

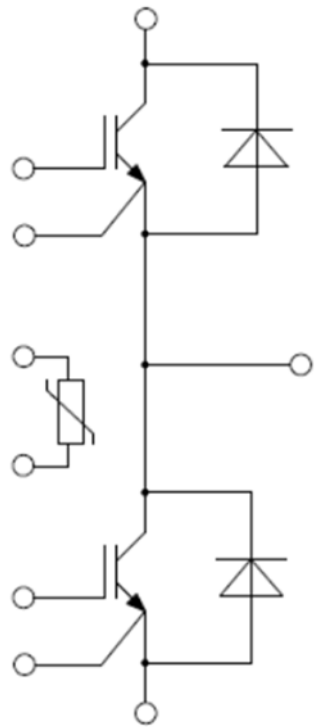
1700V , 600A IGBT Module

■ 特点/Features

- 低 V_{cesat} / Low V_{cesat}
- 高可靠性和功率密度/High reliability and Power density
- 低开关损耗/Low switching loss

■ 应用领域/Applications

- UPS 系统/UPS Systems
- 风力发电机/Wind Tuebines
- 电机传动/Motor Drives



$V_{ces}=1700V$

$I_c \text{ nom} = 600A$

● IGBT-逆变器/IGBT- Inverter

最大额定值/Absolute Max Ratings

符号 Symbol	参数 Parameter	条件 condition	值 Value	单位 Units
V _{CES}	Collector-to-Emitter Voltage 集电极—发射极电压	T _{Vj} =25 °C	1700	V
I _{C nom}	Continuous DC collector current 连续集电极直流电流	T _C = 100°C,T _{Vj max} =175 °C	600	A
I _{CRM}	Repetitive peak collector current 集电极重复峰值电流	t _p =1ms	1200	A
P _{total}	Total power dissipation 总功率损耗	T _C = 25°C,T _{Vj max} =175 °C	3000	W
V _{GES}	Gate-Emitter peak voltage 栅极—发射极峰值电压		+/- 20	V

特征值/Characteristics Values

符号 Symbol	参数 Parameter	测试条件 Test conditions	Value值			单位 Unit s
			Min. 最小	Typ. 典型	Max. 最大	
V _{CE(sat)}	Collector-Emitter Saturation voltage 集电极—发射极饱和电压	V _{GE} =15V, I _C =600A,T _{Vj} =25°C	—	1.78	2.20	V
		V _{GE} =15V, I _C =600A,T _{Vj} =150°C	—	2.20	—	V
V _{GE(th)}	Gate threshold voltage 门极开启阈值电压	V _{GE} = V _{CE} , I _C = 24mA	5	5.75	6.5	V
C _{iss}	Input capacitance 输入电容	V _{GE} = 0V V _{CE} = 25V T _{Vj} =25°C f = 1MHz	—	20.3	—	nF
C _{oss}	Output capacitance 输出电容		—	3.07	—	nF
C _{rss}	Reverse transfer capacitance 反向传输电容		—	1.48	—	nF
Q _g	Total gate charge 栅极电荷	V _{GE} = -15.....+15V	—	3.8	—	uC
R _g	Internal gate resistor 内部栅极电阻	T _{Vj} =25°C	—	1.89	—	Ω
I _{CES}	Collector-Emitter leakage current 集电极-发射极截止电流	V _{CE} =1700V, V _{GE} = 0V,T _{Vj} =25°C	-	-	1.0	mA
I _{GES}	Gate-Emitter leakage current 栅极-发射极漏电流	V _{CE} =0V, V _{GE} =20V,T _{Vj} =25°C	-	-	200	nA
T _{d(on)}	Turn-On DelayTime 开通延迟时间	T _{Vj} =25°C,V _{CE} =900V, I _C =600A,R _g =1.0ohm, V _{GE} =+15V	-	194	-	ns
Tr	Rise Time 上升时间		-	124	-	ns

