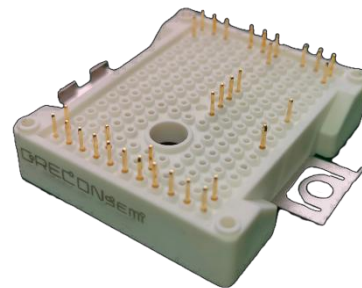
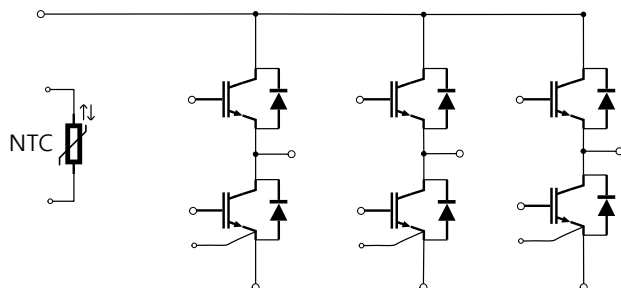


GCP50GX120FEC2

等效电路原理图

Equivalent Circuit Schematic



50A/1200V

说明

翠展 IGBT 功率模块具有超低的导通损耗以及良好的短路可靠性。

该产品是为了通用逆变器以及不间断电源等应用所设计。

典型应用

- 辅助逆变器
- 空调
- 电机传动
- 伺服驱动器

电气特性

- 低开关损耗
- 最大结温 175℃
- V_{CEsat} 带正温度系数
- 低 V_{CEsat}

机械特性

- 高功率循环和温度循环能力
- 低热阻的三氧化二铝(Al_2O_3) 衬底
- 焊接技术
- 标准封装

Description

GRECON IGBT Power Module provides ultra low conduction loss as well as short circuit ruggedness. They are designed for the applications such as general inverters and UPS.

Typical Applications

- Auxiliary Inverters
- Air Conditioning
- Motor Drives
- Servo Drives

Electrical Features

- Low Switching Losses
- Maximum junction temperature was 175 °C
- V_{CEsat} with positive Temperature Coefficient
- Low V_{CEsat}

Mechanical Features

- High Power and Thermal Cycling Capability
- Al_2O_3 Substrate with Low Thermal Resistance
- Solder Contact Technology
- Standard Housing

IGBT,逆变器 / IGBT,Inverter

最大额定值 / Maximum Rated Values

Parameter	Symbol	Conditions	Value	Unit
集电极-发射极电压 Collector-emitter voltage	V _{CES}	T _{vj} =25°C	1200	V
连续集电极直流电流 Continuous DC collector current	I _{C nom}	T _C =100°C, T _{vj max} =175°C	50	A
集电极重复峰值电流 Repetitive peak collector current	I _{CRM}	t _p =1ms	100	A
总功率损耗 Total power dissipation	P _{tot}	T _C =25°C, T _{vj max} =175°C	380	W
栅极-发射极峰值电压 Gate-emitter peak voltage	V _{GES}	T _{vj} =25°C	±20	V

特征值 / Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
栅极阈值电压 Gate threshold voltage	V _{GEth}	V _{GE} =V _{CE} , I _C =3.8mA, T _{vj} =25°C		5.80	6.50	V
栅极-发射极漏电流 Gate-emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =20V, T _{vj} =25 °C			100	nA
集电极-发射极截止电流 Collector-emitter cut-off current	I _{CES}	V _{CE} =1200V, V _{GE} =0V, T _{vj} =25°C			1	mA
集电极-发射极饱和电压 Collector-emitter saturation voltage	V _{CE sat}	I _C =50A, V _{GE} =15V, T _{vj} =25°C		1.70	2.05	V
		I _C =50A, V _{GE} =15V, T _{vj} =125°C		2.00		
		I _C =50A, V _{GE} =15V, T _{vj} =150°C		2.08		
内部栅极电阻 Internal gate resistance	R _{gint}	T _{vj} =25°C		1.1		Ω
栅极电荷 Gate charge	Q _G	V _{GE} =-8V~+15V, V _{CE} =600V		0.4		uC
输入电容 Input capacitance	C _{ies}	V _{CE} =25V, V _{GE} =0V, f=1MHz, T _{vj} =25°C		6.3		nF
反向传输电容 Reverse transfer capacitance	C _{res}			0.04		

