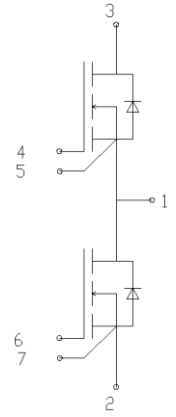


General Description

The H&M-62mm module incorporates H&M 's 1200V Gen3 N-channel SiC MOSFET.

Features

- Industry Standard 62mm Footprint
- Ultra Low Loss, High-Frequency Operation
- Zero Reverse Recovery from Diodes
- Zero Turn-off Tail Current from MOSFET
- Normally-off, Fail-Safe Device Operation
- Copper Baseplate and Silicon Nitride Insulator



Applications

- High Frequency Switching Application
- DC/DC Converter
- Solar and Wind Inverters
- UPS and SMPS
- Traction

Ordering Information

Order Number / Marking	HMSMQ500HF12M62
Package Type	62mm

Key Parameters

Symbol	Parameter	Values			Unit	Test Conditions
Absolute maximum rating						
V_{DS}	Drain-Source Voltage	1200			V	$T_C=25^\circ\text{C}$
I_D	Drain Current (continuous)	500			A	$T_C=25^\circ\text{C}$
T_J	Junction Temperature	175			$^\circ\text{C}$	
Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
Static characteristics						
$R_{DS(on)}$	Static Drain-Source on Resistance	-	3.2	4.4	m Ω	$V_{GS}=18\text{V}; I_D=250\text{A}; T_J=25^\circ\text{C}$
Dynamic characteristics						
Q_G	Total Gate Charge	-	1190	-	nC	$V_{DS}=800\text{V}; V_{GS}=-5/+18\text{V}; I_D=250\text{A}; T_C=25^\circ\text{C}$
Q_{GD}	Gate-Drain Charge	-	391	-		
Source-drain diode						
Q_{RR}	Reverse Recovery Charge	-	3065	-	nC	$V_{GS}=-5/+18\text{V}; I_F=300\text{A}; V_R=900\text{V}; \text{Load}=100\mu\text{H}; T_J=25^\circ\text{C}$

Absolute Maximum Ratings (at $T_c=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	1200	V
V_{GS}	Gate-Source Voltage (dynamic)	-10/+22	V
I_D	Drain Current (continuous) ($T_c=25^\circ\text{C}$)	500	A
I_{DM}	Drain Current (pulsed)	1000	A
$T_{op}; T_{stg}$	Operating and Storage Temperature Range	-40 to +150	$^\circ\text{C}$
T_J	Junction Temperature	175	$^\circ\text{C}$
R_{thJh}	Thermal Resistance, Junction-to-Heatsink	0.12	$^\circ\text{C}/\text{W}$

MOSFET Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
Static characteristics (at $T_c=25^\circ\text{C}$ unless otherwise specified)						
BV_{DS}	Drain-Source Breakdown Voltage	1200	-	-	V	$V_{GS}=0\text{V}$
I_{DSS}	Zero Gate Voltage Drain Current	-	-	50	μA	$V_{DS}=1200\text{V}; V_{GS}=0\text{V}$
I_{GSS}	Gate-Body Leakage Current	-	-	2.5	μA	$V_{GS}=-10/20\text{V}; V_{DS}=0\text{V}$
$V_{GS(th)}$	Gate Threshold Voltage	2.0	-	4.0	V	$V_{DS}=V_{GS}; I_D=50\text{mA}$
$R_{DS(on)}$	Static Drain-Source on Resistance	-	3.2	4.4	$\text{m}\Omega$	$V_{GS}=18\text{V}; I_D=250\text{A}$
$V_{GS(on)}$	Recommended Turn-on Voltage	-	18	-	V	Static
$V_{GS(off)}$	Recommended Turn-off Voltage	-	-5	-		
R_G	Gate Resistance	-	0.64	-	Ω	$V_{GS}=0\text{V}; f=1\text{MHz}$
Dynamic characteristics (at $T_c=25^\circ\text{C}$ unless otherwise specified)						
C_{iss}	Input Capacitance	-	34.4	-	nF	$V_{DS}=1000\text{V}; f=100\text{KHz}; V_{AC}=25\text{mV}$
C_{oss}	Output Capacitance	-	1.4	-		
C_{riss}	Reverse Transfer Capacitance	-	65	-		
E_{on}	Turn-on Switching Energy	-	25.7	-	mJ	$V_{DS}=900\text{V}; V_{GS}=-5/+18\text{V}; I_D=300\text{A}; R_{G(ext)}=5.0\Omega; \text{Load}=100\mu\text{H}$
E_{off}	Turn-off Switching Energy	-	15.8	-		
Q_{GS}	Gate-Source Charge	-	383	-	nC	$V_{DS}=800\text{V}; V_{GS}=-5/+18\text{V}; I_D=250\text{A}$
Q_{GD}	Gate-Drain Charge	-	391	-		
Q_G	Total Gate Charge	-	1190	-		
$t_{d(on)}$	Turn-on Delay Time	-	105	-	ns	$V_{DS}=900\text{V}; V_{GS}=-5/+18\text{V}; I_D=300\text{A}; R_{G(ext)}=5.0\Omega; \text{Load}=100\mu\text{H}$
t_r	Rise Time	-	82	-		
$t_{d(off)}$	Turn-off Delay Time	-	343	-		
t_f	Fall Time	-	62	-		

