MG50HF12TFC1

RoHS COMPLIANT

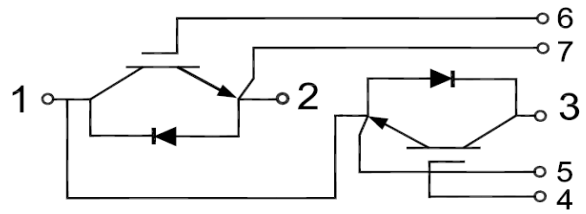
IGBT Modules

V_{CES}	1200V
I_C	50A

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
- 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℃	50	A
Repetitive Peak Collector Current	I_{CRM}	t_p=1ms	100	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_C=25℃ T_{vjmax}=175℃	288	W

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, I_C=1.7mA,T_{vj}=25℃	5.2	5.8	6.4	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=50A,V_{GE}=15V, T_{vj}=25℃		2.10		V
		I_C=50A,V_{GE}=15V, T_{vj}=125℃		2.45		
		I_C=50A,V_{GE}=15V, T_{vj}=150℃		2.50		
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1MHz,T_{vj}=25℃		2.60		nF
Reverse Transfer Capacitance	C_{res}			0.10		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=50A V_{CE}=600V V_{GE}=±15V R_G=3.9Ω T_{vj}=25℃		45		ns
Rise Time	t_r			50		ns
Turn-off Delay Time	$t_{d(off)}$			125		ns
Fall Time	t_f			152		ns
Energy Dissipation During Turn-on Time	E_{on}			1.56		mJ
Energy Dissipation During Turn-off Time	E_{off}			1.82		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=50A V_{CE}=600V V_{GE} =±15V R_G=3.9Ω T_{vj}=150℃		55		ns
Rise Time	t_r			54		ns
Turn-off Delay Time	$t_{d(off)}$			180		ns
Fall Time	t_f			175		ns
Energy Dissipation During Turn-on Time	E_{on}			4.65		mJ
Energy Dissipation During Turn-off Time	E_{off}			5.95		mJ

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		50	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	100	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=50A,T_{vj}=25℃		1.80	2.80	V
		I_F=50A,T_{vj}=125℃		1.70		
		I_F=50A,T_{vj}=150℃		1.63		
Recovered Charge	Q_{rr}	I_F=50A V_R=600V -di_F/dt =950A/us T_{vj}=25℃		2.85		uC
Peak Reverse Recovery Current	I_{rr}			85		A
Reverse Recovery Energy	E_{rec}			0.72		mJ
Recovered Charge	Q_{rr}	I_F=50A V_R=600V -di_F/dt=950A/us T_{vj}=150℃		4.96		uC
Peak Reverse Recovery Current	I_{rr}			92		A
Reverse Recovery Energy	E_{rec}			1.75		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			0.52	K/W
		per Diode			0.72	
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

