



E502650

Features

- Low $V_{CE(sat)}$ With SPT+ Technology
- $V_{CE(sat)}$ With Positive Temperature Coefficient
- Including Fast & Soft Recovery Anti-parallel FWD
- High Short Circuit Capability(10us)
- Low Inductance Module Structure
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

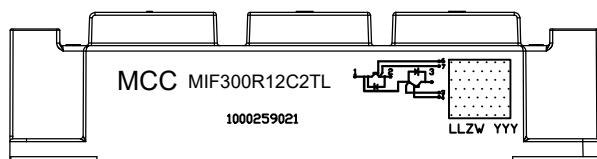
Applications

- Inverter for Motor Drive
- AC and DC Servo Driver Amplifier
- UPS(Uninterruptible Power Supplies)
- Soft Switching Welding Machine

Maximum Ratings

Parameter	Symbol	Rating	Unit
Collector-Emitter Voltage@ $V_{GE}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	V_{CES}	1200	V
Continuous Collector Current @ $T_C=100^{\circ}C$	I_C	300	A
Peak Collector Current @ $T_p=1ms$	I_{CRM}	600	A
Gate-Emitter Voltage@ $T_{vj}=25^{\circ}C$	V_{GE}	± 20	V
Isolation Voltage @ $f=50Hz, t=1min$	V_{iso}	2500	V
Weight of Module	G	315	g
Module Electrodes Torque:M5	M_t	3~5	N*m
Module-to-Sink Torque:M6	M_s	3~5	N*m
Total Power Dissipation (IGBT-Inverter)	$T_C=25^{\circ}C$	P_{tot}	W
	$T_{vjmax}=175^{\circ}C$		

Module Marking



Marking Code Contents:

Logo: MCC

Product Number:MIF300R12C2TL

Trace Code: 10 Digits

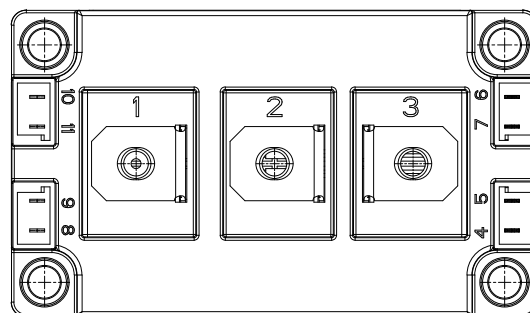
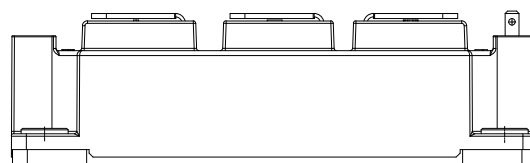
Circuit Diagram

