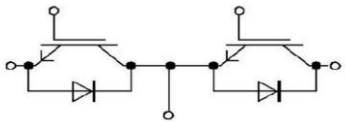
34MM Standard housing IGBT MODULE

DESCRIPTION

34mm standard housing IGBT module with
high speed Planar-FS IGBT and Fast Recovery Diode chip.

VCES	VCEsat		Icnom/ICRM
1200V	T_{vj}=25℃	2.2V	200A/400A
	Tvj= 150℃	2.65V	



FEATURES

- Half-bridge module
- Increased blocking voltage to 1200V
- Low switching losses
- Positive temperature coefficient
- Low reverse recovery charge
- high flexibility and reliability

APPLICATIONS

- Welding machine
- High Frequency Switching Application
- High Power Converters
- UPS systems

MAXIMUM RATED VALUES(IGBT)

Parameter	Symbol	Conditions	Values	Units
Collector-emitter voltage	V_{CES}	T_{vj}=25℃, V_{GE}=0V	1200	V
Continuous collector current	I_{cnom}	T_c= 100℃, T_{vjmax}=175℃	200	A
Repetitive peak collector current	I_{CRM}	t_p= 1ms, T_{vj}=25℃	400	A
Gate-emitter peak voltage	V_{GES}	T_{vj}=25℃	±20	V
SC data	I_{SC}	V_{GE}≤15V,V_{CC}=800V,V_{CEmax}=V_{CES}-L_{sCE}*di/dt, t_p≤10μs, T_{vj}= 150℃	800	A
Total power dissipation	P_{tot}	T_c=25℃, $T_{vj\ max}$=150℃	833	W

CHARACTERISTICS VALUES(IGBT)

Parameter	Symbol	Conditions	Values			Units
			Min.	Typ.	Max.	
Collector-emitter saturation	$V_{CE\ sat}$	I_C=150A, V_{GE}=15V, T_{vj}=25℃		2.2	2.6	V
		I_C=150A, V_{GE}=15V, T_{vj}=125℃		2.55		

voltage		I_C=150A, V_{GE}=15V, T_{vj}=150°C			2.65		V
Gate-emitter threshold voltage	V_{GEth}	V_{CE}=V_{GE} , I_C=6.4mA, T_{vj}=25°C		4.8	5.8	6.8	V
Gate charge	Q_G	V_{GE}=-8V...+15V			1.2		μC
Integrated gate resistor	R_G	T_{vj}=25°C			5		Ω
Input capacitance	C_{ies}	T_{vj}=25°C,f=1MHz,V_{GE}=0V,V_{CE}=25V			10.9		nF
Output capacitance	C_{oes}	T_{vj}=25°C,f=1MHz,V_{GE}=0V,V_{CE}=25V			0.79		nF
Reverse transfer capacitance	C_{res}	T_{vj}=25°C,f=1MHz,V_{GE}=0V,V_{CE}=25V			0.32		nF
Collector-emitter cut-off current	I_{CES}	V_{CE}=1200V, V_{GE}=0V, T_{vj}=25°C				500	μA
Gate-emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V, T_{vj}=25°C				100	nA
Turn-on delay time, inductive load	$t_{d\ on}$	I_C=150A, V_{CE}=600V, V_{GE}=-8V/+15V R_{Gon}=5Ω, R_{Goff}=20Ω	T_{vj}=25°C		190		ns
			T_{vj}=125°C		206		ns
			T_{vj}=150°C		214		ns
Rise time, inductive load	t_r		T_{vj}=25°C		85		ns
			T_{vj}=125°C		90		ns
			T_{vj}=150°C		93		ns
Turn-off delay time, inductive load	$t_{d\ off}$		T_{vj}=25°C		1056		ns
			T_{vj}=125°C		1219		ns
			T_{vj}=150°C		1249		ns
Fall time, inductive load	t_f		T_{vj}=25°C		57		ns
			T_{vj}=125°C		59		ns
			T_{vj}=150°C		60		ns
Turn-on energy loss per pulse	E_{on}	I_C=150A, V_{CE}=600V, V_{GE}=-8V/+15V, R_{Gon}=5Ω, R_{Goff}=20Ω ,di/dt = 2000 A/μs , dv/dt=8000Vμs,	T_{vj}=25°C		7.8		mJ
			T_{vj}=125°C		10.5		mJ
			T_{vj}=150°C		11.5		mJ
Turn-off energy loss per pulse	E_{off}	$L_σ$=45nH	T_{vj}=25°C		12.4		mJ
			T_{vj}=125°C		13.4		mJ
			T_{vj}=150°C		13.9		mJ