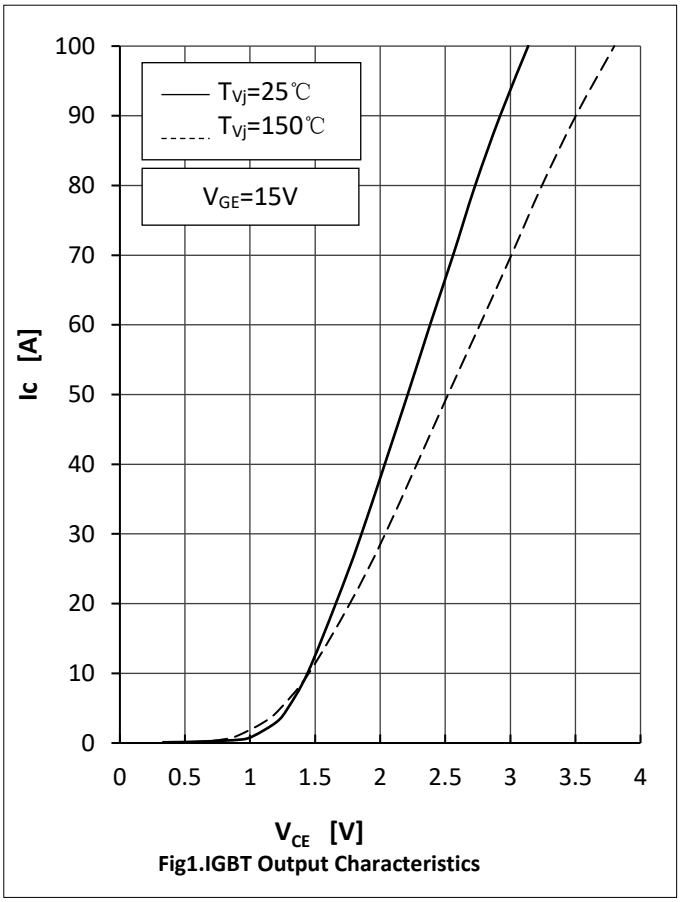


Fig1.IGBT Output Characteristics

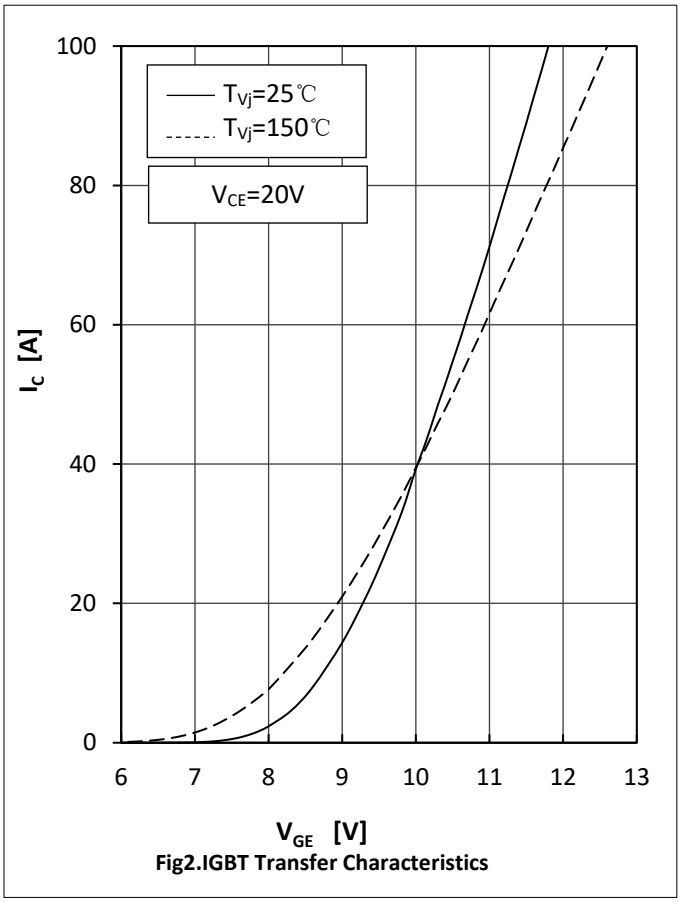


Fig2.IGBT Transfer Characteristics

