

电气特性

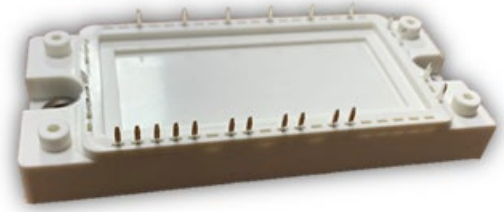
- 沟槽栅+场终止 IGBT
- $V_{CE(sat)}$ 正温度系数
- 低 $V_{CE(sat)}$

典型应用

- 电机传动
- 伺服驱动器
- 辅助逆变器

机械特性

- 高功率密度
- 内部集成 NTC 温度传感器
- 铜散热基板
- 焊接连接技术
- 标准封装



IGBT, Inverter

Maximum Rated Values							
Symbol	Item	Conditions	Rating	Unit			
IGBT							
V_{CES}	Collector-emitter voltage	$T_{vj}=25^{\circ}\text{C}$	1200	V			
V_{GES}	Gate-emitter voltage	-	± 20	V			
I_C	Collector current,DC	$T_C=100^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$	50	A			
I_{CRM}	Repetitive peak collector current	$T_C=80^{\circ}\text{C}, t_p=1\text{ms}$	100	A			
P_{tot}	Total power dissipation	$T_C=25^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$	278	W			
Characteristics Values							
Symbol	Item	Conditions	Values			Unit	
			Min.	Typ.	Max.		
IGBT							
I_{CES}	Collector-emitter cut-off current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_{vj}=25^{\circ}\text{C}$	-	-	1	mA	
I_{GES}	Gate leakage current	$V_{CE}=0\text{V}, V_{GE}=20\text{V}, T_{vj}=25^{\circ}\text{C}$	-	-	100	nA	
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=1.5\text{mA}, V_{CE}=V_{GE}, T_{vj}=25^{\circ}\text{C}$	5.2	5.6	6.6	V	
V_{CEsat}	Collector-emitter saturation voltage	$I_C=50\text{A}$ $V_{GE}=15\text{V}$	$T_{vj}=25^{\circ}\text{C}$	-	2.23		-
			$T_{vj}=125^{\circ}\text{C}$	-	2.324		-
			$T_{vj}=150^{\circ}\text{C}$	-	2.436	-	
C_{ies}	Input capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}$ $f=1\text{MHz}, T_{vj}=25^{\circ}\text{C}$	-	3.535	-	nF	
C_{oes}	Output capacitance		-	0.231	-		
C_{res}	Reverse transfer capacitance		-	0.119	-		
Q_G	Gate charge	$V_{CC}=600\text{V}, I_C=50\text{A}$ $V_{GE}=-15\dots+15\text{V}, T_{vj}=25^{\circ}\text{C}$	-	0.201	-	μC	
R_g	Internal gate resistance	$T_{vj}=25^{\circ}\text{C}$	-	4	-	Ω	

