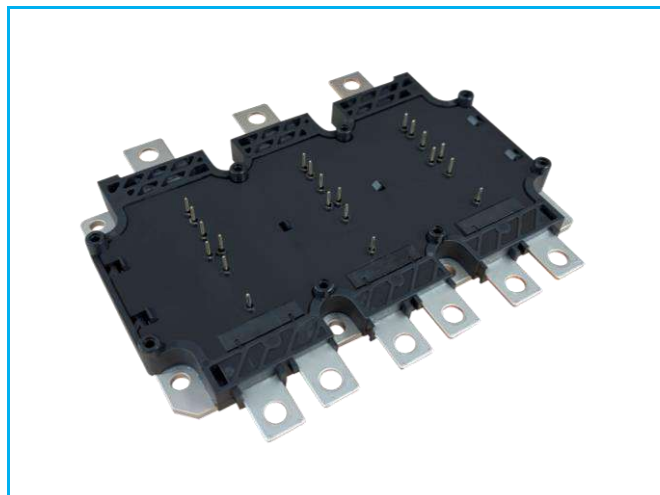


PRODUCT FEATURES

- ☐ 750V Field Stop Trench IGBT
- ☐ $V_{CE(sat)}$ with positive temperature coefficient
- ☐ Fast switching and short tail current
- ☐ Free wheeling diodes with fast and soft reverse recovery
- ☐ Max Junction Temperature 185°C
- ☐ Temperature sense included



APPLICATIONS

- ☐ Automotive applications
- ☐ Hybrid Electrical Vehicles (H)EV
- ☐ Motor Drives

IGBT-inverter

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_{vj}=25^{\circ}\text{C}$	750	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_F=60^{\circ}\text{C}$, $T_{vjmax}=185^{\circ}\text{C}$	270	A
I_{CM}	Repetitive Peak Collector Current	$tp=1\text{ms}$	900	
T_{vjmax}	Max. Junction Temperature		185	$^{\circ}\text{C}$
P_{tot}	Power Dissipation Per IGBT	$T_F=60^{\circ}\text{C}$, $T_{vjmax}=185^{\circ}\text{C}$	735	W

Diode-inverter

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

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_{vj}=25^{\circ}\text{C}$	750	V
$I_{F(AV)}$	Average Forward Current	$T_F=60^{\circ}\text{C}$, $T_{vjmax}=185^{\circ}\text{C}$	160	A
I_{FRM}	Repetitive Peak Forward Current	$tp=1\text{ms}$	900	
T_{vjmax}	Max. Junction Temperature		185	$^{\circ}\text{C}$

HCG770FT075H5T7L

IGBT-inverter

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

Symbol	Parameter/Test Conditions			Min.	Typ.	Max.	Unit
V _{GE(th)}	Gate Emitter Threshold Voltage	V _{CE} =V _{GE} , I _C =6mA			6.0		V
V _{CE(sat)}	Collector Emitter Saturation Voltage	I _C =500A, V _{GE} =15V, T _{vj} =25℃			1.2		
		I _C =500A, V _{GE} =15V, T _{vj} =125℃			1.24		
		I _C =500A, V _{GE} =15V, T _{vj} =175℃			1.26		
I _{CES}	Collector Leakage Current	V _{CE} =750V, V _{GE} =0V, T _{vj} =25℃				100	μA
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±20V, T _{vj} =25℃		-400		400	nA
R _{Gint}	Integrated Gate Resistor				1.6		Ω
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =100kHz			38.4		nF
C _{oes}	Output Capacitance				1.65		nF
C _{res}	Reverse Transfer Capacitance				0.227		nF
t _{d(on)}	Turn on Delay Time	V _{CC} =450V, I _C =500A R _{Gon} =1Ω, V _{GE} =-8...+15V, Inductive Load	T _{vj} =25℃		170		ns
			T _{vj} =175℃		180		ns
			T _{vj} =185℃		180		ns
t _r	Rise Time		T _{vj} =25℃		50		ns
			T _{vj} =175℃		55		ns
			T _{vj} =185℃		57		ns
E _{on}	Turn on Energy		T _{vj} =25℃		7.2		mJ
			T _{vj} =175℃		11.4		mJ
			T _{vj} =185℃		10.8		mJ
t _{d(off)}	Turn off Delay Time	V _{CC} =450V, I _C =500A R _{Goff} =3Ω, V _{GE} =-8...+15V, Inductive Load	T _{vj} =25℃		380		ns
			T _{vj} =175℃		410		ns
			T _{vj} =185℃		415		ns
t _f	Fall Time		T _{vj} =25℃		68		ns
			T _{vj} =175℃		110		ns
			T _{vj} =185℃		115		ns
E _{off}	Turn off Energy		T _{vj} =25℃		24.9		mJ
			T _{vj} =175℃		33.2		mJ
			T _{vj} =185℃		33.6		mJ
I _{SC}	Short Circuit Current	tpsc≤3μs , V _{GE} =15V T _{vj} =25℃, V _{CC} =450V			3340		A
I _{SC}	Short Circuit Current	tpsc≤3μs , V _{GE} =15V T _{vj} =175℃, V _{CC} =450V			3130		A
R _{thJF}	Junction to cooling fluid, ΔV/Δt = 10 dm³/min, T _F = 60℃					0.17	K /W

