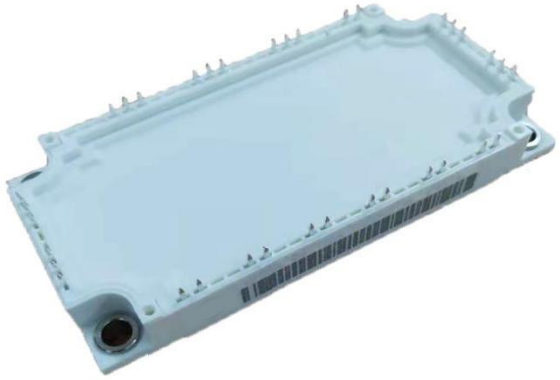
QMFS100R12TFF

1200V 100A IGBT Module

Electrical Features

- Trench/ Fieldstop IGBT
- V_{CEsat} with positive Temperature Coefficient
- Low V_{CEsat}



Typical Applications

- Auxiliary inverters
- Motor drives
- Servo drives

Mechanical Features

- High power density
- Integrated NTC temperature sensor
- Copper base plate
- Solder contact technology
- Standard housing

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℃	100	A
I_{CRM}	Repetitive peak collector current	t_p= 1ms	200	A
P_{tot}	Total power dissipation	T_C=25℃ ,T_{vj}= 175℃	517	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=3.8mA,V_{CE}=V_{GE},T_{vj}=25℃		5.2	5.86	6.2	V
V_{CEsat}	Collector-emitter saturation voltage	I_C= 100A V_{GE}= 15V	T_{vj}=25℃	-	1.81	-	V
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
C_{ies}	Input capacitance	V_{CE}=25V,V_{GE}=0V f=1MHz,T_{vj}=25℃		-	7.07	-	nF
C_{oes}	Output capacitance			-	0.46	-	
C_{res}	Reverse transfer capacitance			-	0.24	-	
Q_G	Gate charge	V_{CC}=600V, I_C= 100A V_{GE}=- 15...+ 15V,T_{vj}=25℃		-	640	-	nC
R_g	Internal gate resistance	T_{vj}=25℃		-	1.8	-	Ω

$t_{d(on)}$	Turn-on delay time	V_{CC}=600V I_C= 100A V_{GE}=±15V $R_{G(on)}$= 1.6Ω $R_{G(off)}$= 1.6Ω	T_{vj}=25℃	-	200	-	ns
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
t_r	Rise time		T_{vj}=25℃	-	246	-	
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
$t_{d(off)}$	Turn-off delay time		T_{vj}=25℃	-	262	-	
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
t_f	Fall time		T_{vj}=25℃	-	234	-	
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
E_{on}	Turn-on energy (per pulse)		T_{vj}=25℃	-	2.23	-	mJ
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
E_{off}	Turn-off energy (per pulse)		T_{vj}=25℃	-	6.9	-	
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
SC data	Short-circuit current	V_{CC}=600V,V_{GE}≤ 15V,T_{vj}=25℃ V_{CES}≤ 1200V,t_P≤ 10μs		-	1037	-	A
R_{thJC}	Thermal resistance,junction to case	Per IGBT		-	-	0.29	K/W
R_{thCH}	Thermalresistance,case to heatsink	Per IGBT λgrease= 1W/(m·K)		-	0.085	-	K/W
Tvjop	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		100	A
I_{FRM}	Repetitive peak forward current	t_p= 1ms	200	A
I^2t	I^2t-value	V_R=0V,t_p= 10ms,T_{vj}= 150℃	1500	A^2s

Characteristic Values

V_F	Continuous forward voltage	I_F= 100A V_{GE}=0V	T_{vj}=25℃	-	1.83	-	V
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
I_{RM}	Peak reverse recovery current	V_R=600V I_F= 100A V_{GE}=- 15V	T_{vj}=25℃	-	145	-	A
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
t_{rr}	Reverse recovery time		T_{vj}=25℃	-	136	-	ns
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
Q_r	Recovered charge		T_{vj}=25℃	-	8.9	-	μC
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	

E_{rec}	Reverse recovery energy		T_{vj}=25℃	-	6 07	-	mJ
			T_{vj}= 125℃	-	-	-	
			T_{vj}= 150℃	-	-	-	
R_{thJC}	Thermal resistance, junction to case	per diode		-	-	0.5	K/W
R_{thCH}	Thermal resistance, case to heatsink	per diode， λ_{grease}= 1 W/(m • K)		-	0. 145	-	K/W
Tvjop	Temperature under switching conditions			-40		150	℃