$t_{d(on)}$	Turn-on delay time	$V_{CC}=600V$ $I_C=50A$ $V_{GE}=\pm 15V$ $R_{G(on)}=51\Omega$ $R_{G(off)}=51\Omega$	$T_{vj}=25^\circ C$	-	245	-	ns
			$T_{vj}=125^\circ C$	-	212	-	
			$T_{vj}=150^\circ C$	-	208	-	
t_r	Rise time		$T_{vj}=25^\circ C$	-	127	-	
			$T_{vj}=125^\circ C$	-	146	-	
			$T_{vj}=150^\circ C$	-	145	-	
$t_{d(off)}$	Turn-off delay time		$T_{vj}=25^\circ C$	-	474	-	
			$T_{vj}=125^\circ C$	-	748	-	
			$T_{vj}=150^\circ C$	-	1188	-	
t_f	Fall time		$T_{vj}=25^\circ C$	-	411	-	
			$T_{vj}=125^\circ C$	-	238	-	
			$T_{vj}=150^\circ C$	-	1257	-	
E_{on}	Turn-on energy (per pulse)	$V_{CC}=600V, I_C=50A$ $V_{GE}=\pm 15V, R_{G(on)}=51\Omega$ $di/dt=1570A/\mu s(T_{vj}=25^\circ C)$	$T_{vj}=25^\circ C$	-	14.39	-	mJ
			$T_{vj}=125^\circ C$	-	18.19	-	
			$T_{vj}=150^\circ C$	-	19.21	-	
E_{off}	Turn-off energy (per pulse)		$T_{vj}=25^\circ C$	-	3.42	-	
			$T_{vj}=125^\circ C$	-	4.56	-	
			$T_{vj}=150^\circ C$	-	4.80	-	
SC data	Short-circuit current	$V_{CC}=600V, V_{GE}\leq 15V, T_{vj}=25^\circ C$ $V_{CES}\leq 1200V, t_p\leq 10\mu s$	-	560	-	A	
R_{thJC}	Thermal resistance, junction to case	Per IGBT	-	-	0.54	K/W	
R_{thCH}	Thermal resistance, case to heatsink	Per IGBT, $\lambda_{grease}=1W/(m\cdot K)$	-	0.295	-	K/W	
T_{vjop}	Temperature under switching conditions		-40		150	$^\circ C$	
Diode, Inverter							
Maximum Rated Values							
Symbol	Item	Conditions			Rating	Unit	
V_{RRM}	Repetitive peak reverse voltage	$T_{vj}=25^\circ C$			1200	V	
I_F	Forward current, DC	$T_C=80^\circ C, T_{vj}=175^\circ C$			50	A	
I_{FRM}	Repetitive peak forward current	$t_p=1ms$			100	A	
I^2t	I^2t -value	$V_R=0V, t_p=10ms, T_{vj}=125^\circ C$			667	A^2s	
Characteristic Values							
V_F	Continuous forward voltage	$I_F=50A$ $V_{GE}=0V$	$T_{vj}=25^\circ C$	-	2.31	-	V
			$T_{vj}=125^\circ C$	-	2.11	-	
			$T_{vj}=150^\circ C$	-	1.99	-	
I_{RM}	Peak reverse recovery current	$V_R=600V$ $I_F=50A$ $V_{GE}=-15V$ $-di_F/dt=1560A/\mu s$ $(T_{vj}=25^\circ C)$	$T_{vj}=25^\circ C$	-	21.5	-	A
			$T_{vj}=125^\circ C$	-	28.0	-	
			$T_{vj}=150^\circ C$	-	28.9	-	
t_{rr}	Reverse recovery time		$T_{vj}=25^\circ C$	-	86.3	-	ns
			$T_{vj}=125^\circ C$	-	169	-	
			$T_{vj}=150^\circ C$	-	228	-	
Q_r	Recovered charge	$T_{vj}=25^\circ C$	-	0.92	-	μC	
		$T_{vj}=125^\circ C$	-	6.89	-		
		$T_{vj}=150^\circ C$	-	9.74	-		

E _{rec}	Reverse recovery energy		T _{vj} =25°C	-	1.9	-	mJ
			T _{vj} =125°C	-	2.4	-	
			T _{vj} =150°C	-	2.8	-	
R _{thJC}	Thermal resistance, junction to case	per diode	-	-	0.81	K/W	
R _{thCH}	Thermal resistance, case to heatsink	Per diode, λ _{grease} =1 W/(m • K)	-	0.44	-	K/W	
T _{vjop}	Temperature under switching conditions		-40		150	°C	

Diode, Converter

Maximum Rated Values						
Symbol	Item	Conditions	Rating			Unit
V _{RRM}	Repetitive peak reverse voltage	T _{vj} =25°C	1800			V
I _{FRMSM}	Maximum RMS forward current per chip	T _C =80°C	50			A
I _{RMSM}	Maximum RMS current at rectifier output	T _C =80°C	60			A
I _{FSM}	Surge forward current	t _p = 10ms, T _{vj} =150°C	420			A
I ² t	I ² t-value	T _p = 10ms, T _{vj} =150°C	882			A ² s

