



IGBT Modules

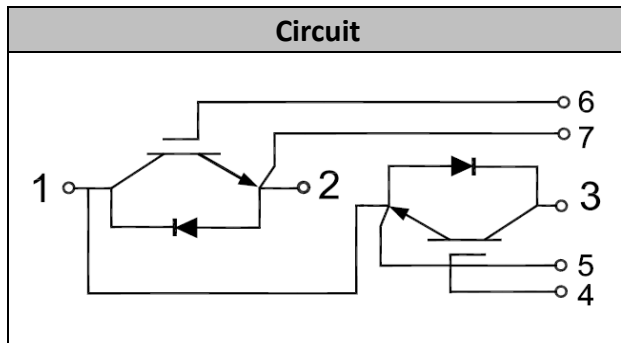
V_{CES}	1200V
I_C	300A

Applications

- Motion/servo control
- High frequency switching application
- UPS (Uninterruptible Power Supplies)
- Welding machine

Features

- Low $V_{CE(sat)}$ with trench technology
- Low switching losses especially Eoff
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance package
- Maximum junction temperature 175°C



● IGBT

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V_{CES}	$V_{GE}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	1200	V
Continuous Collector Current	I_C	$T_C=100^{\circ}C$	300	A
Repetitive Peak Collector Current	I_{CRM}	$t_p=1ms$	600	A
Gate-Emitter Voltage	V_{GES}	$T_{vj}=25^{\circ}C$	± 20	V
Total Power Dissipation	P_{tot}	$T_C=25^{\circ}C$ $T_{vjmax}=175^{\circ}C$	1700	W



Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=8mA, T_{vj}=25^{\circ}C$	5.4	5.8	6.4	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	$V_{CE(sat)}$	$I_C=300A, V_{GE}=15V, T_{vj}=25^{\circ}C$		2.10	2.60	V
		$I_C=300A, V_{GE}=15V, T_{vj}=125^{\circ}C$		2.45		
		$I_C=300A, V_{GE}=15V, T_{vj}=150^{\circ}C$		2.60		
Gate Charge	Q_G			2.5		uC
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V,$ $f=1MHz, T_{vj}=25^{\circ}C$		15.2		nF
Reverse Transfer Capacitance	C_{res}			0.7		nF
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$			400	nA
Turn-on Delay Time	$t_{d(on)}$	$I_C=300A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=2\Omega$ $T_{vj}=25^{\circ}C$		102		ns
Rise Time	t_r			50		ns
Turn-off Delay Time	$t_{d(off)}$			291		ns
Fall Time	t_f			102		ns
Energy Dissipation During Turn-on Time	E_{on}			29.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			16.8		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=300A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=2\Omega$ $T_{vj}=150^{\circ}C$		114.		ns
Rise Time	t_r			53		ns
Turn-off Delay Time	$t_{d(off)}$			315		ns
Fall Time	t_f			165		ns
Energy Dissipation During Turn-on Time	E_{on}			39.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			21.2		mJ
SC Data	I_{sc}	$t_p \leq 10\mu s, V_{GE}=15V,$ $T_{vj}=150^{\circ}C, V_{CC}=600V,$ $V_{CEM} \leq 1200V$		1700		A



● Diode

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25^{\circ}\text{C}$	1200	V
Continuous DC Forward Current	I_F		300	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1\text{ms}$	600	A

