Features:

- IGBT Inverter Short Circuit Rated 10μs
- IGBT Inverter Low Saturation Voltage:
  $V_{CE\ (Sat)}$ = 1.65V@I_C = 100A, T_C=25℃
- 100% RBSOA Tested（2×I_C）
- Low Stray Inductance
- HI-REL Power Terminals
- Lead Free, Compliant With RoHS Requirement

Applications:

- Industrial Inverters
- Servo Applications

IGBT-Inverter

Absolute Maximum Ratings(T_C=25℃ unless otherwise specified)

Symbol	Description		Value	Units
V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C=80℃	100	A
		T_C=25℃	200	A
$I_{CM(1)}$	Peak Collector Current Repetitive	T_J=175℃	200	A
t_{SC}	Short Circuit Withstand Time	T_J=150℃	>10	μs
P_D	Maximum Power Dissipation(IGBT)	T_C=25℃ T_{Jmax}=175℃	550	W

Characteristic Values (T_J = 25℃ unless otherwise specified)

Symbol	Description	Test Conditions		Min.	Typ.	Max.	Units
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=V_{CES}	T_J=25℃			500	μA
			T_J=125℃			1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES}, V_{CE}=0V	T_J=25℃			300	nA
			T_J=125℃			600	nA
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=1mA,V_{CE}=V_{GE}		5	5.6	6.8	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=100A, V_{GE}=15V	T_J=25℃		1.65	1.95	V
			T_J=125℃		1.85		V
C_{ies}	Input Capacitance	V_{CE}=25V,V_{GE}=0V, f=1MHz			8.3		nF
C_{oes}	Output Capacitance				0.29		nF

$d_{(on)}$	Turn-on Delay Time	V_{CC}=600V,I_C=100A, R_G=10Ω,V_{GE}=±15V, L=1030uH,T_J=25℃		181		ns
t_r	Rise Time			72		ns
$t_{d(off)}$	Turn-off Delay Time			301		ns
t_f	Fall Time			299		ns
E_{on}	Turn-on Switching Loss			11.3		mJ
E_{off}	Turn-off Switching Loss			7.7		mJ
E_{ts}	Total Switching Loss			20.8		mJ
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V,I_C=100A, R_G=10Ω,V_{GE}=±15V, L=1030uH,T_J=125℃		178		ns
t_r	Rise Time			64		ns
$t_{d(off)}$	Turn-off Delay Time			327		ns
t_f	Fall Time			441		ns
E_{on}	Turn-on Switching Loss			15		mJ
E_{off}	Turn-off Switching Loss			11		mJ
E_{ts}	Total Switching Loss			29.6		mJ
Q_g	Total Gate Charge	V_{CE}=600V,I_C=100A, V_{GE}=-15V~+15V		630		nC
RBSOA	Reverse Bias Safe Operating Area	I_C=150A,V_{CC}=960V, Vp=1200V,Rg=10Ω, V_{GE}=+15V to 0V,T_J=150℃	Trapezoid			
SCSOA	Short Circuit Safe Operating Area	V_{CC}=600V,V_{GE}=15V, T_J=150℃	10			μs

Diode-Inverter

Absolute Maximum Ratings(T_C=25℃ unless otherwise specified)

Symbol	Description	Value	Units
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	DC Forward Current	100	A
I_{FRM}	Repetitive Peak Forward Current	150	A
I^2t	V_R=0V,tp=10ms,T_J=125℃	1200	A^2s

Characteristic Values

Symbol	Description	Test Conditions		Min.	Typ.	Max.	Units
V_F	Forward Voltage	I_F=100A, V_{GE}=0V	T_J=25℃		1.9	2.0	V
			T_J=150℃		2.0		
t_{rr}	Reverse Recovery Time	I_F=100A, di/dt=750A/μs, V_{rr}=600V, V_{GE}=-15V	T_J=25℃		302		ns
			T_J=125℃		503		
I_{RM}	Peak Reverse Recovery Current		T_J=25℃		55		A
			T_J=125℃		59		
Q_{rr}	Recovered Charge		T_J=25℃		5.7		μC
			T_J=125℃		10.7		
E_{rec}	Reverse Recovery Energy		T_J=25℃		1.8		mJ
			T_J=125℃		3.6		

Diode-Rectifier

Absolute Maximum Ratings(T_C=25℃ unless otherwise specified)