T _{d(off)}	Turn-Off DelayTime 关断延迟时间	T _{vj} =150°C,V _{CE} =900V, I _c =600A,R _g =1.0ohm, V _{GE} =+15V	-	638	-	ns
T _f	Turn-Off Fall Time 下降时间		-	460	-	ns
T _{d(on)}	Turn-On DelayTime 开通延迟时间		-	213	-	ns
T _r	Rise Time 上升时间		-	155	-	ns
T _{d(off)}	Turn-Off DelayTime 关断延迟时间		-	764	-	ns
T _f	Turn-Off Fall Time 下降时间	T _{vj} =25°C,V _{CE} =900V, I _c =600A,R _g =1.0ohm, L _S =50uH, V _{GE} =+15V	-	630	-	ns
E _{on}	Turn-on switch loss 开通损耗		-	137	-	mJ
E _{off}	Turn-off switch loss 关断损耗		-	167	-	mJ
E _{on}	Turn-on switch loss 开通损耗		-	256	-	mJ
E _{off}	Turn-off switch loss 关断损耗		-	217	-	mJ
I _{sc}	Short- circuit current 短路电流	T _{vj} =25°C,V _{GE} =15V, V _{CE} =1000V, t _p <10us	-	3000	-	A
R _{thJC}	Junction-Case Thermal resistance 结－外壳热阻	-	-	-	0.036	K/W
T _{vj op}	Temperature under switching 在开关状态下温度	-	-40	-	150	°C

● 二极管-逆变器/Diode- Inverter

最大额定值/Absolute Max Ratings

符号 Symbol	参数 Parameter	条件 condition	值 Value	单位 Units
V _{RRM}	Repetitive peak reversevoltage 反向重复峰值电压	T _{vj} =25 °C	1700	V
I _F	Continuous DC forward current 连续正向直流电流		600	A
I _{FRM}	Repetitive peak forward current 正向重复峰值电流	T _p =1ms	1200	A

特征值/Characteristics Values						
符号 Symbol	参数 Parameter	测试条件 Test conditions	Value值			单位 Units
			Min. 最小	Typ. 典型	Max. 最大	
V _F	Forward voltage 正向电压	I _F =600A,T _{VJ} =25 °C	-	2.22	2.50	V
		I _F =600A,T _{VJ} =150 °C	-	2.42	-	V
I _{RM}	Peak reverse recovery current 反向恢复峰值电流	I _F =600A,V _R =900V, T _{VJ} =25 °C	-	377	-	A
Q _r	Recovery charge 恢复电荷		-	95	-	uC
E _{rec}	Reverse recovery energy 反向恢复损耗		-	55	-	mJ
I _{RM}	Peak reverse recovery current 反向恢复峰值电流	I _F =600A,V _R =900V, T _{VJ} =150 °C	-	454	-	A
Q _r	Recovery charge 恢复电荷		-	131	-	uC
E _{rec}	Reverse recovery energy 反向恢复损耗		-	122	-	mJ
R _{ThJC}	Junction-Case Thermal resistance 结—外壳热阻		-	-	0.072	K/W
T _{VJ OP}	Temperature under switching 在开关状态下温度		-40	-	150	°C

● 负温度系数热敏电阻/ NTC- Thermistor

特征值/Characteristics Values						
符号 Symbol	参数 Parameter	测试条件 Test conditions	Value值			单位 Units
			Min. 最小	Typ. 典型	Max. 最大	
R ₂₅	Rated Resistance 额定电阻值	T _C = 25 °C		5.0		kΩ
ΔR/R	Deviation for R100 R100 偏差	T _C = 25 °C,R100=493Ω	-5	-	5	%
P ₂₅	Power dissipation 耗散功率	T _C = 25 °C	-	20	-	mW
B _{25/50}	B-value B-值	R ₂ =R ₂₅ exp[B _{25/50} (1/T ₂ -1/(298,15K))]	-	3375	-	K