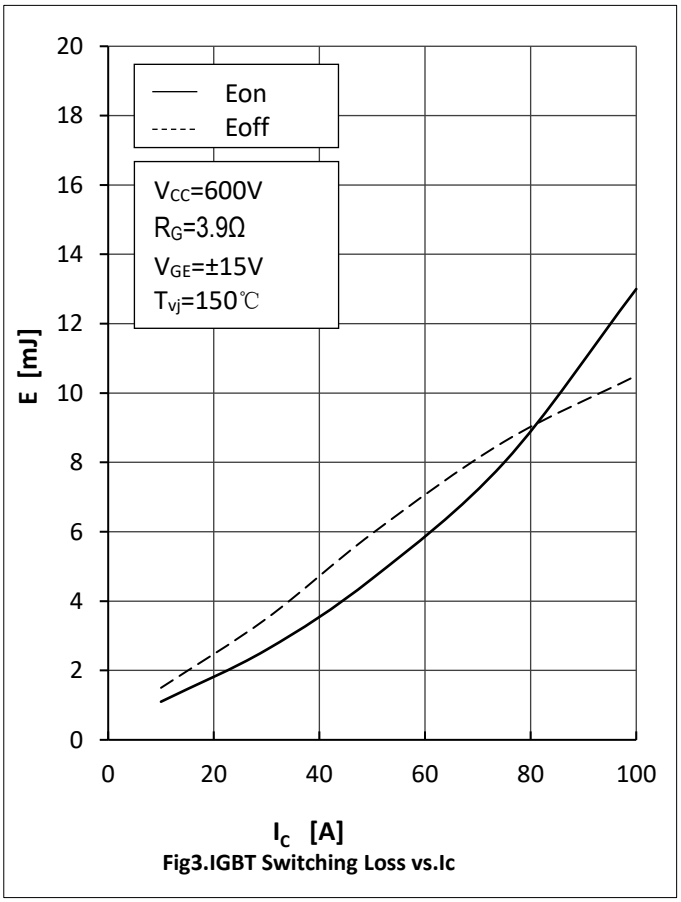


Fig3.IGBT Switching Loss vs.Ic

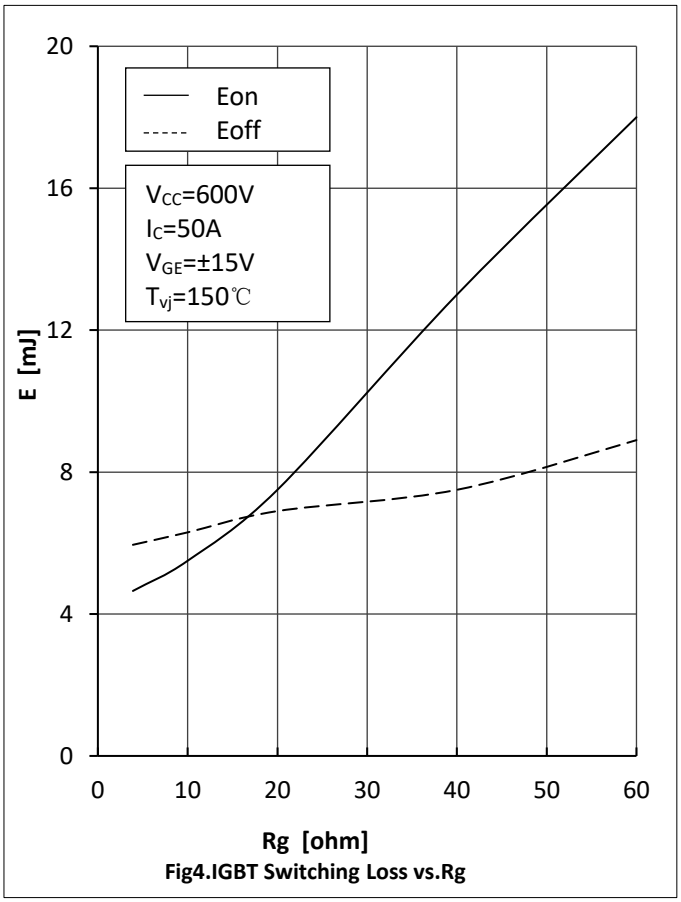


Fig4.IGBT Switching Loss vs.Rg