Symbol	Description	Conditions	Value	Units
V_{RRM}	Repetitive Peak Reverse Voltage	T_J=25℃	1600	V
I_R	Forward Current RMS Maximum Per Diode	T_C=80℃	100	A
I_{RMSM}	Maximum RMS Current At Rectifier Output	T_C=80℃	150	A
I_{FSM}	Surge current @t_p=10 ms	T_J=25℃	1600	A
		T_J=150℃	1380	
I^2t	t_p=10ms	T_J=25℃	-	A^2s
		T_J=150℃	9520	

Characteristic values

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_F	Forward voltage	I_F＝100A, V_{GE}=0V	T_J=25℃		1	1.21	V
			T_J=150℃		0.9		

IGBT-Brake-Chopper

Absolute Maximum Ratings(T_C=25℃ unless otherwise specified)

Symbol	Description		Value	Units
V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C=125℃	50	A
		T_C=25℃	100	A
$I_{CM(1)}$	Peak Collector Current Repetitive	T_J=175℃	100	A
P_D	Maximum Power Dissipation Per Leg	T_C=25℃ T_{Jmax}=175℃	375	W

Characteristic Values

Symbol	Description	Test Conditions		Min.	Typ.	Max.	Units
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=V_{CES}	T_J=25℃			300	μA
			T_J=125℃			1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES}, V_{CE}=0V	T_J=25℃			300	nA
			T_J=125℃			600	nA
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=1mA,V_{CE}=V_{GE}		5	5.5	6.8	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=50A, V_{GE}=15V	T_J=25℃		1.7	1.95	V
			T_J=125℃		1.8		V
C_{ies}	Input Capacitance	V_{CE}=25V,V_{GE}=0V,f＝1MHz			3.8		nF
C_{oes}	Output Capacitance				0.14		nF
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V,I_C=50A, R_G=10Ω,V_{GE}=±15V, Inductive Load, T_J=25℃			46.7		ns
t_r	Rise Time				44.8		ns
$t_{d(off)}$	Turn-off Delay Time				150		ns
t_f	Fall Time				304		ns

E_{on}	Turn-on Switching Loss			3.55		mJ
E_{off}	Turn-off Switching Loss			3.3		mJ
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V,I_C=40A, R_G=15Ω,V_{GE}=±15V, Inductive Load, T_J=125°C		48		ns
t_r	Rise Time			46.7		ns
$t_{d(off)}$	Turn-off Delay Time			166		ns
t_f	Fall Time			467		ns
E_{on}	Turn-on Switching Loss			4.5		mJ
E_{off}	Turn-off Switching Loss			4.8		mJ
Q_g	Total Gate Charge	V_{CE}=600V,I_C=40A, V_{GE}=-15V~+15V		235		nC
RBSOA	Reverse Bias Safe Operating Area	I_C=80A,V_{CC}=960V, V_p=1200V,Rg=15Ω, V_{GE}=+15V to 0V,T_J=150°C	Trapezoid			

Diode-Brake-chopper

Absolute Maximum Ratings(T_C=25°C unless otherwise specified)

Symbol	Description	Value	Units
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	DC Forward Current	50	A
I_{FRM}	Repetitive Peak Forward Current	100	A
I^2t	V_R=0V,tp=10ms,T_J =125°C	--	A^2s

Characteristic values

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_F	Forward Voltage	I_F＝50A, V_{GE}=0V	T_J=25°C		1.7	2.1	V
			T_J=150°C		1.7		
t_{rr}	Reverse Recovery Time	I_F＝50A, di/dt= 850A/μs, V_{rr}=600V, V_{GE}=0V	T_J=25°C		110		ns
			T_J=125°C		363		
I_{RM}	Peak Reverse Recovery Current		T_J=25°C		54		A
			T_J=125°C		56		
Q_{rr}	Recovered Charge		T_J=25°C		3.2		μC
			T_J=125°C		6.9		
E_{rec}	Reverse Recovery Energy		T_J=25°C		1.6		mJ
			T_J=125°C		3.0		

NTC Thermistor

Characteristic values

Symbol	Condition	Typ.	Max.	Units
R_{25}	T_C=25°C	5		kΩ
△R/R	T_C=100°C， R_{100}=481Ω		±5	%
P_{25}	T_C=25°C	50		mW
$B_{25/50}$	R_2=R_{25} exp[$B_{25/50}$(1/T_2-1/(298.15K))]	3380		K
$B_{25/80}$	R_2=R_{25} exp[$B_{25/80}$(1/T_2-1/(298.15K))]	3440		K

