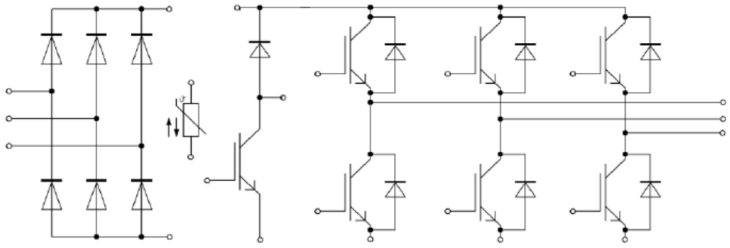
CRGMP15T120DF1C3

产品外观 / Appearance：





V_{CES} = 1200V

$I_{C\ nom}$ = 15A / I_{CRM} = 30A

Flex1 封装

特性 / Features：

- 采用沟槽栅/场终止 IGBT
- 低饱和压降
- 低开关损耗
- 10us 以上短路能力

- Trench / Field Stop IGBT
- Low Vce(sat)
- Low Switching Losses
- Short circuit rated > 10us

应用 / Applications

- 电机传动
- 空调

- Motor Drives
- Air Conditioning

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_j = 25°C	V_{CES}	1200	V
连续集电极直流电流 Continuous DC collector current	T_C = 100°C, $T_{j\,max}$ = 175°C	I_C	15	A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1ms	I_{CRM}	30	A
总功率损耗 Total power dissipation	T_C = 25°C, $T_{j\,max}$ = 175°C	P_D	170	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 = 15A, V_{GE} = 15V I_C = 15A, V_{GE} = 15V	T_j = 25°C T_j = 150°C	$V_{CE\,sat}$		1.9 2.5	2.4	V V
栅极阈值电压 Gate threshold voltage	I_C = 0.38 mA, V_{CE} = V_{GE}, T_j = 25°C		V_{GEth}		5.9		V
栅极电荷 Gate charge	V_{GE} = -15V…+15V		Q_G		114		nC
输入电容 Input capacitance	f = 1MHz, T_j = 25°C, V_{CE} = 25V, V_{GE} = 0V		C_{ies}		0.8		nF
输出电容 Output capacitance	f = 1MHz, T_j = 25°C, V_{CE} = 25V, V_{GE} = 0V		C_{oes}		0.07		nF
反向传输电容 Reverse transfer capacitance	f = 1MHz, T_j = 25°C, V_{CE} = 25V, V_{GE} = 0V		C_{res}		0.024		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 1200V, V_{GE} = 0V, T_j = 25°C		I_{CES}			1.0	mA
栅极-发射极漏电流 Gate-emitter leakage current	V_{GE} = 20V, V_{CE} = 0V, T_j = 25°C		I_{GES}			400	nA
开通延迟时间 Turn-on delay time	V_{CE} = 600V, I_C = 15A V_{GE} = ±15V, R_{Gon} = 39Ω, R_{Goff} = 39Ω, Inductive Load	T_j = 25°C T_j = 150°C	$t_{d\,on}$		11 12		ns ns
上升时间 Rise Time		T_j = 25°C T_j = 150°C	t_r		27 29		ns ns
关断延迟时间 Turn-Off Delay Time		T_j = 25°C T_j = 150°C	$t_{d\,off}$		104 119		ns ns
下降时间 Fall Time		T_j = 25°C T_j = 150°C	t_f		340 389		ns ns
开通能量损耗 Turn-on energy loss		T_j = 25°C T_j = 150°C	E_{on}		2.60 3.90		mJ mJ
关断损耗能量 Turn-off energy loss		T_j = 25°C T_j = 150°C	E_{off}		0.79 1.07		mJ mJ
短路数据 SC data	V_{GE} ≤ 15V, V_{CC} = 800V, T_p ≤ 10µs, T_j = 150°C		I_{sc}		70		A
结－外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		R_{thJC}			0.85	K/W
在开关状态下温度 Temperature under switching conditions			$T_{j\,op}$	-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_j = 25°C	V_{RRM}	1200	V
连续正向直流电流 Continuous DC forward current		I_F	15	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1ms	I_{FRM}	30	A

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	I_F = 15A, T_j = 25°C I_F = 15A, T_j = 150°C	V_F		2.15 1.6		V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 15A, V_R = 600 V, V_{GE} = -15V T_j = 25°C T_j = 150°C	I_{RM}		12 10		A A
恢复电荷 Recovered charge	T_j = 25°C T_j = 150°C	Q_r		1.0 1.9		µC
反向恢复损耗 Reverse recovery energy	T_j = 25°C T_j = 150°C	E_{rec}		0.3 0.6		mJ
结－外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R_{thJC}			1.10	K/W
在开关状态下温度 Temperature under switching conditions		$T_{j\,op}$	-40		150	°C

