MG75TF12E2A

RoHS COMPLIANT

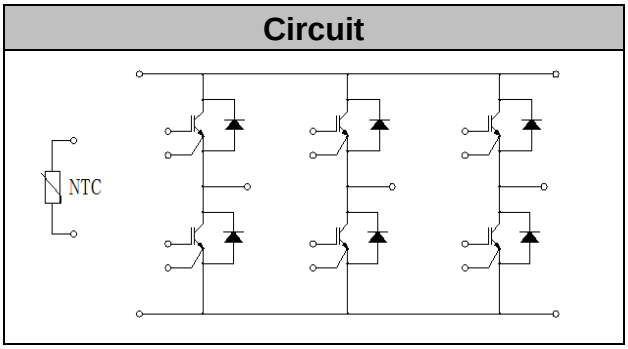
IGBT Modules

VCES	1200V
IC	75A

Applications

- Motor Drivers
- AC and DC servo drive amplifier
- UPS (Uninterruptible Power Supplies)

Circuit



Features

- Low switching losses
- Low $V_{ce(sat)}$ with positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD
- Low inductance case
- High short circuit capability(10us)
- Maximum junction temperature 175℃

● IGBT- inverter

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℃, T_{vjmax}=175℃	75	A
Repetitive Peak Collector Current	I_{CRM}	tp=1ms	150	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_c=25℃ T_{vjmax}=175℃	440	W

IGBT

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}$, I_C =3mA,T_{vj}=25℃	5.0	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	$V_{CE(sat)}$	Ic=100A,V_{GE}=15V, T_{vj}=25℃		1.85	2.25	V
		Ic=100A,V_{GE}=15V, T_{vj}=125℃		2.15		
Gate Charge	Q_G			0.85		uC
Internal Gate Resistance	R_{gint}			10		Ω
Input Capacitance	C_{ies}	V_{CE}=25V,V_{GE} =0V, f=1MHz,T_{vj}=25℃		4.20		nF
Reverse Transfer Capacitance	C_{res}			0.32		nF
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 =75 A V_{CE} = 600 V V_{GE} = ±15V R_G =5.1Ω T_{vj}=25℃		230		ns
Rise Time	t_r			78		ns
Turn-off Delay Time	$t_{d(off)}$			380		ns
Fall Time	t_f			42		ns
Energy Dissipation During Turn-on Time	E_{on}			5.60		mJ
Energy Dissipation During Turn-off Time	E_{off}			4.3		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C =75 A V_{CE} = 600 V V_{GE} = ±15V R_G =5.1Ω T_{vj}=125℃		280		ns
Rise Time	t_r			85		ns
Turn-off Delay Time	$t_{d(off)}$			450		ns
Fall Time	t_f			68		ns
Energy Dissipation During Turn-on Time	E_{on}			7.42		mJ
Energy Dissipation During Turn-off Time	E_{off}			6.5		mJ
SC Data	I_{sc}	T_p≤10us,V_{GE}=15V,T_{vj}=150℃, V_{cc}=900V,V_{CEM}≤1200V		300		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		75	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	150	A
I^2t-value	I^2t	V_R=0,t_p=10ms,T_{vj}=125℃	1140	A^2s
		V_R=0,t_p=10ms,T_{vj}=150℃	1050	

Characteristic values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=75A,T_{vj}=25℃		1.95		V
		I_F=75A,T_{vj}=125℃		2.05		
Recovered Charge	Q_{rr}	I_F =75 A V_R=600V -di_F/dt =900A/us T_{vj}=25℃		4.2		uC
Peak Reverse Recovery Current	I_{rr}			75		A
Reverse Recovery Energy	E_{rec}			2.06		mJ
Recovered Charge	Q_{rr}	I_F =75 A V_R=600V -di_F/dt =900A/us T_{vj}=125℃		9.6		uC
Peak Reverse Recovery Current	I_{rr}			92		A
Reverse Recovery Energy	E_{rec}			4.34		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	$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		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	℃
Stray-inductance-module	L_{SCE}			21		nH
Comparative Tracking Index	CTI			>200		
Module lead resistance, terminals-chip	$R_{cc'+EE'}$	T_C=25℃, per switch		1.9		mΩ
	$R_{AA'+CC'}$			1.5		
Thermal Resistance Junction-to Case	$R_{\theta JC}$	per IGBT-inverter			0.34	K/W
		per Diode-inverter			0.62	
Thermal Resistance Case-to Sink	$R_{\theta CS}$	per IGBT-inverter		0.21		K/W
		per Diode-inverter		0.33		
Mounting Force Per Clamp	F		3.0		6.0	N
Weight of Module	G			300		g