Note:
IGBT electrical characteristics according to IEC 60747 – 9
Diode electrical characteristics according to IEC 60747 – 2

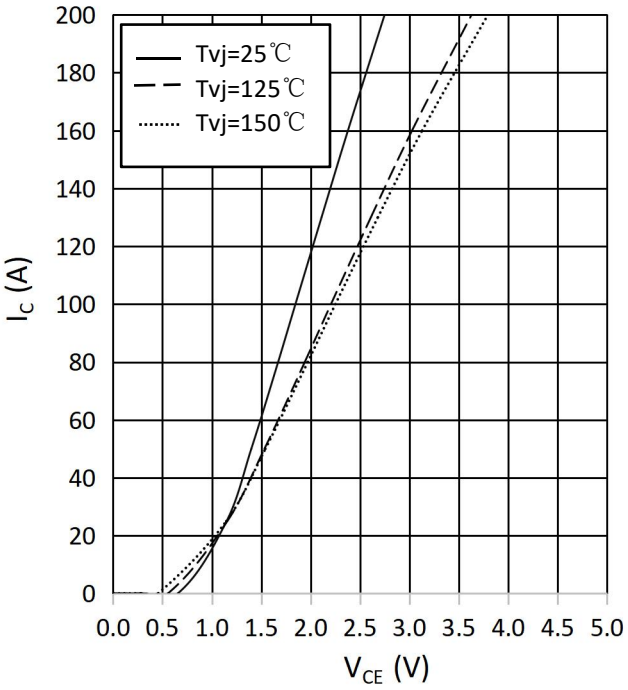
Module

Symbol	Item	Conditions	Rating			Unit
V_{ISOL}	Isolation voltage	Terminals to baseplate，RMS,f=50Hz,t=1min	2500			V
$T_{vj\ max}$	Maximum junction temperature	-	175			℃
$T_{vj\ op}$	Operatingjunction temperature	Continuous operationg(underswitching)	-40~ 150			℃
T_{stg}	Storage temperature	-	-40~ 125			℃
Symbol	Item	Condition s	Values			Unit
			Min.	Typ.	Max.	
M	Mountingtorqueformodulmounting	-	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	-	-	290	-	g

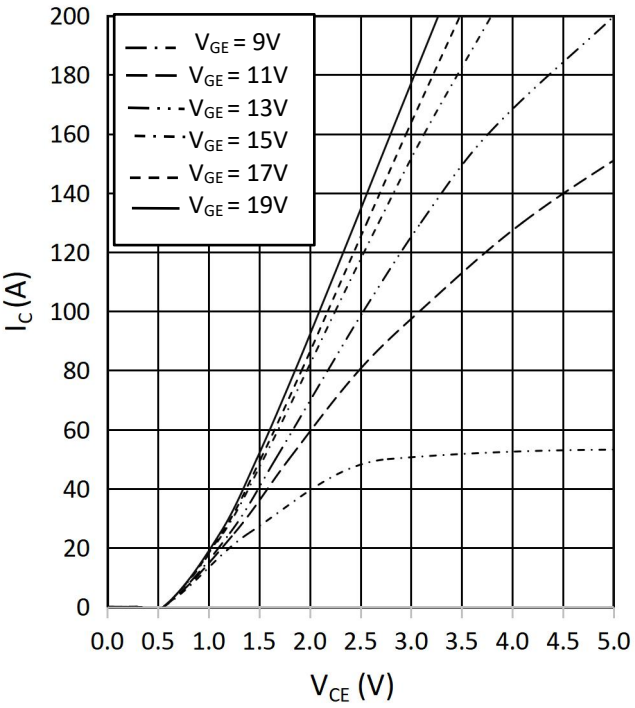
NTC Thermistor Characteristics

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	-	

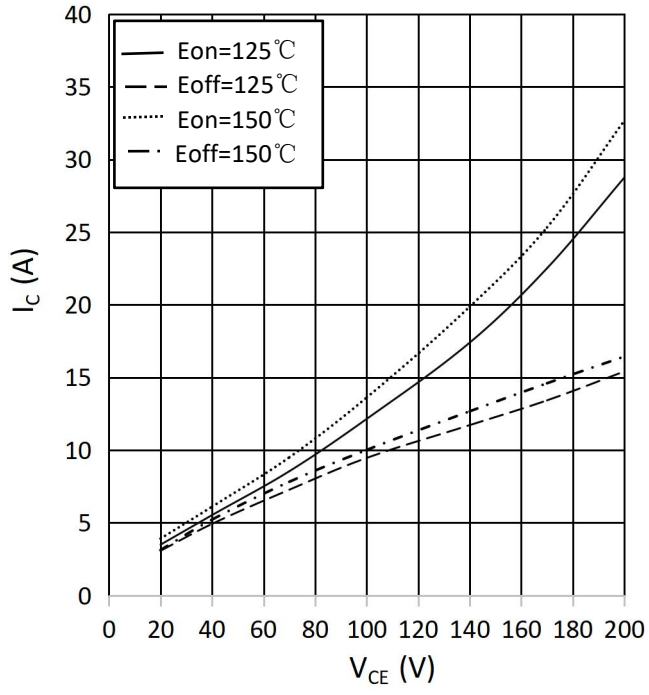
output characteristic IGBT,Inverter (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15V$