二极管，整流器 / Diode, Rectifier

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_j = 25°C	V_{RRM}	1800	V
最大正向均方根电流(每芯片) Maximum RMS forward current per chip	Tc = 100°C	I_{FRMSM}	20	A
最大整流器输出均方根电流 Maximum RMS current per at rectifier output	Tc = 100°C	I_{FRM}	30	A
正向浪涌电流 Surge forward current	t_p = 10ms, Tj = 25°C t_p = 10ms, Tj = 150°C	I_{FSM}	300 250	A A
I^2t-值 I^2t - value	t_p = 10ms, Tj = 25°C t_p = 10ms, Tj = 150°C	I^2t	450 312	A^2s A^2s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	I_F = 10A, T_j = 25°C I_F = 10A, T_j = 150°C	V_F		1.10 1.00		V V
反向电流 Reverse current	V_R = 1600 V, T_j = 25°C	I_R			1	mA
结－外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R_{thJC}			0.93	K/W

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_j = 25°C	V_{CES}	1200	V
连续集电极直流电流 Continuous DC collector current	T_C = 100°C, $T_{j\,max}$ = 175°C	I_C	15	A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1ms	I_{CRM}	30	A
总功率损耗 Total power dissipation	T_C = 25°C, $T_{j\,max}$ = 175°C	P_D	170	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 = 15A, V_{GE} = 15V I_C = 15A, V_{GE} = 15V	$V_{CE\,sat}$		1.9 2.5	2.4	V V
栅极阈值电压 Gate threshold voltage	I_C = 0.38 mA, V_{CE} = V_{GE}, T_j = 25°C	V_{GEth}		5.9		V
栅极电荷 Gate charge	V_{GE} = -15V…+15V	Q_G		114		nC
输入电容 Input capacitance	f = 1MHz, T_j = 25°C, V_{CE} = 25V, V_{GE} = 0V	C_{ies}		0.8		nF
输出电容 Output capacitance	f = 1MHz, T_j = 25°C, V_{CE} = 25V, V_{GE} = 0V	C_{oes}		0.07		nF
反向传输电容 Reverse transfer capacitance	f = 1MHz, T_j = 25°C, V_{CE} = 25V, V_{GE} = 0V	C_{res}		0.024		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 1200V, V_{GE} = 0V, T_j = 25°C	I_{CES}			1.0	mA
栅极-发射极漏电流 Gate-emitter leakage current	V_{GE} = 20V, V_{CE} = 0V, T_j = 25°C	I_{GES}			400	nA
开通延迟时间 Turn-on delay time	V_{CE} = 600V, I_C = 15A V_{GE} = ±15V, R_{Gon} = 39Ω, R_{Goff} = 39Ω, Inductive Load	T_j = 25°C T_j = 150°C $t_{d\,on}$		11 12		ns ns
上升时间 Rise Time		T_j = 25°C T_j = 150°C t_r		27 29		ns ns
关断延迟时间 Turn-Off Delay Time		T_j = 25°C T_j = 150°C $t_{d\,off}$		104 119		ns ns
下降时间 Fall Time		T_j = 25°C T_j = 150°C t_f		340 389		ns ns
开通能量损耗 Turn-on energy loss		T_j = 25°C T_j = 150°C E_{on}		2.60 3.90		mJ mJ
关断损耗能量 Turn-off energy loss		T_j = 25°C T_j = 150°C E_{off}		0.79 1.07		mJ mJ
短路数据 SC data	V_{GE} ≤ 15V, V_{CC} = 800V, T_p ≤ 10µs, T_j = 150°C	I_{sc}		70		A
结－外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT	R_{thJC}			0.85	K/W
在开关状态下温度 Temperature under switching conditions		$T_{j\,op}$	-40		150	°C

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_j = 25°C	V_{RRM}	1200	V
连续正向直流电流 Continuous DC forward current		I_F	15	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1ms	I_{FRM}	30	A

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	I_F = 15A, T_j = 25°C I_F = 15A, T_j = 150°C	V_F		2.15 1.6		V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 15A, V_R = 600 V, V_{GE} = -15V T_j = 25°C T_j = 150°C	I_{RM}		12 10		A A
恢复电荷 Recovered charge	T_j = 25°C T_j = 150°C	Q_r		1.0 1.9		µC
反向恢复损耗 Reverse recovery energy	T_j = 25°C T_j = 150°C	E_{rec}		0.3 0.6		mJ
结－外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R_{thJC}			1.10	K/W
在开关状态下温度 Temperature under switching conditions		$T_{j\,op}$	-40		150	°C