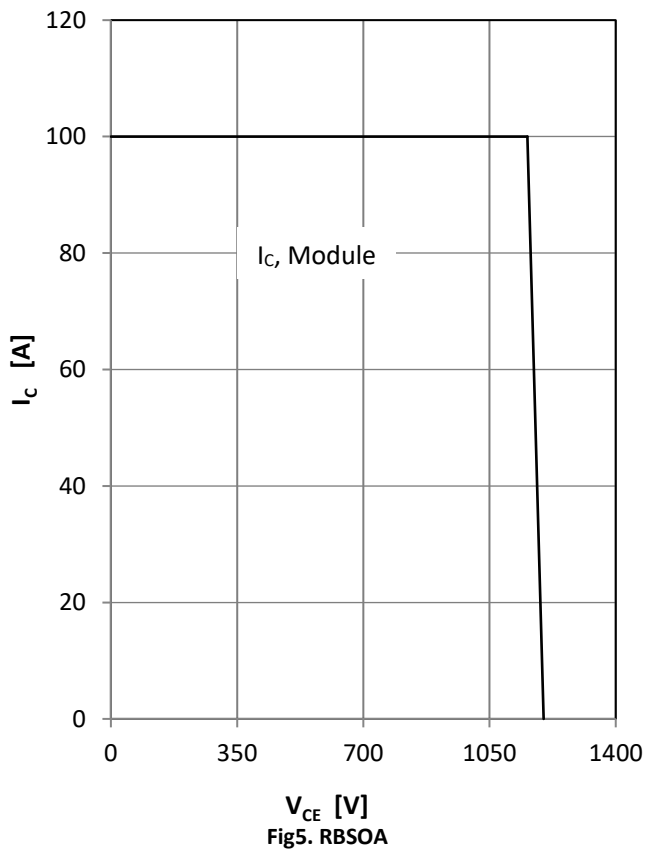


Fig5. RBSOA

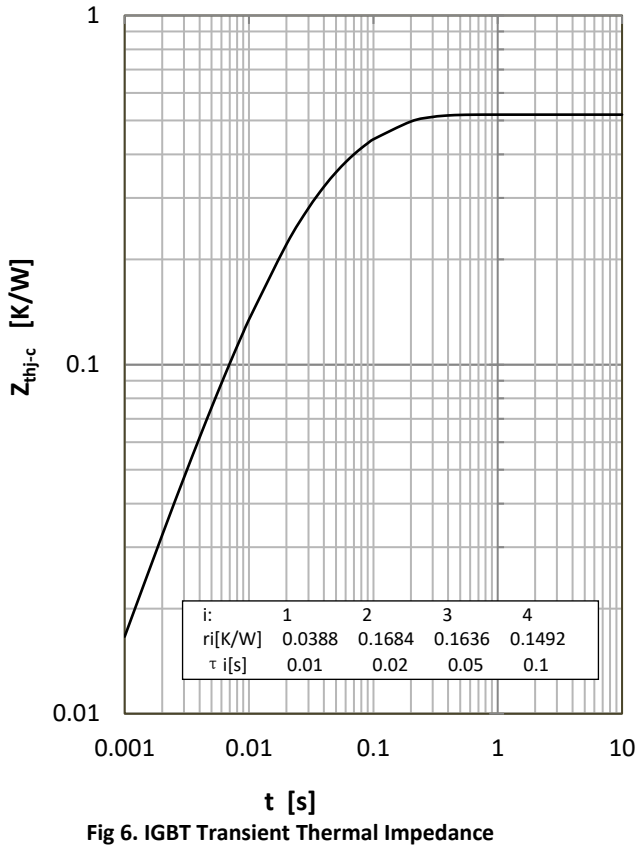


Fig 6. IGBT Transient Thermal Impedance

