STARSEA

MG150HF12TLC1

RoHS COMPLIANT



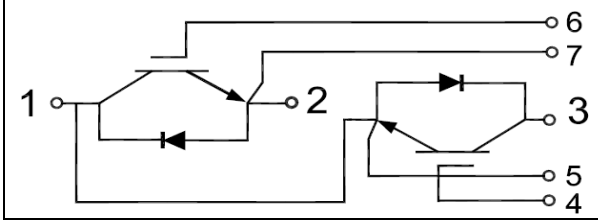
IGBT Modules

V_{CES} 1200V
I_C 150A

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 Trench technology
- V_{CE}(sat) with positive temperature coefficient
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance
- 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℃	150	A
Repetitive Peak Collector Current	I_{CRM}	t_p=1ms	300	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_C=25℃ T_{vjmax}=175℃	960	W

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, I_C=5mA,T_{vj}=25℃	5.2	5.8	6.5	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=150A,V_{GE}=15V, T_{vj}=25℃		1.86	2.20	V
		I_C=150A,V_{GE}=15V, T_{vj}=150℃		2.24		
		I_C=150A,V_{GE}=15V, T_{vj}=175℃		2.30		
Gate Charge	Q_G			1.1		uC
Internal Gate Resistance	R_{gint}			5		Ω
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1MHz, T_{vj}=25℃		14.5		nF
Reverse Transfer Capacitance	C_{res}			0.48		nF
Gate-Emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V,T_{vj}=25℃			400	nA
Turn-on Delay Time	$t_{d(on)}$	I_C=150A V_{CE}=600V V_{GE}=±15V R_G=1.1Ω T_{vj}=25℃		156		ns
Rise Time	t_r			55		ns
Turn-off Delay Time	$t_{d(off)}$			264		ns
Fall Time	t_f			189		ns
Energy Dissipation During Turn-on Time	E_{on}			11.5		mJ
Energy Dissipation During Turn-off Time	E_{off}			10.3		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=150A V_{CE}=600V V_{GE}=±15V R_G=1.1Ω T_{vj}=150℃		125		ns
Rise Time	t_r			60		ns
Turn-off Delay Time	$t_{d(off)}$			284		ns
Fall Time	t_f			260		ns
Energy Dissipation During Turn-on Time	E_{on}			17.2		mJ
Energy Dissipation During Turn-off Time	E_{off}			14.1		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=150A V_{CE}=600V V_{GE}=±15V R_G=1.1Ω T_{vj}=175℃		127		ns
Rise Time	t_r			62		ns
Turn-off Delay Time	$t_{d(off)}$			295		ns
Fall Time	t_f			281		ns
Energy Dissipation During Turn-on Time	E_{on}			18.8		mJ
Energy Dissipation During Turn-off Time	E_{off}			14.8		mJ
SC Data	I_{sc}	t_p≤10us, V_{GE}=15V, T_{vj}=150℃,V_{CC}=900V, V_{CEM}≤1200V		650		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		150	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	300	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=150A,T_{vj}=25℃		2.03	2.80	V
		I_F=150A,T_{vj}=150℃		1.72		
		I_F=150A,T_{vj}=175℃		1.63		
Recovered Charge	Q_{rr}	I_F=150A V_R=600V -di_F/dt=2300A/us T_{vj}=25℃		9.7		uC
Peak Reverse Recovery Current	I_{rr}			86		A
Reverse Recovery Energy	E_{rec}			3.56		mJ
Recovered Charge	Q_{rr}	I_F=150A V_R=600V -di_F/dt=2300A/us T_{vj}=150℃		24.1		uC
Peak Reverse Recovery Current	I_{rr}			127		A
Reverse Recovery Energy	E_{rec}			9.3		mJ
Recovered Charge	Q_{rr}	I_F=150A V_R=600V -di_F/dt=2300A/us T_{vj}=175℃		28.6		uC
Peak Reverse Recovery Current	I_{rr}			134		A
Reverse Recovery Energy	E_{rec}			11.1		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	℃
Thermal Resistance Junction to Case	$R_{\theta JC}$	per IGBT			0.155	K/W
		per Diode			0.29	
Thermal Resistance Case to Sink	$R_{\theta CS}$	Conductive grease applied		0.05		K/W
Module Electrodes Torque	M_t	Recommended(M5)	2.5		5.0	N·m
Module-to-Sink Torque	M_s	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			150		g