2D Code format: Data Matrix

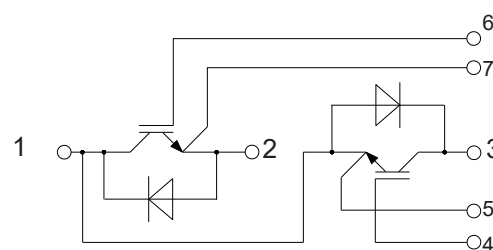
IGBT Modules

1200V 300A

C2



Circuit Diagram



Electrical Characteristics of IGBT @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=8mA, T_{vj}=25^{\circ}C$	5.2	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	$V_{CE(sat)}$	$V_{GE}=15V, I_C=300A, T_{vj}=25^{\circ}C$		1.85	2.20	V
		$V_{GE}=15V, I_C=300A, T_{vj}=125^{\circ}C$		2.2		
		$V_{GE}=15V, I_C=300A, T_{vj}=150^{\circ}C$		2.3		
Gate Charge	Q_G			2.6		uC
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz, T_{vj}=25^{\circ}C$		18.4		nF
Reverse Transfer Capacitance	C_{res}			0.9		
Internal Gate Resistance	R_{gint}			2.5		Ω
Gate Emitter Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$			400	nA
Turn-On Delay Time	$t_{d(on)}$	$V_{CE}=600V, I_C=300A, V_{GE}=\pm 15V, R_G=2.4\Omega, T_{vj}=25^{\circ}C$		217		ns
Rise Time	t_r			80		
Turn-Off Delay Time	$t_{d(off)}$			315		
Fall Time	t_f			171		
Energy Dissipation During Turn-on Time	E_{on}	$V_{CE}=600V, I_C=300A, V_{GE}=\pm 15V, R_G=2.4\Omega, T_{vj}=25^{\circ}C$		37.1		mJ
Energy Dissipation During Turn-off Time	E_{off}			20.6		
Turn-On Delay Time	$t_{d(on)}$	$V_{CE}=600V, I_C=300A, V_{GE}=\pm 15V, R_G=2.4\Omega, T_{vj}=150^{\circ}C$		224		ns
Rise Time	t_r			90		
Turn-Off Delay Time	$t_{d(off)}$			362		
Fall Time	t_f			248		
Energy Dissipation During Turn-on Time	E_{on}			48.9		mJ
Energy Dissipation During Turn-off Time	E_{off}			26.2		
SC data	I_{SC}	$T_P \leq 10\mu s, V_{GE}=15V, T_{vj}=150^{\circ}C, V_{CC}=900, V_{CEM} \leq 1200V$		1500		A

Electrical Characteristics of DIODE @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	$T_{vj}=25^{\circ}C$	1200	V
Continuous DC Forward Current	I_F		300	A
Repetitive Peak Forward Current	I_{FRM}	$t_p=1ms$	600	A
I^2t -Value	I^2t	$V_R=0V, t_p=10ms, T_{vj}=125^{\circ}C$	18200	A^2s
		$V_R=0V, t_p=10ms, T_{vj}=150^{\circ}C$	17000	

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage	V_F	$I_F=300A, T_{vj}=25^{\circ}C$		1.95		V
		$I_F=300A, T_{vj}=125^{\circ}C$		1.80		
Recovered Charge	Q_{rr}	$I_F=300A$ $V_R=600V$		17		μC
Peak Reverse Recovery Current	I_{rr}	$-diF/dt = 3000A/us$		97		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=25^{\circ}C$		5.2		mJ
Recovered Charge	Q_{rr}	$I_F=300A$ $V_R=600V$		47		μC
Peak Reverse Recovery Current	I_{rr}	$-diF/dt = 3000A/us$		157		A
Reverse Recovery Energy	E_{rec}	$T_{vj}=150^{\circ}C$		15.8		mJ

Module Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Isolation Voltage	V_{isol}	$t=1min, f=50Hz$	2500			V
Maximum Junction Temperature	T_{jmax}				175	$^{\circ}C$
Operating Junction Temperature	$T_{vj op}$		-40		150	$^{\circ}C$
Storage Temperature	T_{stg}		-40		125	$^{\circ}C$
Thermal Resistance Junction to Case	$R_{\theta JC}$	per IGBT			0.09	K/W
		per Diode			0.16	
Thermal Resistance Case-to Sink	$R_{\theta CS}$	Conductive grease applied		0.035		K/W

