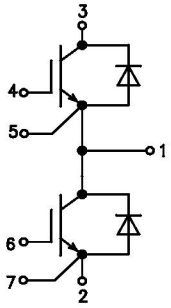
62MM Trench-Field Stop IGBT Moudle

DESCRIPTION

HGF300MB75XXX designed for a 125°C junction Operation temperature, the module accommodates a Half bridge configuration of Planar Trench-FS IGBT and matching emitter controlled diodes.



V_{CES}	V_{CEsat}		I_{CN}/I_{CRM}
750V	Tvj=25°C	1.5A	300A/600A
	Tvj= 125°C	1.7A	

FEATURES

- Low switching losses
- VCEsat positive temperature coefficient
- High robustness
- 750V Trench-FS technology
- Isolated Base Plate
- Copper Base Plate
- Standard Housing

APPLICATIONS

- UPS
- Inductive heating
- High frequency switching

MAXIMUM RATED VALUES(IGBT)

Parameter	Symbol	Conditions	Values	Units
Collector-emitter voltage	V_{CES}	Tvj=25°C, V_{GE}=0V	750	V
Continuous collector current	I_{CN}	Tc= 100°C, Tvjmax= 150°C	300	A
Repetitive peak collector current	I_{CRM}	tp= 1ms, Tvj=25°C	600	A
Gate-emitter peak voltage	V_{GES}	Tvj=25°C	±20	V
SC data	I_{SC}	VGE≤15V, VCC=800V VCEmax=VCES-LsCE*di/dt, tp≤10μs, Tvj= 125°C	1200	A
Total power dissipation	Ptot	Tc=25°C, Tvj max= 150°C	1250	W

1) Verified by characterization / design not by test.

CHARACTERISTICS VALUES(IGBT)

Parameter	Symbol	Conditions		Values			Units
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	$V_{CE\ sat}$	IC= 300A, VGE= 15V, Tvj=25℃			1.5	2.0	V
		IC= 300A, VGE= 15V, Tvj= 125℃			1.7		V
		IC= 300A, VGE= 15V, Tvj= 150℃			1.75		V
Gate-emitter threshold voltage	V_{GEth}	IC=4mA, V_{CE}=V_{GE} , Tvj=25℃		5	6	7	V
Gate charge	QG	VGE=-8V...+15V			470		nC
Integrated gate resistor	RG	Tvj=25℃			2.5		Ω
Input capacitance	Cies	Tvj=25℃,f= 1MHz,V_{GE}=0V,V_{CE}=25V			28.5		nF
Output capacitance	Coes	Tvj=25℃,f= 1MHz,V_{GE}=0V,V_{CE}=25V			1.9		nF
Reverse transfer capacitance	Cres	Tvj=25℃,f= 1MHz,V_{GE}=0V,V_{CE}=25V			0.85		nF
Collector-emitter cut-off current	I_{CES}	V_{CE}= 750V, V_{GE}=0V, Tvj=25℃				100	μA
Gate-emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V, Tvj=25℃				200	nA
	I_{GES}	V_{CE}=0V, V_{GE}=30V, Tvj=25℃				500	nA
Turn-on delay time, inductive load	td on	I_C= 300A,V_{CE}=400V, VGE=-8V/+15V RGon=5.1Ω ,RGoff=5Ω	Tvj=25℃		0.23		μs
			Tvj= 125℃		0.26		μs
			Tvj= 150℃		0.26		μs
Rise time,inductive load	tr		Tvj=25℃		0.08		μs
			Tvj= 125℃		0.1		μs
			Tvj= 150℃		0.11		μs
Turn-off delay time,inductive load	td off		Tvj=25℃		0.53		μs
			Tvj= 125℃		0.65		μs
			Tvj= 150℃		0.68		μs
Fall time, inductive load	tf		Tvj=25℃		0.11		μs
			Tvj= 125℃		0.13		μs
			Tvj= 150℃		0.14		μs
Turn-on energy loss per pulse	Eon	I_C= 300A,V_{CE}=400V, VGE=-8V/+15V RGon=5.1Ω ,RGoff=5Ω Ls=35nH	Tvj=25℃		40.5		mJ
			Tvj= 125℃		52		mJ
			Tvj= 150℃		56		mJ
Turn-off energy loss per pulse	Eoff	di/dt=900A/μs (T_{vj}= 150°C), du/dt=1000V/μs (T_{vj}=150°C)	Tvj=25℃		21.1		mJ
			Tvj=125℃		32.4		mJ
			Tvj= 150℃		38.2		mJ
Thermal resistance, junction to heatsick	R_{thJc}	per IGBT				0.12	K/W