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
开通延迟时间（电感负载） Turn-on delay time , inductive load	$t_{d\ on}$	$I_c=50A, V_{CE}=600V$ $R_{gon}=R_{goff}=10\Omega$ $V_{GE}=-8V/+15V$ $di/dt_{on}=1100A/us$ $dv/dt_{off}=7500V/us$ $T_{vj}=25^{\circ}C$		51		ns
上升时间（电感负载） Rise time , inductive load	t_r			41		
关断延迟时间（电感负载） Turn-off delay time , inductive load	$t_{d\ off}$			210		
下降时间（电感负载） Fall time , inductive load	t_f			178		
开通损耗能量（每脉冲） Turn-on energy loss per pulse	E_{on}	$I_c=50A, V_{CE}=600V$ $R_{gon}=R_{goff}=10\Omega$ $V_{GE}=-8V/+15V$ $di/dt_{on}=950A/us$ $dv/dt_{off}=6000V/us$ $T_{vj}=125^{\circ}C$		4.1		mJ
关断损耗能量（每脉冲） Turn-off energy loss per pulse	E_{off}			3.7		
开通延迟时间（电感负载） Turn-on delay time , inductive load	$t_{d\ on}$			51		ns
上升时间（电感负载） Rise time , inductive load	t_r			45		
关断延迟时间（电感负载） Turn-off delay time , inductive load	$t_{d\ off}$			219		
下降时间（电感负载） Fall time , inductive load	t_f			256		
开通损耗能量（每脉冲） Turn-on energy loss per pulse	E_{on}	$I_c=50A, V_{CE}=600V$ $R_{gon}=R_{goff}=10\Omega$ $V_{GE}=-8V/+15V$ $di/dt_{on}=900A/us$ $dv/dt_{off}=5800V/us$ $T_{vj}=150^{\circ}C$		6.5		mJ
关断损耗能量（每脉冲） Turn-off energy loss per pulse	E_{off}			4.4		
开通延迟时间（电感负载） Turn-on delay time , inductive load	$t_{d\ on}$			52		
上升时间（电感负载） Rise time , inductive load	t_r			51		
关断延迟时间（电感负载） Turn-off delay time , inductive load	$t_{d\ off}$	$I_c=50A, V_{CE}=600V$ $R_{gon}=R_{goff}=10\Omega$ $V_{GE}=-8V/+15V$ $di/dt_{on}=900A/us$ $dv/dt_{off}=5800V/us$ $T_{vj}=150^{\circ}C$		219		ns
下降时间（电感负载） Fall time , inductive load	t_f			284		
开通损耗能量（每脉冲） Turn-on energy loss per pulse	E_{on}			7.4		mJ
关断损耗能量（每脉冲） Turn-off energy loss per pulse	E_{off}			4.6		

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
短路数据 SC data	I _{SC}	t _p ≤10us, V _{GE} =15V, V _{ce} =800V, V _{CEM} ≤1200V, T _{vj} =25°C		195		A
		t _p ≤8us, V _{GE} =15V, V _{ce} =800V, V _{CEM} ≤1200V, T _{vj} =150°C		182		A
结-外壳热阻 Thermal resistance,junction to case	R _{thJC}	每个 IGBT / per IGBT			0.395	K/W
外壳-散热器热阻 Thermal resistance,case to heatsink	R _{thCH}	每个 IGBT / per IGBT λ _{grease} =1 W/(m • K)		0.591		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 Ratings

Parameter	Symbol	Conditions	Value	Unit
反向重复峰值电压 Repetitive peak reverse voltage	V_{RRM}	$T_{vj}=25^{\circ}C$	1200	V
连续正向直流电流 Continuous DC forward current	I_F		50	A
正向重复峰值电流 Repetitive peak forward current	I_{FRM}	$t_p=1ms$	100	A
I^2t -值 I^2t -value	I^2t	$V_R = 0\text{ V}$, $t_p = 8.3\text{ ms}$, $T_{vj} = 25^{\circ}C$	664	A^2s

