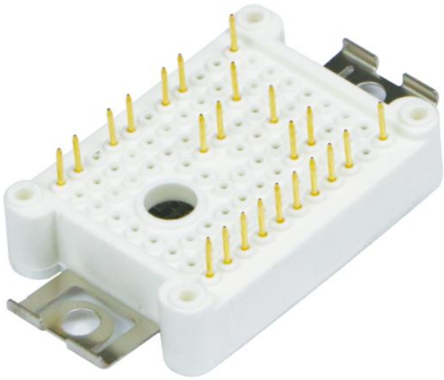
MG30P065MLP2

RoHS COMPLIANT



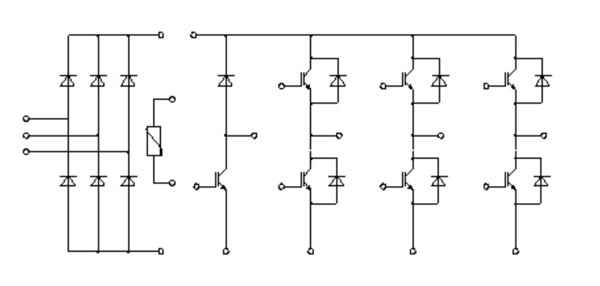
IGBT Modules

V_{CES}	650V
I_C	30A

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℃	30	A
Repetitive Peak Collector Current	I_{CRM}	t_p=1ms	60	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_C=25℃ T_{vjmax}=175℃	111	W

- ## IGBT- inverter

Characteristic Values

Parameter	Symbol	Conditions	Value Min.	Value Typ.	Value Max.	Unit
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=30A, V_{GE}=15V, T_{vj}=25℃		1.70		V
		I_C=30A, V_{GE}=15V, T_{vj}=150℃		1.85		
		I_C=30A, V_{GE}=15V, T_{vj}=175℃		1.90		
Gate Charge	Q_G			0.14		uC
Input Capacitance	C_{ies}	V_{CE}=25V, V_{GE}=0V, f=1MHz, T_{vj}=25℃		2.00		nF
Reverse Transfer Capacitance	C_{res}			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=30A V_{CE}=300V V_{GE}=±15V R_G=15Ω T_{vj}=25℃		25		ns
Rise Time	t_r			37		ns
Turn-off Delay Time	$t_{d(off)}$			84		ns
Fall Time	t_f			120		ns
Energy Dissipation During Turn-on Time	E_{on}			0.45		mJ
Energy Dissipation During Turn-off Time	E_{off}			0.51		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=30A V_{CE}=300V V_{GE}=±15V R_G=15Ω T_{vj}=150℃		21		ns
Rise Time	t_r			39		ns
Turn-off Delay Time	$t_{d(off)}$			99		ns
Fall Time	t_f			202		ns
Energy Dissipation During Turn-on Time	E_{on}			0.68		mJ
Energy Dissipation During Turn-off Time	E_{off}			0.64		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=30A V_{CE}=300V V_{GE}=±15V R_G=15Ω T_{vj}=175℃		20		ns
Rise Time	t_r			39		ns
Turn-off Delay Time	$t_{d(off)}$			101		ns
Fall Time	t_f			210		ns
Energy Dissipation During Turn-on Time	E_{on}			0.75		mJ
Energy Dissipation During Turn-off Time	E_{off}			0.69		mJ
SC Data	I_{SC}	t_p≤5us, V_{GE}=15V, T_{vj}=175℃, V_{CC}=300V, V_{CEM}≤650V		130		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		30	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	60	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=30A, T_{vj}=25℃		2.15		V
		I_F=30A, T_{vj}=150℃		1.95		
		I_F=30A, T_{vj}=175℃		1.85		
Recovered Charge	Q_{rr}	I_F=30A V_R=300V -di_F/dt=700A/us T_{vj}=25℃		0.37		uC
Peak Reverse Recovery Current	I_{rr}			10		A
Reverse Recovery Energy	E_{rec}			0.05		mJ
Recovered Charge	Q_{rr}	I_F=30A V_R=300V -di_F/dt=700A/us T_{vj}=150℃		1.1		uC
Peak Reverse Recovery Current	I_{rr}			14		A
Reverse Recovery Energy	E_{rec}			0.16		mJ
Recovered Charge	Q_{rr}	I_F=30A V_R=300V -di_F/dt=700A/us T_{vj}=175℃		1.33		uC
Peak Reverse Recovery Current	I_{rr}			16		A
Reverse Recovery Energy	E_{rec}			0.19		mJ

IGBT-brake-chopper

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℃	30	A
Repetitive Peak Collector Current	I_{CRM}	t_p=1ms	60	A
Gate-Emitter Voltage	V_{GES}	T_{vj}=25℃	±20	V
Total Power Dissipation	P_{tot}	T_C=25℃ T_{vjmax}=175℃	111	W

