MG150ZD12TLC1

RoHS COMPLIANT

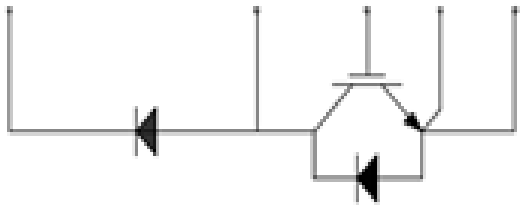
IGBT Modules

VCES	1200V
IC	150A

Applications

- Motor drive
- 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}	tp=1ms	300	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_c=25℃ T_{vjmax}=175℃	968	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℃	5.0	5.7	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	$V_{CE(sat)}$	Ic=150A,V_{GE}=15V, T_{vj}=25℃		1.85	2.20	V
		Ic=150A,V_{GE}=15V, T_{vj}=125℃		2.15		
		Ic=150A,V_{GE}=15V, T_{vj}=150℃		2.25		
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE} =0V, f=1MHz, T_{vj}=25℃		9.8		nF
Reverse Transfer Capacitance	C_{res}			0.48		nF
Internal Gate Resistance	R_{gint}			5.0		Ω
Gate-Emitter leakage current	I_{GES}	V_{CE}=0 V, V_{GE}=20V,T_{vj} = 25℃			400	nA
Turn-on Delay Time	$t_{d(on)}$	I_C=150 A V_{CE}=600 V V_{GE}=±15V R_G=5.1Ω T_{vj}=25℃		185		ns
Rise Time	t_r			55		ns
Turn-off Delay Time	$t_{d(off)}$			360		ns
Fall Time	t_f			115		ns
Energy Dissipation During Turn-on Time	E_{on}			15.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			11.6		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=150 A V_{CE}=600 V V_{GE}=±15V R_G=5.1Ω T_{vj}=125℃		200		ns
Rise Time	t_r			60		ns
Turn-off Delay Time	$t_{d(off)}$			420		ns
Fall Time	t_f			120		ns
Energy Dissipation During Turn-on Time	E_{on}			23.2		mJ
Energy Dissipation During Turn-off Time	E_{off}			17.0		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=150 A V_{CE}=600 V V_{GE}=±15V R_G=5.1Ω T_{vj}=150℃		215		ns
Rise Time	t_r			72		ns
Turn-off Delay Time	$t_{d(off)}$			431		ns
Fall Time	t_f			134		ns
Energy Dissipation During Turn-on Time	E_{on}			27.8		mJ
Energy Dissipation During Turn-off Time	E_{off}			19.5		mJ
SC Data	I_{sc}	T_p≤10us, V_{GE}=15V, Tvj=150℃,V_{cc}=600V, V_{CEM}≤1200V		750		A

Diode-Chopper

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
I^2t value	I^2t	V_R=0V,tp=10ms,Tvj=150℃	4050	A^2s

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=150A,T_{vj}=25℃		2.0		V
		I_F=150A,T_{vj}=125℃		1.9		
		I_F=150A,T_{vj}=150℃		1.85		
Recovered Charge	Q_{rr}	I_F=150 A V_R=600V -di_F/dt=2200A/us T_{vj}=25℃		13.4		uC
Peak Reverse Recovery Current	I_{rr}			143		A
Reverse Recovery Energy	E_{rec}			9.1		mJ
Recovered Charge	Q_{rr}	I_F=150 A V_R=600V -di_F/dt=2200A/us T_{vj}=125℃		26.1		uC
Peak Reverse Recovery Current	I_{rr}			178		A
Reverse Recovery Energy	E_{rec}			15.4		mJ
Recovered Charge	Q_{rr}	I_F=150 A V_R=600V -di_F/dt=2200A/us T_{vj}=150℃		31.3		uC
Peak Reverse Recovery Current	I_{rr}			185		A
Reverse Recovery Energy	E_{rec}			18.5		mJ

● Diode，Reverse

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
I^2t value	I^2t	V_R=0V,tp=10ms,Tvj=150℃	4050	A^2s

