MG200HF12MRC2

RoHS COMPLIANT

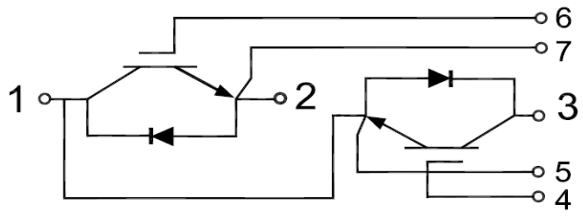
IGBT Modules

V_{CES}	1200V
I_C	200A

Applications

- Industrial Inverters
- Servo Applications
- SMPS UPS
- Induction Heating

Circuit



Features

- Short Circuit Rated 10μs
- Low Stray Inductance
- Low Saturation Voltage
- Ultra Low loss
- HI-REL Power Terminals
- Lead Free, Compliant With RoHS Requirement

Absolute Maximum Ratings （T_C = 25℃ unless otherwise specified）

Symbol	Description		Values	Units
V_{CES}	Collector - Emitter Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	DC Collector Current	T_C=25℃	300	A
		T_C=80℃	200	A
I_{CM}	Repetitive Peak Collector Current	tp=1ms	400	A
P_{tot}	Power Dissipation Per IGBT		1150	W
T_J	Junction Temperature Range		40 to +150	°C
T_{STG}	Storage Temperature Range		40 to +125	°C
Viso	Insulation Test Voltage	AC, t=1min	3000	V
Mounting Torque	Power Terminals Screw: M6		5±15%	N*m
	Mounting Screw:M6		5±15%	N*m

Notes :

(1) Repetitive Rating: Pulse width limited by max. junction temperature

Electrical Characteristics of IGBT (T_J = 25℃ unless otherwise specified)

Symbol	Item	Conditions	Values			Units
			Min.	Typ.	Max.	
OFF Characteristics						
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 1mA	1200			V
I_{CES}	Collector Leakage Current	V_{CE}=1200V,V_{GE}=0V, T_J=25°C		0.4	1	mA
		V_{CE}=1200V, V_{GE}=0V, T_J=125°C			5	mA
I_{GES}	Gate Leakage Current	V_{CE}=0V, V_{GE}=±20V	-400		400	nA
ON Characteristics						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	V_{CE}=V_{GE}, I_C=6mA	5.5	6	6.5	V
$V_{CE(sat)}$	Collector – Emitter Saturation Voltage	I_C=150A,V_{GE}=15V, T_J=25°C		2		V
		I_C=150A,V_{GE}=15V, T_J=125°C		2.4		V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f =1MHz		12.5		nF
C_{oes}	Output Capacitance			1.04		nF
C_{res}	Reverse Transfer Capacitance			0.7		nF
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V, I_C=200A R_G =5Ω,V_{GE}=±15V T_J=25°C Inductive Load		125		ns
t_r	Rise Time			60		ns
$t_{d(off)}$	Turn-off Delay Time			420		ns
T_f	Fall Time			60		ns
E_{on}	Turn-on Switching Loss	V_{CC}=600V, I_C=200A, R_G=5Ω , V_{GE}=±15V Inductive Load; T_J=25°C		17		mJ
		T_J=125°C		24.8		mJ
E_{off}	Turn-off Switching Loss	T_J=25°C		13.6		mJ
		T_J=125°C		21.6		mJ
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V, I_C=200A R_G =5Ω,V_{GE}=±15V T_J=125°C Inductive Load		135		ns
t_r	Rise Time			60		ns
$t_{d(off)}$	Turn-off Delay Time			490		ns
T_f	Fall Time			75		ns
Q_{ge}	Gate Charge	V_{CC}=600V,I_C=150A, V_{GE}=±15V		2100		nC
RBSOA	Reverse Bias Safe Operating Area	I_C = 200A ,V_{CC} = 600V, V_p =1200V, Rg = 10Ω, V_{GE}=+15V to 0V, T_J =150°C	Trapezoid			
SCSOA	Short Circuit Safe Operating Area	V_{CC} = 600V, V_{GE} = 15V, T_J = 150℃	10			μs