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	V
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=30A, V_{GE}=15V, T_{vj}=25℃		1.70		V
		I_C=30A, V_{GE}=15V, T_{vj}=150℃		1.85		
		I_C=30A, V_{GE}=15V, T_{vj}=175℃		1.90		
Gate Charge	Q_G			0.14		uC
Input Capacitance	C_{ies}	V_{CE}=25V, V_{GE}=0V, f=1MHz, T_{vj}=25℃		2.00		nF
Reverse Transfer Capacitance	C_{res}			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=30A V_{CE}=300V V_{GE}=±15V R_G=15Ω T_{vj}=25℃		25		ns
Rise Time	t_r			37		ns
Turn-off Delay Time	$t_{d(off)}$			84		ns
Fall Time	t_f			120		ns
Energy Dissipation During Turn-on Time	E_{on}			0.45		mJ
Energy Dissipation During Turn-off Time	E_{off}			0.51		mJ

Turn-on Delay Time	$t_{d(on)}$	I_C=30A V_{CE}=300V V_{GE}=±15V R_G=15Ω T_{vj}=150℃		21		ns
Rise Time	t_r			39		ns
Turn-off Delay Time	$t_{d(off)}$			99		ns
Fall Time	t_f			202		ns
Energy Dissipation During Turn-on Time	E_{on}			0.68		mJ
Energy Dissipation During Turn-off Time	E_{off}			0.64		mJ
Turn-on Delay Time	$t_{d(on)}$	I_C=30A V_{CE}=300V V_{GE}=±15V R_G=15Ω T_{vj}=175℃		20		ns
Rise Time	t_r			39		ns
Turn-off Delay Time	$t_{d(off)}$			101		ns
Fall Time	t_f			210		ns
Energy Dissipation During Turn-on Time	E_{on}			0.75		mJ
Energy Dissipation During Turn-off Time	E_{off}			0.69		mJ
SC Data	I_{SC}	t_p≤5us, V_{GE}=15V, T_{vj}=175℃, V_{CC}=300V, V_{CEM}≤650V		130		A

Diode-brake-chopper

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		15	A
Repetitive Peak Forward Current	I_{FRM}	t_p=1ms	30	A

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Forward Voltage	V_F	I_F=15A, T_{vj}=25℃		1.75		V
		I_F=15A, T_{vj}=150℃		1.60		
		I_F=15A, T_{vj}=175℃		1.55		
Recovered Charge	Q_{rr}	I_F=15A V_R=300V $-di_F/dt$=350A/us T_{vj}=25℃		0.08		uC
Peak Reverse Recovery Current	I_{rr}			4.0		A
Reverse Recovery Energy	E_{rec}			0.05		mJ
Recovered Charge	Q_{rr}	I_F=15A V_R=300V $-di_F/dt$=350A/us T_{vj}=150℃		0.16		uC
Peak Reverse Recovery Current	I_{rr}			8.0		A
Reverse Recovery Energy	E_{rec}			0.11		mJ
Recovered Charge	Q_{rr}	I_F=15A V_R=300V $-di_F/dt$=350A/us T_{vj}=175℃		0.21		uC
Peak Reverse Recovery Current	I_{rr}			9.0		A
Reverse Recovery Energy	E_{rec}			0.15		mJ

Diode-rectifier

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Value	Unit
Repetitive Peak Reverse Voltage	V_{RRM}	T_{vj}=25℃	1600	V
Average output Current 50/60Hz, sine wave	$I_{F(AV)}$	T_C=100℃	30	A
Maximum RMS Current at Rectifier Output	I_{RMSM}	T_C=100℃	60	A
Surge Forward Current	I_{FSM}	V_R=0V,t_p=10ms,T_{vj}=25℃	330	A
		V_R=0V,t_p=10ms,T_{vj}=150℃	280	A
I^2t-value	I^2t	V_R=0V,t_p=10ms,T_{vj}=25℃	520	A^2s
		V_R=0V,t_p=10ms,T_{vj}=150℃	390	A^2s

Characteristic Values

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	V_F	I_F=30A, T_{vj}=150℃		1.1		V
Reverse Current	I_R	T_{vj}=150℃, V_R=1600V			1.0	mA

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			1.34	K/W
		per Diode-inverter			1.65	
		per IGBT-brake-chopper			1.34	
		per Diode-chopper			2.80	
		per Diode-rectifier			1.03	
Thermal Resistance Case to Sink	$R_{\theta CS}$	per Module		0.058		K/W
Mounting Force Per Clamp	F		20		50	N
Weight of Module	G			25		g