特征值 / Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
正向电压 Forward voltage	V_F	$I_F=50A$, $V_{GE}=0V$, $T_{vj}=25^{\circ}C$		2.19		V
		$I_F=50A$, $V_{GE}=0V$, $T_{vj}=125^{\circ}C$		1.94		
		$I_F=50A$, $V_{GE}=0V$, $T_{vj}=150^{\circ}C$		1.88		
恢复电荷 Recovered charge	Q_{rr}	$I_F=50A$, $V_R=600V$ $-di_F/dt=1100A/us$ $T_{vj}=25^{\circ}C$		5.1		μC
反向恢复峰值电流 Peak reverse recovery current	I_{RM}			40		A
反向恢复损耗（每脉冲） Reverse recovery energy	E_{rec}			2.0		mJ
恢复电荷 Recovered charge	Q_{rr}	$I_F=50A$, $V_R=600V$ $-di_F/dt=850A/us$ $T_{vj}=125^{\circ}C$		10.7		μC
反向恢复峰值电流 Peak reverse recovery current	I_{RM}			54		A
反向恢复损耗（每脉冲） Reverse recovery energy	E_{rec}			4.1		mJ
恢复电荷 Recovered charge	Q_{rr}	$I_F=50A$, $V_R=600V$ $-di_F/dt=800A/us$ $T_{vj}=150^{\circ}C$		12.0		μC
反向恢复峰值电流 Peak reverse recovery current	I_{RM}			55		A
反向恢复损耗（每脉冲） Reverse recovery energy	E_{rec}			4.5		mJ

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
结-外壳热阻 Thermal resistance,junction to case	R_{thJC}	每个二极管 / per diode			0.633	K/W
外壳-散热器热阻 Thermal resistance,case to heatsink	R_{thCH}	每个二极管 / per diode $\lambda_{grease}=1W/(m \cdot K)$		0.730		K/W
在开关状态下温度 Temperature under switching conditions	$T_{vj\ op}$		-40		150	°C

负温度系数热敏电阻 / NTC-Thermistor

特征值 / Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
额定电阻值 Rated resistance	R_{25}			5		kΩ
R100 偏差 Deviation of R100	$\Delta R/R$	$T_c=100^{\circ}C, R_{100}=493.3\Omega$	-5		5	%
耗散功率 Power dissipation	P_{25}				20	mW
B-值 B-value	$B_{25/50}$	$R_2=R_{25exp}[B_{25/50}(1/T_2-1/(298.15K))]$		3380		K

模块 / Module

特征值（除非另有说明，否则 T_c=25°C）

Characteristic Values (T_c=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
绝缘电压 Isolation voltage	V _{isol}	RMS,t=1min, f=50Hz	2500			V
最大结温 Maximum junction temperature	T _{Jmax}				175	°C
在开关状态下温度 Operating junction temperature	T _{vj op}		-40		150	°C
储存温度 Storage temperature	T _{stg}		-40		125	°C
杂散电感（模块） Stray inductance module	L _{CE}			40		nH
模块安装扭力（每个夹具） Mounting force per clamp	F		20		50	N
模块重量 / Weight of module	G			45		g

电气特性（曲线） / Electrical Characteristics (curves)