Curve Characteristics

Fig1.IGBT Output Characteristics

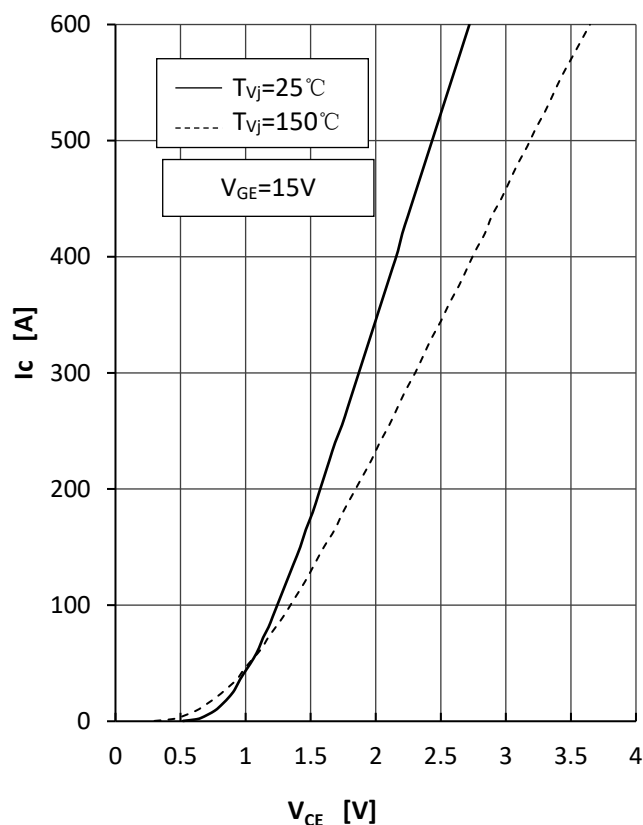


Fig2.IGBT Transfer Characteristics

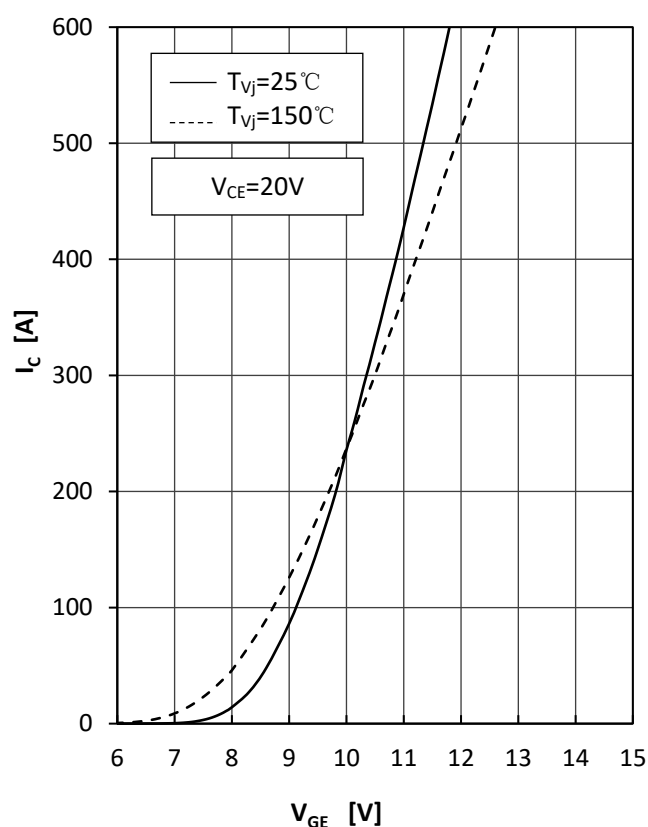


Fig3.IGBT Switching Loss vs.Ic

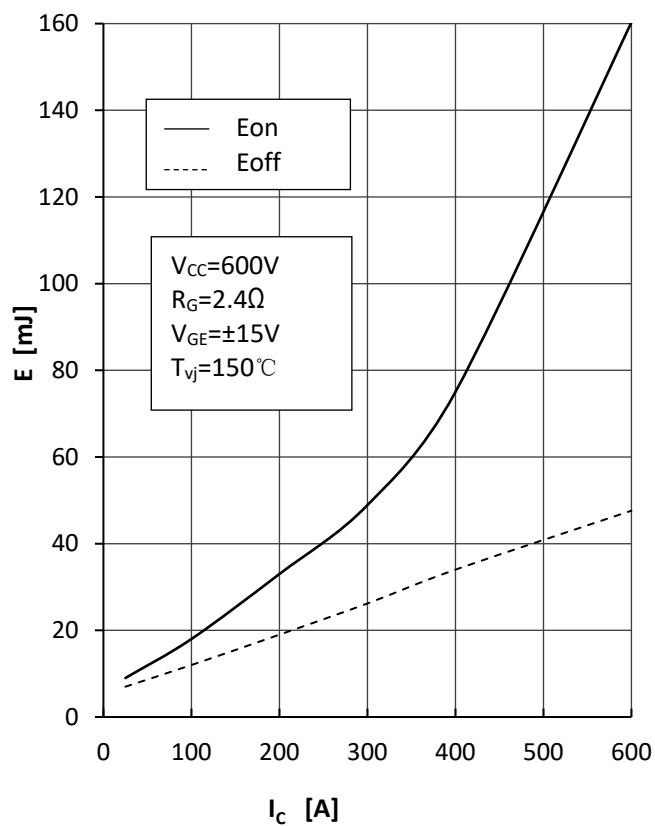
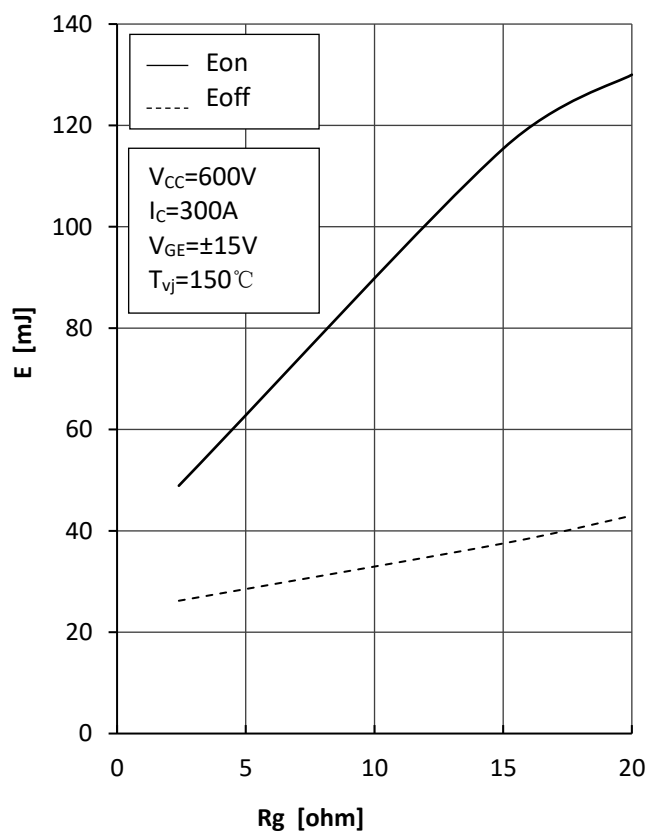


