT H3
- 低开关损耗

Electrical Features

- High Speed IGBT H3
- Low Switching Losses

机械特性

- 低热阻的三氧化二铝 (Al_2O_3 衬底
- 集成NTC温度传感器
- 紧凑型设计
- PressFIT 压接技术

Mechanical Features

- Al_2O_3 Substrate with Low Thermal Resistance
- Integrated NTC temperature sensor
- Compact design
- PressFIT Contact Technology

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

prepared by: CM	date of publication: 2013-11-11	
approved by: MB	revision: 2.0	UL approved (E83335)

初步数据
Preliminary Data

旁路二极管 / Bypass-Diode

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
最大正向均方根电流(每芯片) Maximum RMS forward current per chip	$T_c = 80^{\circ}\text{C}$	I_{FRMSM}	50	A
最大整流器输出均方根电流 Maximum RMS current at rectifier output	$T_c = 80^{\circ}\text{C}$	I_{RMSM}	60	A
正向浪涌电流 Surge forward current	$t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$ $t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I_{FSM}	450 360	A A
I ² t-值 I ² t - value	$t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$ $t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I ² t	1000 650	A ² s A ² s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	$T_{vj} = 150^{\circ}\text{C}, I_F = 30\text{ A}$	V_F		0,95		V
反向电流 Reverse current	$T_{vj} = 150^{\circ}\text{C}, V_R = 1200\text{ V}$	I_R		0,10		mA
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R_{thJC}		0,80	1,05	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}		0,80		K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\text{ op}}$				$^{\circ}\text{C}$

反极性保护二极管A / Inverse-polarity protection diode A

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
最大正向均方根电流(每芯片) Maximum RMS forward current per chip	$T_c = 80^{\circ}\text{C}$	I_{FRMSM}	30	A
最大整流器输出均方根电流 Maximum RMS current at rectifier output	$T_c = 80^{\circ}\text{C}$	I_{RMSM}	60	A
正向浪涌电流 Surge forward current	$t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$ $t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I_{FSM}	290 245	A A
I ² t-值 I ² t - value	$t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$ $t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I ² t	420 300	A ² s A ² s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	$T_{vj} = 150^{\circ}\text{C}, I_F = 20\text{ A}$	V_F		1,00		V
反向电流 Reverse current	$T_{vj} = 150^{\circ}\text{C}, V_R = 1200\text{ V}$	I_R		0,10		mA
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R_{thJC}		1,20	1,35	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}		1,15		K/W
在开关状态下温度 Temperature under switching conditions		$T_{vj\text{ op}}$				$^{\circ}\text{C}$

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approved by: MB	revision: 2.0

初步数据
Preliminary Data

IGBT, 斩波器 / IGBT-Chopper
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
集电极电流 Implemented collector current		I_{CN}	40	A
连续集电极直流电流 Continuous DC collector current	$T_C = 100^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ $T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	$I_{C\text{nom}}$ I_C	20 50	A A
集电极重复峰值电流 Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	80	A
总功率损耗 Total power dissipation	$T_C = 25^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	P_{tot}	190	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	$I_C = 20\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 20\text{ A}, V_{GE} = 15\text{ V}$ $I_C = 20\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{sat}}$	1,55 1,70 1,75	1,70	V V V
栅极阈值电压 Gate threshold voltage	$I_C = 1,00\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		$V_{G\text{Eth}}$	5,0	5,8	6,5 V
栅极电荷 Gate charge	$V_{GE} = -15\text{ V} \dots +15\text{ V}$		Q_G	0,32		μC
内部栅极电阻 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		$R_{G\text{int}}$	0,0		Ω
输入电容 Input capacitance	$f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{ies}	2,35		nF
反向传输电容 Reverse transfer capacitance	$f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{res}	0,13		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}		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	$I_C = 20\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{G\text{on}} = 12\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{on}}$	0,035 0,035 0,035		μs μs μs
上升时间(电感负载) Rise time, inductive load	$I_C = 20\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{G\text{on}} = 12\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,01 0,012 0,014		μs μs μs
关断延迟时间(电感负载) Turn-off delay time, inductive load	$I_C = 20\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{G\text{off}} = 12\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{off}}$	0,25 0,32 0,35		μs μs μs
下降时间(电感负载) Fall time, inductive load	$I_C = 20\text{ A}, V_{CE} = 600\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $R_{G\text{off}} = 12\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,016 0,023 0,025		μs μs μs
开通损耗能量(每脉冲) Turn-on energy loss per pulse	$I_C = 20\text{ A}, V_{CE} = 600\text{ V}, L_S = 30\text{ nH}$ $V_{GE} = \pm 15\text{ V}, di/dt = 1800\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{G\text{on}} = 12\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	0,90 1,55 1,75		mJ mJ mJ
关断损耗能量(每脉冲) Turn-off energy loss per pulse	$I_C = 20\text{ A}, V_{CE} = 600\text{ V}, L_S = 30\text{ nH}$ $V_{GE} = \pm 15\text{ V}, du/dt = 3200\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $R_{G\text{off}} = 12\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	0,80 1,20 1,40		mJ mJ mJ
短路数据 SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$ $V_{CE\text{max}} = V_{CES} - L_{SCE} \cdot di/dt$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$		I_{SC}	130		A
结 - 外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		R_{thJC}	0,55	0,65	K/W