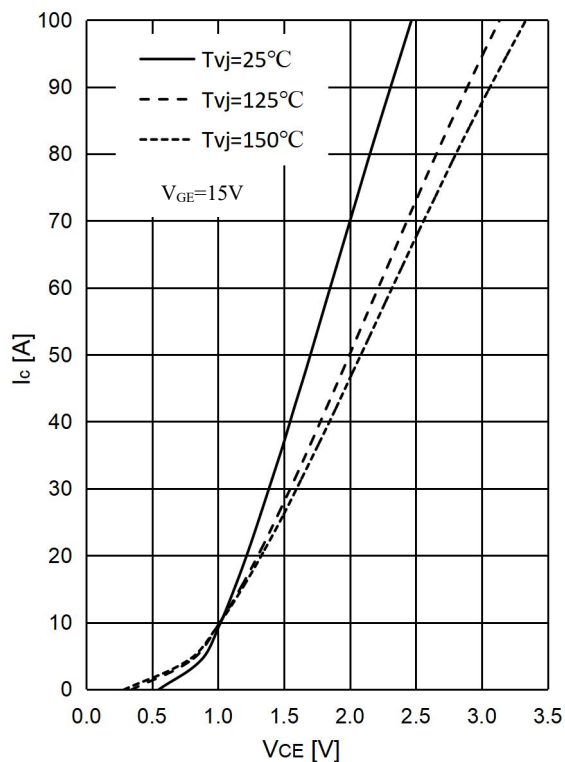


图 1 . IGBT 输出特性,逆变器
Fig 1. IGBT Output Characteristic, Inverter

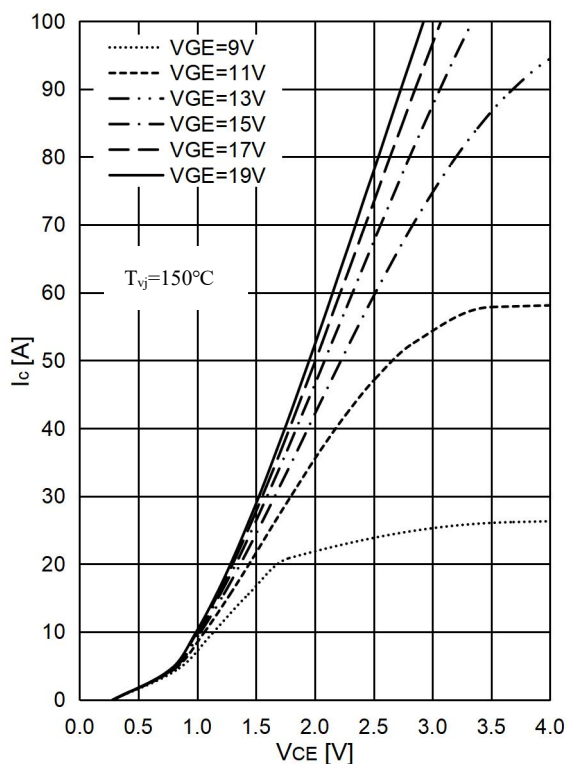


图 2 . IGBT 输出特性,逆变器
Fig 2. IGBT Output Characteristic, Inverter

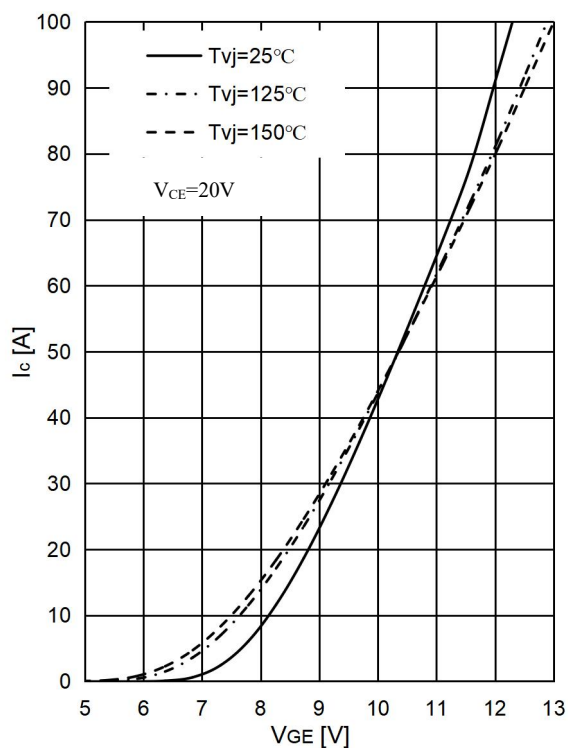


图 3 . IGBT 转移特性,逆变器
