

PRODUCT FEATURES

- ☐ IGBT Chip(Trench technology and switching losses)
- ☐ Low saturation voltage and positive temperature coefficient
- ☐ 10 μ S Short circuit current capability
- ☐ IGBT-Maximum junction temperature 175 $^{\circ}$ C
- ☐ Free wheeling diodes with fast and soft reverse recovery
- ☐ Industry standard package with insulated copper base plate and soldering pins for PCB mounting
- ☐ Temperature sense included



APPLICATIONS

- ☐ AC motor control
- ☐ Motion/servo control
- ☐ Inverter and power supplies

Rectifier+Brake+Inverter

IGBT-inverter

ABSOLUTE MAXIMUM RATINGS($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector - Emitter Voltage	$T_J=25^{\circ}\text{C}$	1200	V
V_{GES}	Gate - Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C=25^{\circ}\text{C}$	40	A
		$T_C=95^{\circ}\text{C}$	25	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	50	
P_{tot}	Power Dissipation Per IGBT		230	W

Diode-inverter

ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^{\circ}\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current	$T_C=25^{\circ}\text{C}$	25	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	50	
I^2t		$T_J=125^{\circ}\text{C}$, $t=10\text{ms}$, $V_R=0\text{V}$	170	A^2S

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IGBT-inverter

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions			Min.	Typ.	Max.	Unit	
V _{GE(th)}	Gate - Emitter Threshold Voltage	V _{CE} =V _{GE} , I _C =1.2mA		5	5.8	7.5	V	
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =25A, V _{GE} =15V, T _J =25°C			1.9	2.3		
		I _C =25A, V _{GE} =15V, T _J =125°C			2.30			
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25°C				100	μA	
		V _{CE} =1200V, V _{GE} =0V, T _J =125°C				1	mA	
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±15V, T _J =125°C		-200		200	nA	
R _{gint}	Integrated Gate Resistor				0		Ω	
Q _g	Gate Charge	V _{CE} =600V, I _C =25A , V _{GE} =15V			0.16		μC	
C _{ies}	Input Capacitance	V _{CE} =30V, V _{GE} =0V, f =1MHz			3.43		nF	
C _{res}	Reverse Transfer Capacitance				0.08		nF	
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V, I _C =25A, R _G =30Ω, V _{GE} =±15V, Inductive Load	T _J =25°C		55		ns	
			T _J =125°C		60		ns	
t _r	Rise Time		T _J =25°C		70		ns	
			T _J =125°C		75		ns	
t _{d(off)}	Turn - off Delay Time		T _J =25°C		195		ns	
			T _J =125°C		220		ns	
t _f	Fall Time		T _J =25°C		70		ns	
			T _J =125°C		180		ns	
E _{on}	Turn - on Energy	V _{CC} =600V, I _C =25A, R _G =30Ω, V _{GE} =±15V, Inductive Load	T _J =25°C		1.9		mj	
			T _J =125°C		2.6		mj	
E _{off}	Turn - off Energy		T _J =25°C		1.2		mj	
			T _J =125°C		1.7		mj	
I _{sc}	Short Circuit Current		tpsc≤10μS , V _{GE} =15V T _J =125°C, V _{CC} =900V			100		A
R _{thJC}	Junction-to-Case Thermal Resistance （ Per IGBT ）					0.65	K / W	

Diode-inverter

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=25\text{A}, V_{GE}=0\text{V}, T_J=25^\circ\text{C}$		1.65	2.15	V
		$I_F=25\text{A}, V_{GE}=0\text{V}, T_J=125^\circ\text{C}$		1.65		
I_{RRM}	Max. Reverse Recovery Current	$I_F=25\text{A}, V_R=600\text{V}$		16		A
Q_{RR}	Reverse Recovery Charge	$diF/dt=-300\text{A}/\mu\text{s}, T_J=125^\circ\text{C}$		4.6		μC
E_{rec}	Reverse Recovery Energy			1.75		mj
R_{thJCD}	Junction-to-Case Thermal Resistance (Per Diode)				1.35	K/W

