

	<b>E502650</b>
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### 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)

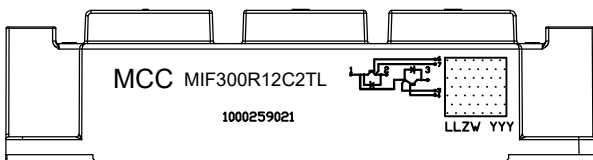
### Applications

- 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@ $T_{vj}=25^{\circ}C$	$V_{GE}$	$\pm 20$	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)	$T_C=25^{\circ}C$	$P_{tot}$	1600	W
	$T_{vjmax}=175^{\circ}C$			

### Module Marking



Marking Code Contents:

Logo: MCC

Product Number:MIF300R12C2TL

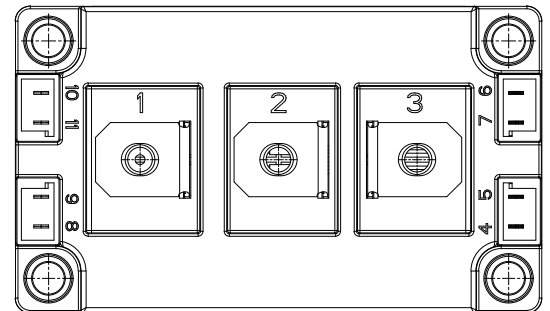
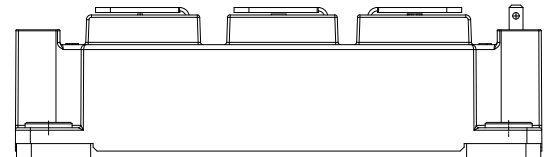
Trace Code: 10 Digits

Circuit Diagram

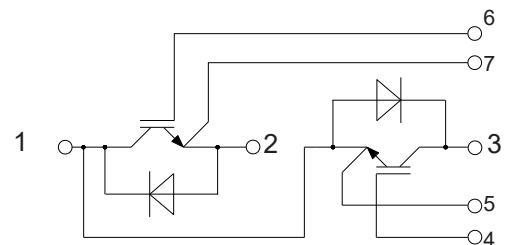
2D Code format: Data Matrix

## 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		$\Omega$
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	$E_{on}$			37.1		
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		
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	

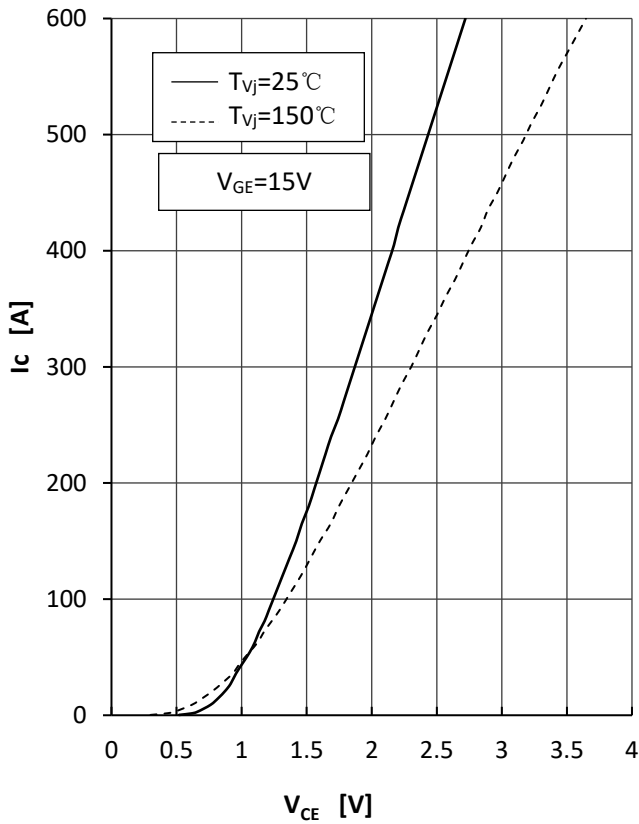
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage	$V_F$	$I_F=300A, T_{vj}=25^{\circ}C$		1.95		V
		$I_F=300A, T_{vj}=125^{\circ}C$		1.80		
Recovered Charge	$Q_{rr}$	$I_F=300A$		17		$\mu C$
Peak Reverse Recovery Current	$I_{rr}$	$V_R=600V$ $-diF/dt = 3000A/us$		97		A
Reverse Recovery Energy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

