MG600HF12TLE3

RoHS COMPLIANT



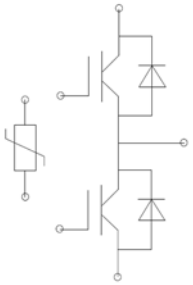
IGBT Modules

V_{CES} 1200V
I_C 600A

Applications

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

Circuit



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℃

● IGBT

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Collector-Emitter Voltage	V_{CES}	V_{GE}=0V, I_C=1mA, T_{vj}=25℃	1200	V
Continuous Collector Current	I_C	T_C=100℃	600	A
Repetitive Peak Collector Current	I_{CRM}	t_p=1ms	1200	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_C=25℃ T_{vjmax}=175℃	3333	W

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, I_C=13mA,T_{vj}=25℃	5.0	6.2	7.5	V
Collector-Emitter Cut-off Current	I_{CES}	V_{CE}=1200V,V_{GE}=0V,T_{vj}=25℃			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=600A,V_{GE}=15V, T_{vj}=25℃		1.75		V
		I_C=600A,V_{GE}=15V, T_{vj}=125℃		2.0		
		I_C=600A,V_{GE}=15V, T_{vj}=150℃		2.15		
Gate Charge	Q_G			5.3		uC
Internal Gate Resistance	R_{Gint}			1.2		Ω
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1MHz,T_{vj}=25℃		44		nF
Reverse Transfer Capacitance	C_{res}			2.1		nF
Gate-Emitter Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}=20V,T_{vj}=25℃			500	nA
Turn-on Delay Time	$t_{d(on)}$	I_C=600A V_{CE}=600V V_{GE}=±15V R_G=1.5Ω T_{vj}=25℃		120		ns
Rise Time	t_r			80		ns
Turn-off Delay Time	$t_{d(off)}$			552		ns
Fall Time	t_f			207		ns
Energy Dissipation During Turn-on Time	E_{on}			84.2		mJ
Energy Dissipation During Turn-off Time	E_{off}			59.3		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=600A V_{CE}=600V V_{GE}=±15V R_G=1.5Ω T_{vj}=150℃		144		ns
Rise Time	t_r			84		ns
Turn-off Delay Time	$t_{d(off)}$			644		ns
Fall Time	t_f			323		ns
Energy Dissipation During Turn-on Time	E_{on}			110.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			79.1		mJ
SC Data	I_{sc}	t_p≤10us, V_{GE}=15V, T_{vj}=150℃, V_{CC}=900V, V_{CEM}≤1200V		2350		A

Diode

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	T_{vj}=25℃	1200	V
Continuous DC Forward Current	I_F		600	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	1200	A
I^2t-value	I^2t	V_R=0V,t_p=10ms, T_{vj}=150℃	37500	A^2s

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=600A,T_{vj}=25℃		2.0		V
		I_F=600A,T_{vj}=125℃		2.15		
		I_F=600A,T_{vj}=150℃		2.25		
Recovered Charge	Q_{rr}	I_F=600A V_R=600V -di_F/dt=6000A/us T_{vj}=25℃		50.3		uC
Peak Reverse Recovery Current	I_{rr}			253		A
Reverse Recovery Energy	E_{rec}			15.2		mJ
Recovered Charge	Q_{rr}	I_F=600A V_R=600V -di_F/dt=6000A/us T_{vj}=150℃		93.1		uC
Peak Reverse Recovery Current	I_{rr}			303		A
Reverse Recovery Energy	E_{rec}			29.4		mJ

NTC-Thermistor

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Rated Resistance	R_{25}			5.0		kΩ
Deviation of R100	ΔR/R	T_C=100,R_{100}=493.3Ω	-5		5	%
Power Dissipation	P_{25}				20.0	mW
B-value	$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15\ K))]$		3375		K

Module Characteristics

T_C=25°C unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Isolation Voltage	V_{isol}	t=1min,f=50Hz	2500			V
Maximum Junction Temperature	T_{jmax}				175	℃
Operating Junction Temperature	$T_{vj\ op}$		-40		150	℃
Storage Temperature	T_{stg}		-40		125	℃
Thermal Resistance Junction to Case	$R_{\theta JC}$	per IGBT			0.045	K/W
		per Diode			0.076	
Thermal Resistance Case to Sink	$R_{\theta CS}$	Conductive grease applied		0.009		K/W
Comparative Tracking Index	CTI		200			
Module Electrodes Torque	M_t	Recommended(M6)	4.0		5.0	N·m
Module to Sink Torque	M_s	Recommended(M5)	3.0		6.0	N·m
Weight of Module	G			345		g