Diode-RECTIFIER**ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^{\circ}\text{C}$	1600	V
I_{FRMS}	R.M.S. Forward Current Per Diode	$T_C=80^{\circ}\text{C}$	50	A
I_{RMS}	R.M.S. Current at rectifier output		60	
I_{FSM}	Non-Repetitive Surge Forward Current	$T_J=45^{\circ}\text{C}$, $t=10\text{ms}$, 50Hz	320	
		$T_J=45^{\circ}\text{C}$, $t=8.3\text{ms}$, 60Hz	360	
I^2t		$T_J=45^{\circ}\text{C}$, $t=10\text{ms}$, 50Hz	512	A^2S
		$T_J=45^{\circ}\text{C}$, $t=8.3\text{ms}$, 60Hz	537	

Diode-RECTIFIER**ELECTRICAL CHARACTERISTICS** ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=25\text{A}$, $T_J=25^{\circ}\text{C}$		1.1	1.35	V
		$I_F=25\text{A}$, $T_J=125^{\circ}\text{C}$		1.05		
I_R	Reverse Leakage Current	$V_R=1600\text{V}$, $T_J=25^{\circ}\text{C}$			50	μA
		$V_R=1600\text{V}$, $T_J=125^{\circ}\text{C}$			1	mA
R_{thJC}	Junction-to-Case Thermal Resistance (Per Diode)				1.0	K/W

IGBT-Brake chopper**ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector - Emitter Voltage	$T_J=25^{\circ}\text{C}$	1200	V
V_{GES}	Gate - Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C=25^{\circ}\text{C}$	20	A
		$T_C=95^{\circ}\text{C}$	15	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	30	
P_{tot}	Power Dissipation Per IGBT		176	W

Diode-Brake chopper**ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J=25^{\circ}\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current	$T_C=25^{\circ}\text{C}$	15	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	30	
I^2t		$T_J=125^{\circ}\text{C}$, $t=10\text{ms}$, $V_R=0\text{V}$	60	A^2S

IGBT-Brake chopper

ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions			Min.	Typ.	Max.	Unit	
V _{GE(th)}	Gate - Emitter Threshold Voltage	V _{CE} =V _{GE} , I _C =0.72mA		5	5.8	7.5	V	
V _{CE(sat)}	Collector - Emitter Saturation Voltage	I _C =15A, V _{GE} =15V, T _J =25°C			1.9	2.3		
		I _C =15A, V _{GE} =15V, T _J =125°C			2.30			
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25°C				50	μA	
		V _{CE} =1200V, V _{GE} =0V, T _J =125°C				1	mA	
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±15V, T _J =125°C		-200		200	nA	
R _{gint}	Integrated Gate Resistor				0		Ω	
Q _g	Gate Charge	V _{CE} =600V, I _C =15A , V _{GE} =±15V			0.08		μC	
C _{ies}	Input Capacitance	V _{CE} =30V, V _{GE} =0V, f =1MHz			1.95		nF	
C _{res}	Reverse Transfer Capacitance				0.05		nF	
t _{d(on)}	Turn - on Delay Time	V _{CC} =600V, I _C =15A, R _G =40Ω, V _{GE} =±15V, Inductive Load	T _J =25°C		40		ns	
			T _J =125°C		45		ns	
t _r	Rise Time		T _J =25°C		45		ns	
			T _J =125°C		50		ns	
t _{d(off)}	Turn - off Delay Time		T _J =25°C		190		ns	
			T _J =125°C		210		ns	
t _f	Fall Time		T _J =25°C		70		ns	
			T _J =125°C		180		ns	
E _{on}	Turn - on Energy	V _{CC} =600V, I _C =15A, R _G =40Ω, V _{GE} =±15V, Inductive Load	T _J =25°C		0.85		mJ	
			T _J =125°C		1.2		mJ	
E _{off}	Turn - off Energy		T _J =25°C		0.7		mJ	
			T _J =125°C		1		mJ	
I _{sc}	Short Circuit Current		tpsc≤10μS , V _{GE} =15V T _J =125°C, V _{CC} =900V			60		A
R _{thJC}	Junction-to-Case Thermal Resistance （Per IGBT）					0.85	K / W	