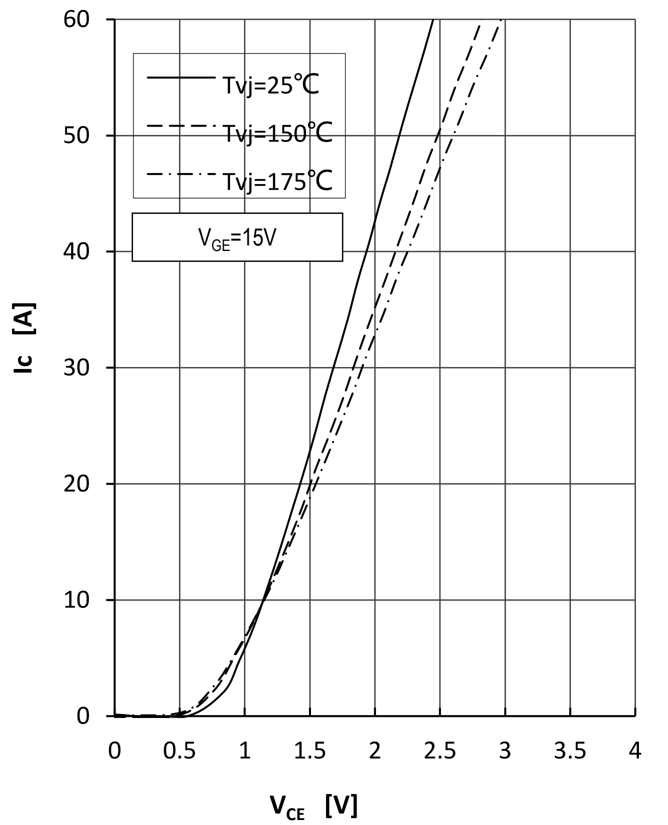


Fig1.IGBT Output Characteristics

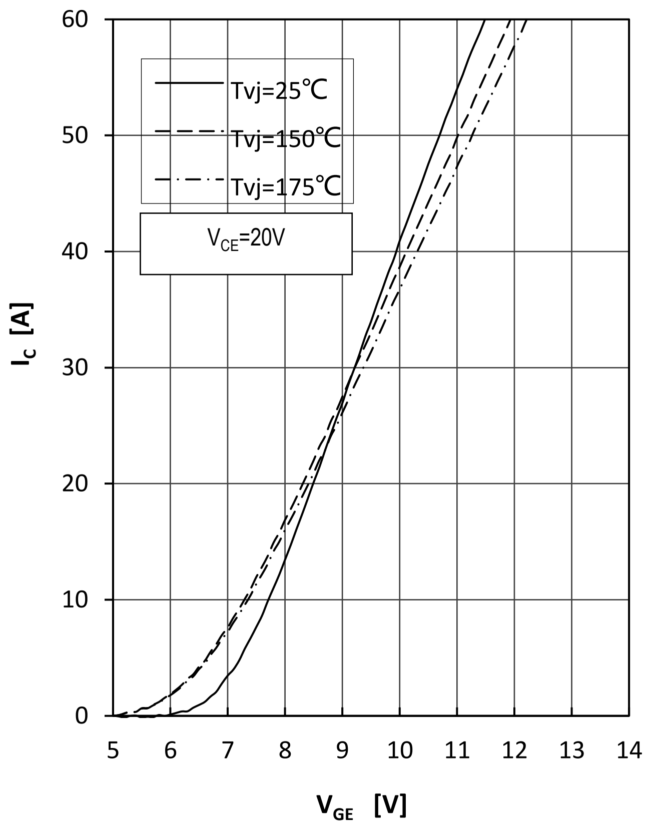


Fig2.IGBT Transfer Characteristics

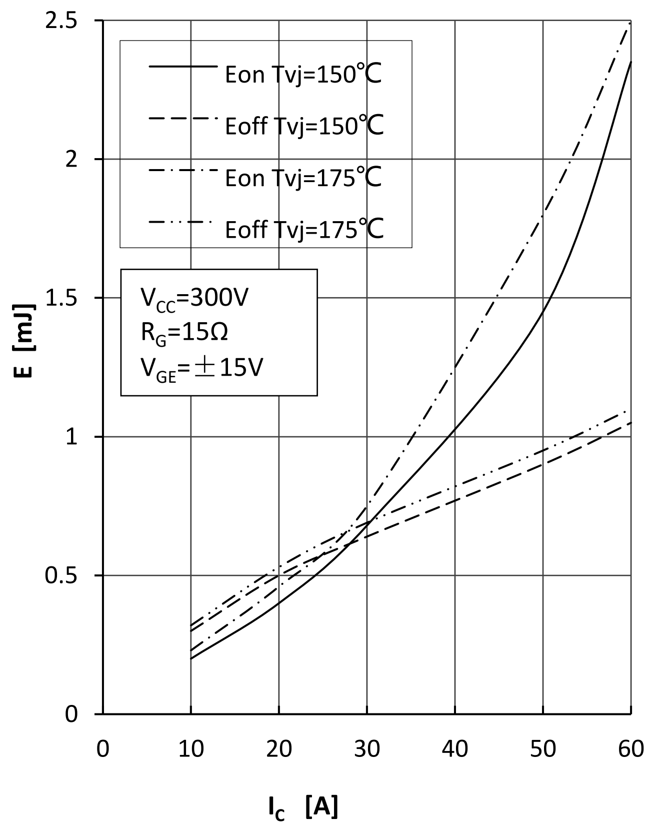


