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

$t_{d(on)}$	Turn-on delay time	V_{CC}=600V I_C=50A V_{GE}=±15V $R_{G(on)}$=51Ω $R_{G(off)}$=51Ω	T_{vj}=25℃	-	245	-	ns
			T_{vj}=125℃	-	212	-	
			T_{vj}=150℃	-	208	-	
t_r	Rise time		T_{vj}=25℃	-	127	-	
			T_{vj}=125℃	-	146	-	
			T_{vj}=150℃	-	145	-	
$t_{d(off)}$	Turn-off delay time		T_{vj}=25℃	-	474	-	
			T_{vj}=125℃	-	748	-	
			T_{vj}=150℃	-	1188	-	
t_f	Fall time		T_{vj}=25℃	-	411	-	
			T_{vj}=125℃	-	238	-	
			T_{vj}=150℃	-	1257	-	
E_{on}	Turn-on energy (per pulse)	V_{CC}=600V，I_C=50A V_{GE}=±15V，$R_{G(on)}$=51Ω di/dt=1570A/μs(T_{vj}=25℃)	T_{vj}=25℃	-	14.39	-	mJ
			T_{vj}=125℃	-	18.19	-	
			T_{vj}=150℃	-	19.21	-	
E_{off}	Turn-off energy (per pulse)	V_{CC}=600V，I_C=50A V_{GE}=±15V，$R_{G(off)}$=51Ω du/dt=5500V/μs(T_{vj}=25℃)	T_{vj}=25℃	-	3.42	-	
			T_{vj}=125℃	-	4.56	-	
			T_{vj}=150℃	-	4.80	-	
SC data	Short-circuit current	V_{CC}=600V,V_{GE}≤15V,T_{vj}=25℃ V_{CES}≤1200V,t_P≤10μs		-	560	-	A
R_{thJC}	Thermal resistance,junction to case	Per IGBT		-	-	0.54	K/W
R_{thCH}	Thermal resistance,case to heatsink	Per IGBT, λgrease=1W/(m·K)		-	0.295	-	K/W
T_{vjop}	Temperature under switching conditions			-40		150	℃

Diode，Inverter

Maximum Rated Values

Symbol	Item	Conditions	Rating	Unit
V_{RRM}	Repetitive peak reverse voltage	T_{vj}=25℃	1200	V
I_F	Forward current,DC	T_C=80℃,T_{vj}=175℃	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℃	667	A^2s

Characteristic Values

				Min.	Typ.	Max.	
V_F	Continuous forward voltage	I_F=50A V_{GE}=0V	T_{vj}=25℃	-	2.31	-	V
			T_{vj}=125℃	-	2.11	-	
			T_{vj}=150℃	-	1.99	-	
I_{RM}	Peak reverse recovery current	V_R=600V I_F=50A V_{GE}=-15V -di_F/dt=1560A/μs (T_{vj}=25℃)	T_{vj}=25℃	-	21.5	-	A
			T_{vj}=125℃	-	28.0	-	
			T_{vj}=150℃	-	28.9	-	
t_{rr}	Reverse recovery time		T_{vj}=25℃	-	86.3	-	ns
			T_{vj}=125℃	-	169	-	
			T_{vj}=150℃	-	228	-	
Q_r	Recovered charge		T_{vj}=25℃	-	0.92	-	μC
			T_{vj}=125℃	-	6.89	-	
			T_{vj}=150℃	-	9.74	-	

E_{rec}	Reverse recovery energy		T_{vj}=25℃	-	1.9	-	mJ
			T_{vj}=125℃	-	2.4	-	
			T_{vj}=150℃	-	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	℃

Diode, Converter

Maximum Rated Values					
Symbol	Item	Conditions		Rating	Unit
V_{RRM}	Repetitive peak reverse voltage	T_{vj}=25℃		1800	V
I_{FRMSM}	Maximum RMS forward current per chip	T_C=80℃		50	A
I_{RMSM}	Maximum RMS current at rectifier output	T_C=80℃		60	A
I_{FSM}	Surge forward current	t_p = 10ms, T_{vj}=150℃		420	A
I^2t	I^2t-value	T_p = 10ms,T_{vj}=150℃		882	A^2s