Module

Absolute Maximum Ratings

Inverter& Brake& Rectifier	T_J	Operating Junction Temperature of IGBT		-40+175	℃
		Operating Junction Temperature of diode		-40+150	℃
	T_{stg}	Storage Temperature		-40+125	℃
	V_{iso}	Isolation Voltage (All Terminals Shorted)	f=50Hz,1minute	2500	V

Thermal characteristics

	Symbol	Description	Typ.	Max.	Units
Inverter	$R_{\theta JC}$	Junction-To-Case (IGBT Part, Per Leg)		0.33	℃/W
	$R_{\theta JC}$	Junction-To-Case (Diode Part, Per Leg)		0.39	℃/W
Brake	$R_{\theta JC}$	Junction-To-Case, IGBT		0.40	℃/W
	$R_{\theta JC}$	Junction-To-Case, diode		0.56	℃/W
Rectifier	$R_{\theta JC}$	Junction-To-Case, diode		0.38	℃/W
Module	$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)		0.10	℃/W
	Mounting torque	Mounting Screw:M6	4.0	6.0	N·m
Weight		Weight Of Module		300	g

Notes:

(1) Repetitive Rating: Pulse width limited by max. junction temperature

V_{GE}=15V

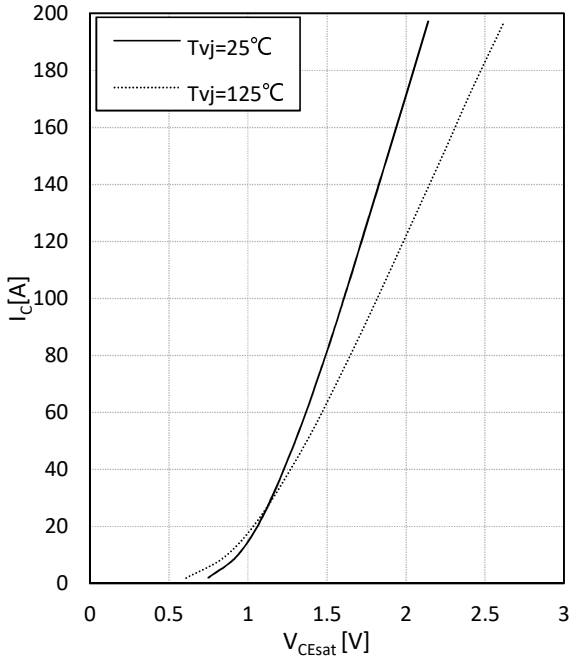


Fig.1 Typical Saturation Voltage Characteristics
(IGBT Inverter)

Tvj=125℃

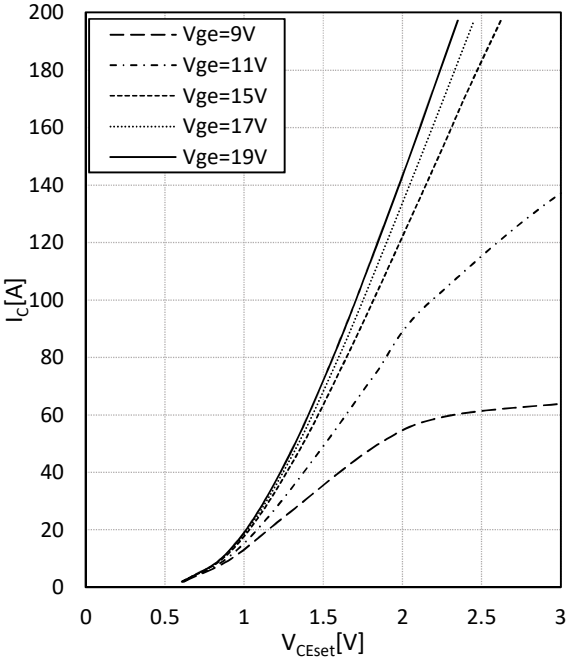


Fig.2 Typical Output Characteristics
(IGBT Inverter)