HCG770FT075H5T7L

Diode-inverter

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V _F	Forward Voltage	I _F =500A , V _{GE} =0V, T _{vj} =25°C		1.91		V
		I _F =500A , V _{GE} =0V, T _{vj} =125°C		1.84		
		I _F =500A , V _{GE} =0V, T _{vj} =175°C		1.78		
t _{rr}	Reverse Recovery Time	I _F =500A , V _R =450V dI _F /dt=-9000A/μs T _{vj} =25°C		88		ns
I _{RRM}	Max. Reverse Recovery Current			222		A
Q _{RR}	Reverse Recovery Charge			12.5		μC
E _{rec}	Reverse Recovery Energy			2.9		mJ
t _{rr}	Reverse Recovery Time	I _F =500A , V _R =450V dI _F /dt=-9100A/μs T _{vj} =175°C		190		ns
I _{RRM}	Max. Reverse Recovery Current			335		A
Q _{RR}	Reverse Recovery Charge			32		μC
E _{rec}	Reverse Recovery Energy			9.9		mJ
t _{rr}	Reverse Recovery Time	I _F =500A , V _R =450V dI _F /dt=-8300A/μs T _{vj} =185°C		230		ns
I _{RRM}	Max. Reverse Recovery Current			320		A
Q _{RR}	Reverse Recovery Charge			39		μC
E _{rec}	Reverse Recovery Energy			10.9		mJ
R _{thJF}	Junction to cooling fluid, ΔV/Δt = 10 dm³/min, T _F = 60°C				0.27	K /W

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

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
R_{25}	Resistance	$T_F = 25^{\circ}\text{C}$		5		k Ω
$B_{25/50}$	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298.15 \text{ K}))]$			3375		K

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

Symbol	Parameter/Test Conditions		Values	Unit
T_{vjop}	Operating Temperature		-40~185	$^{\circ}\text{C}$
T_{stg}	Storage Temperature		-40~125	
L_{sCE}	Stray Inductance Module		6.5	nH
$R_{CC'+EE'}$	Module Lead Resistance, terminals - chip	$T_F=25^{\circ}\text{C}$, per switch	0.7	m Ω
V_{isol}	Isolation Breakdown Voltage	RMS, $f = 0 \text{ Hz}$, $t = 5 \text{ sec}$	3500	V
CTI	Comparative Tracking Index		> 200	
Torque	baseplate to heatsink	Recommended (M4)	1.8~2.2	Nm
	PCB to frame	Recommended (M3)	0.4~0.6	Nm
Weight			775	g