● 模块/Module

模块参数/Module parameter						
符号 Symbol	参数 Parameter	测试条件 Test conditions	Value值			单位 Units
			Min. 最小	Typ. 典型	Max. 最大	
V _{ISOL}	Isolation voltage 绝缘测试电压	RMS,f=50Hz,t=1min	-	3.4	-	kV
	Material of Base plate 模块基板材料		-	Cu	-	
	Internal Isolation 内部绝缘	Basic insulation (class1,IEC61140)	-	Al ₂ O ₃	-	
R _{thCH}	Junction to heatsink, Thermal Resistance 外壳—散热器热阻		-	0.009	-	K/W
L _{s CE}	Stray induction module 杂散电感,模块		-	25	-	nH
R _{CC'+EE'}	Module lead resistance 模块引线电阻,端子-芯片	T _C = 25 °C	-	1.5	-	mΩ
T _{STG}	Storage Temperature 储存温度		-40	-	+150	°C
M	Mounting torque for modul mounting 模块安装的安装扭距	Mounting to heat sink M5	3.0	-	6.0	Nm
	Terminal connection torque 端子联接扭距	Main Terminal M6	3.0	-	6.0	Nm
G	Weigh 重量		-	350	-	g

● 特征曲线/ Characteristic Curve

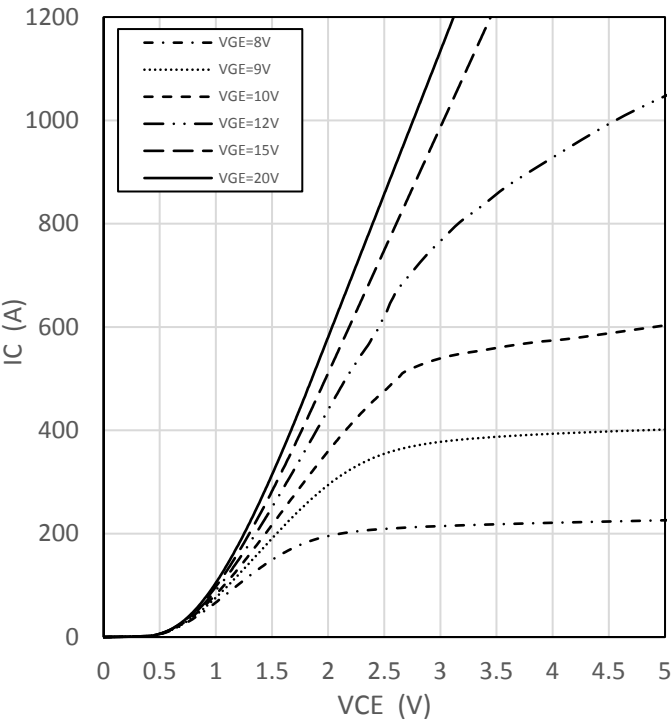


图 1: 输出特性@150°C/ Typical Output Characteristic @150°C

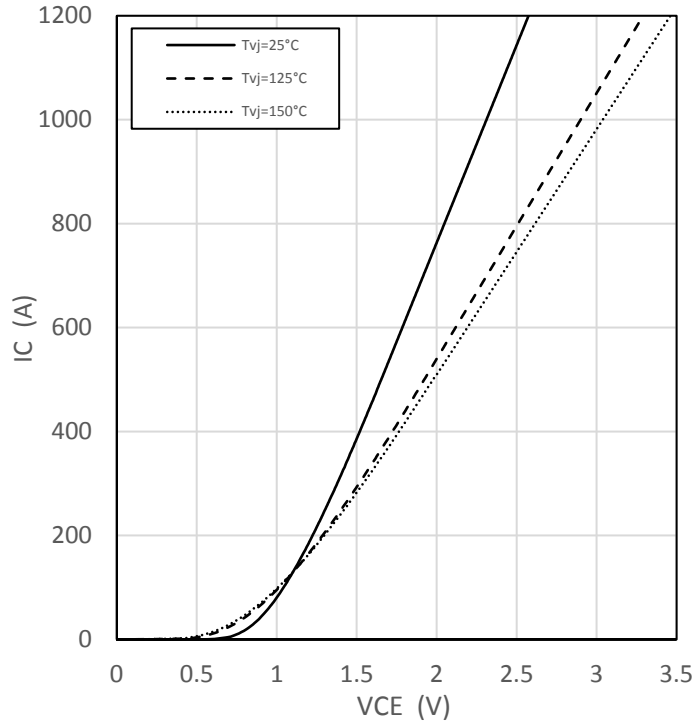


图 2: 输出特性@/ Typical Output Characteristic

$V_{CC}=900V$, $I_C=600A$, $V_{GE}=15V$, $R_g=1.0\Omega$