IGBT-Brake chopper

ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=15\text{A}, V_{GE}=0\text{V}, T_J=25^{\circ}\text{C}$		1.65	2.15	V
		$I_F=15\text{A}, V_{GE}=0\text{V}, T_J=125^{\circ}\text{C}$		1.65		
I_{RRM}	Max. Reverse Recovery Current	$I_F=15\text{A}, V_R=600\text{V}$		14		A
Q_{RR}	Reverse Recovery Charge	$di_F/dt=-250\text{A}/\mu\text{s}, T_J=125^{\circ}\text{C}$		2.8		μC
E_{rec}	Reverse Recovery Energy			1.1		mj
R_{thJCD}	Junction-to-Case Thermal Resistance (Per Diode)				1.5	K/W

NTC CHARACTERISTICS ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
R25	Resistance	$T_C=25^{\circ}\text{C}$		5		K Ω
B25/50				3375		K

MODULE CHARACTERISTICS ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$T_{j\max}$	Max. Junction Temperature	Inverter, Brake-Chopper			175	$^{\circ}\text{C}$
		Rectifier			150	
$T_{j\text{op}}$	Operating Temperature		-40		150	
T_{stg}	Storage Temperature		-40		125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute			3000	V
CTI	Comparative Tracking Index		200			
Md	Mounting Torque	Recommended (M5)	2.5		5	N•m
Weight				180		g