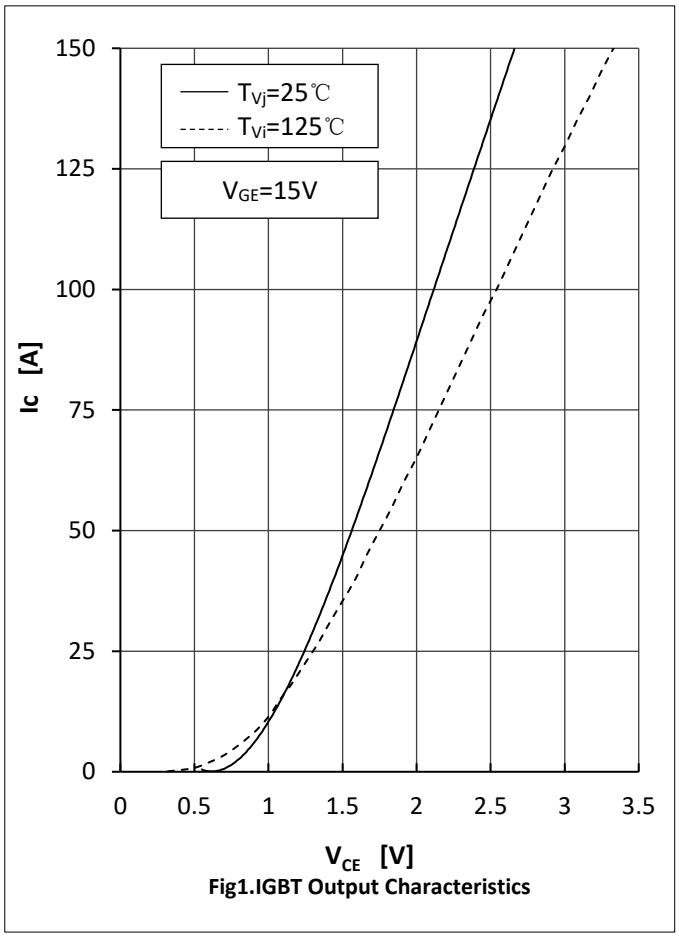


Fig1.IGBT Output Characteristics

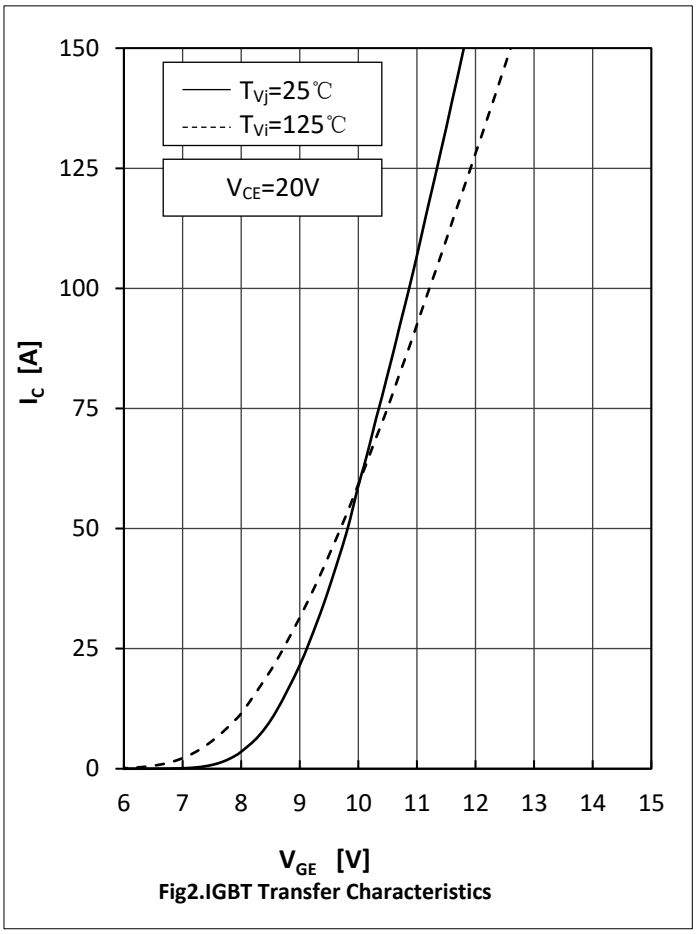


Fig2.IGBT Transfer Characteristics