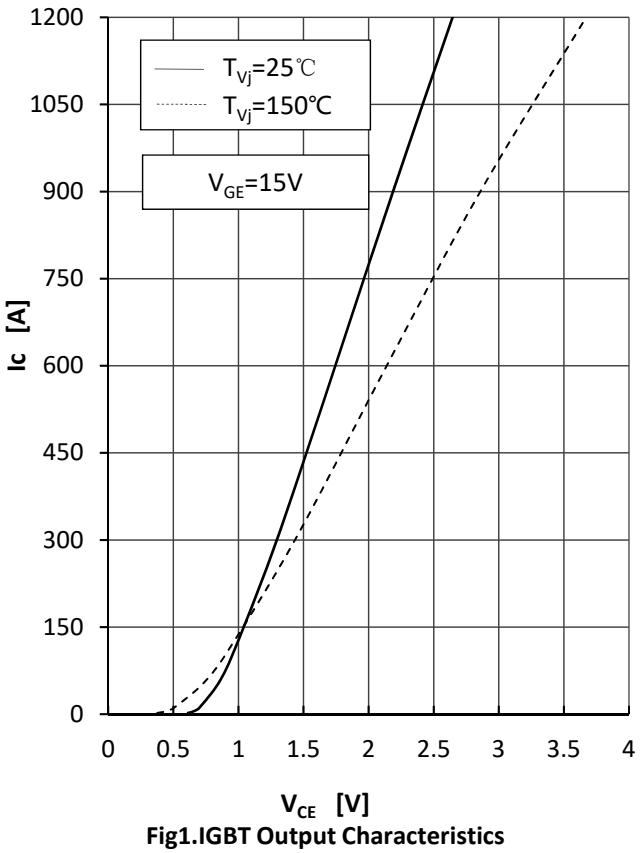


Fig1.IGBT Output Characteristics

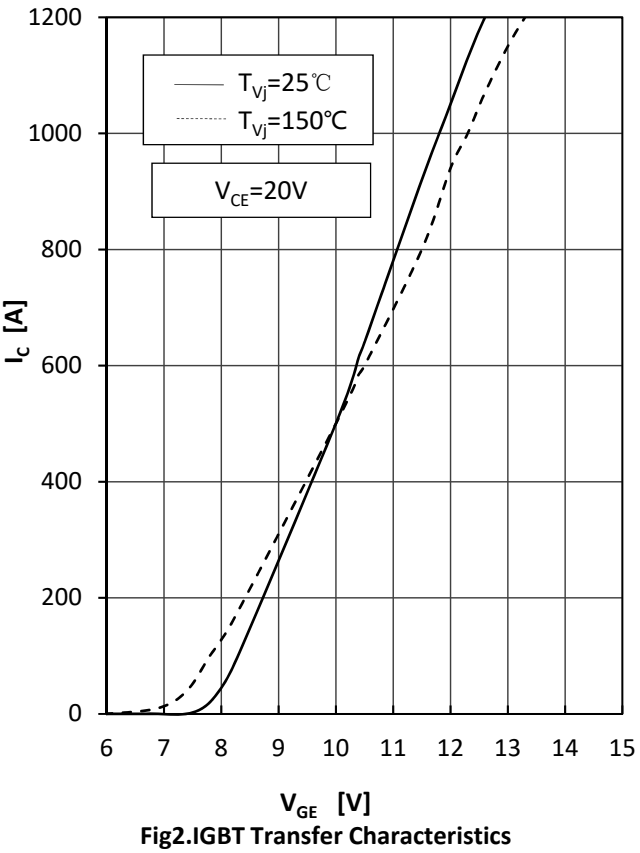


Fig2.IGBT Transfer Characteristics

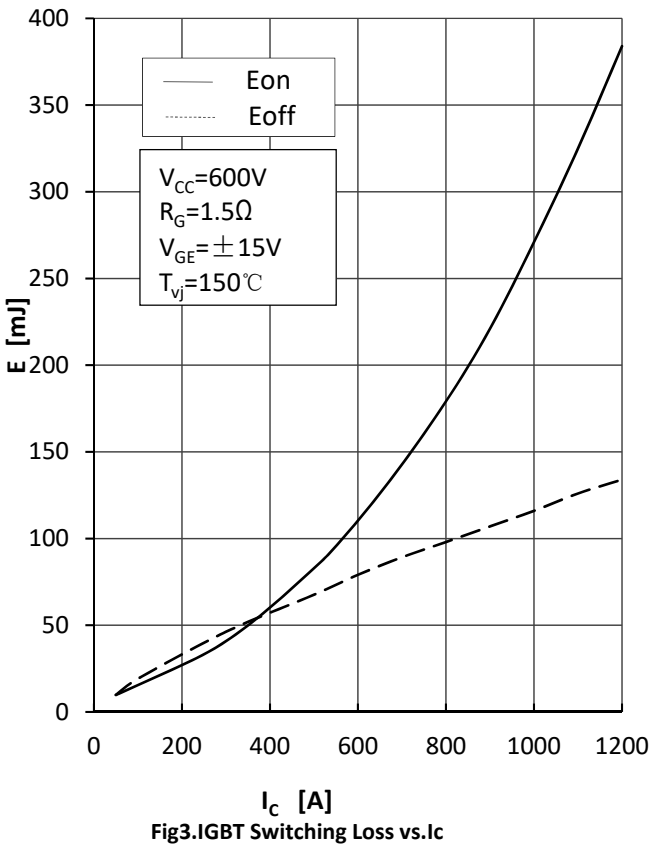