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初步数据
Preliminary Data

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}		0,55		K/W
在开关状态下温度 Temperature under switching conditions		$T_{\text{vj op}}$	-40		150	°C

Diode-斩波器 / Diode-Chopper

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	$T_{\text{vj}} = 25^\circ\text{C}$	V_{RRM}		1200		V
连续正向直流电流 Continuous DC forward current		I_{F}		20		A
正向重复峰值电流 Repetitive peak forward current	$t_{\text{p}} = 1 \text{ ms}$	I_{FRM}		70		A
I ² t-值 I ² t - value	$V_{\text{R}} = 0 \text{ V}$, $t_{\text{p}} = 10 \text{ ms}$, $T_{\text{vj}} = 125^\circ\text{C}$	I^2t		360		A ² s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	$I_{\text{F}} = 20 \text{ A}$, $V_{\text{GE}} = 0 \text{ V}$ $I_{\text{F}} = 20 \text{ A}$, $V_{\text{GE}} = 0 \text{ V}$ $I_{\text{F}} = 20 \text{ A}$, $V_{\text{GE}} = 0 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	V_{F}	1,70 1,35 1,30	2,00	V V V
反向恢复峰值电流 Peak reverse recovery current	$I_{\text{F}} = 20 \text{ A}$, $-di_{\text{F}}/dt = 1800 \text{ A}/\mu\text{s}$ ($T_{\text{vj}}=150^\circ\text{C}$) $V_{\text{R}} = 600 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	I_{RM}	36,0 53,0 58,0		A A A
恢复电荷 Recovered charge	$I_{\text{F}} = 20 \text{ A}$, $-di_{\text{F}}/dt = 1800 \text{ A}/\mu\text{s}$ ($T_{\text{vj}}=150^\circ\text{C}$) $V_{\text{R}} = 600 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	Q_{r}	1,65 3,90 5,00		μC μC μC
反向恢复损耗 (每脉冲) Reverse recovery energy	$I_{\text{F}} = 20 \text{ A}$, $-di_{\text{F}}/dt = 1800 \text{ A}/\mu\text{s}$ ($T_{\text{vj}}=150^\circ\text{C}$) $V_{\text{R}} = 600 \text{ V}$	$T_{\text{vj}} = 25^\circ\text{C}$ $T_{\text{vj}} = 125^\circ\text{C}$ $T_{\text{vj}} = 150^\circ\text{C}$	E_{rec}	0,86 1,90 2,40		mJ mJ mJ
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		R_{thJC}	0,70	0,75	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}	0,70		K/W
在开关状态下温度 Temperature under switching conditions			$T_{\text{vj op}}$	-40	150	°C

负温度系数热敏电阻 / NTC-Thermistor

特征值 / Characteristic Values

			min.	typ.	max.	
额定电阻值 Rated resistance	$T_{\text{C}} = 25^\circ\text{C}$		R_{25}	5,00		k Ω
R100 偏差 Deviation of R100	$T_{\text{C}} = 100^\circ\text{C}$, $R_{100} = 493 \Omega$	$\Delta R/R$	-5		5	%
耗散功率 Power dissipation	$T_{\text{C}} = 25^\circ\text{C}$		P_{25}		20,0	mW
B-值 B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15 \text{ K}))]$	$B_{25/50}$		3375		K
B-值 B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15 \text{ K}))]$	$B_{25/80}$		3411		K
B-值 B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15 \text{ K}))]$	$B_{25/100}$		3433		K

根据应用手册标定

Specification according to the valid application note.