MAXIMUM RATED VALUES(FRD)

Parameter	Symbol	Conditions	Values	Units
Repetitive peak reverse voltage	V_{RRM}	Tvj =25°C	750	V
Continuous forward current	IF	TC=100°C,Tvjmax=150°C	300	A
Maximum repetitive forward current	I_{FRM}	Pulse, tp = 1ms	600	A
I2t-value	I2t	V_R =0V, tp = 10ms, Tvj = 125°C	14000	A2 s

CHARACTERISTICS VALUES(FRD)

Parameter	Symbol	Conditions		Values			Units
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F=300A, V_{GE}=0V,	Tvj=25°C		1.33	1.8	V
			Tvj= 125°C		1.38		V
			Tvj= 150°C		1.43		V
Peak reverse recovery current	IRM	I_F=300A, V_R=400V, V_{GE}=-8V, di_F/dt=500A/μs (T_{vj}=150°C)	Tvj=25°C		120		A
			Tvj= 125°C		185		A
			Tvj= 150°C		195		A
Recovered charge	Qr		Tvj=25°C		15.2		μC
			Tvj= 125°C		22.5		μC
			Tvj= 150°C		30.3		μC
Reverse recovery energy	Erec		Tvj=25°C		4.4		mJ
			Tvj= 125°C		7.2		mJ
			Tvj= 150°C		8.9		mJ
Thermal resistance, junction to case	R_{thJC}	per FRD				0.15	K/W

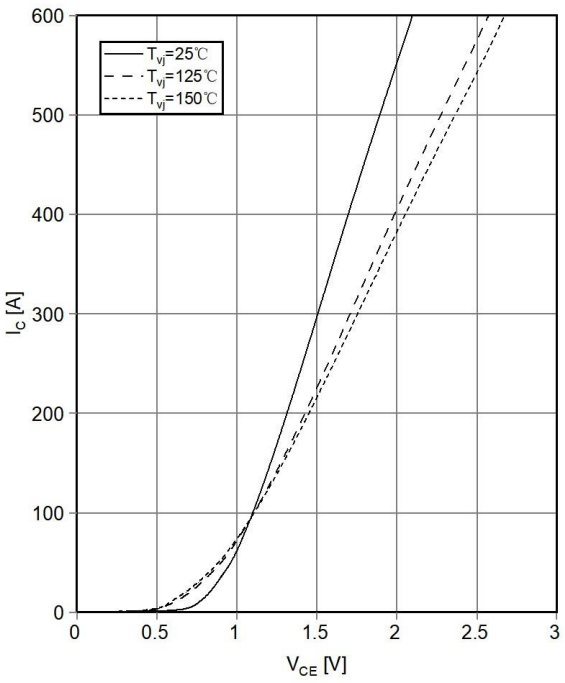
CHARACTERISTICS VALUES(MODULE)

Parameter	Symbol	Conditions	Values			Units
			Min.	Typ.	Max.	
Maximum junction temperature	Tvj max				150	°C
Temperature under switching conditions	Tvj op		-40		150	°C
Storage temperature	Tstg		-40		125	°C
Stray inductance module	LsCE			20		nH
Module lead resistance, terminals-chip	$R_{CC'+EE}$	Tvj=25°C, per switch		0.7		mΩ
Isolation test voltage	Visol	AC, RMS, f=50Hz, t= 1min		2.5		kV