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=150A,T_{vj}=25℃		2.0		V
		I_F=150A,T_{vj}=125℃		1.9		
		I_F=150A,T_{vj}=150℃		1.85		
Recovered Charge	Q_{rr}	I_F=150 A V_R=600V -di_F/dt=2200A/us T_{vj}=25℃		13.4		uC
Peak Reverse Recovery Current	I_{rr}			143		A
Reverse Recovery Energy	E_{rec}			9.1		mJ
Recovered Charge	Q_{rr}	I_F=150 A V_R=600V -di_F/dt=2200A/us T_{vj}=125℃		26.1		uC
Peak Reverse Recovery Current	I_{rr}			178		A
Reverse Recovery Energy	E_{rec}			15.4		mJ
Recovered Charge	Q_{rr}	I_F=150 A V_R=600V -di_F/dt=2200A/us T_{vj}=150℃		31.3		uC
Peak Reverse Recovery Current	I_{rr}			185		A
Reverse Recovery Energy	E_{rec}			18.5		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	℃
Comperative tracking index			CTI		>200	
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 ElectrodesTorque	M_t	Recommended(M5)	2.5		5.0	N·m
Module-to-SinkTorque	M_s	Recommended(M6)	3.0		5.0	N·m
Weight of Module	G			150		g

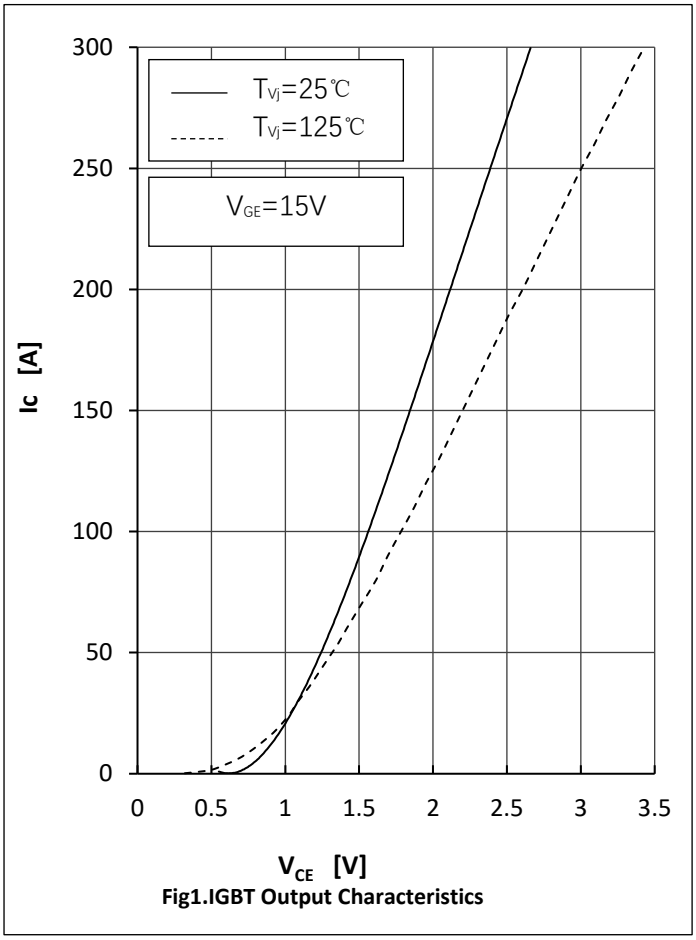


Fig1.IGBT Output Characteristics

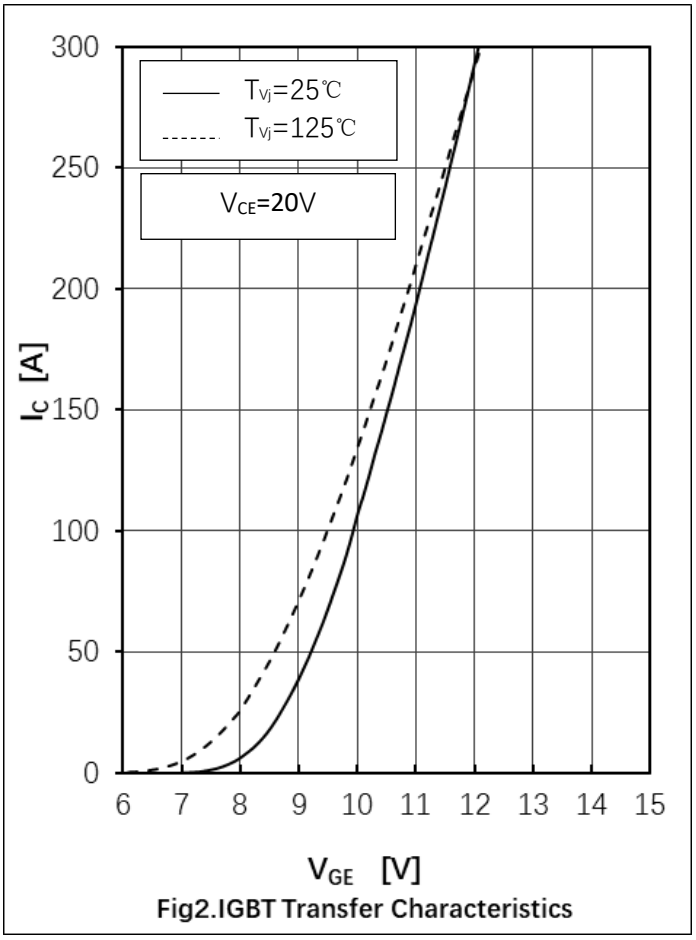


Fig2.IGBT Transfer Characteristics

