TXG50HH120A3F

Product Datasheet
Full Bridge Module
IGBT Module

62mm Module with Ultrafast switching speed IGBT and Fast recovery diode.

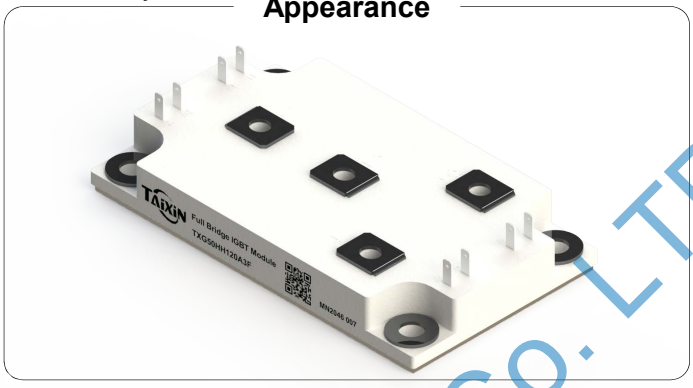
Feature

- NPT+ IGBT technology With Low switching loss
- 10μs short circuit capability
- Maximum junction temperature 175℃

Applications

- Switching mode power supplies
- Inductive heating
- Electronic welder

Appearance



Maximum Ratings of IGBT (T_{vj}=25 ℃ unless otherwise noted)

Items	Symbol	Conditions	Maximum Rating	Units
Collector-emitter voltage	V_{CES}		1200	V
Gate-emitter voltage	V_{GES}		±20	V
Collector current	I_C	T_{vj}=25℃	100	A
		T_{vj}=100℃	50	A
Pulsed collector current	I_{CM}	t_P=1ms	100	A
Short circuit current	I_{sc}	V_{GE}≤15V,V_{CC}=600V,t_P=10us V_{CEmax}=V_{CES}-L_{sCE} ·di/dt	400	A
Maximum power dissipation	P_D	T_c=25℃,T_{vj}=175℃	410	W

Electrical Characteristics of IGBT (T_{vj}=25 ℃ unless otherwise noted)

Items	Symbol	Conditions	Min.	typ.	Max.	Units
Collector-emitter breakdown voltage	V_{CES}	V_{GE}=0V,I_C=1mA	1200			V
Collector -emitter leakage current	I_{CES}	V_{CE}=1200V,V_{GE}=0V			5.0	mA
Gate leakage current, forward	I_{GES}	V_{GE}=20V,V_{CE}=0V			400	nA
		V_{GE}=-20V,V_{CE}=0V			-400	nA
Gate threshold voltage	$V_{GE(th)}$	V_{GE}=V_{CE},I_C=4mA	4.8	5.5	6.3	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE}=15V,I_C=50A,T_{vj}=25℃		2.90	3.35	V
		V_{GE}=15V,I_C=50A,T_{vj}=125℃		3.60		V
Integrated gate resistor	R_{Gint}	f=1M;V_{pp}=1V		5.0		Ω
Input capacitance	C_{ies}	V_{CE}=25V V_{GE}=0V f=1MHz		3.45		nF
Output capacitance	C_{oes}			0.52		nF
Reverse transfer capacitance	C_{res}			0.23		nF
Turn-on delay time	$t_{d(on)}$	VCC=600V VGE=±15V IC=50A RG=13Ω Inductive Load Tvj=25℃		205		ns
Rise time	t_r			49		ns
Turn-off delay time	$t_{d(off)}$			262		ns
Fall time	t_f			137		ns
Turn-on energy loss per pulse	E_{on}			4.20		mJ
Turn-off energy loss per pulse	E_{off}			1.64		mJ
Turn-on delay time	$t_{d(on)}$	VCC=600V VGE=±15V IC=50A RG=13Ω Inductive Load Tvj=125℃		205		ns
Rise time	t_r			50		ns
Turn-off delay time	$t_{d(off)}$			275		ns
Fall time	t_f			170		ns
Turn-on energy loss per pulse	E_{on}			5.50		mJ
Turn-off energy loss per pulse	E_{off}			2.41		mJ
Temperature under switching conditions	$T_{vj\ op}$		-55		150	℃