负温度系数热敏电阻 / NTC-Thermistor

特征值 / Characteristic Values

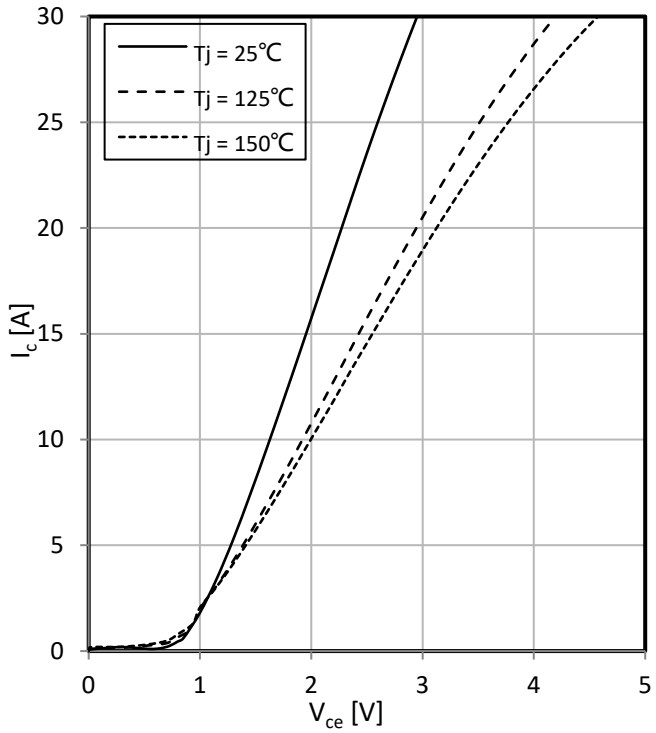
			min.	typ.	max.	
额定电阻值 Rated resistance	T_c = 25°C	R_{25}		5		kΩ
R100 偏差 Deviation of R100	T_c = 100°C, R100 = 493Ω	ΔR/R	-5		5	%
耗散功率 Power dissipation	T_c = 25°C	P_{25}			20	mW
B-值 B-value	$R_2 = R_{25}\exp[B_{25/50}(1/T_2 - 1/(298{,}15\ K))]$	$B_{25/50}$		3380		K
B-值 B-value	$R_2 = R_{25}\exp[B_{25/80}(1/T_2 - 1/(298{,}15\ K))]$	$B_{25/80}$		3440		K

模块 / Module

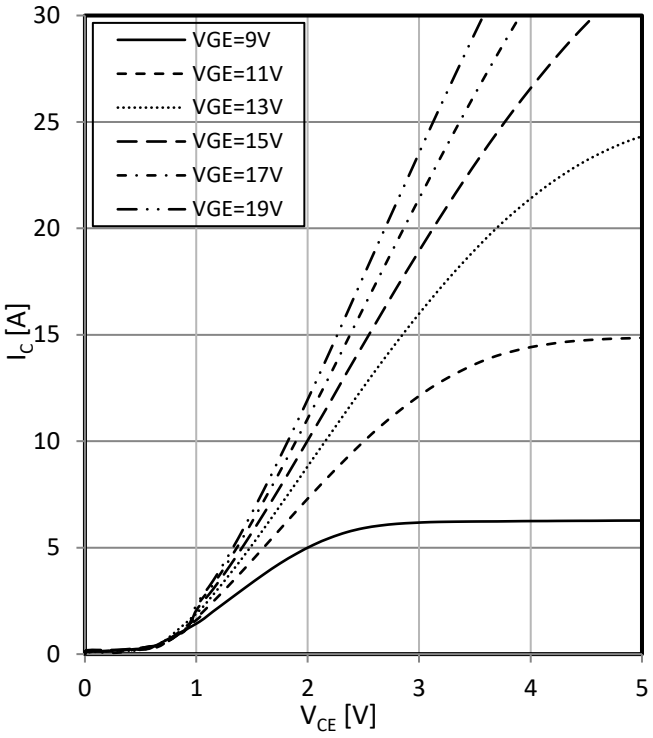
绝缘测试电压 Isolation test voltage	RMS, f = 50Hz, t = 1 min.	V_{ISOL}	2.5	kV
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) Basic insulation (class1, IEC 61140)		Al_2O_3	
爬电距离 Creepage distance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		11.5 6.3	mm
电气间隙 Clearance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		10.0 5.0	mm
相对电痕指数 Comparative tracking index		CTI	>200	

			min.	typ.	max.	
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 module mounting	螺丝M4 Screw M4	M	2.0		2.3	N·m
重量 Weight				24		g