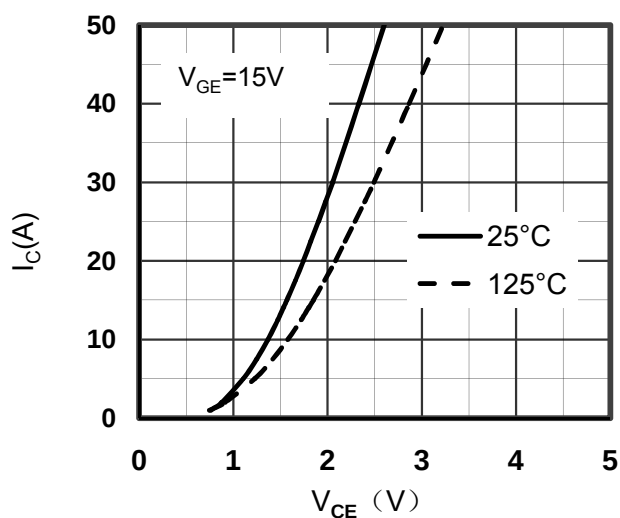


Figure1. Typical Output Characteristics
IGBT-inverter

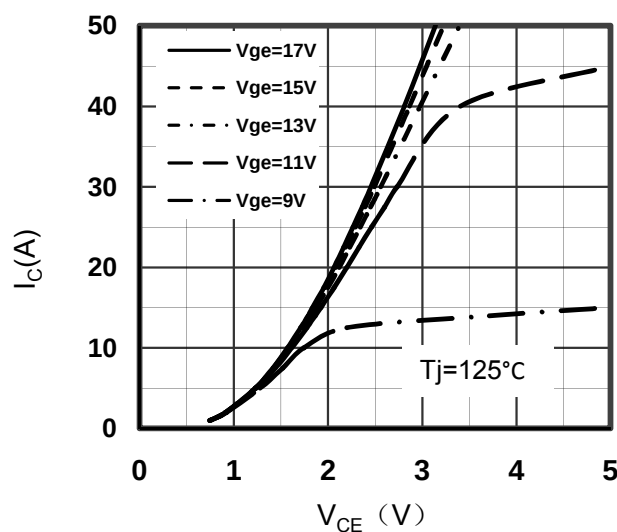


Figure2. Typical Output Characteristics
IGBT-inverter

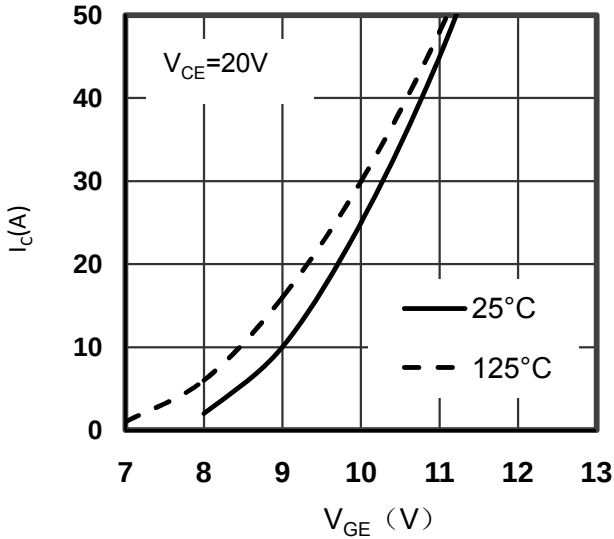


Figure3. Typical Transfer characteristics IGBT-inverter

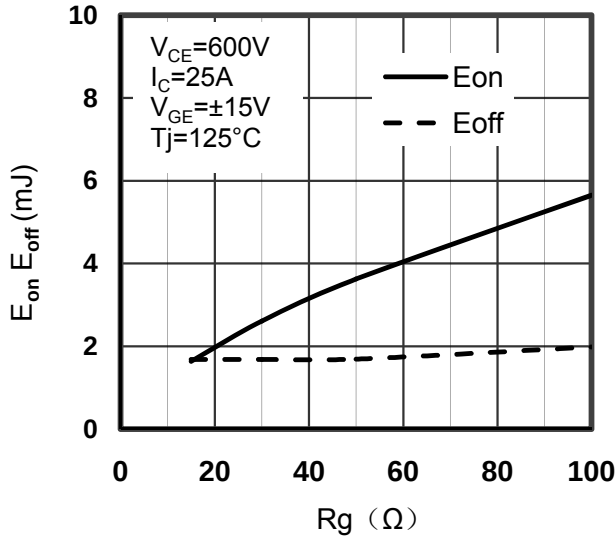