Electrical Characteristics of FWD（T_C = 25℃ unless otherwise specified）

Symbol	Item	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F＝150A, V_{GE} = 0V	T_J = 25℃		2.0	2.44	V
			T_J = 125℃		1.7	2.20	
t_{rr}	Reverse Recovery Time	I_F＝100A, Rg = 10Ω, di/dt =1000A/μs, V_{rr} = 600V, V_{GE} =±15V	T_J = 25℃		230		ns
			T_J = 125℃		260		
I_{rr}	Peak Reverse Recovery Current		T_J = 25℃		90		A
			T_J = 125℃		110		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		10.5		μC
			T_J = 125℃		13.5		

Thermal Resistance Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-To-Case (IGBT Part, Per Leg)			0.09	℃/W
$R_{\theta JC}$	Junction-To-Case (Diode Part, Per Leg)			0.22	℃/W
Mt	Power Terminals Screw:M5	3		5	N·m
Ms	Mounting Screw:M6	3		5	N·m
Weight	Weight Of Module			300	g

Performance Curves

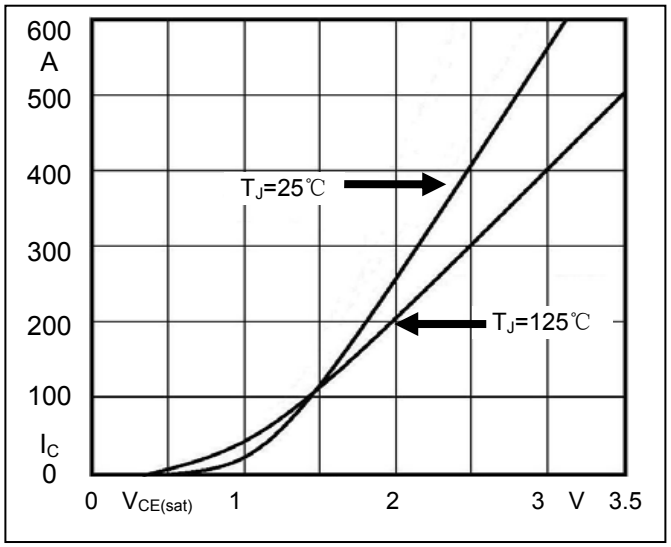