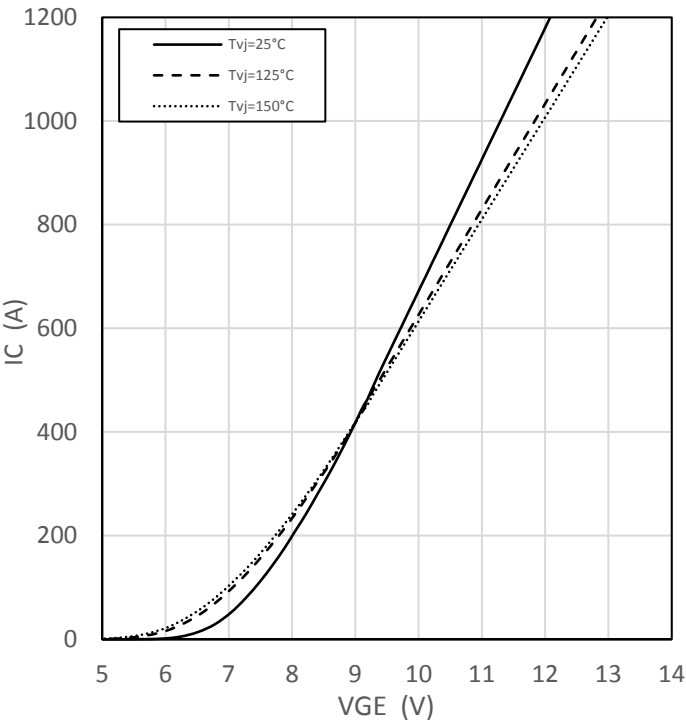


图 3: 传输特性/ Transfer Characteristic

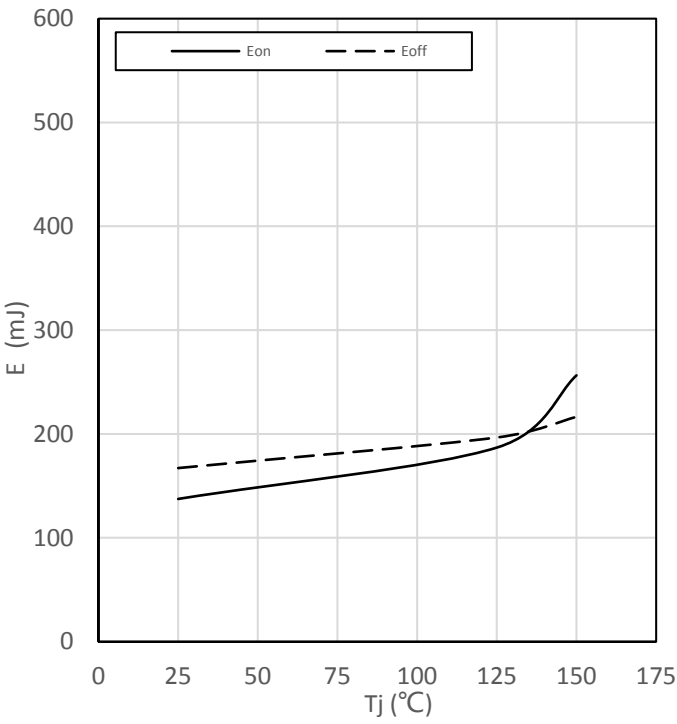


图 4: 动态损耗-温度特性/Typical switching losses as T_j

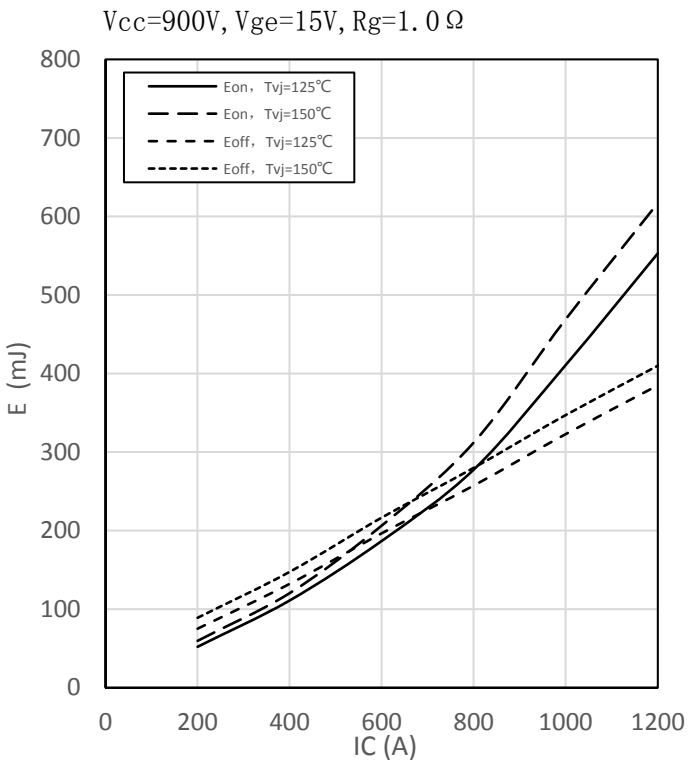


图 5: 动态损耗-电流特性/Typical switching losses as I_C

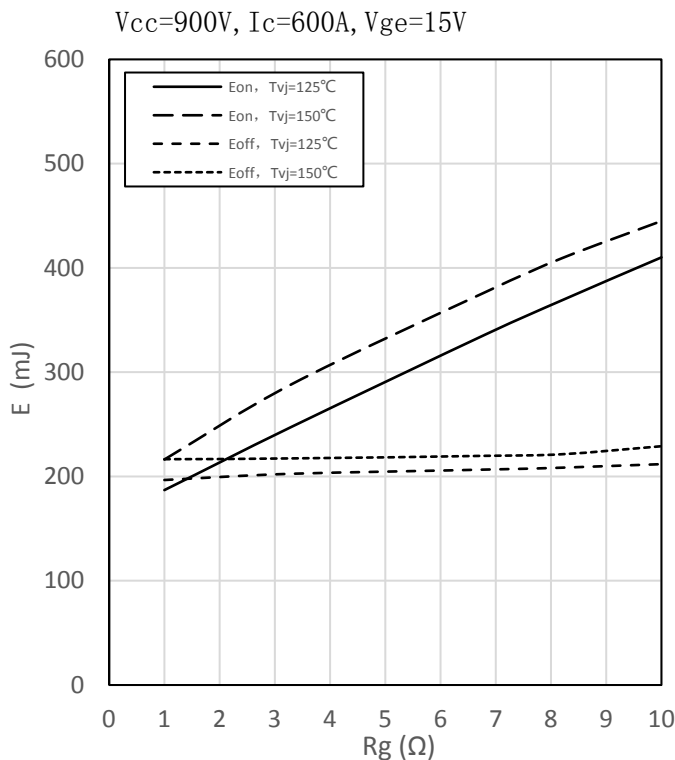


图 6: 动态损耗-门极电阻特性/Typical switching losses as R_G