Fig4.IGBT Switching Loss vs.Rg



Curve Characteristics

Fig5. RBSOA

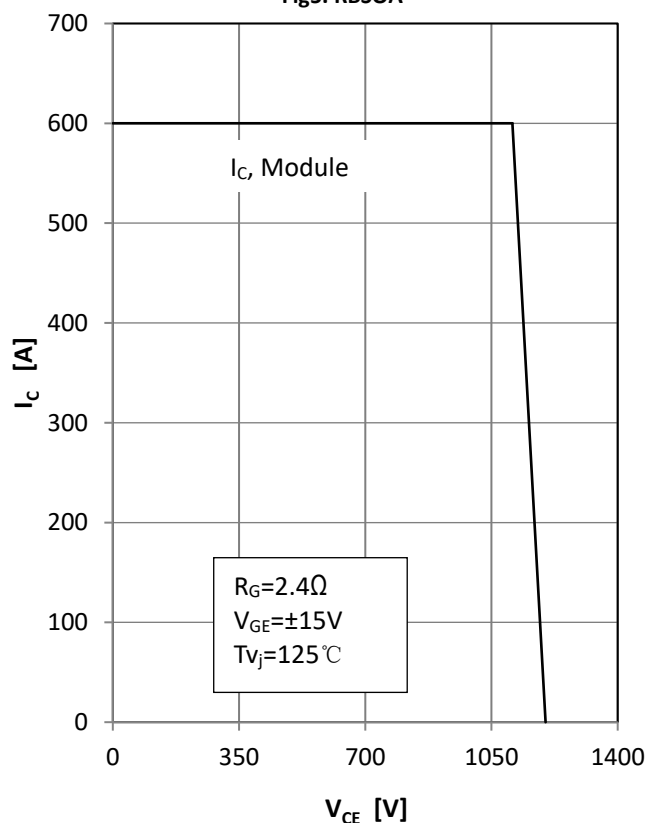


Fig 6. IGBT Transient Thermal Impedance