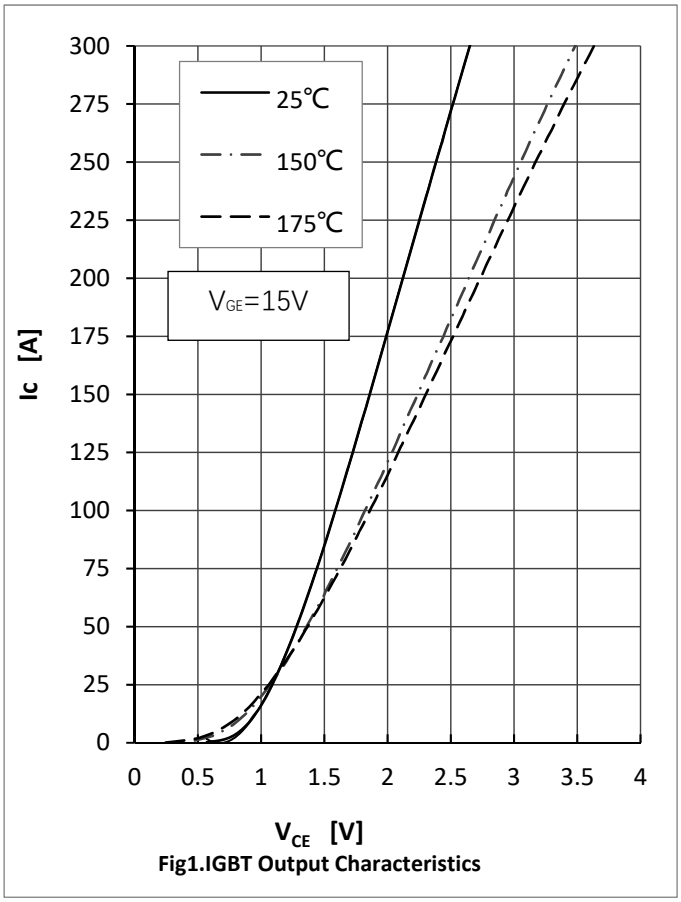


Fig1.IGBT Output Characteristics

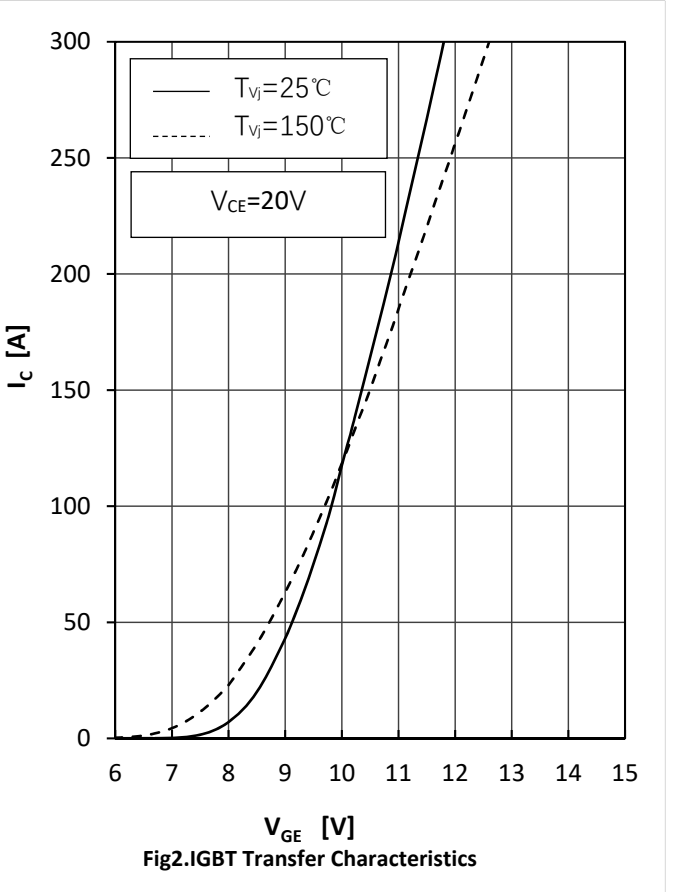


Fig2.IGBT Transfer Characteristics