Fig3.IGBT Switching Loss vs.Ic

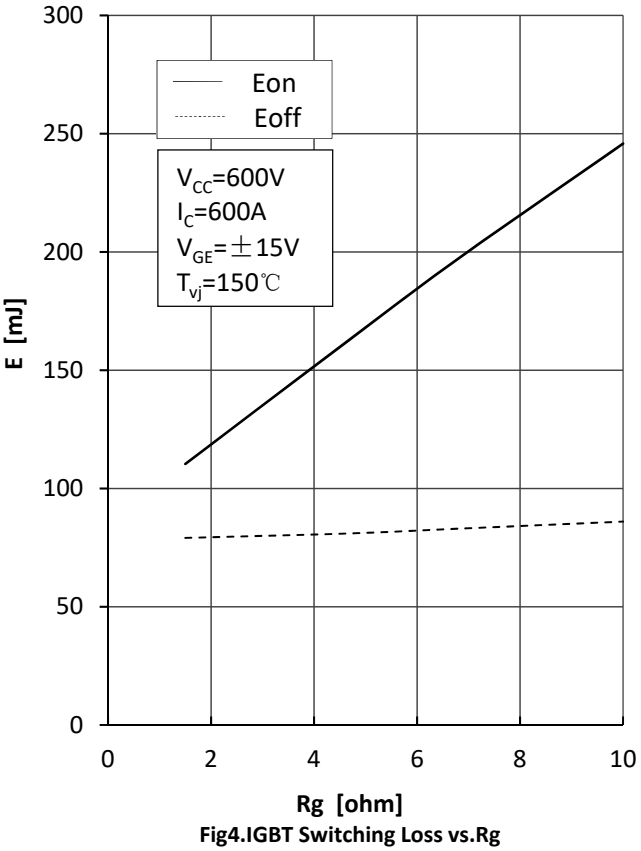


Fig4.IGBT Switching Loss vs.Rg

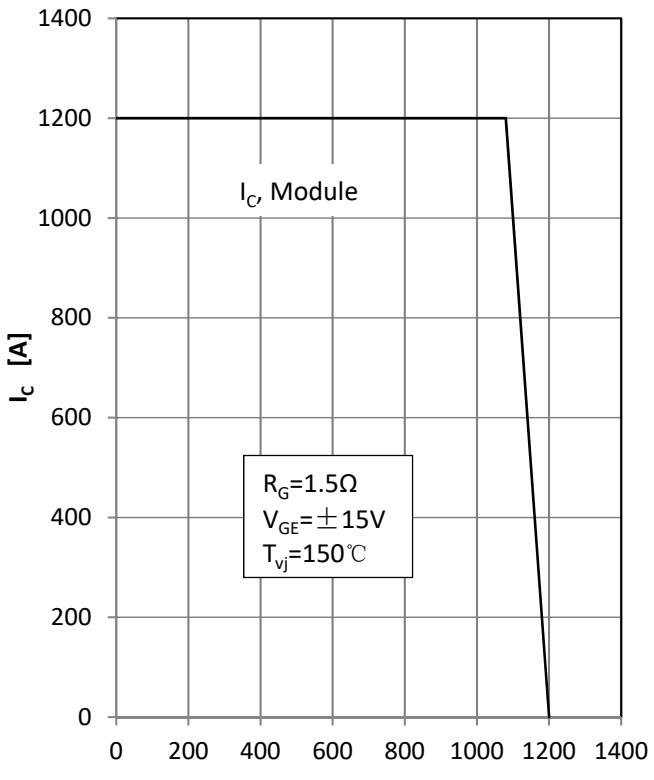


Fig5. RBSOA

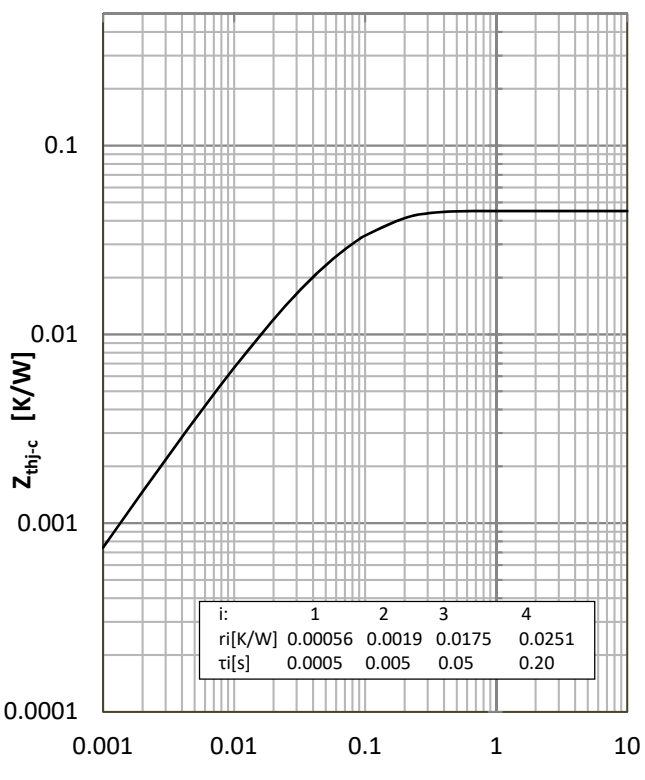