Characteristic Values							
Symbol	Item	Conditions	Values			Unit	
			Min.	Typ.	Max.		
V _F	Continuous forward voltage	I _F =50A V _{GE} =0V	T _{vj} =25°C	-	1.98	-	V
			T _{vj} =125°C	-	1.79	-	
			T _{vj} =150°C	-	1.68	-	
I _R	Reverse current	V _R =1800V	T _{vj} =25°C	-	-	10	μA
			T _{vj} =125°C	-	-	-	
			T _{vj} =150°C	-	-	-	
R _{thJC}	Thermal resistance, junction to case	per diode	-	-	0.85	K/W	
R _{thCH}	Thermal resistance, case to heatsink	Per diode, λ _{grease} =1 W/(m • K)	-	0.465	-	K/W	
T _{vjop}	Temperature under switching conditions		-40		150	°C	

Note:

IGBT electrical characteristics according to IEC 60747 – 9

Diode electrical characteristics according to IEC 60747 – 2

NTC Thermistor Characteristics

Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
R ₂₅	Rated resistance	T _C =25°C	-	5	-	kΩ
ΔR/R	Deviation of resistance	T _C =100°C, R ₁₀₀ =493Ω	-5	-	5	%
P ₂₅	Power dissipation	T _C =25°C	-	-	20	mW
B _{25/50}	B-constant	R ₂ =R ₂₅ exp[B _{25/50} (1/T ₂ -1/(298.15K))]	-	3375	-	K
B _{25/80}	B-constant	R ₂ =R ₂₅ exp[B _{25/80} (1/T ₂ -1/(298.15K))]	-	3411	-	
B _{25/100}	B-constant	R ₂ =R ₂₅ exp[B _{25/100} (1/T ₂ -1/(298.15K))]	-	3433	-	

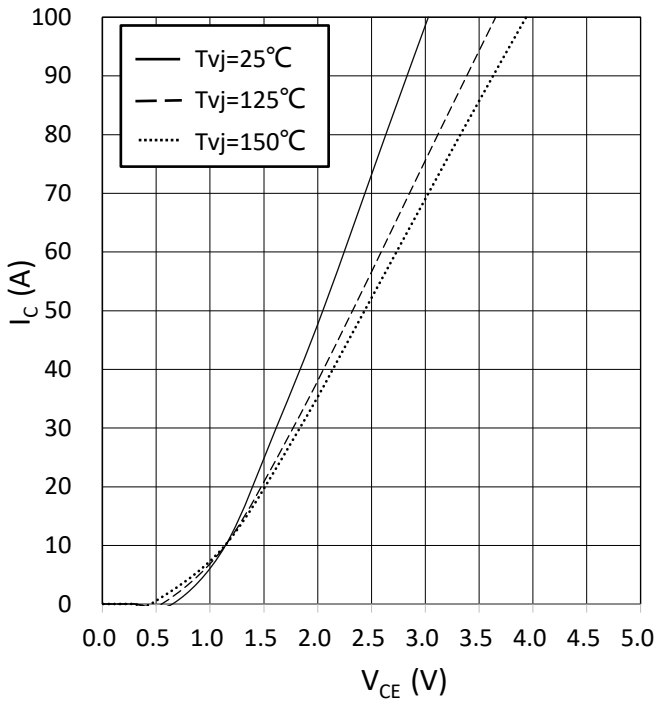
Module

Symbol	Item	Conditions	Rating			Unit
V _{ISOL}	Isolation voltage	Terminals to baseplate, RMS,f=50Hz,t=1min	2500			V
T _{vjmax}	Maximum junction temperature	-	175			°C
T _{vjop}	Operating junction temperature	Continuous operationg(under switching)	-40~150			°C
T _{stg}	Storage temperature	-	-40~125			°C
Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
Ms	Mounting torque	Mounting to heat sink,M5 screw	3	-	6	Nm
ds	Creepage distance	Terminal to terminal	-	-	-	mm
		Terminal to base plate	-	10	-	
da	Clearance	Terminal to terminal	-	-	-	mm
		Terminal to base plate	-	7.5	-	
m	Weight	-	-	173	-	g

output characteristic IGBT,Inverter (typical)

