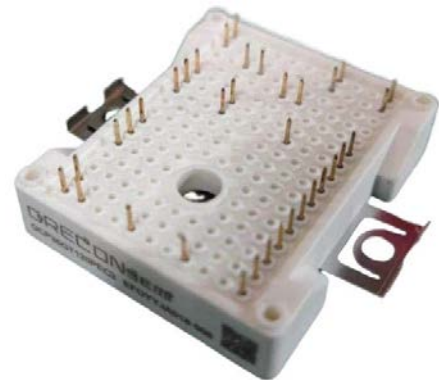


GRECON IGBT Power Module provides ultralow conduction loss as well as short circuit ruggedness. They are designed for the applications such as general inverters and UPS.



35A/1200V

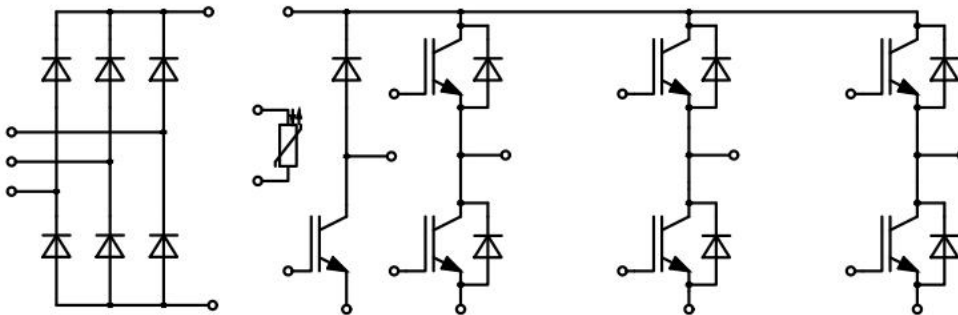
Features

- Including fast & soft recovery anti-parallel
- High short circuit capability
- Low inductance module structure

Application scenarios

- Inverter for motor drive
- AC and DC servo drive amplifier
- UPS

Equivalent Circuit Schematic



Type / Ordering Code	Package	Marking	Related Links

Revision	Date	Subjects (major changes since last revision)
Rev. A	2022.10.14	

Maximum Rated Values(Inverter) $T_{vj} = 25^{\circ}\text{C}$, Unless Otherwise Specified

Parameter	symbol	Condition	Rating	Unit
Collector-emitter voltage	V_{CES}	$T_j=25^{\circ}\text{C}$	1200	V
Implemented collector current	$I_{C\text{ nom}}$	$T_C=100^{\circ}\text{C}$, $T_{j\text{max}}=175^{\circ}\text{C}$	35	A
Peak collector current	I_{CRM}	$t_p=1\text{ms}$	70	A
Gate-emitter voltage	V_{GS}	$T_j=25^{\circ}\text{C}$	+20/-20	V

Electrical Characteristic Values(Inverter)
 $T_{vj} = 25^{\circ}\text{C}$, Unless Otherwise Specified **Static Characteristic**

Parameter	symbol	Condition	Value			Unit
			Min	Typ	Max	
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}$ $T_j=25^{\circ}\text{C}$ $I_C=1.5\text{mA}$	5	5.6	6.2	V
Collector-emitter cut-off current	I_{CES}	$V_{CE}=1200\text{V}$ $T_j=25^{\circ}\text{C}$ $V_{GE}=0\text{V}$	-	-	1	mA
Gate-emitter leakage current	I_{GES}	$V_{CE}=0\text{V}$, $V_{GE}=20\text{V}$, $T_j=25^{\circ}\text{C}$	-	-	500	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=35\text{A}$, $V_{GE}=15\text{V}$, $T_j=25^{\circ}\text{C}$	-	1.73	2.2	V
		$I_C=35\text{A}$, $V_{GE}=15\text{V}$, $T_j=125^{\circ}\text{C}$	-	2.02	-	
		$I_C=35\text{A}$, $V_{GE}=15\text{V}$, $T_j=150^{\circ}\text{C}$	-	2.04	-	
Internal gate resistor	R_{gint}		-	-	-	Ω