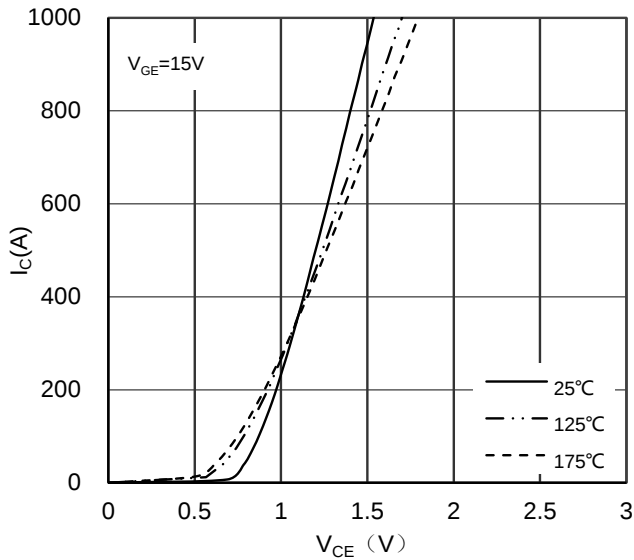


Figure 1. Typical Output Characteristics IGBT-inverter

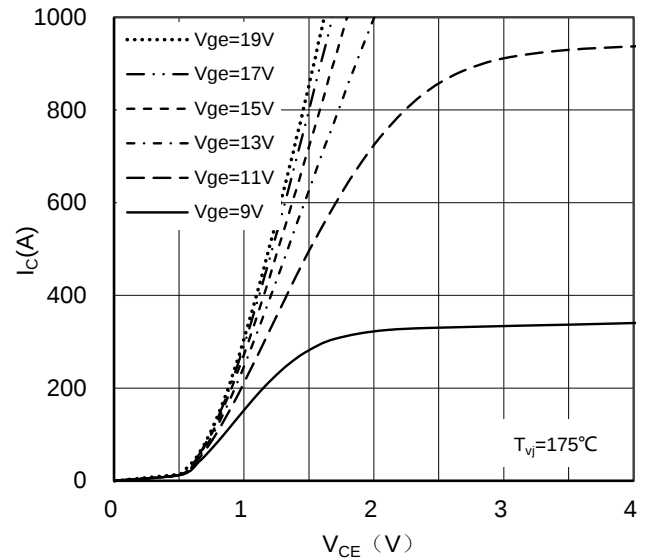


Figure 2. Typical Output Characteristics IGBT-inverter

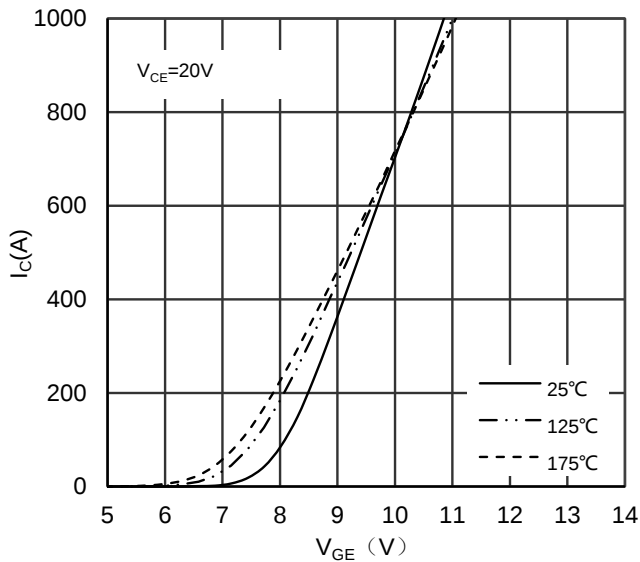