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初步数据
Preliminary Data

模块 / Module

绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V _{ISOL}	2,5		kV
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- 散热片 / terminal to heatsink 端子- 端子 / terminal to terminal		11,5 6,3		mm
电气间隙 Clearance	端子- 散热片 / terminal to heatsink 端子- 端子 / terminal to terminal		10,0 5,0		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}		20	nH
储存温度 Storage temperature		T _{stg}	-40		125 °C
Anpresskraft für mech. Bef. pro Feder mounting force per clamp		F	40	-	80 N
重量 Weight		G		36	g

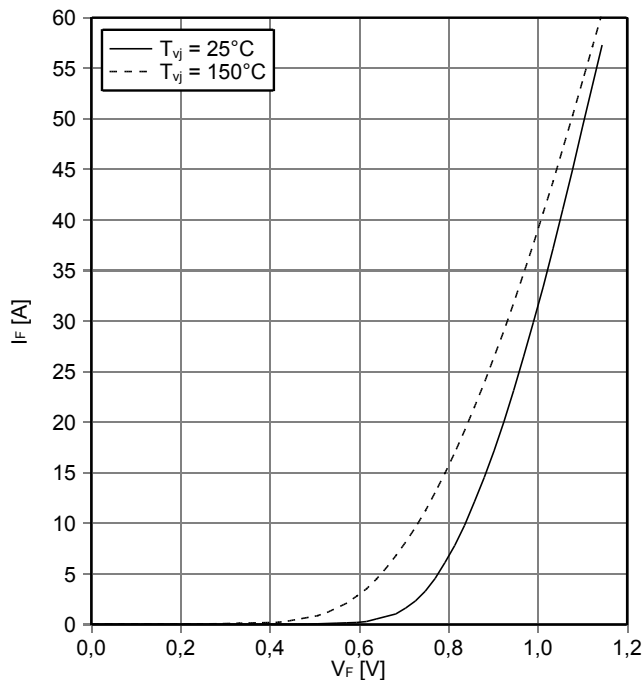
Der Strom im Dauerbetrieb ist auf 25A effektiv pro Anschlusspin begrenzt
The current under continuous operation is limited to 25A rms per connector pin

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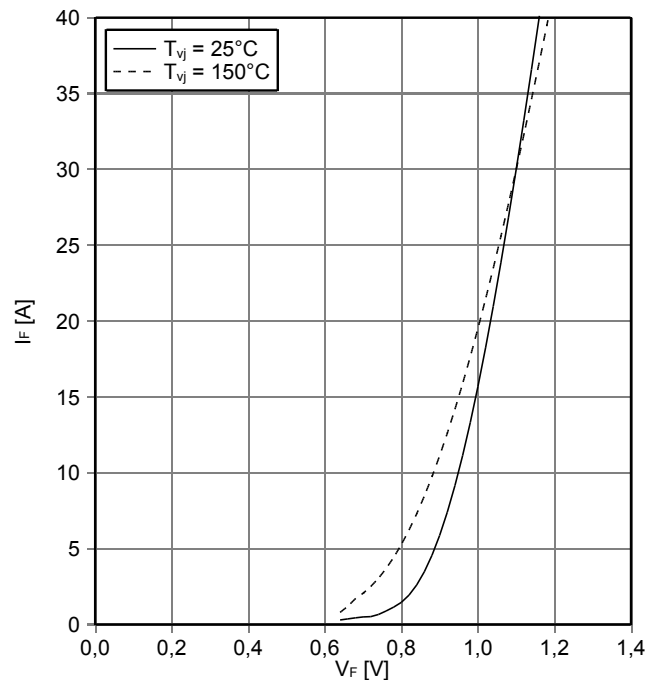


初步数据
Preliminary Data

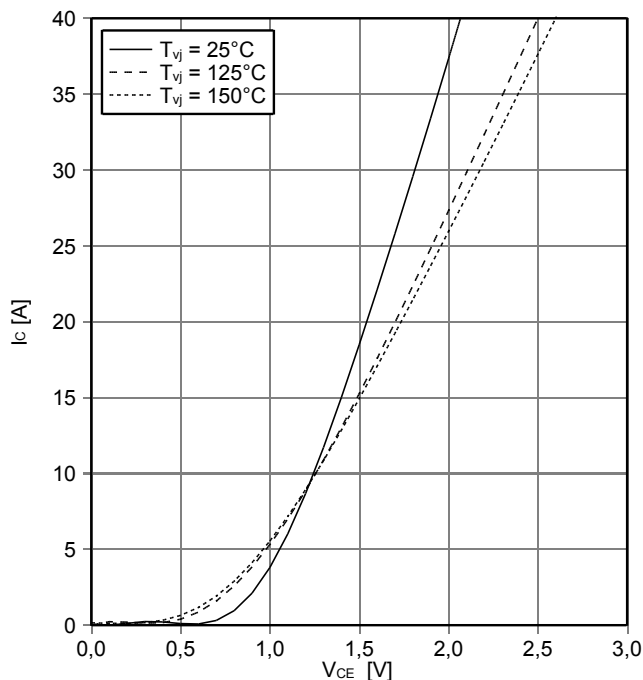
正向偏压特性 旁路二极管 (典型)
forward characteristic of Bypass-Diode (typical)
 $I_F = f(V_F)$