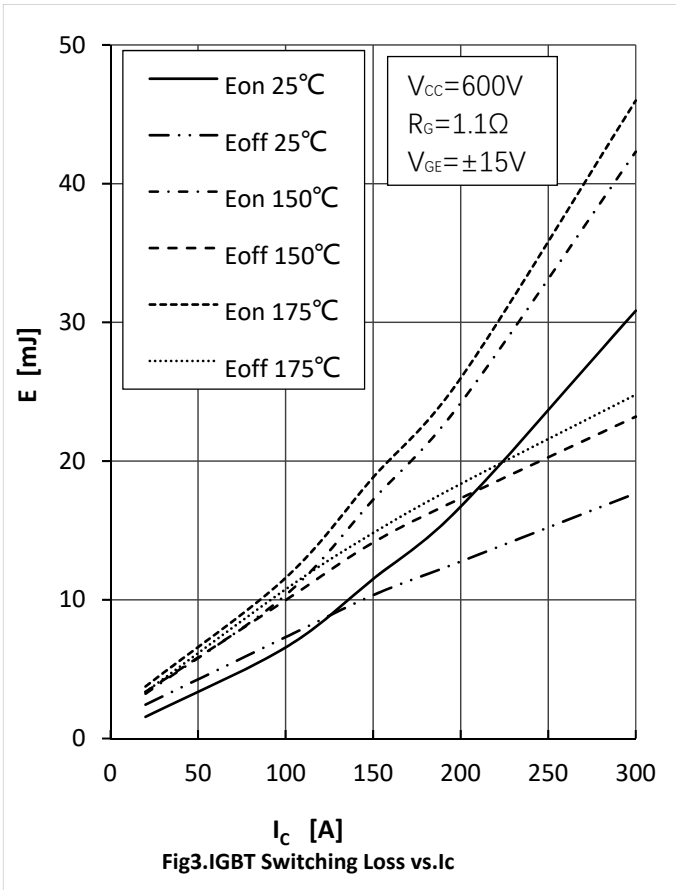


Fig3.IGBT Switching Loss vs.Ic

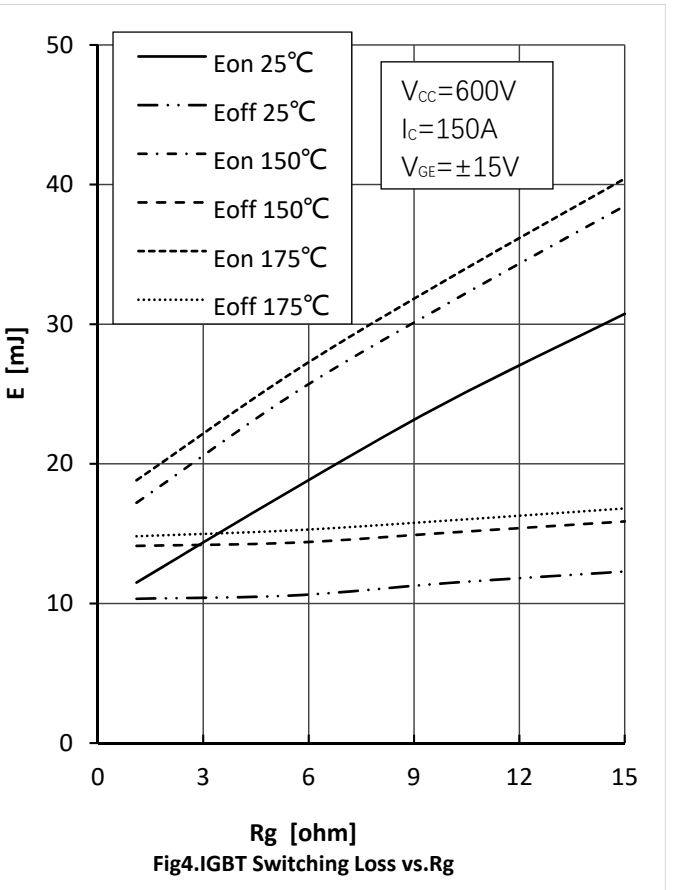


Fig4.IGBT Switching Loss vs.Rg