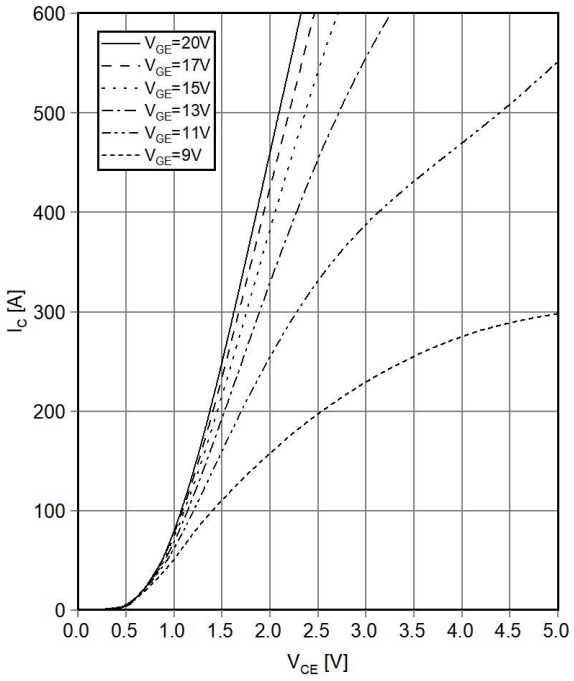
Creepage distance	ds	Terminal to terminal		29		mm
		Terminal to base		24		mm
Clearance distance in air	da	Terminal to terminal		24		mm
		Terminal to base		11		mm
Comperative tracking index	CTI			>400		
Mounting torque for module mounting	M1	Screw M5	3	-	6	N·m
Terminal connection torque	M2	Screw M6	2.5	-	5	N·m
Internal isolation	-	Basic insulation (class1, IEC 61140)		Al_2O_3		-
Material of module baseplate	-	-		Cu+Ni		-
Dimensions	LxWxH	-		106.4x61.4x30.9		mm
Weight	G	-		339		g

CHARACTERISTICS DIAGRAMS

Output characteristic IGBT, Inverter(typical)
IC=f(VCE), VGE=15V

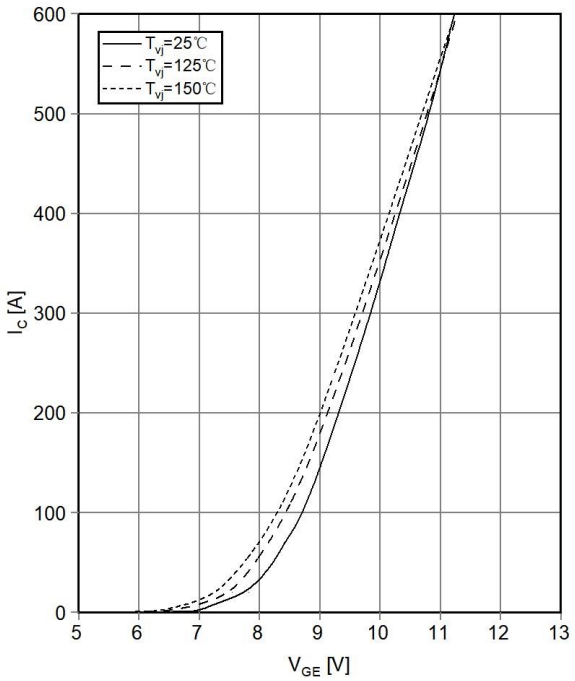


Output characteristic IGBT, Inverter(typical)
IC=f(VCE), Tvj=150°C



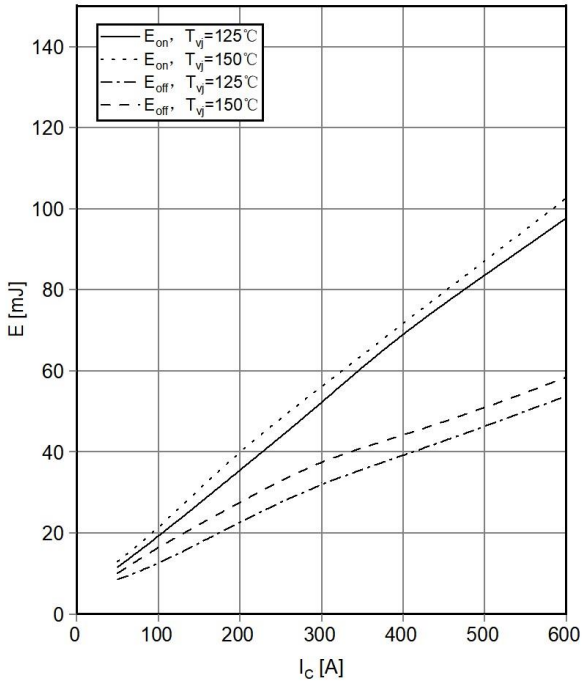
Transfer characteristic IGBT, Inverter(typical)