Fig1. Typical Output Characteristics

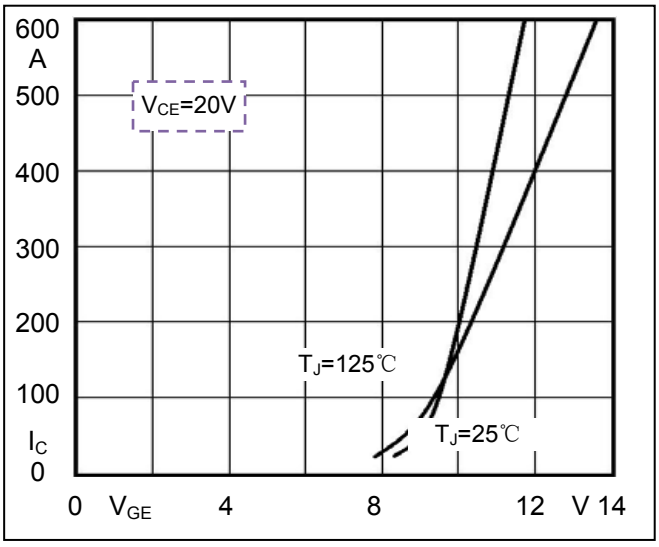


Fig2. Typical Transfer Characteristics

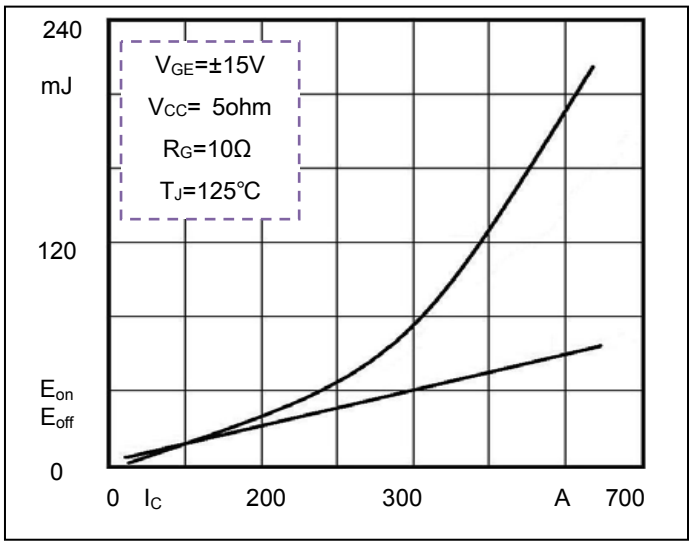


Fig3. Switching Energy vs. Collector Current

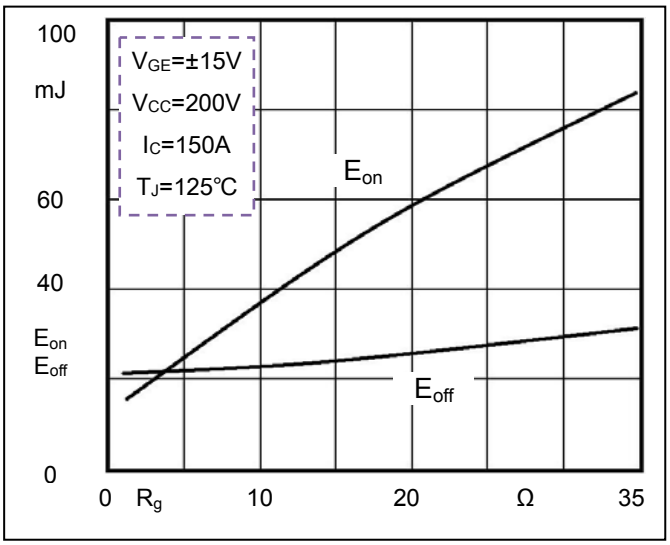


Fig4. Switching Energy vs. Gate Resistor

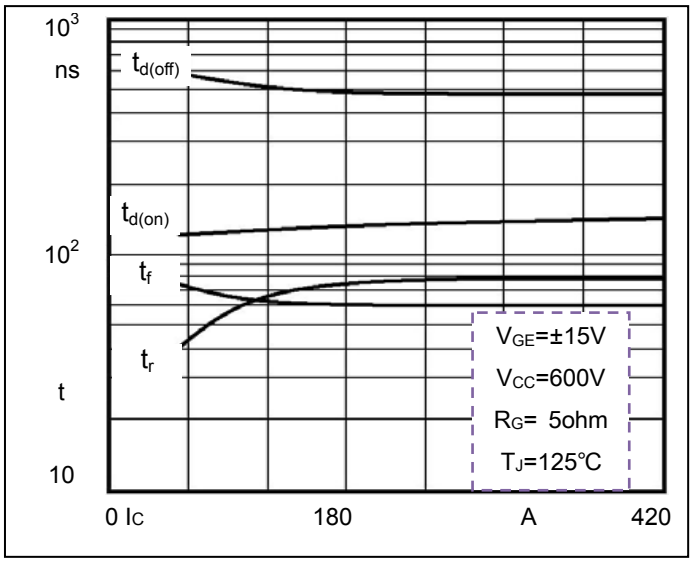


Fig5. Switching Times vs. Collector Current

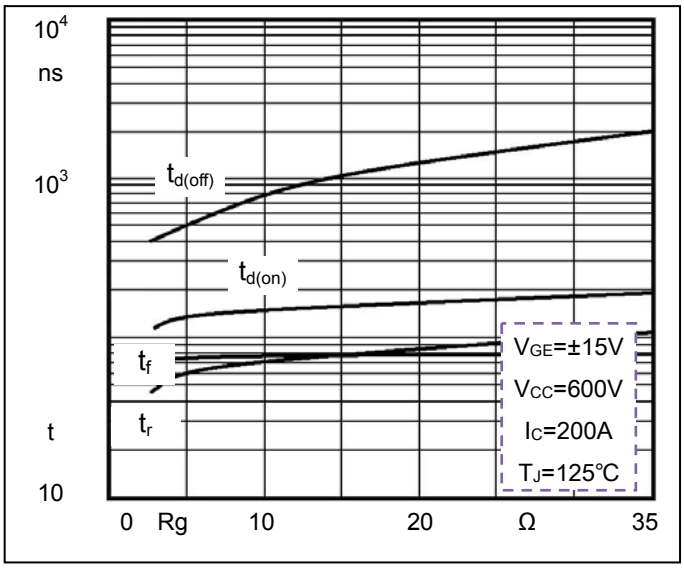