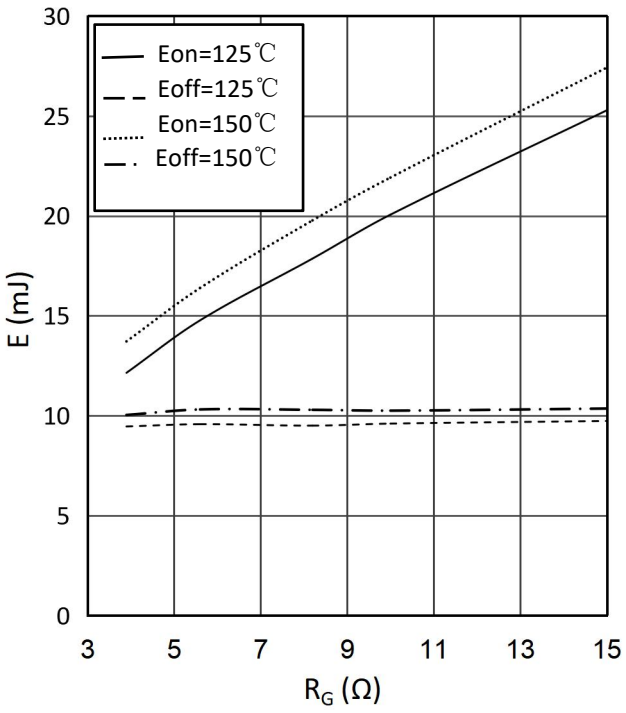
output characteristic IGBT,Inverter (typical)
$I_C = f(V_{CE})$
$T_{vj} = 150°C$



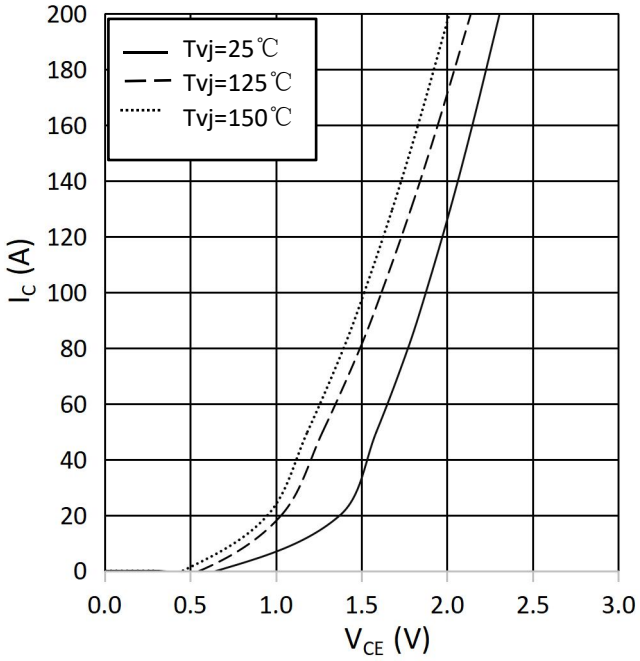
switching losses IGBT,Inverter (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
$V_{GE} = \pm 15V$, $R_{Gon} = 3.9\Omega$, $R_{Goff} = 3.9\Omega$, $V_{CE} = 600V$