$I_C = f(V_{CE})$

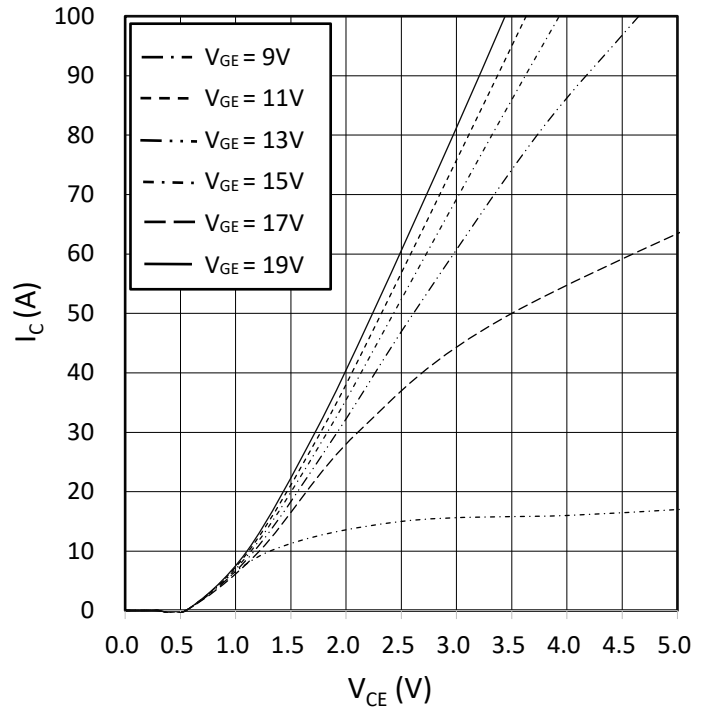
$V_{GE} = 15V$



output characteristic IGBT,Inverter (typical)

$I_C = f(V_{CE})$

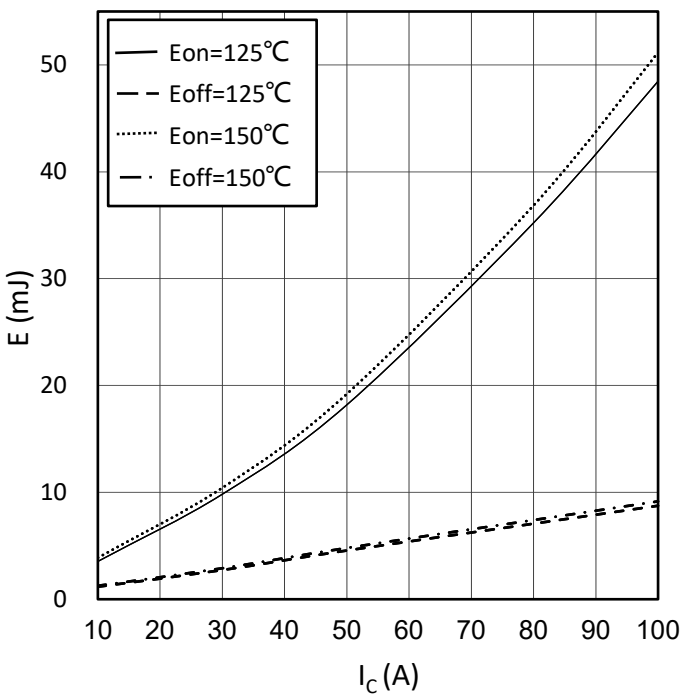
$T_{vj} = 150^\circ C$



switching losses IGBT,Inverter (typical)

