



IGBT Modules

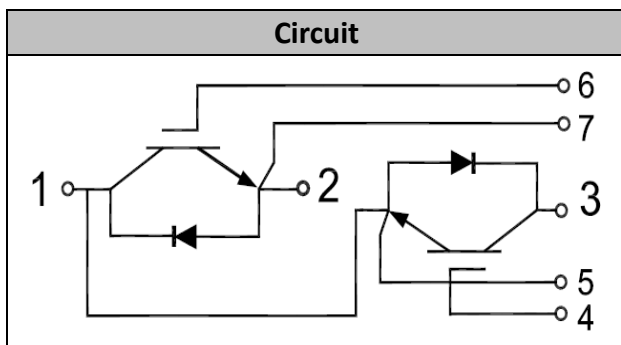
V_{CES}	1200V
I_C	200A

Applications

- High frequency drivers
- Solar inverters
- UPS (Uninterruptible Power Supplies)
- Electric welding machine

Features

- High speed IGBT in NPT technology
- Low switching losses
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance
- Maximum junction temperature 150°C



● IGBT

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V_{CES}	$V_{GE}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	1200	V
Continuous Collector Current	I_C	$T_C=100^{\circ}C$	200	A
Repetitive Peak Collector Current	I_{CRM}	$t_p=1ms$	400	A
Gate-Emitter Voltage	V_{GES}	$T_{vj}=25^{\circ}C$	± 20	V
Total Power Dissipation	P_{tot}	$T_C=25^{\circ}C$ $T_{vjmax}=150^{\circ}C$	1700	W



Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, $I_C=8mA$, $T_{vj}=25^{\circ}C$	5.0	5.8	6.5	V
Collector-Emitter Cut-off Current	I_{CES}	$V_{CE}=1200V$, $V_{GE}=0V$, $T_{vj}=25^{\circ}C$			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=200A$, $V_{GE}=15V$, $T_{vj}=25^{\circ}C$		3.1		V
		$I_C=200A$, $V_{GE}=15V$, $T_{vj}=125^{\circ}C$		3.6		
		$I_C=200A$, $V_{GE}=15V$, $T_{vj}=150^{\circ}C$		3.8		
Gate Charge	Q_G			3.3		uC
Input Capacitance	C_{ies}	$V_{CE}=25V$, $V_{GE}=0V$, $f=1MHz$, $T_{vj}=25^{\circ}C$		20.5		nF
Reverse Transfer Capacitance	C_{res}			1.89		nF
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V$, $V_{GE}=20V$, $T_{vj}=25^{\circ}C$			400	nA
Turn-on Delay Time	$t_{d(on)}$	$I_C=200A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=3.9\Omega$ $T_{vj}=25^{\circ}C$		123		ns
Rise Time	t_r			112		ns
Turn-off Delay Time	$t_{d(off)}$			446		ns
Fall Time	t_f			45		ns
Energy Dissipation During Turn-on Time	E_{on}			32.8		mJ
Energy Dissipation During Turn-off Time	E_{off}			8.5		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=200A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=3.9\Omega$ $T_{vj}=150^{\circ}C$		107		ns
Rise Time	t_r			98		ns
Turn-off Delay Time	$t_{d(off)}$			471		ns
Fall Time	t_f			78		ns
Energy Dissipation During Turn-on Time	E_{on}			41.5		mJ
Energy Dissipation During Turn-off Time	E_{off}			10.3		mJ
SC Data	I_{sc}	$t_p \leq 10\mu s$, $V_{GE}=15V$, $T_{vj}=150^{\circ}C$, $V_{CC}=600V$, $V_{CEM} \leq 1200V$		550		A



● Diode

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25^{\circ}C$	1200	V
Continuous DC Forward Current	I_F		200	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1ms$	400	A