V_{GE}=±15V，R_G=10Ω，V_{CC}=600V

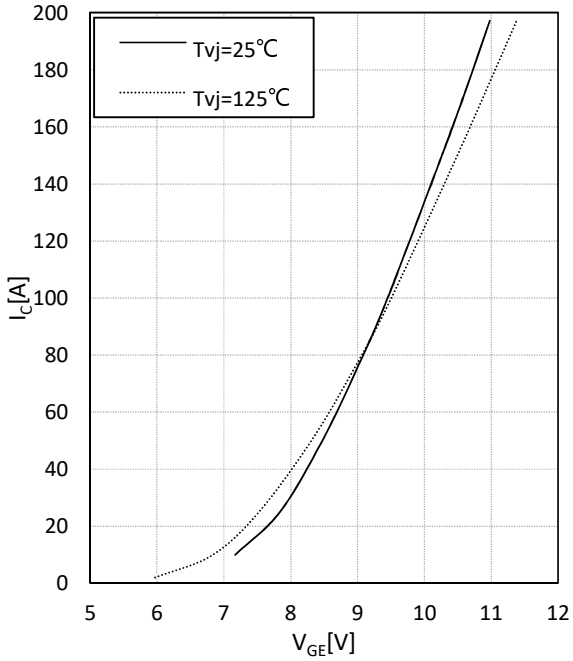


Fig.3 Transfer characteristic IGBT
(Diode Inverter)

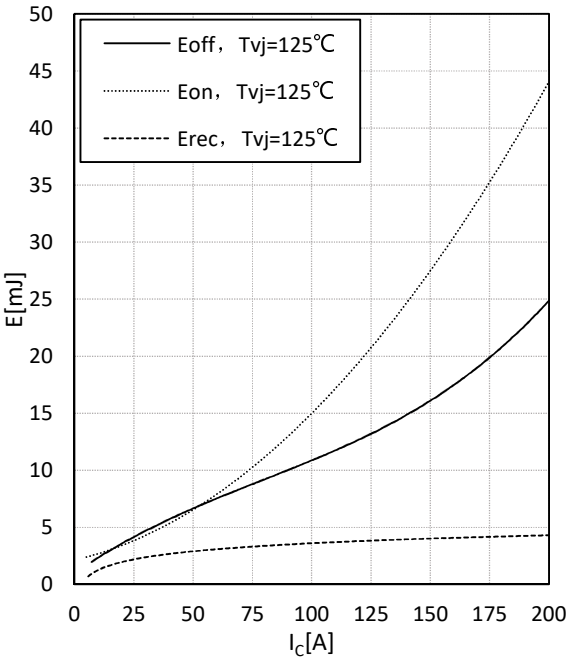


Fig.4 Switching losses IGBT
(IGBT&Diode Inverter)

V_{GE}=±15V，R_G=10Ω，V_{CC}=600V，I_C=100A

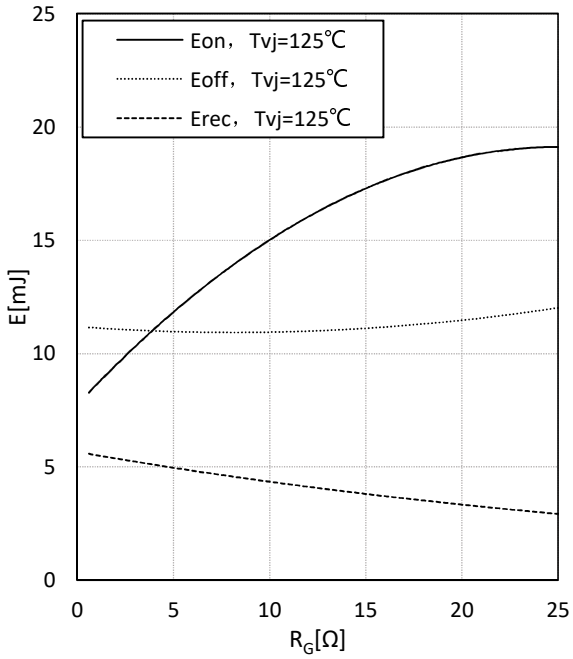


Fig.5 Typical Switching Loss vs. Gate Resistance

(IGBT & Diode Inverter)