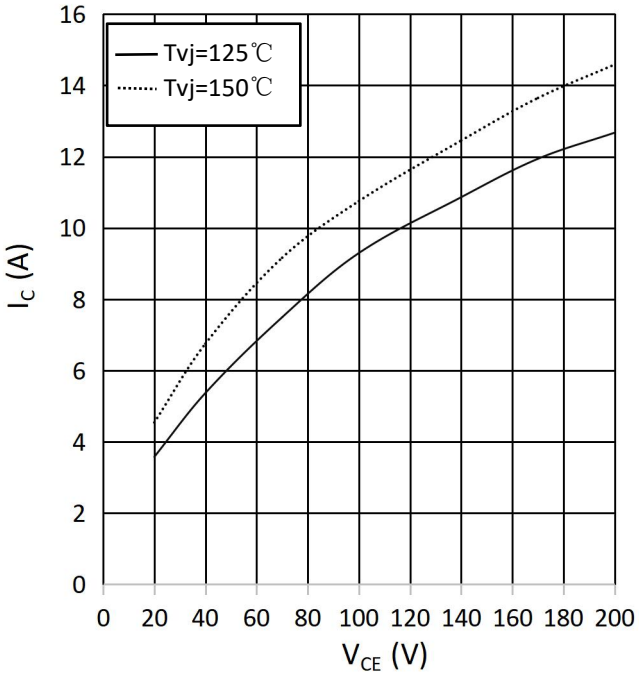
switching losses IGBT,Inverter (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
$V_{GE} = \pm 15V$, $I_C = 100A$, $V_{CE} = 600V$



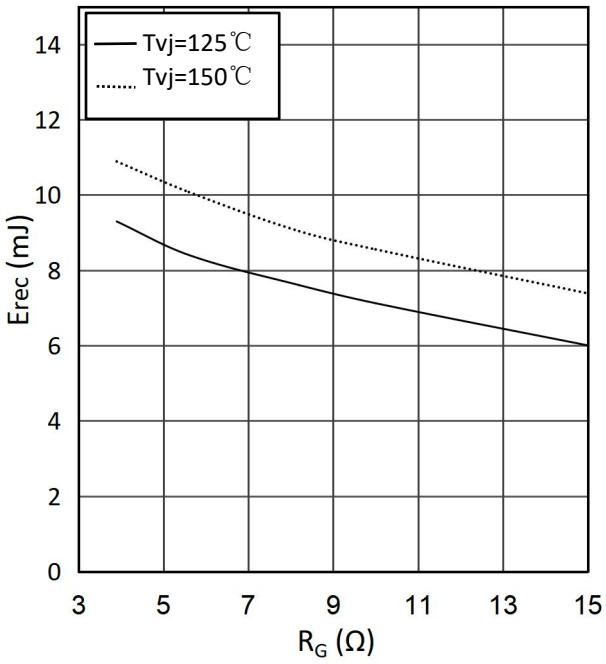
forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



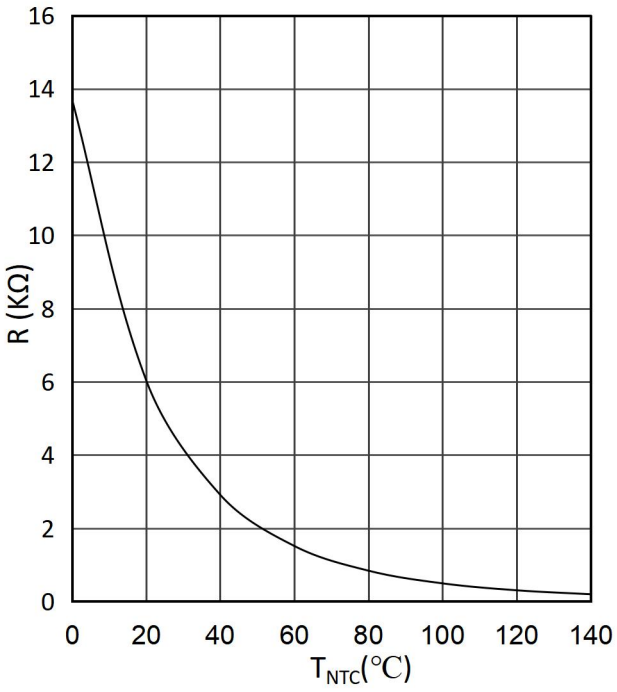
switching losses Diode, Inverter (typical)
$E_{rec} = f(I_F)$
$R_{Gon} = 3.9\Omega$, $V_{CE} = 600$ V



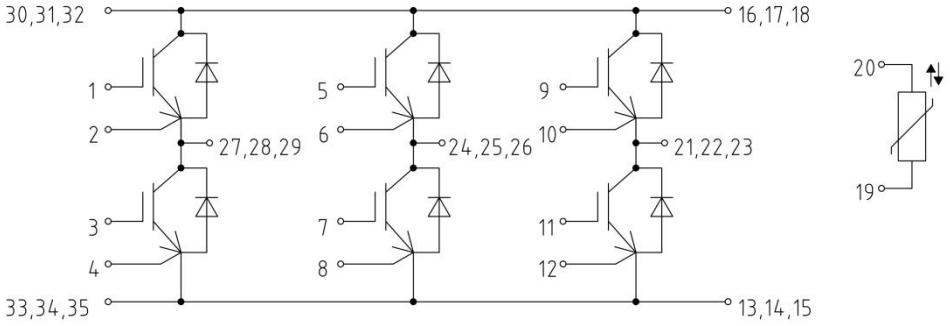
switching losses Diode, Inverter (typical)
$E_{rec} = f(R_G)$
$I_F = 100A$, $V_{CE} = 600V$