Fig3.IGBT Switching Loss vs.Ic

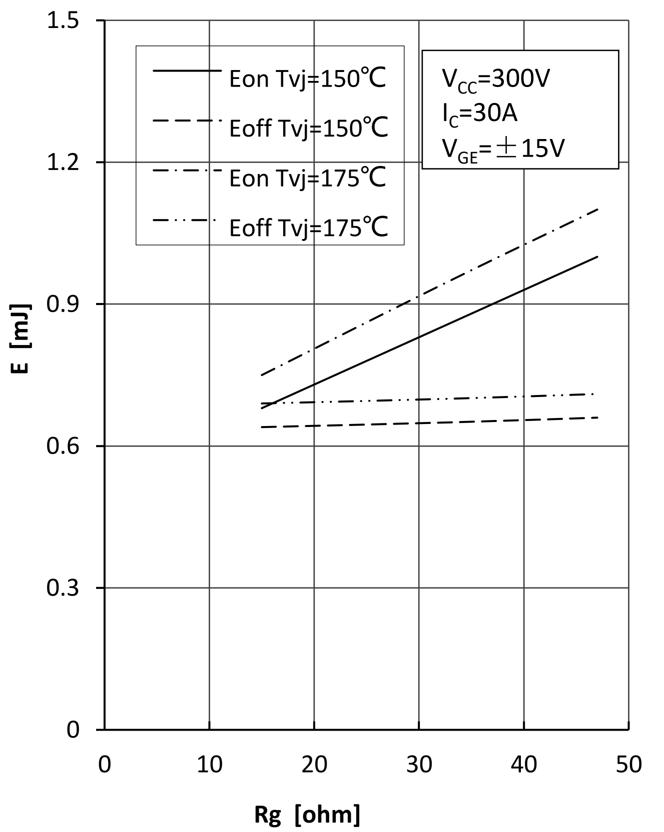


Fig4.IGBT Switching Loss vs.Rg

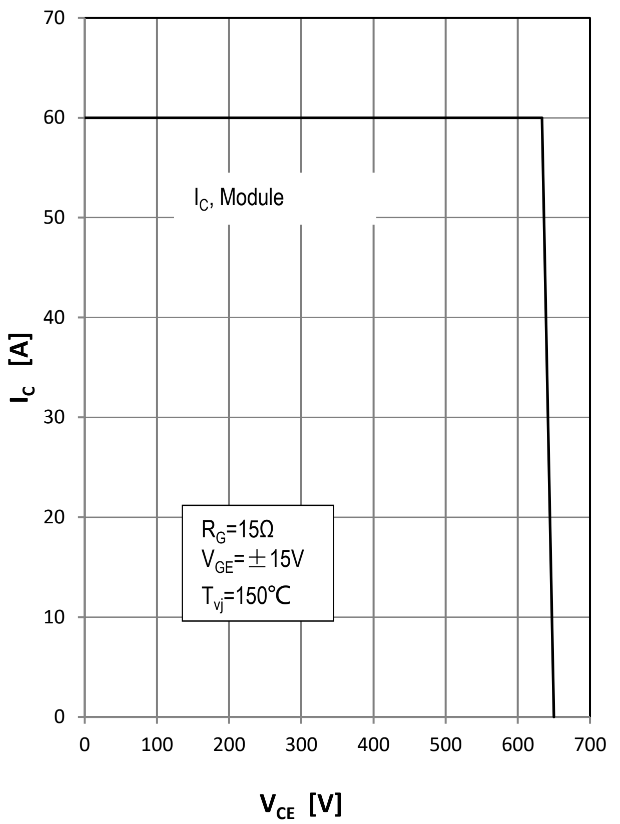


Fig5. RBSOA

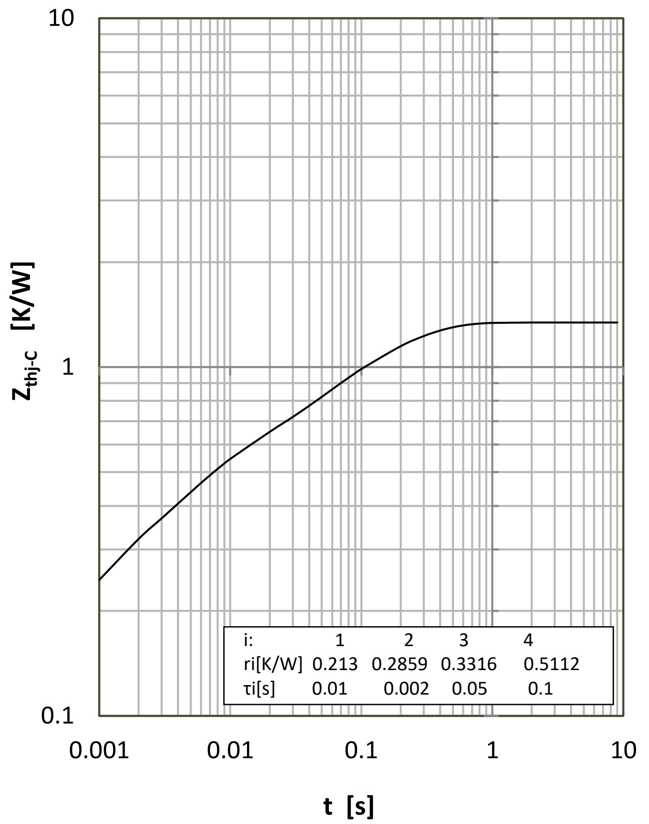