**Module Characteristics**

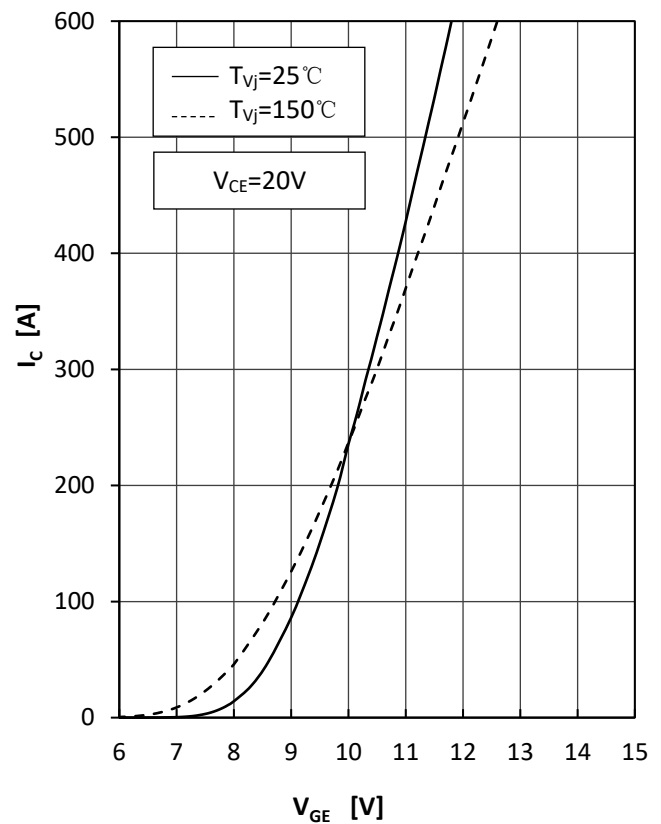
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Isolation Voltage	$V_{isol}$	$t=1min, f=50Hz$	2500			V
Maximum Junction Temperature	$T_{jmax}$				175	$^{\circ}C$
Operating Junction Temperature	$T_{vj op}$		-40		150	$^{\circ}C$
Storage Temperature	$T_{stg}$		-40		125	$^{\circ}C$
Thermal Resistance Junction 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**