MAXIMUM RATED VALUES(FRD)

Parameter	Symbol	Conditions	Values	Units
Repetitive peak reverse voltage	V_{RRM}	T_{vj}=25℃	1200	V
Continuous forward current	I_F		150	A
Maximum repetitive forward current	I_{FRM}	Pulse, t_p= 1ms, T_{vj}=25℃	300	A
I²t-value	I²t	V_R=0V, t_p=10ms, T_{vj}=125℃ V_R=0V, t_p=10ms, T_{vj}=150℃	4000 3900	A²s

CHARACTERISTICS VALUES(FRD)

Parameter	Symbol	Conditions		Values			Units
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F=150A, V_{GE}=0V,	T_{vj}=25℃		2.4	2.8	V
			T_{vj}=125℃		2.5		V
			T_{vj}=150℃		2.6		V
Peak reverse recovery current	I_{RM}	I_F=150A, V_R=600V, V_{GE}=-8V/+15V, di_F/dt=1350A/μs $L_σ$=45nH	T_{vj}=25℃		71.7		A
			T_{vj}=25℃		81.7		A
			T_{vj}=150℃		91.6		A
Recovered charge	Q_r		T_{vj}=25℃		9.4		μC
			T_{vj}=125℃		17.5		μC
			T_{vj}=150℃		18		μC
Reverse recovery energy	E_{rec}		T_{vj}=25℃		4.3		mJ
			T_{vj}=125℃		5.3		mJ
			T_{vj}=150℃		7.9		mJ

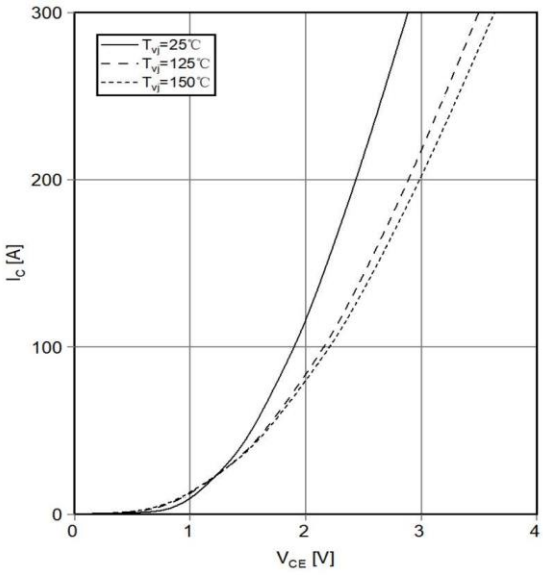
MODULE

Parameter	Symbol	Conditions	Values			Units
			Min.	Typ.	Max.	
Maximum junction temperature	$T_{vj\ max}$				150	℃
Temperature under switching conditions	$T_{vj\ op}$		-40		150	℃
Storage temperature	T_{stg}		-40		125	℃
IGBT, thermal resistance, junction to case	$R_{thjc\ IGBT}$	Per IGBT			0.15	K/W