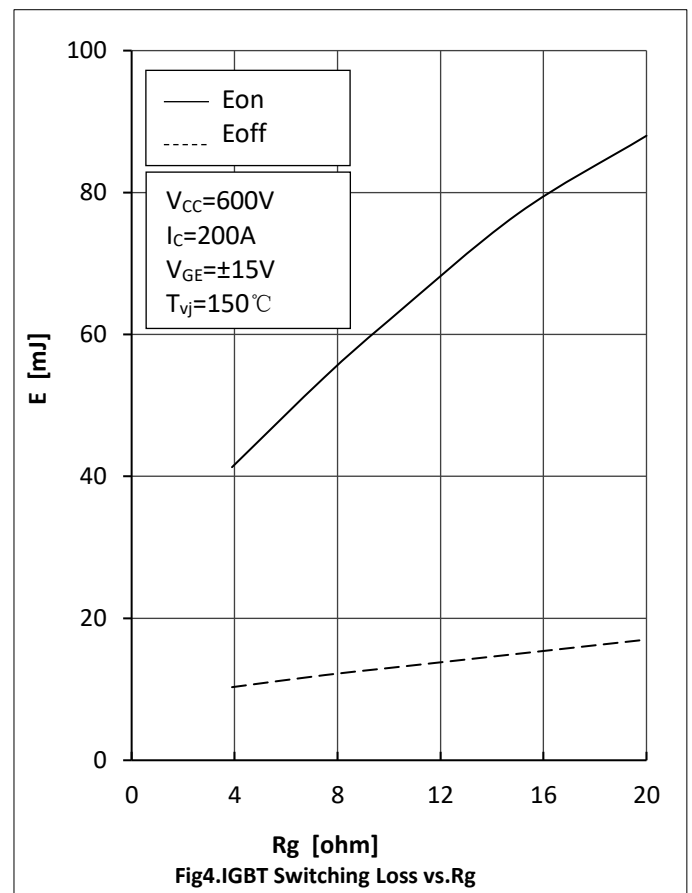
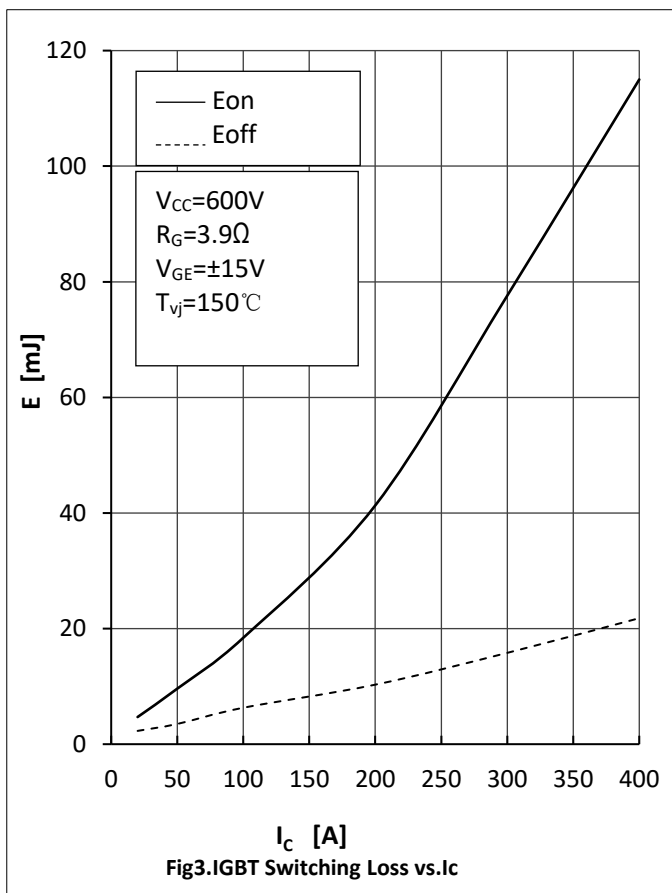