Dynamic Characteristic

Parameter	symbol	Condition	Value			Unit
			Min	Typ	Max	
Input Capacitance	C_{ies}	$V_{GE}=0$, $V_{CE}=25\text{V}$ $f=1.0\text{MHz}$, $T_j=25^{\circ}\text{C}$	-	2.72	-	nF
Reverse transfer capacitance	C_{res}		-	0.14	-	

Turn on delay time, inductive load	$t_{d(on)}$	$V_{CE}=600V, V_{GE}=\pm 15V$ $I_C=35A, T_j=25^\circ C$ $R_{gon}=R_{goff}=20\ \Omega$	-	49	-	ns	
Rise time, inductive load	t_r		-	55	-		
Turn off delay time, inductive load	$t_{d(off)}$		-	267	-		
Fall time, inductive load	t_f		-	148	-		
Turn-on energy loss per pulse	E_{on}		-	3.47	-		mJ
Turn-off energy loss per pulse	E_{off}		-	2.07	-		mJ
Turn on delay time, inductive load	$t_{d(on)}$	$V_{CE}=600V, V_{GE}=\pm 15V$ $I_C=35A, T_j=125^\circ C$ $R_{gon}=R_{goff}=20\ \Omega$	-	42	-	ns	
Rise time, inductive load	t_r		-	57	-		
Turn off delay time, inductive load	$t_{d(off)}$		-	320	-		
Fall time, inductive load	t_f		-	226	-		
Turn-on energy loss per pulse	E_{on}		-	4.94	-		mJ
Turn-off energy loss per pulse	E_{off}		-	2.92	-		mJ
Turn on delay time, inductive load	$t_{d(on)}$	$V_{CE}=600V, V_{GE}=\pm 15V$ $I_C=35A, T_j=150^\circ C$ $R_{gon}=R_{goff}=20\ \Omega$	-	44	-	ns	
Rise time, inductive load	t_r		-	57	-		
Turn off delay time, inductive load	$t_{d(off)}$		-	336	-		
Fall time, inductive load	t_f		-	245	-		
Turn-on energy loss per pulse	E_{on}		-	5.65	-		mJ
Turn-off energy loss per pulse	E_{off}		-	3.17	-		mJ
SC data	I_{SC}	$t_p \leq 8\ \mu s, V_{GE} \leq 15V,$ $V_{CC}=800V, V_{CEmax}=V_{CES}-$ $L_{sCE} \cdot di/dt, T_j=150^\circ C$	-	196	-	A	
Total gate charge	Q_G	$V_{GE}=-15V \cdots +15V$	-	0.33	-	μC	

Diode Characteristic(Inverter)

Parameter	symbol	Condition	Value			Unit
			Min	Typ	Max	

Repetitive peak reverse voltage	V_{RRM}	$T_j=25^{\circ}\text{C}$	-	1200	-	V
Continuous DC forward current	I_F	$T_j=25^{\circ}\text{C}$	-	30	-	A
Repetitive peak forward current	I_{FRM}	$t_p=1\text{ms}$	-	60	-	A
I^2t -value	I^2t	$t_p=10\text{ms}, T_j=125^{\circ}\text{C}$	-	1560	-	A^2s
Forward voltage	VF	$I_F=30\text{A}, T_j=25^{\circ}\text{C}$	-	2.05	2.6	V
		$I_F=30\text{A}, T_j=125^{\circ}\text{C}$	-	1.71	-	
		$I_F=30\text{A}, T_j=150^{\circ}\text{C}$	-	1.61	-	
Recovered charge	Qrr	$I_F=30\text{A}, V_R=600\text{V},$ $-diF/dt=632\text{A/us},$ $V_{GE}=-15\text{V}$ $T_j=25^{\circ}\text{C}$	-	2.39	-	μC
Peak reverse recovery current	IRM		-	28	-	A
Reverse recovery energy	Erec		-	0.81	-	mJ
Recovered charge	Qrr	$I_F=30\text{A}, V_R=600\text{V},$ $-diF/dt=632\text{A/us},$ $V_{GE}=-15\text{V}$ $T_j=125^{\circ}\text{C}$	-	5.9	-	μC
Peak reverse recovery current	IRM		-	43	-	A
Reverse recovery energy	Erec		-	1.99	-	mJ
Recovered charge	Qrr	$I_F=30\text{A}, V_R=600\text{V},$ $-diF/dt=632\text{A/us},$ $V_{GE}=-15\text{V}$ $T_j=150^{\circ}\text{C}$	-	7.21	-	μC
Peak reverse recovery current	IRM		-	47	-	A
Reverse recovery energy	Erec		-	2.42	-	mJ