Maximum Ratings of Diode

Items	Symbol	Conditions	Maximum Rating	Units
Repetitive peak reverse voltage	V_{RRM}	T_{vj}=25℃	1200	V
Diode continuous forward current	I_F	T_{vj}=25℃	100	A
		T_{vj}=100℃	50	A
Diode maximum forward current	I_{FM}	t_P=1ms,T_{vj}=25℃	100	A

Electrical s Characteristics of Diode (T_{vj}=25℃ unless otherwise noted)

Items	Symbol	Conditions	Min.	typ.	Max.	Units
Diode forward voltage	V_F	I_F=50A,T_{vj}=25℃		1.82	2.22	V
		I_F=50A,T_{vj}=125℃		1.95		V
Diode reverse recovery time	t_{rr}	V_{CE}=600V		120		ns
Diode peak reverse recovery current	I_{rr}	I_F=50A		85		A
Diode reverse recovery charge	Q_{rr}	d_{IF}/dt=2000A/μs		5.5		uC
Reverse recovery energy	E_{rec}	T_{vj}=25℃		1.52		mJ
Diode reverse recovery time	t_{rr}	V_{CE}=600V		160		ns
Diode peak reverse recovery current	I_{rr}	I_F=50A		103		A
Diode reverse recovery charge	Q_{rr}	d_{IF}/dt=2000A/μs		11.9		uC
Reverse recovery energy	E_{rec}	T_{vj}=125℃		2.19		mJ

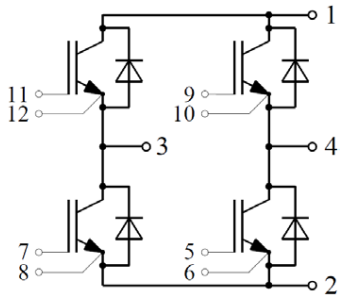
Thermal Characteristics

Items	Symbol	Min.	typ.	Max.	Units
Thermal resistance, junction to case for IGBT	$R_{th\ j\text{-}c}$			0.15	℃/W
Thermal resistance, junction to case for Diode	$R_{th\ j\text{-}c}$			0.23	℃/W
Thermal resistance, case to sink	$R_{thC\text{-}S}$		0.04		℃/W

Module Characteristics

Items	Symbol	Conditions	Min.	typ.	Max.	Units
Material of module baseplate			Cu			
Internal isolation		terminal to terminal	Al_2O_3			
Isolation test voltage	V_{isol}	RMS, f = 50 Hz, t = 1 min.	2.5			kV
Stray inductance module	L_{sCE}			30		nH
Mounting torque for modul mounting	M	Screw M6	3.0		5.0	Nm
Terminal connection torque	M	Screw M5	4.0		6.0	Nm
Storage temperature range	T_{STG}		-55		150	℃
Weight of Module	W_t			315		g

Internal Circuit:



Representative Characteristics

Fig 1. Output characteristic IGBT
$I_C=f(V_{CE}),V_{GE}=15V$

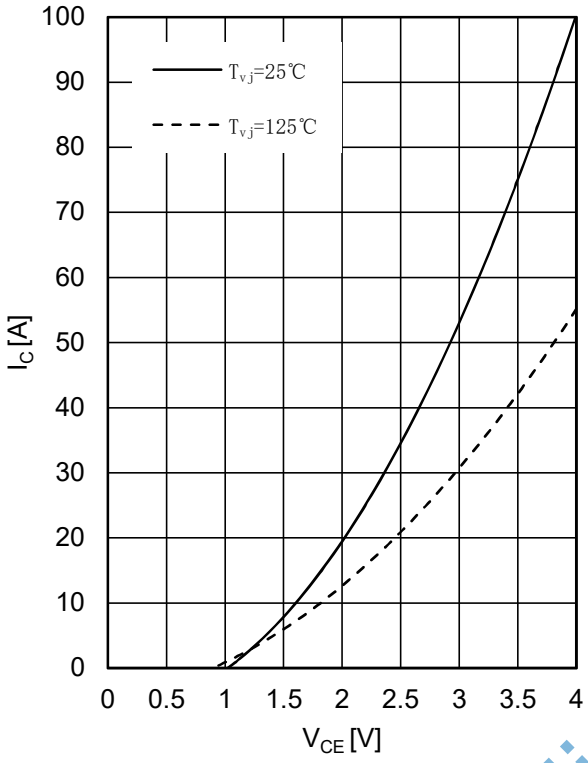


Fig 2. Output characteristic IGBT
$I_C=f(V_{CE})$
$T_{vj}=125℃$

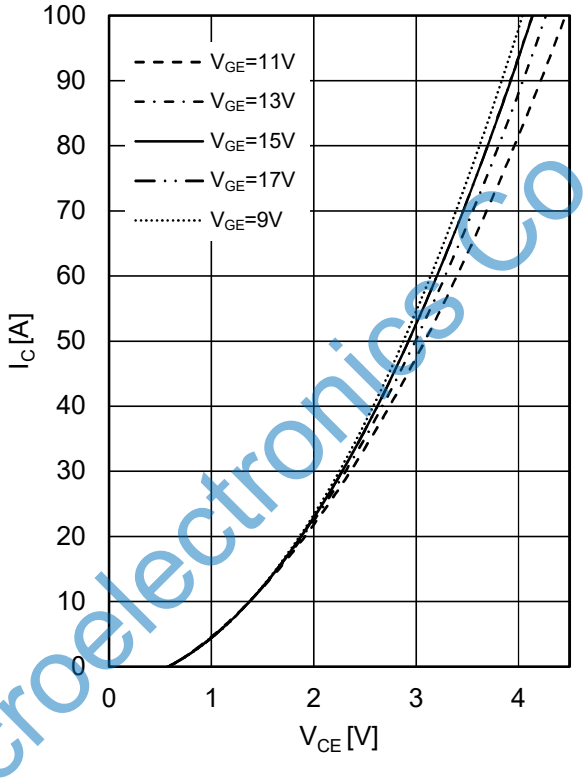


Fig 3. Transfer characteristic IGBT
$I_C=f(V_{GE})$
$V_{CE}=20V$

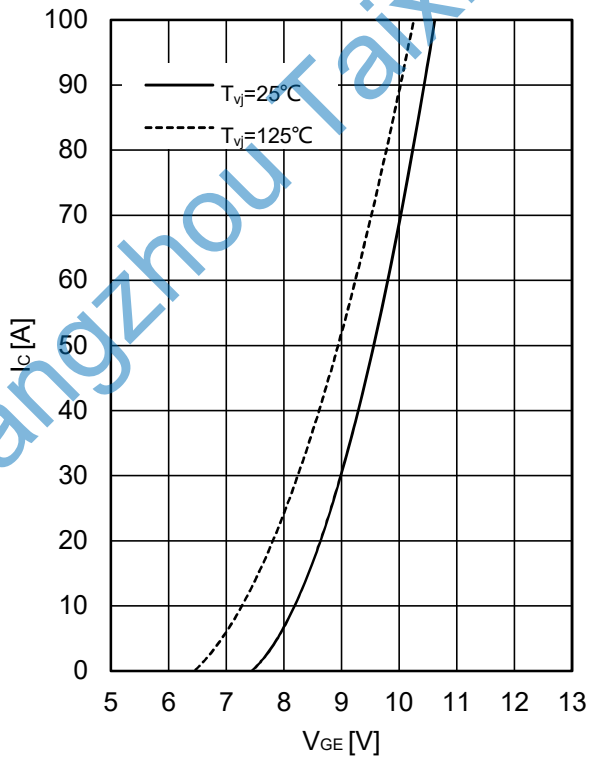


Fig 4. Switching losses IGBT
$E_{on}=f(I_C),E_{off}=f(I_C)$,
$V_{GE}=\pm15V,R_G=13\Omega,V_{CE}=600V$