Figure 3. Typical Transfer characteristics IGBT-inverter

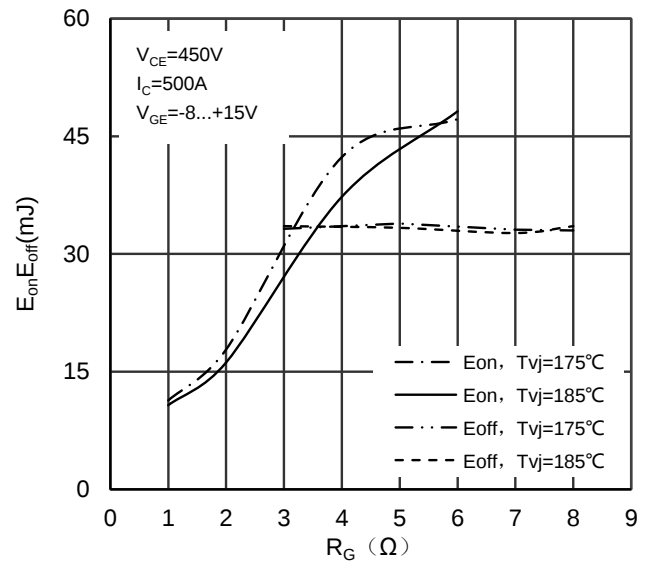


Figure 4. Switching Energy vs Gate Resistor IGBT-inverter

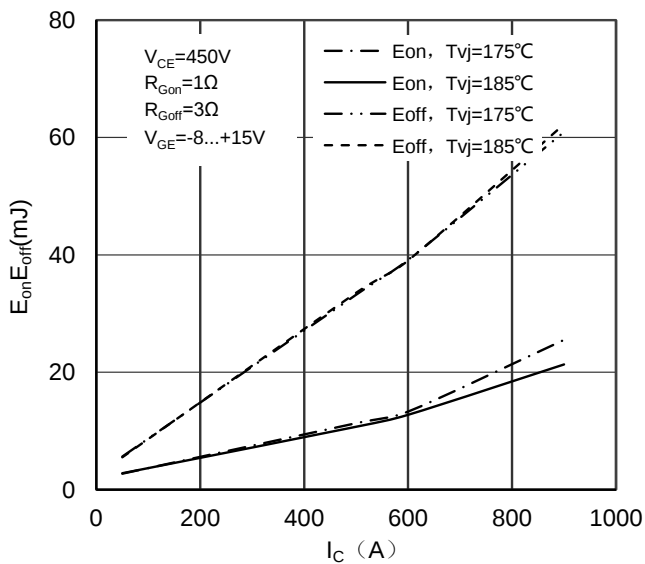


Figure 5. Switching Energy vs Collector Current IGBT-inverter

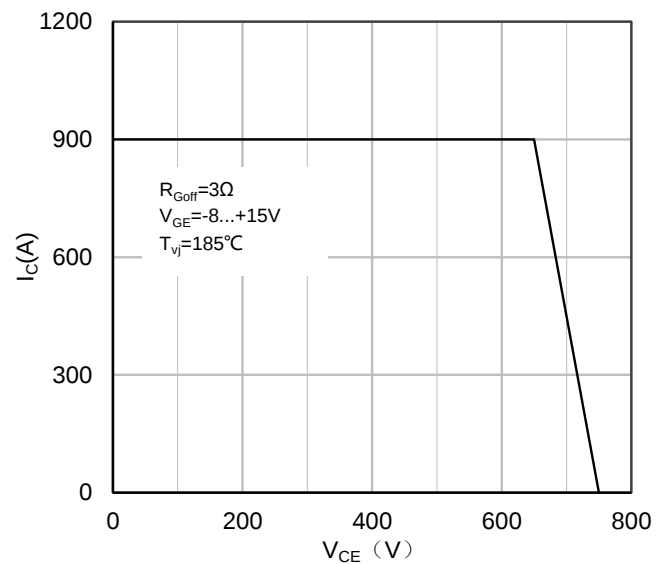