Characteristic Values							
Symbol	Item	Conditions		Values			Unit
				Min.	Typ.	Max.	
V_F	Continuous forward voltage	I_F=50A V_{GE}=0V	T_{vj}=25℃	-	1.98	-	V
			T_{vj}=125℃	-	1.79	-	
			T_{vj}=150℃	-	1.68	-	
I_R	Reverse current	V_R=1800V	T_{vj}=25℃	-	-	10	μA
			T_{vj}=125℃	-	-	-	
			T_{vj}=150℃	-	-	-	
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	℃

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℃	-	5	-	kΩ
ΔR/R	Deviation of resistance	T_C=100℃,R_{100}=493Ω	-5	-	5	%
P_{25}	Power dissipation	T_C=25℃	-	-	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	-	

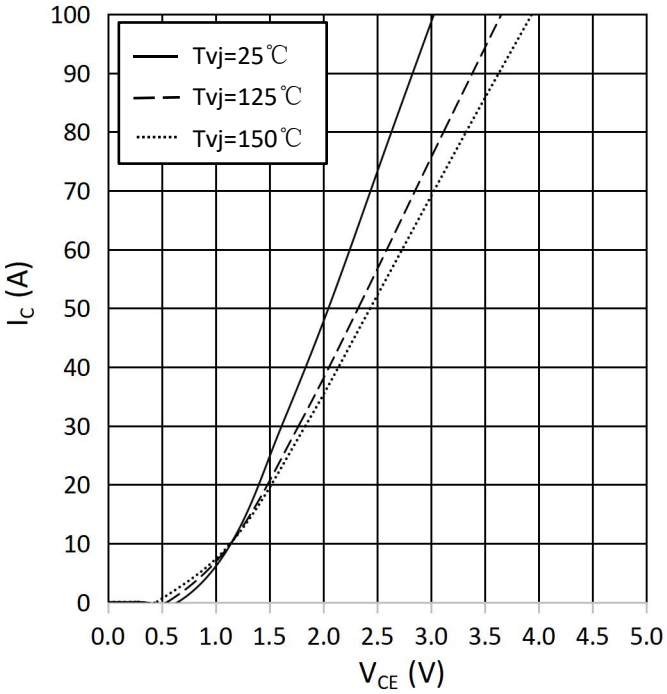
Module

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			℃
T_{vjop}	Operating junction temperature	Continuous operationg(under switching)	-40~150			℃
T_{stg}	Storage temperature	-	-40~125			℃
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)

$I_C = f(V_{CE})$

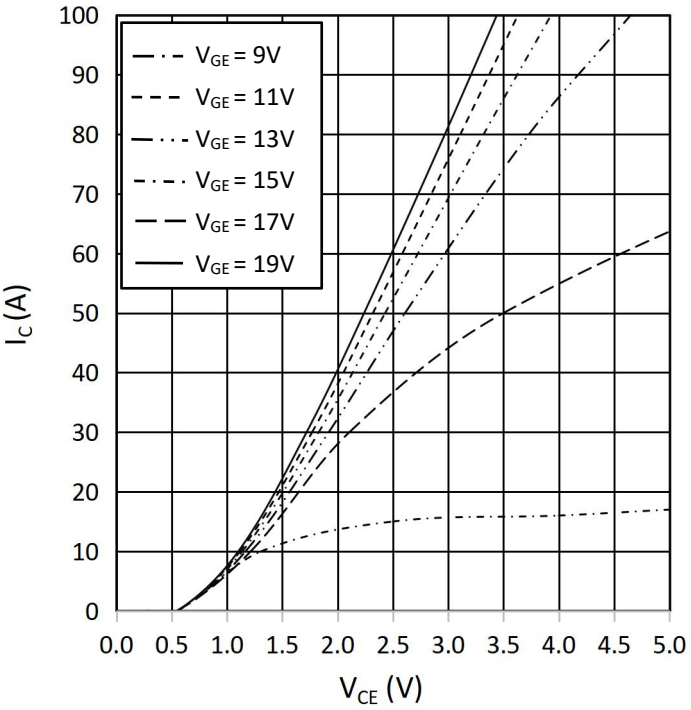
$V_{GE} = 15V$



output characteristic IGBT,Inverter (typical)