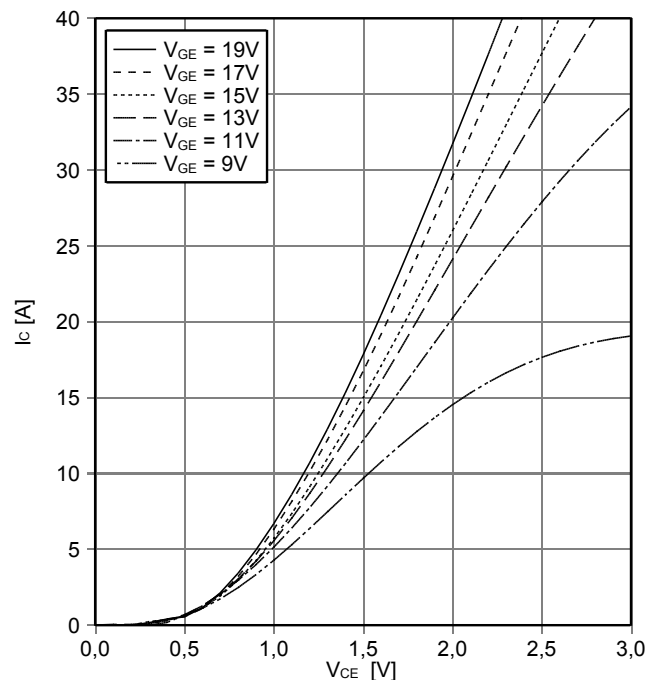
正向偏压特性 反极性保护二极管A (典型)
forward characteristic of Inverse-polarity protection diode A (typical)
 $I_F = f(V_F)$



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



输出特性 IGBT, 斩波器 (典型)
output characteristic IGBT-Chopper (typical)
 $I_C = f(V_{CE})$
 $T_{vj} = 150^\circ\text{C}$



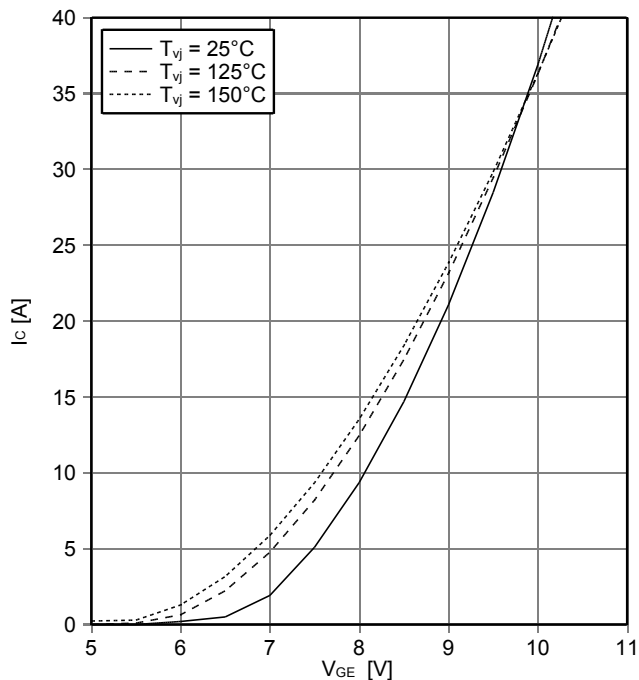
prepared by: CM	date of publication: 2013-11-11
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初步数据
Preliminary Data

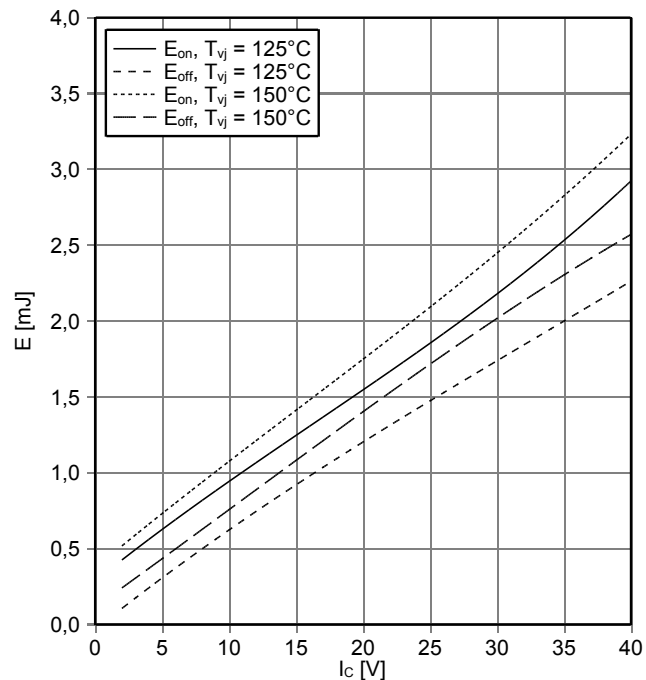
传输特性 IGBT, 斩波器 (典型)
transfer characteristic IGBT-Chopper (typical)

