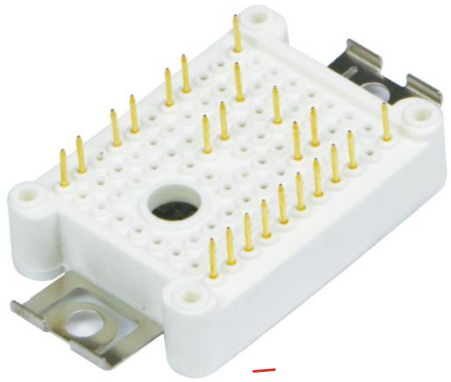
MG20TF065MLP2

RoHS COMPLIANT



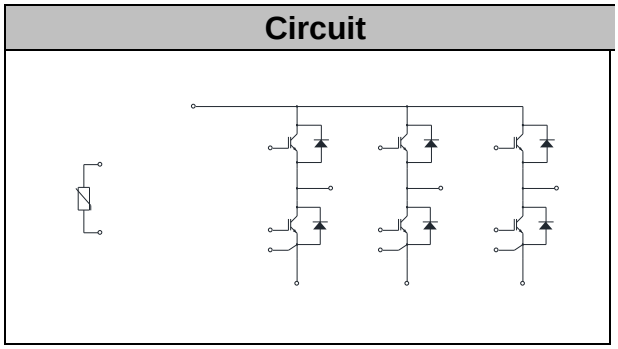
IGBT Modules

V_{CES}	650V
I_C	20A

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(5us)
- Isolated heatsink using DBC technology
- 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℃	650	V
Continuous Collector Current	I_C	T_C=100℃, T_{vjmax}=175℃	20	A
Repetitive Peak Collector Current	I_{CRM}	t_p=1ms	40	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_C=25℃ T_{vjmax}=175℃	113	W

IGBT- inverter

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=0.5mA, T_{vj}=25℃	4.0	5.1	6.5	
Collector-Emitter Cut-off Current	I_{CES}	V_{CE}=650V, V_{GE}=0V, T_{vj}=25℃			1.0	mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=20A, V_{GE}=15V, T_{vj}=25℃		1.45		V
		I_C=20A, V_{GE}=15V, T_{vj}=150℃		1.55		
		I_C=20A, V_{GE}=15V, T_{vj}=175℃		1.60		
Gate Charge	Q_G			0.14		uC
Input Capacitance	C_{ies}	V_{CE}=25V, V_{GE}=0V,		2.00		nF
Reverse Transfer Capacitance	C_{res}	f=1MHz, T_{vj}=25℃		0.03		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=20A V_{CE}=300V V_{GE}=±15V R_G=15Ω T_{vj}=25℃		23		ns
Rise Time	t_r			35		ns
Turn-off Delay Time	$t_{d(off)}$			81		ns
Fall Time	t_f			115		ns
Energy Dissipation During Turn-on Time	E_{on}			0.25		mJ
Energy Dissipation During Turn-off Time	E_{off}			0.3		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=20A V_{CE}=300V V_{GE}=±15V R_G=15Ω T_{vj}=150℃		21		ns
Rise Time	t_r			38		ns
Turn-off Delay Time	$t_{d(off)}$			95		ns
Fall Time	t_f			200		ns
Energy Dissipation During Turn-on Time	E_{on}			0.4		mJ
Energy Dissipation During Turn-off Time	E_{off}			0.5		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=20A V_{CE}=300V V_{GE}=±15V R_G=15Ω T_{vj}=175℃		20		ns
Rise Time	t_r			39		ns
Turn-off Delay Time	$t_{d(off)}$			100		ns
Fall Time	t_f			207		ns
Energy Dissipation During Turn-on Time	E_{on}			0.46		mJ
Energy Dissipation During Turn-off Time	E_{off}			0.53		mJ
SC Data	I_{SC}	t_p≤5us, V_{GE}=15V, T_{vj}=175℃, V_{CC}=300V, V_{CEM}≤650V		110		A

