MG450HF12E3

RoHS COMPLIANT

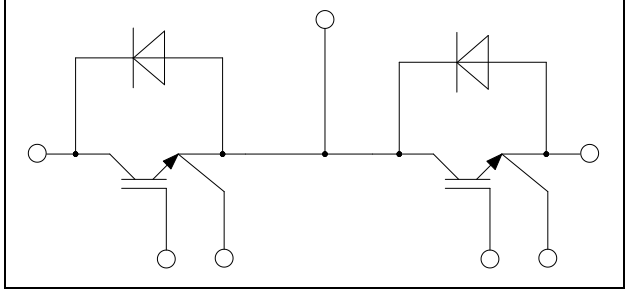
IGBT Modules

V_{CES}	1200V
I_C	450A

Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- UPS (Uninterruptible Power Supplies)
- Soft switching welding machine

Circuit



Features

- Low $V_{ce(sat)}$ with Planner technology
- $V_{ce(sat)}$ with positive temperature coefficient
- High short circuit capability(10us)
- Including fast & soft recovery anti-parallel FWD
- Low inductance module structure

● 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℃	450	A
Peak Collector Current	I_{CRM}	t_p=1ms	900	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation (IGBT-inverter)	P_{tot}	T_c=25℃ T_{vjmax}=175℃	2500	W

● IGBT Characteristics

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, I_C =9mA,T_{vj}=25℃	5.6	6.2	7.0	V
Collector-Emitter Cut-off Current	I_{CES}	V_{CE}=1200V,V_{GE}=0V, T_{vj}=25℃			3	mA
		V_{CE}=1200V,V_{GE}=0V, T_{vj}=125℃			15	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	Ic=600A,V_{GE}=15V, T_{vj}=25℃		1.70	2.20	V
		Ic=600A,V_{GE}=15V, T_{vj}=125℃		2.05		V
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE} =0V, f=1MHz, T_{vj}=25℃		32.4		nF
Reverse Transfer Capacitance	C_{res}			1.85		nF
Internal Gate Resistance	R_{gint}			0.85		Ω
Gate-Emitter leakage current	I_{GES}	V_{CE}=0 V, V_{GE}=20 V,T_{vj} = 25℃			400	nA
Turn-on Delay Time	$t_{d(on)}$	I_C =450 A V_{CE} = 600 V V_{GE} = ±15V R_G =1.7Ω T_{vj}=25℃		180		ns
Rise Time	t_r			105		ns
Turn-off Delay Time	$t_{d(off)}$			640		ns
Fall Time	t_f			98		ns
Energy Dissipation During Turn-on Time	E_{on}			30		mJ
Energy Dissipation During Turn-off Time	E_{off}			42		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C =450 A V_{CE} = 600 V V_{GE} = ±15V R_G =1.7Ω T_{vj}=125℃		200		ns
Rise Time	t_r			110		ns
Turn-off Delay Time	$t_{d(off)}$			680		ns
Fall Time	t_f			135		ns
Energy Dissipation During Turn-on Time	E_{on}			43		mJ
Energy Dissipation During Turn-off Time	E_{off}			61		mJ
SC Data	Isc	T_p≤10us,V_{GE}=15V, Tvj=150℃,V_{cc}=600V, V_{CEM}≤1200V		2200		A

● Diode Characteristics

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Diode DC Forward Current	I_F	T_c=100℃		450		A
Diode Peak Forward Current	I_{FRM}			900		A
Forward Voltage	V_F	I_F=450A,T_{vj}=25℃		1.80		V
		I_F=450A,T_{vj}=125℃		1.85		V

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Recovered Charge	Q_{rr}	I_F =450 A V_R=600V -di$_F$/dt =3600A/us T_{vj}=25℃		40		uC
Peak Reverse Recovery Current	I_{rr}			320		A
Reverse Recovery Energy	E_{rec}			18		mJ
Recovered Charge	Q_{rr}	I_F =450 A V_R=600V -di$_F$/dt =3600A/us T_{vj}=125℃		72		uC
Peak Reverse Recovery Current	I_{rr}			410		A
Reverse Recovery Energy	E_{rec}			36		mJ