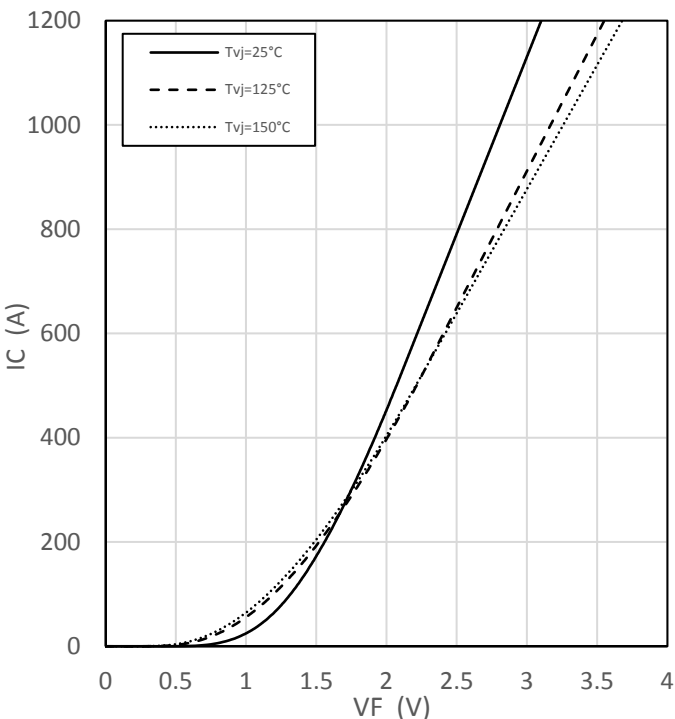


图 7: 二极管压降/Typical I_F as a function of V_F

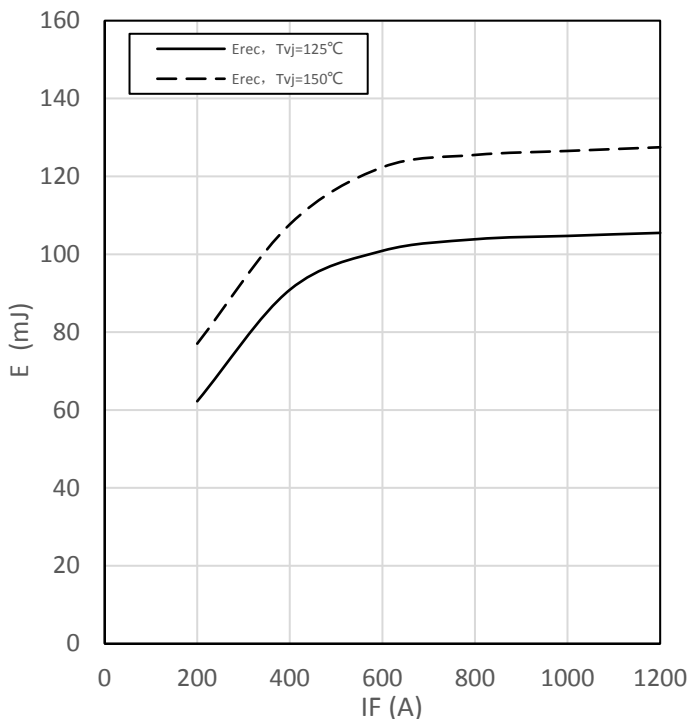


图 8: 反向恢复损耗-电流/Typical E_{REC} as a function of I_C

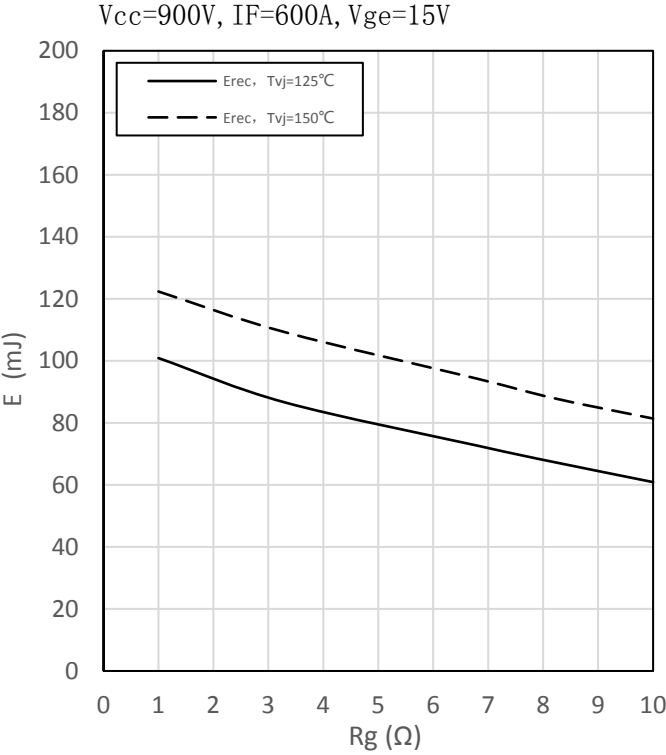


图 9：反向恢复损耗-门极电阻特性/Typical EREC as a function of Rg

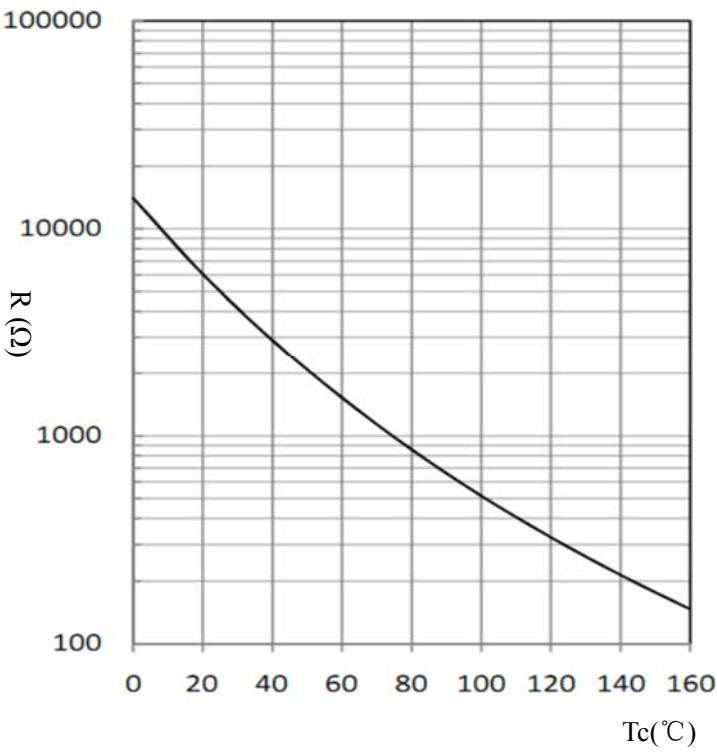