Fig 6. IGBT Transient Thermal Impedance

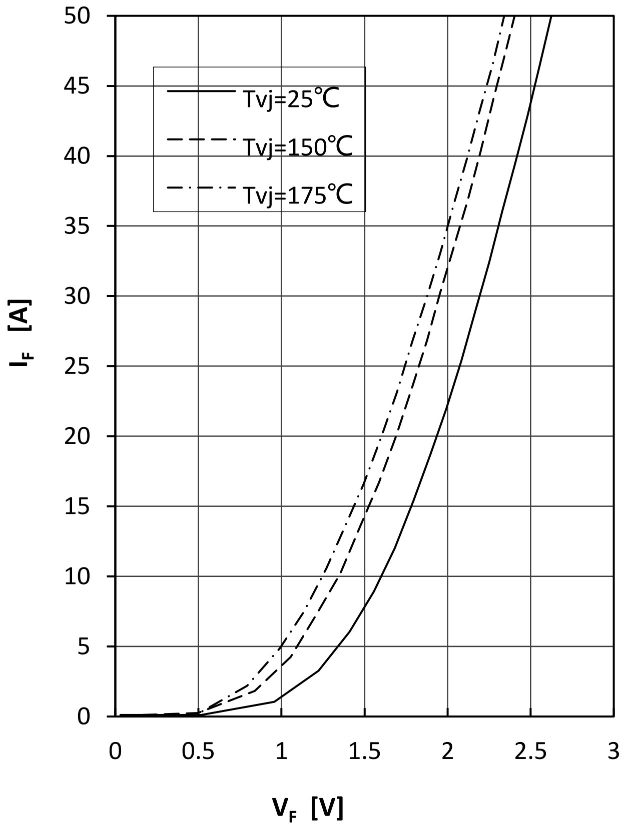


Fig7.Diode Foward Characteristics

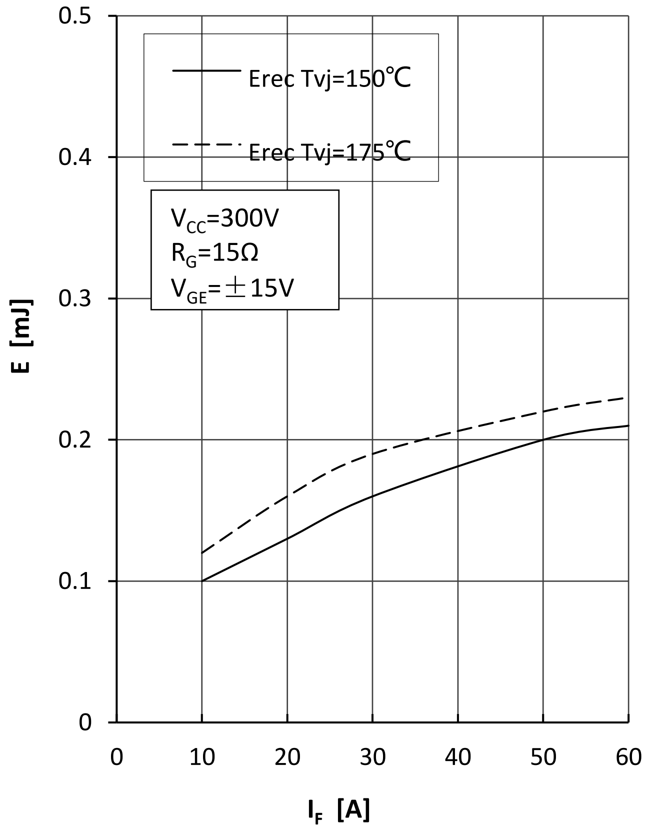


Fig8.Diode Switching Loss(Erec) vs.I_F