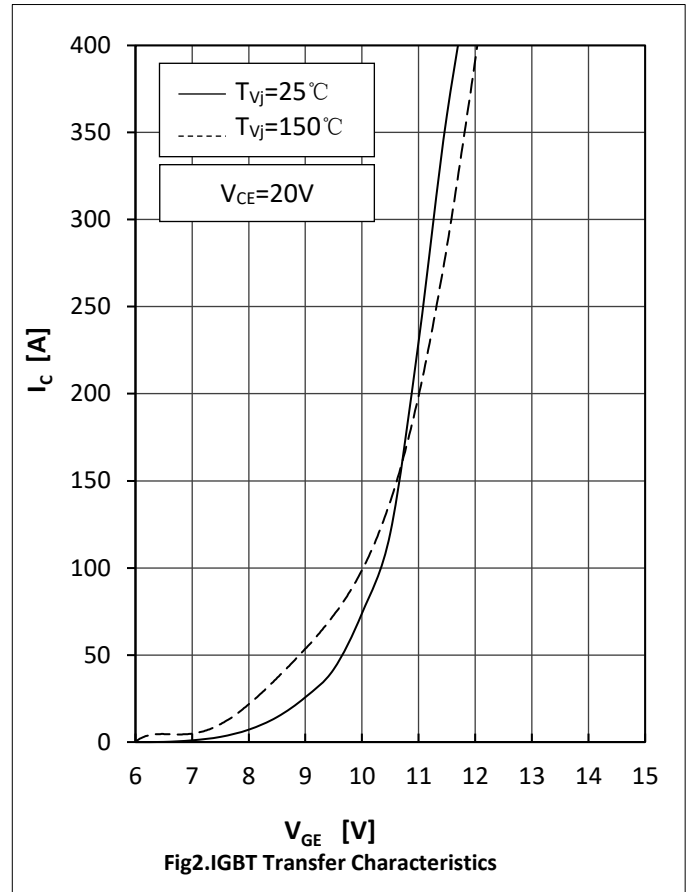
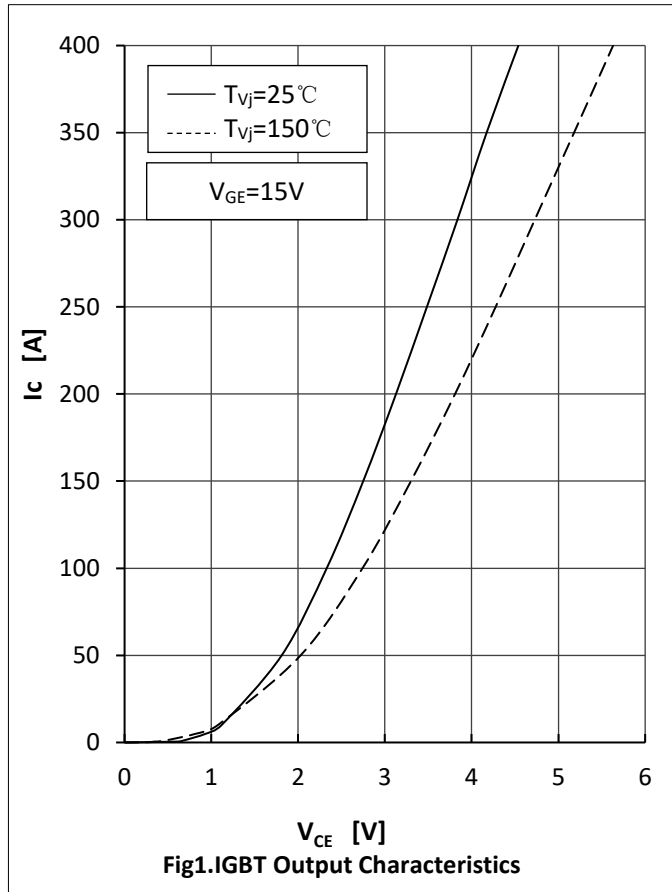
Characteristic Values