Fig 3. IGBT Transfer Characteristic, Inverter

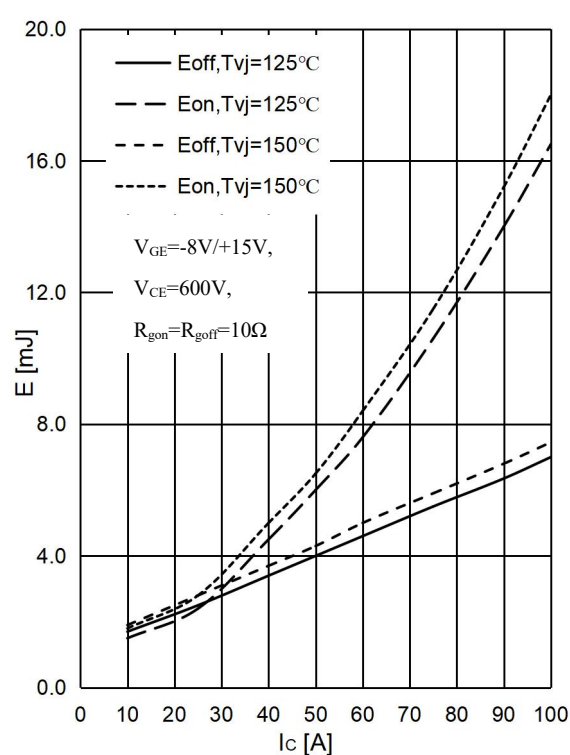


图 4 . IGBT 开关损耗-集电极电流,逆变器
Fig 4. IGBT Switching Loss E_{on} & E_{off} vs. I_c , Inverter

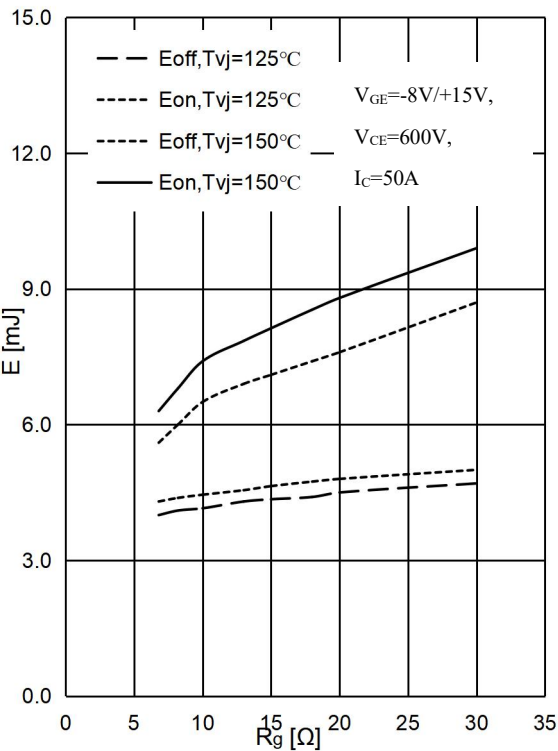


图 5 . IGBT 开关损耗-栅极电阻,逆变器
Fig 5. IGBT Switching Loss E_{on} & E_{off} vs. R_g , Inverter