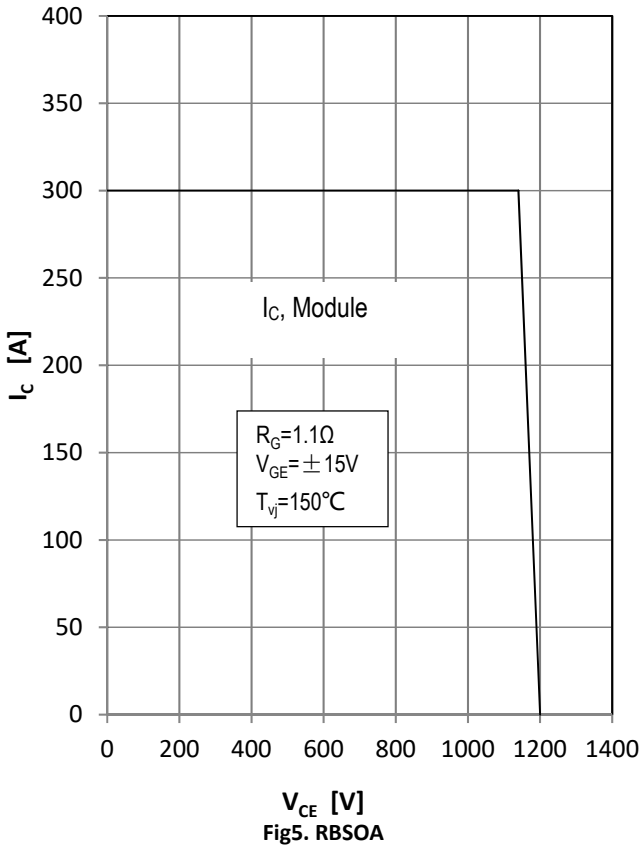


Fig5. RBSOA

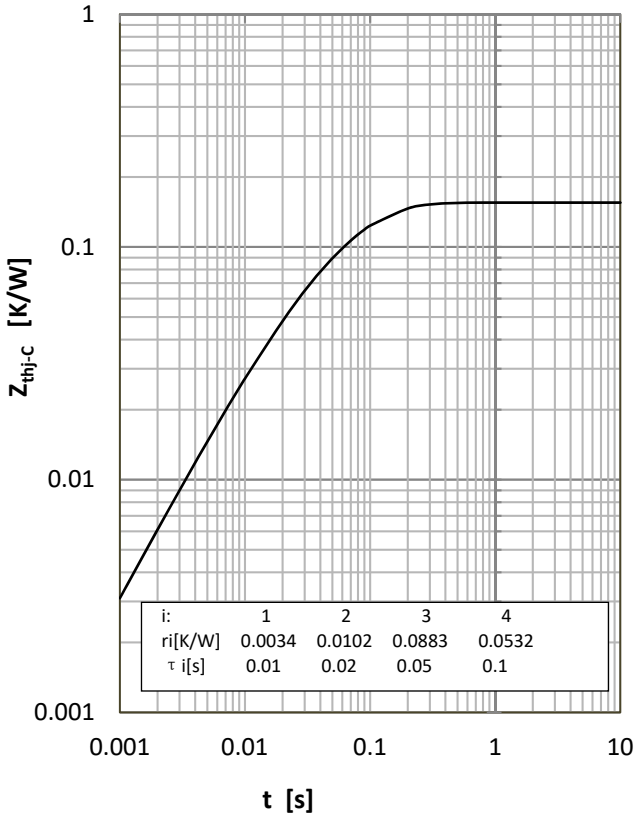


Fig 6. IGBT Transient Thermal Impedance