● 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	℃
Stray Inductance	L_{CE}			20		nH
Module Lead Resistance ,Terminal to Chip	$R_{CC'+EE'}$			1.1		mΩ
Junction-to Case	$R_{\theta jc}$	per IGBT			0.060	K/W
		per Diode			0.096	K/W
Case to Sink (Conductive grease applied)	$R_{\theta cs}$	per IGBT		0.030		K/W
		per Diode		0.045		K/W
Module Electrodes Torque	M_t	Recommended(M6)	2.5		5.0	N·m
Module-to-Sink Torque	M_s	Recommended(M6)	3.0		6.0	N·m
Weight of Module	G			340		g

Performance Curves

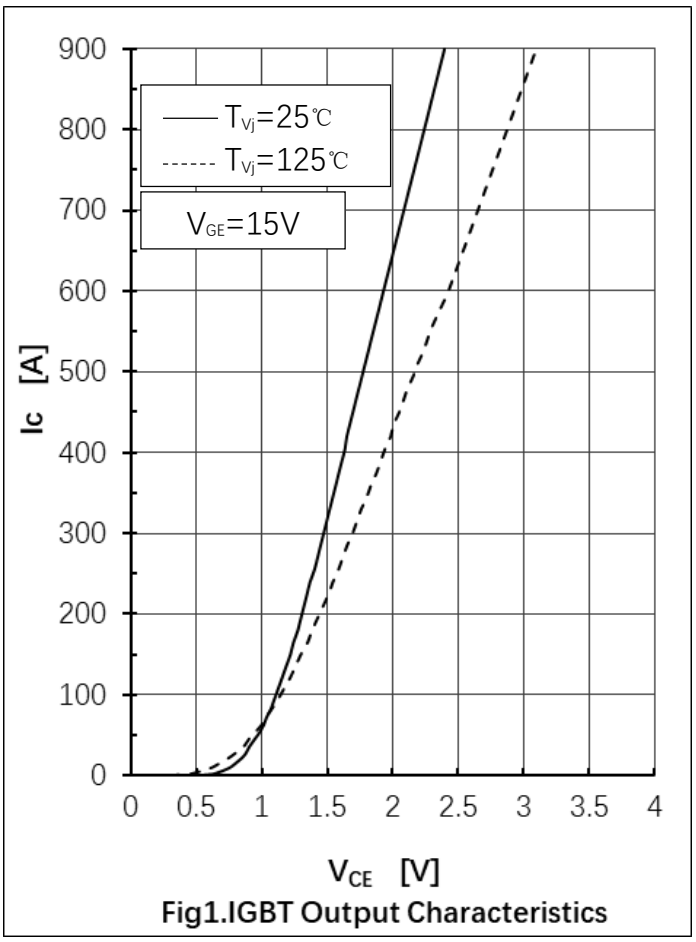


Fig1.IGBT Output Characteristics

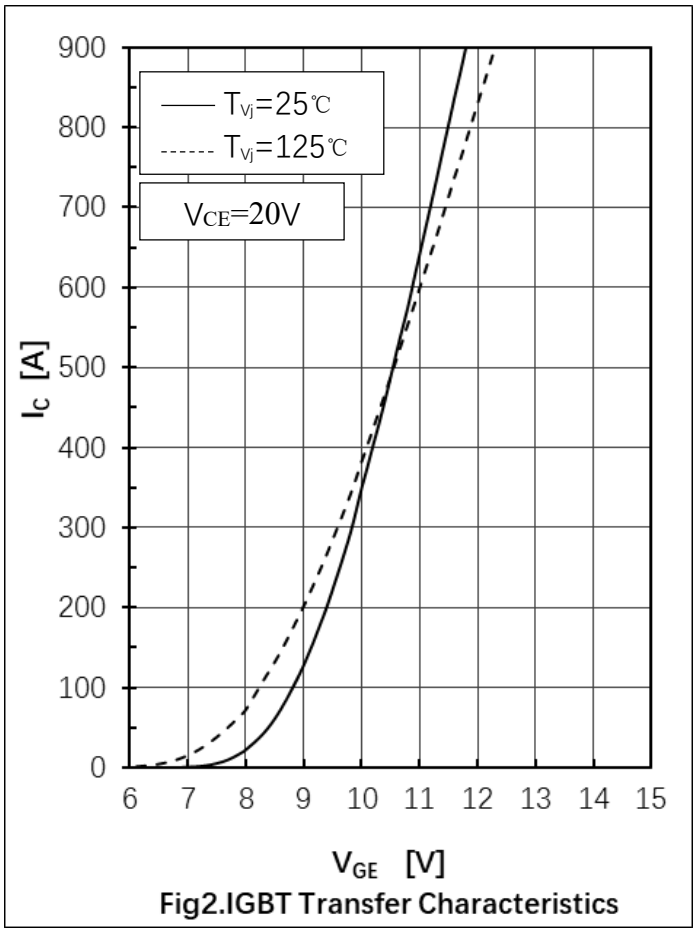


Fig2.IGBT Transfer Characteristics

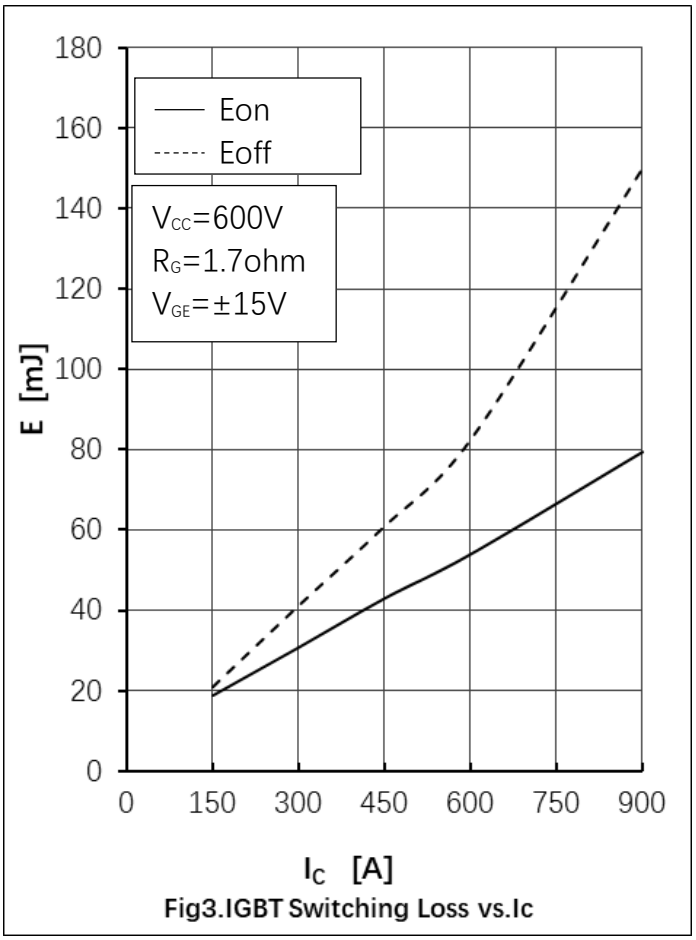