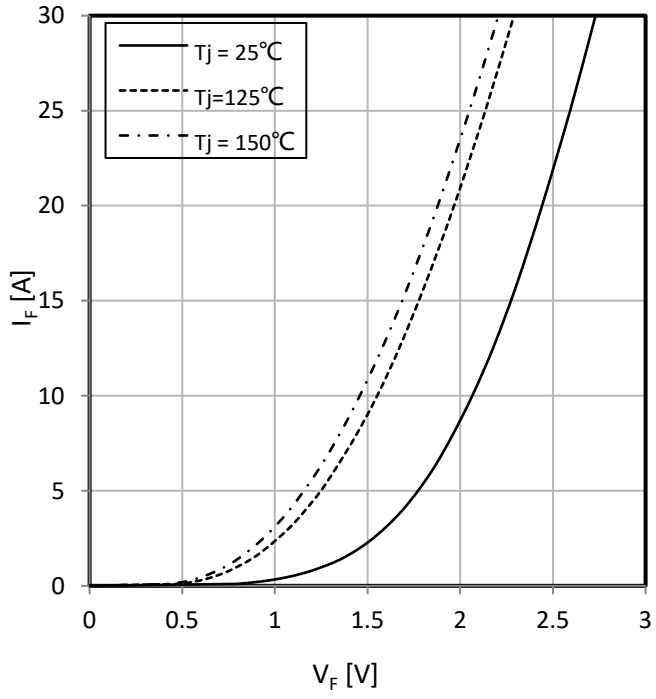
输出特性 IGBT，逆变器（典型）
Output characteristic IGBT, Inverter (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



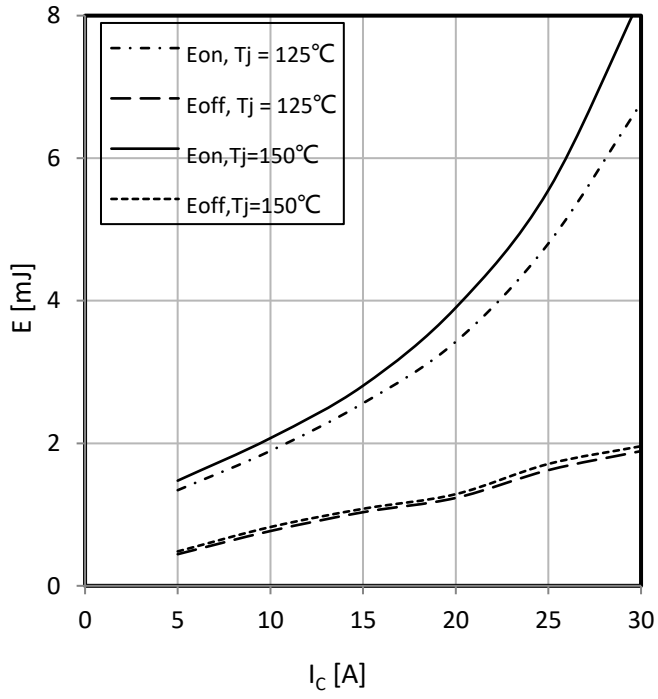
输出特性 IGBT，逆变器（典型）
Output characteristic IGBT, Inverter (typical)
$I_C = f(V_{CE})$
T_j = 150℃



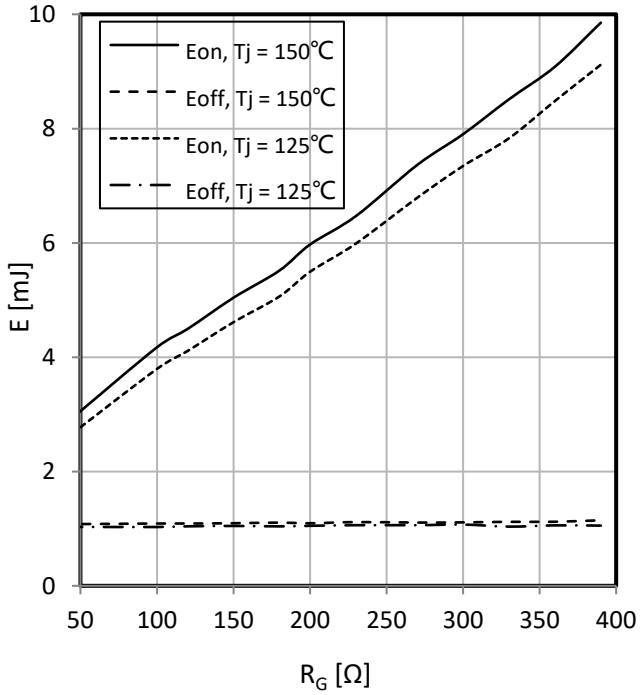
正向偏压特性 二极管，逆变器（典型）
Forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