Diode-inverter

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	T_{vj}=25℃	650	V
Continuous DC Forward Current	I_F		20	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	40	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=20A, T_{vj}=25℃		2.00		V
		I_F=20A, T_{vj}=150℃		1.75		
		I_F=20A, T_{vj}=175℃		1.60		
Recovered Charge	Q_{rr}	I_F=20A V_R=300V -di_F/dt=600A/us T_{vj}=25℃		0.29		uC
Peak Reverse Recovery Current	I_{rr}			9		A
Reverse Recovery Energy	E_{rec}			0.05		mJ
Recovered Charge	Q_{rr}	I_F=20A V_R=300V -di_F/dt=600A/us T_{vj}=150℃		0.97		uC
Peak Reverse Recovery Current	I_{rr}			12		A
Reverse Recovery Energy	E_{rec}			0.13		mJ
Recovered Charge	Q_{rr}	I_F=20A V_R=300V -di_F/dt=600A/us T_{vj}=175℃		1.26		uC
Peak Reverse Recovery Current	I_{rr}			15		A
Reverse Recovery Energy	E_{rec}			0.16		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}			30		nH
Module Lead Resistance, Terminals-chip	$R_{CC'+EE'}$	T_C=25℃, per switch		8.00		mΩ
	$R_{AA'+CC'}$			6.00		
Thermal Resistance Junction to Case	$R_{\theta JC}$	per IGBT-inverter			1.32	K/W
		per Diode-inverter			1.65	
Mounting Force Per Clamp	F		20		50	N
Weight of Module	G			25		g