V_{GE}=±15V，R_G=10Ω，V_{CC}=600V

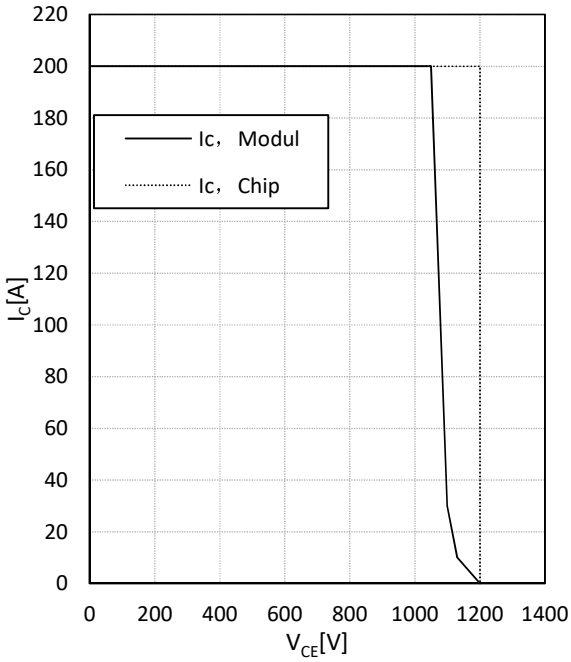


Fig.6 reverse bias safe operating area IGBT

(IGBT&Diode Inverter)

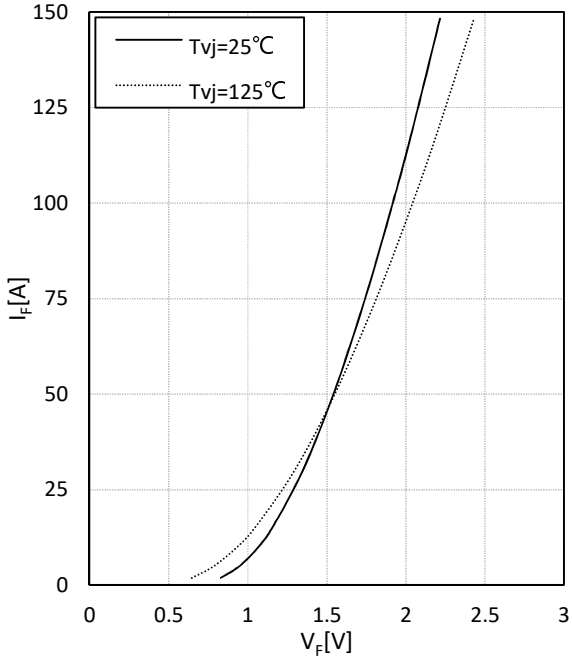


Fig.7 Forward Characteristics of Diode

(Diode Inverter)

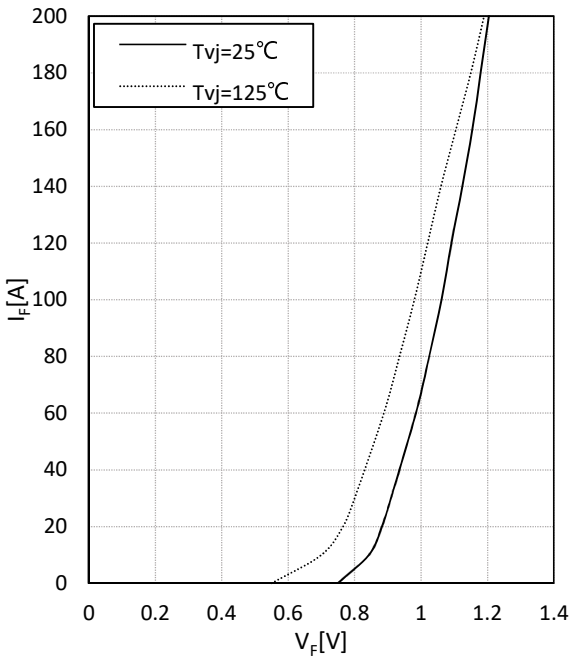


Fig.8 Forward Characteristics of Diode

(Diode Rectifier)

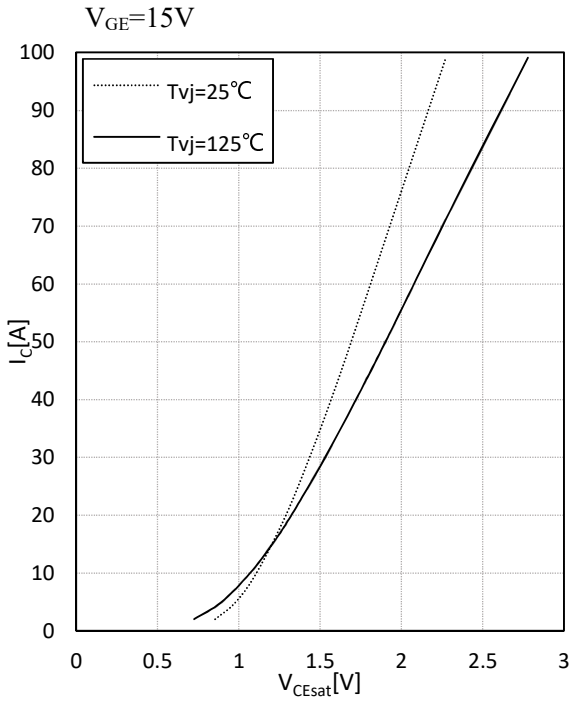


Fig.9 Typical Saturation Voltage Characteristics
(IGBT-Brake-Chopper)