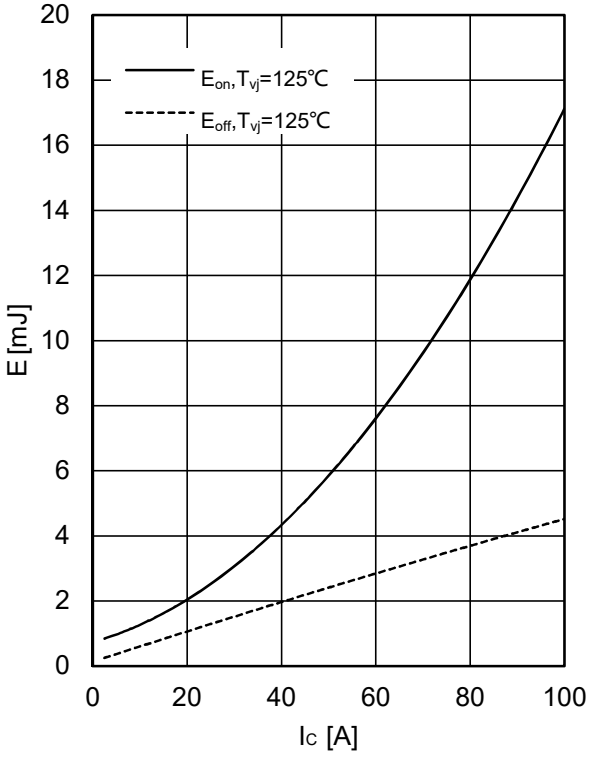


Fig 5. Switching losses IGBT
$E_{on}=f(R_G),E_{off}=f(R_G)$,
$V_{GE}=\pm15V,I_C=50A,V_{CE}=600V$