Characteristic Values

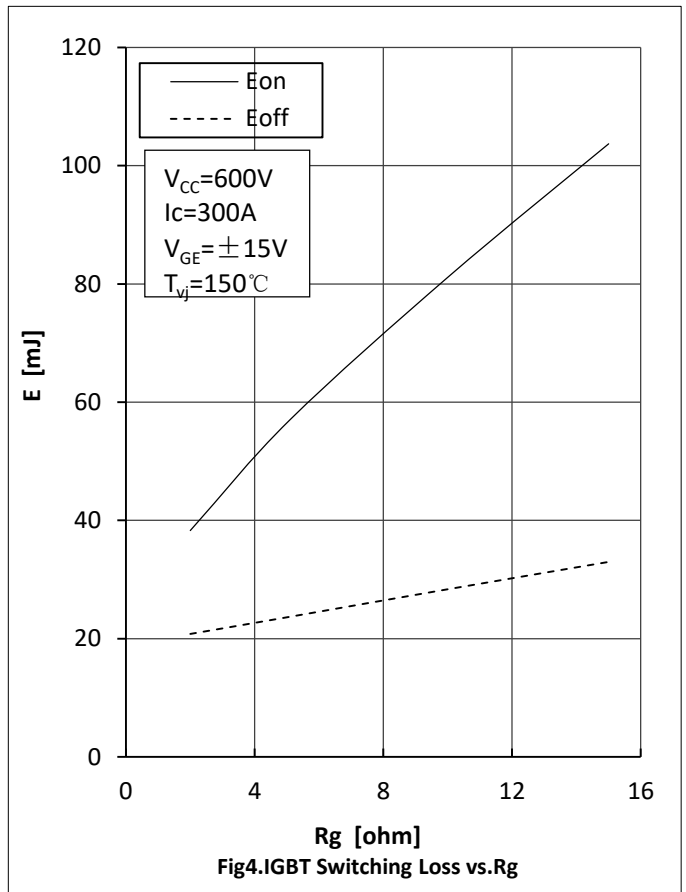
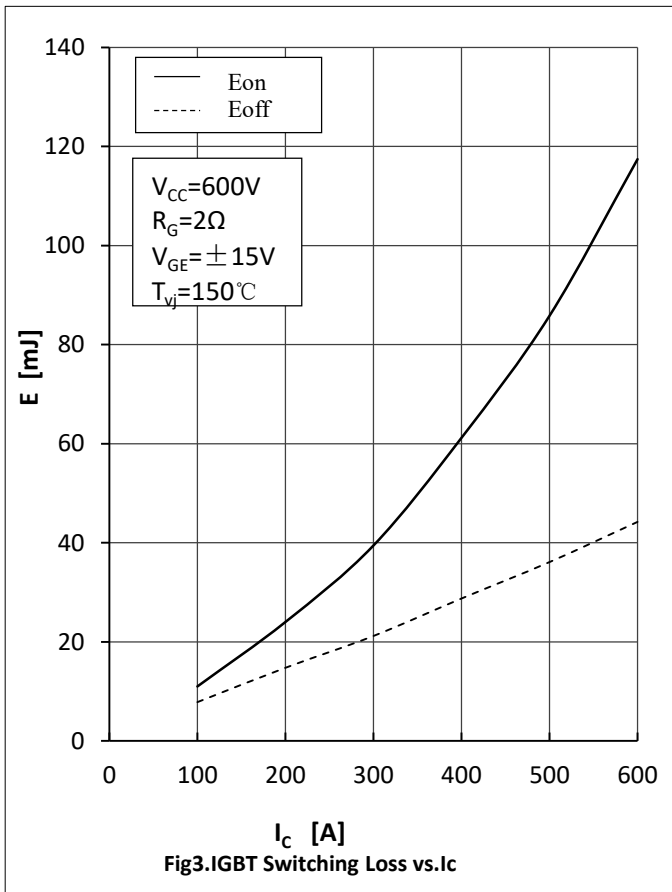
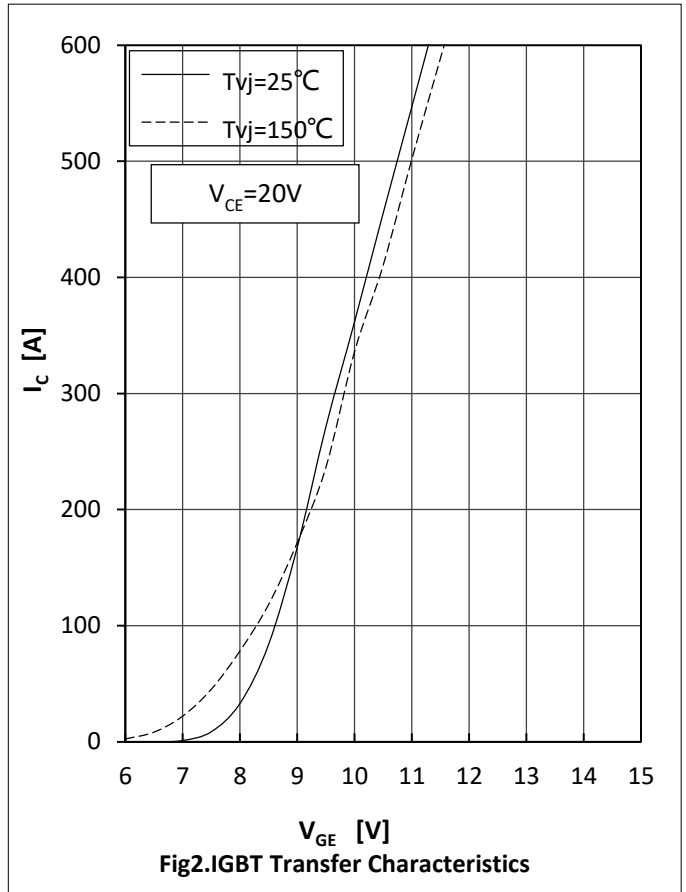
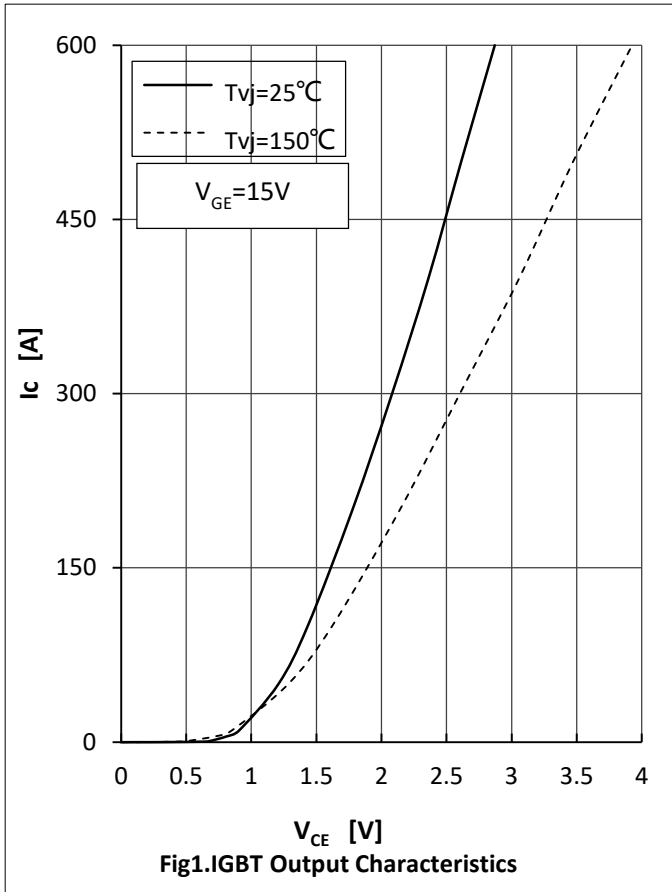
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=300\text{A}, T_{vj}=25^{\circ}\text{C}$		2.00	2.80	V
		$I_F=300\text{A}, T_{vj}=125^{\circ}\text{C}$		1.85		
		$I_F=300\text{A}, T_{vj}=150^{\circ}\text{C}$		1.75		
Recovered Charge	Q_{rr}	$I_F=300\text{A}$ $V_R=600\text{V}$ $-di_F/dt=4500\text{A/us}$ $T_{vj}=25^{\circ}\text{C}$		20		μC
Peak Reverse Recovery Current	I_{rr}			145		A
Reverse Recovery Energy	E_{rec}			7.3		mJ
Recovered Charge	Q_{rr}	$I_F=300\text{A}$ $V_R=600\text{V}$ $-di_F/dt=4500\text{A/us}$ $T_{vj}=150^{\circ}\text{C}$		45		μC
Peak Reverse Recovery Current	I_{rr}			205		A
Reverse Recovery Energy	E_{rec}			16.7		mJ