Fig 6. IGBT Transient Thermal Impedance

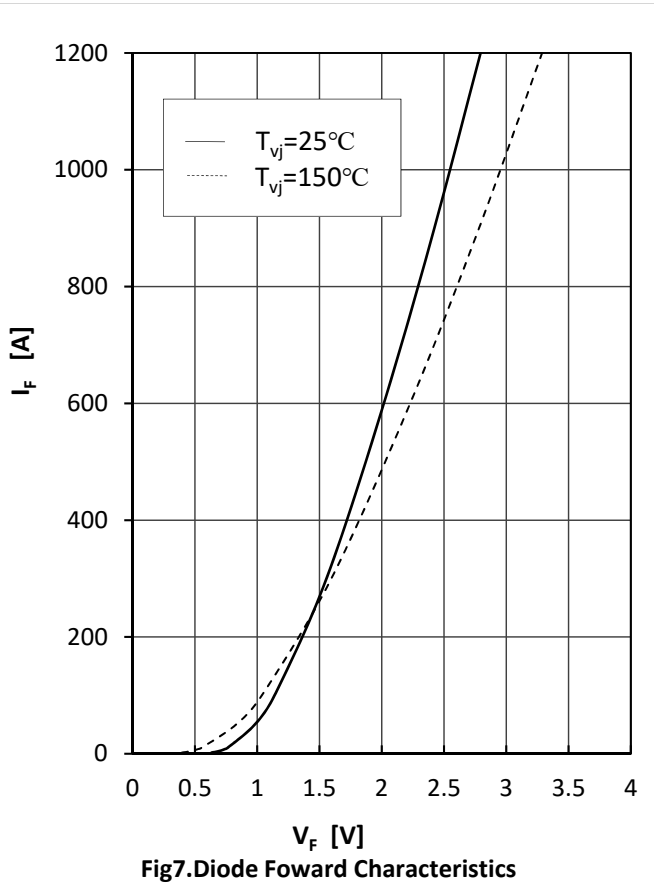


Fig7.Diode Foward Characteristics

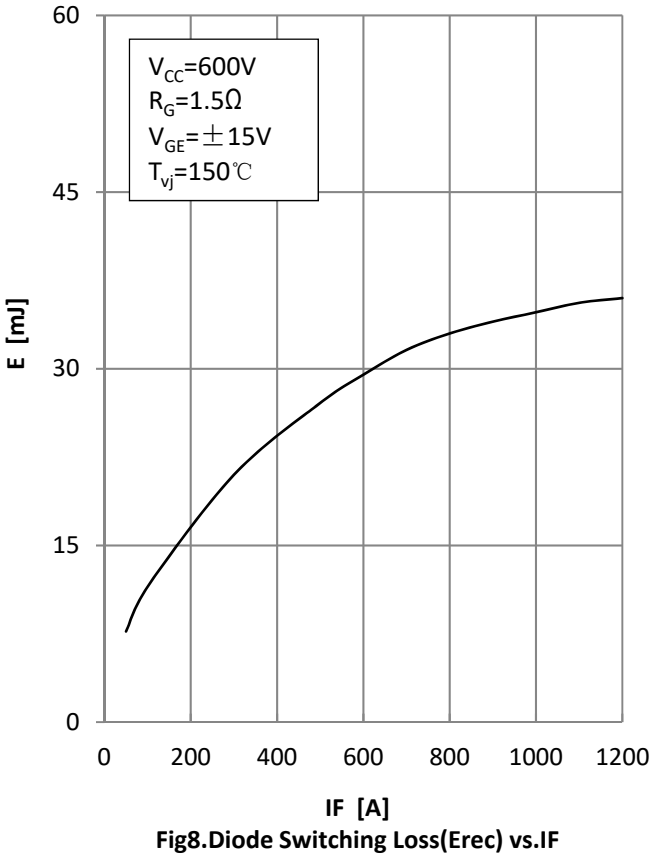