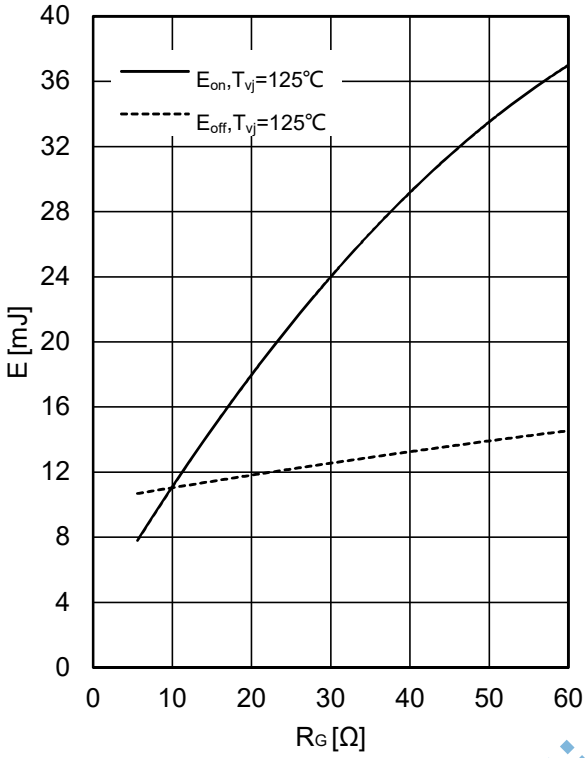


Fig 6. Transient thermal impedance IGBT
$Z_{thjc}=f(t)$

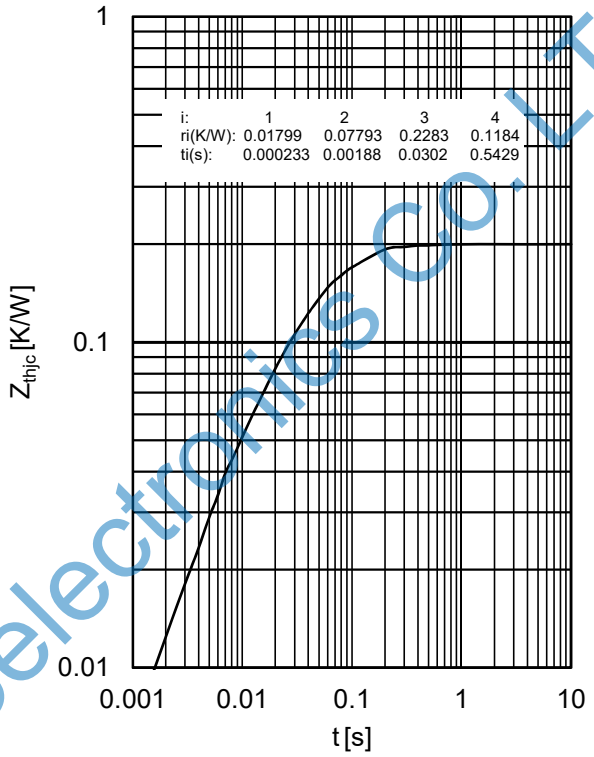


Fig 7. Reverse bias safe operating area IGBT
$I_C=f(V_{CE})$
$V_{GE}=\pm15V,R_{Goff}=13\Omega,T_{vj}=125℃$