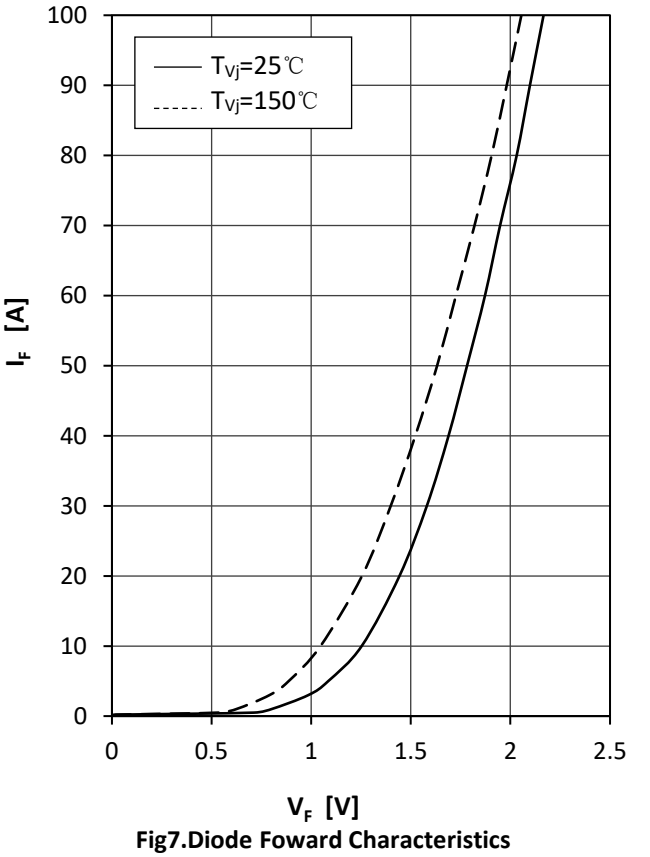


Fig7.Diode Foward Characteristics

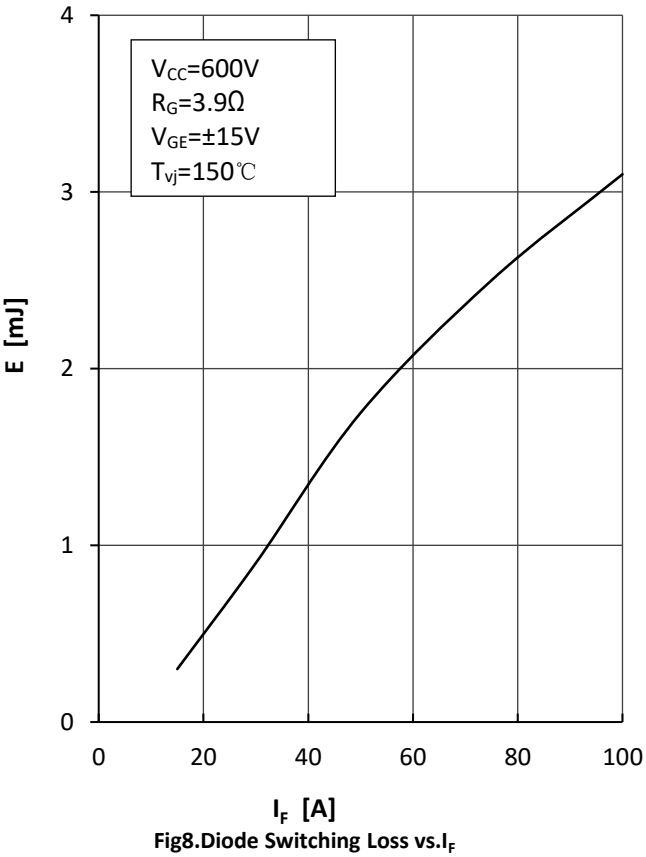


Fig8.Diode Switching Loss vs.I_F