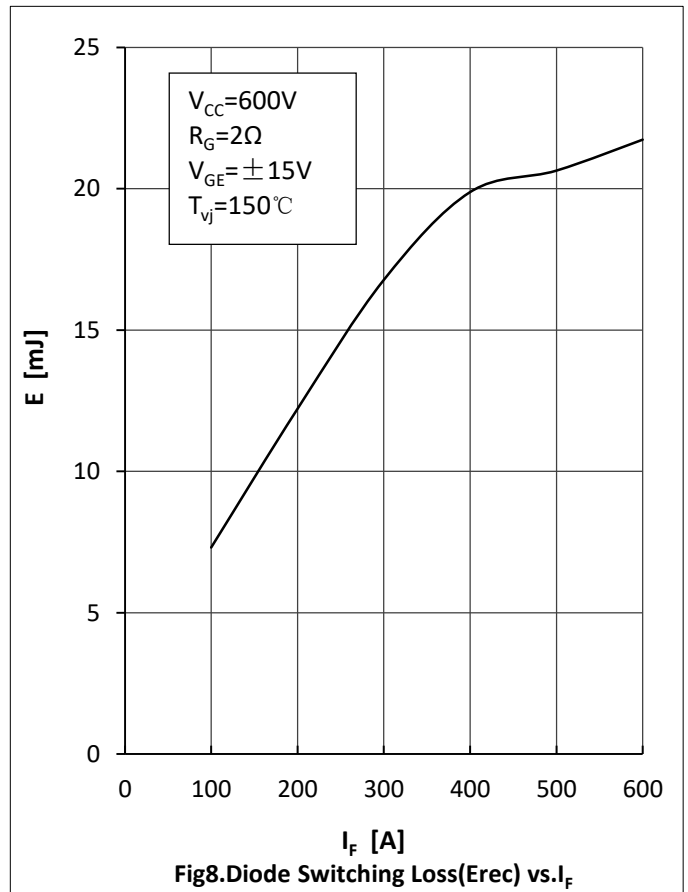
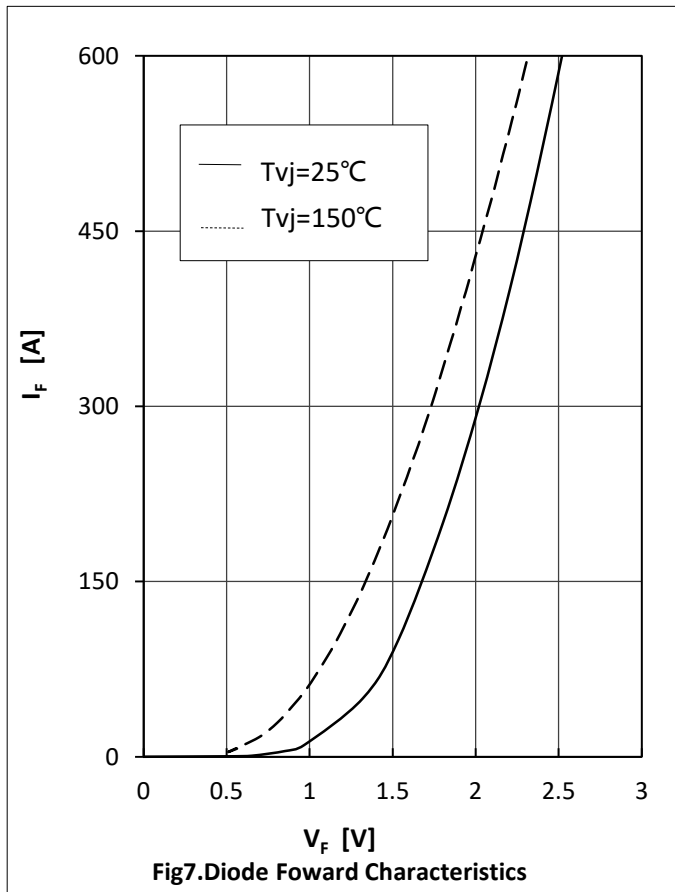
