



IGBT Modules

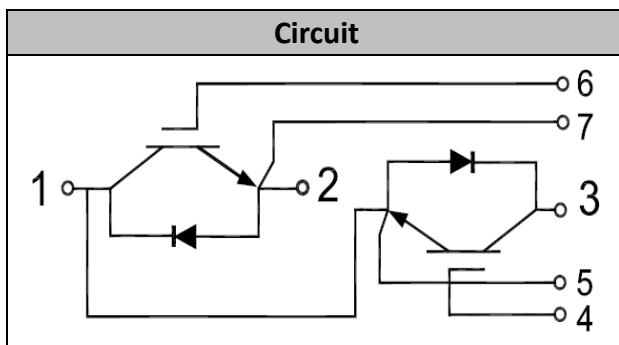
V_{CES}	650V
I_C	600A

Applications

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

Features

- Low $V_{CE(sat)}$ with Trench technology
- Low switching losses
- High short circuit capability(6us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance
- Maximum junction temperature 175°C



● IGBT

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V_{CES}	$V_{GE}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	650	V
Continuous Collector Current	I_C	$T_C=100^{\circ}C$	600	A
Repetitive Peak Collector Current	I_{CRM}	$t_p=1ms$	1200	A
Gate-Emitter Voltage	V_{GES}	$T_{vj}=25^{\circ}C$	± 20	V
Total Power Dissipation	P_{tot}	$T_C=25^{\circ}C$ $T_{vjmax}=175^{\circ}C$	2500	W



Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=8mA, T_{vj}=25^{\circ}C$	4.5	5.8	6.5	V
Collector-Emitter Cut-off Current	I_{CES}	$V_{CE}=650V, V_{GE}=0V, T_{vj}=25^{\circ}C$			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=600, V_{GE}=15V, T_{vj}=25^{\circ}C$		1.55		V
		$I_C=600, V_{GE}=15V, T_{vj}=125^{\circ}C$		1.70		
		$I_C=600, V_{GE}=15V, T_{vj}=150^{\circ}C$		1.80		
Gate Charge	Q_G			3.4		uC
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz, T_{vj}=25^{\circ}C$		37.9		nF
Reverse Transfer Capacitance	C_{res}			0.76		nF
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$			400	nA
Turn-on Delay Time	$t_{d(on)}$	$I_C=600A$ $V_{CE}=300V$ $V_{GE}=\pm 15V$ $R_G=3.3\Omega$ $T_{vj}=25^{\circ}C$		291		ns
Rise Time	t_r			191		ns
Turn-off Delay Time	$t_{d(off)}$			646		ns
Fall Time	t_f			97		ns
Energy Dissipation During Turn-on Time	E_{on}			29.1		mJ
Energy Dissipation During Turn-off Time	E_{off}			20.5		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=600A$ $V_{CE}=300V$ $V_{GE}=\pm 15V$ $R_G=3.3\Omega$ $T_{vj}=150^{\circ}C$		280		ns
Rise Time	t_r			201		ns
Turn-off Delay Time	$t_{d(off)}$			651		ns
Fall Time	t_f			104		ns
Energy Dissipation During Turn-on Time	E_{on}			32		mJ
Energy Dissipation During Turn-off Time	E_{off}			23		mJ
SC Data	I_{sc}	$t_p \leq 6\mu s, V_{GE}=15V,$ $T_{vj}=150^{\circ}C, V_{CC}=300V,$ $V_{CEM} \leq 650V$		3000		A