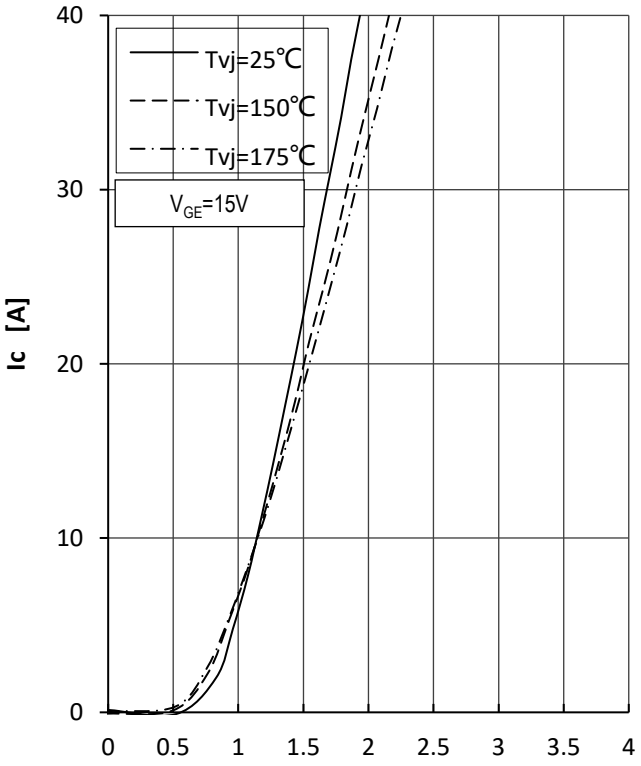


Fig1.IGBT Output Characteristics

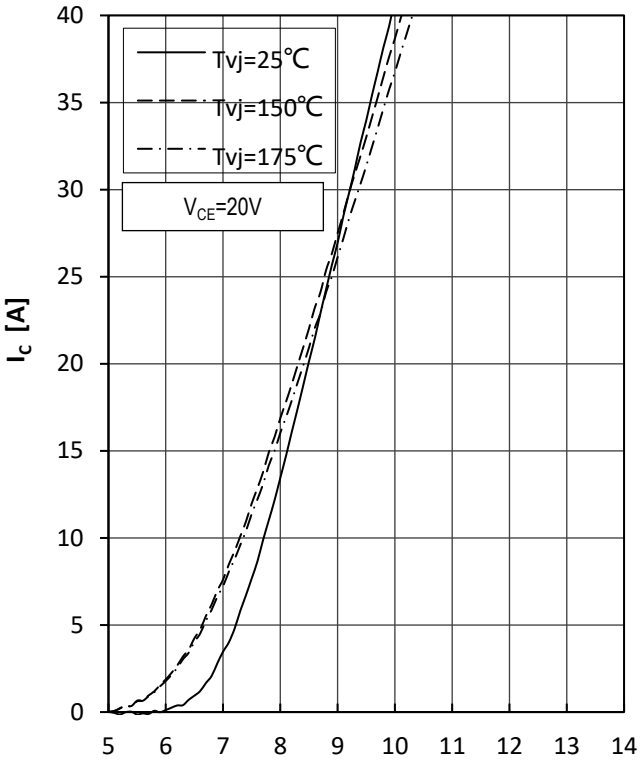


Fig2.IGBT Transfer Characteristics