Fig6. Switching Times vs. Gate Resistor

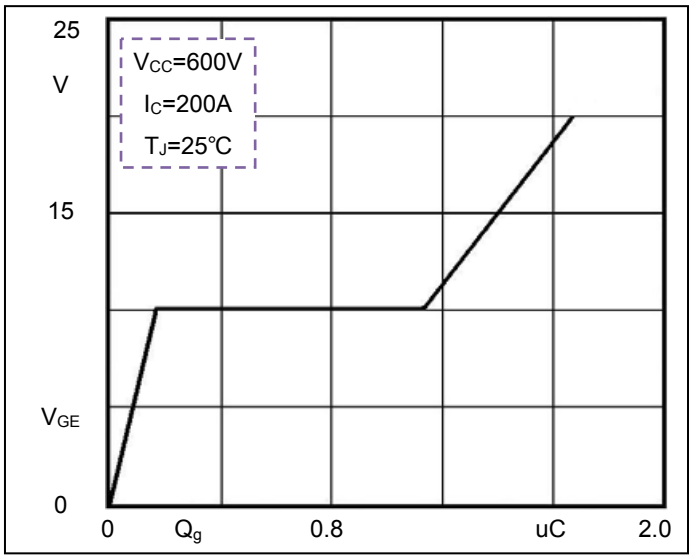


Fig7. Gate Charge characteristics

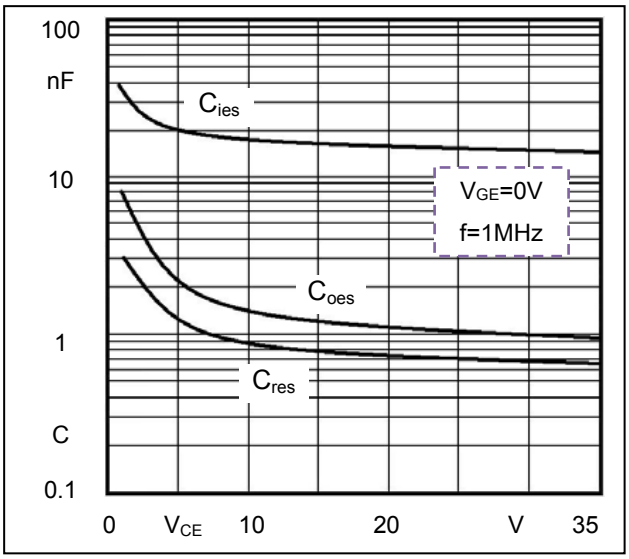


Fig8. Typical Capacitances vs. V_{CE}

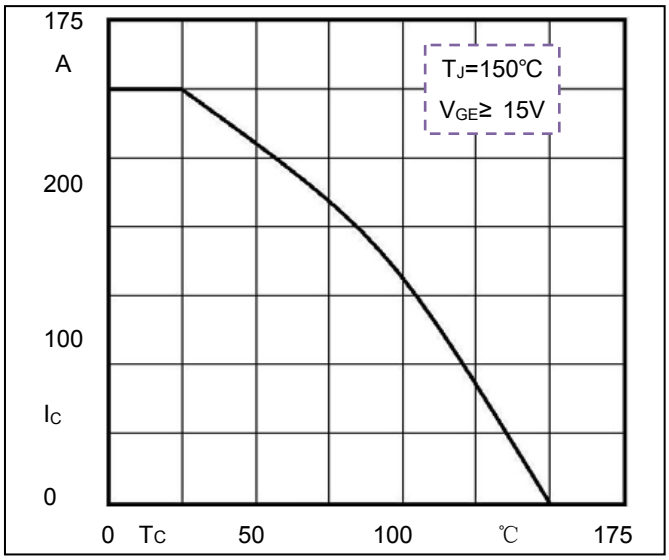


Fig9. Rated Current vs. T_C

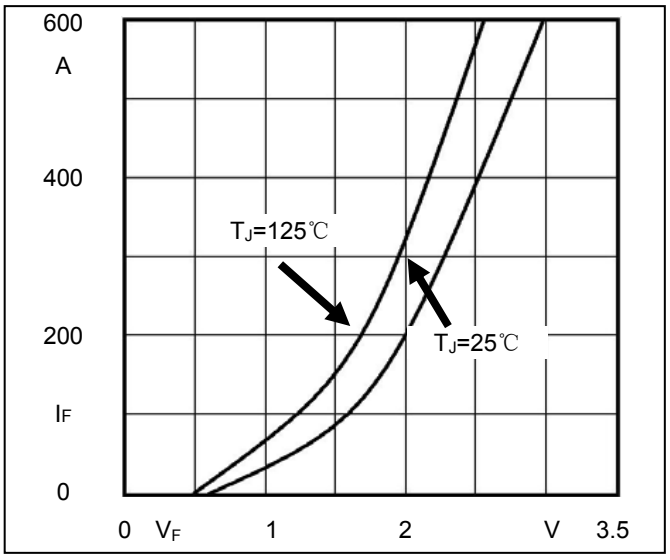


Fig10. Diode Forward Characteristics

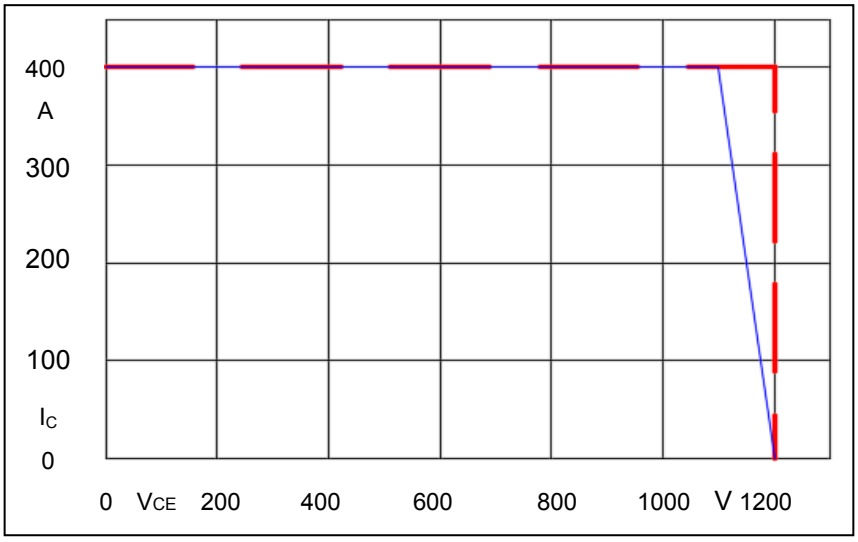


Fig11. Reverse Bias Safe Operation Area (RBSOA)