● Diode

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25^{\circ}\text{C}$	650	V
Continuous DC Forward Current	I_F		600	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1\text{ms}$	1200	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=600\text{A}, T_{vj}=25^{\circ}\text{C}$		1.75		V
		$I_F=600\text{A}, T_{vj}=125^{\circ}\text{C}$		1.60		
		$I_F=600\text{A}, T_{vj}=150^{\circ}\text{C}$		1.55		
Recovered Charge	Q_{rr}	$I_F=600\text{A}$ $V_R=300\text{V}$ $-di_F/dt = 4000\text{ A/us}$ $T_{vj}=25^{\circ}\text{C}$		7.2		μC
Peak Reverse Recovery Current	I_{rr}			249		A
Reverse Recovery Energy	E_{rec}			1.15		mJ
Recovered Charge	Q_{rr}	$I_F=600\text{A}$ $V_R=300\text{V}$ $-di_F/dt = 4000\text{ A/us}$ $T_{vj}=150^{\circ}\text{C}$		20.3		μC
Peak Reverse Recovery Current	I_{rr}			413		A
Reverse Recovery Energy	E_{rec}			2.85		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}				175	$^{\circ}\text{C}$
Operating Junction Temperature	$T_{\text{vj op}}$		-40		150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-40		150	$^{\circ}\text{C}$
Comparative Tracking Index	CTI		400			
Thermal Resistance Junction to Case	$R_{\theta\text{JC}}$	per IGBT			0.06	K/W
		per Diode			0.15	
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