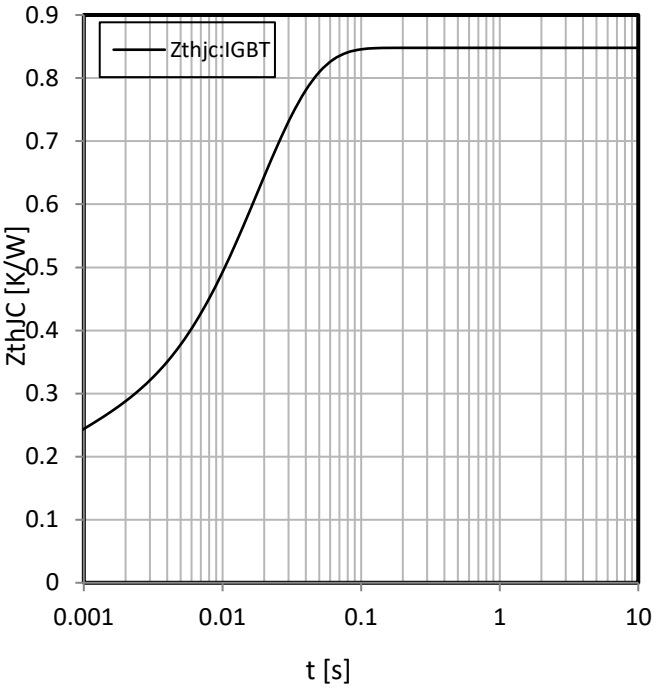
开关损耗 IGBT，逆变器（典型）
Switching losses IGBT, Inverter (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm 15$ V, R_{Gon} = 39 Ω, R_{Goff} =39 Ω, V_{CE} = 600 V



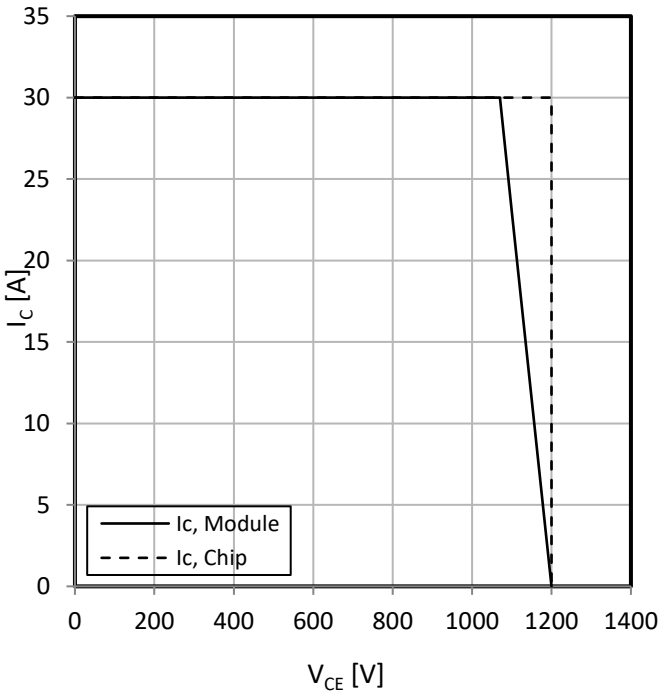
开关损耗 IGBT，逆变器（典型）
Switching losses IGBT, Inverter (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm 15$ V, $I_C = 15$ A, $V_{CE} = 600$ V



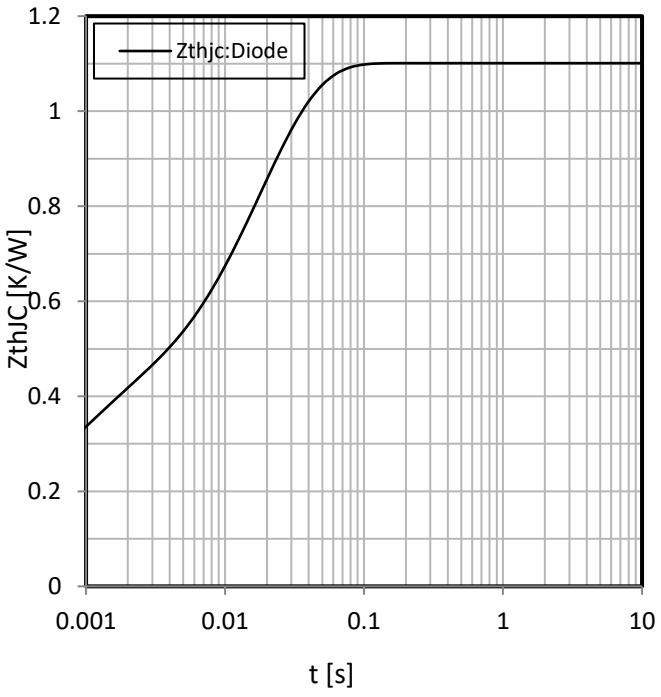
瞬态热阻抗 IGBT，逆变器（典型）
Transient thermal impedance IGBT, Inverter (typical)
$Z_{thJC} = f(t)$