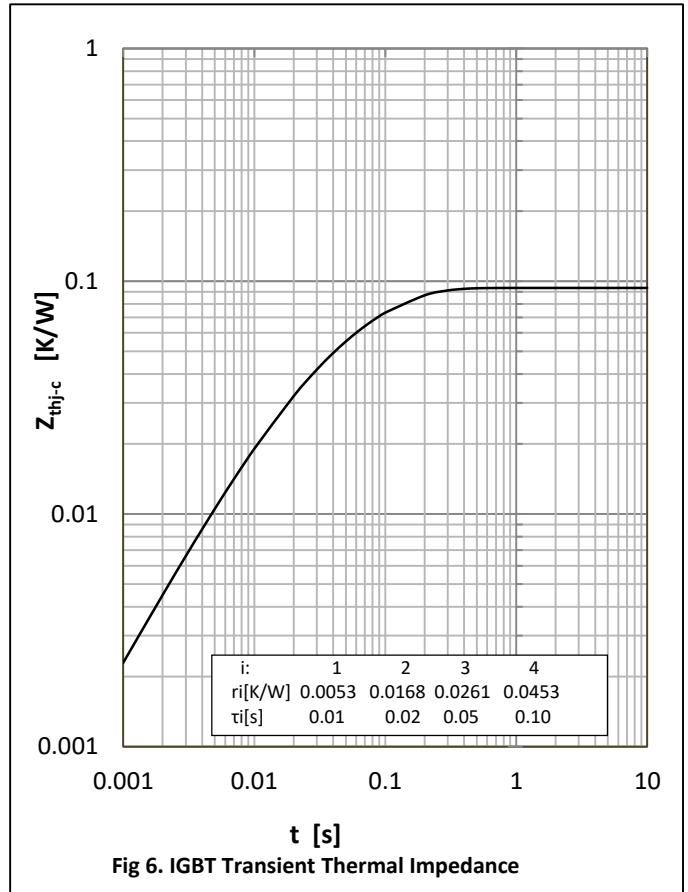
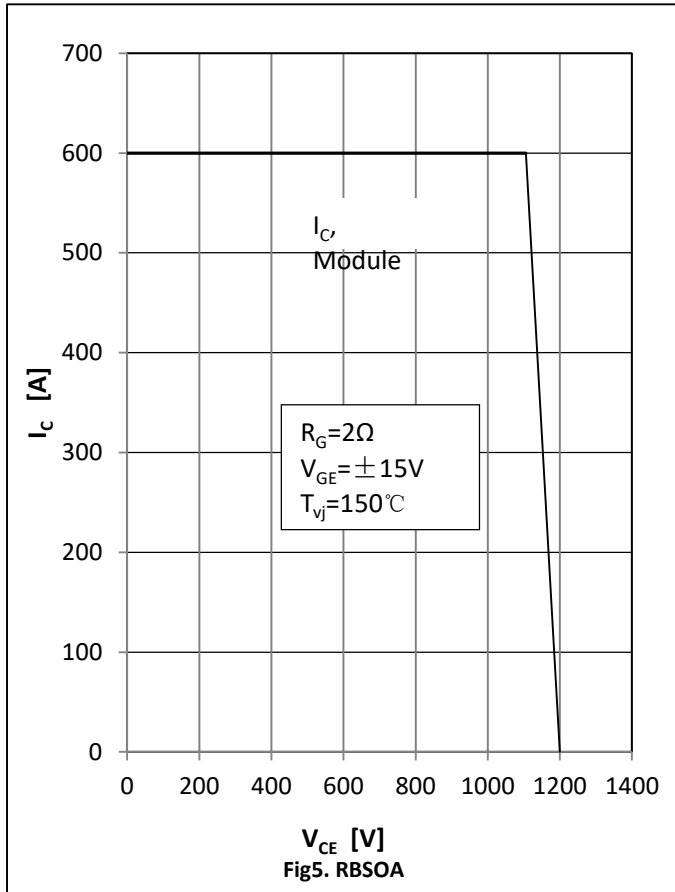