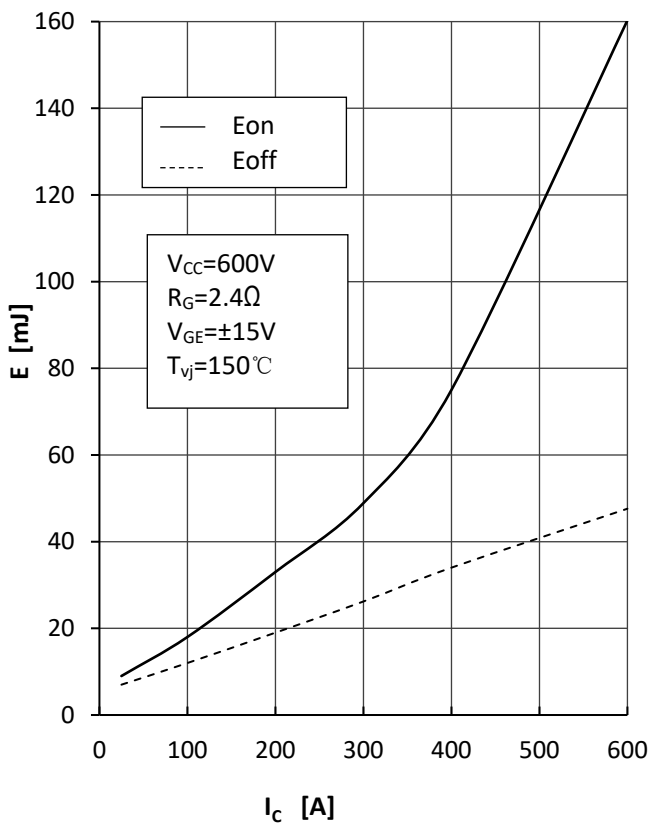
**Fig1.IGBT Output Characteristics**



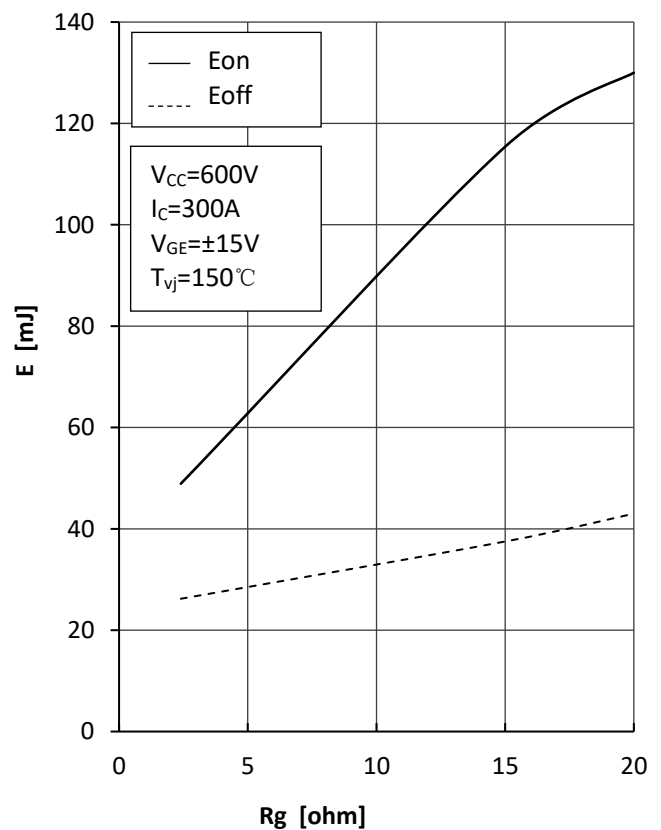
**Fig2.IGBT Transfer Characteristics**



**Fig3.IGBT Switching Loss vs.Ic**



**Fig4.IGBT Switching Loss vs.Rg**



Curve Characteristics