Figure4. Switching Energy vs. Gate Resistor IGBT-inverter

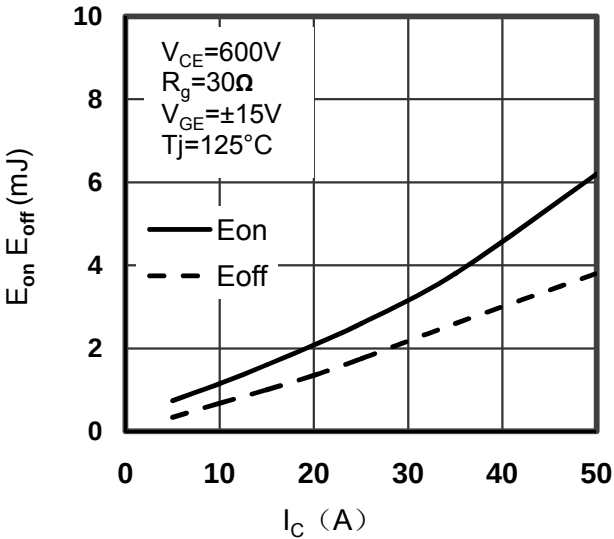


Figure5. Switching Energy vs. Collector Current IGBT-inverter

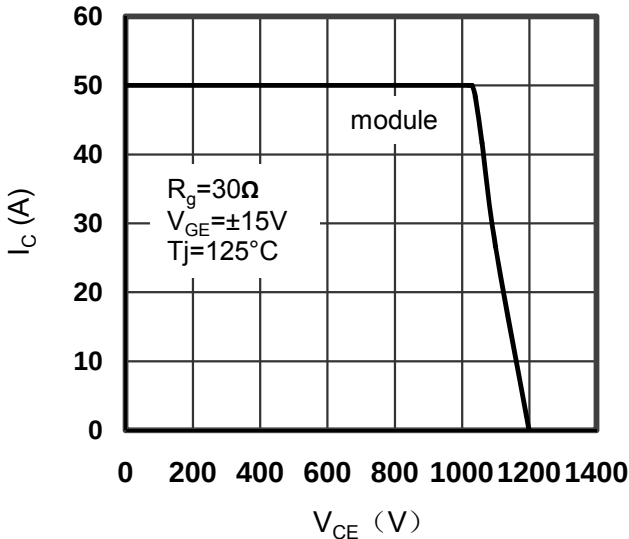


Figure6. Reverse Biased Safe Operating Area IGBT-inverter

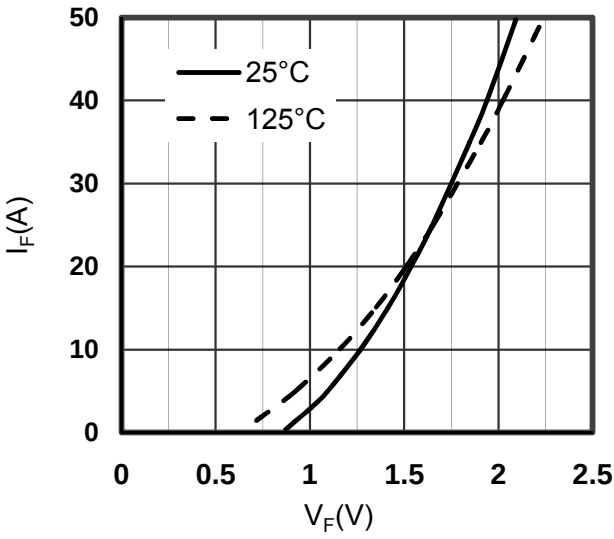