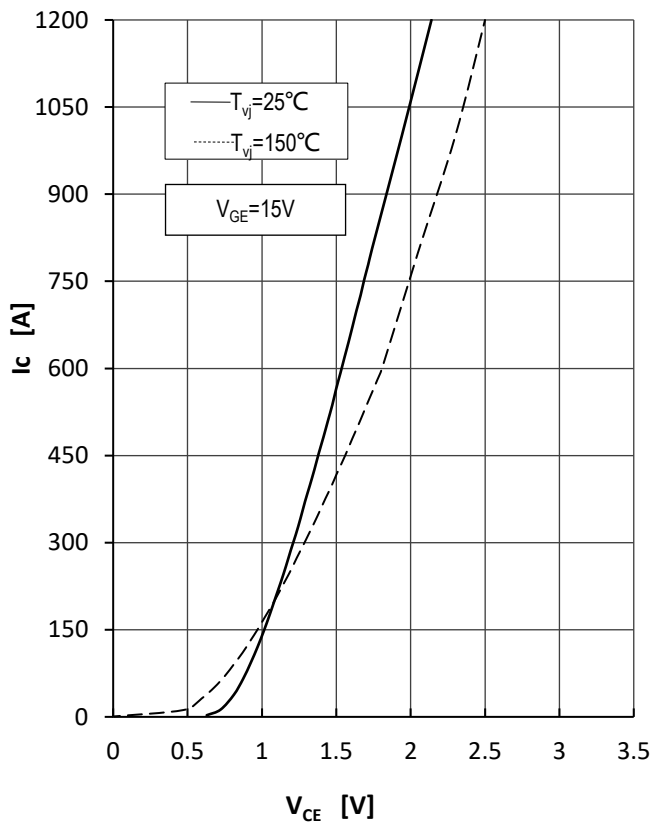


Fig1.IGBT Output Characteristics

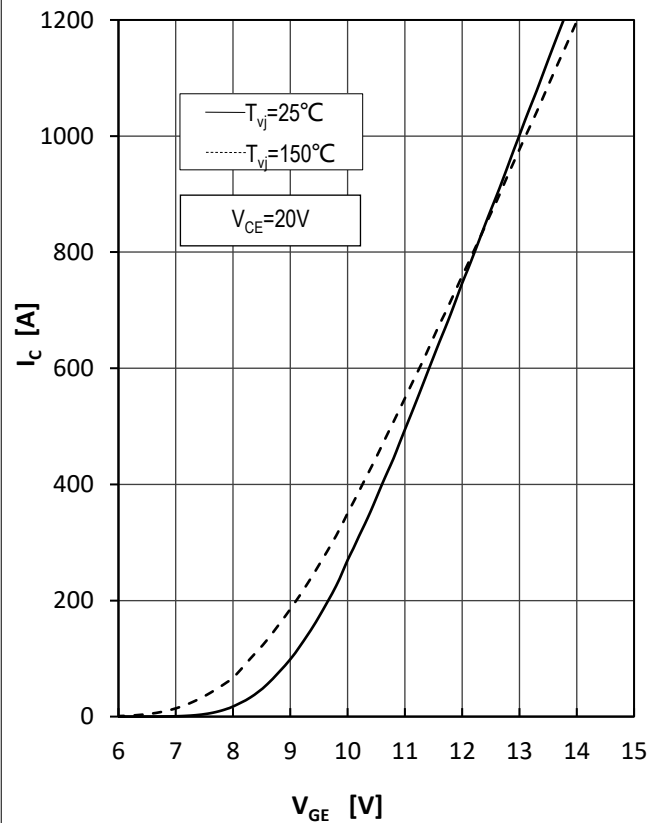


Fig2.IGBT Transfer Characteristics