$E_{on} = f(I_C), E_{off} = f(I_C)$

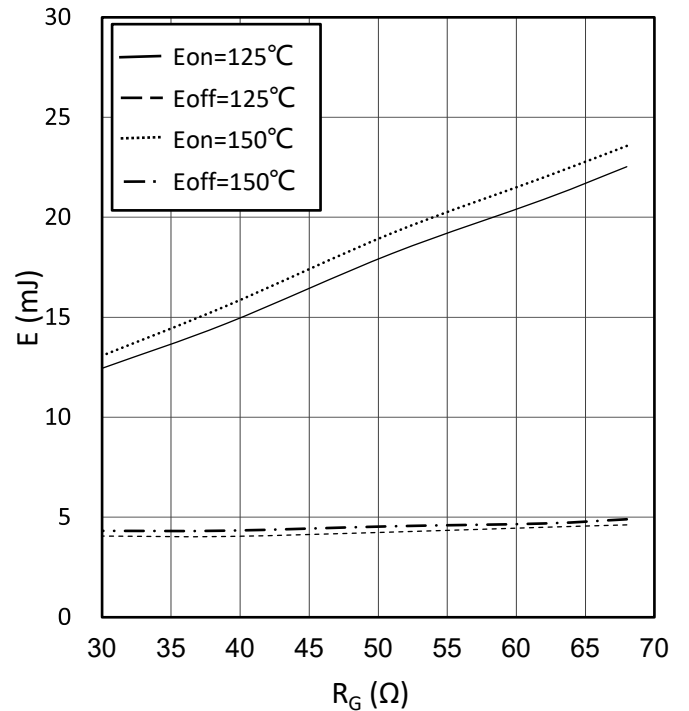
$V_{GE} = \pm 15V, R_{Gon} = 51\Omega, R_{Goff} = 51\Omega, V_{CE} = 600V$



switching losses IGBT,Inverter (typical)

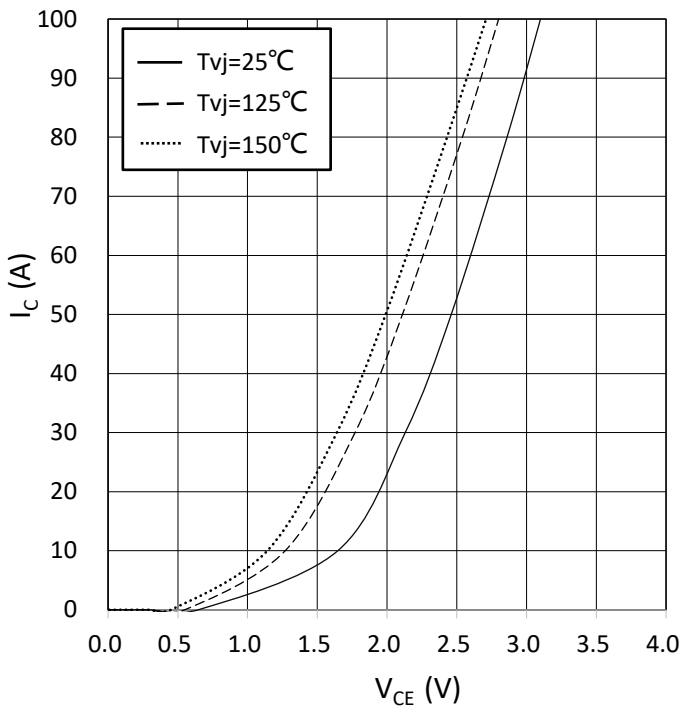
$E_{on} = f(R_G), E_{off} = f(R_G)$

$V_{GE} = \pm 15V, I_C = 50A, V_{CE} = 600V$



forward characteristic of Diode, Inverter (typical)

