



IGBT Modules

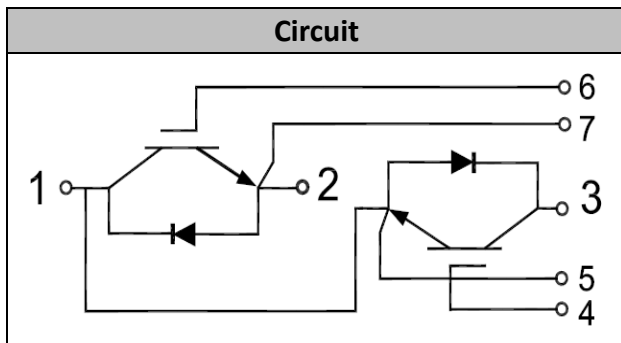
V_{CES}	1200V
I_C	600A

Applications

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

Features

- Low $V_{CE(sat)}$ with Trench technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability(10us)
- 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}	$V_{GE}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	1200	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}	$T_C=25^{\circ}C$ $T_{vjmax}=175^{\circ}C$	2580	W



Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, $I_C=18mA$, $T_{vj}=25^{\circ}C$	5.0	5.89	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	$V_{CE(sat)}$	$I_C=600A$, $V_{GE}=15V$, $T_{vj}=25^{\circ}C$		1.70	2.00	V
		$I_C=600A$, $V_{GE}=15V$, $T_{vj}=150^{\circ}C$		2.04		
		$I_C=600A$, $V_{GE}=15V$, $T_{vj}=175^{\circ}C$		2.10		
Gate Charge	Q_G			5.8		uC
Internal Gate Resistor	R_{Gint}			0.54		Ω
Input Capacitance	C_{ies}	$V_{CE}=25V$, $V_{GE}=0V$, $f=1MHz$, $T_{vj}=25^{\circ}C$		59.7		nF
Reverse Transfer Capacitance	C_{res}			1.26		nF
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V$, $V_{GE}=20V$, $T_{vj}=25^{\circ}C$			400	nA
Turn-on Delay Time	$t_{d(on)}$	$I_C=600A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.1\Omega$ $T_{vj}=25^{\circ}C$		130.6		ns
Rise Time	t_r			72.6		ns
Turn-off Delay Time	$t_{d(off)}$			377.6		ns
Fall Time	t_f			135.0		ns
Energy Dissipation During Turn-on Time	E_{on}			40.6		mJ
Energy Dissipation During Turn-off Time	E_{off}			40.2		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=600A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.1\Omega$ $T_{vj}=150^{\circ}C$		137.9		ns
Rise Time	t_r			79.4		ns
Turn-off Delay Time	$t_{d(off)}$			431.7		ns
Fall Time	t_f			229.8		ns
Energy Dissipation During Turn-on Time	E_{on}			64.6		mJ
Energy Dissipation During Turn-off Time	E_{off}			56.5		mJ
Turn-on Delay Time	$t_{d(on)}$	$I_C=600A$ $V_{CE}=600V$ $V_{GE}=\pm 15V$ $R_G=1.1\Omega$ $T_{vj}=175^{\circ}C$		139.4		ns
Rise Time	t_r			81.6		ns
Turn-off Delay Time	$t_{d(off)}$			443.8		ns
Fall Time	t_f			256.6		ns
Energy Dissipation During Turn-on Time	E_{on}			70.7		mJ
Energy Dissipation During Turn-off Time	E_{off}			61.0		mJ
SC Data	I_{sc}	$t_p \leq 10\mu s$, $V_{GE}=15V$, $V_{CEM} \leq 1200V$ $T_{vj}=150^{\circ}C$, $V_{CC}=600V$,		2147		A



● Diode

Absolute Maximum Ratings

	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25^{\circ}\text{C}$	1200	V
Continuous DC Forward Current	I_F		600	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1\text{ms}$	1200	A
I^2t -value	I^2t	$V_R=0\text{V}, t_p=10\text{ms}, T_{vj}=125^{\circ}\text{C}$	35000	A^2s
		$V_R=0\text{V}, t_p=10\text{ms}, T_{vj}=150^{\circ}\text{C}$	32000	