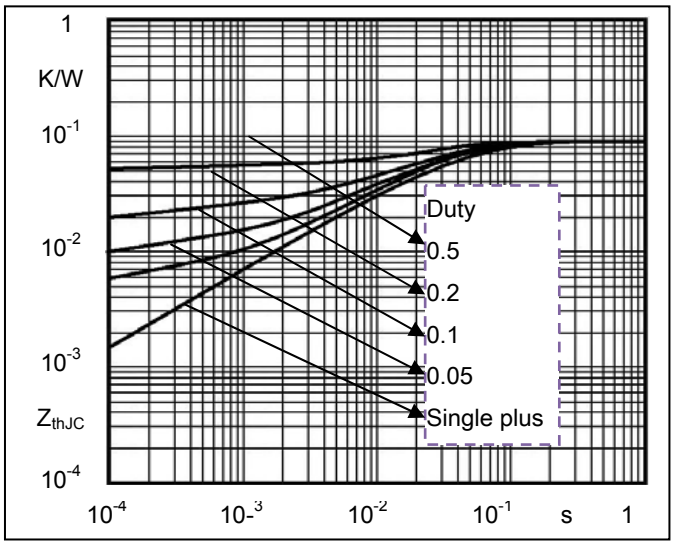


Fig12. Transient Thermal Impedance of IGBT

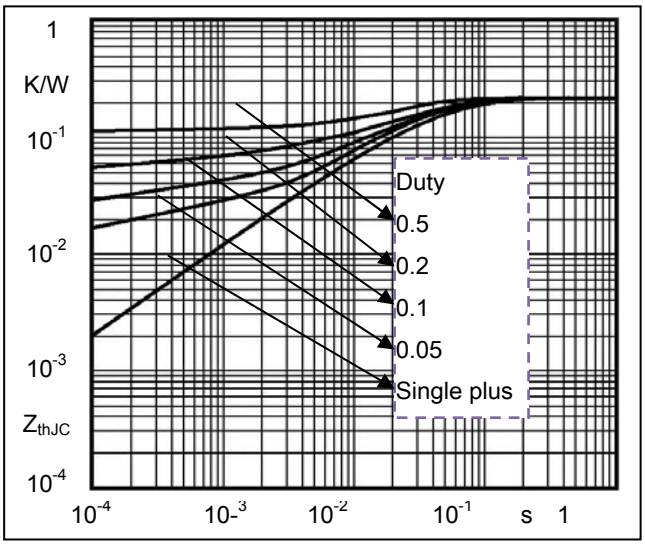
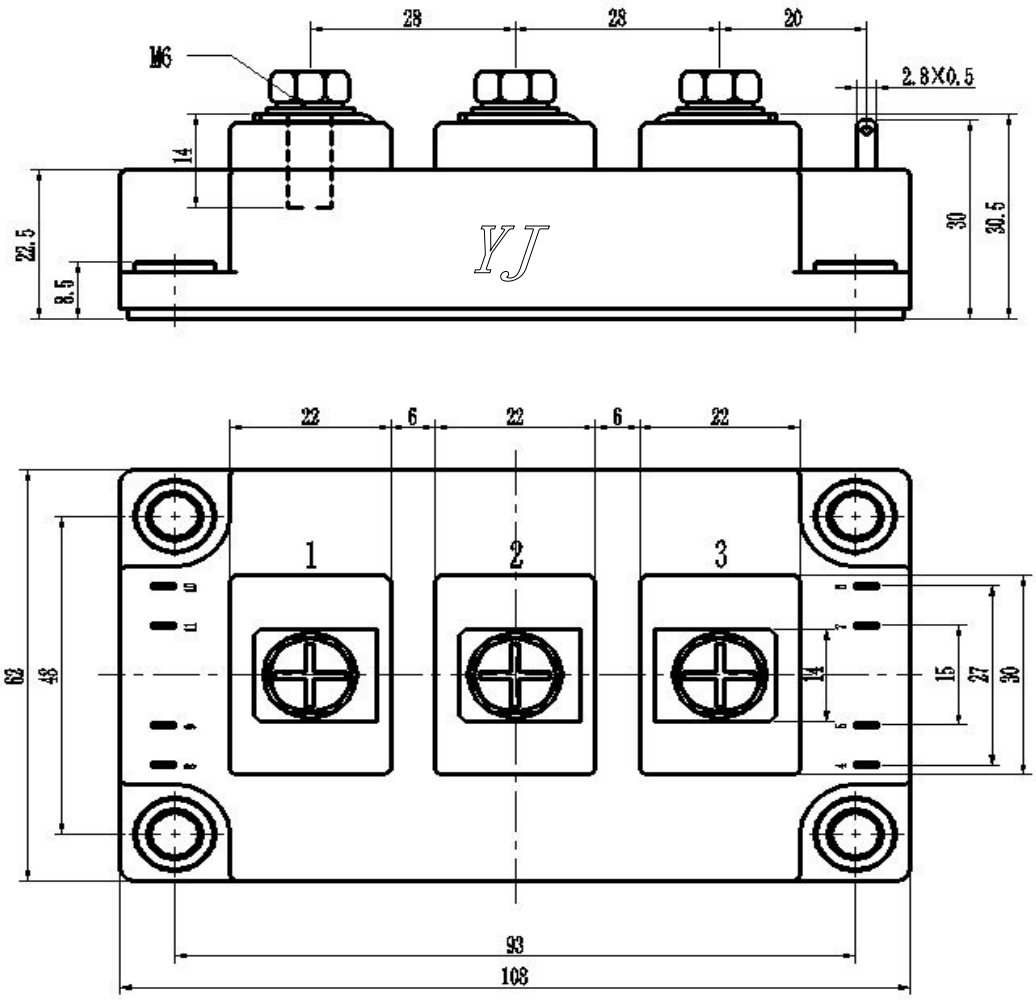


Fig13. Transient Thermal Impedance of Diode

Package Outline Information

CASE: C2



Dimensions in mm

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F3L100R07W2E3_B11 F3L15R12W2H3_B27 F3L400R07ME4_B22 F3L400R12PT4_B26 F4-100R12KS4 F4-50R07W2H3_B51 F4-75R12KS4_B11 FB15R06W1E3 FB20R06W1E3_B11 FD1000R33HE3-K FD300R06KE3 FD300R12KE3 FD300R12KS4_B5 FD400R12KE3 FD400R33KF2C-K FD401R17KF6C_B2 FD-DF80R12W1H3_B52 FF100R12KS4 FF1200R17KE3_B2 FF150R12KE3G FF200R06KE3 FF200R06YE3 FF200R12KT3 FF200R12KT3_E FF200R12KT4 FF200R17KE3 FF300R06KE3_B2 FF300R12KE4_E FF300R12KS4HOSA1 FF300R12ME4_B11 FF300R12MS4 FF300R17ME4 FF450R12ME4P FF450R17IE4 FF600R12IE4V FF600R12IP4V FF800R17KE3 FF800R17KP4_B2 FF900R12IE4V MIXA30W1200TED MIXA450PF1200TSF FP06R12W1T4_B3 FP100R07N3E4 FP100R07N3E4_B11 FP10R06W1E3_B11 FP10R12W1T4_B11 FP10R12YT3 FP10R12YT3_B4 FP150R07N3E4 FP15R12KT3