$I_C = f(V_{CE})$

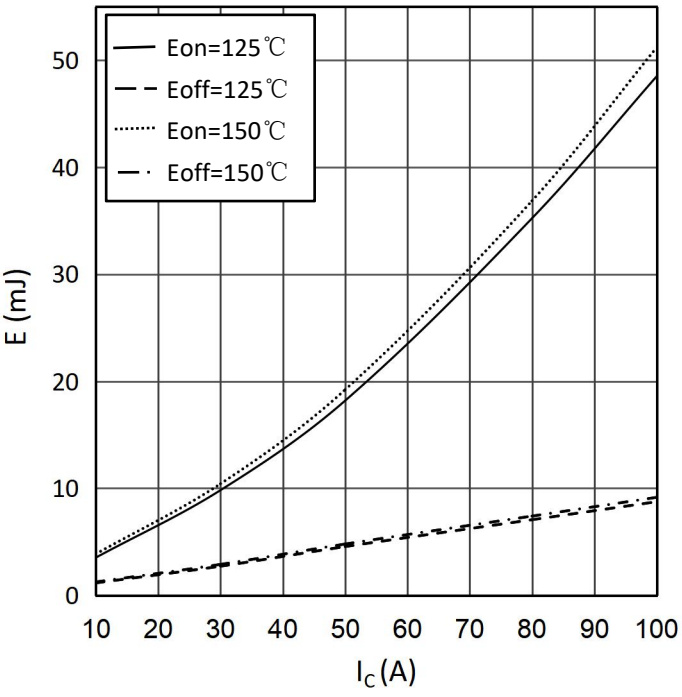
$T_{vj} = 150°C$



switching losses IGBT,Inverter (typical)

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

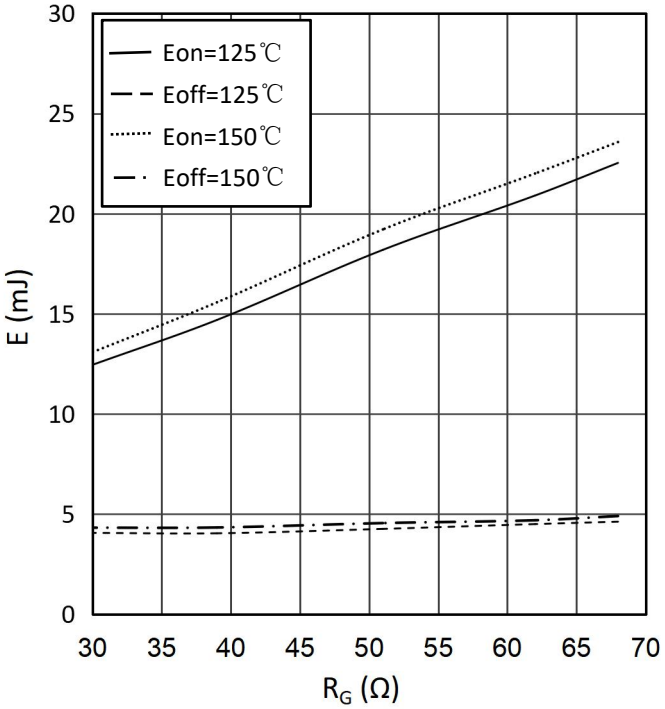
$V_{GE} = \pm 15V$, $R_{Gon} = 51\Omega$, $R_{Goff} = 51\Omega$, $V_{CE} = 600V$



switching losses IGBT,Inverter (typical)