● Module Characteristics

$T_C=25^{\circ}\text{C}$ 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		125	$^{\circ}\text{C}$
Thermal Resistance Junction to Case	$R_{\theta\text{JC}}$	per IGBT			0.09	K/W
		per Diode			0.16	
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





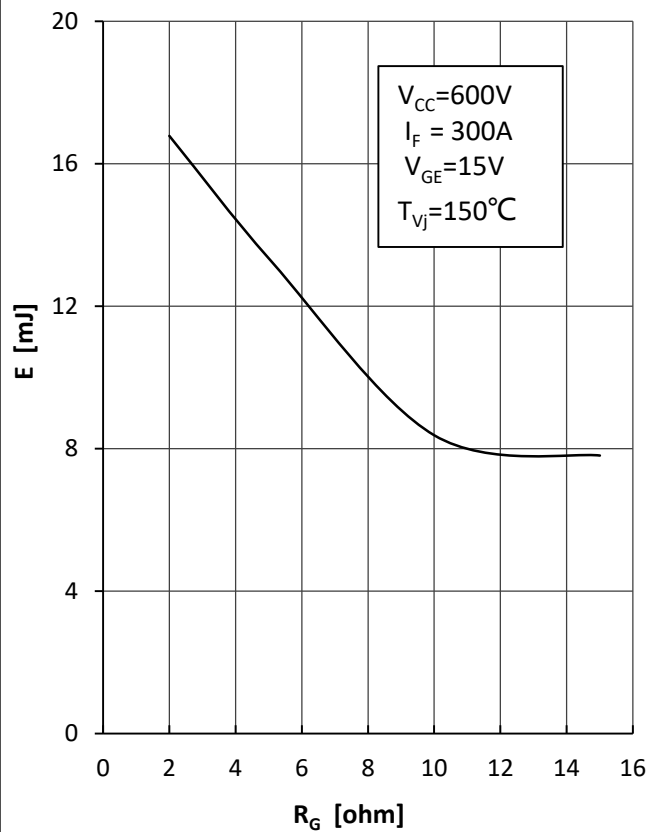


Fig9.Diode Switching Loss(E_{rec}) vs. R_g

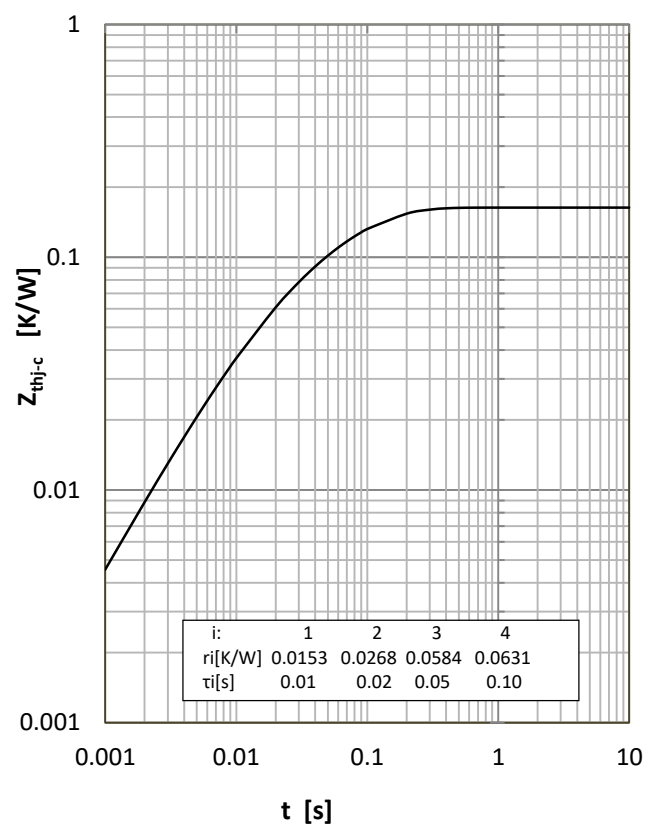
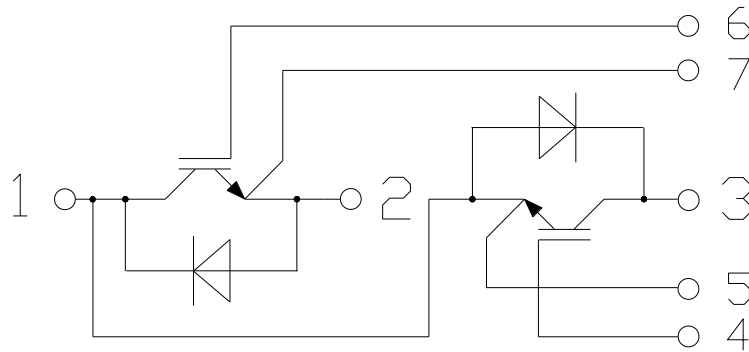