Characteristic Values

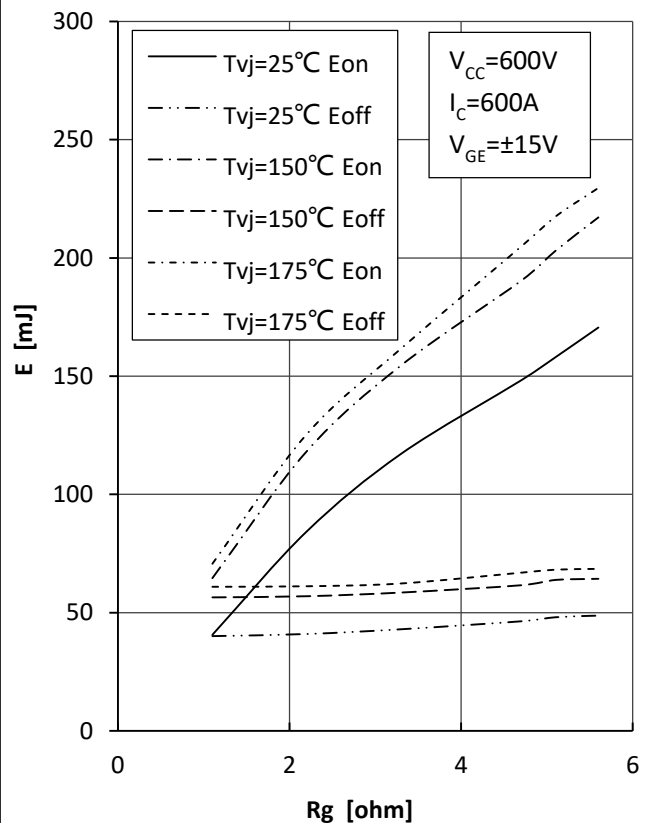
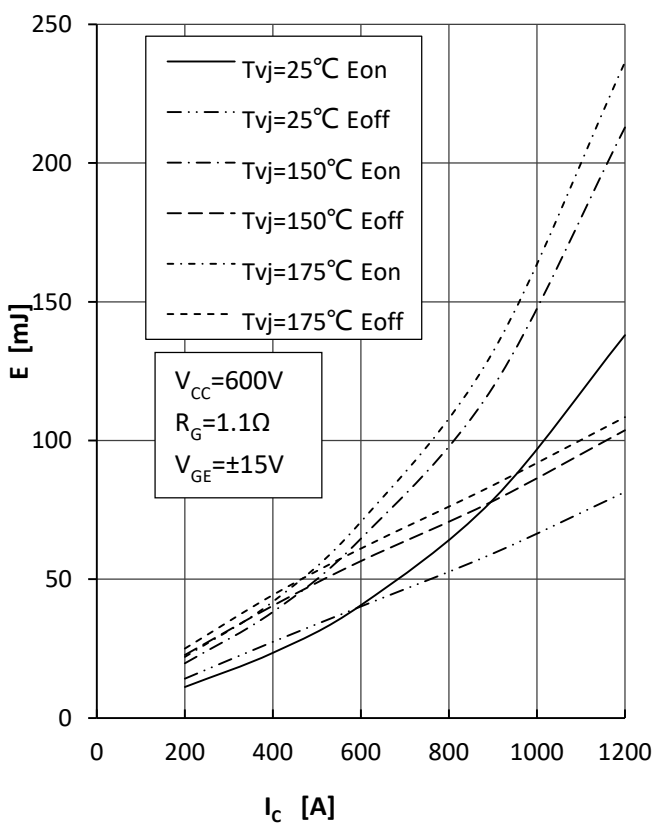
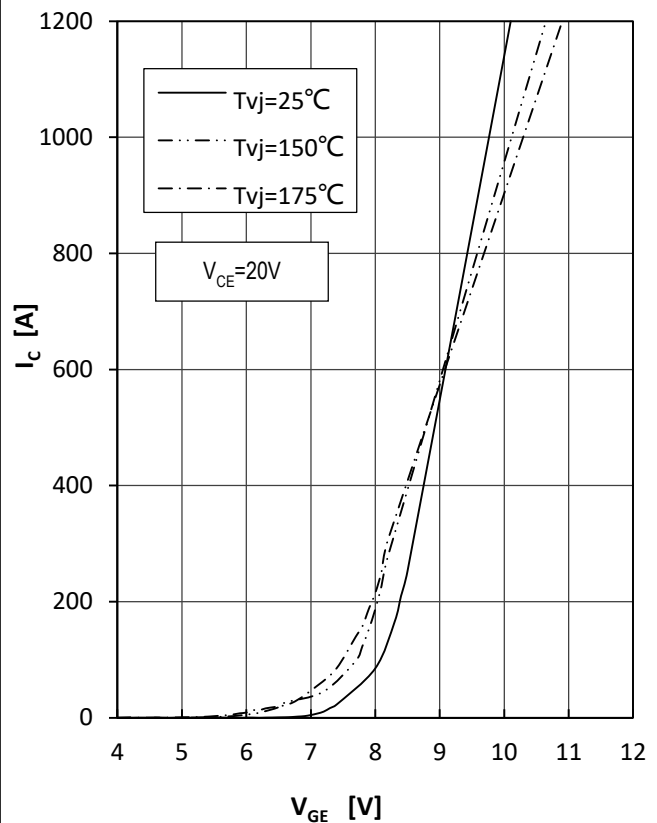
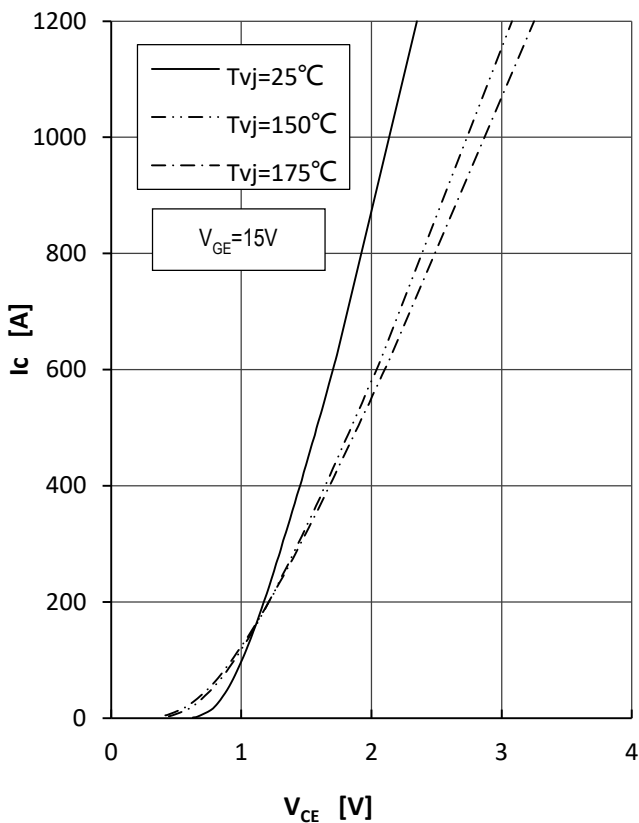
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	$I_F=600\text{A}, T_{vj}=25^{\circ}\text{C}$		1.95	2.10	V
		$I_F=600\text{A}, T_{vj}=150^{\circ}\text{C}$		1.77		
		$I_F=600\text{A}, T_{vj}=175^{\circ}\text{C}$		1.72		
Recovered Charge	Q_{rr}	$I_F=600\text{A}$		43.7		μC
Peak Reverse Recovery Current	I_{rr}	$V_R=600\text{V}$		303.9		A
Reverse Recovery Energy	E_{rec}	$-di_F/dt=6000\text{A}/\mu\text{s}$ $T_{vj}=25^{\circ}\text{C}$		17.1		mJ
Recovered Charge	Q_{rr}	$I_F=600\text{A}$		96.3		μC
Peak Reverse Recovery Current	I_{rr}	$V_R=600\text{V}$		417.4		A
Reverse Recovery Energy	E_{rec}	$-di_F/dt=6000\text{A}/\mu\text{s}$ $T_{vj}=150^{\circ}\text{C}$		37.8		mJ
Recovered Charge	Q_{rr}	$I_F=600\text{A}$		110.5		μC
Peak Reverse Recovery Current	I_{rr}	$V_R=600\text{V}$		437.5		A
Reverse Recovery Energy	E_{rec}	$-di_F/dt=6000\text{A}/\mu\text{s}$ $T_{vj}=175^{\circ}\text{C}$		43.2		mJ