Fig5. RBSOA

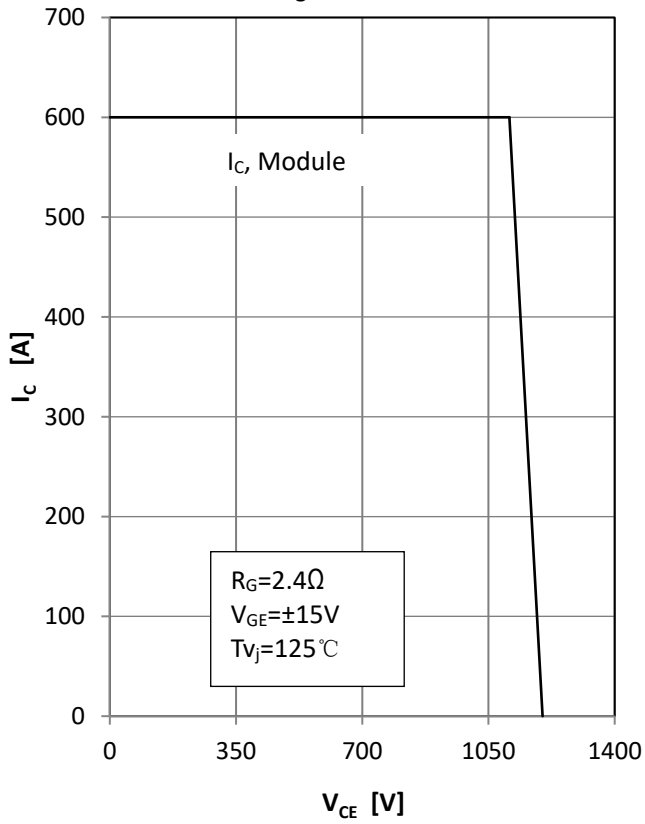


Fig 6. IGBT Transient Thermal Impedance

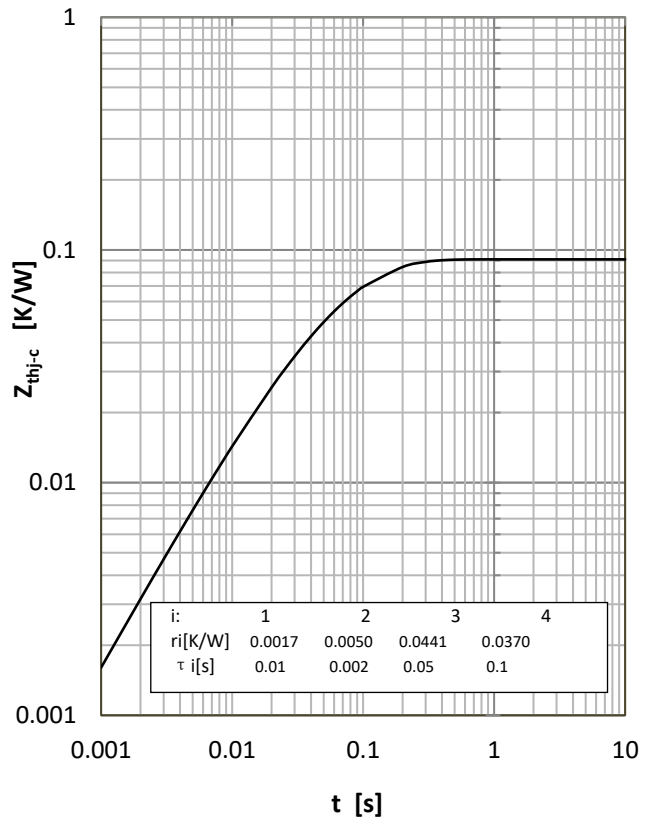


Fig7. Diode Forward Characteristics

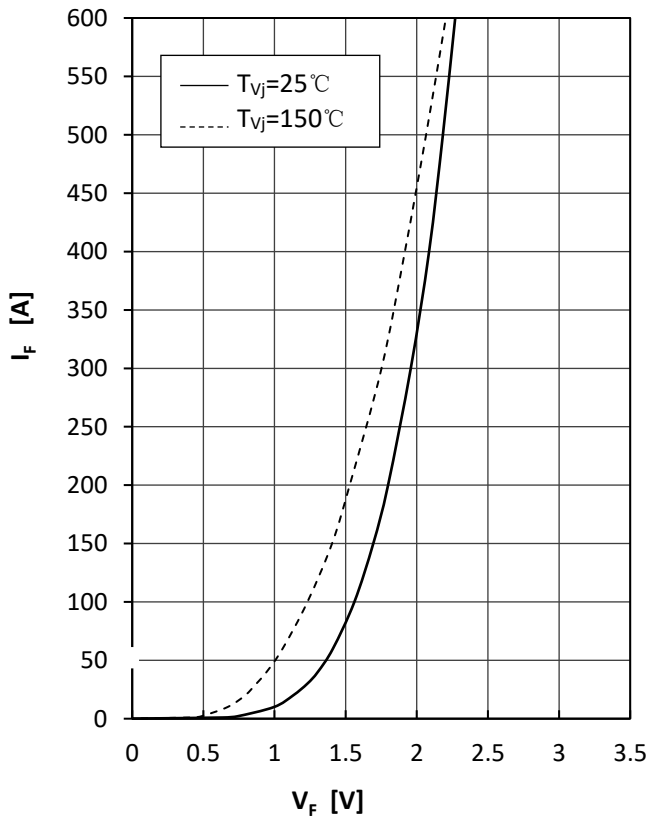
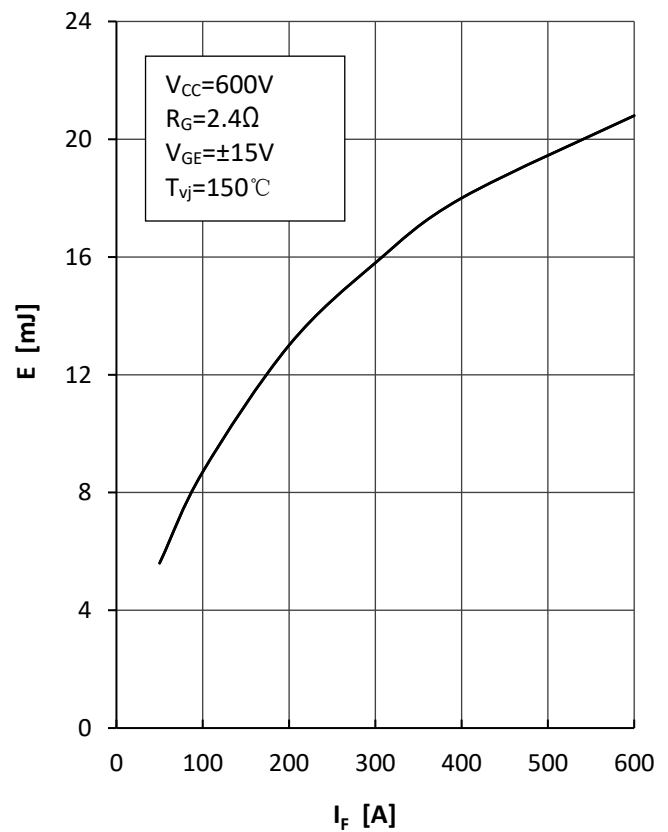