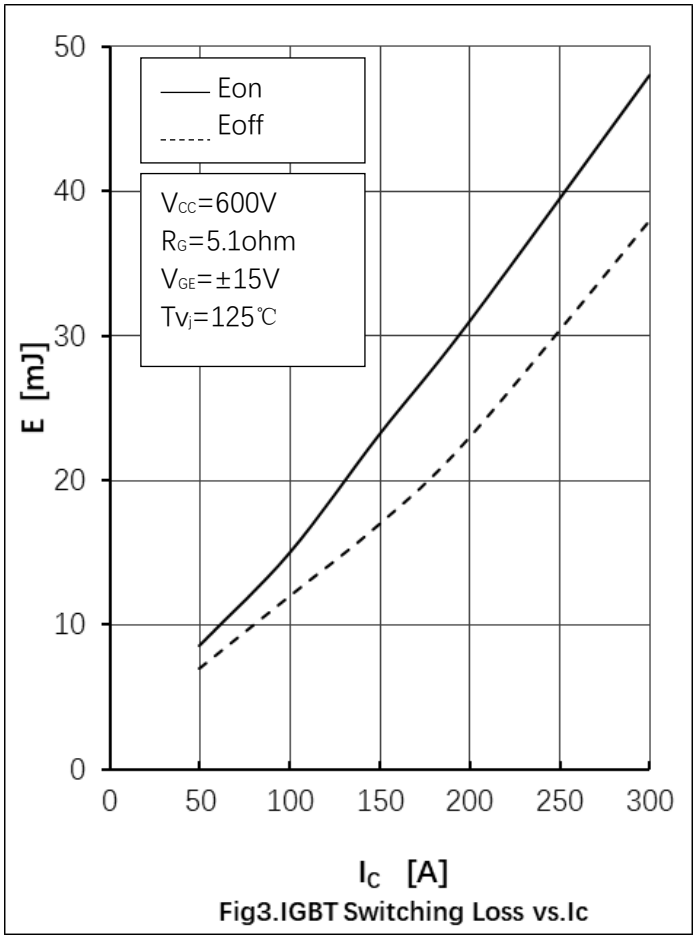


Fig3.IGBT Switching Loss vs.Ic

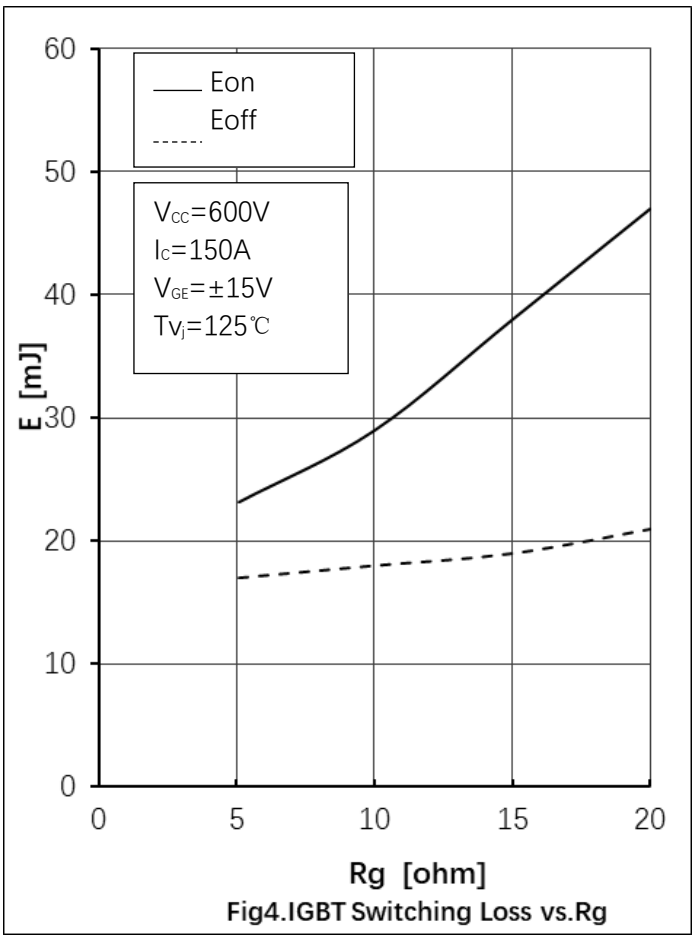


Fig4.IGBT Switching Loss vs.Rg

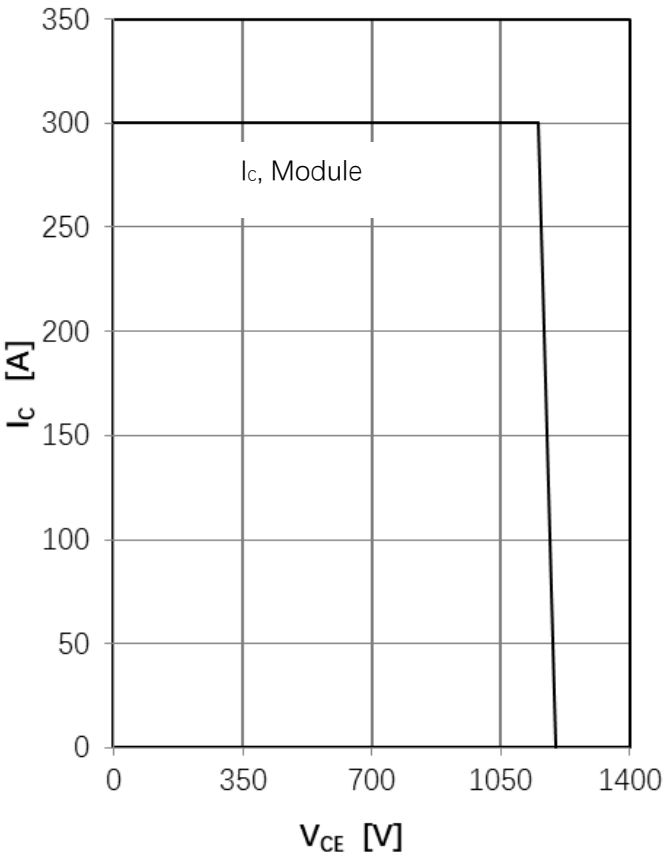


Fig5. RBSOA

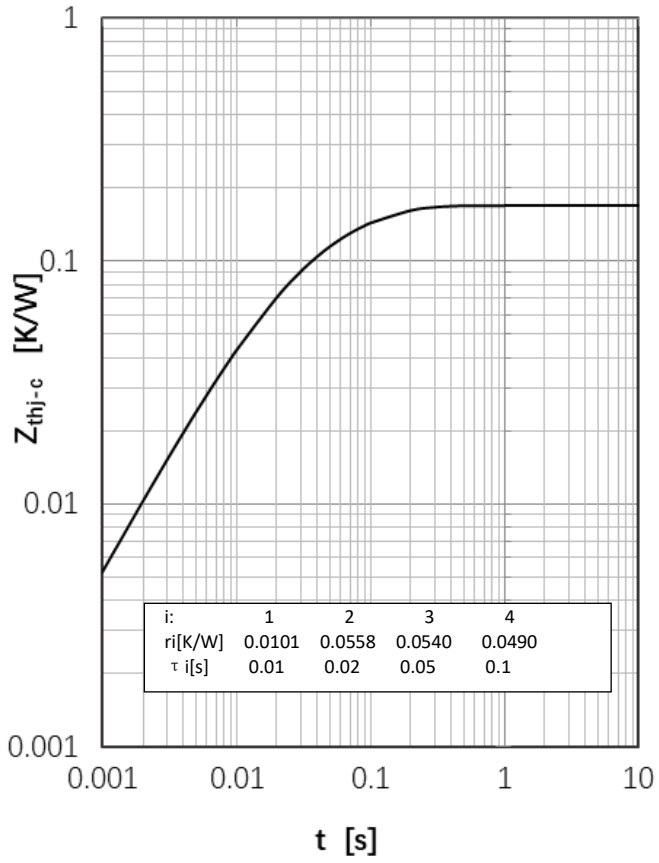


Fig 6. IGBT Transient Thermal Impedance

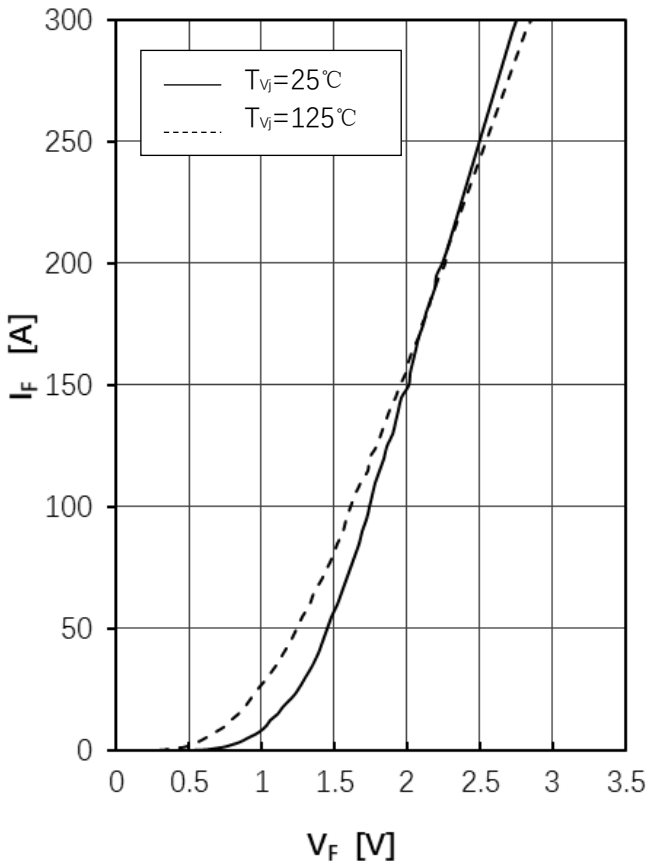


Fig7.Diode Foward Characteristics