Diode Characteristic(Rectifier)

Parameter	symbol	Condition	Value			Unit
			Min	Typ	Max	
Repetitive peak reverse voltage	V_{RRM}	$T_j=25^{\circ}\text{C}$	-	1600	-	V
Continuous DC forward current	I_F		-	25	-	A
Repetitive peak forward current	I_{FRM}	$t_p=1\text{ms}$	-	50	-	A
I^2t -value	I^2t	$t_p=10\text{ms}, T_j=125^{\circ}\text{C}$	-	648	-	A^2s

正向电压 Forward voltage	V_F	$I_F=25A, T_j=25^\circ C$	-	-	1.2	V
反向电流 Reverse current	I_R	$V_R=V_{RRM}, T_j=25^\circ C$	-	-	500	μA

最大额定值(制动器) / Maximum Rated Values (Brake)

$T_{vj} = 25^\circ C$, 除非另有说明/ $T_{vj} = 25^\circ C$, Unless Otherwise Specified

Parameter	symbol	Condition	Rating	Unit
集电极-发射极电压 Collector-emitter voltage	V_{CES}	$T_j=25^\circ C$	1200	V
实际集电极电流 Implemented collector current	$I_{C\ nom}$	$T_C=100^\circ C, T_{jmax}=175^\circ C$	25	A
峰值集电极电流 Peak collector current	I_{CRM}	$t_p=1ms$	50	A
栅极-发射极电压 Gate-emitter voltage	V_{GS}	$T_j=25^\circ C$	+20/-20	V

Electrical Characteristic Values (Brake) $T_{vj} = 25^\circ C$, Unless Otherwise Specified

Static Characteristic

Parameter	symbol	Condition	Value			Unit
			Min	Typ	Max	
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, T_j=25^\circ C$ $I_C=1mA$	5.1	5.7	6.3	V
Collector-emitter cut-off current	I_{CES}	$V_{CE}=1200V, T_j=25^\circ C$ $V_{GE}=0V$	-	-	1	mA
Gate-emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_j=25^\circ C$	-	-	500	nA
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=25A, V_{GE}=15V, T_j=25^\circ C$	-	1.97	2.4	V
		$I_C=25A, V_{GE}=15V, T_j=125^\circ C$	-	2.2	-	
		$I_C=25A, V_{GE}=15V, T_j=150^\circ C$	-	2.26	-	
Internal gate resistor	R_{gint}		-	-	-	Ω