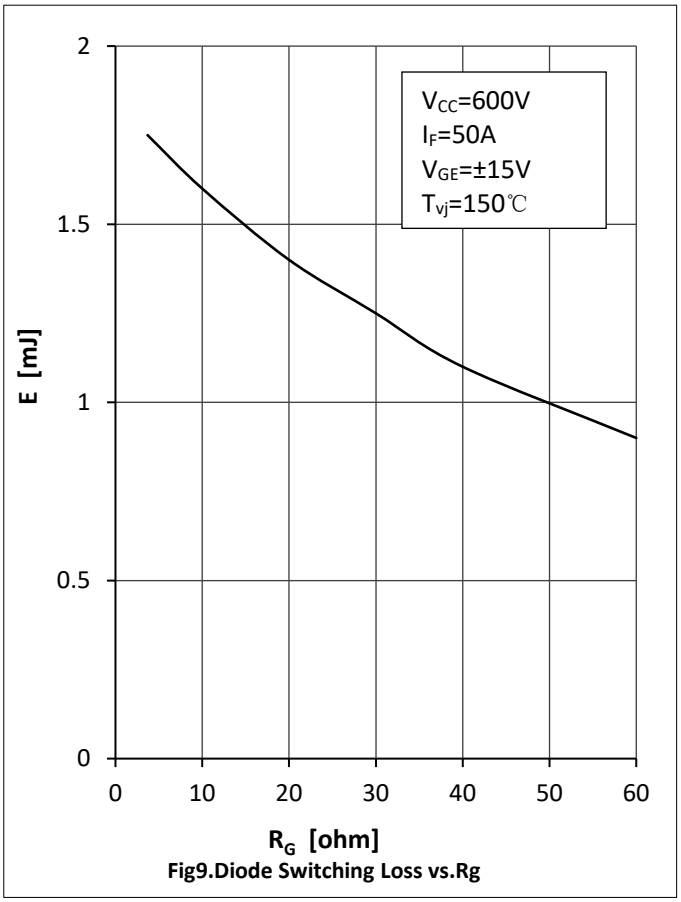


Fig9.Diode Switching Loss vs.Rg

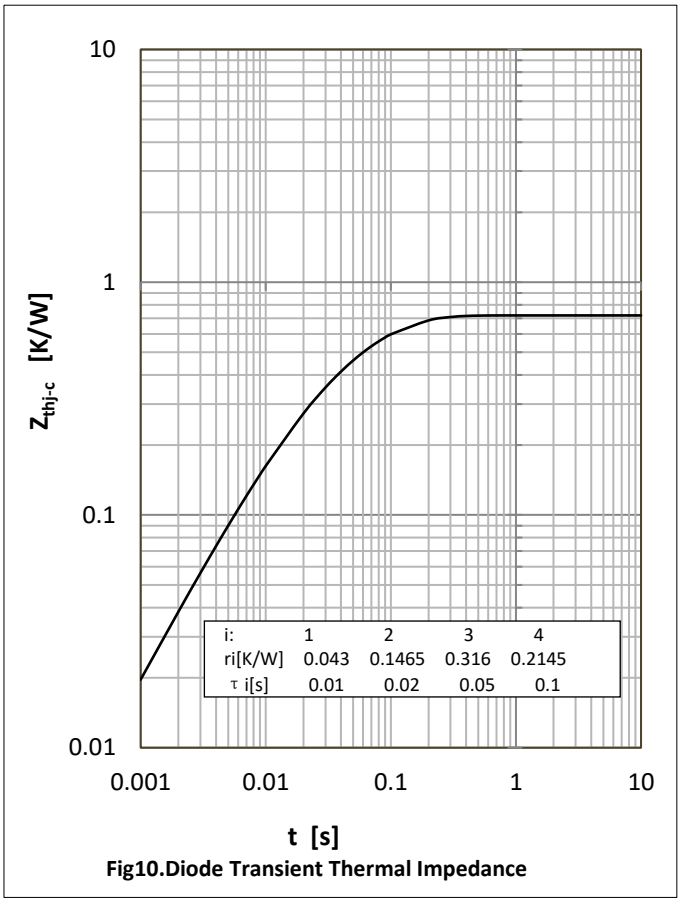
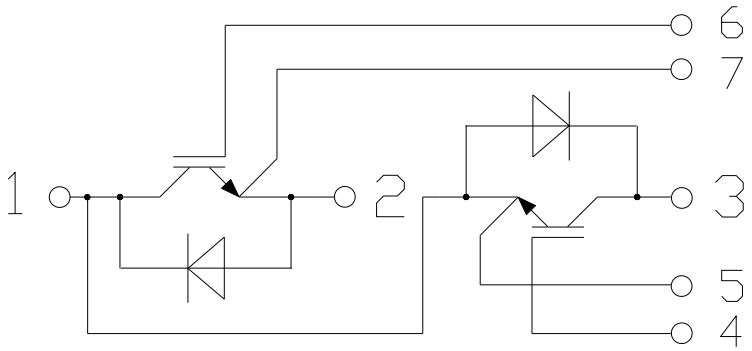