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



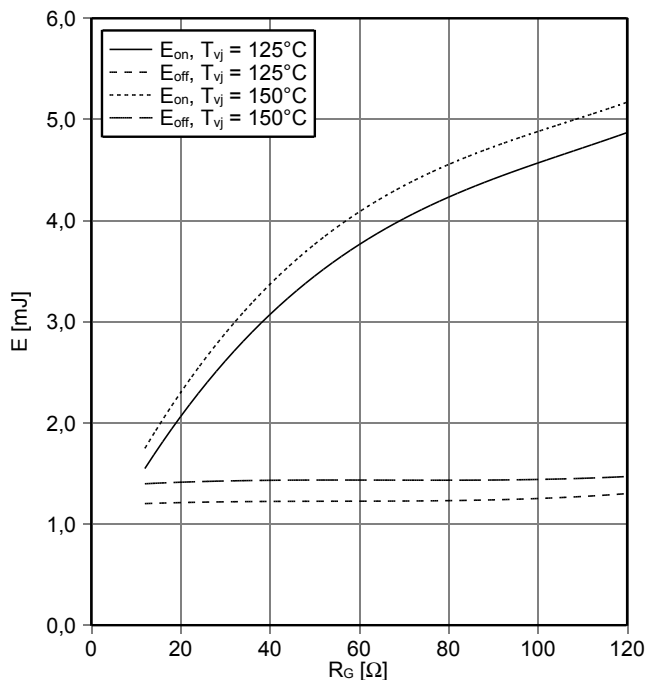
开关损耗 IGBT, 斩波器 (典型)
switching losses IGBT-Chopper (typical)

$E_{on} = f(I_C), E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}, R_{Gon} = 12\ \Omega, R_{Goff} = 12\ \Omega, V_{CE} = 600\text{ V}$



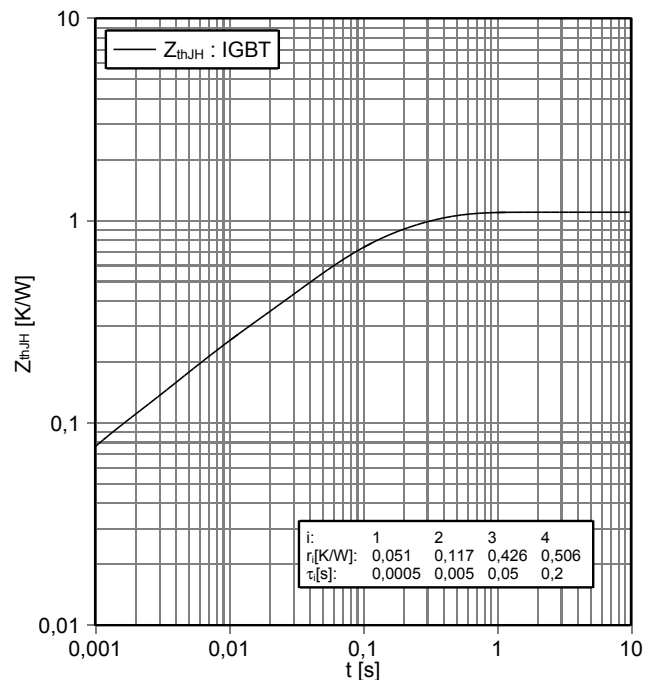
开关损耗 IGBT, 斩波器 (典型)
switching losses IGBT-Chopper (typical)

$E_{on} = f(R_G), E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}, I_C = 20\text{ A}, V_{CE} = 600\text{ V}$