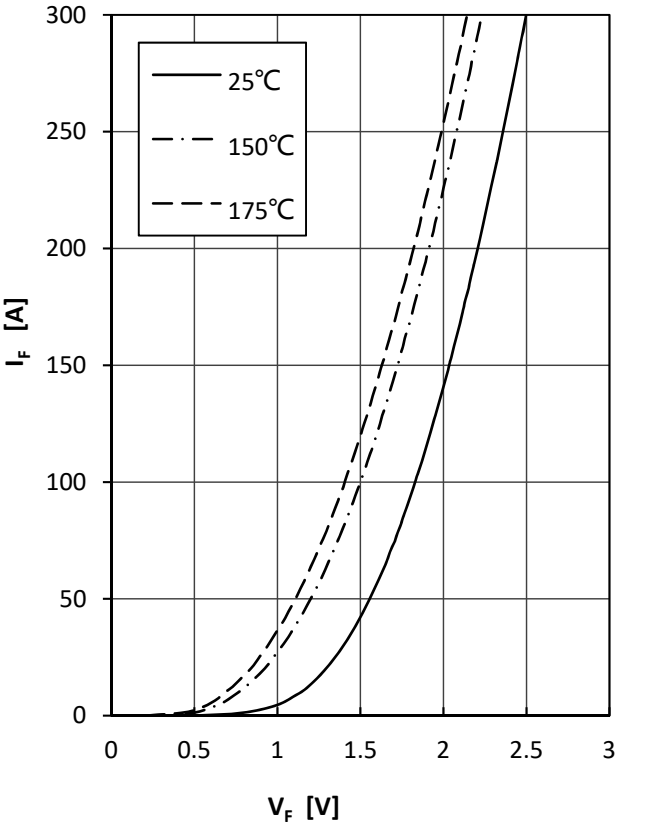


Fig7.Diode Foward Characteristics

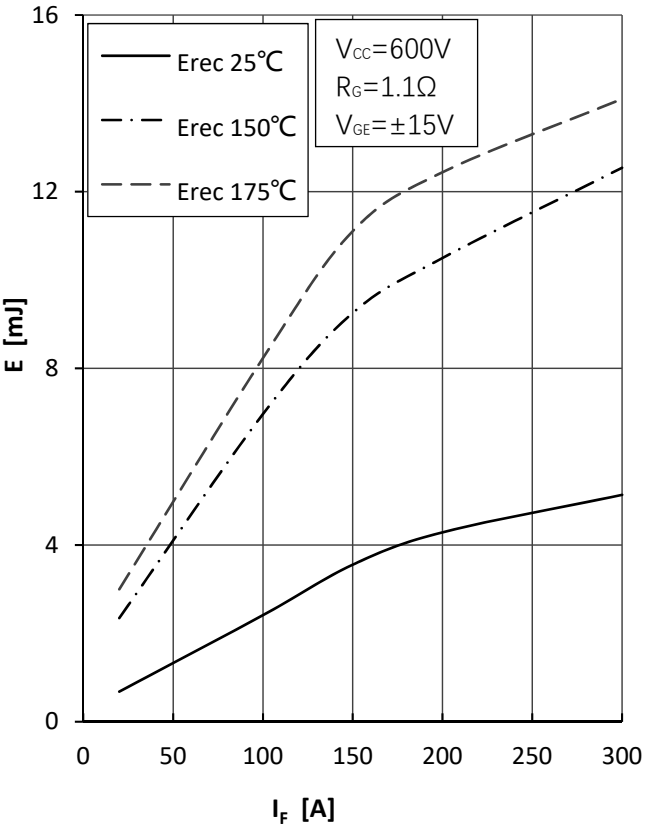


Fig8.Diode Switching Loss vs.I_F