$I_C=f(V_{GE})$, V_{CE}=20V



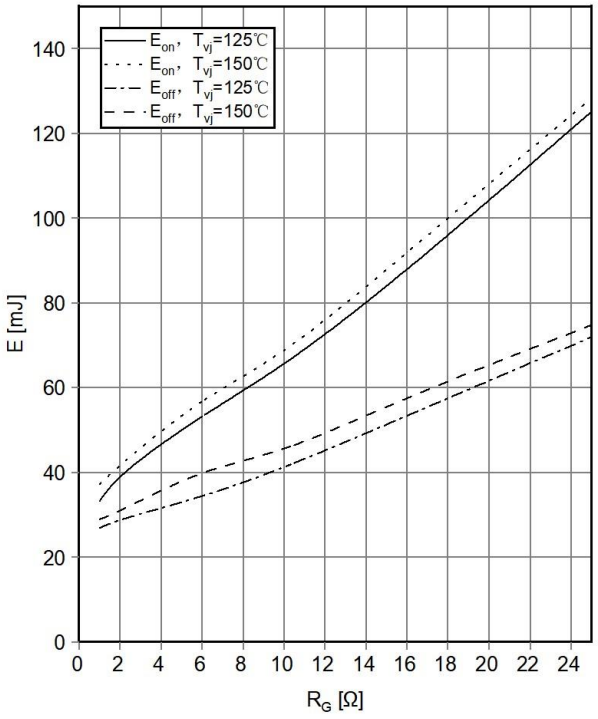
Switching losses IGBT, Inverter(typical)

$E_{on}=f(I_C)$, $E_{off}=f(I_C)$, V_{GE}= -8V/+15V, R_{Gon}=5.1Ω, R_{Goff}=5Ω, V_{CE}=400V



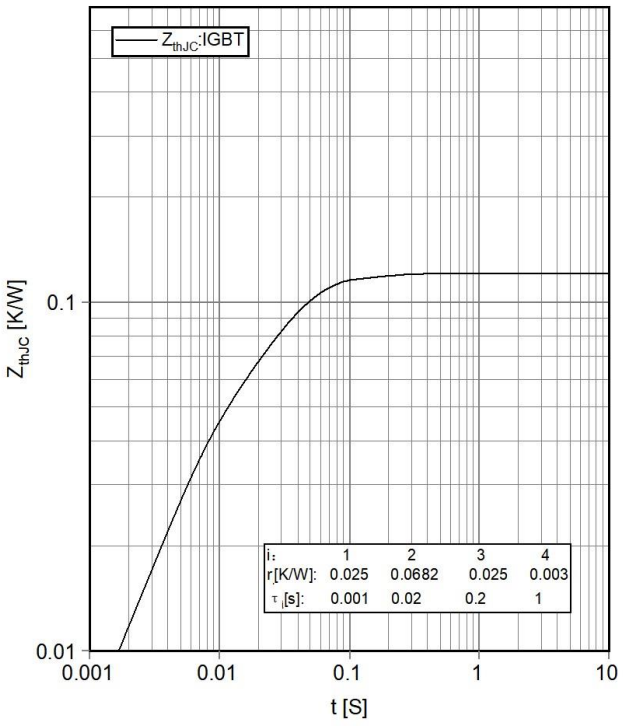
Switching losses IGBT, Inverter(typical)