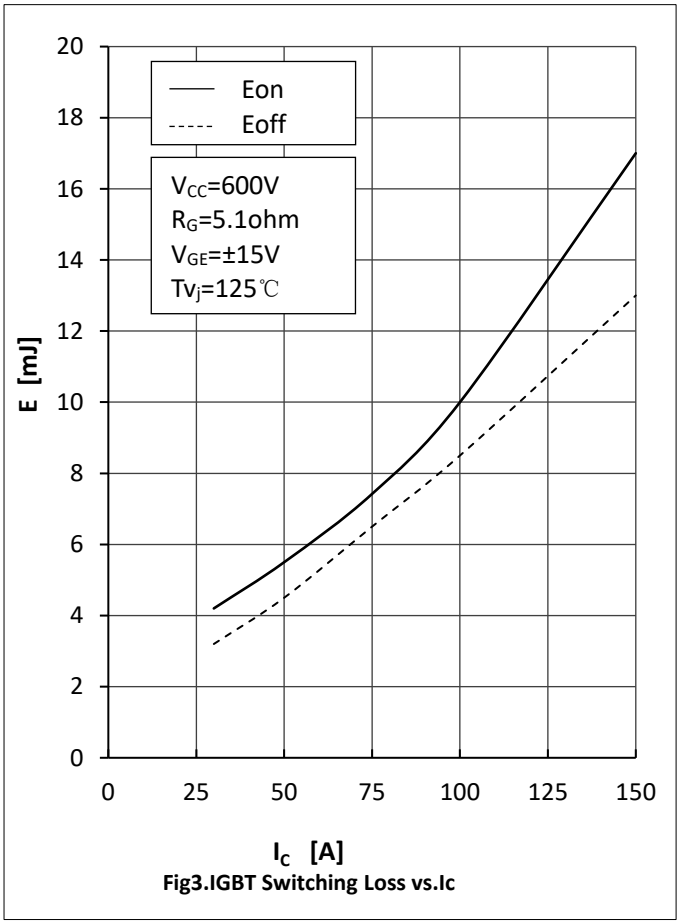


Fig3.IGBT Switching Loss vs.Ic

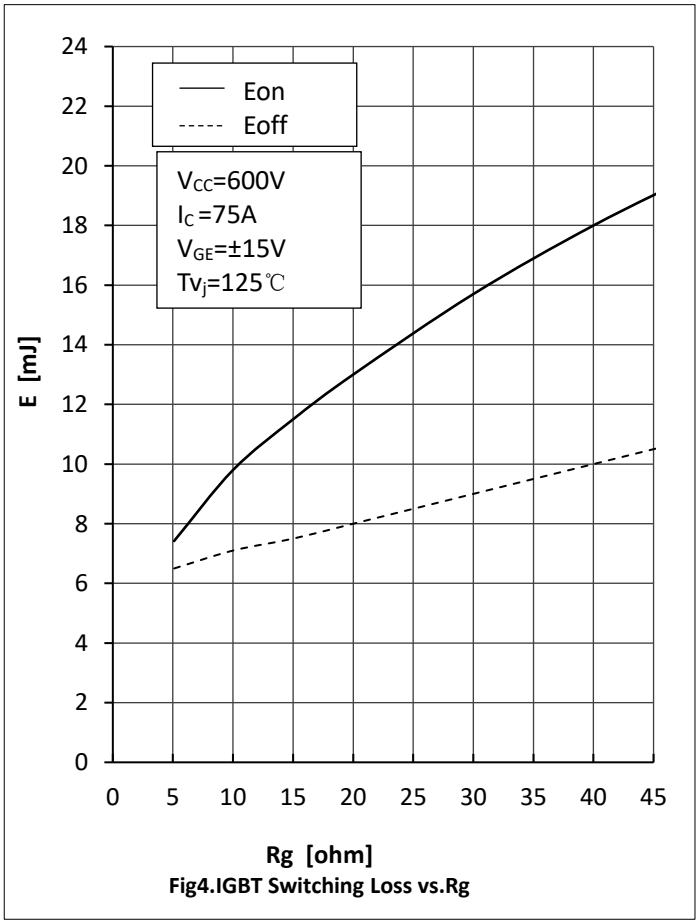


Fig4.IGBT Switching Loss vs.Rg