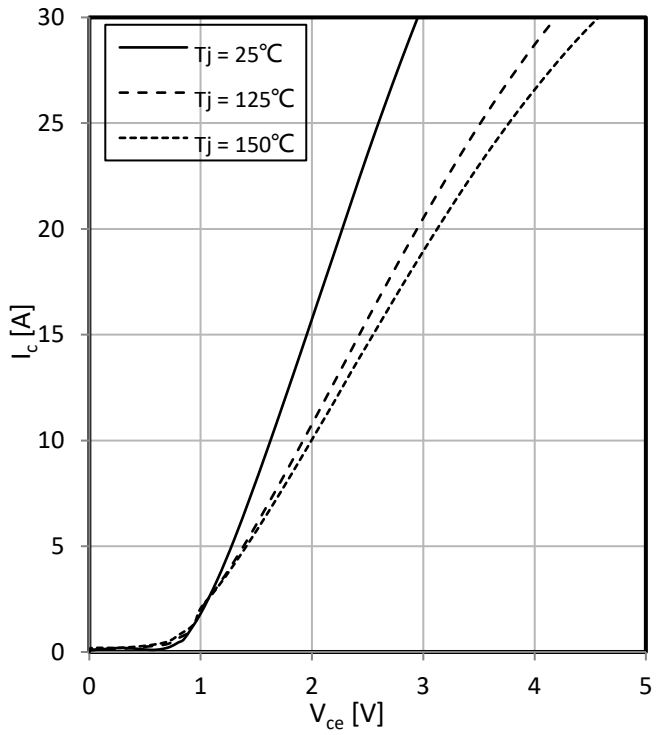
反偏安全工作区 IGBT，逆变器（RBSOA）
Reverse bias operating area IGBT, Inverter (RBSOA)
$I_C = f(V_{CE})$
$V_{GE} = \pm 15$ V, $R_{Goff} = 10\ \Omega$, $T_j = 150$℃



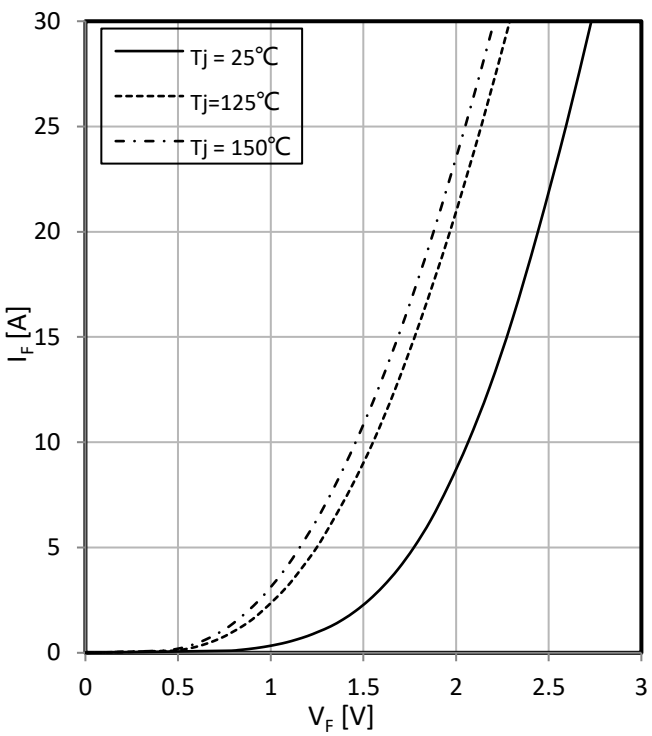
瞬态热阻抗 二极管，逆变器（典型）
Transient thermal impedance Diode, Inverter (typical)
$Z_{thJC} = f(t)$