Figure 6. Reverse Biased Safe Operating Area IGBT-inverter

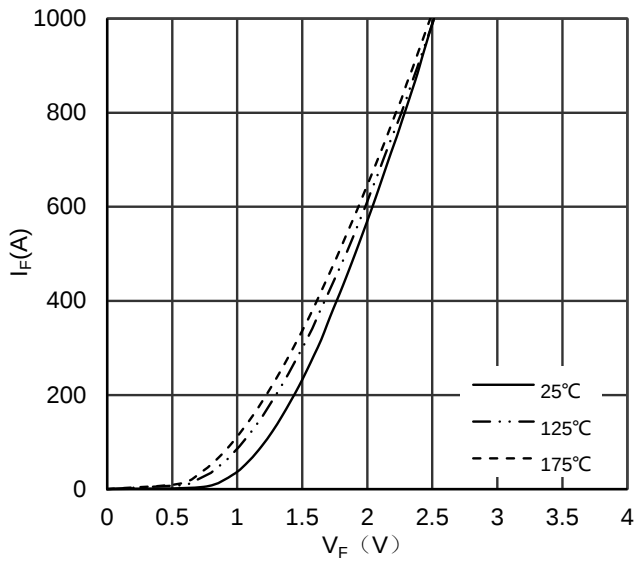


Figure 7. Diode Forward Characteristics Diode-inverter

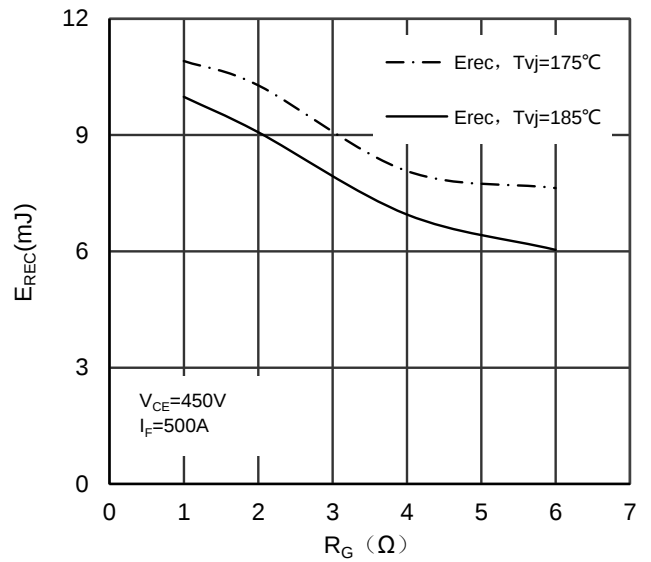


Figure 8. Switching Energy vs Gate Resistor Diode-inverter