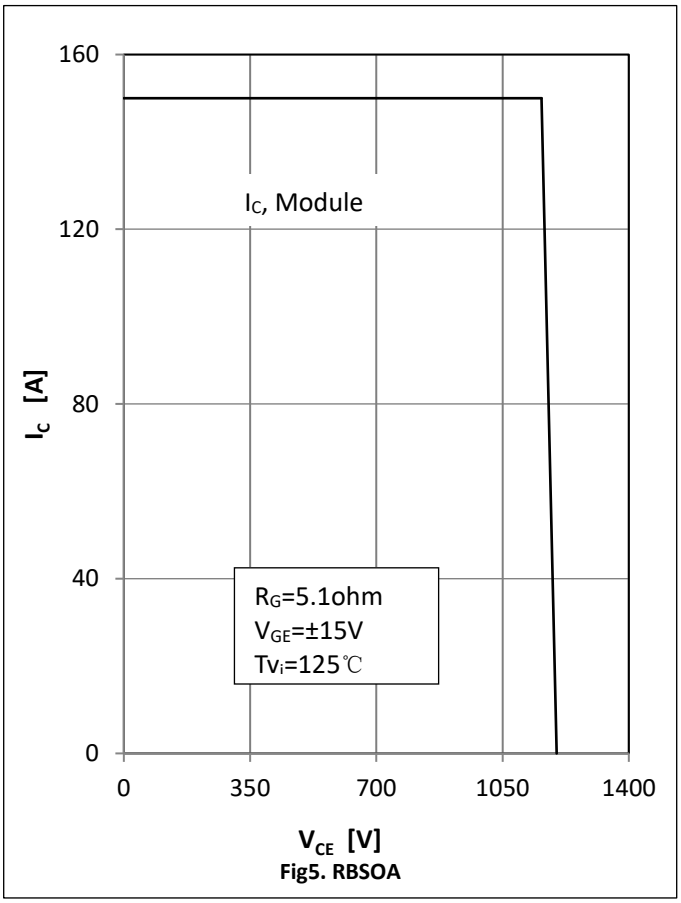


Fig5. RBSOA

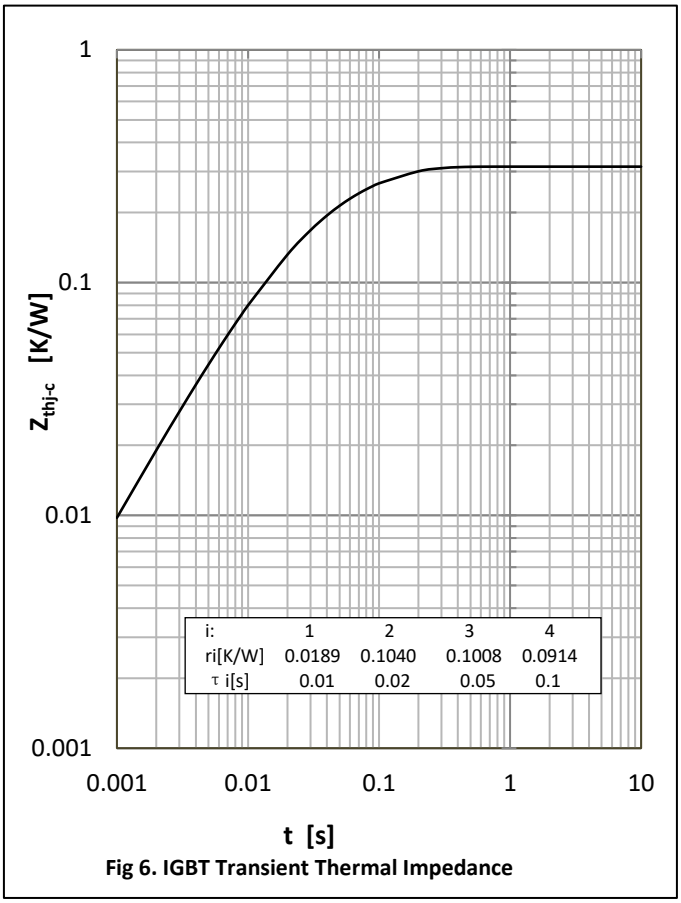


Fig 6. IGBT Transient Thermal Impedance