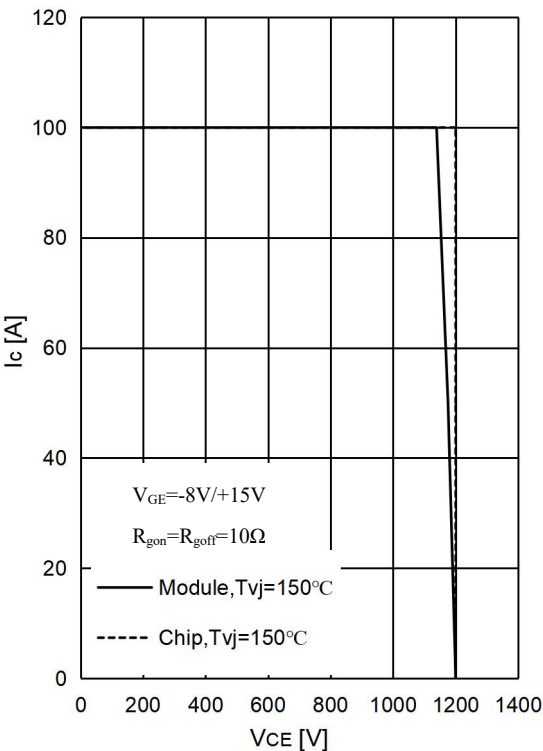


图 6 . IGBT 反偏安全工作区,逆变器
Fig 6. IGBT RBSOA, Inverter

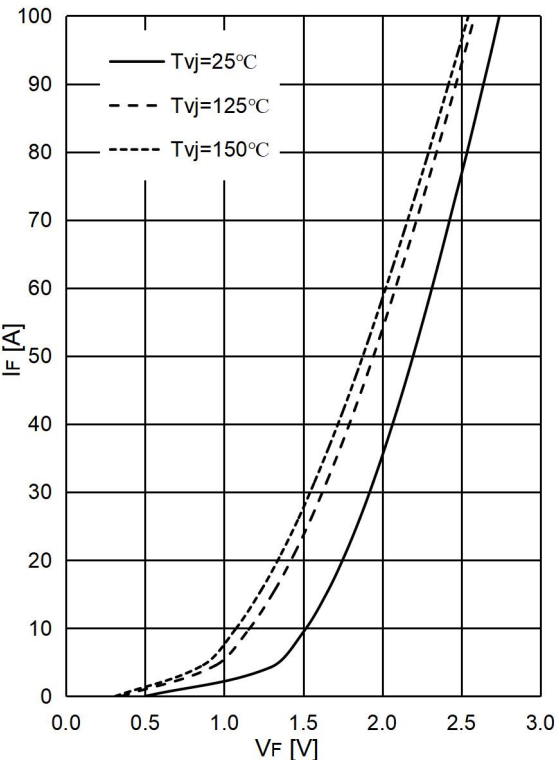


图 7 . 二极管 正向偏压特性,逆变器
Fig 7. Diode Forward characteristic, Inverter

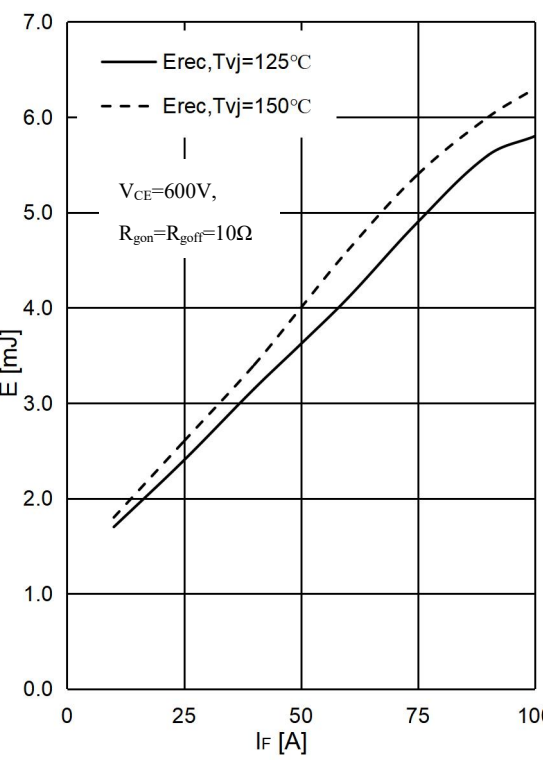


图 8 . 二极管 开关损耗-正向电流,逆变器
Fig 8. Diode Switching Loss E_{rec} vs. I_F , Inverter

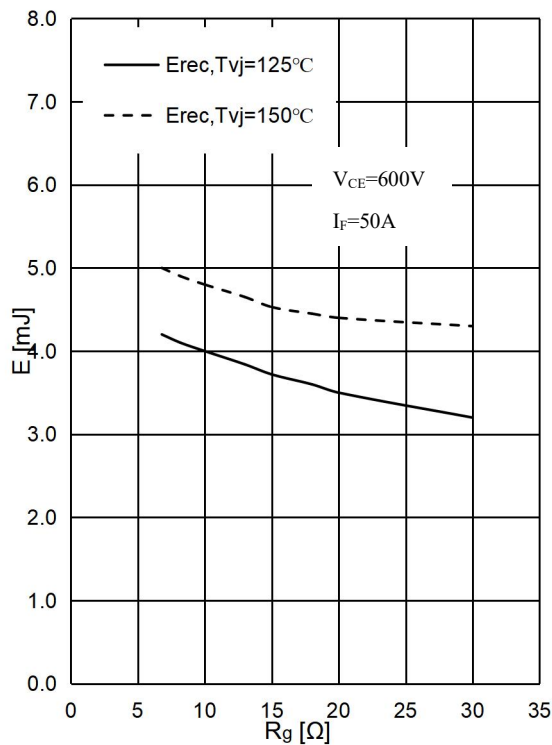


图 9 . 二极管 开关损耗-栅极电阻,逆变器
Fig 9. Diode Switching Loss E_{rec} vs. R_G ,Inverter

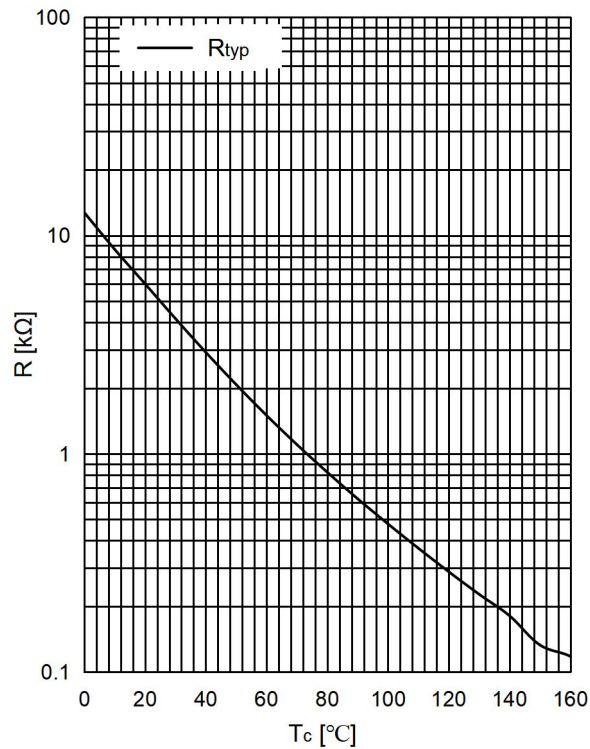


图 10 . 负温度系数热敏电阻 温度特性
Fig 10. NTC-Thermistor-temperature characteristic

Technical drawing of a 16-pin connector, showing three views: Top View, Side View, and Front View. Dimensions are provided in millimeters (mm) with tolerances.

Top View Dimensions:

- Overall Width: 62.8 ± 0.5
- Overall Height: 42.5 ± 0.15
- Pin Array Width: 56.7 ± 0.3
- Pin Array Height: 48 ± 0.3
- Pin Pitch (Horizontal): 2.54
- Pin Pitch (Vertical): 2.54
- Central Feature Diameter: $\varnothing 4.5 \pm 0.2$
- Mounting Hole Diameter: $\varnothing 4.5 \pm 0.2$
- Pin Height: 1.69 ± 0.3

Side View Dimensions:

- Overall Height: 15.5 ± 0.5
- Pin Height: 1.69 ± 0.3
- Pin Array Width: 56.7 ± 0.3

Front View Dimensions:

- Overall Width: 62.8 ± 0.5
- Overall Height: 42.5 ± 0.15
- Pin Array Width: 56.7 ± 0.3
- Pin Array Height: 48 ± 0.3
- Pin Pitch (Horizontal): 2.54
- Pin Pitch (Vertical): 2.54
- Central Feature Diameter: $\varnothing 4.5 \pm 0.2$
- Mounting Hole Diameter: $\varnothing 4.5 \pm 0.2$
- Pin Height: 1.69 ± 0.3

使用条件和条款:

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请注意，对这类应用我们强烈建议：

- 执行风险和质量评估；
- 签订质量协议；
- 进行规定的测试和产品出厂检查，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您的客户。我们将保留产品规格书的修改权。

Terms & Conditions of usage

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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.

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