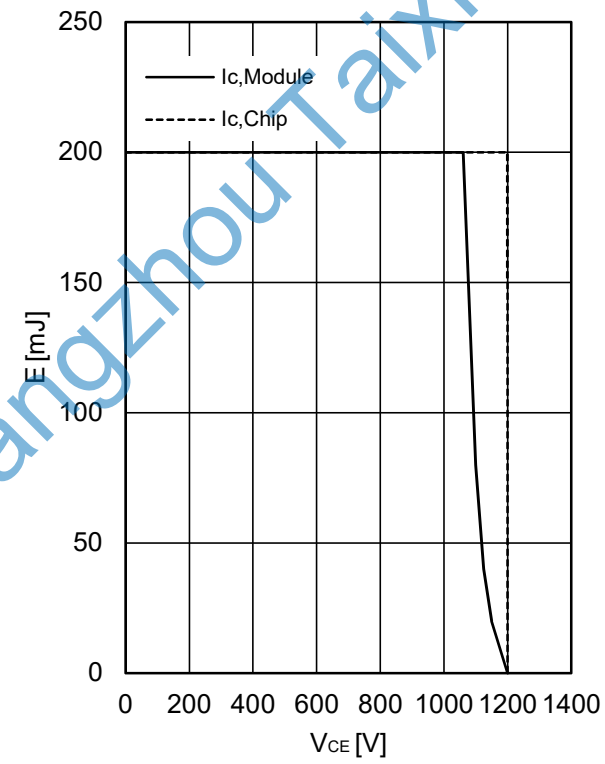


Fig 8. Forward characteristic of Diode
$I_F=f(V_F)$

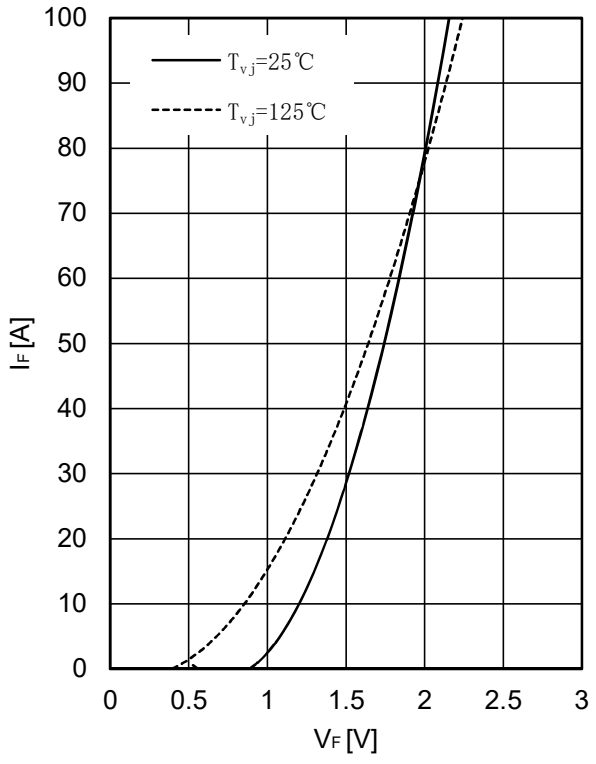


Fig 9. Switching losses Diode
$E_{rec}=f(I_F)$
$R_G=8.2\Omega, V_{CE}=600V$

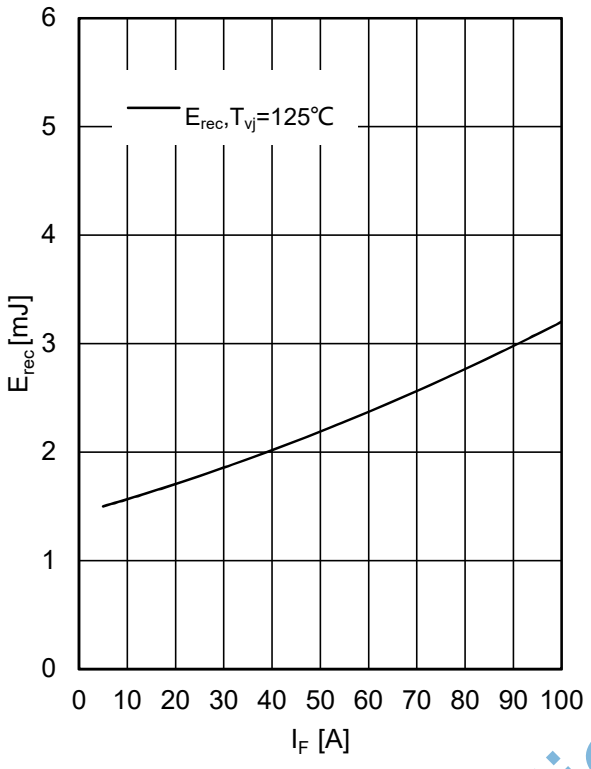