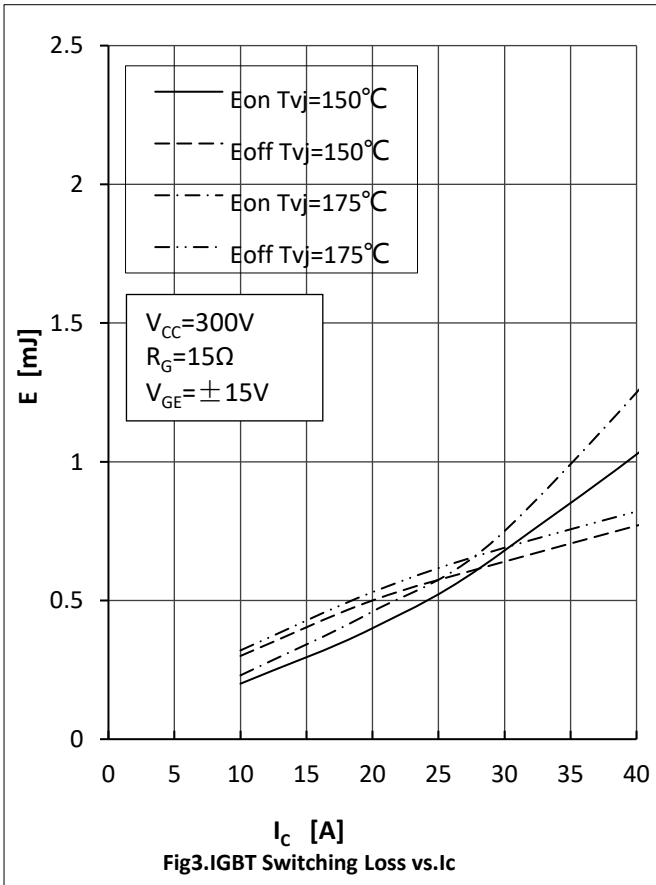


Fig3.IGBT Switching Loss vs.Ic

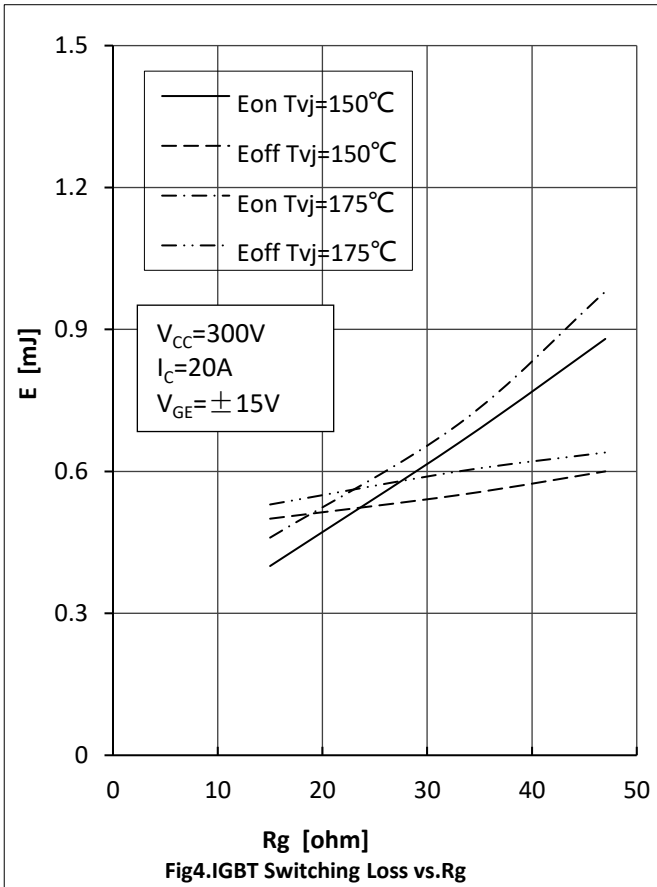


Fig4.IGBT Switching Loss vs.Rg

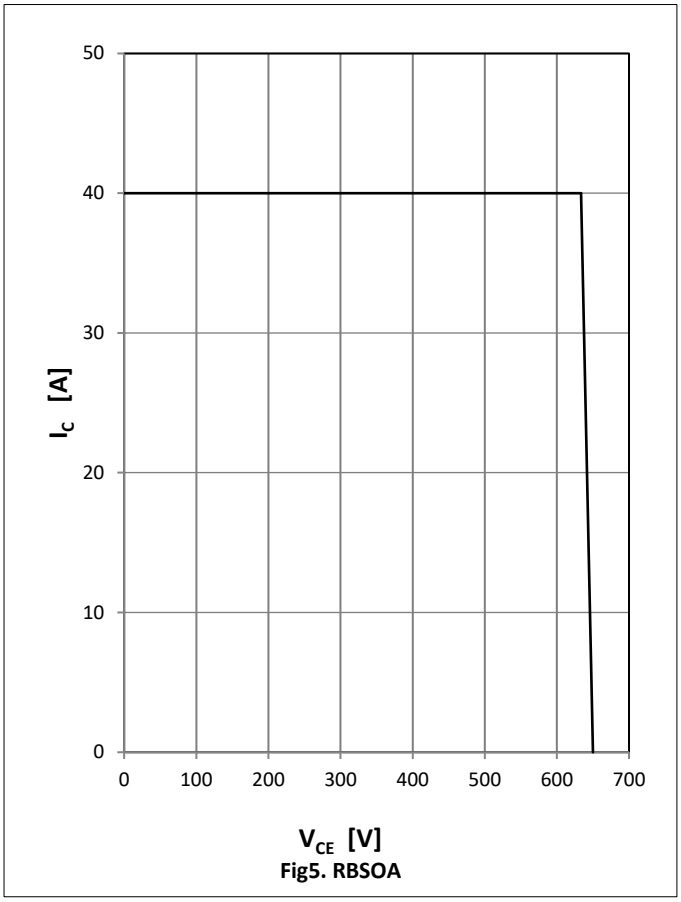