Fig3.IGBT Switching Loss vs.Ic

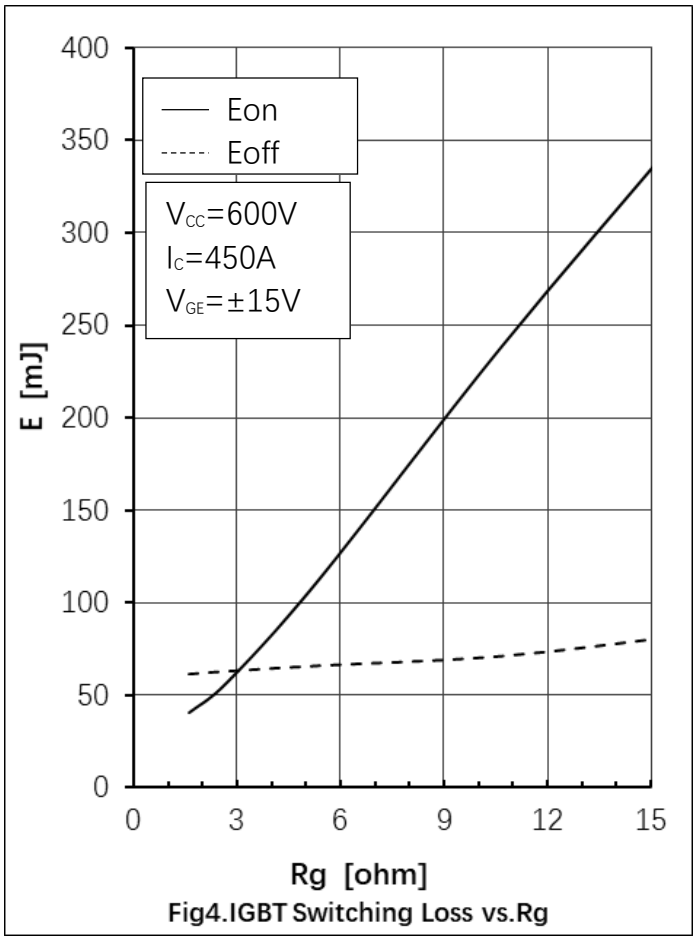


Fig4.IGBT Switching Loss vs.Rg

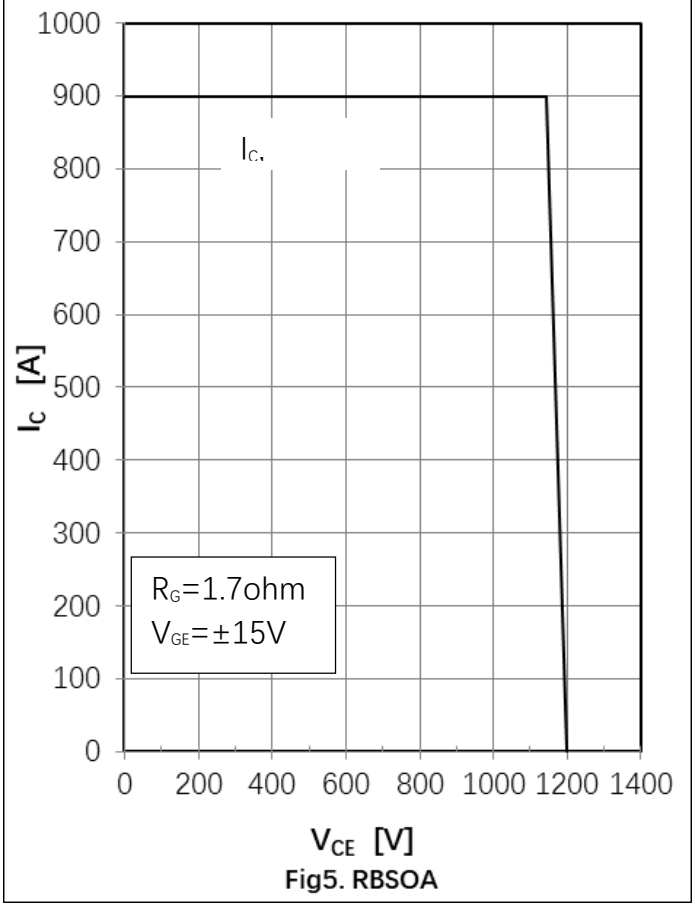


Fig5. RBSOA

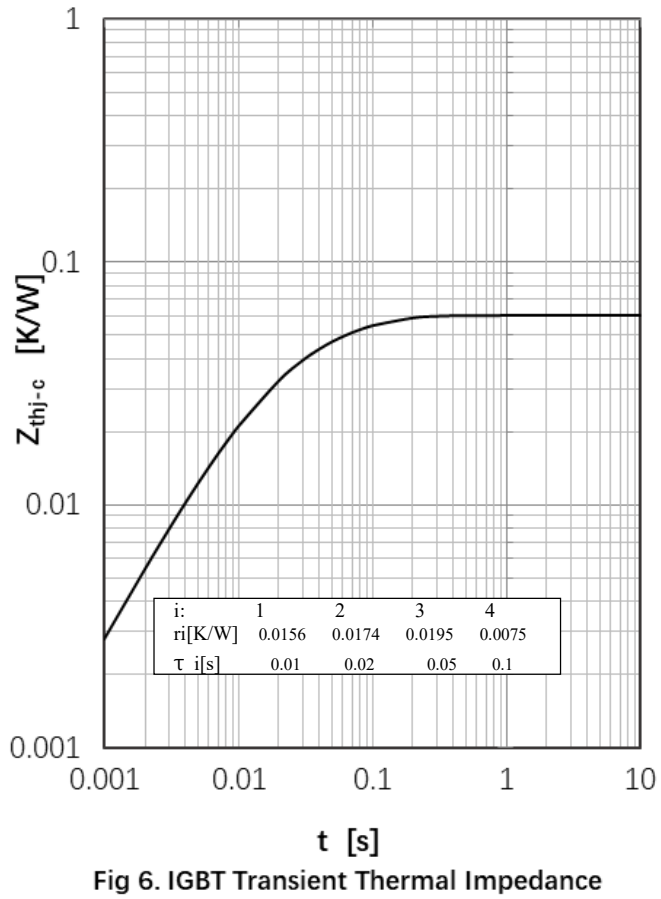


Fig 6. IGBT Transient Thermal Impedance