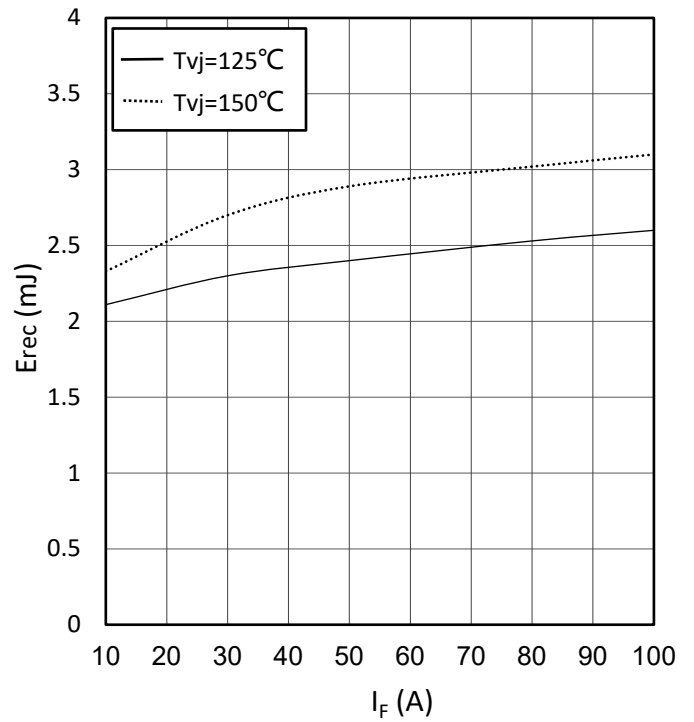
$I_F = f(V_F)$



switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$

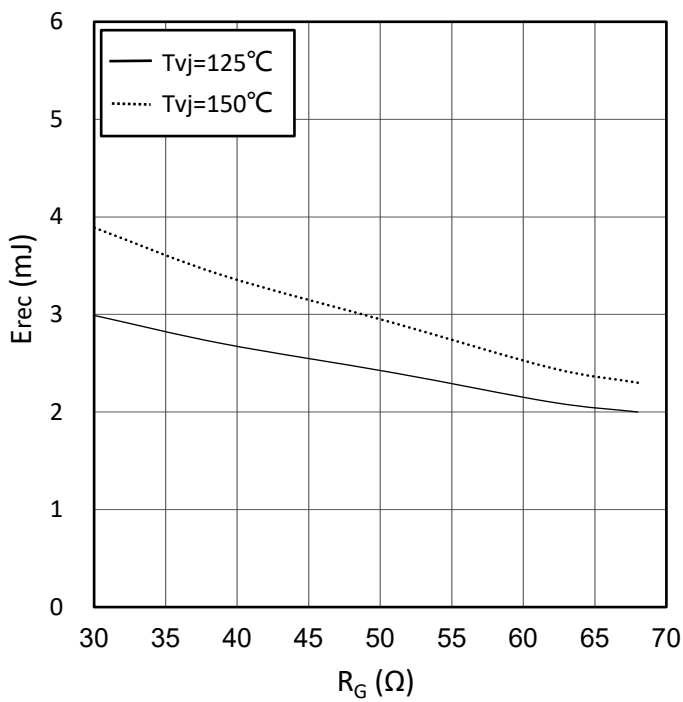
$R_{Gon} = 51\Omega, V_{CE} = 600V$



switching losses Diode, Inverter (typical)