Fig5. RBSOA

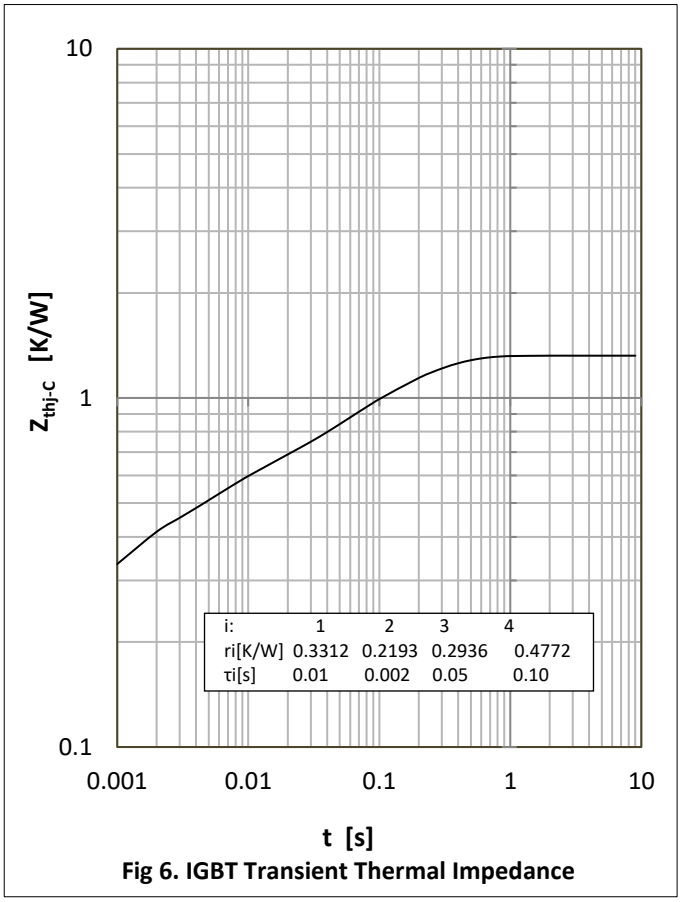


Fig 6. IGBT Transient Thermal Impedance

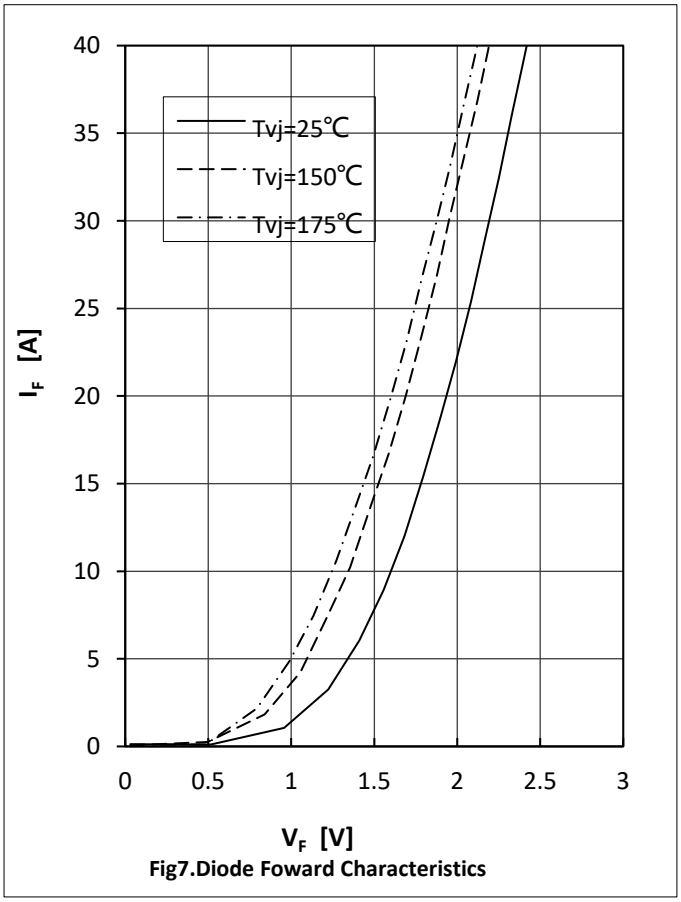


Fig7.Diode Foward Characteristics