Dynamic Characteristic

Parameter	symbol	Condition	Value			Unit	
			Min	Typ	Max		
Input Capacitance	C_{ies}	$V_{GE}=0, V_{CE}=25V$ $f=1.0MHz, T_j=25^\circ C$	-	1.65	-	nF	
Reverse transfer capacitance	C_{res}		-	0.08	-		
Turn on delay time, inductive load	$t_{d(on)}$	$V_{CE}=600V, V_{GE}=\pm 15V$ $I_C=25A, T_j=25^\circ C$ $R_{gon}=R_{goff}=68\ \Omega$	-	112	-	ns	
Rise time, inductive load	t_r		-	96	-		
Turn off delay time, inductive load	$t_{d(off)}$		-	422	-		
Fall time, inductive load	t_f		-	187	-		
Turn-on energy loss per pulse	E_{on}		-	3.75	-		mJ
Turn-off energy loss per pulse	E_{off}		-	1.83	-		mJ
Turn on delay time, inductive load	$t_{d(on)}$	$V_{CE}=600V, V_{GE}=\pm 15V$ $I_C=25A, T_j=125^\circ C$ $R_{gon}=R_{goff}=68\ \Omega$	-	97	-	ns	
Rise time, inductive load	t_r		-	102	-		
Turn off delay time, inductive load	$t_{d(off)}$		-	460	-		
Fall time, inductive load	t_f		-	262	-		
Turn-on energy loss per pulse	E_{on}		-	4.67	-		mJ
Turn-off energy loss per pulse	E_{off}		-	2.28	-		mJ
Turn on delay time, inductive load	$t_{d(on)}$	$V_{CE}=600V, V_{GE}=\pm 15V$ $I_C=25A, T_j=150^\circ C$ $R_{gon}=R_{goff}=68\ \Omega$	-	96	-	ns	
Rise time, inductive load	t_r		-	105	-		
Turn off delay time, inductive load	$t_{d(off)}$		-	470	-		
Fall time, inductive load	t_f		-	282	-		
Turn-on energy loss per pulse	E_{on}		-	5.02	-		mJ
Turn-off energy loss per pulse	E_{off}		-	2.45	-		mJ

Diode Characteristic (Brake)

Parameter	symbol	Condition	Value			Unit
			Min	Typ	Max	
Repetitive peak reverse voltage	V_{RRM}	$T_j=25^{\circ}\text{C}$	-	1200	-	V
Continuous DC forward current	I_F		-	15	-	A
Repetitive peak forward current	I_{FRM}	$t_p=1\text{ms}$	-	30	-	A
I^2t -value	I^2t	$t_p=10\text{ms}, T_j=125^{\circ}\text{C}$	-	120	-	A^2s
Forward voltage	VF	$I_F=15\text{A}, T_j=25^{\circ}\text{C}$	-	2.32	2.7	V
		$I_F=15\text{A}, T_j=125^{\circ}\text{C}$	-	1.8	-	
		$I_F=15\text{A}, T_j=150^{\circ}\text{C}$	-	1.69	-	
Recovered charge	Qrr	$I_F=15\text{A}, V_R=600\text{V},$ $-diF/dt=189\text{A}/\mu\text{s},$ $V_{GE}=-15\text{V}$ $T_j=25^{\circ}\text{C}$	-	1.25	-	μC
Peak reverse recovery current	IRM		-	8	-	A
Reverse recovery energy	Erec		-	0.4	-	mJ
Recovered charge	Qrr	$I_F=15\text{A}, V_R=600\text{V},$ $-diF/dt=189\text{A}/\mu\text{s},$ $V_{GE}=-15\text{V}$ $T_j=125^{\circ}\text{C}$	-	2.75	-	μC
Peak reverse recovery current	IRM		-	12	-	A
Reverse recovery energy	Erec		-	0.9	-	mJ
Recovered charge	Qrr	$I_F=15\text{A}, V_R=600\text{V},$ $-diF/dt=189\text{A}/\mu\text{s},$ $V_{GE}=-15\text{V}$ $T_j=150^{\circ}\text{C}$	-	3.58	-	μC
Peak reverse recovery current	IRM		-	14	-	A
Reverse recovery energy	Erec		-	1.21	-	mJ

NTC

Parameter	symbol	Condition	Value			Unit
			Min	Typ	Max	
Rated resistance	R_{25}		-	5	-	$\text{k}\Omega$
Deviation of R100	$\Delta R/R$	$T_c=100^{\circ}\text{C}, R_{100}=493.3\Omega$	-5	-	5	%
Power dissipation	P_{25}		-	-	20	mW
B-value	$B_{25/50}$	$R_2=R_{25\text{exp}}[B_{25/50}(1/T_2-1/(298.15\text{K}))]$	-	3380	-	k