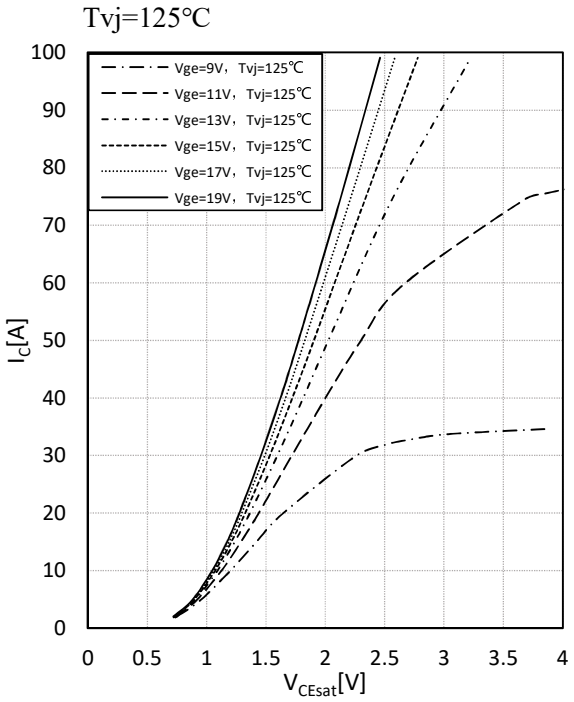


Fig.10 Typical Output Characteristics
(IGBT-Brake-Chopper)

V_{GE}=±15V，R_G=10Ω，V_{CC}=600V

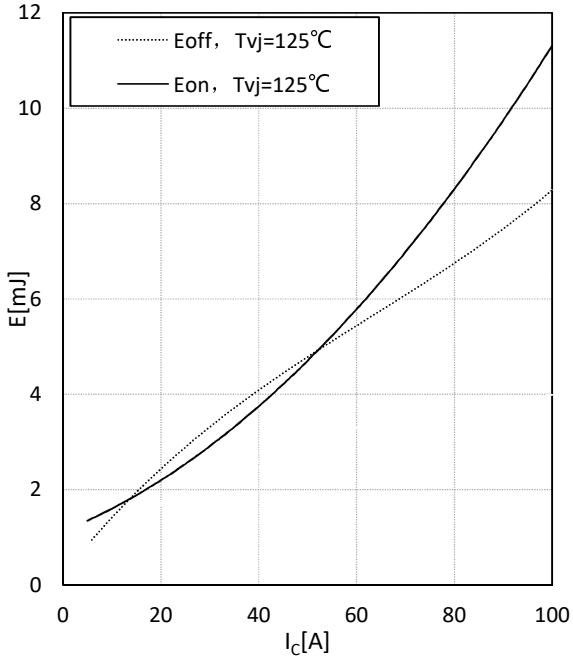


Fig.11 Typical Switching Loss vs. Collector Current
(IGBT-Brake-Chopper)

V_{GE}=±15V，R_G=10Ω，V_{CC}=600V，I_C=50A

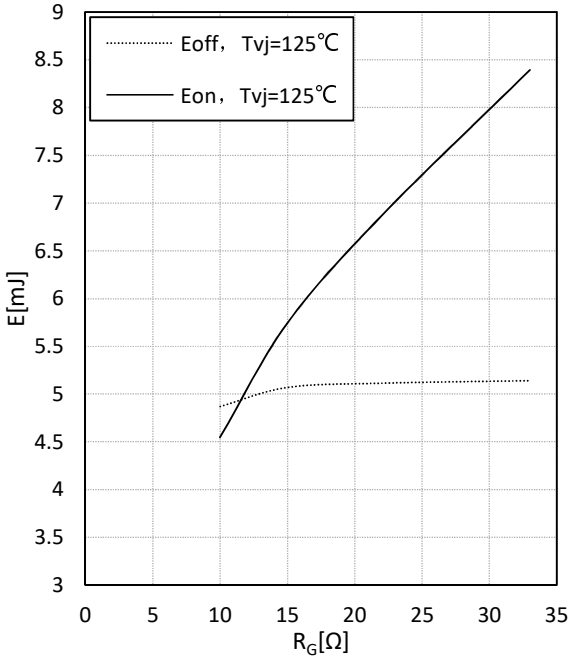


Fig.12 Typical Switching Loss vs. Gate Resistance
(IGBT-Brake-Chopper)