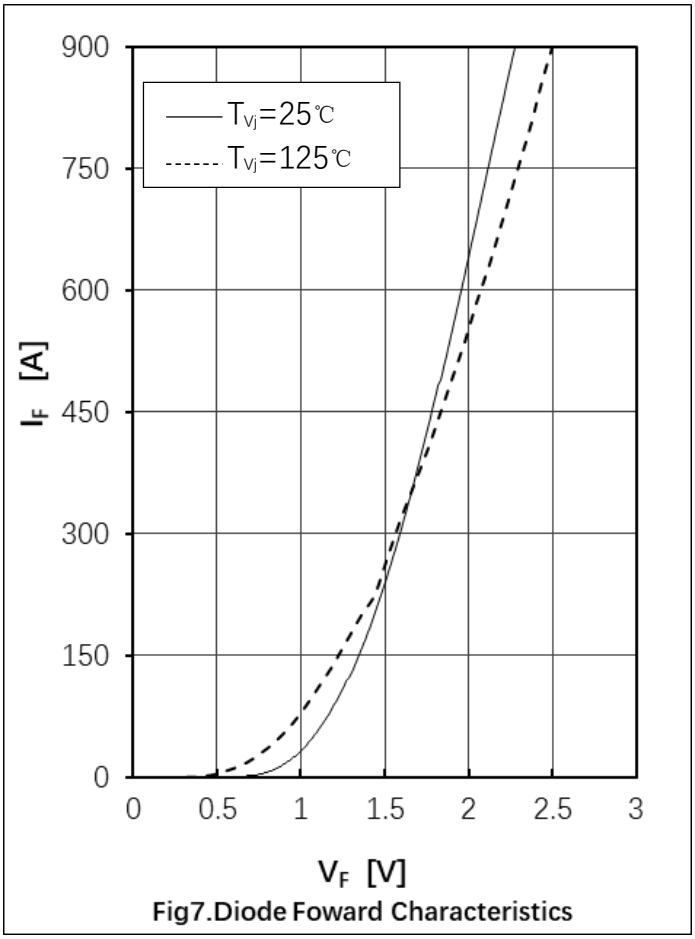


Fig7.Diode Foward Characteristics

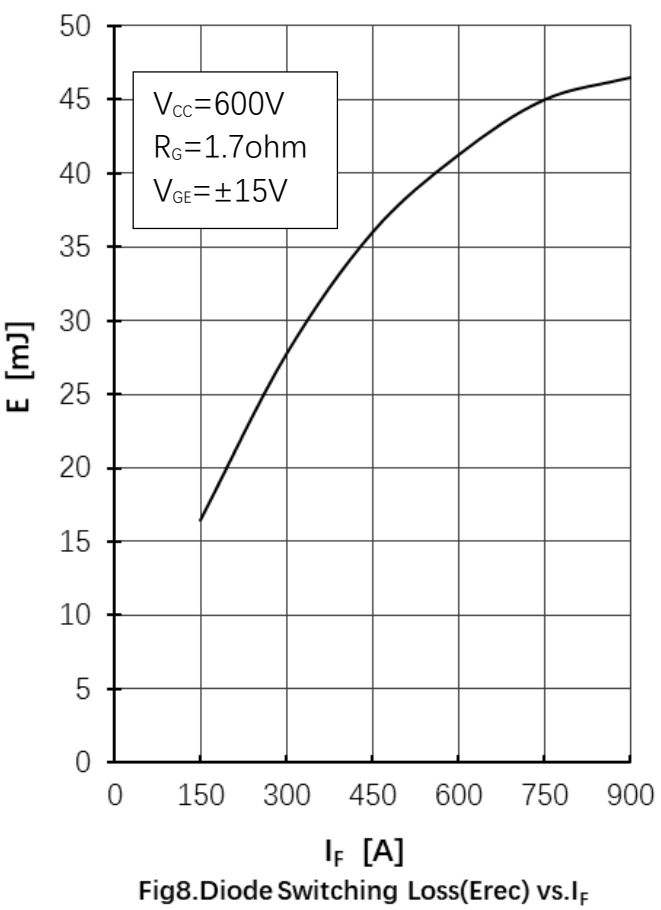


Fig8.Diode Switching Loss(Erec) vs.I_F

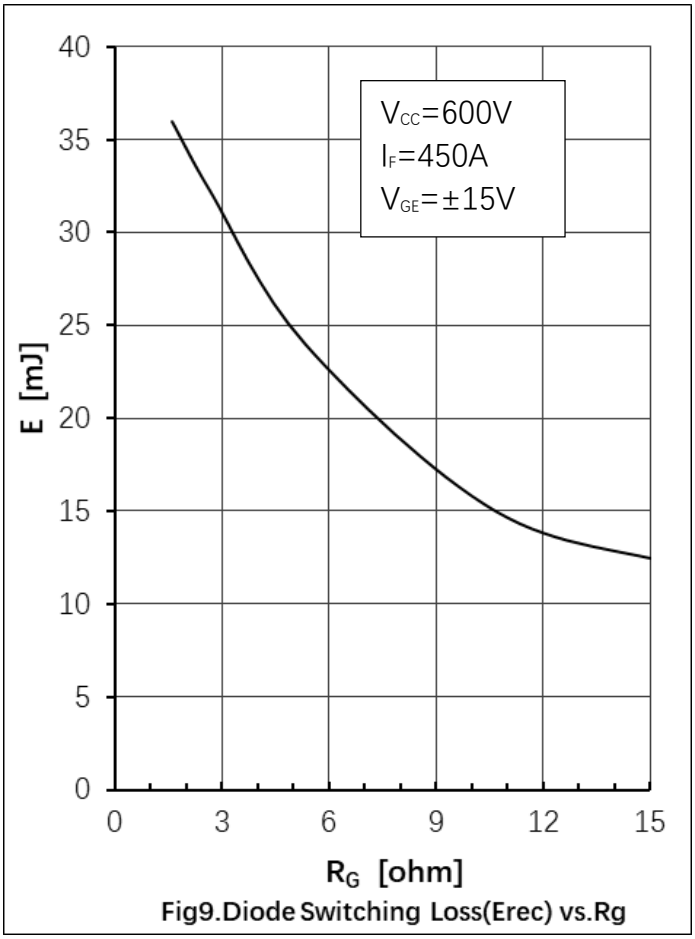