$E_{on}=f(R_G)$, $E_{off}=f(R_G)$, V_{GE}=-8/+15V, I_C=300A, V_{CE}=400V



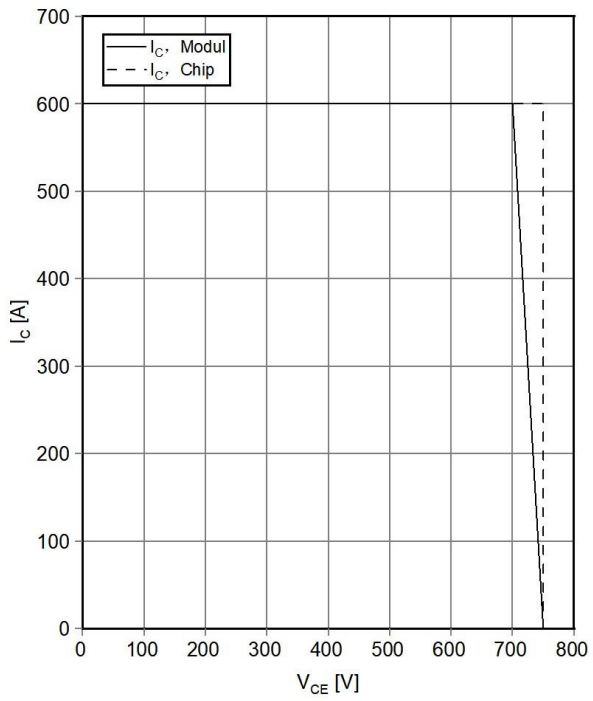
Transient thermal impedance IGBT, Inverter

$Z_{thJC}=f(t)$



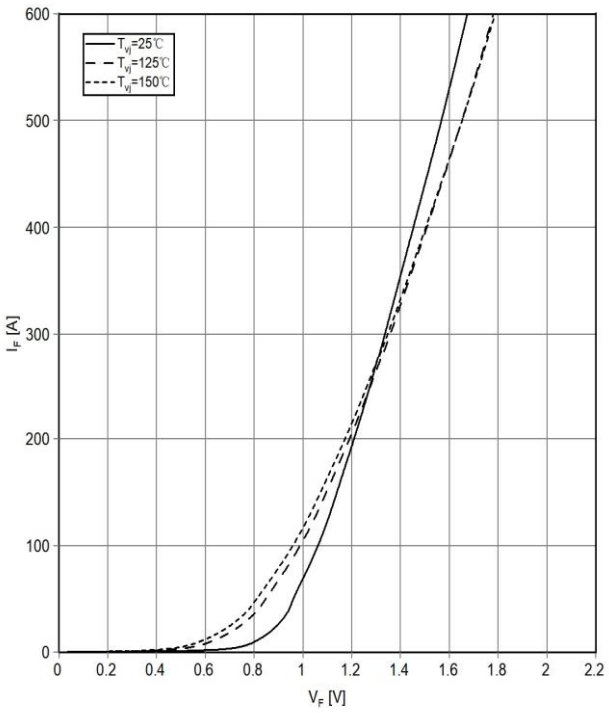
Everse bias safe operating area IGBT, Inverter(RBSOA)

$I_C=f(V_{CE})$, V_{GE}=15V, R_{Goff}=5Ω, T_{vj}=150°C



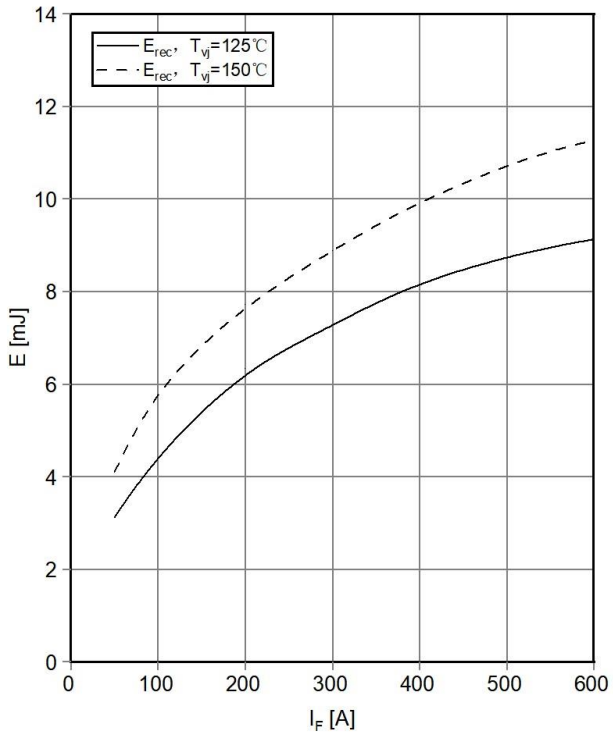
Forward characteristic of FRD, Inverter(typical)