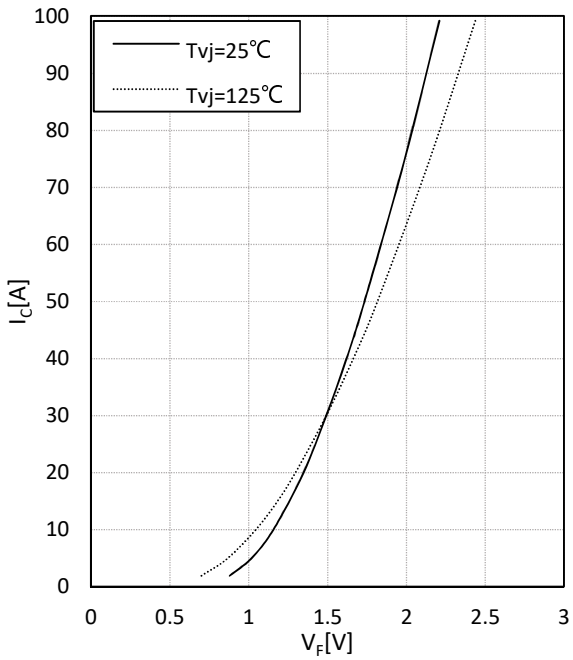


Fig.13 Forward Characteristics of Diode
(IGBT-Brake-Chopper)