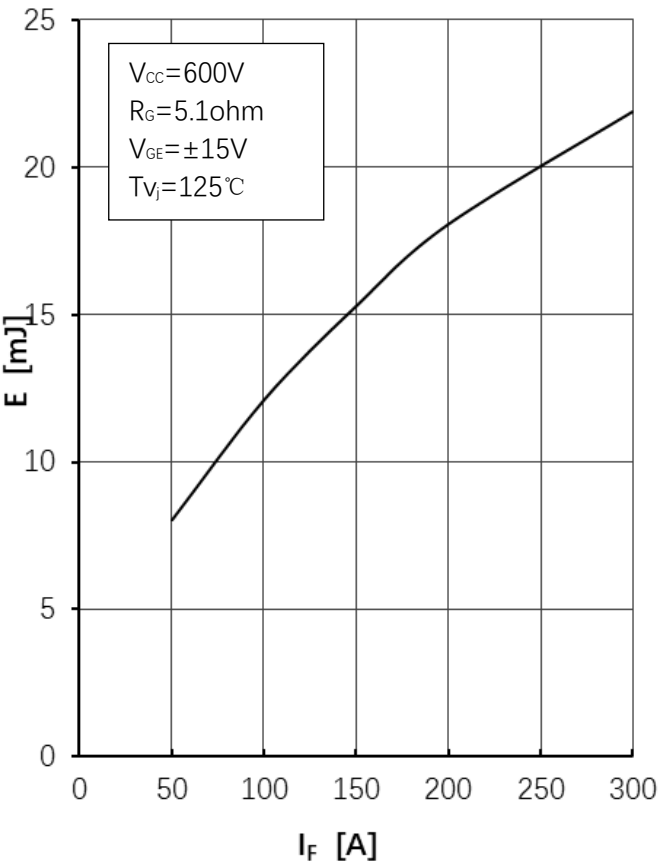


Fig8.Diode Switching Loss(Erec) vs.I_F

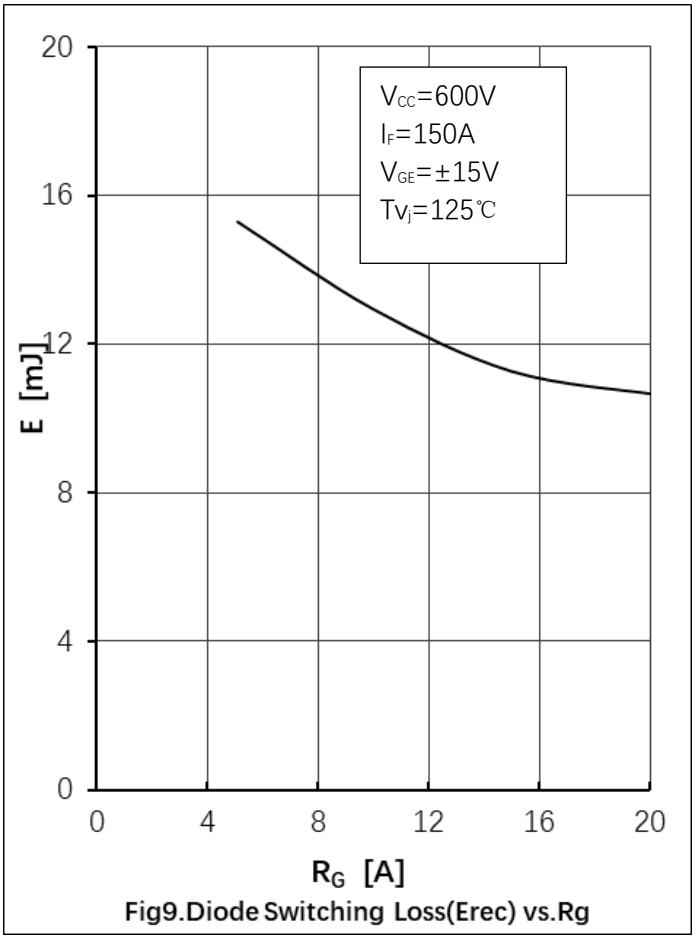


Fig9.Diode Switching Loss(Erec) vs.Rg

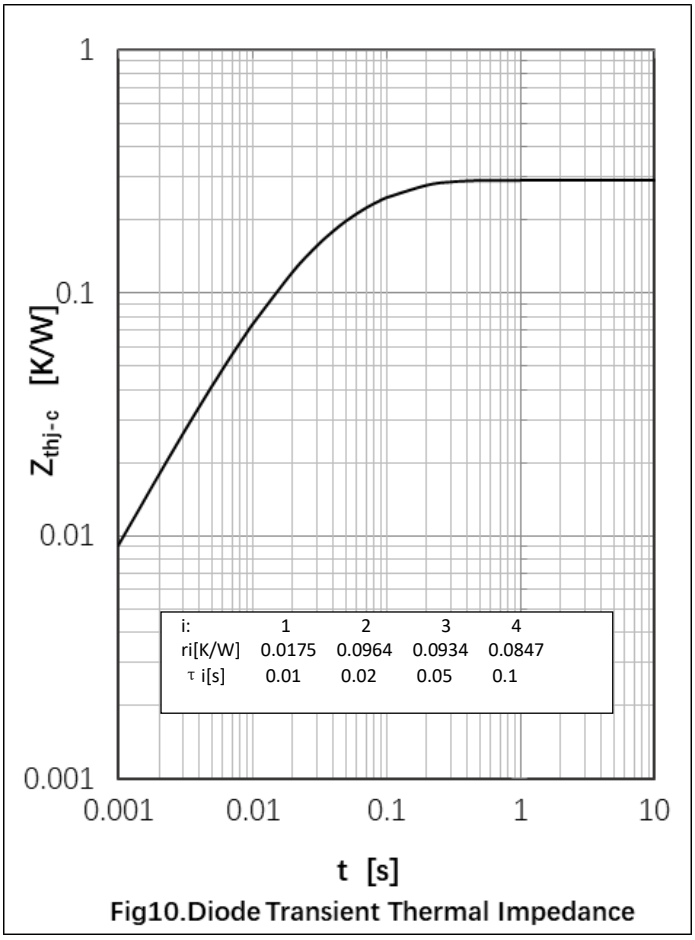
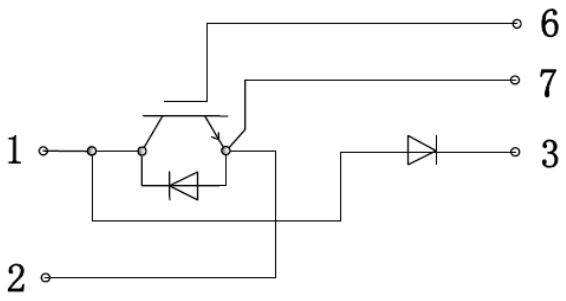


Fig10.Diode Transient Thermal Impedance

Circuit Diagram



Package Outline Information

Dimensions in Millimeters