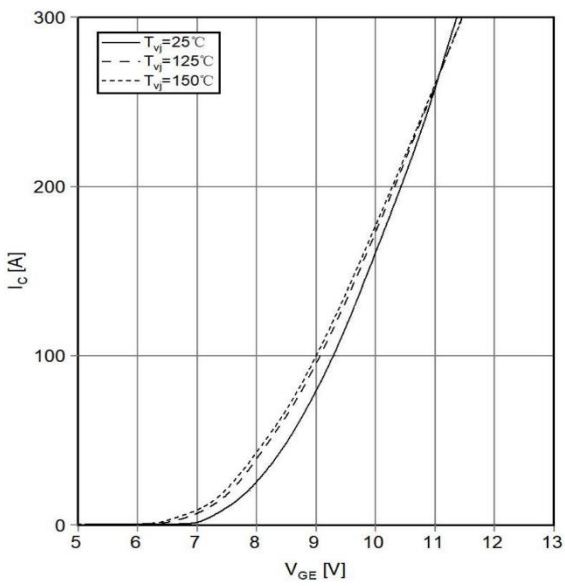
Diode, thermal resistance, junction to case	$R_{thjc\ Diode}$	Per diode			0.49	K/W
Stray inductance module	L_{sCE}			28		nH
Module lead resistance, terminals-chip	$R_{CC'+EE}$	T_{vj}=25℃, per switch		0.65		mΩ
Isolation test voltage	V_{isol}	AC, RMS, f=50Hz, t=1min		2.5		kV
Creepage distance	ds	Terminal to terminal		17.0		mm
		Terminal to base		20.0		mm
Clearance distance in air	da	Terminal to terminal		17.0		mm
		Terminal to base		9.5		mm
Comperative tracking index	CTI			>200		
Mounting torque for module	M	Screw M6	3.0		5.0	N·m
mounting						
Internal isolation	-	Basic insulation	Al_2O_3			-
Material of module baseplate	-		Cu			-
Dimensions	L* W* H		94x34x30.2			mm
Weight	G		160	g		

CHARACTERISTICS DIAGRAMS

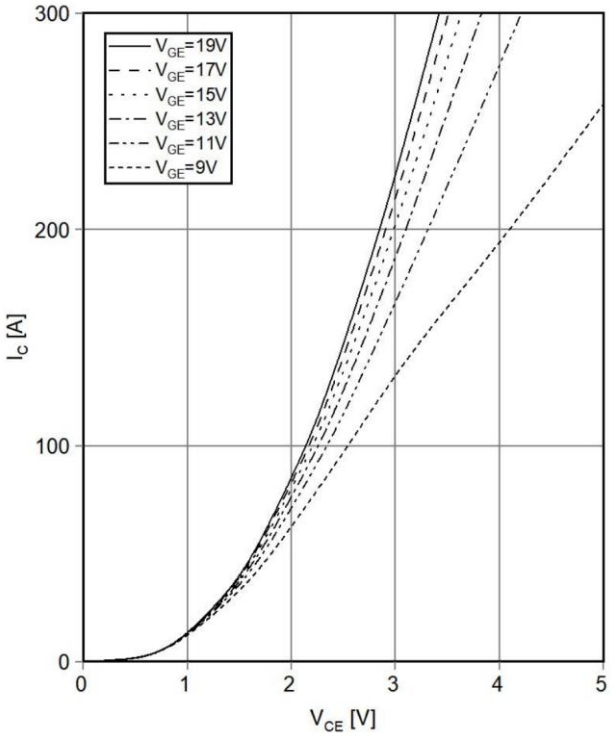
Output characteristic IGBT, Inverter(typical) IC=f(VCE)
VGE=15V