$I_F=f(V_F)$



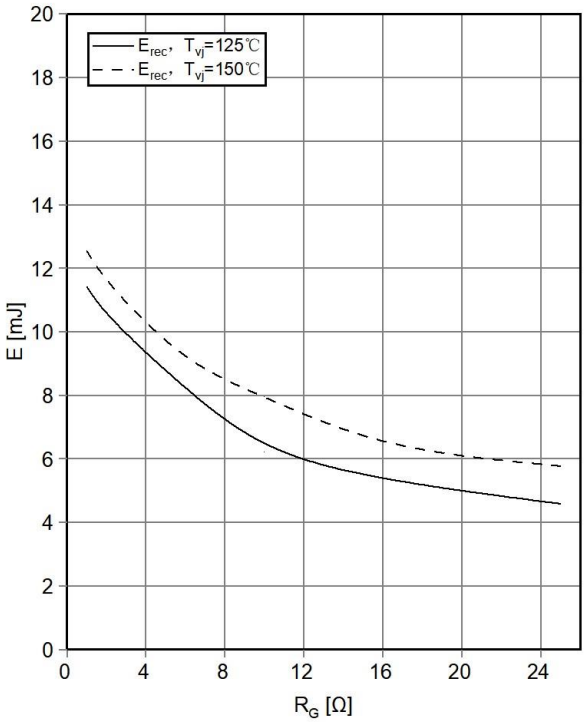
Switching losses FRD, Inverter(typical)

$E_{rec}=f(I_F)$, R_{Gon}=5Ω, V_{CE}=400V



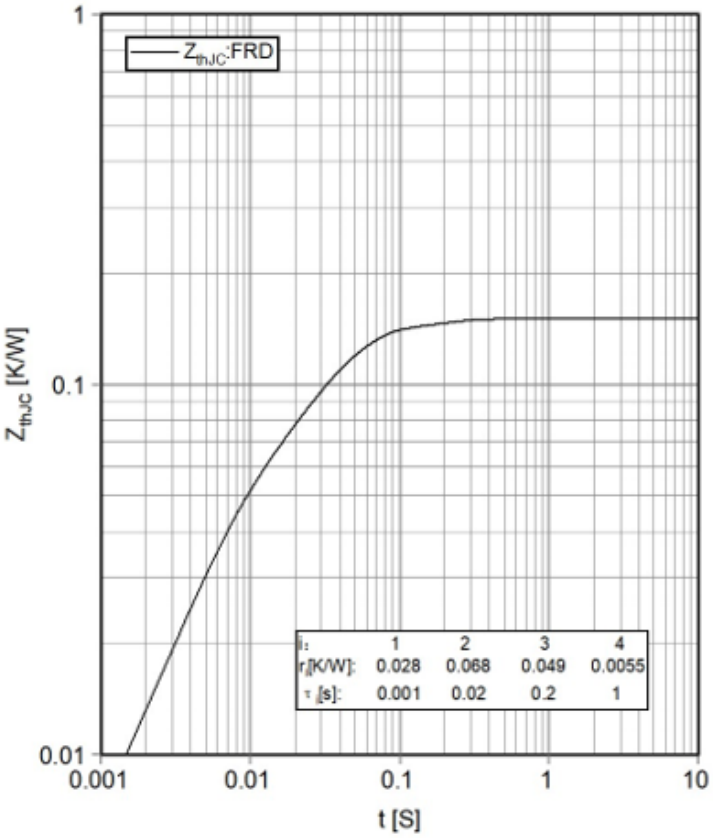
Switching losses FRD, Inverter(typical)