Figure7. Diode Forward Characteristics Diode -inverter

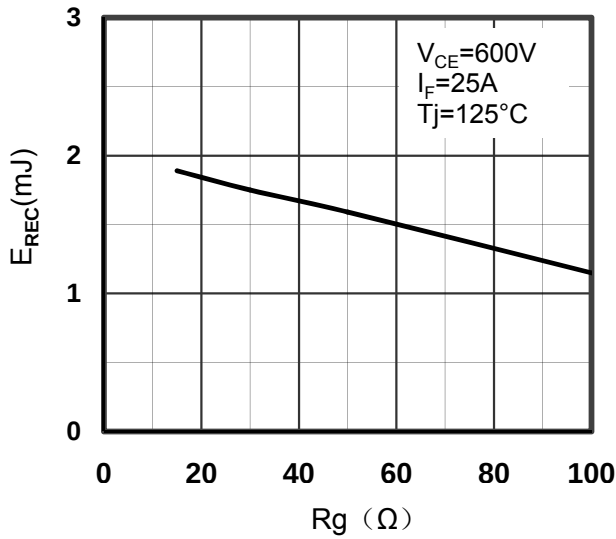


Figure8. Switching Energy vs. Gate Resistor Diode -inverter

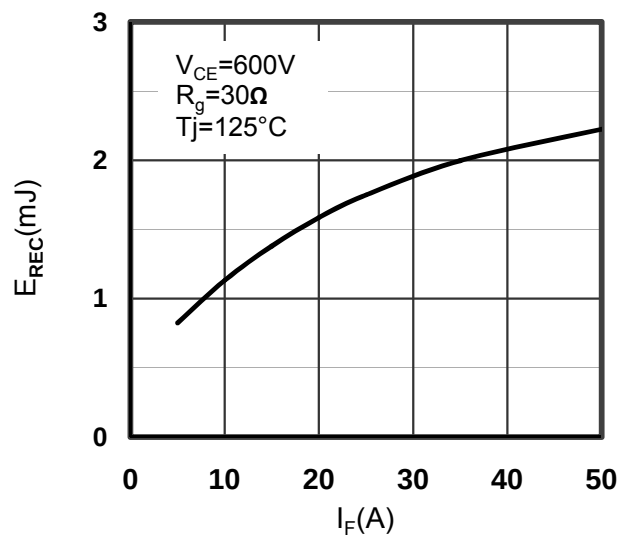


Figure9. Switching Energy vs. Forward Current Diode-inverter

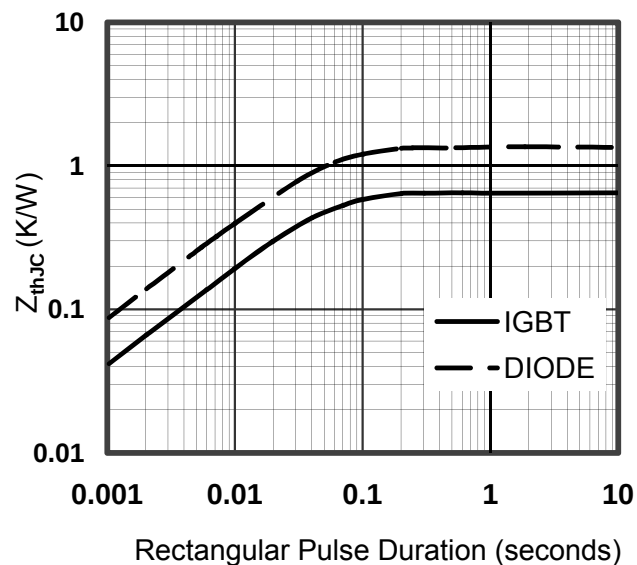