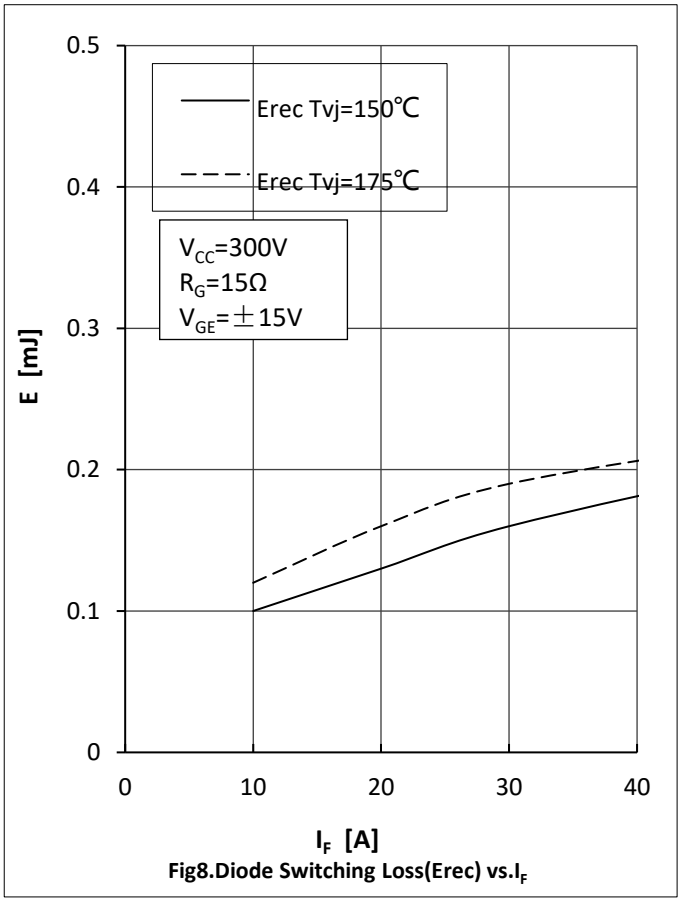


Fig8.Diode Switching Loss(Erec) vs.I_F

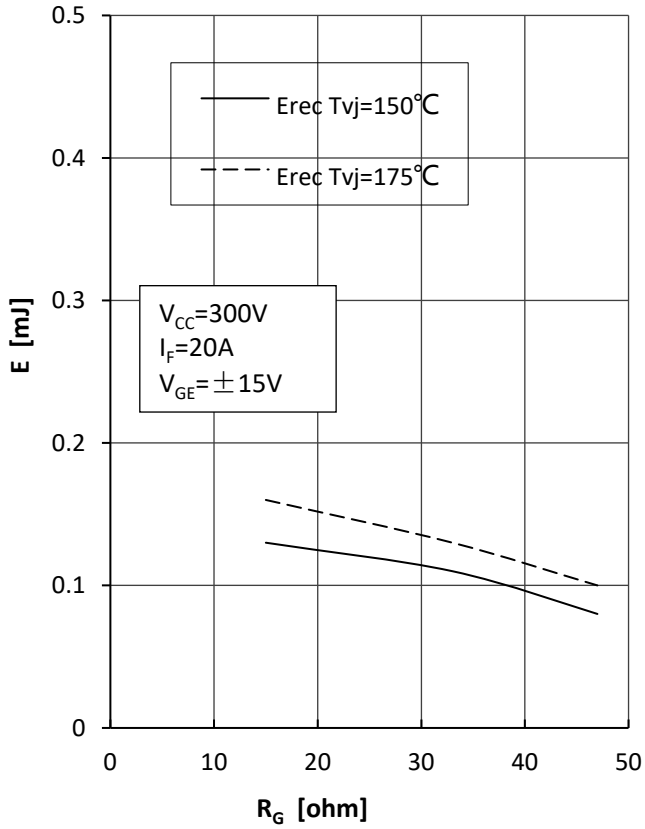


Fig9.Diode Switching Loss(Erec) vs.Rg