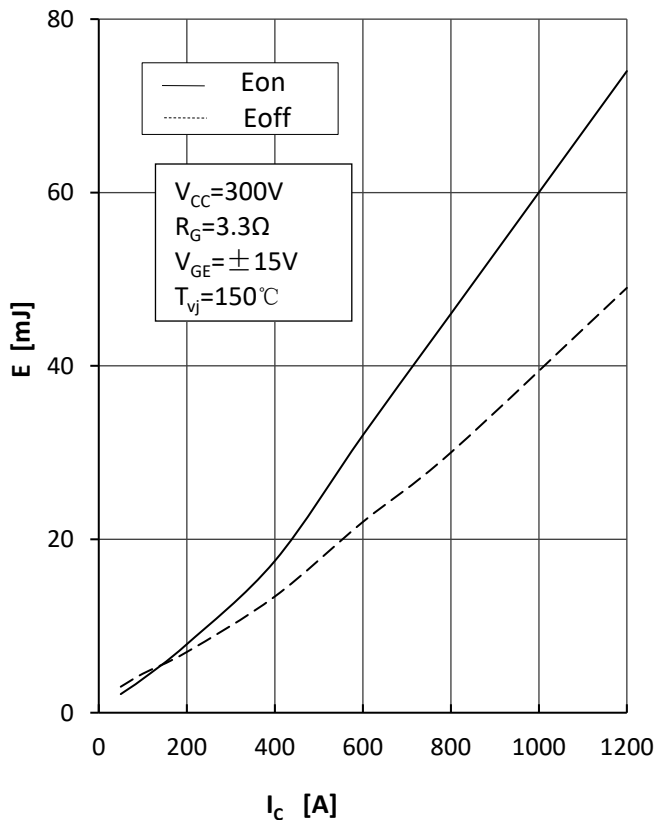


Fig3.IGBT Switching Loss vs.Ic

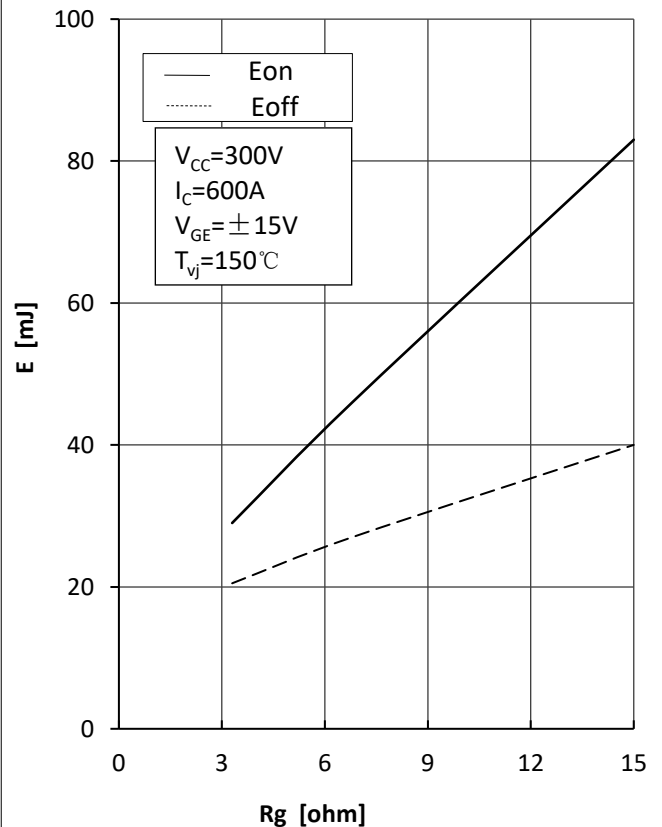