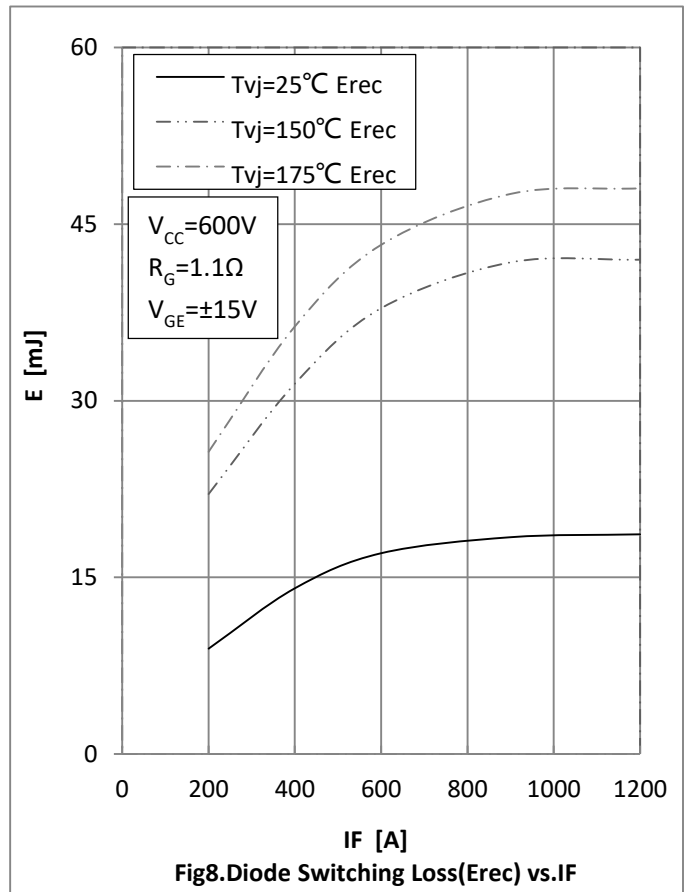
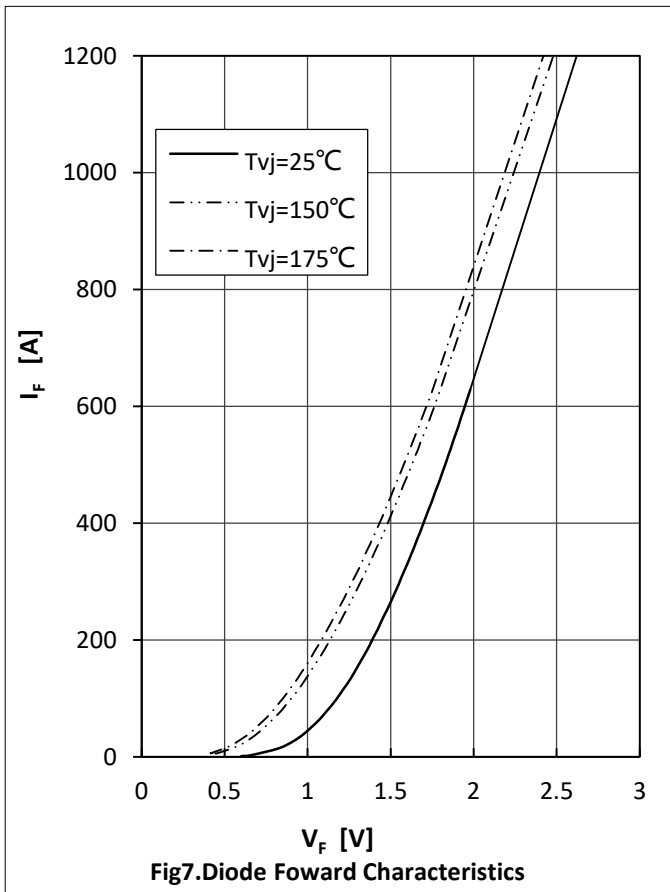