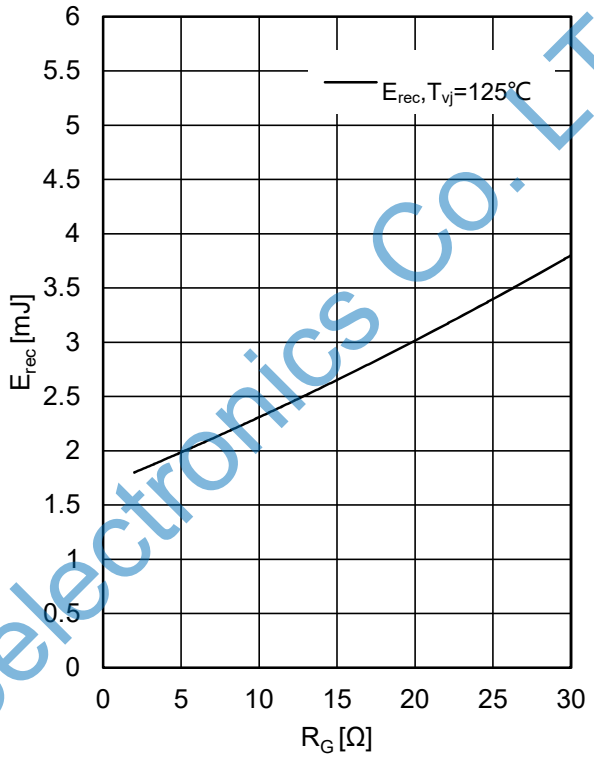
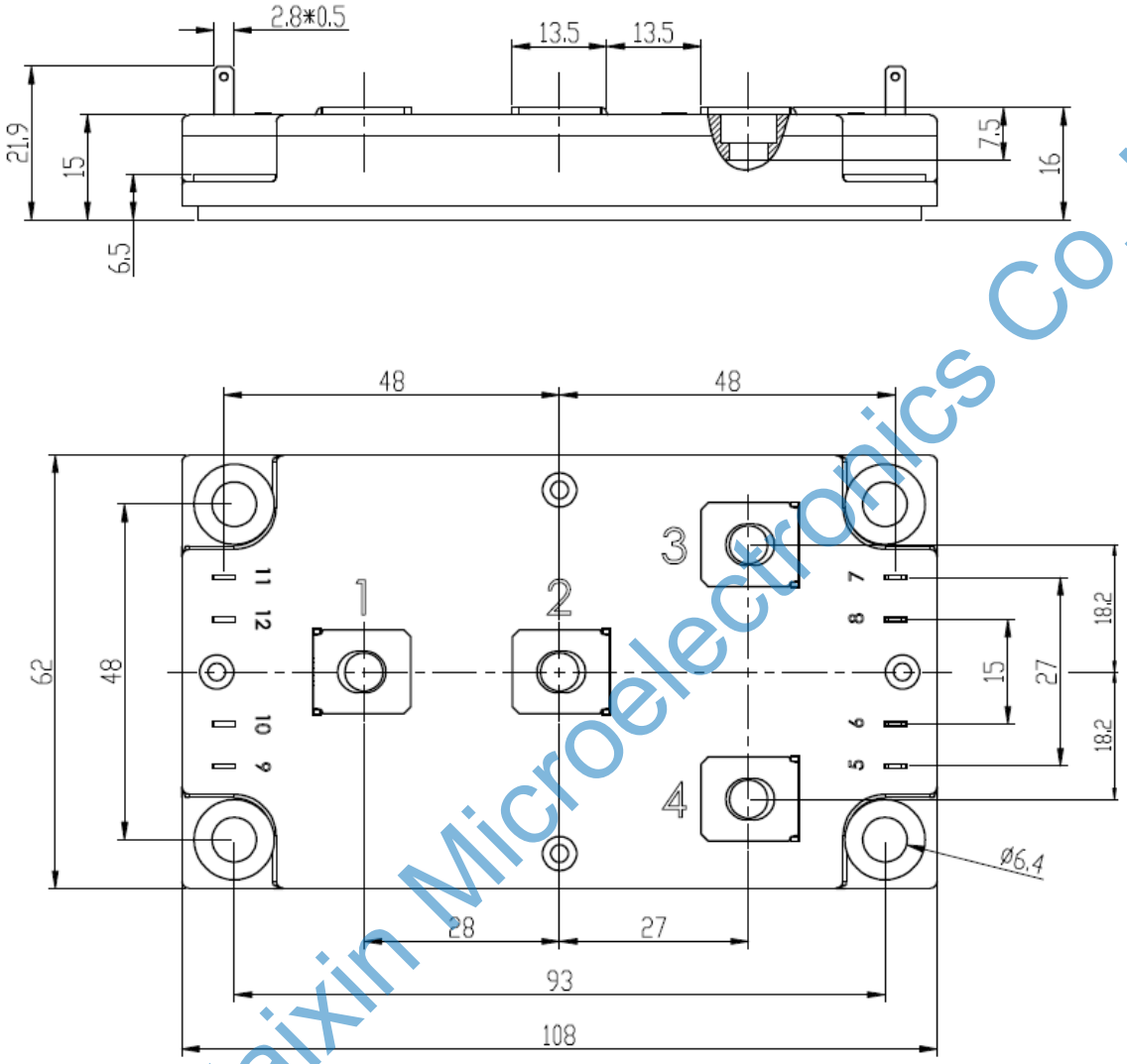


Fig 10. Switching losses Diode
Erec=f(RG)
IF=50A,VCE=600V



Package Dimensions

Dimensions in Millimeters



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