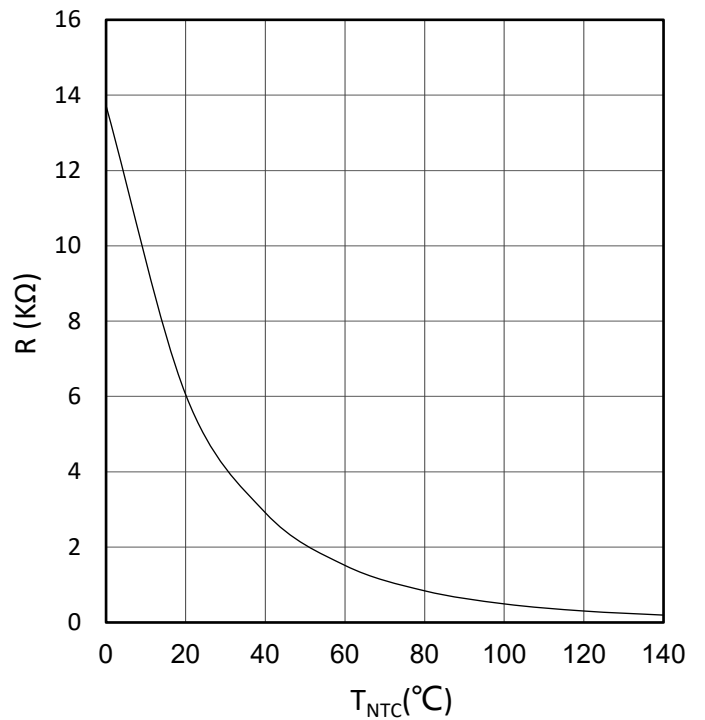
$E_{rec} = f(R_G)$

$I_F = 50A, V_{CE} = 600V$

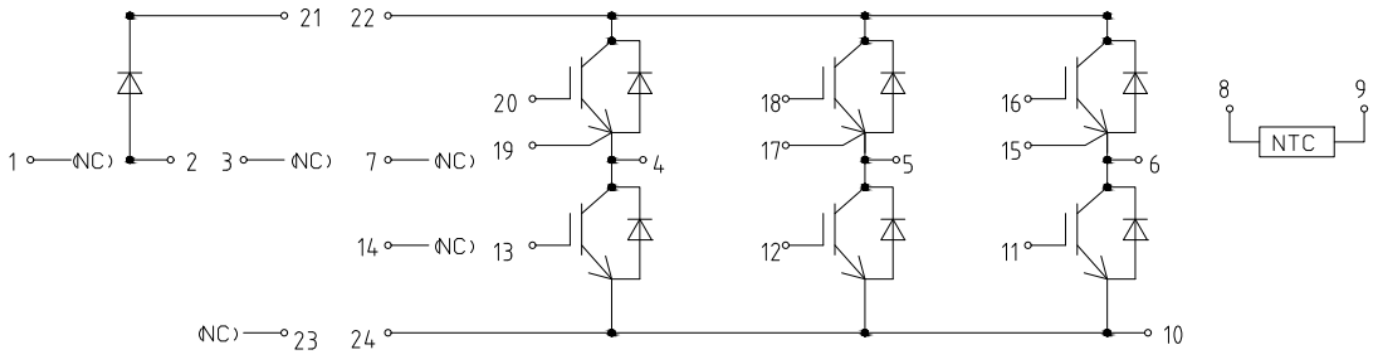


NTC-Thermistor-temperature characteristic(typical)