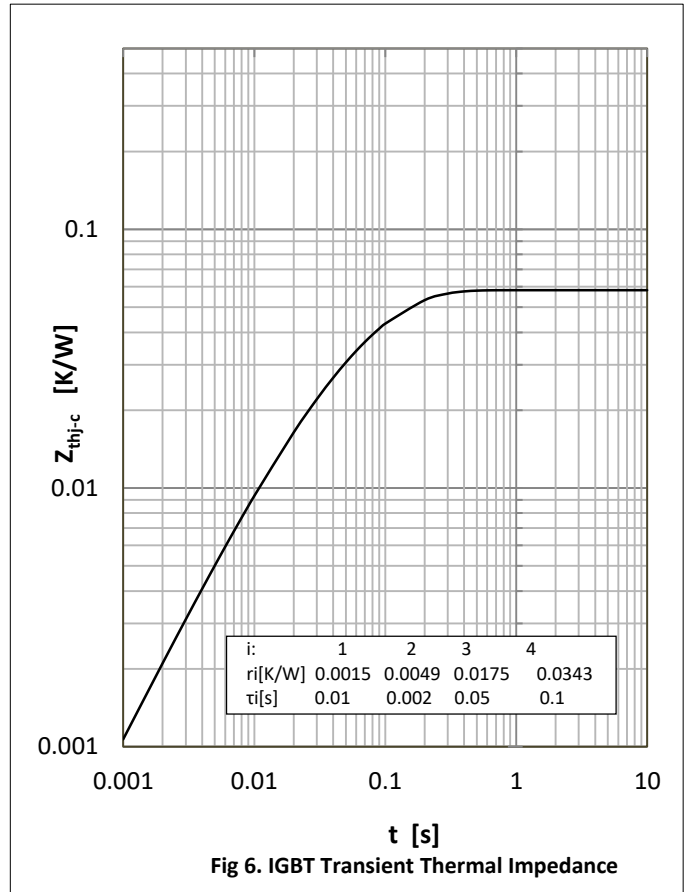
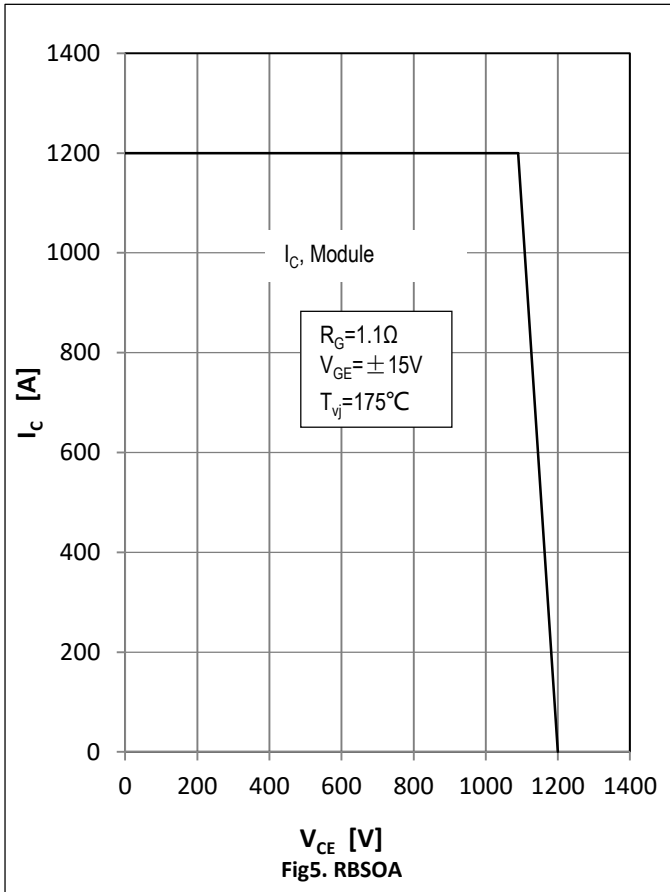