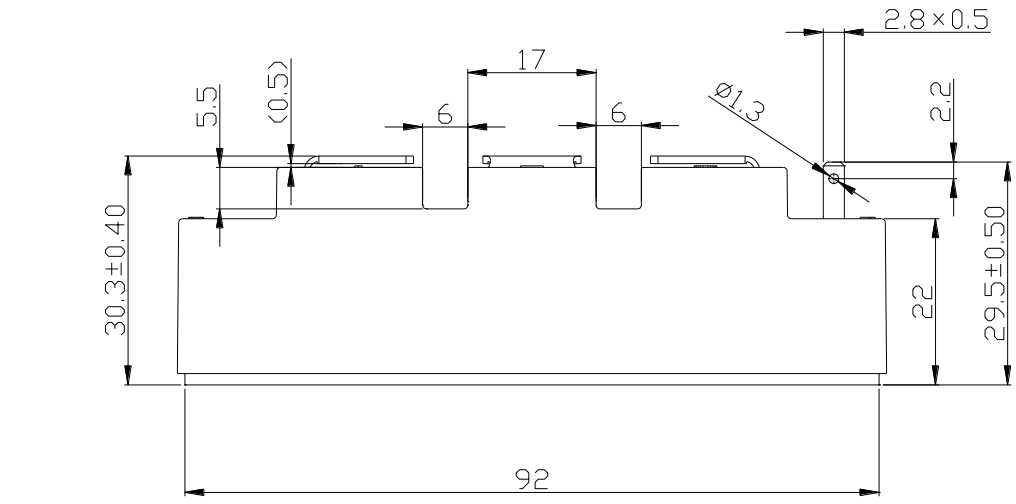
Fig10.Diode Transient Thermal Impedance

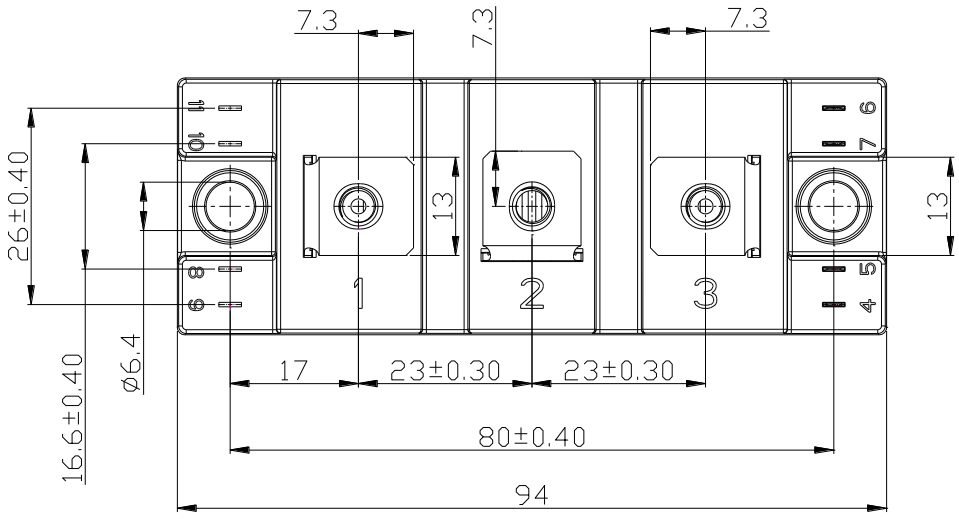
Circuit Diagram



Package Outline Information

Dimensions in Millimeters





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