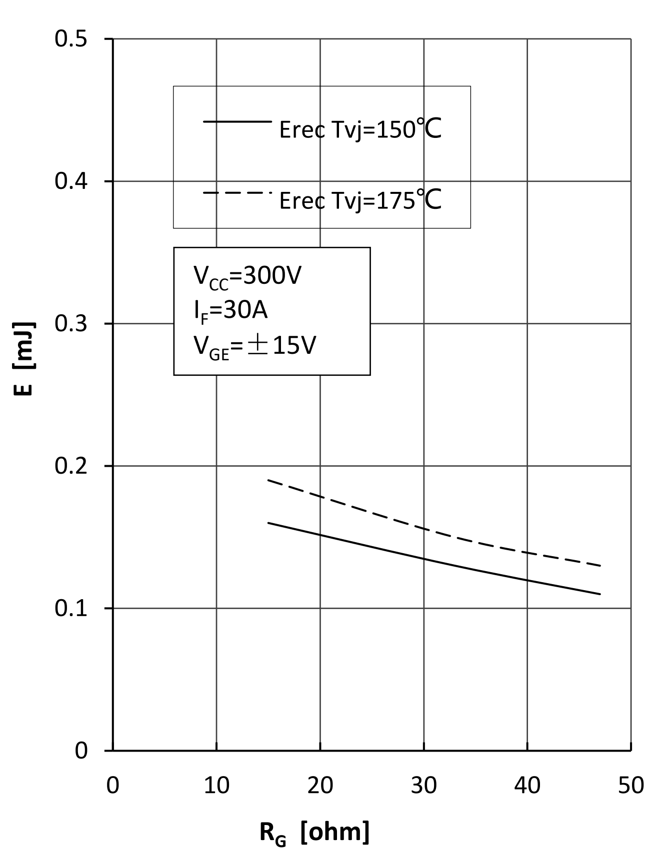


Fig9.Diode Switching Loss(Erec) vs.Rg

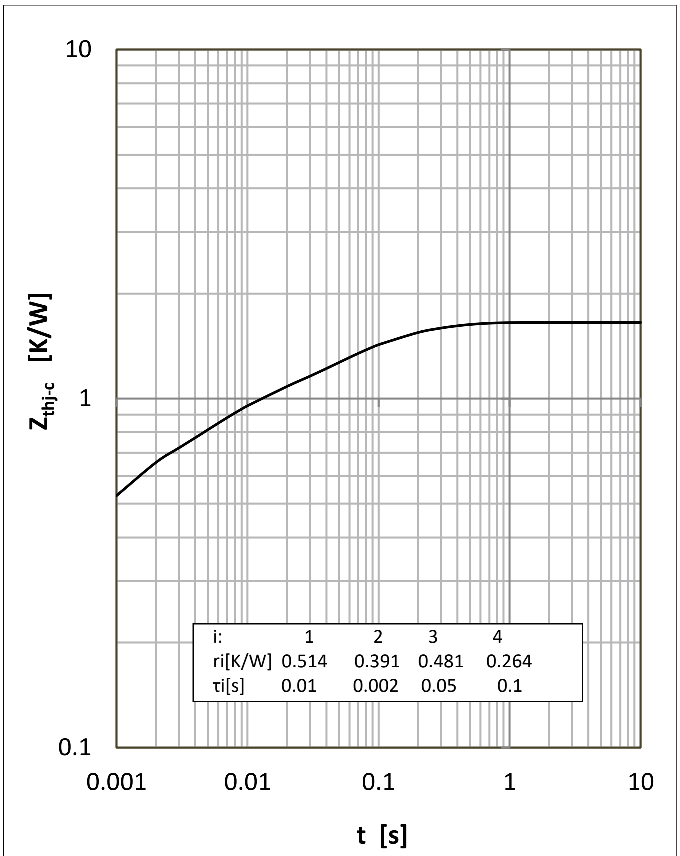


Fig 10. Diode Transient Thermal Impedance

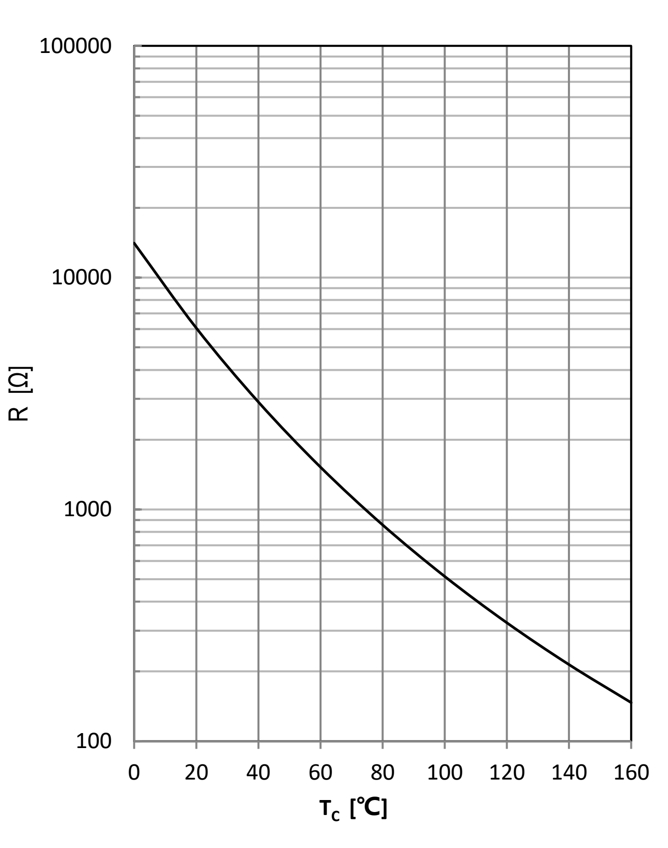