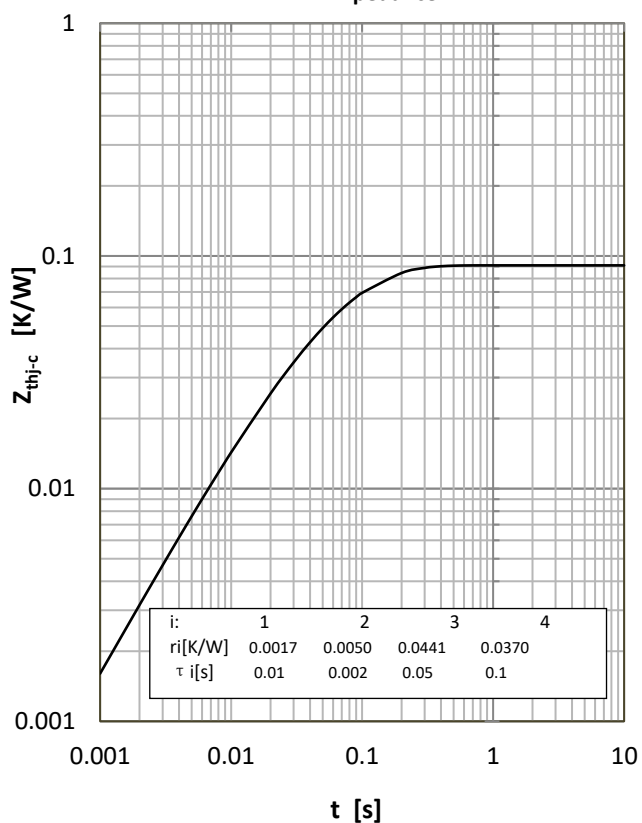


Fig7.Diode Foward Characteristics

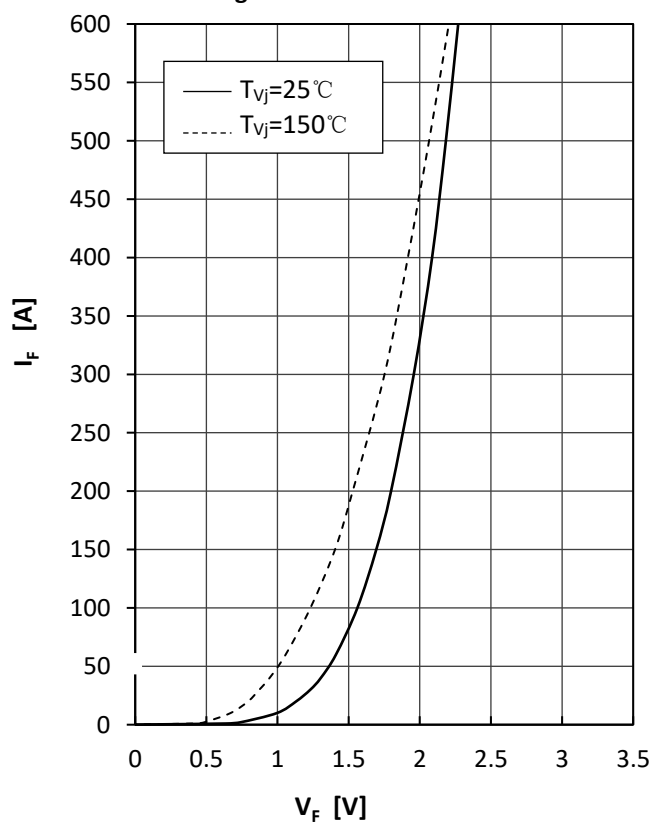
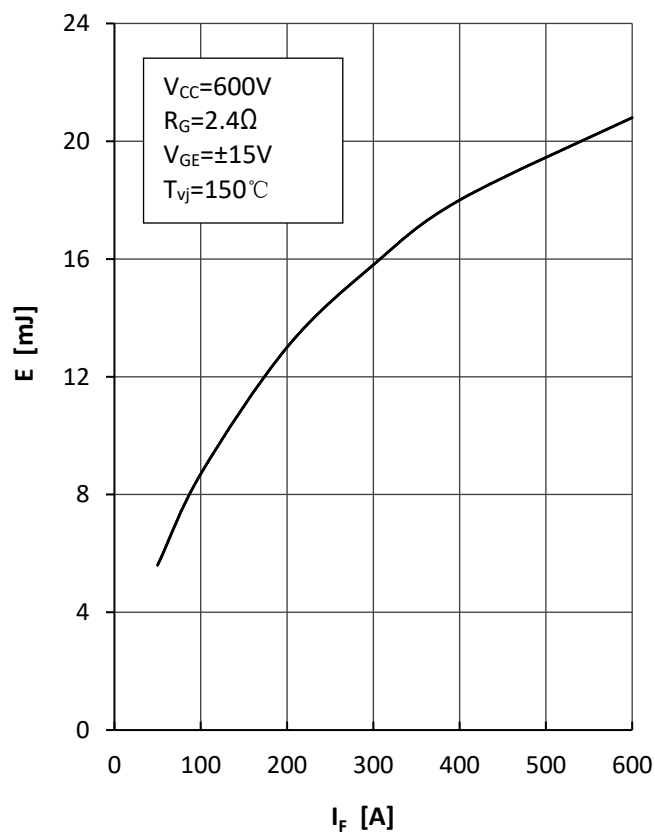