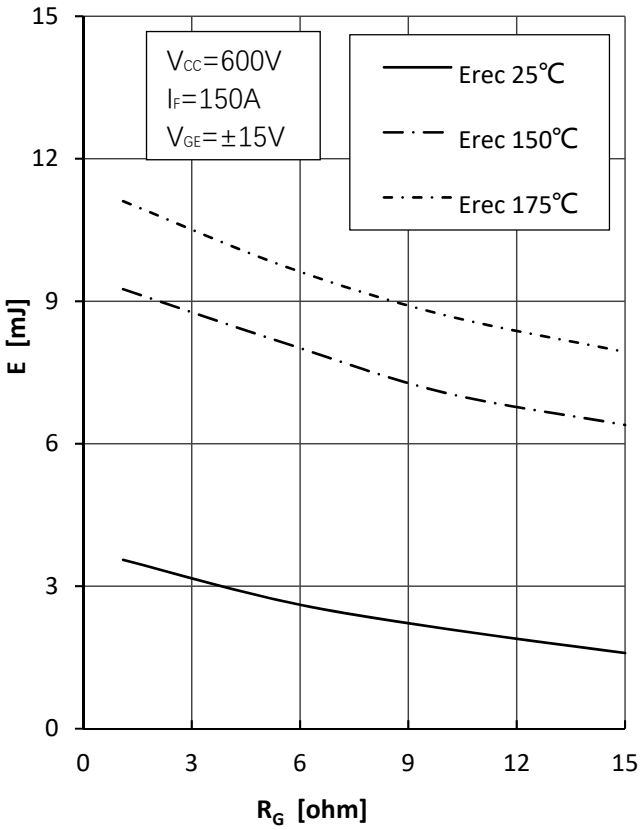


Fig9.Diode Switching Loss vs.Rg

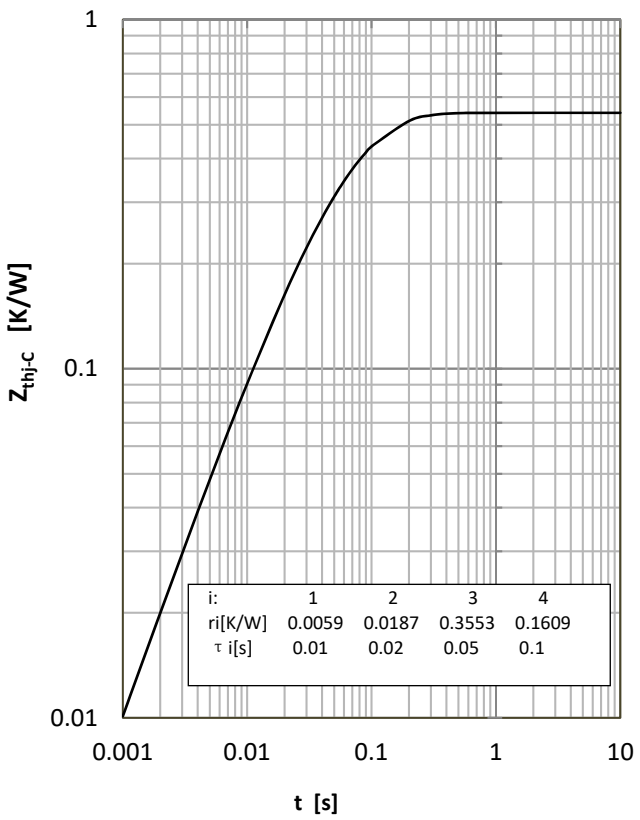
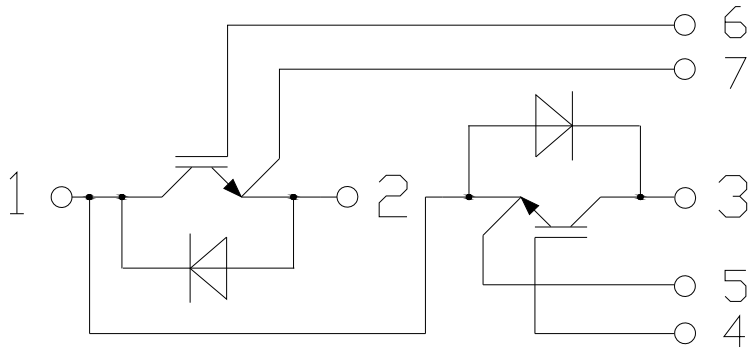