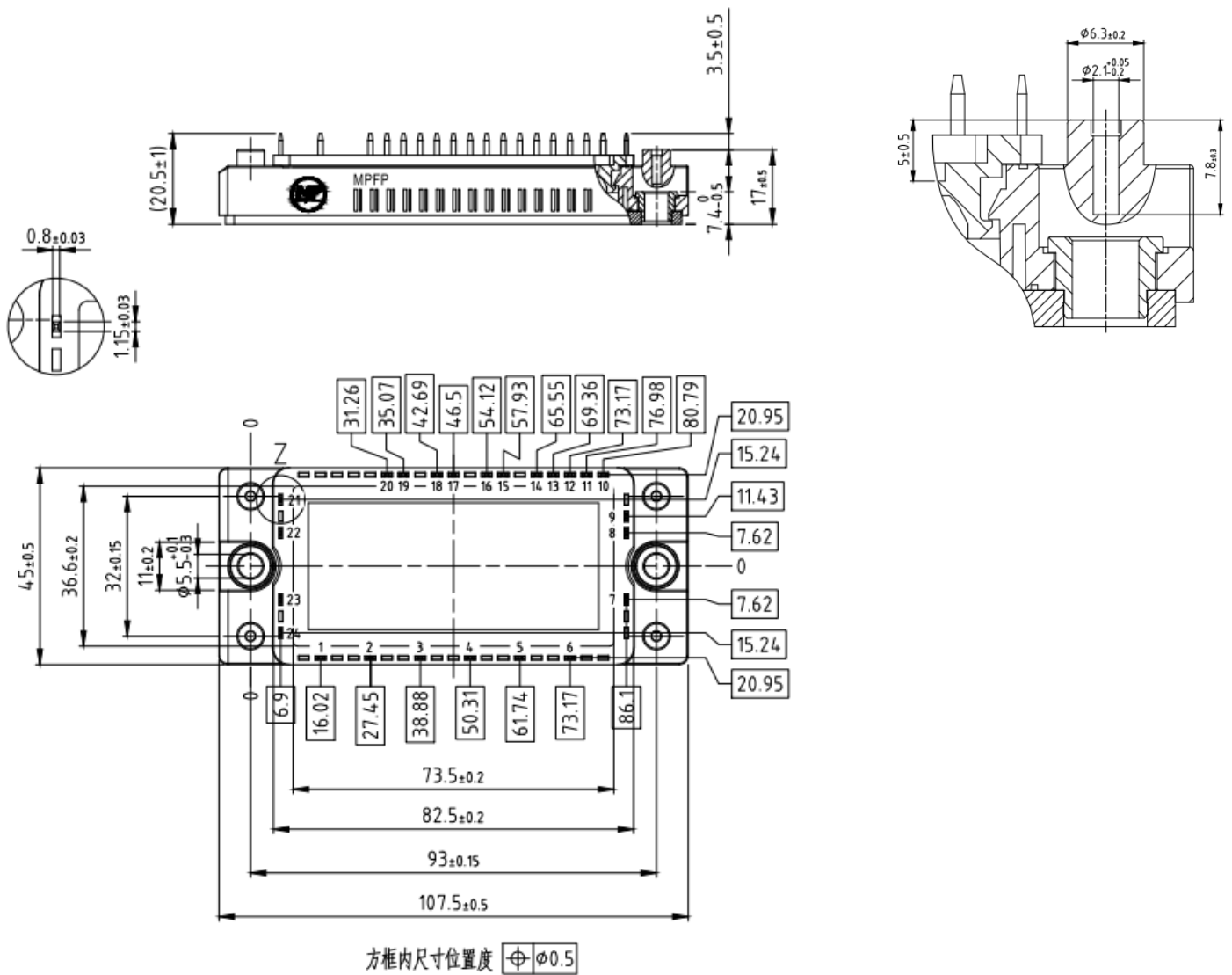
$R = f(T)$



Circuit Diagram



Package Outlines



使用条件和条款

- 1、本数据手册给出的产品规格、特性、数据、材料和结构如有更改，则会根据相关流程通知客户；
- 2、本数据手册中提供的相关数据是产品的典型值，实际出厂测试可能与典型值存在一定偏差，我司保证这种偏差不会影响产品的正常使用；
- 3、本数据手册仅作为客户应用本公司产品时的参考资料，本公司不承诺允许使用与本数据手册中描述的产品信息相关的知识产权或任何第三方产权；
- 4、本公司致力于提高产品质量和可靠性，但所有半导体产品仍有失效的可能性。客户在设备中使用本公司产品时，要求采取足够的安全措施，以防止产品出现故障时设备发生包括（但不限于）人身伤害、火灾或其他财产损失等事故；
- 5、本产品是静电敏感器件，在产品的安装，测试，包装，储存和运输过程中必须采取防静电措施；
- 6、由于技术需要，我们的产品可能含有危险物质。如果需要查询类似问题请联系我们负责你的销售部门；
- 7、如果您计划将本产品用于对可靠性要求严格的设备或系统或/和可能直接危害人类生命的设备或系统，包括但不限于医疗，救生，生命维持，太空设备，航空设备和核设备等，请提前告知我司；
- 8、本数据手册中包含的数据仅供专业技术人员使用。客户的技术部门有责任评估产品是否适宜于其预期的应用以及针对该应用而言本数据手册中所提供的信息是否充分。如果您对本数据手册中的任何部分有任何疑问，请在使用本产品之前联系本公司。本公司对因未按照上述条件和条款使用产品而造成的任何损失概不负责。

产品命名规则