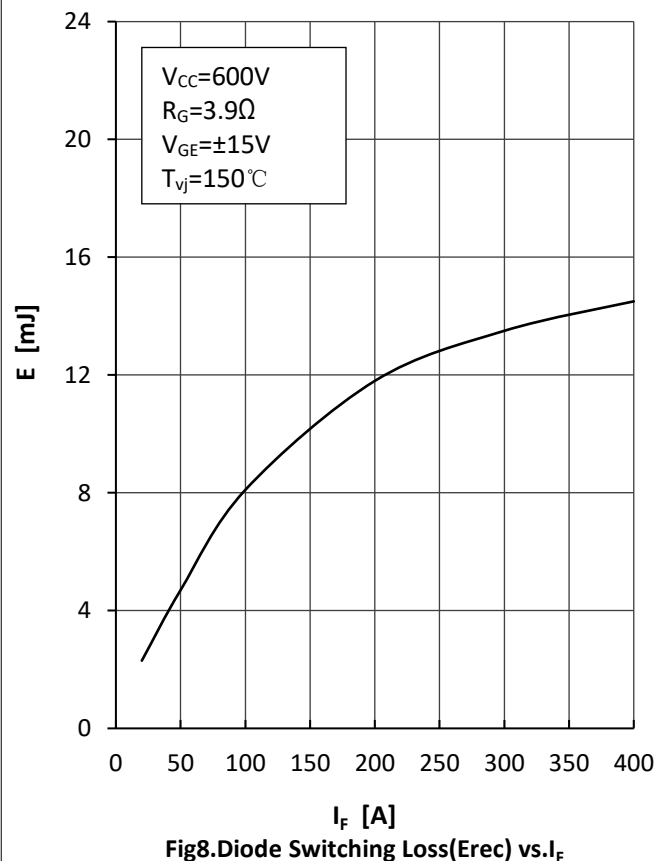
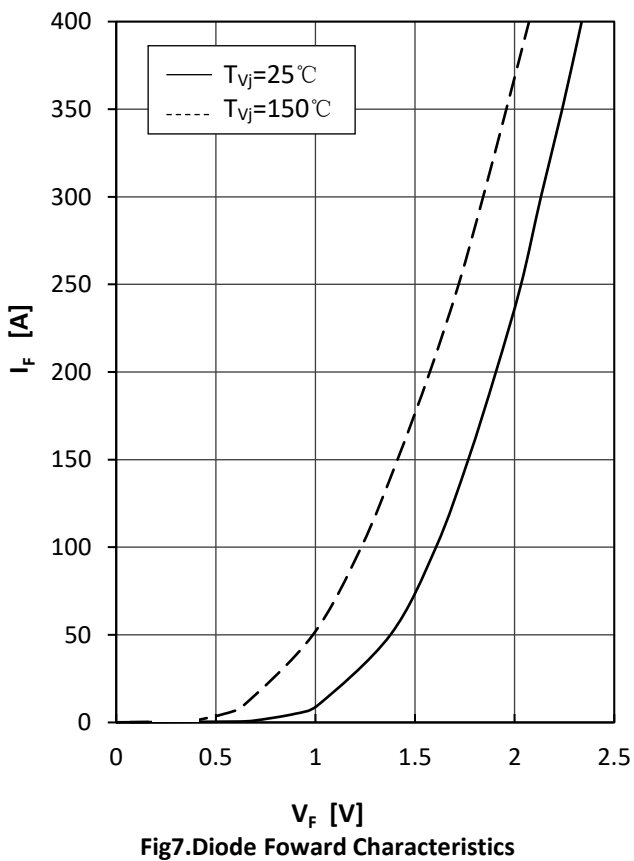
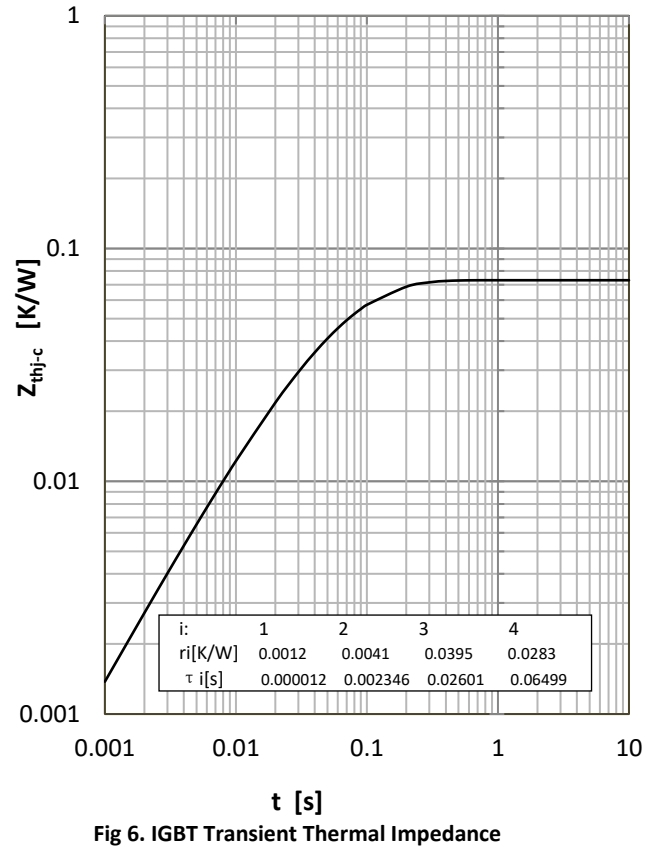
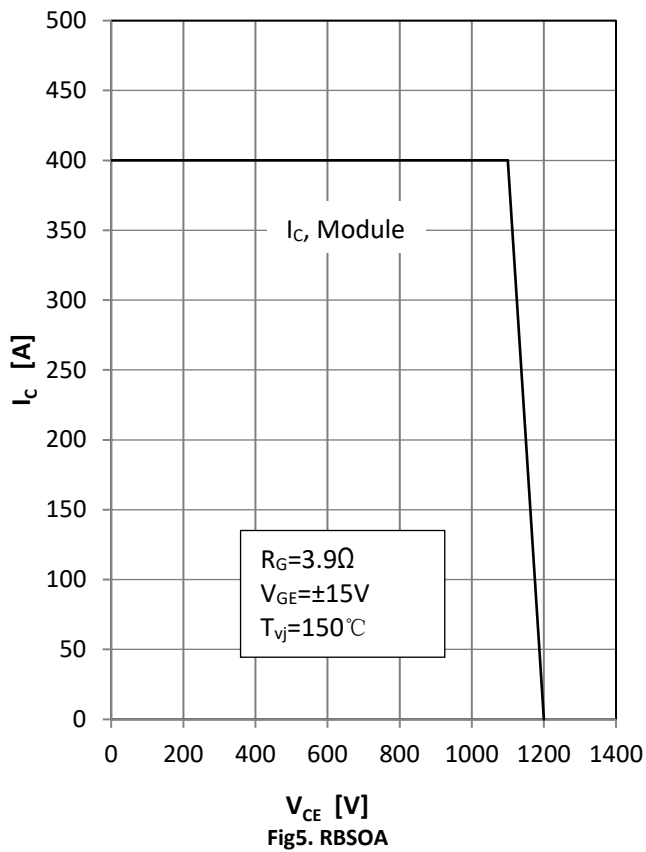
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=200A, T_{vj}=25^{\circ}C$		1.90	2.8	V
		$I_F=200A, T_{vj}=125^{\circ}C$		1.70		
		$I_F=200A, T_{vj}=150^{\circ}C$		1.55		
Recovered Charge	Q_{rr}	$I_F=200A$ $V_R=600V$ $-di_F/dt = 1500A/us$ $T_{vj}=25^{\circ}C$		11.38		μC
Peak Reverse Recovery Current	I_{rr}			56		A
Reverse Recovery Energy	E_{rec}			3.2		mJ
Recovered Charge	Q_{rr}	$I_F=200A$ $V_R=600V$ $-di_F/dt = 1500A/us$ $T_{vj}=150^{\circ}C$		37.28		μC
Peak Reverse Recovery Current	I_{rr}			116		A
Reverse Recovery Energy	E_{rec}			11.8		mJ