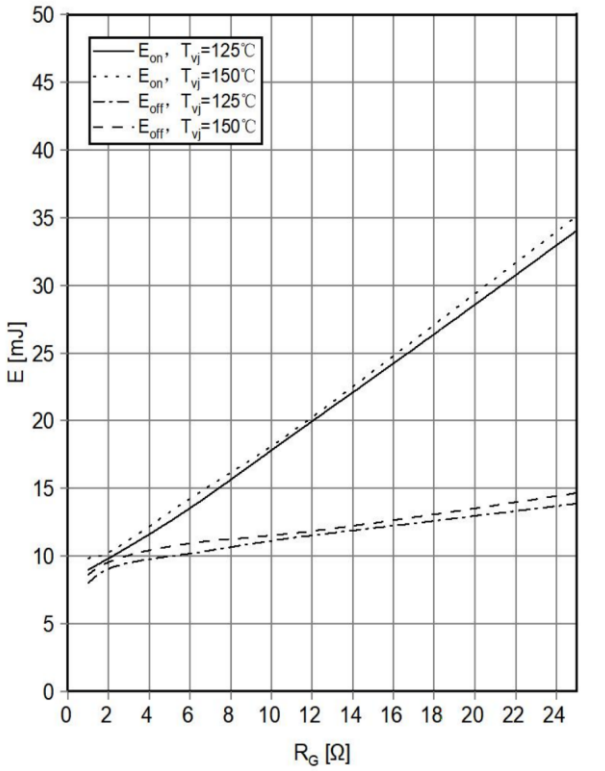
Transfer characteristic IGBT,Inverter(typical)
IC=f(VGE) VCE=20V



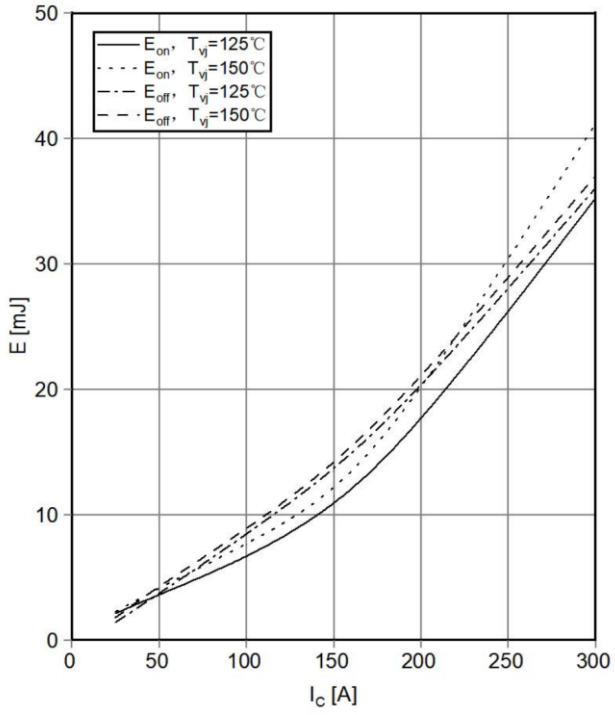
Output characteristic IGBT,Inverter(typical)
IC=f(VCE) Tvj=150℃



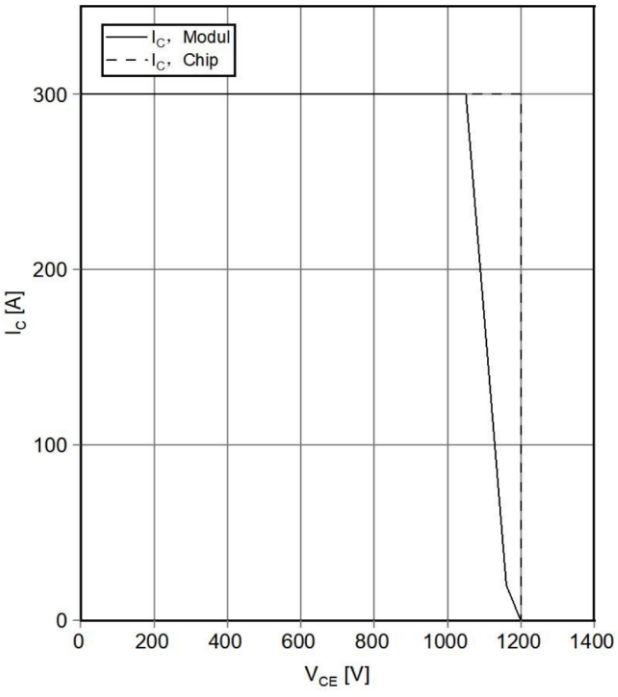
Switching losses IGBT, Inverter(typical)
Eon=f(RG), Eoff=f(RG) VGE=±15V, IC=150A, VCE=600V