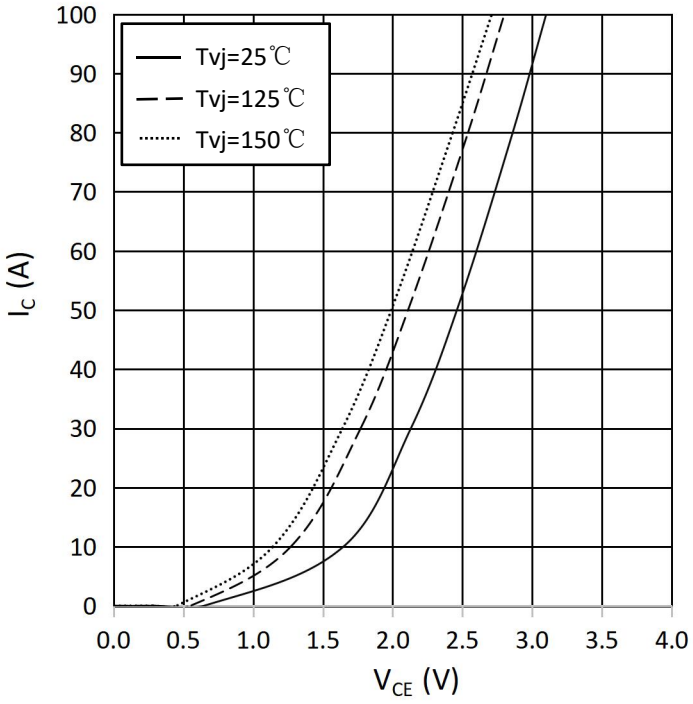
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$

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



forward characteristic of Diode, Inverter (typical)