图 10：热敏电阻特性/NTC Temperature Characteristic

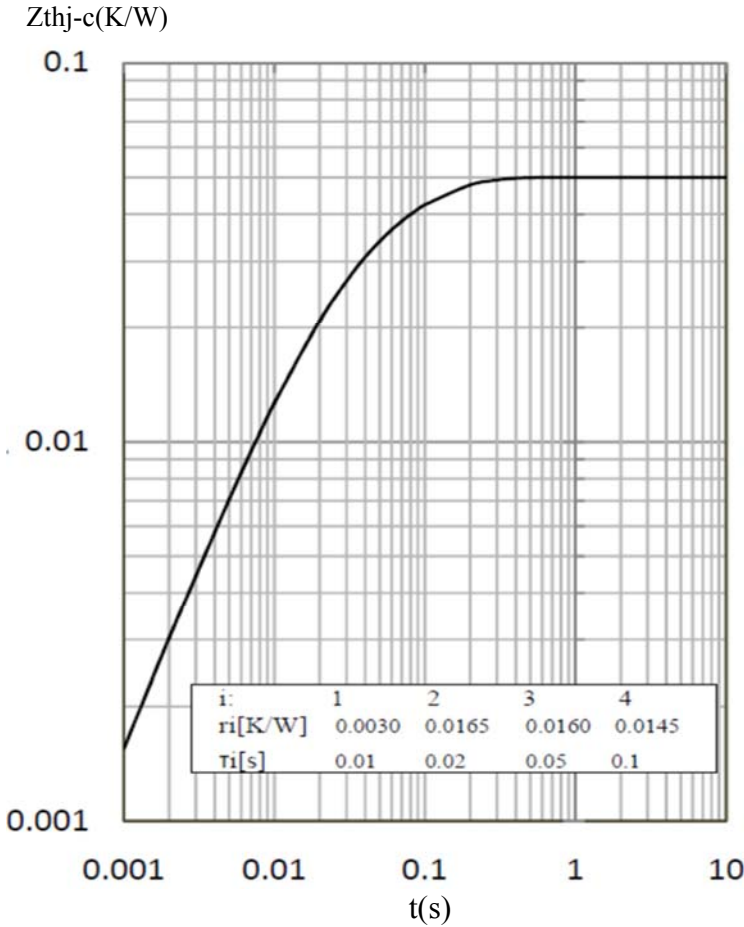


图 11：IGBT 瞬态热阻抗/IGBT Transient Thermal Impedance

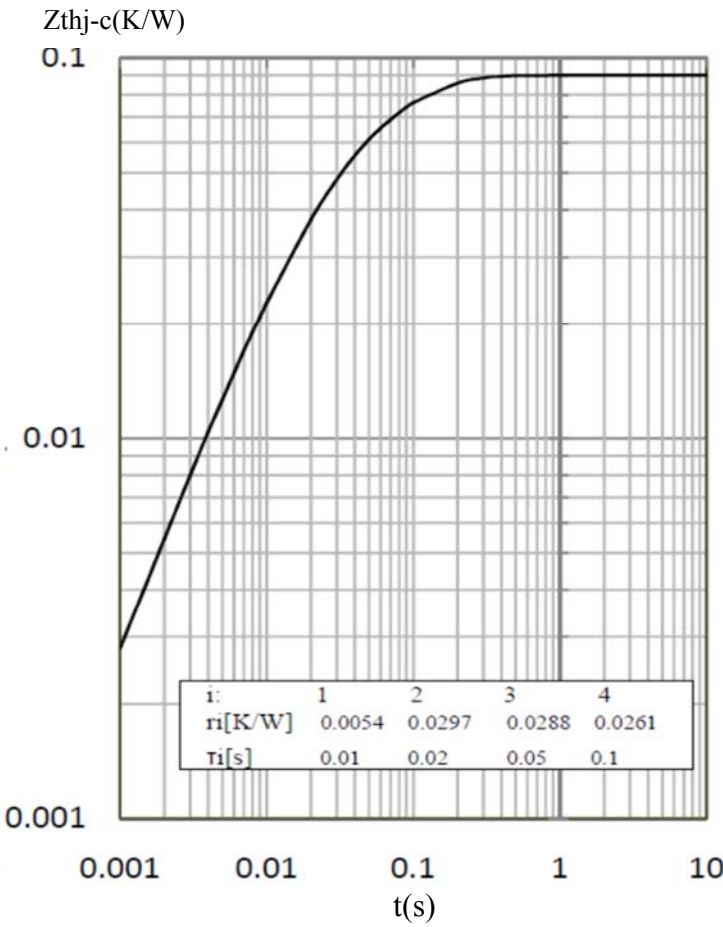
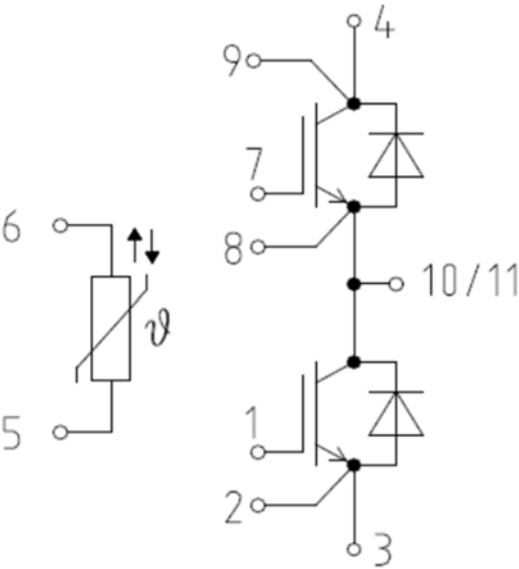


图 12：二极管瞬态热阻抗/Diode Transient Thermal Impedance

● 接线图/Circuit diagram headline



● 封装尺寸/Package Dimensions