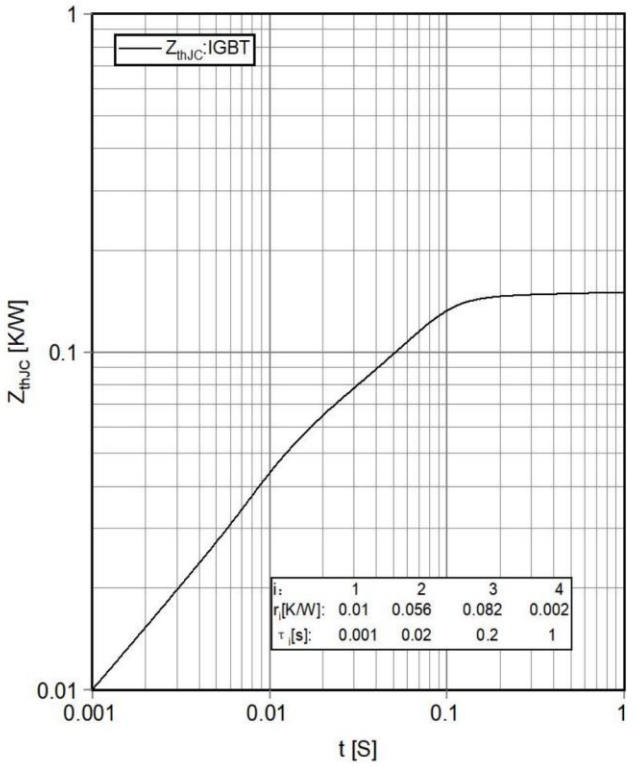
Switching losses IGBT, Inverter(typical)
Eon=f(IC), Eoff=f(IC) VGE=±15V, RGon=5Ω , RGoff=20Ω , VCE=600V



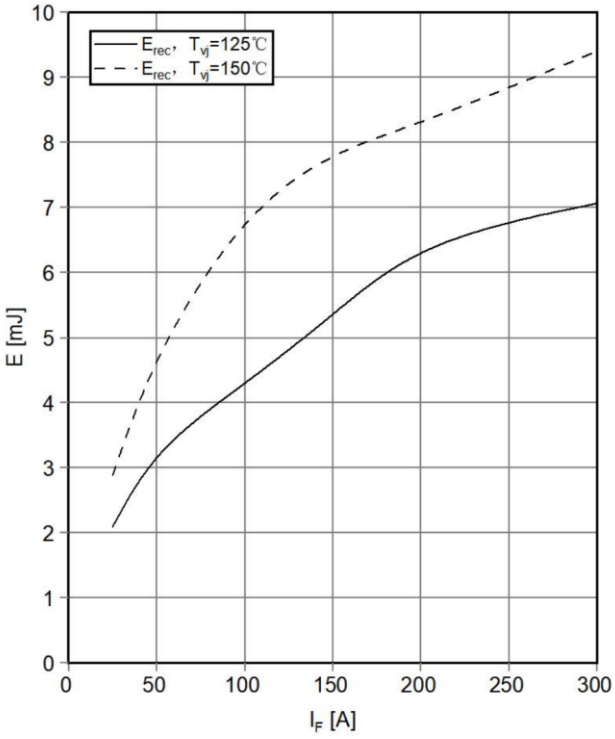
Reverse bias safe operating area IGBT, Inverter(RBSOA)
IC=f(VCE), VGE=±15V, RGoff=5Ω , Tvj=150°C