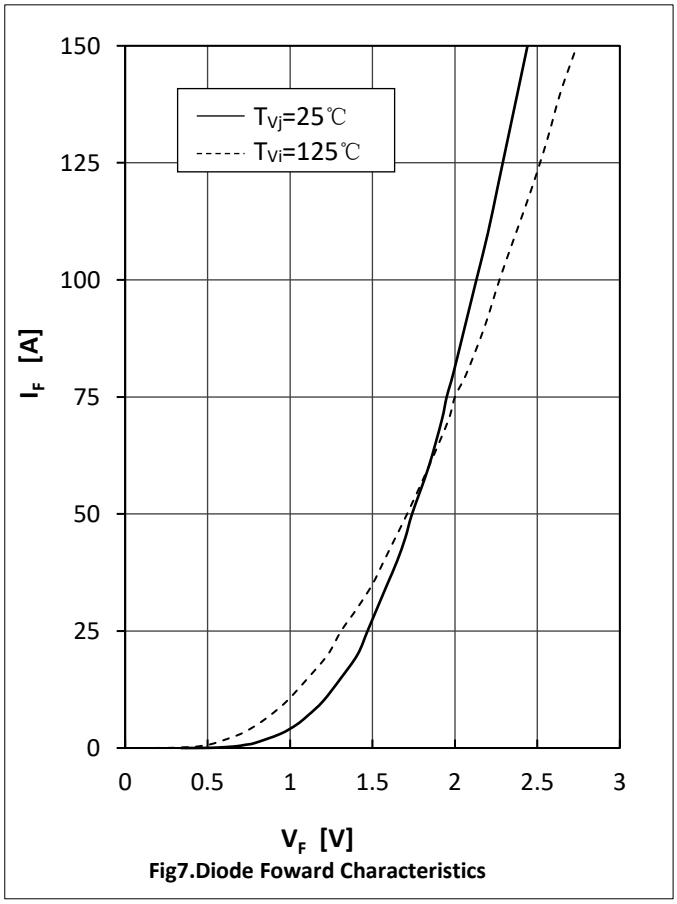


Fig7.Diode Foward Characteristics

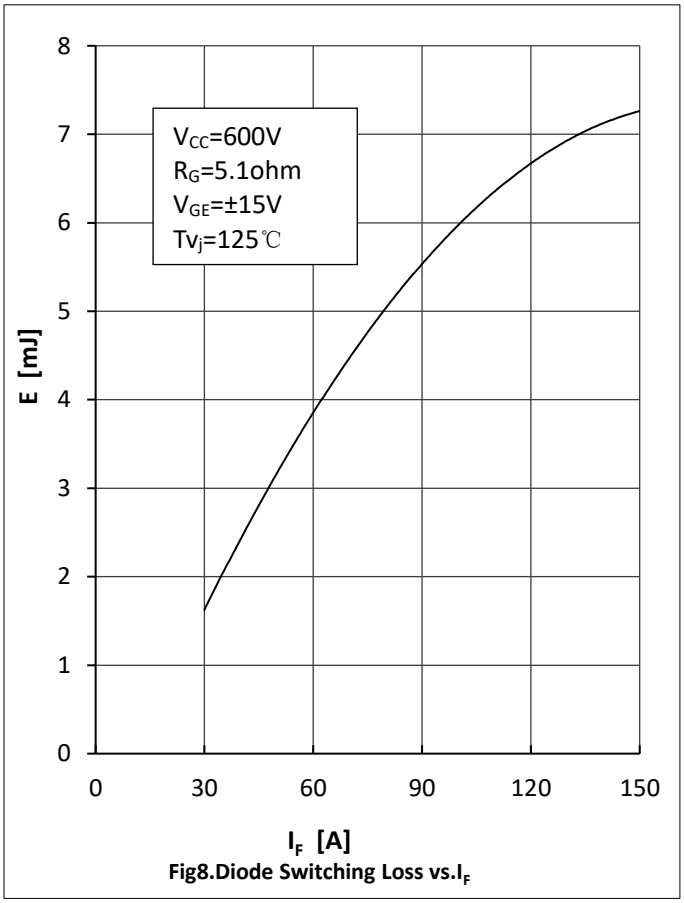


Fig8.Diode Switching Loss vs.I_F