瞬态热阻抗 IGBT, 斩波器
transient thermal impedance IGBT-Chopper

$Z_{thJH} = f(t)$



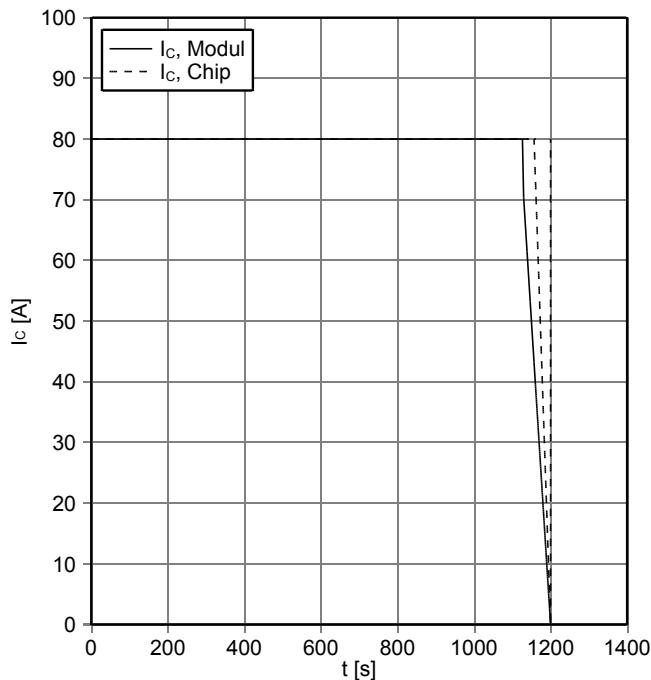
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初步数据
Preliminary Data

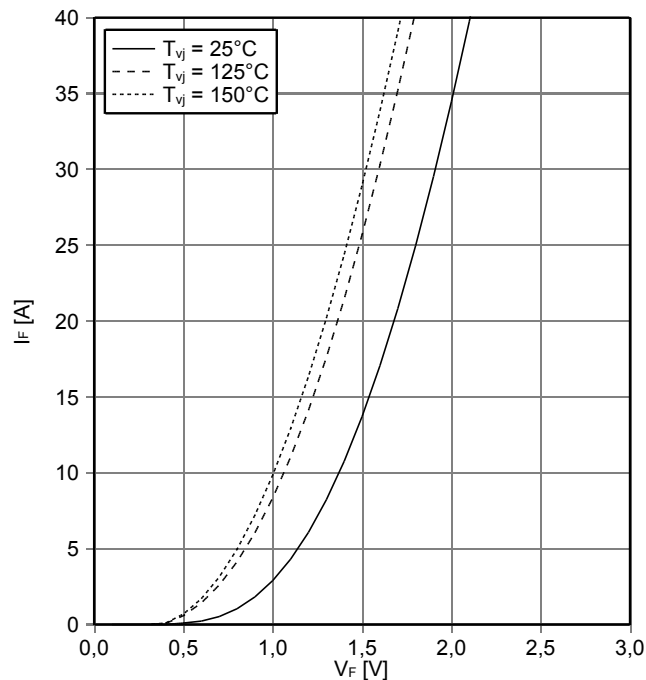
反偏安全工作区 IGBT, 斩波器 (RBSOA)
reverse bias safe operating area IGBT-Chopper (RBSOA)

$I_C = f(V_{CE})$
 $V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 12\ \Omega$, $T_{vj} = 150^\circ\text{C}$



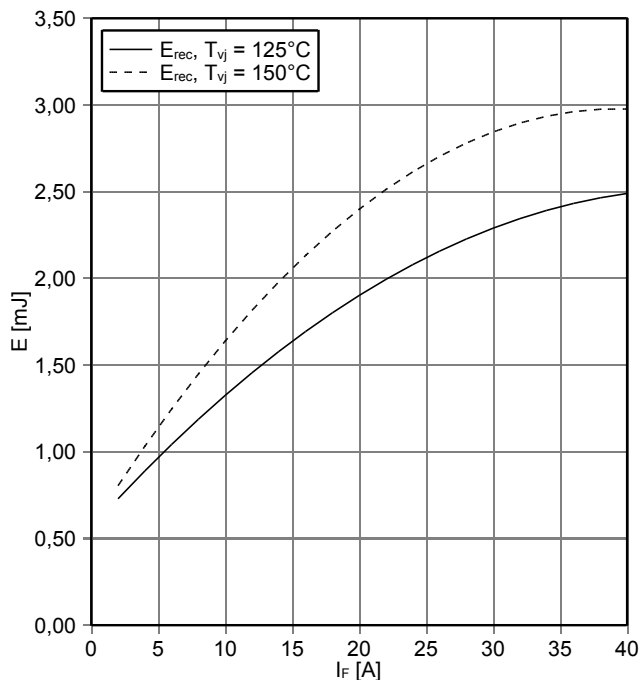
正向偏压特性 Diode-斩波器 (典型)
forward characteristic of Diode-Chopper (typical)