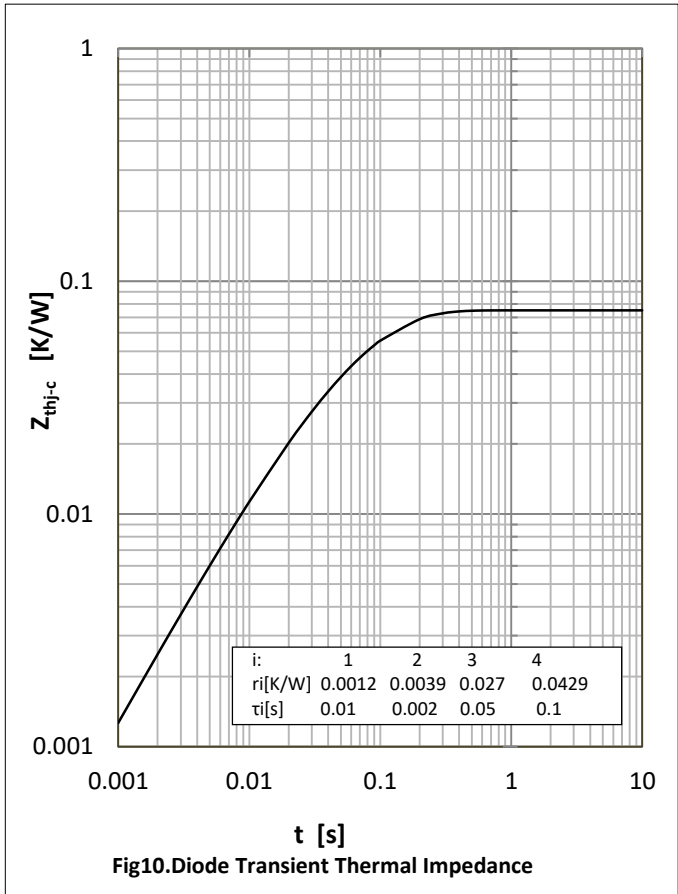
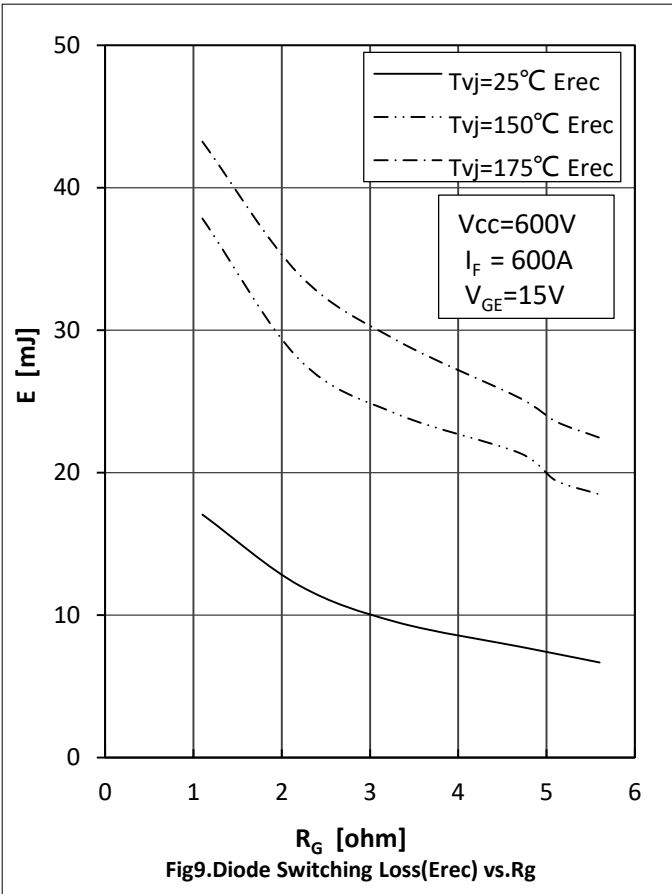
● Module Characteristics