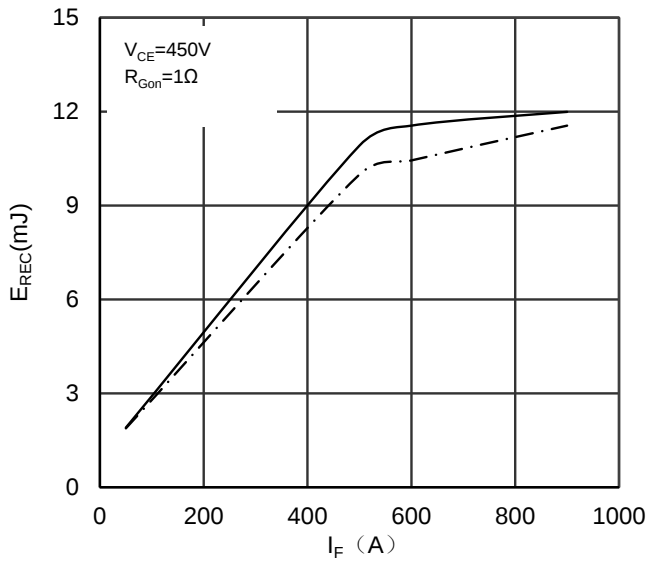


Figure 9. Switching Energy vs Forward Current Diode-inverter

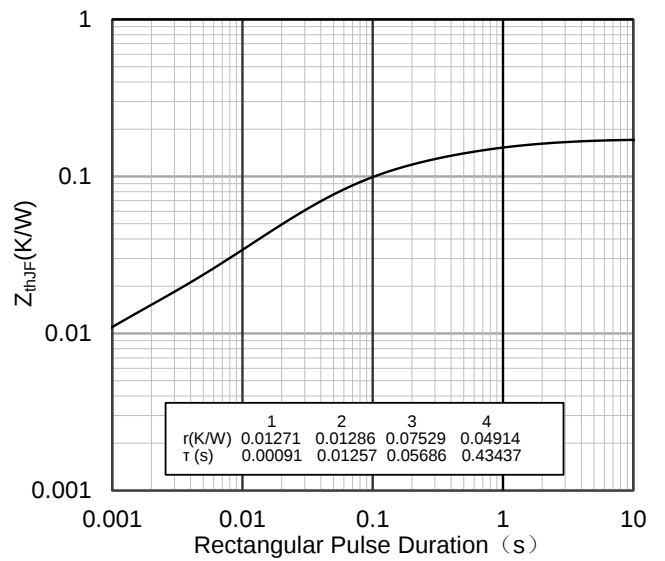


Figure 10. Transient Thermal Impedance of IGBT-inverter

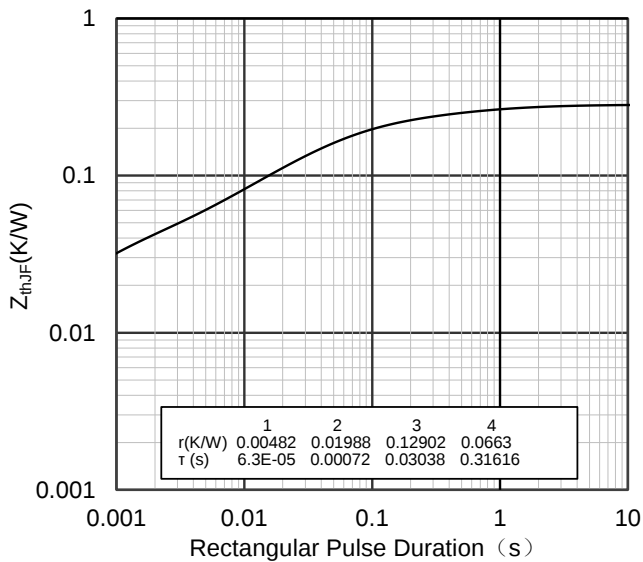