$I_F = f(V_F)$



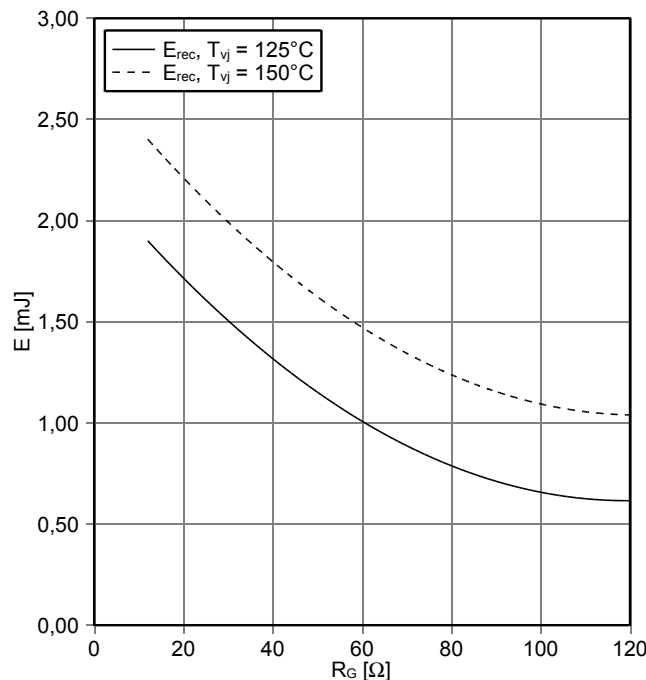
开关损耗 Diode-斩波器 (典型)
switching losses Diode-Chopper (typical)

$E_{rec} = f(I_F)$
 $R_{Gon} = 12\ \Omega$, $V_{CE} = 600\text{ V}$



开关损耗 Diode-斩波器 (典型)
switching losses Diode-Chopper (typical)

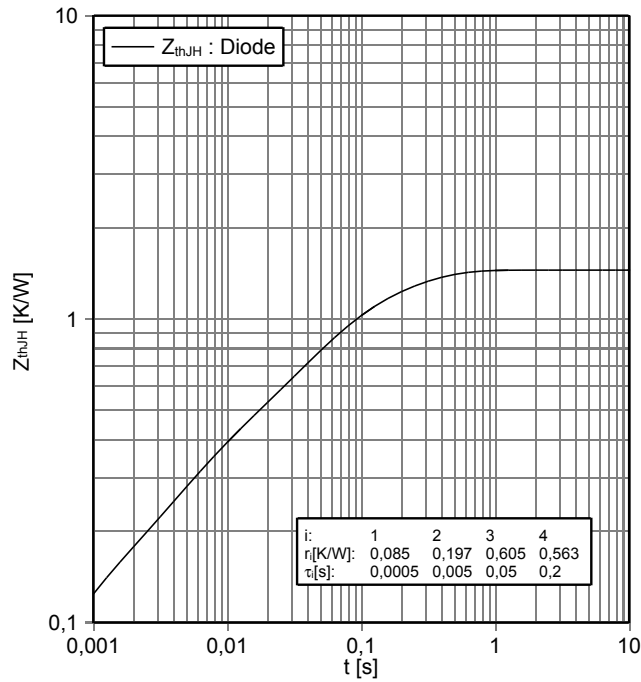
$E_{rec} = f(R_G)$
 $I_F = 20\text{ A}$, $V_{CE} = 600\text{ V}$



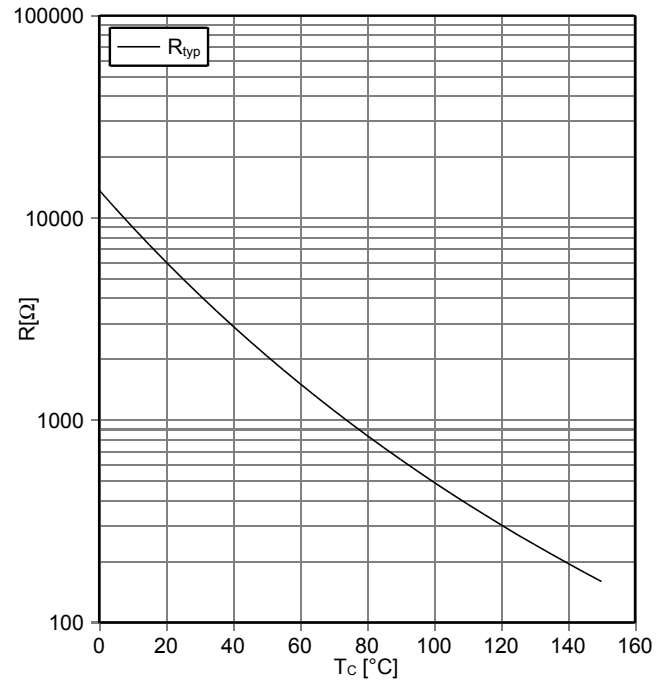
prepared by: CM	date of publication: 2013-11-11
approved by: MB	revision: 2.0