Fig8.Diode Switching Loss(E_{rec}) vs. I_F



Curve Characteristics

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

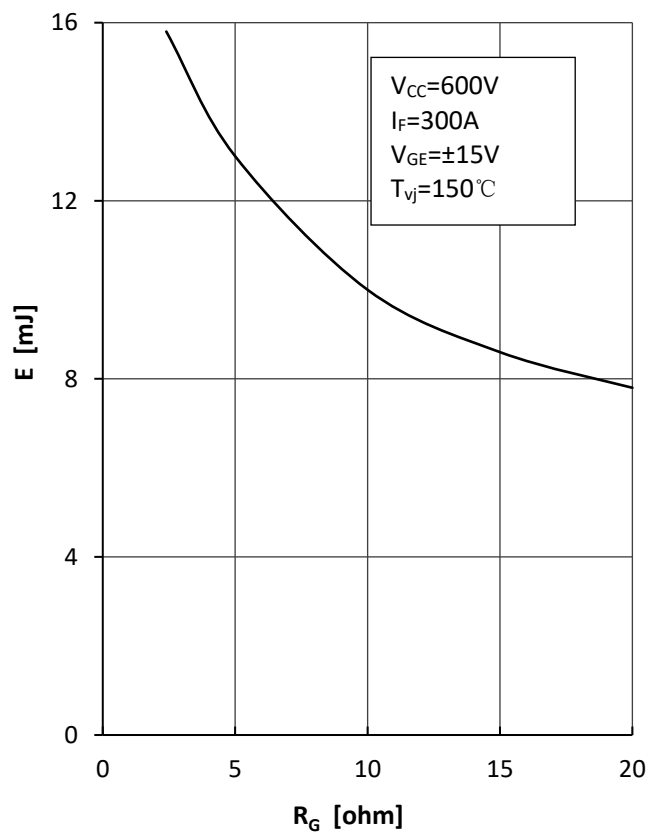
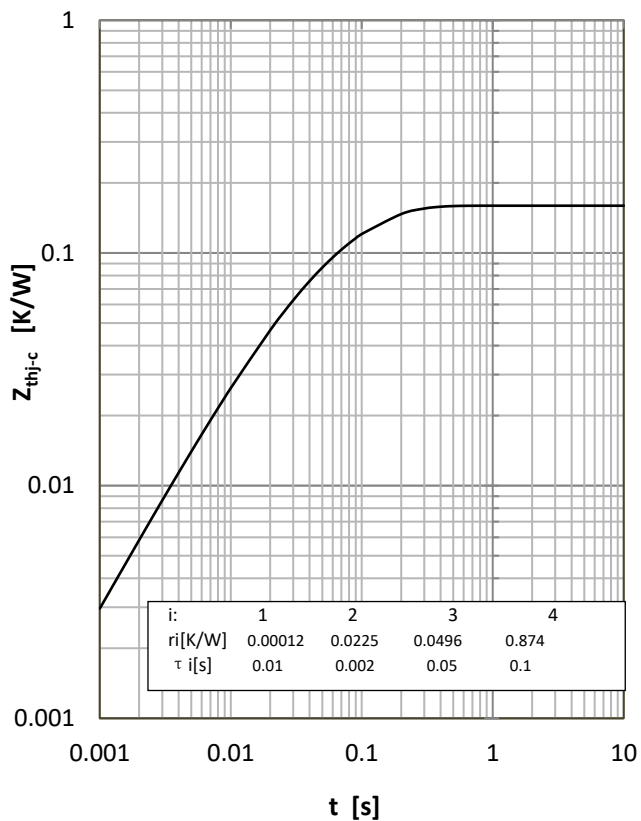