Figure 11. Transient Thermal Impedance of Diode-inverter

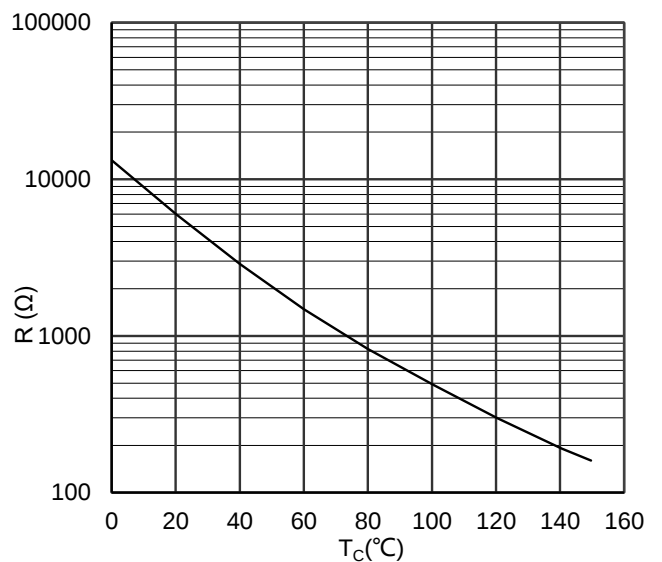


Figure 12. NTC Characteristics

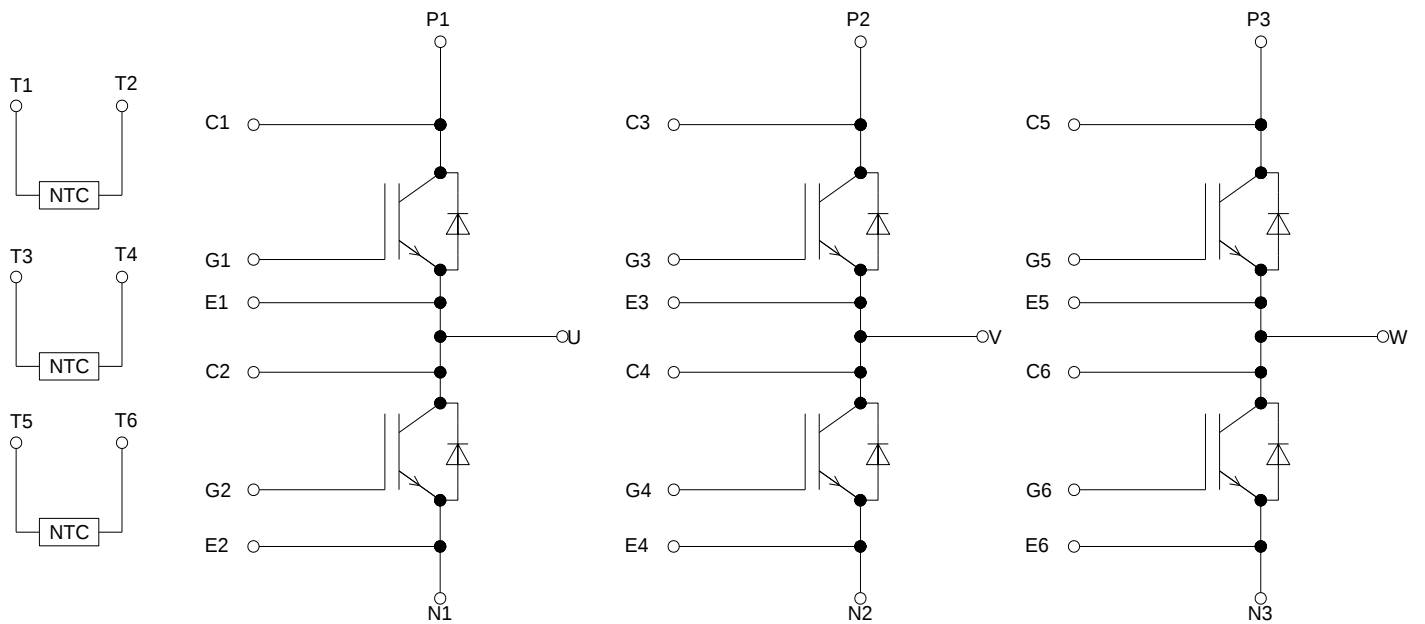


Figure 13. Circuit Diagram

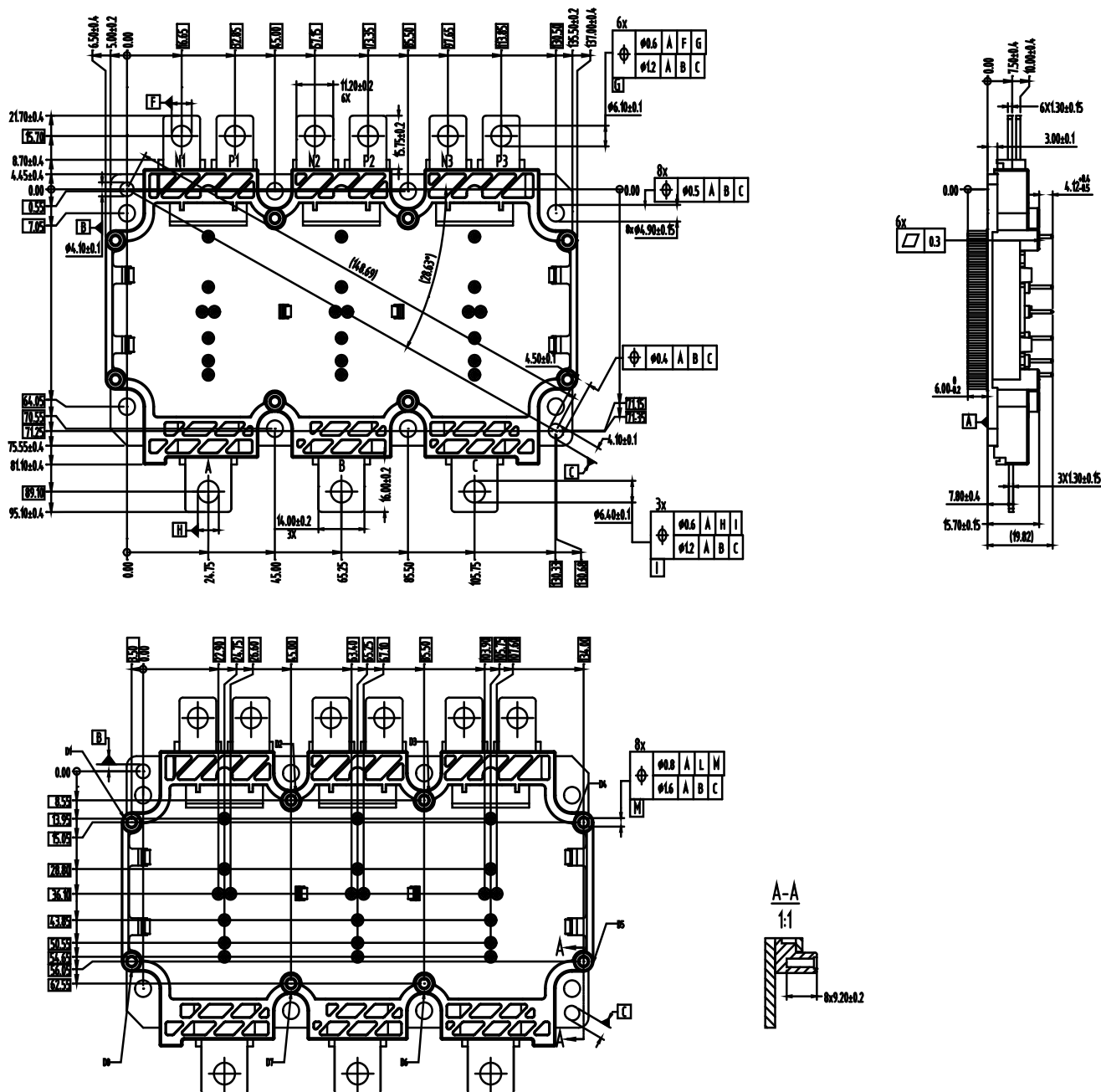


Figure 14. Package Outline