$T_C=25^{\circ}\text{C}$ unless otherwise specified

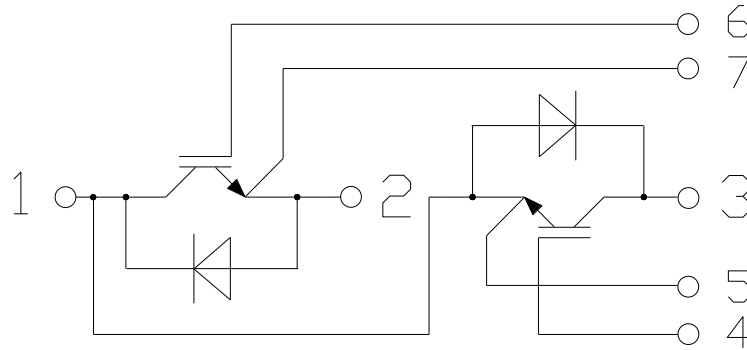
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation voltage	V_{isol}	$t=1\text{min}, f=50\text{Hz}$	2500			V
Maximum Junction Temperature	T_{jmax}				175	$^{\circ}\text{C}$
Operating Junction Temperature	$T_{\text{vj op}}$		-40		175	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-40		125	$^{\circ}\text{C}$
Thermal Resistance Junction to Case	$R_{\theta\text{JC}}$	per IGBT			0.058	K/W
		per Diode			0.075	
Thermal Resistance Case to Sink	$R_{\theta\text{CS}}$	Conductive grease applied		0.012	0.035	K/W
Comparative Tracking Index	CTI		400			
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





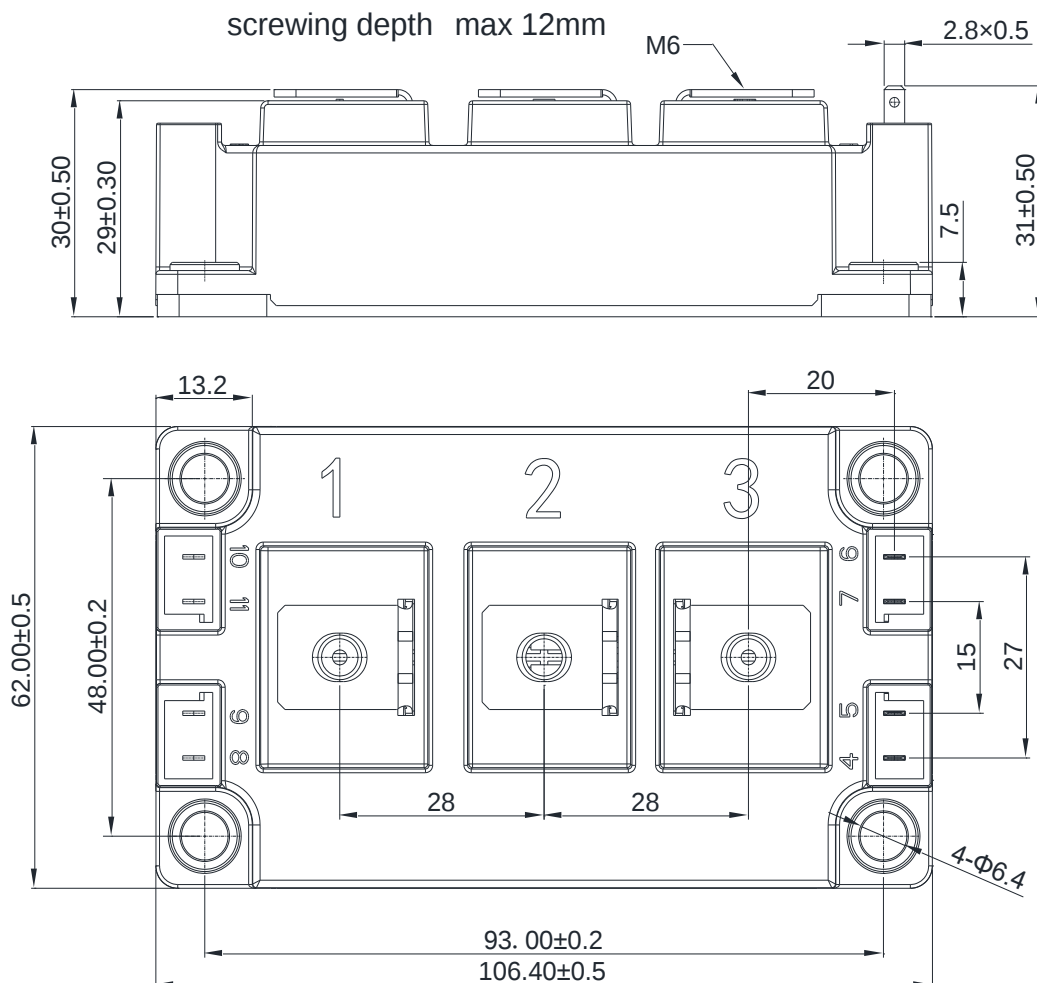


Circuit Diagram



● 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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