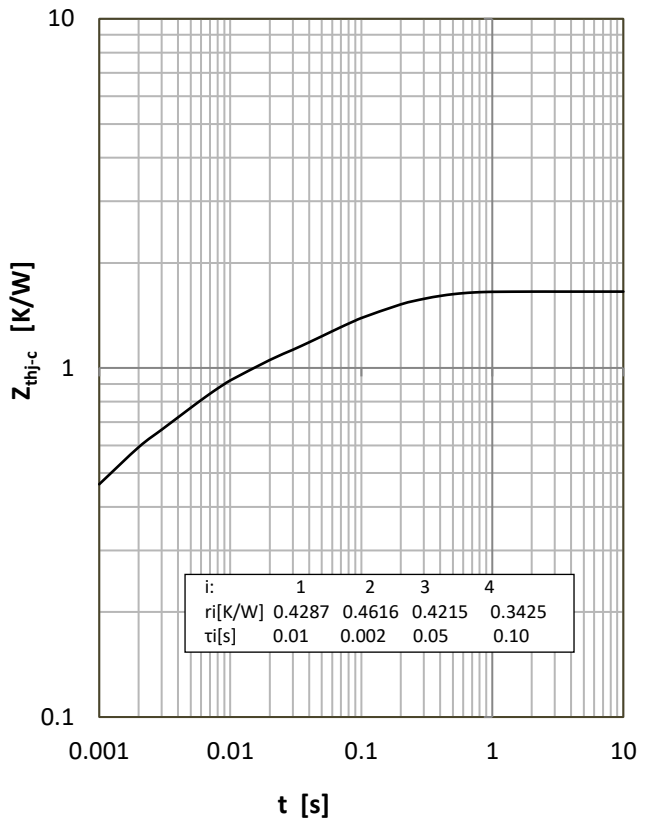


Fig 10. Diode Transient Thermal Impedance

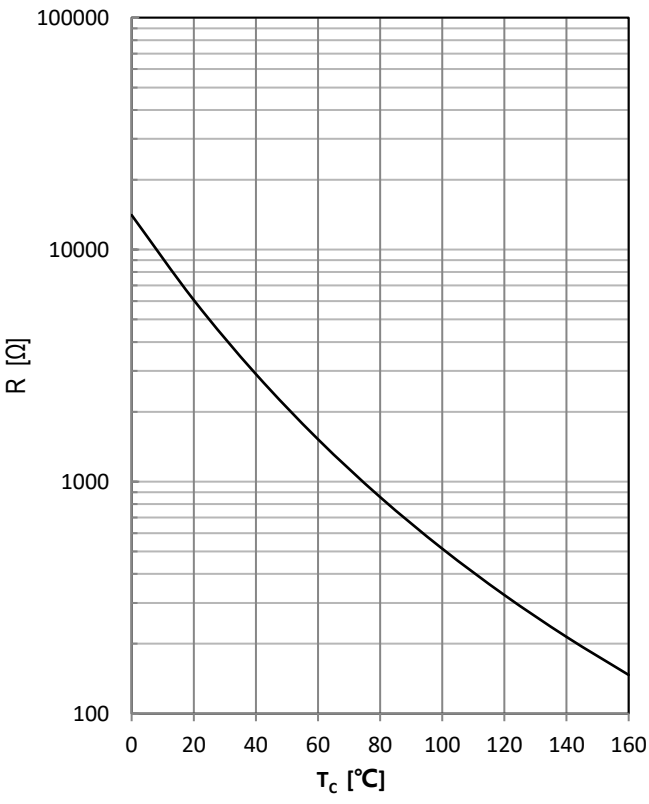
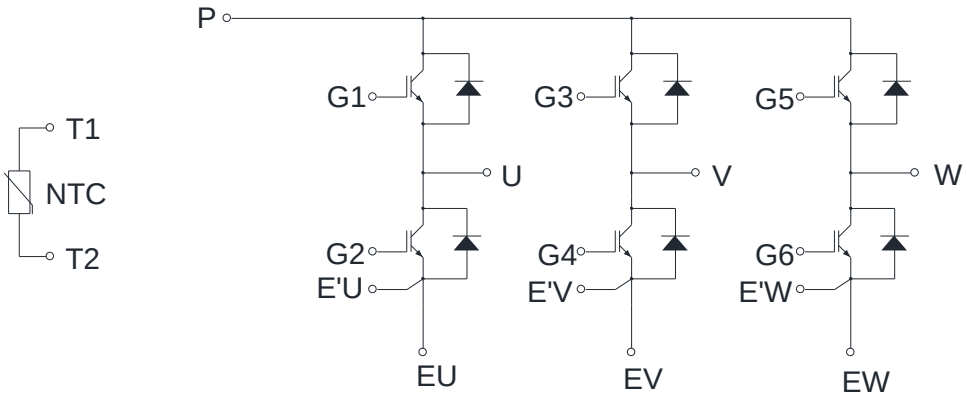