Fig8. Diode Switching Loss( $E_{rec}$ ) vs.  $I_F$



Curve Characteristics

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

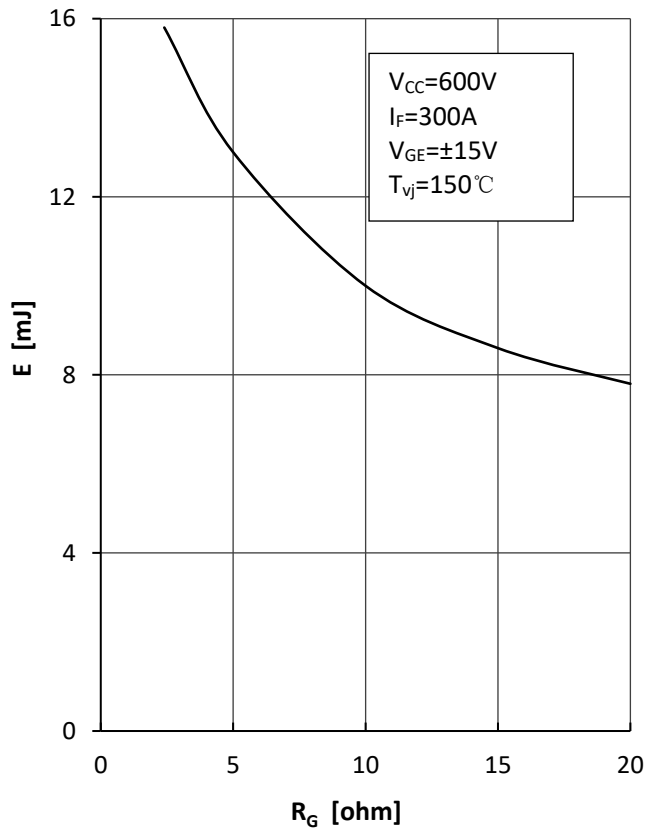
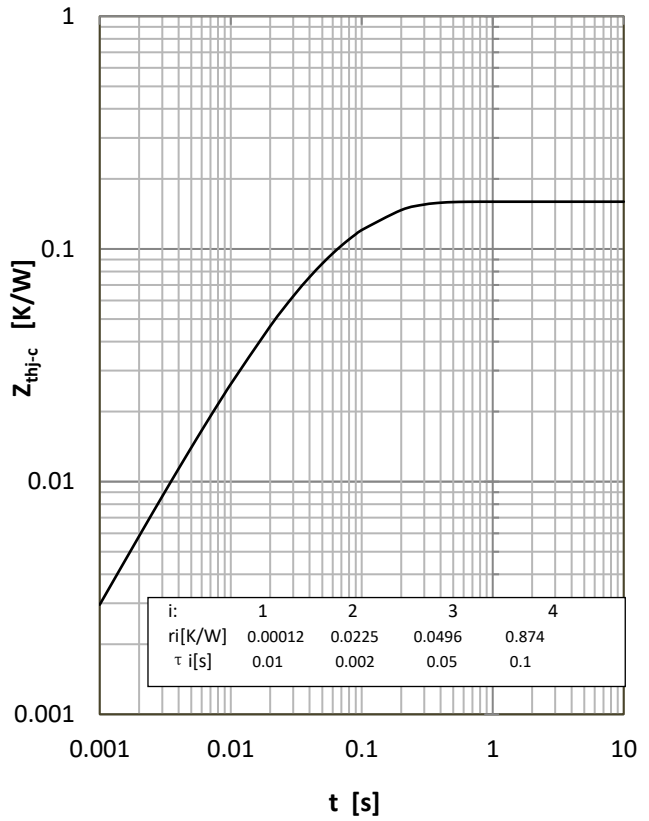