Fig9.Diode Switching Loss(Erec) vs.Rg

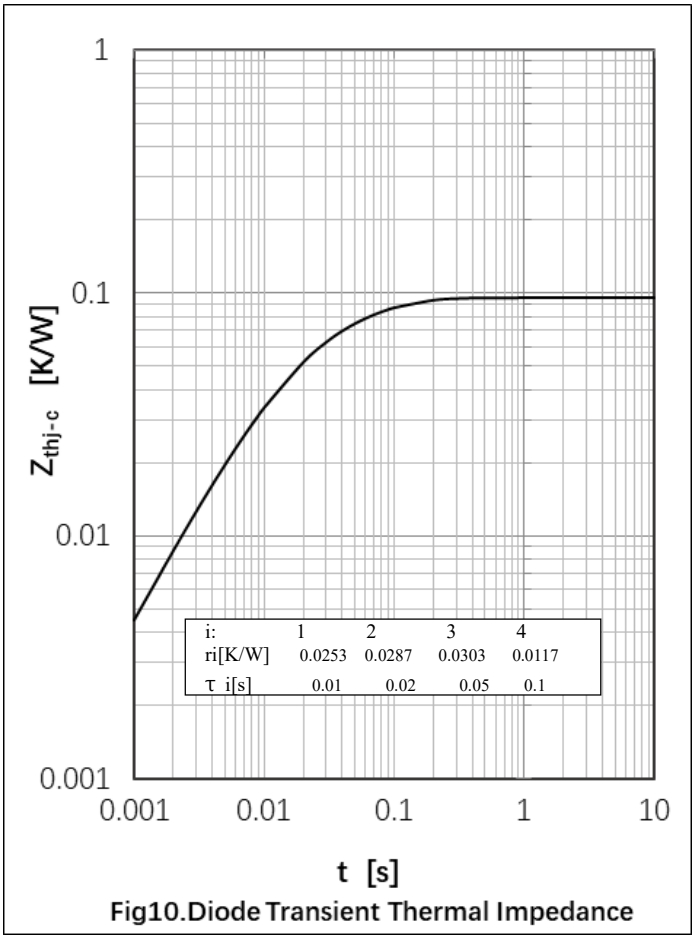
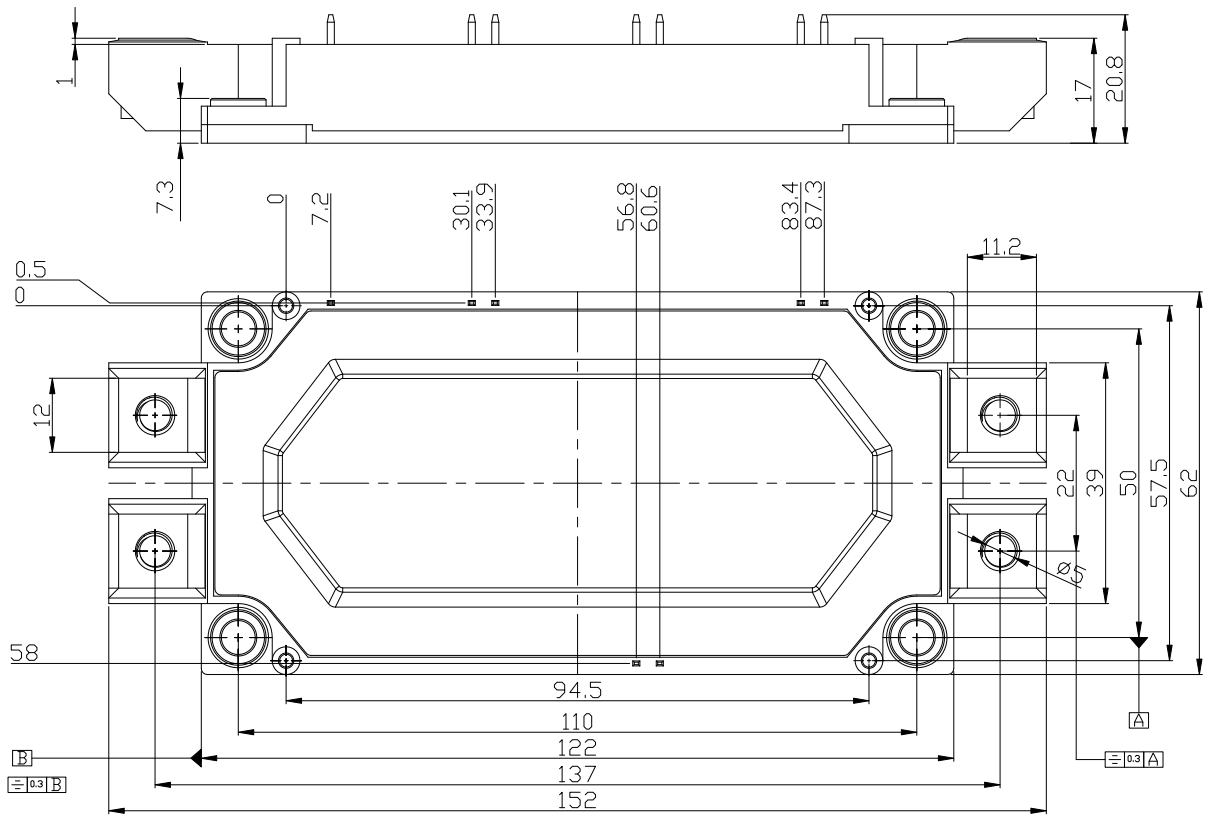


Fig10.Diode Transient Thermal Impedance

Package Outline Information

CASE: E3

Dimensions in Millimeters



Dimensions in mm