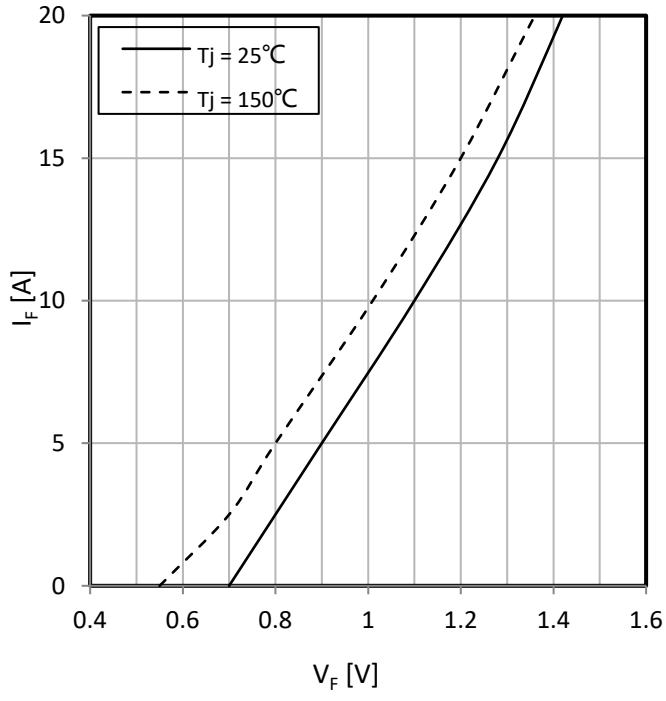
输出特性 IGBT，制动-斩波器（典型）
Output characteristic IGBT, Brake-Chopper (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



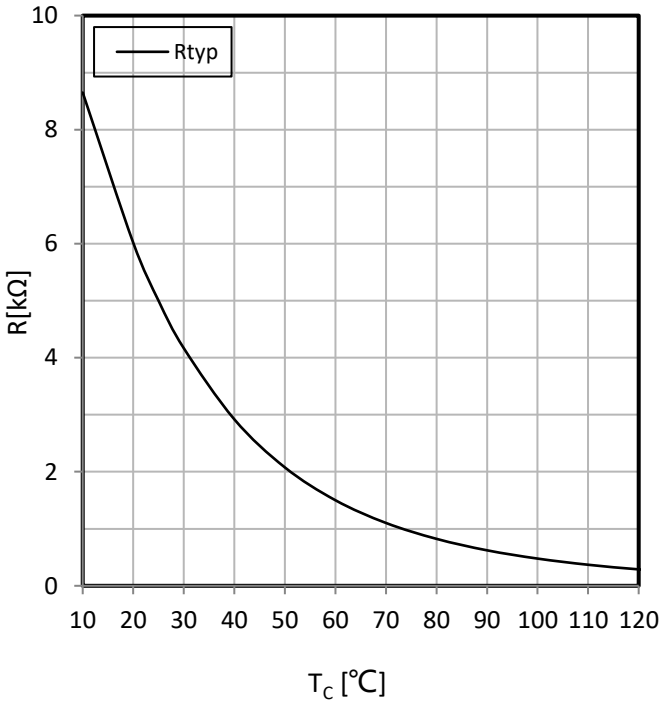
正向偏压特性 二极管，斩波器（典型）
Forward characteristic of Diode, Brake-Chopper (typical)
$I_F = f(V_F)$



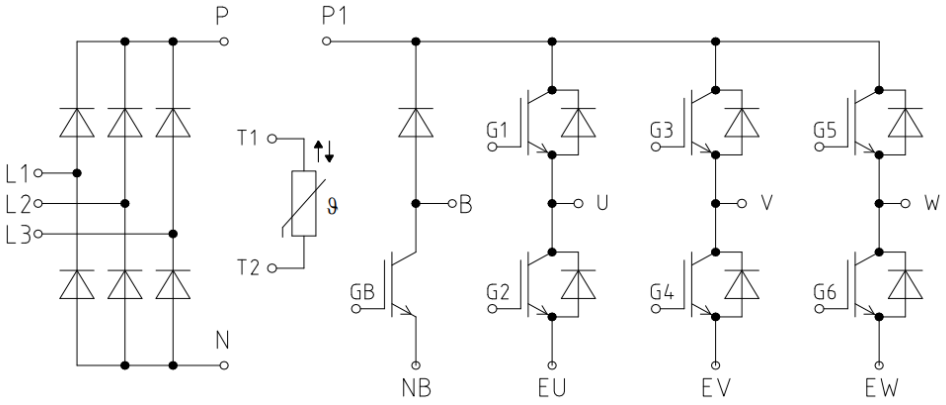
正向偏压特性 二极管，整流器（典型）
Forward characteristic of Diode, Rectifier (typical)
$I_F = f(V_F)$