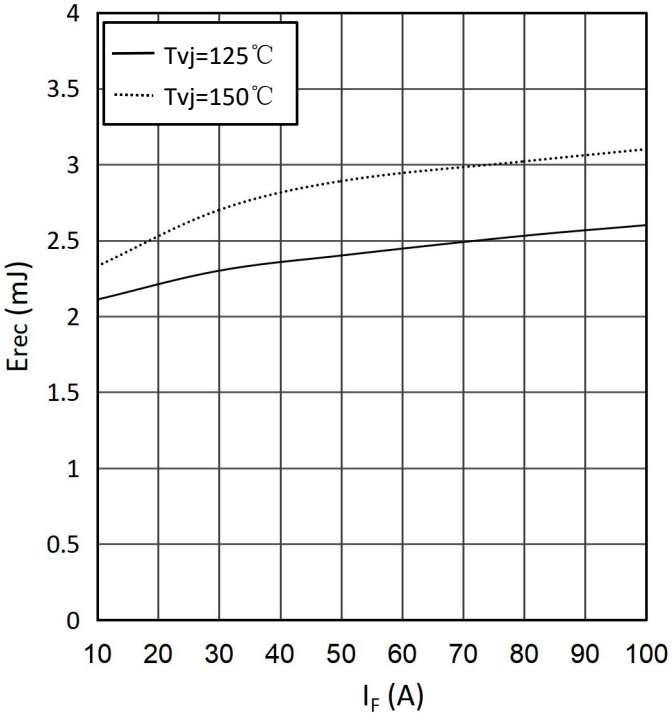
$I_F = f(V_F)$



switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$

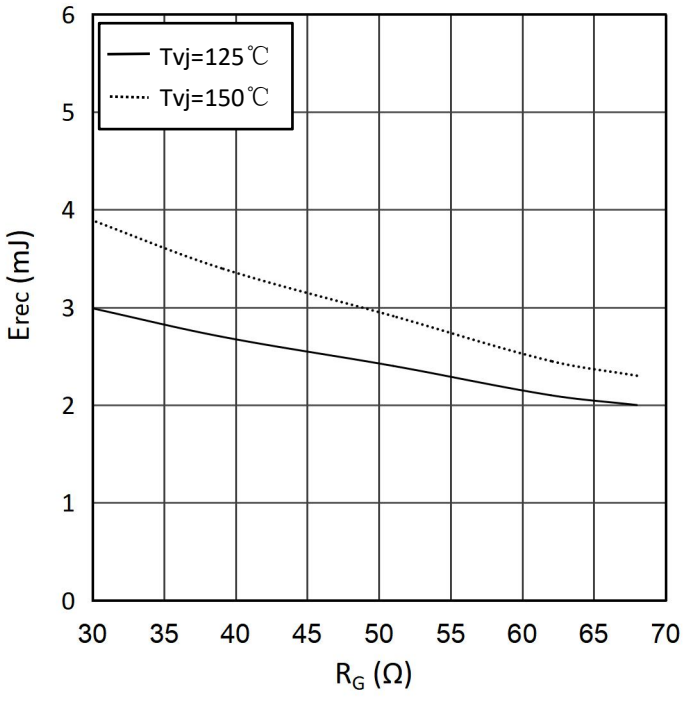
$R_{Gon} = 51\Omega$, $V_{CE} = 600$ V



switching losses Diode, Inverter (typical)

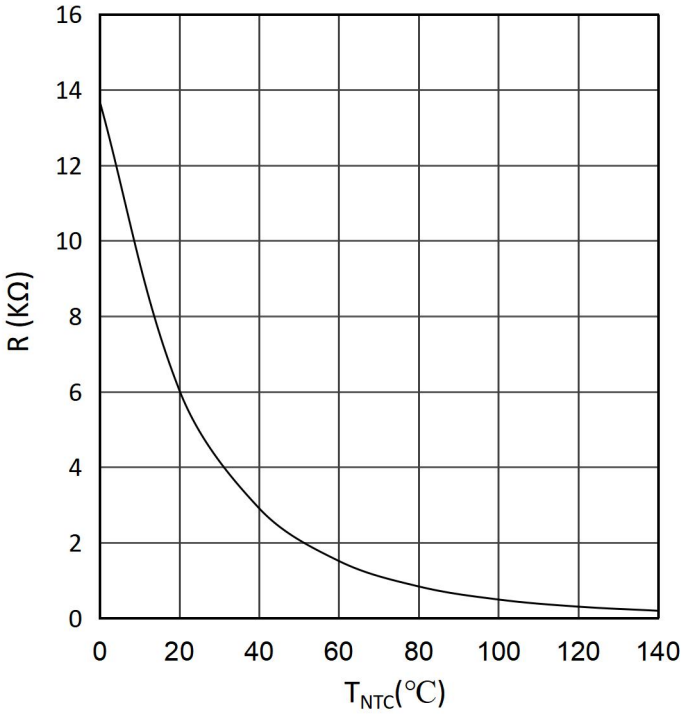
$E_{rec} = f(R_G)$

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

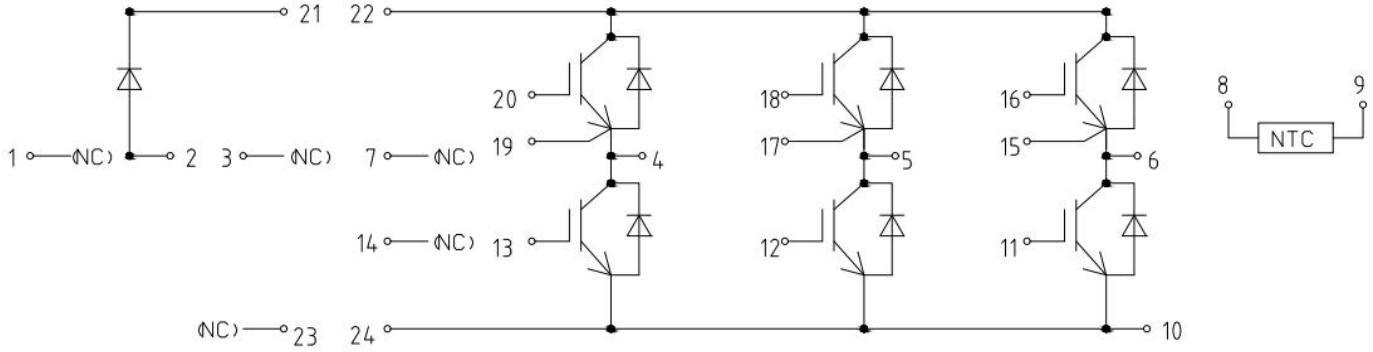


NTC-Thermistor-temperature characteristic(typical)