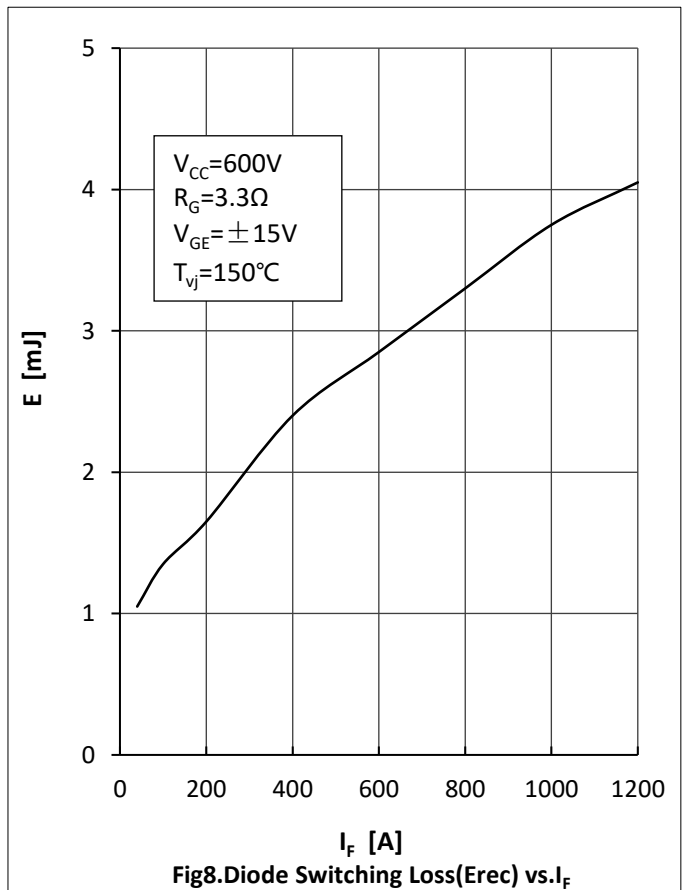
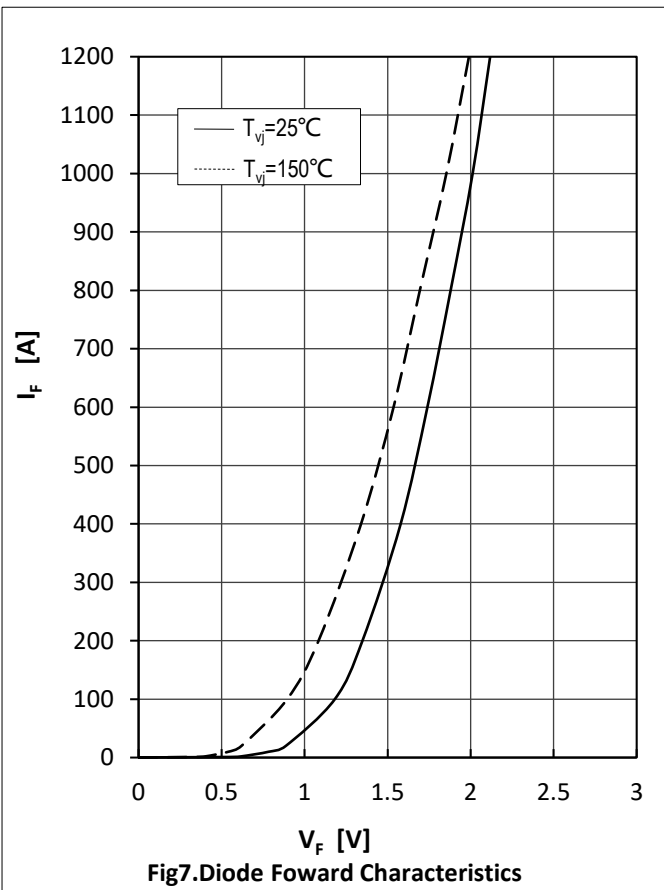
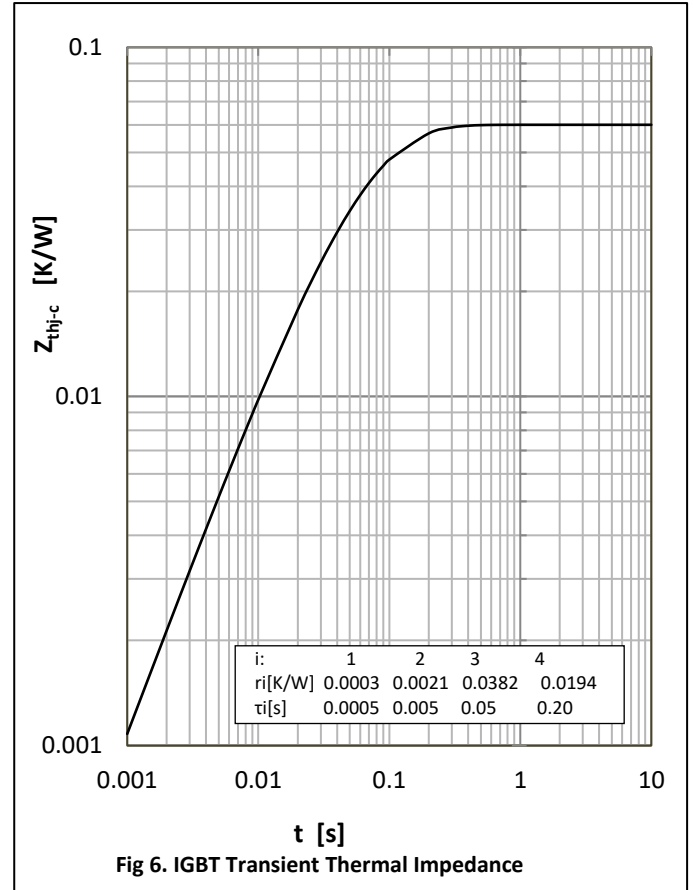
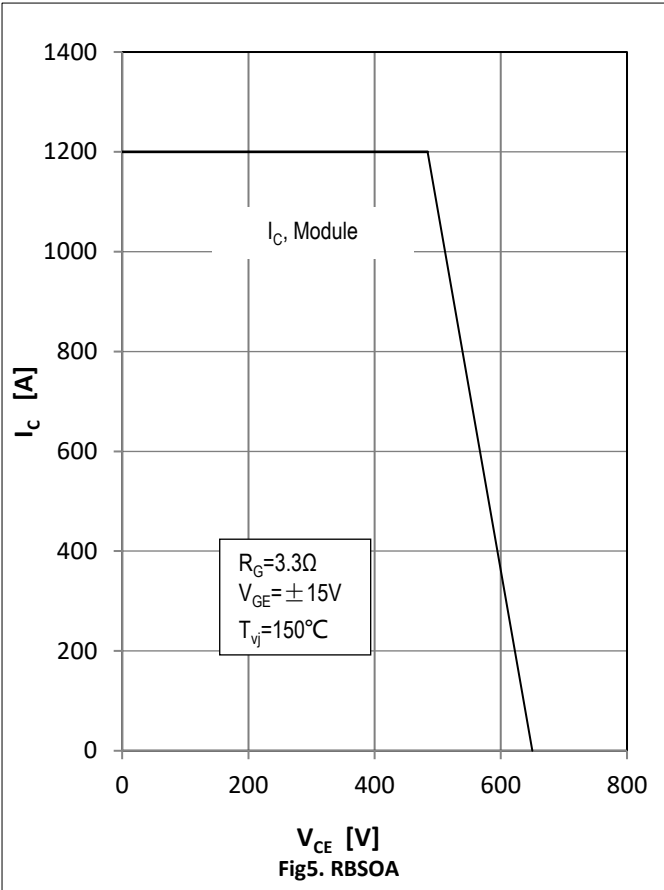