Module Features

Parameter	symbol	Condition	Rating	Unit
Thermal resistance, junction to case	R_{thJC}	per IGBT	-	K/W
Thermal resistance, junction to case	R_{thJC}	per Diode	-	K/W
Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=1min	2.5	kV
Weight	G	-	42	g
Internal isolation			Al2O3	
Temperature under switching conditions	$T_{vj\ op}$		-40/150	°C
Storage temperature	T_{stg}		-40/125	°C
Mounting torque, screw: M5	Ms		3~6	Nm
Maximum junction temperature	T_{jmax}		175	°C

Electrical characteristics diagrams

Fig 1. IGBT Output Characteristic

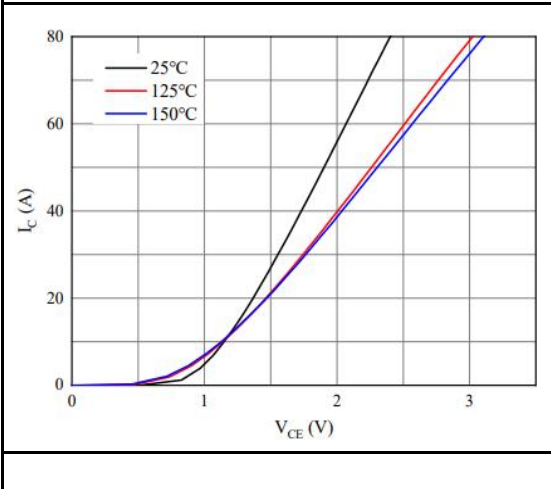


Fig 2. IGBT Output Characteristic

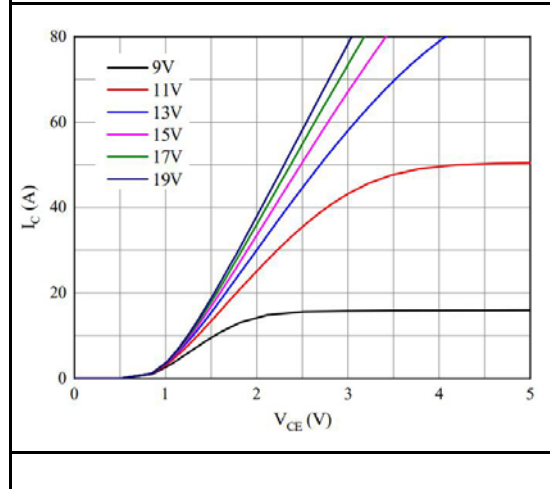


Fig 3. Transfer Characteristic

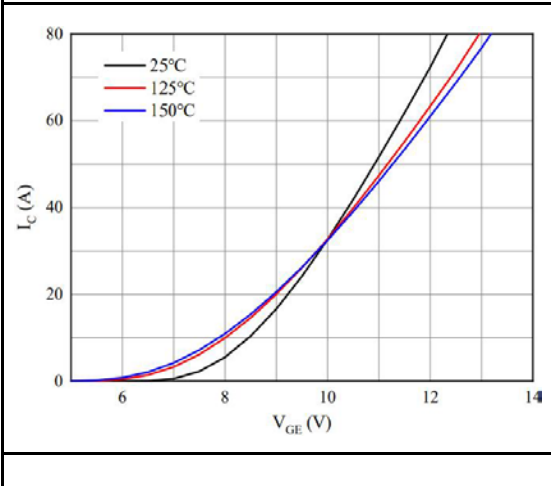