Fig10.Diode Transient Thermal Impedance

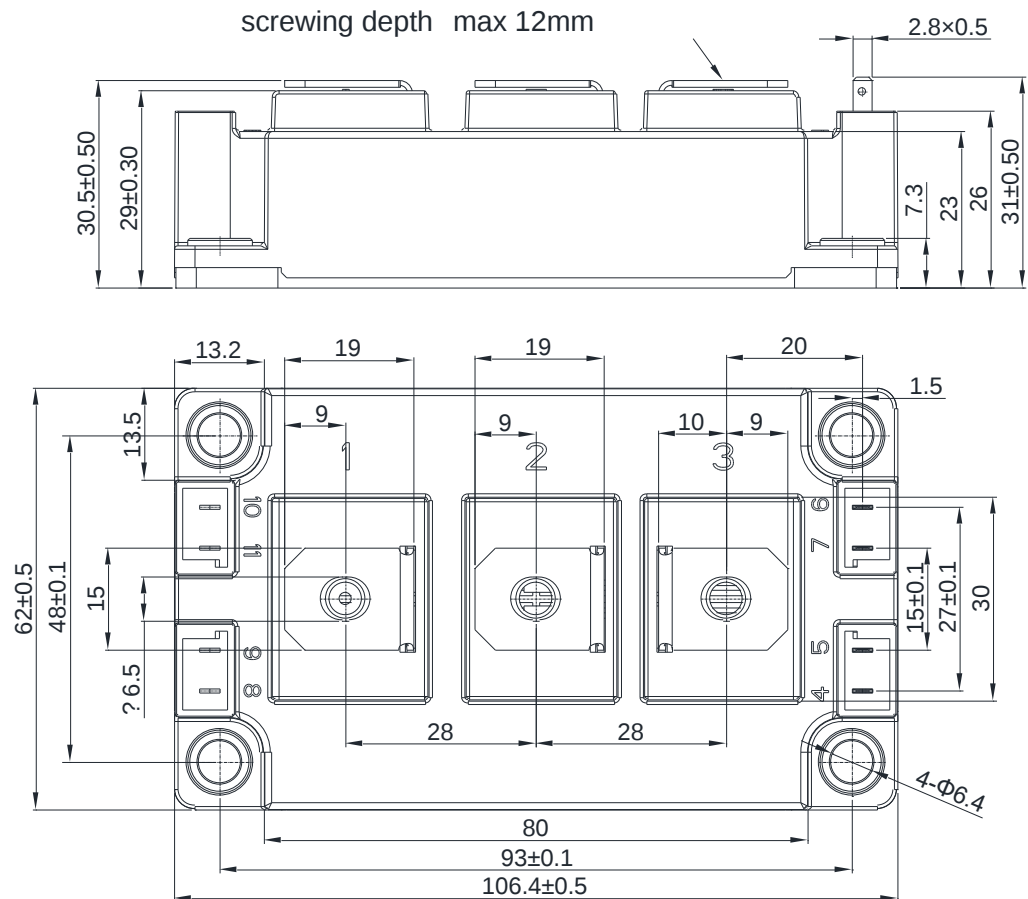


● Circuit Diagram



● Package Outline Information

Dimensions in Millimeters





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