$E_{rec}=f(R_G)$, I_F=300A, V_{CE}=400V

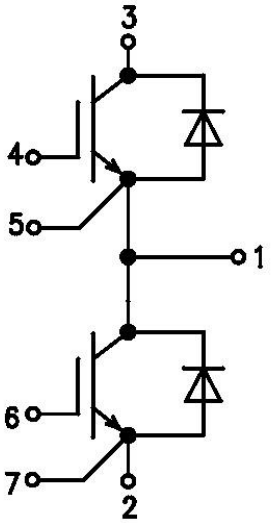


Transient thermal impedance FRD, Inverter

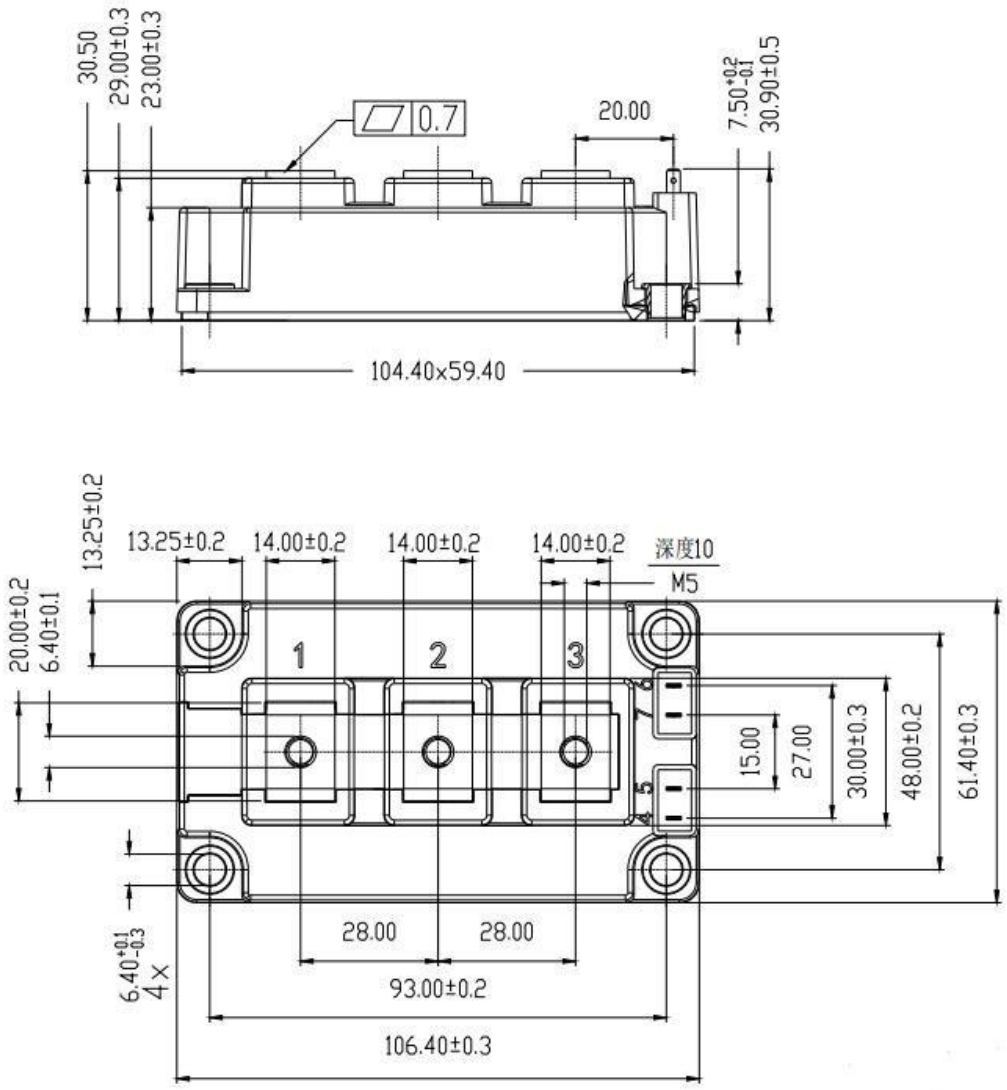
$Z_{thJC}=f(t)$



CIRCUIT DIAGRAM



PACKAGE OUTLINES



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Date of change	Rev #	revise content
2024/3/1	A/0	First version release