Fig 4. Diode Forward Voltage VF vs. IF

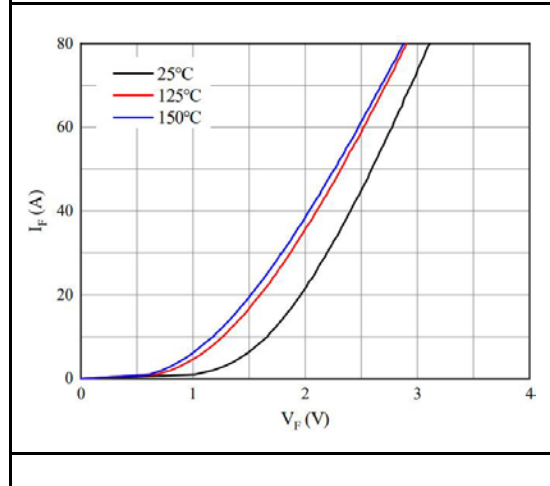


Fig 5. IGBT Switching Loss Eon & Eoff vs. IC

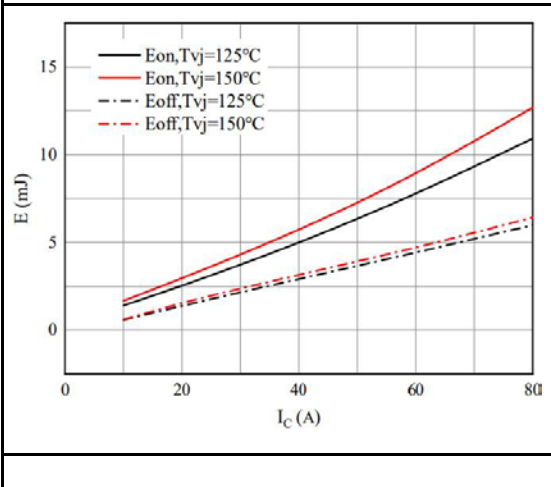


Fig 6. IGBT Switching Loss Eon & Eoff vs. Rg

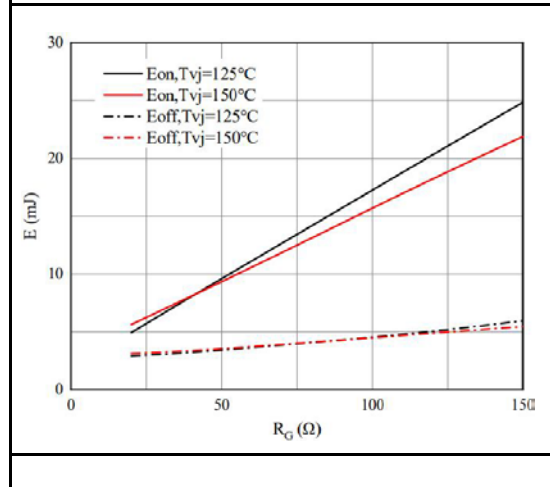


Fig 7. Diode Switching Loss Erec vs. Ic

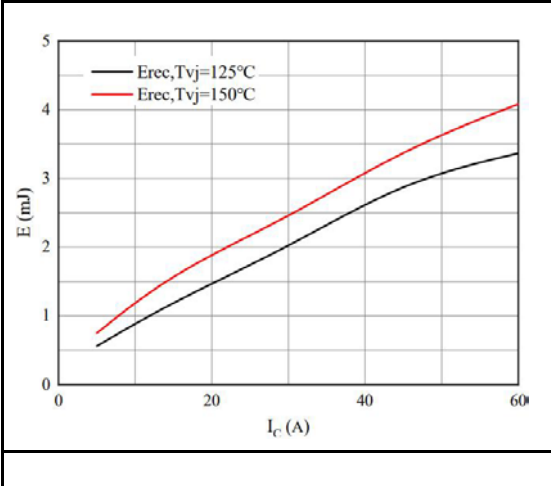


Fig 8. Diode Switching Loss Erec vs. Rg