Fig 11. NTC Temperature Characteristics

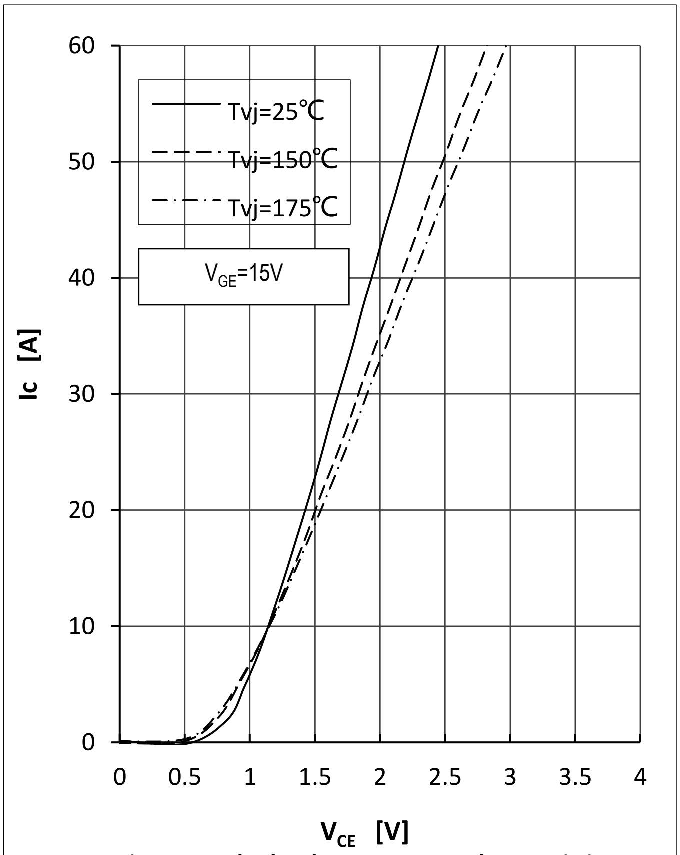


Fig12. IGBT-brake-chopper Output Characteristics

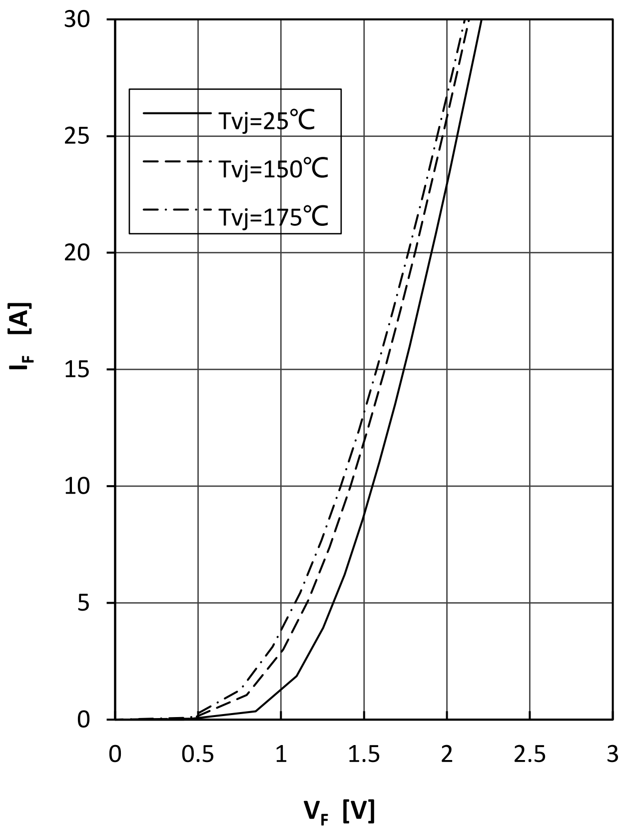
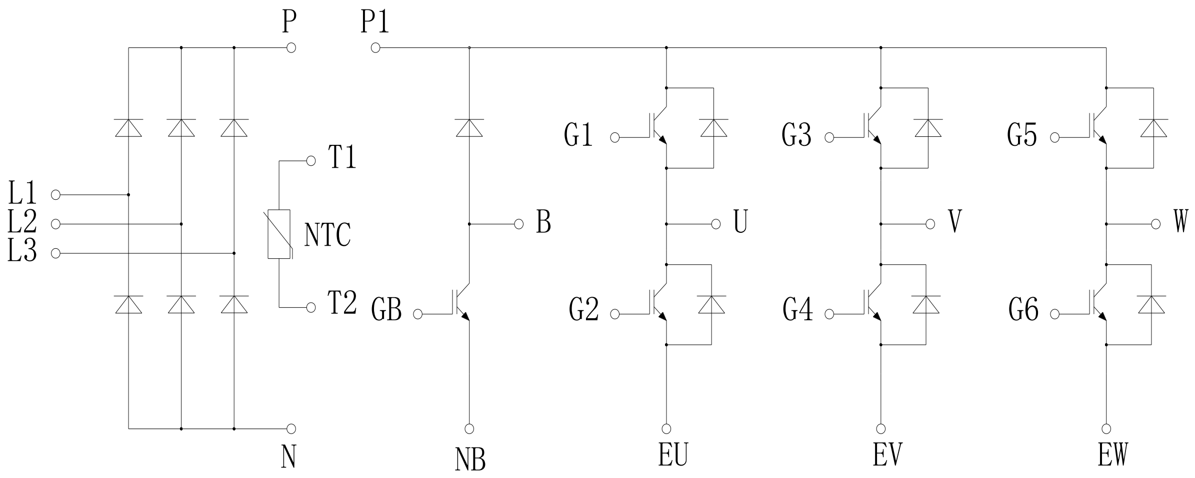