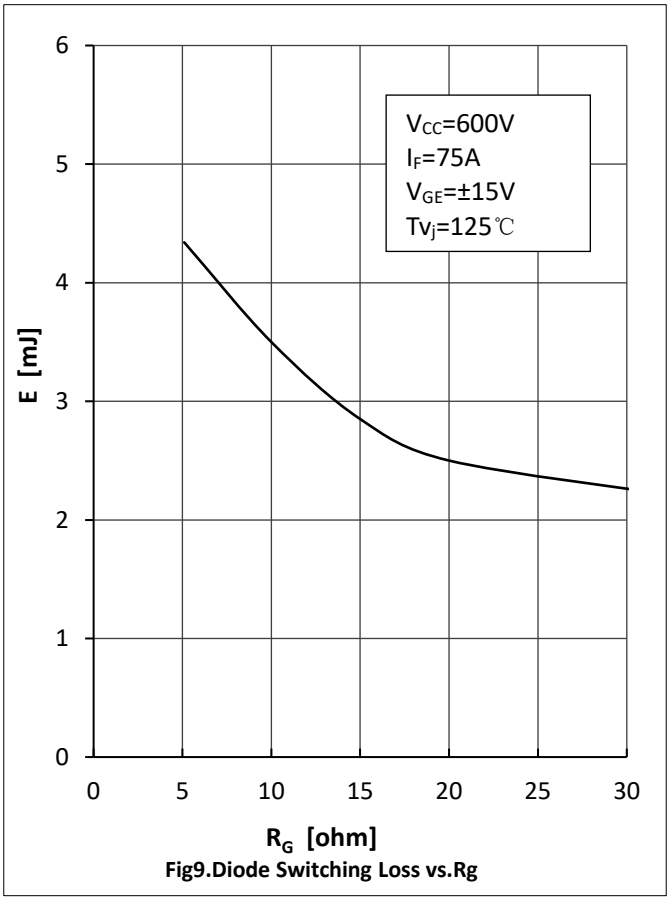


Fig9.Diode Switching Loss vs.Rg

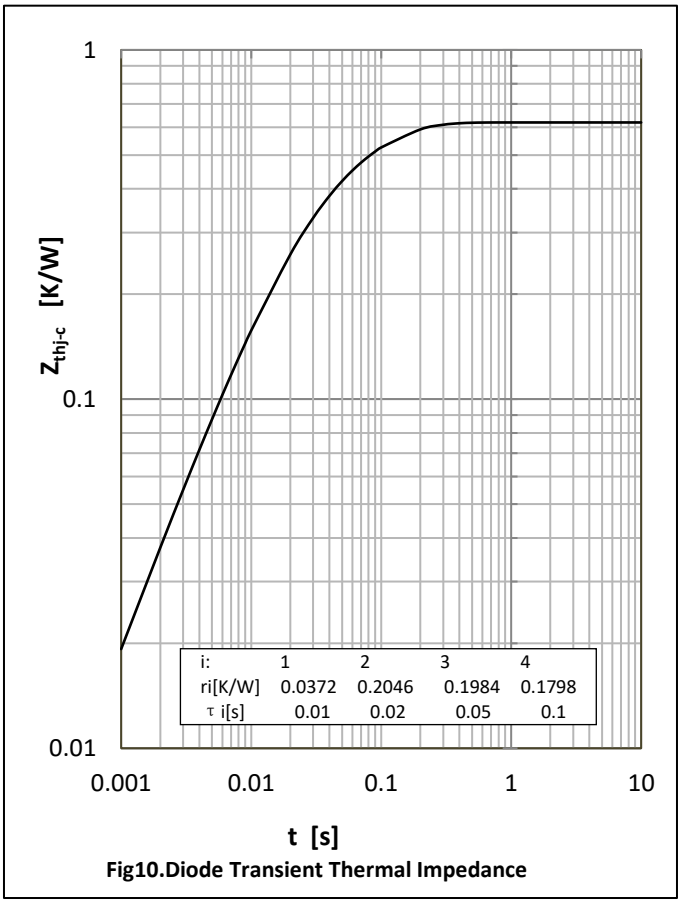


Fig10.Diode Transient Thermal Impedance