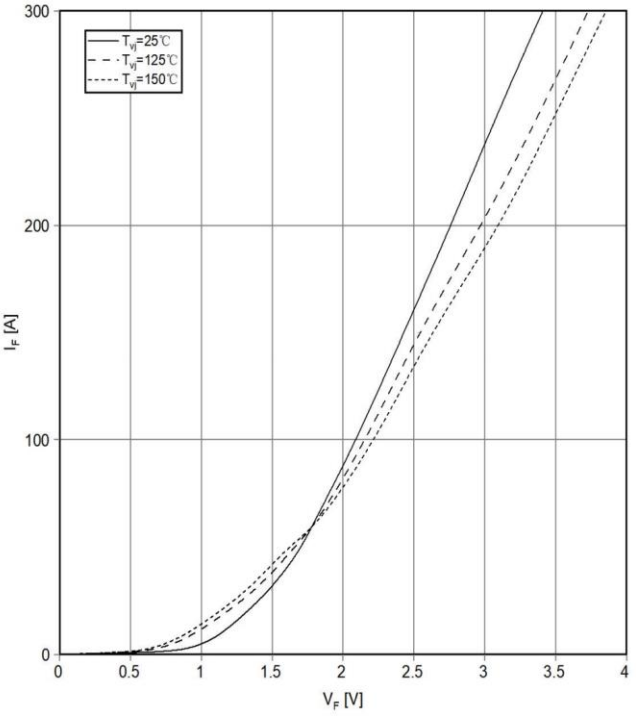
Transient thermal impedance IGBT, Inverter
ZthJC=f(t)



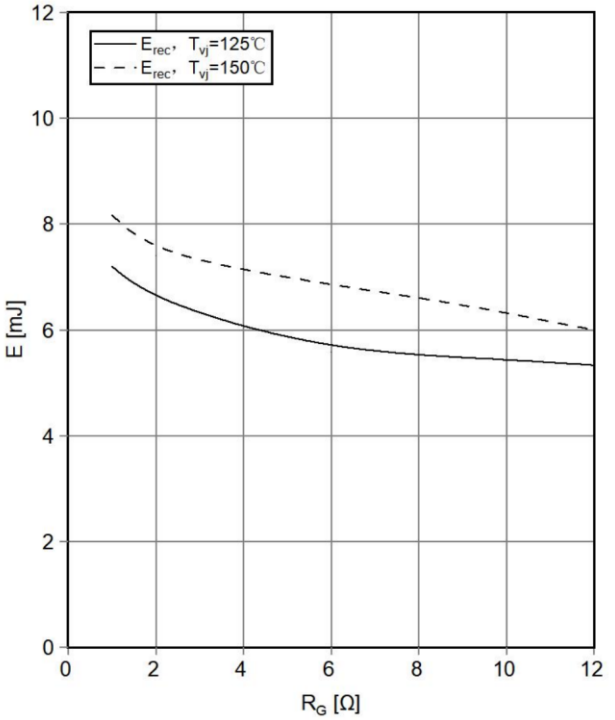
Switching losses Diode, Inverter(typical)
Erec=f(IF) RGon=5Ω , VCE=600V