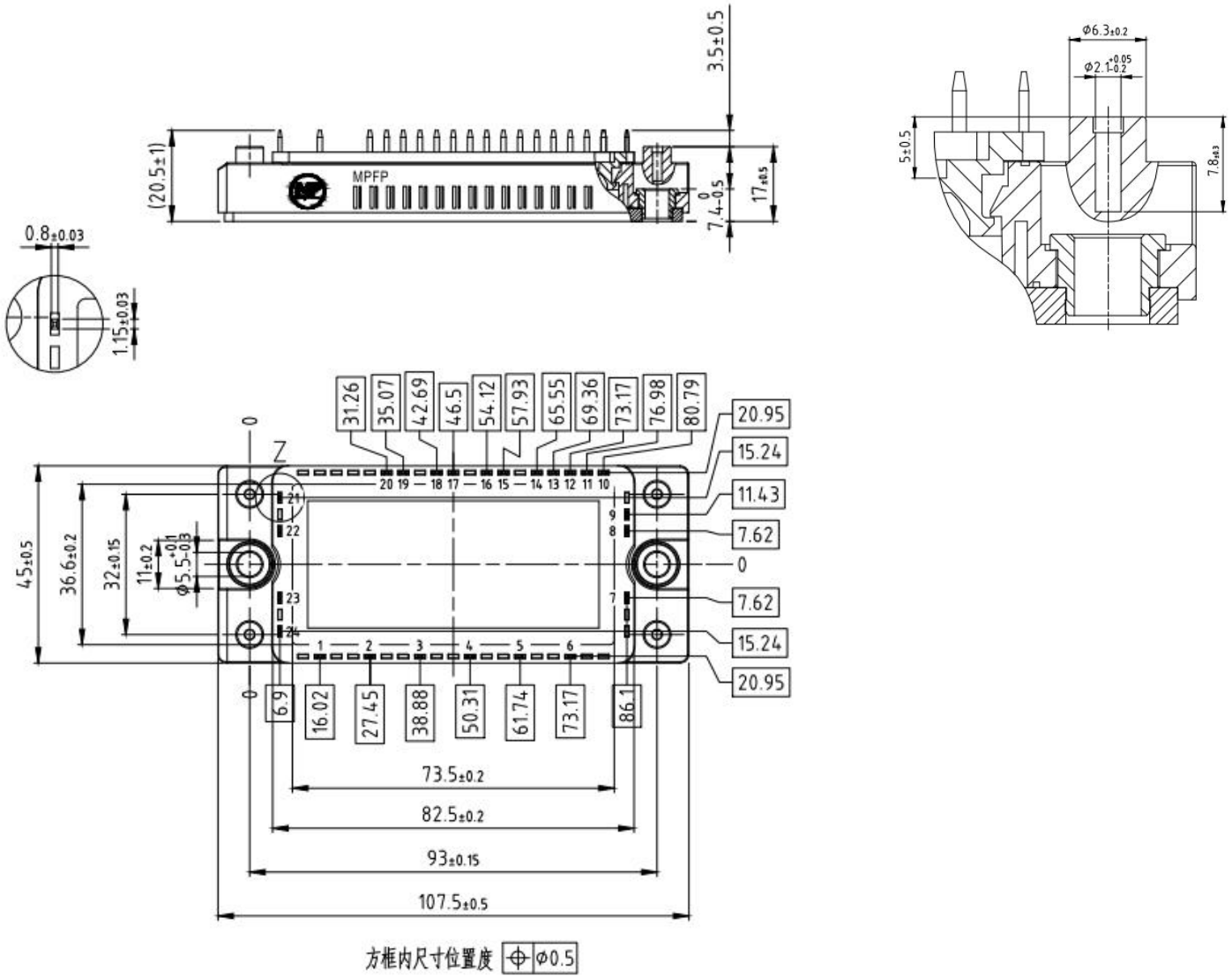
R=f (T)



Cricuit Diagram



Package Outlines



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