● **Module Characteristics** $T_C=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation Voltage	V_{isol}	$t=1\text{min}, f=50\text{Hz}$	2500			V
Maximum Junction Temperature	T_{jmax}				150	$^{\circ}\text{C}$
Operating Junction Temperature	$T_{\text{vj op}}$		-40		125	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-40		125	$^{\circ}\text{C}$
Thermal Resistance Junction to Case	$R_{\theta\text{JC}}$	per IGBT			0.073	K/W
		per Diode			0.20	
Thermal Resistance Case to Sink	$R_{\theta\text{CS}}$	Conductive grease applied		0.012	0.035	K/W
Module Electrodes Torque	M_t	Recommended(M6)	3.0		5.0	N·m
Module-to-Sink Torque	M_s	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			315		g





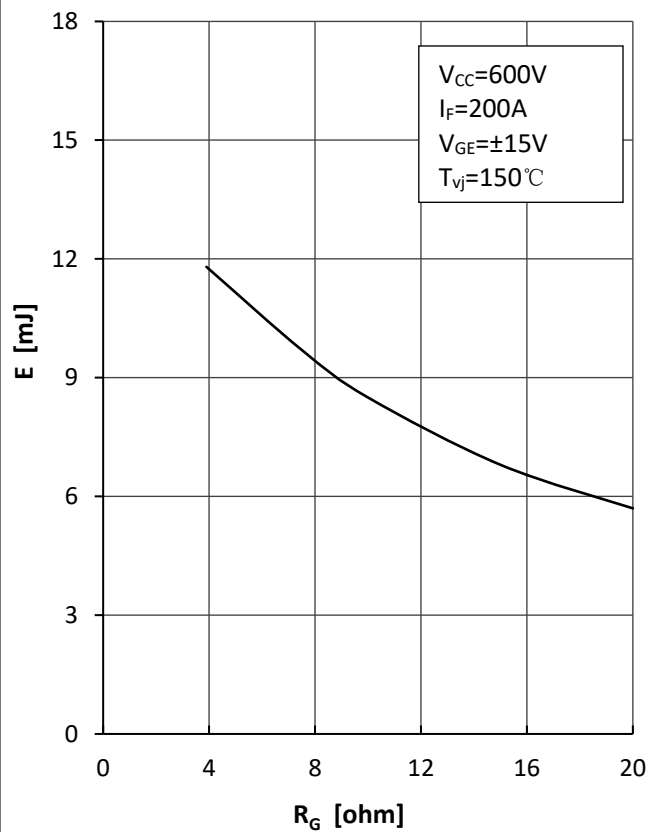


Fig9.Diode Switching Loss(E_{rec}) vs. R_g

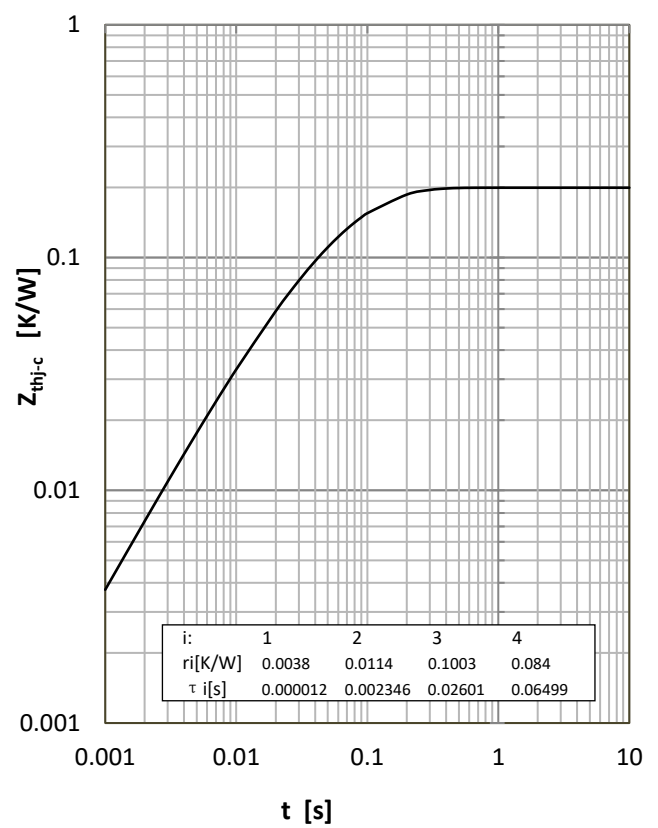
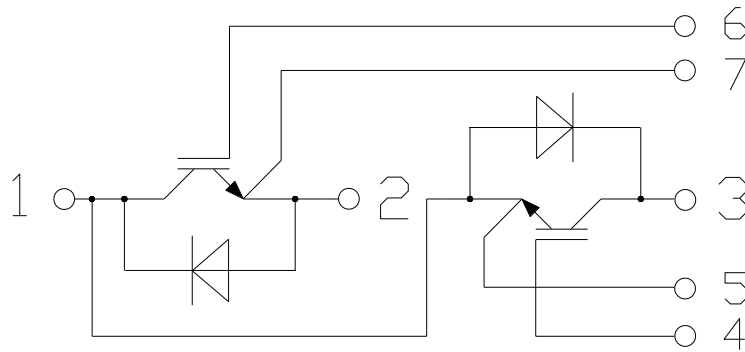