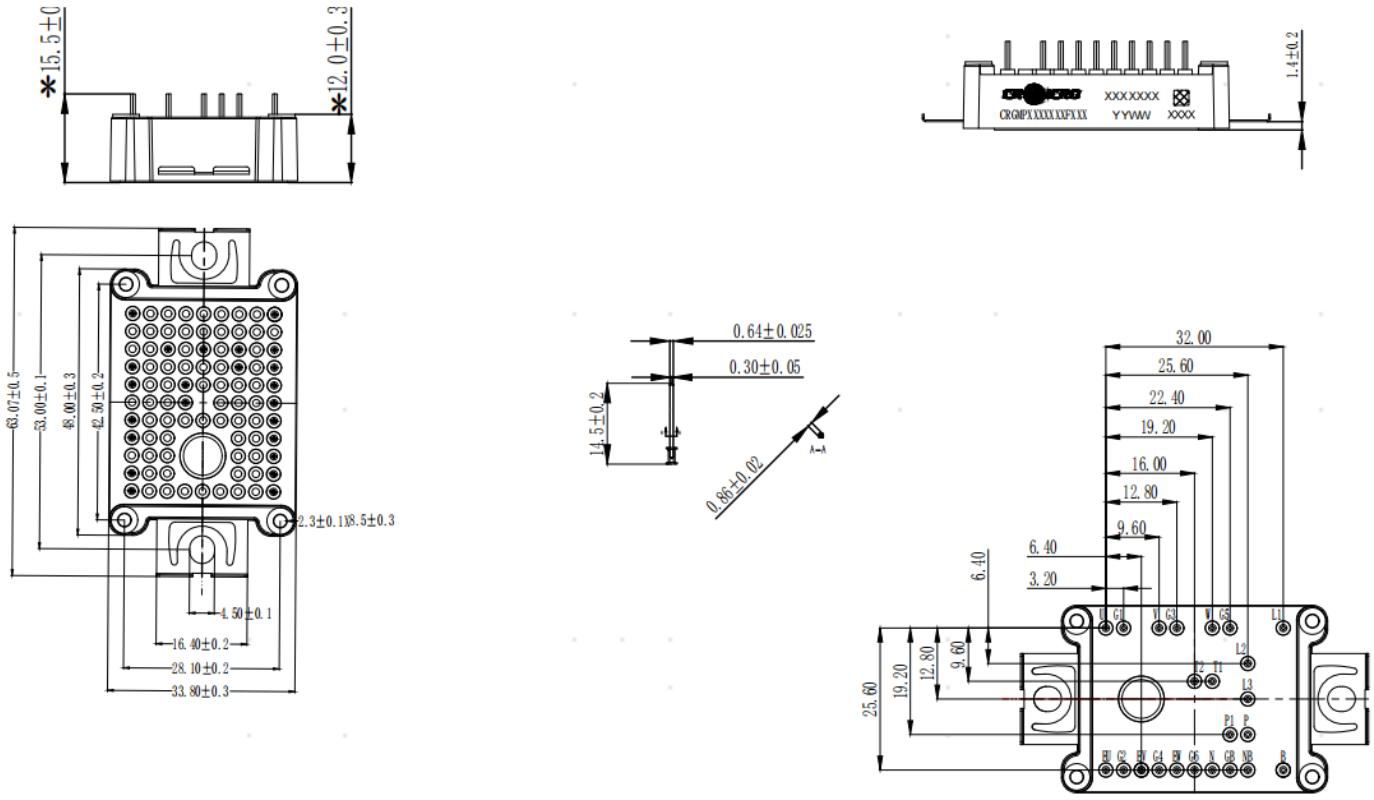
负温度系数热敏电阻 温度特性
NTC-Thermistor-temperature characteristic (typical)
R = f(T)



接线图 / Circuit Diagram



封装尺寸 / Package Outlines



警告：

1. 在性能上超过设备的最高额定值可能会对设备造成损坏，甚至永久故障，这可能会影响机器的可靠性。建议在设备最高额定值的80%以下使用。
2. 安装散热器时，请注意散热片的扭转力矩和平滑度。
3. IGBT 是一种对静电敏感的器件，使用时必须保护其免受静电的破坏。
4. 本刊物由华润微电子制作，如有定期更改，恕不另行通知。

Warnings:

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. It is suggested to be used under 80 percent of the maximum ratings of the device.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. IGBTs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. This publication is made by CR Microelectronics and subject to regular change without notice.