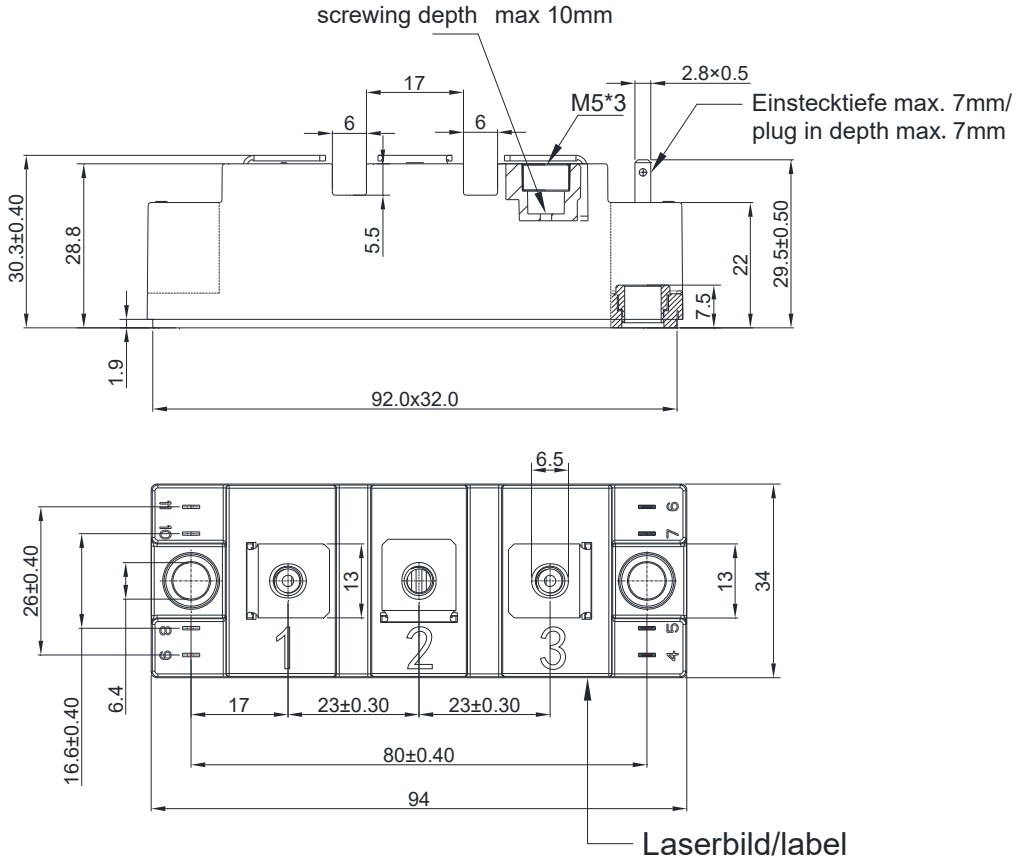
Fig10.Diode Transient Thermal Impedance

- Circuit Diagram



- **Package Outline Information**

Dimensions in Millimeters



Notice

All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in STARSEA's terms and conditions of sale for such products, STARSEA assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of STARSEA products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.