Fig4.IGBT Switching Loss vs.Rg



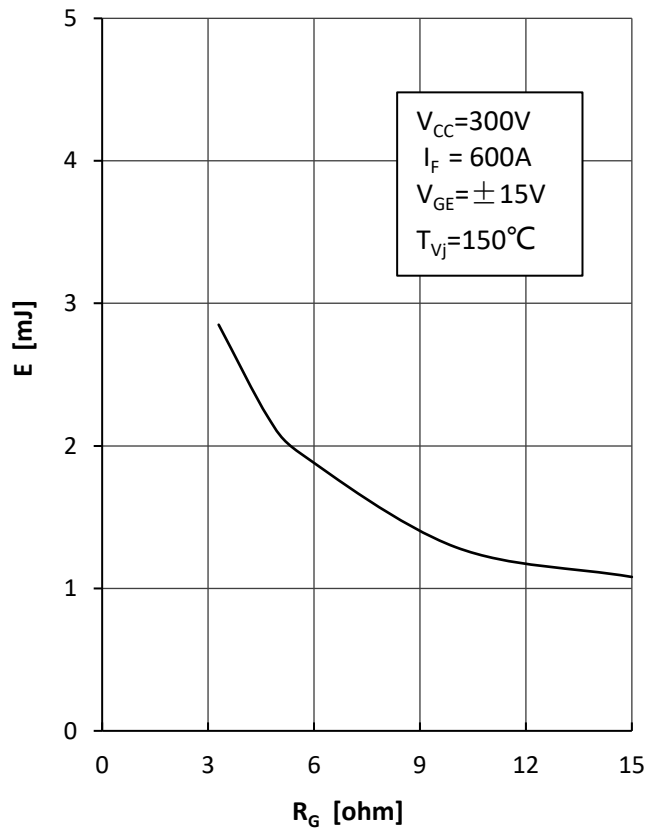


Fig9.Diode Switching Loss(E_{rec}) vs. R_g

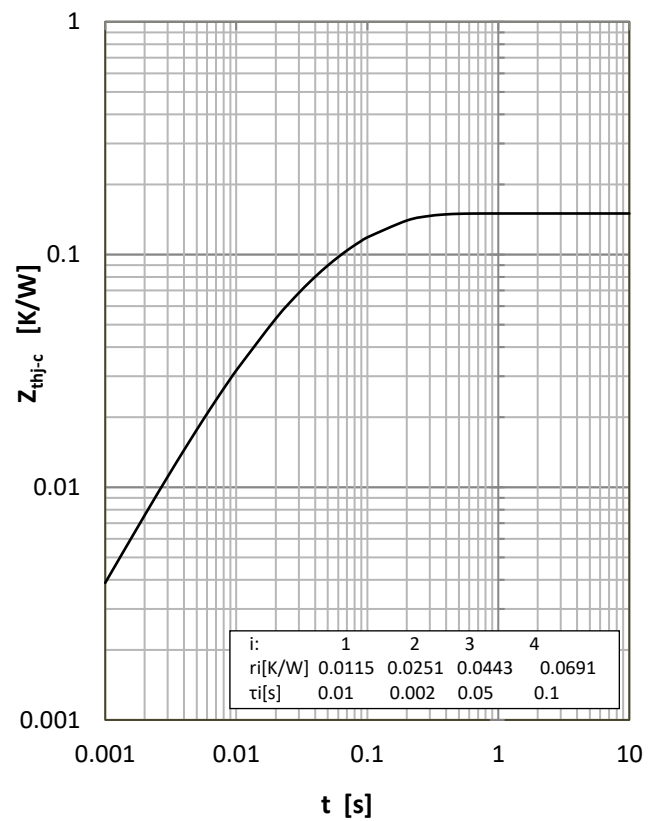
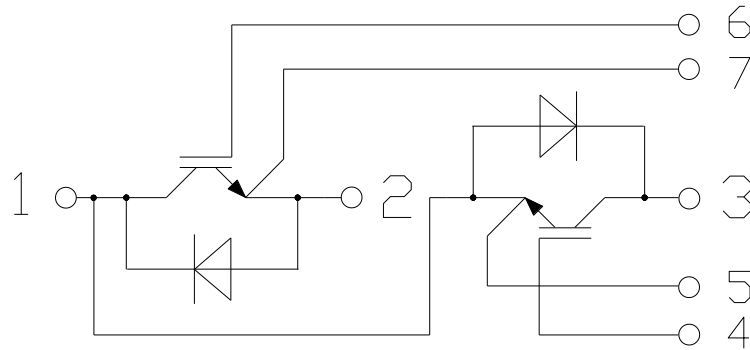