初步数据
Preliminary Data

瞬态热阻抗 Diode-斩波器
transient thermal impedance Diode-Chopper
 $Z_{thJH} = f(t)$



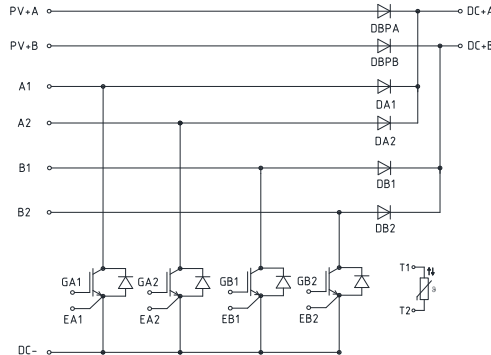
负温度系数热敏电阻 温度特性
NTC-Thermistor-temperature characteristic (typical)
 $R = f(T)$



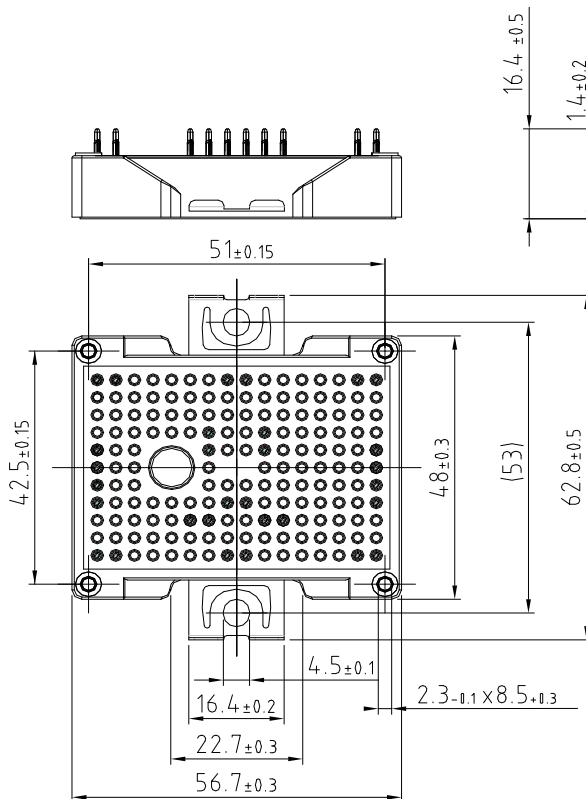
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初步数据
Preliminary Data

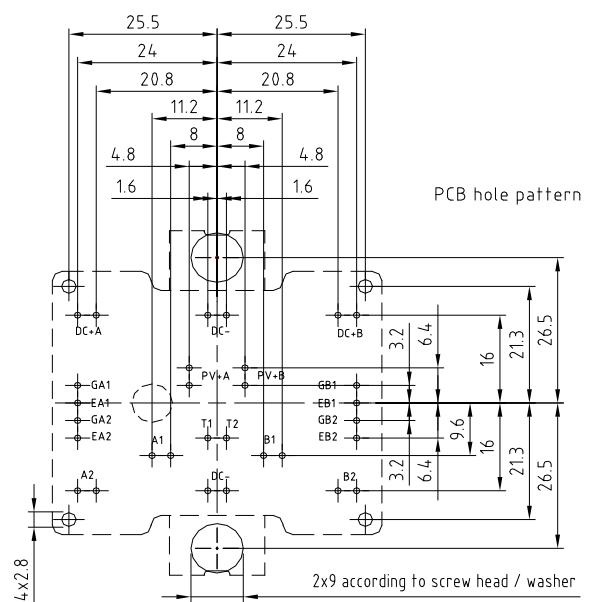
接线图 / circuit_diagram_headline



封装尺寸 / package outlines



- Pin-Grid 3.2mm
- Tolerance of PCB hole pattern $\begin{matrix} \oplus \\ \ominus \end{matrix} \phi 0.1$
- Hole specification for contacts see AN 2009-01:
Diameters of drill $\phi 1.15\text{mm}$
and copper thickness in hole 25-50 μm



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**初步数据
Preliminary Data**

使用条件和条款

使用条件和条款

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-得到质量协议的结论

-建立联合的测试和出厂产品检查，我们可以根据测试的实际情况供货

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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- 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.

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