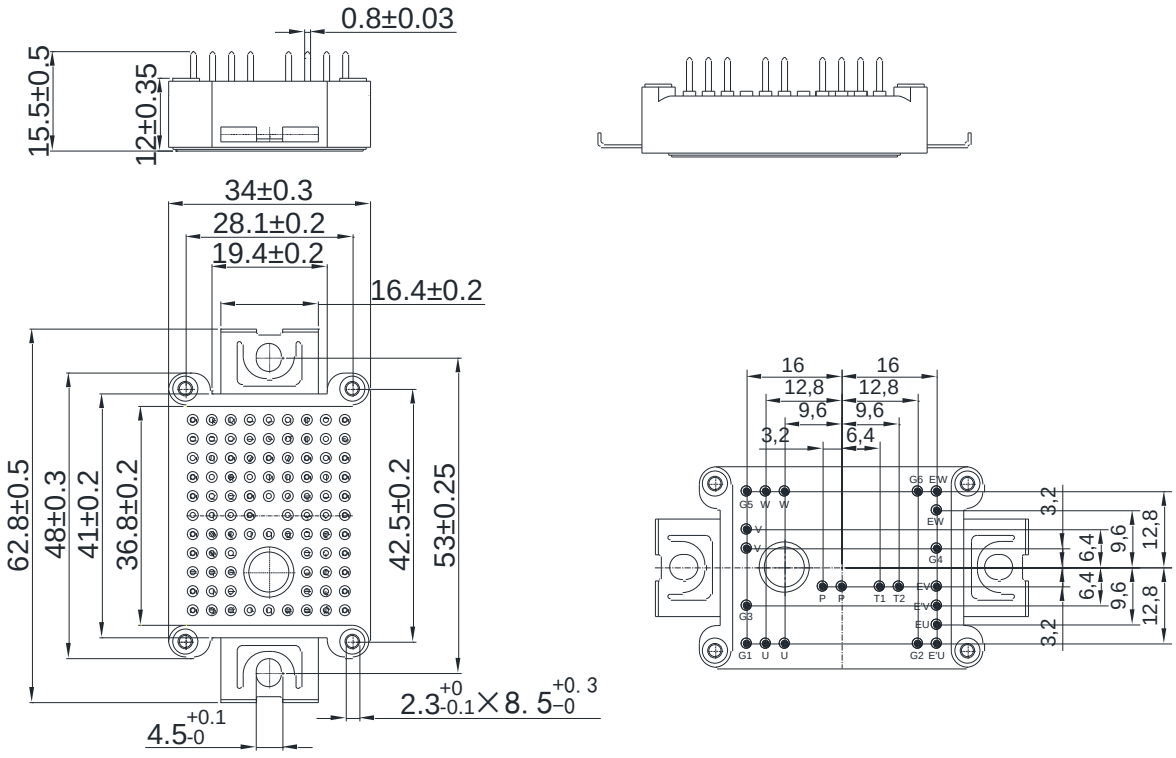


Fig 11. NTC Temperature Characteristics

Circuit Diagram



- **Package Dimensions**



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