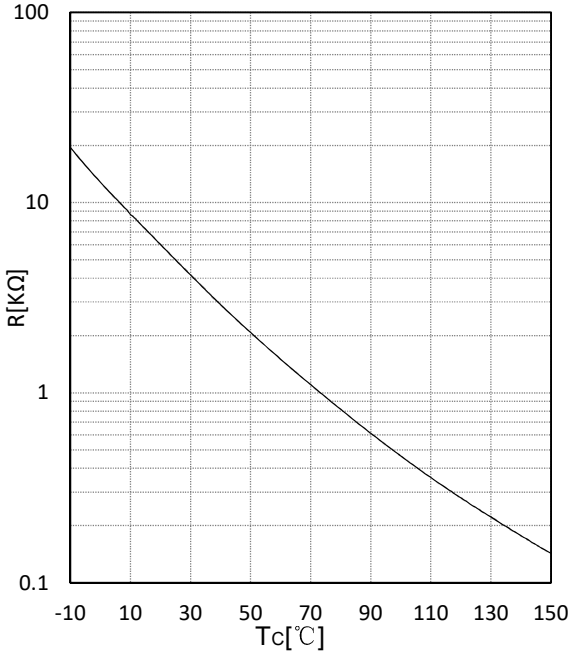
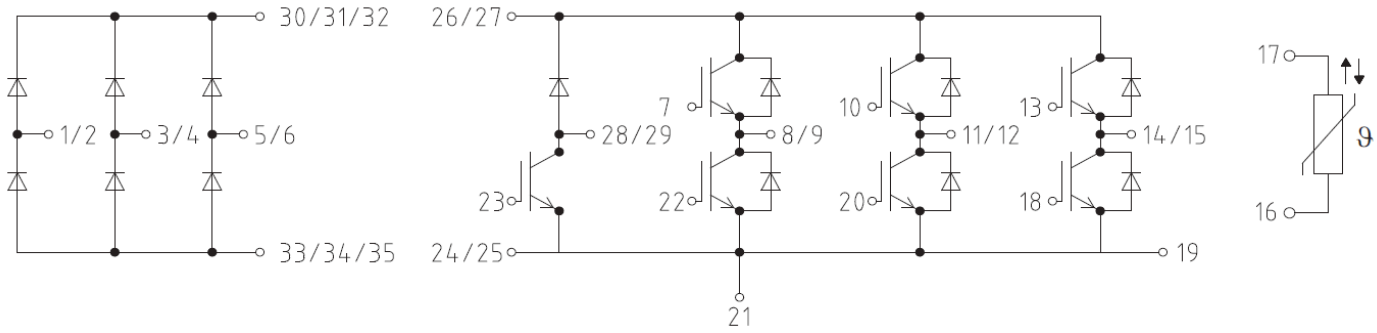
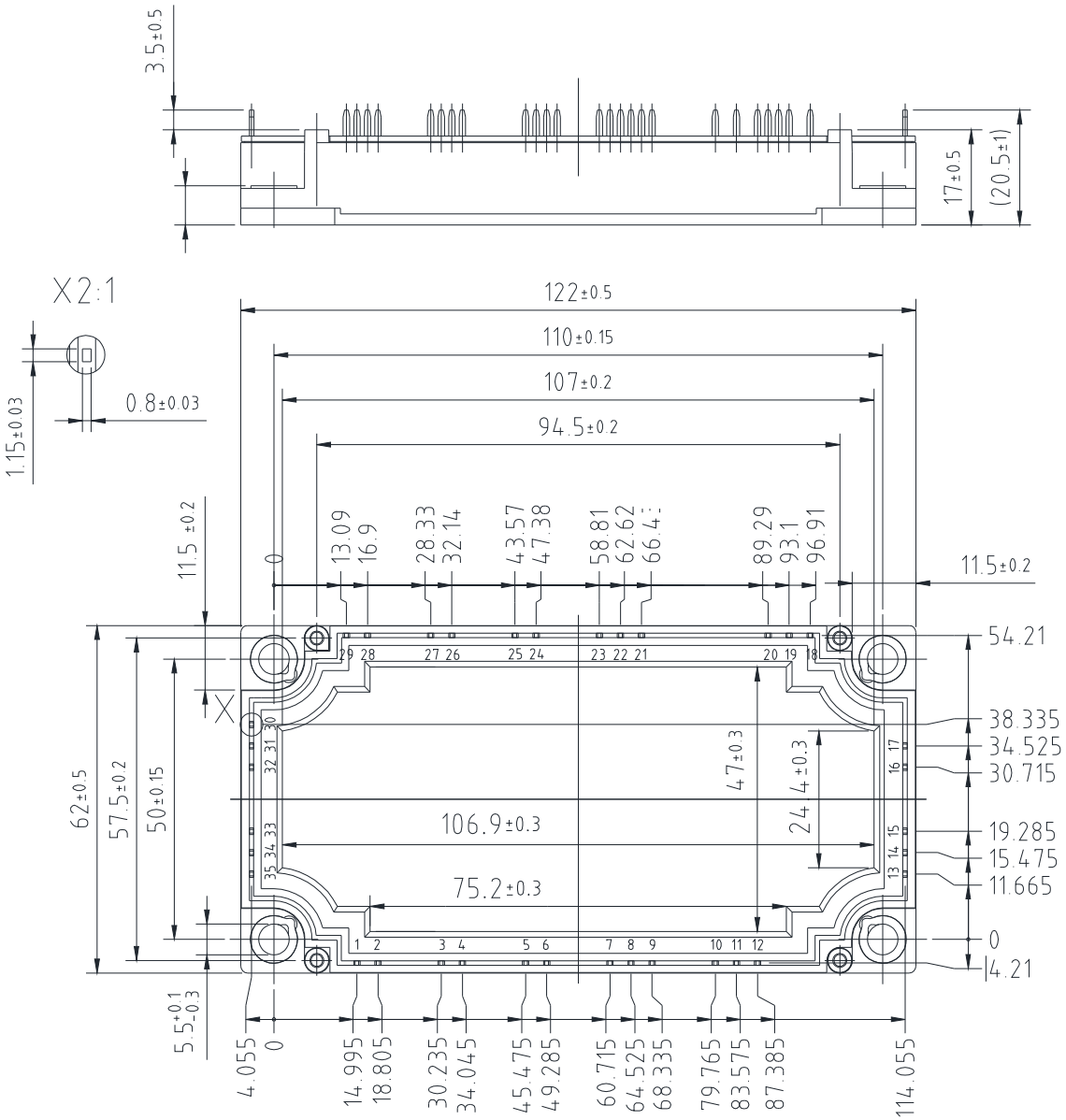


Fig.14 NTC Temperature characteristics

Internal Circuit Diagram:



Package Outline (Unit：mm)



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