Figure10. Transient Thermal Impedance of Diode and IGBT-inverter

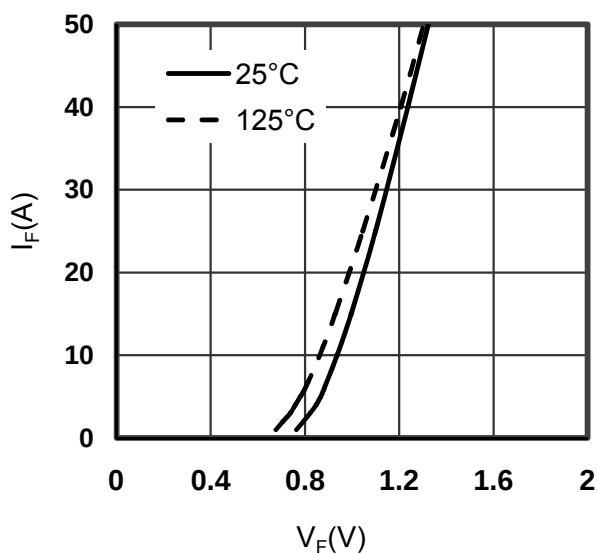


Figure11. Diode Forward Characteristics Diode- rectifier

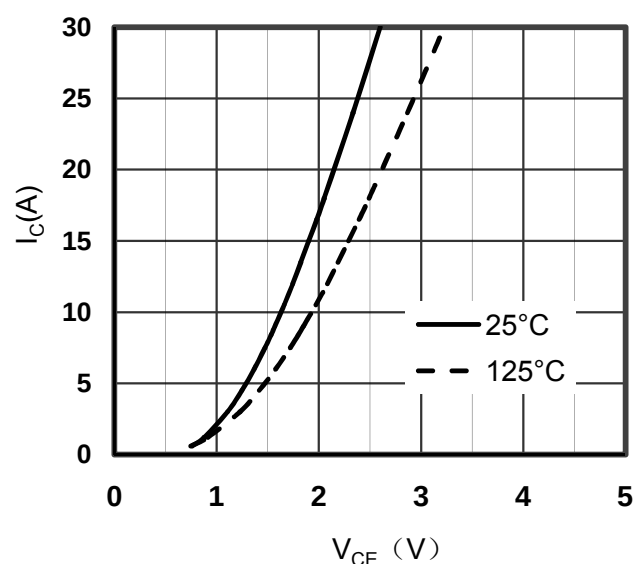


Figure12. Typical Output Characteristics IGBT- brake chopper

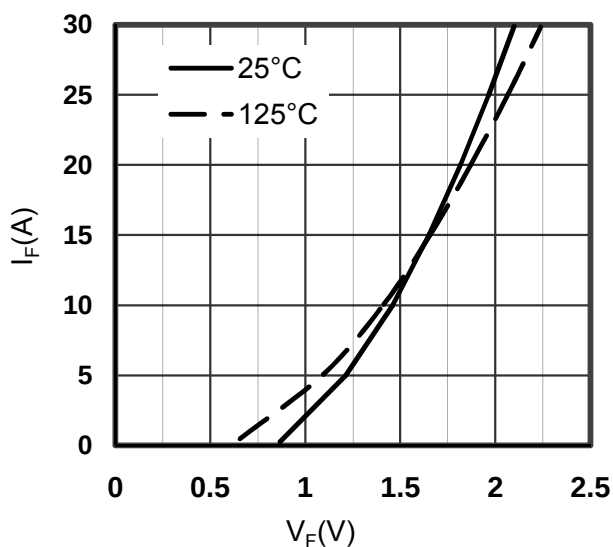