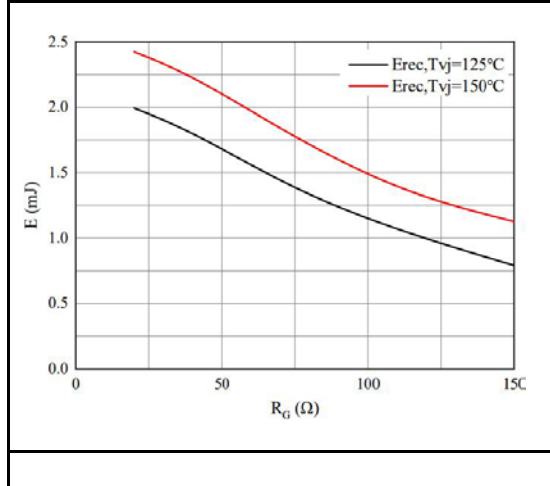


Fig 9. Capacitance Characteristic

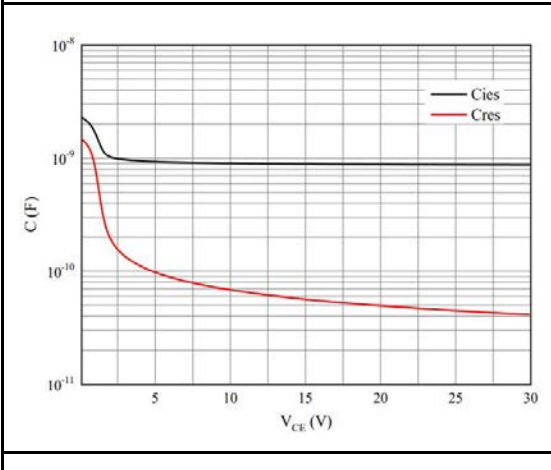
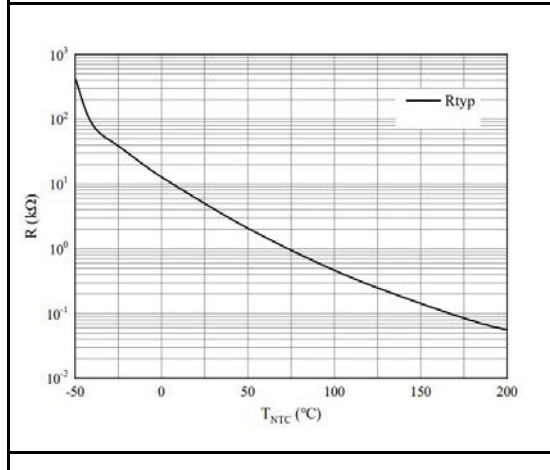
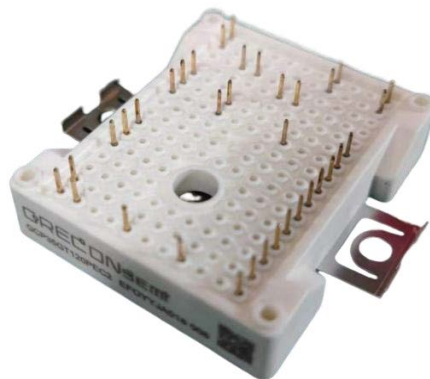
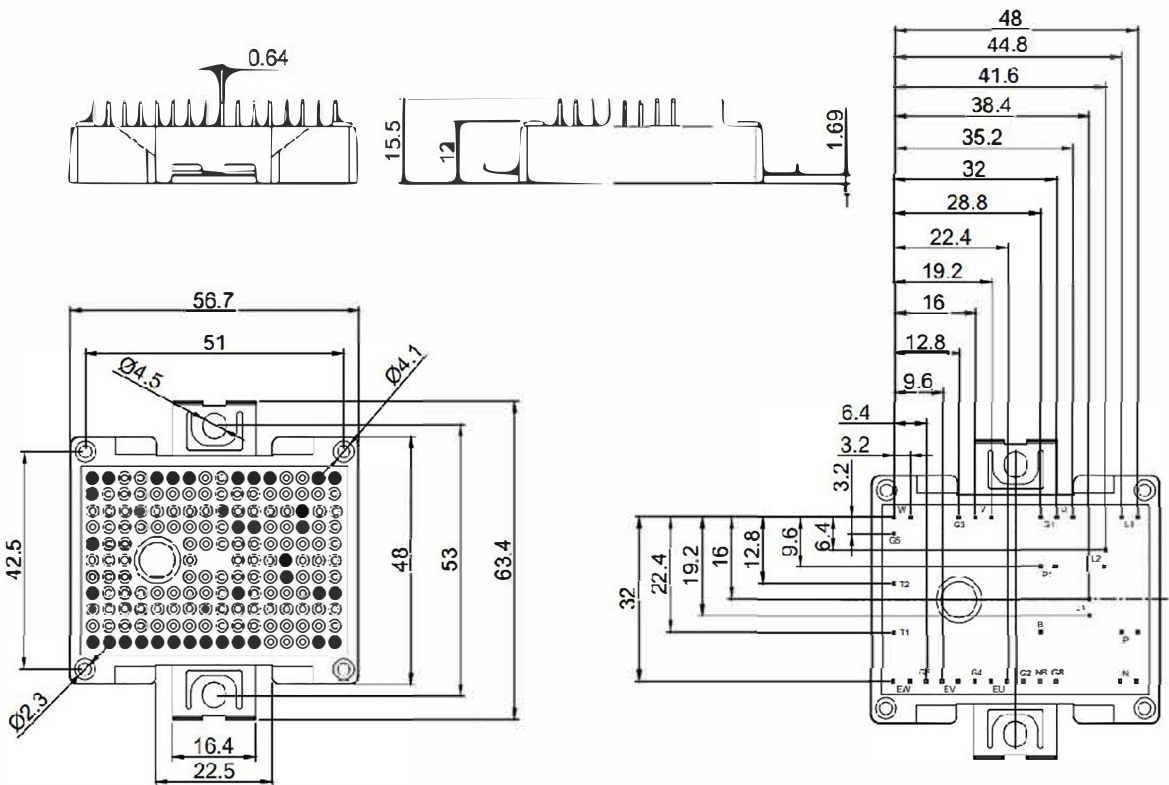
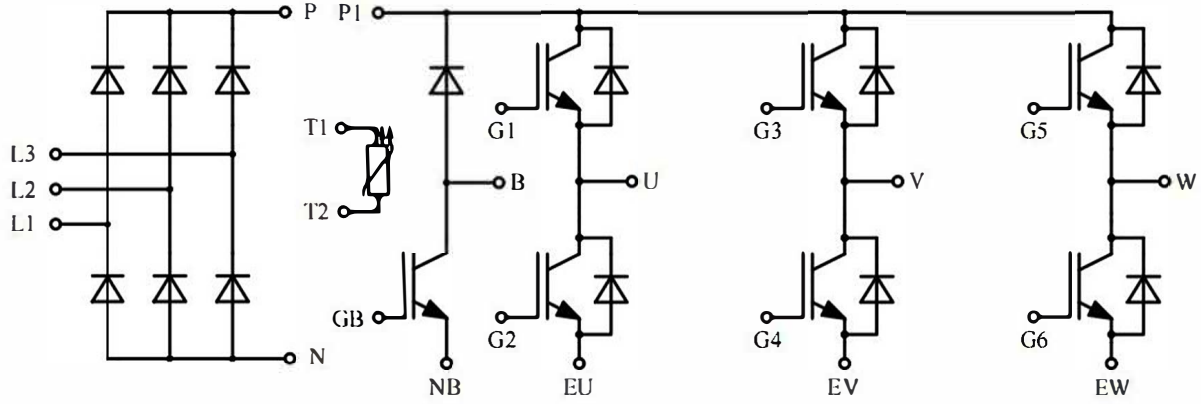


Fig 10. NTC Curve



Package Outlines (Unit:mm)





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