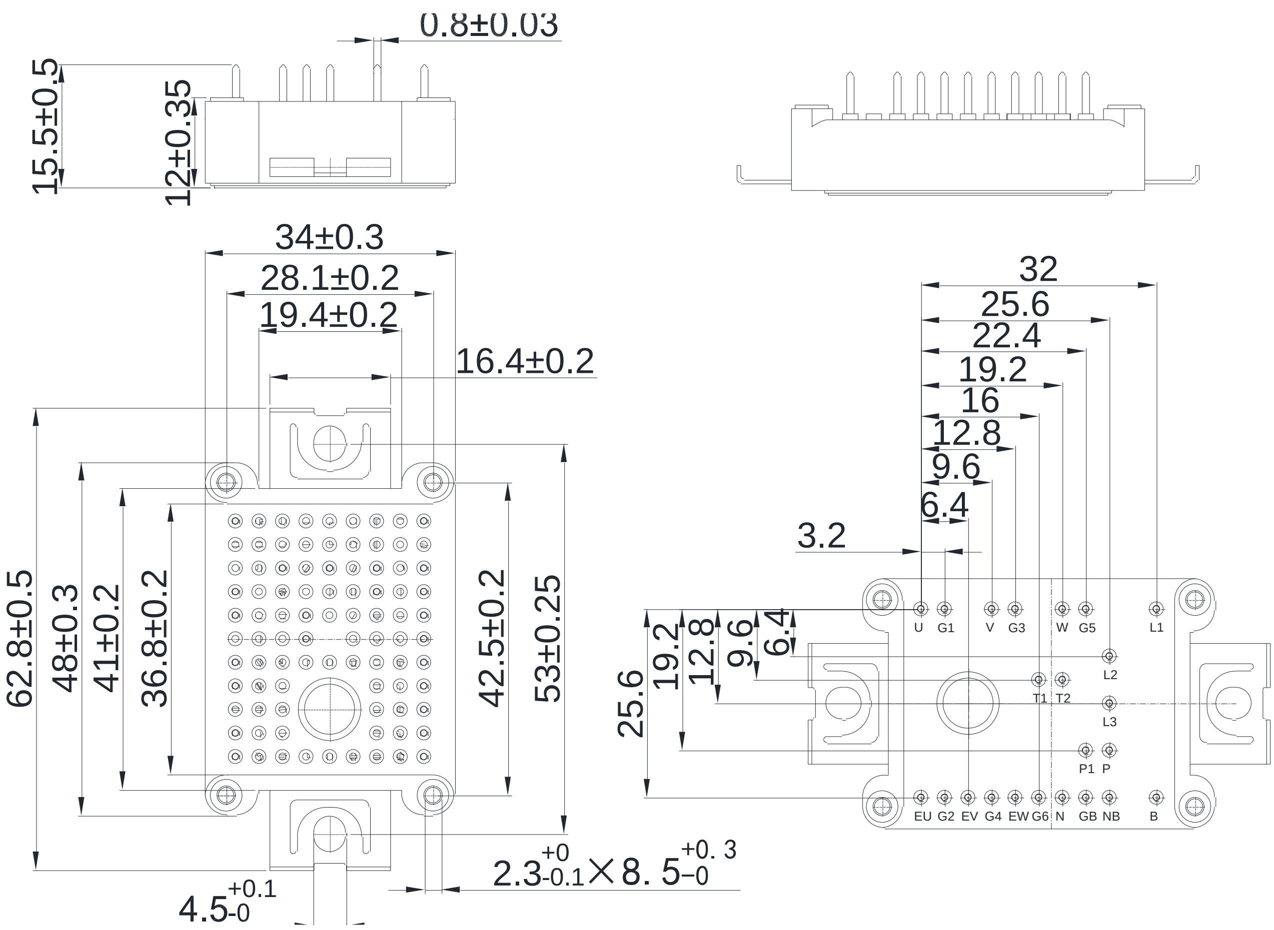


Fig13.Diode-brake-chopper Foward Characteristics

Circuit Diagram



- **Package Dimensions**



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