Fig8.Diode Switching Loss(Erec) vs.IF

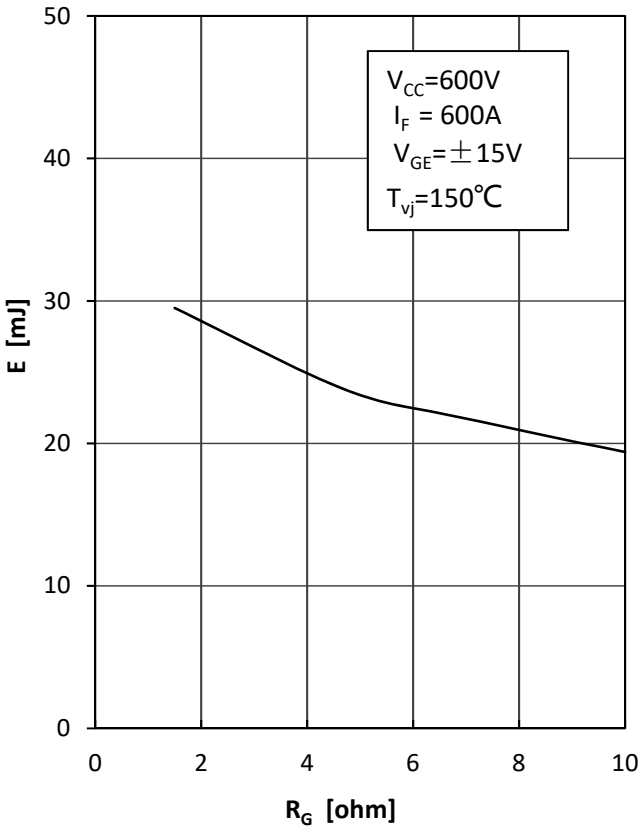


Fig9.Diode Switching Loss(Erec) vs.Rg

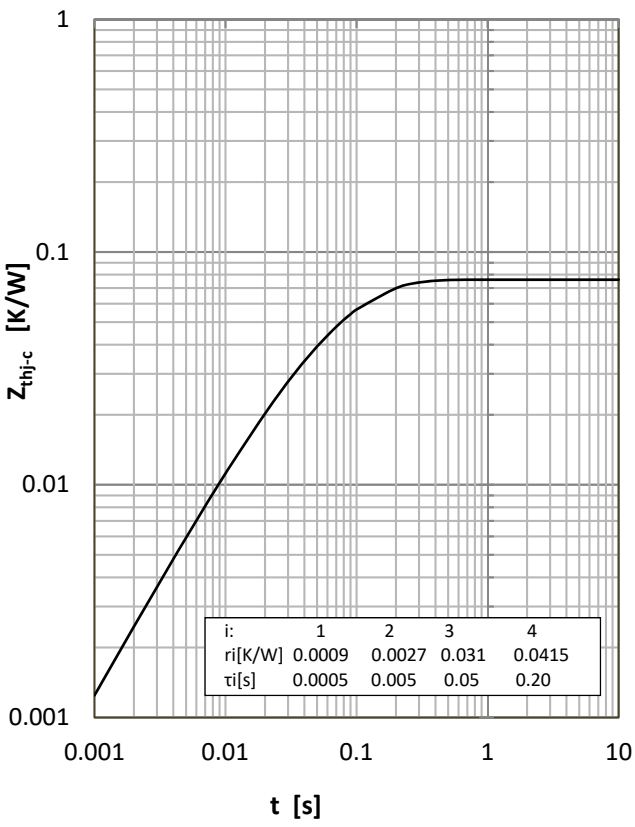
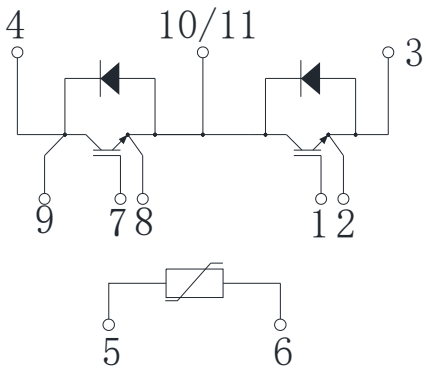