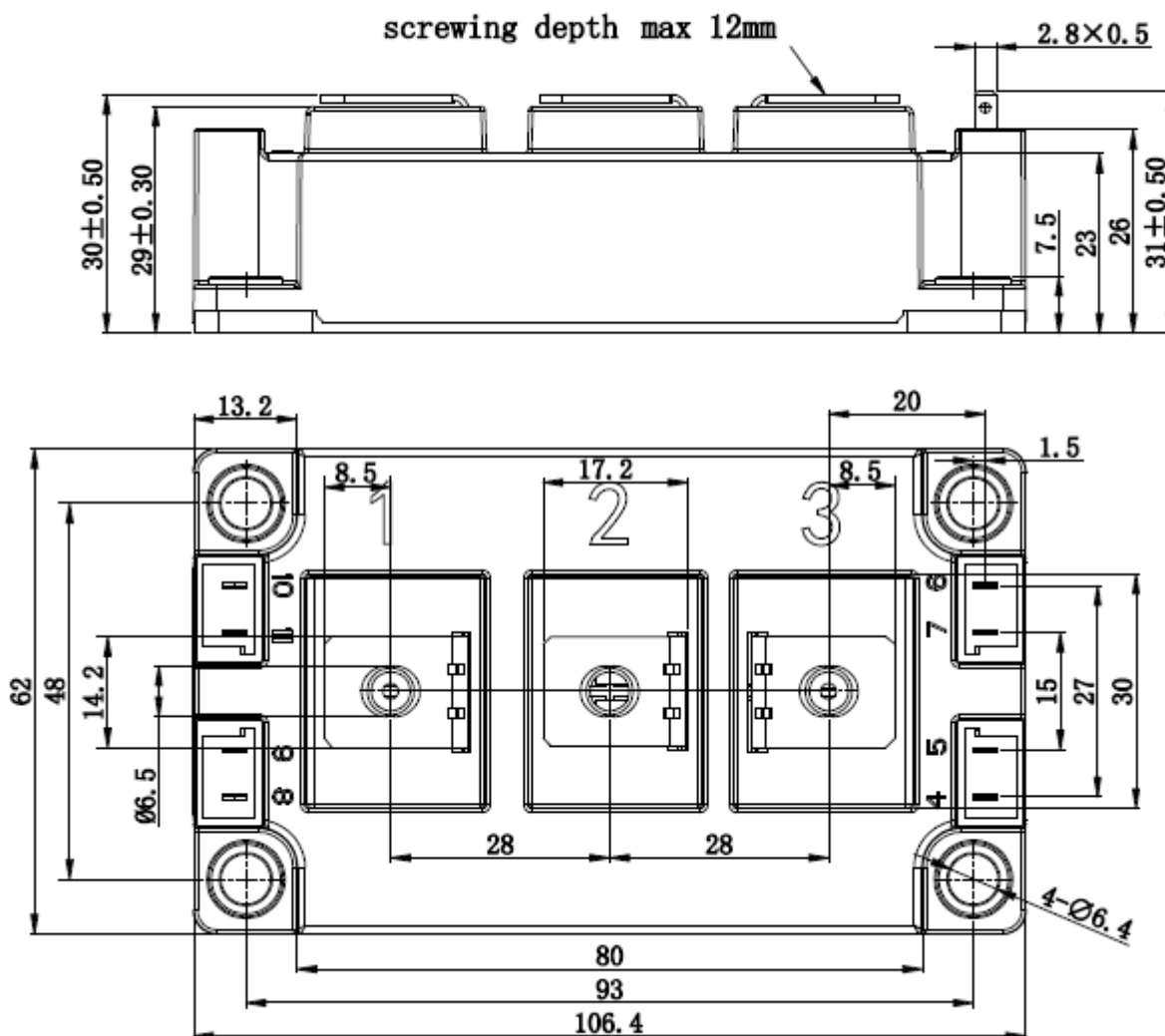
Fig10. Diode Transient Thermal Impedance



Package Dimensions

**C2**

Dimensions in Millimeters



## Ordering Information

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

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