Fig10.Diode Transient Thermal Impedance

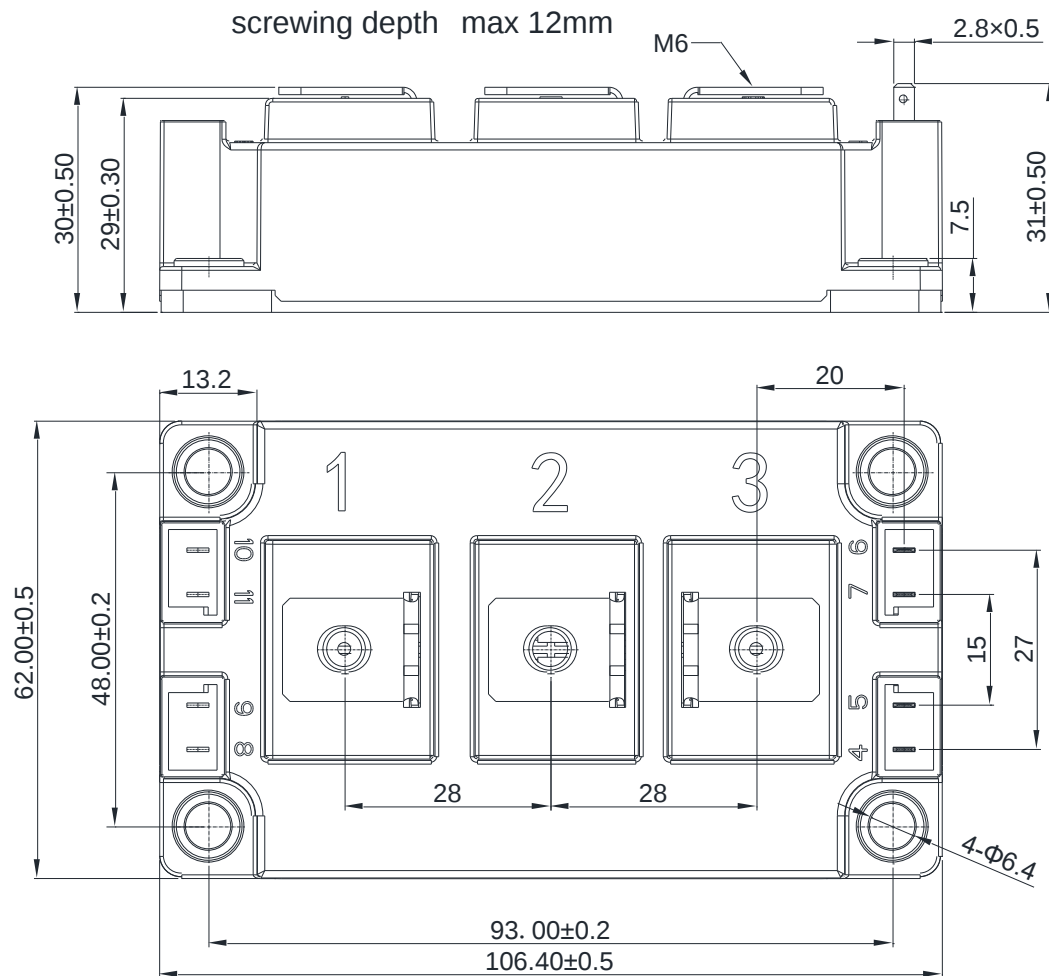


● Circuit Diagram



● Package Outline Information

Dimensions in Millimeters





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IGBTs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.

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