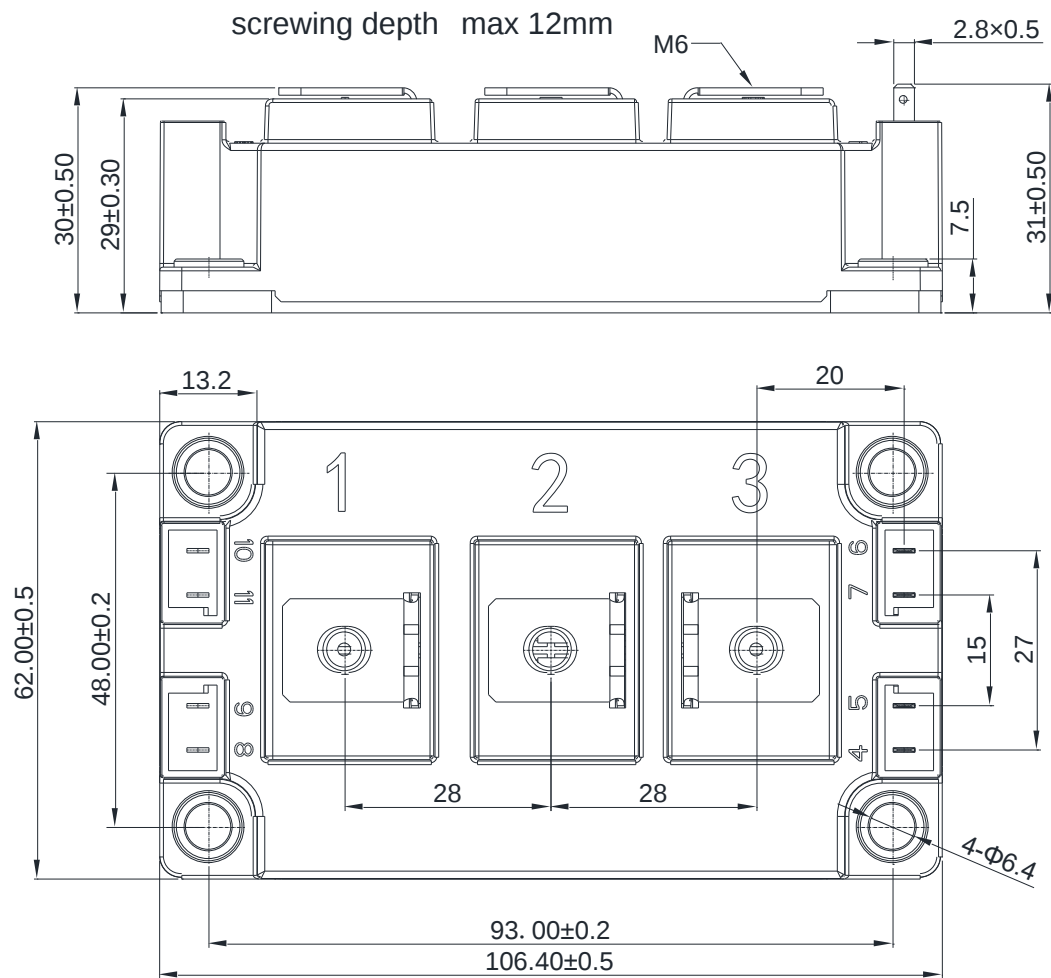
Fig10.Diode Transient Thermal Impedance

● 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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