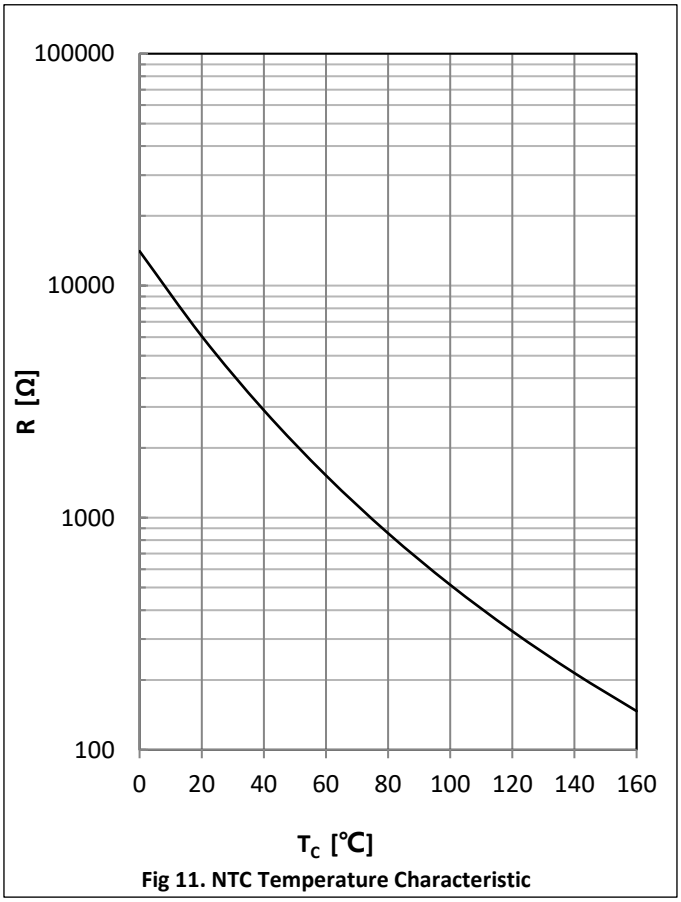
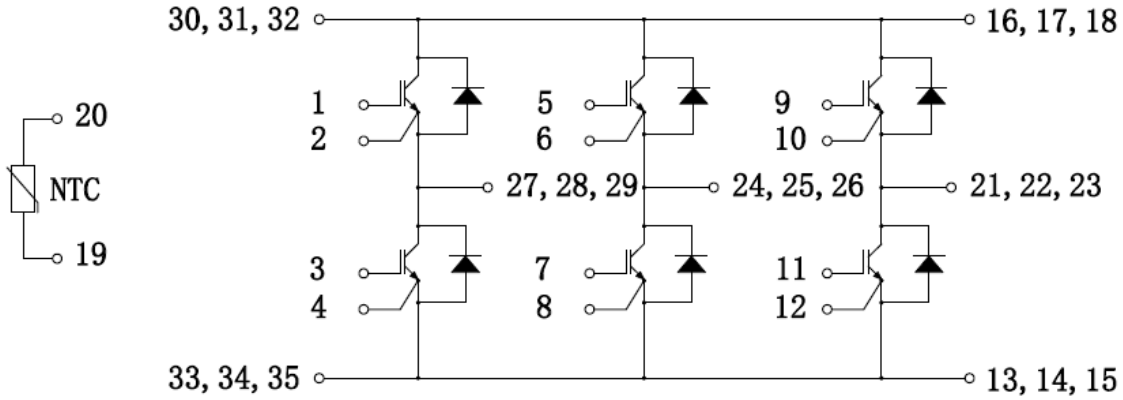


Fig 11. NTC Temperature Characteristic

Circuit Diagram



Package Outline Information