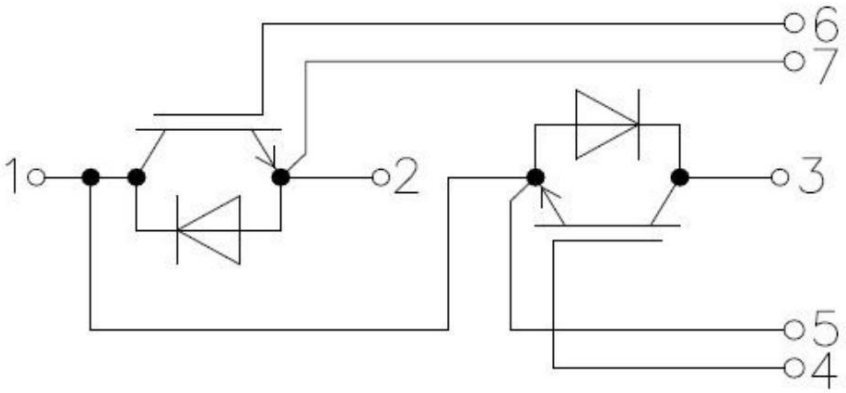
forward characteristic of Diode, Inverter(typical)
IF=f(VF)



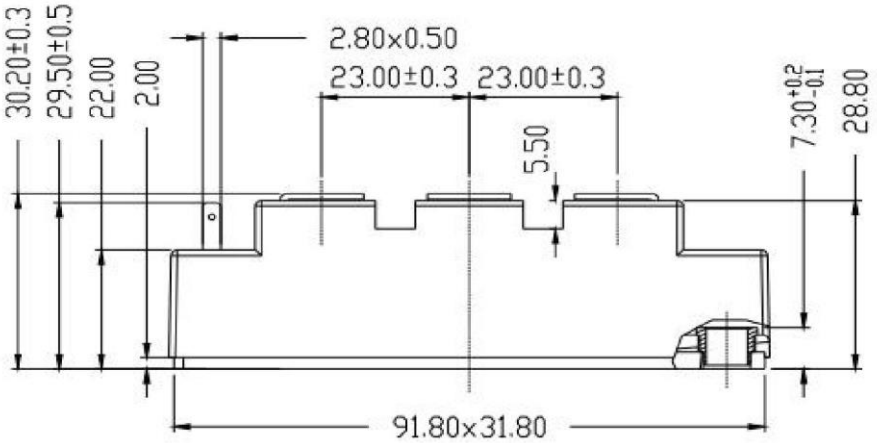
switchinglossesDiode,Inverter(typical)
Erec=f(RG),IF=150A,VCE=600V

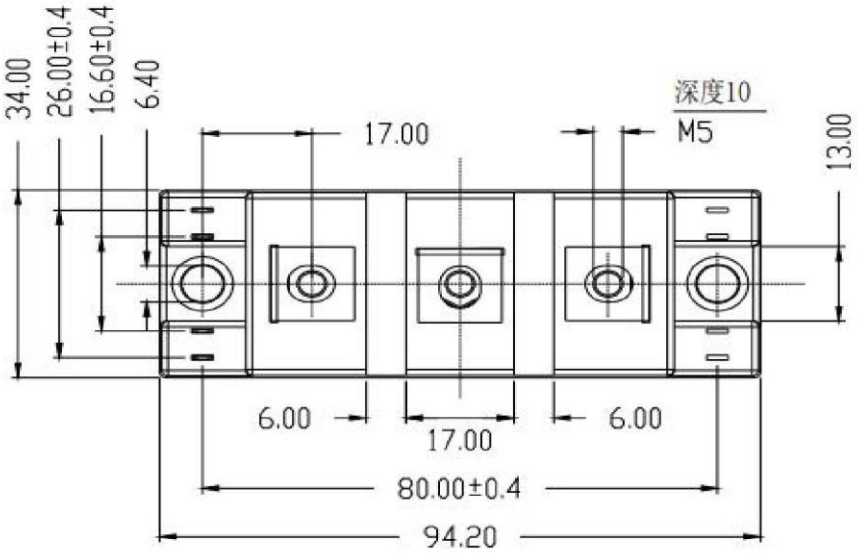


CIRCUIT DIAGRAM



PACKAGE OUTLINES





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Date of change	Rev #	revise content
2023/9/3	A/0	First edition release