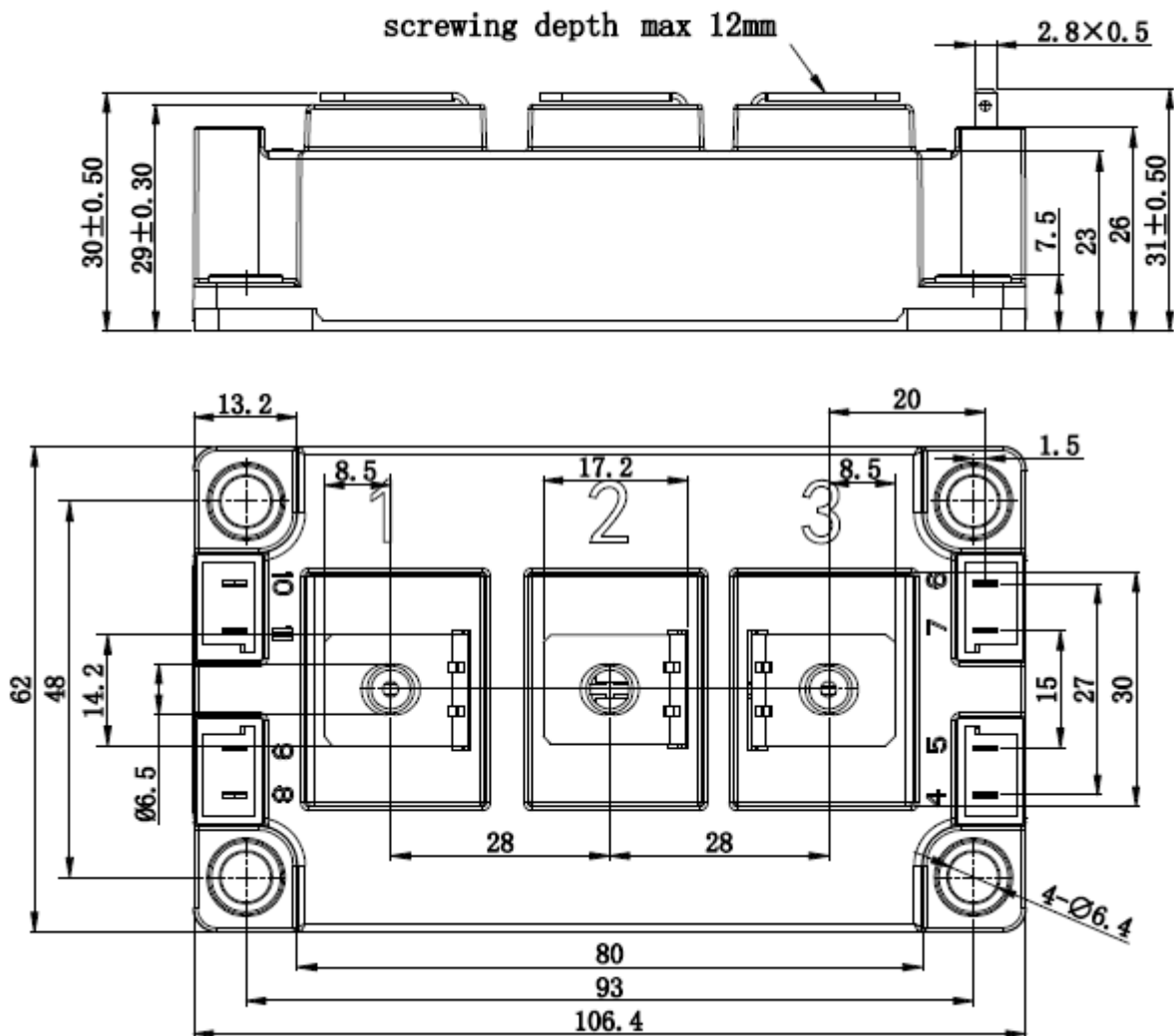
Fig10.Diode Transient Thermal Impedance



Package Dimensions

C2

Dimensions in Millimeters



Ordering Information

Device	Packing
Part Number-BP	Bulk: 6pcs/Box ; 30pcs/Ctn

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