Figure13. Diode Forward Characteristics Diode - brake chopper

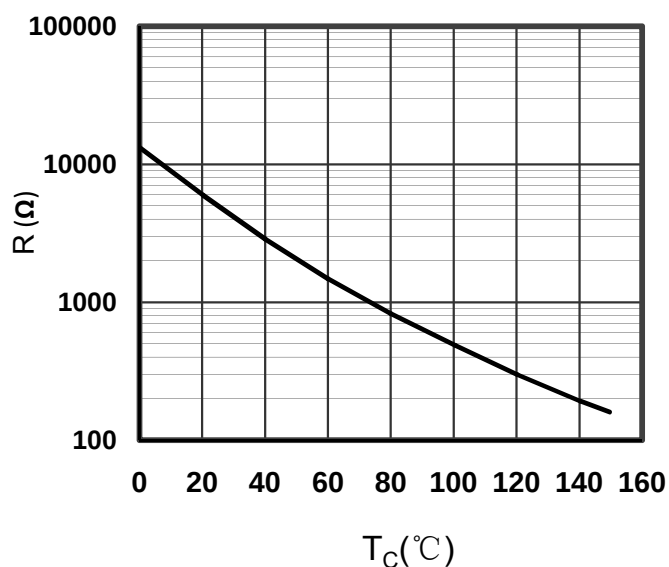


Figure14. NTC Characteristics

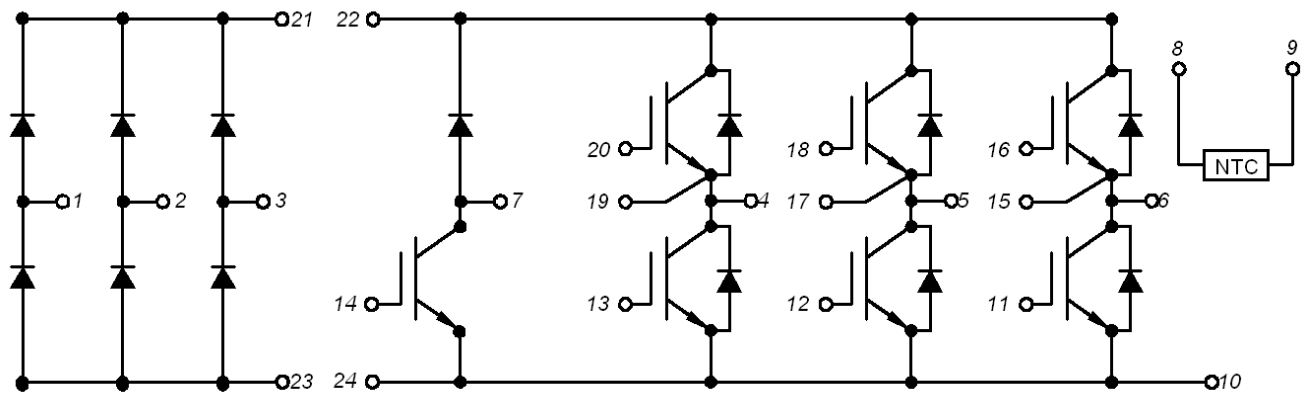
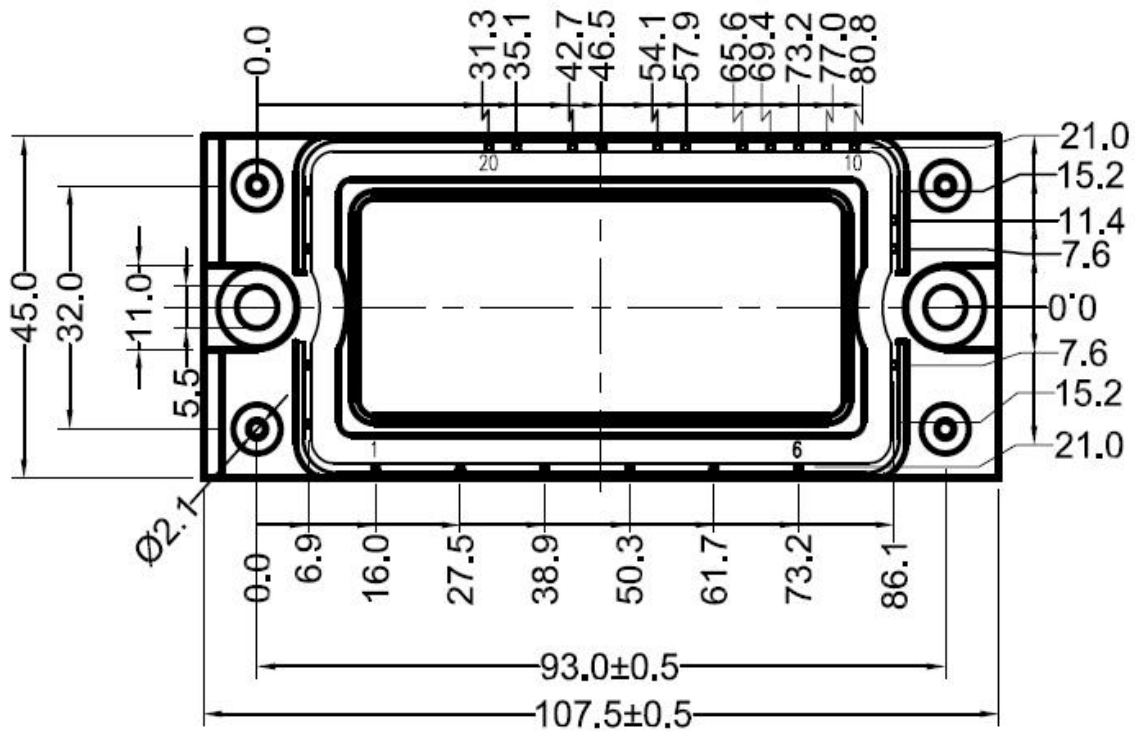
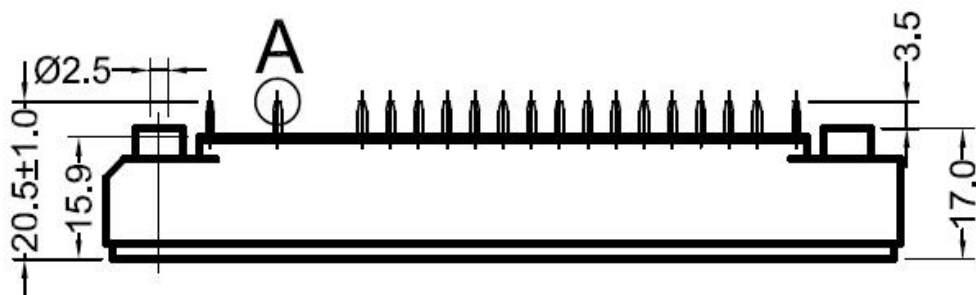


Figure15. Circuit Diagram



Dimensions in Millimeters
Figure16. Package Outline