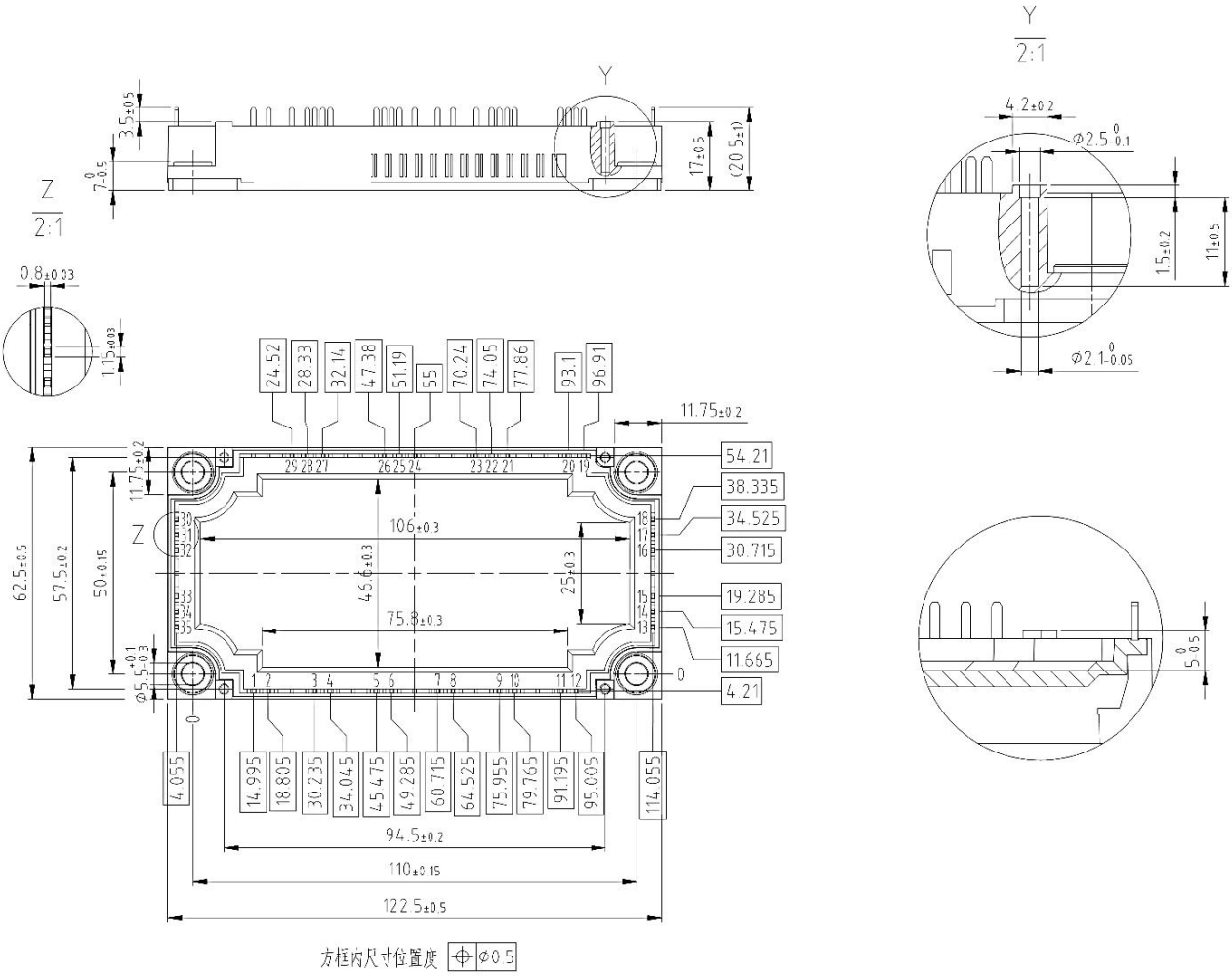
NTC-Thermistor-temperature characteristic(typical)
R=f (T)



Cricuit Diagram



Package Outlines



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