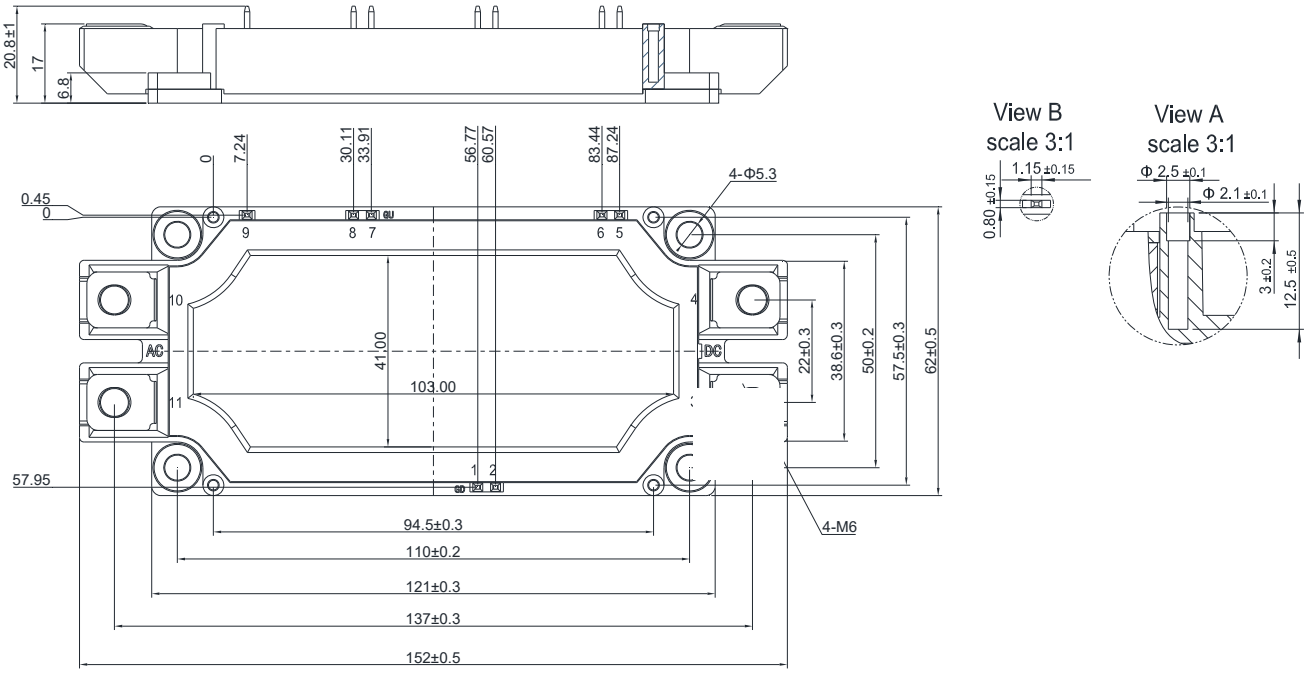


Fig10.Diode Transient Thermal Impedance

- Circuit Diagram



- **Package Outline Information**



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