Diode Characteristics (at $T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{FSD}	Forward Voltage	-	-	6	V	$V_{GS}=0\text{V}; I_F=250\text{A}$
I_S	Continuous Diode Forward Current	-	250	-	A	$V_{GS}=0\text{V}; T_C=25^\circ\text{C}$
t_{RR}	Reverse Recovery Time	-	41	-	ns	$V_{GS}=-5/+18\text{V}; I_F=300\text{A}; V_R=900\text{V};$ Load=100 μH
Q_{RR}	Reverse Recovery Charge	-	3065	-	nC	
I_{RRM}	Peak Reverse Recovery Current	-	77	-	A	

Module Physical Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
L_{Stray}	Stray Inductance	-	20	-	nH	
W	Weight	-	340	-	g	
M_s	Mounting Torque	4.0	-	5.5	Nm	M6-1.0 Bolts
V_{isol}	Case Isolation Voltage	4.2	-	-	kV	DC; $t=1\text{min}$
-	Clearance Distance	-	11	-	mm	Terminal to Terminal
		-	23	-	mm	Terminal to Baseplate
-	Creepage Distance	-	23	-	mm	Terminal to Terminal
		-	29	-	mm	Terminal to Baseplate

Typical Performance

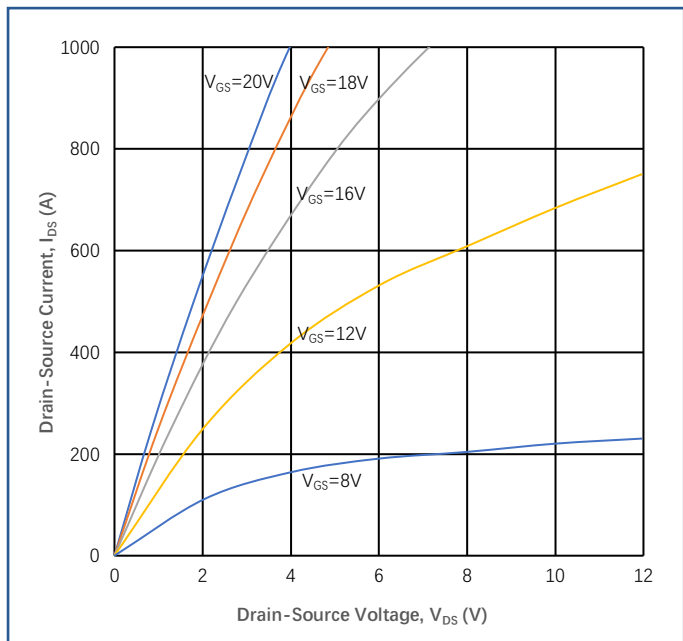


Figure 1
Output Characteristics ($T_j=25\text{ }^\circ\text{C}$)

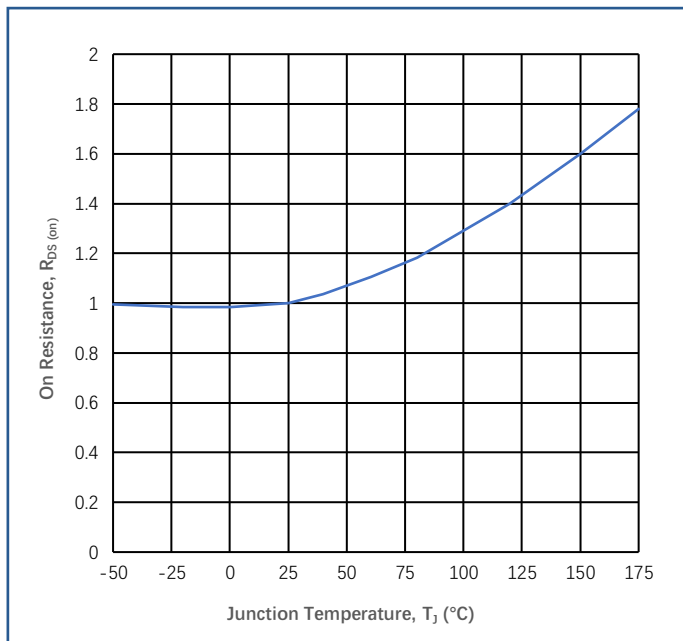


Figure 2
Normalized On-Resistance vs. T_j

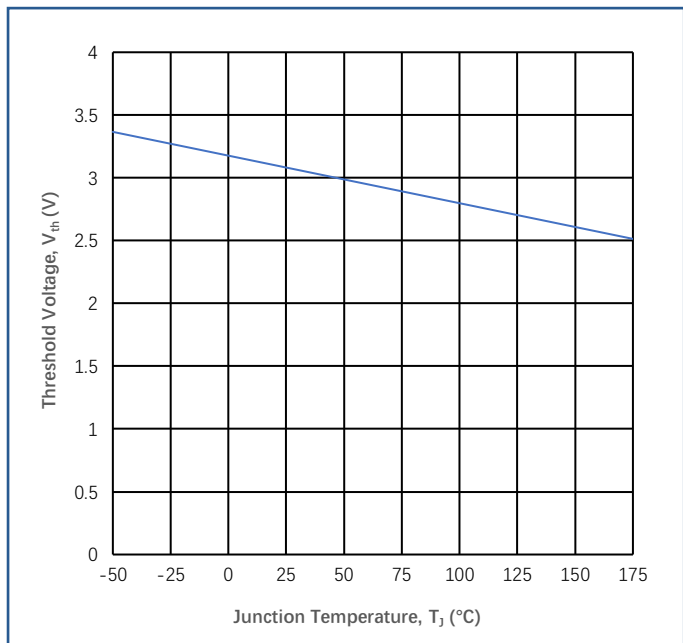


Figure 3
Threshold Voltage vs. Temperature

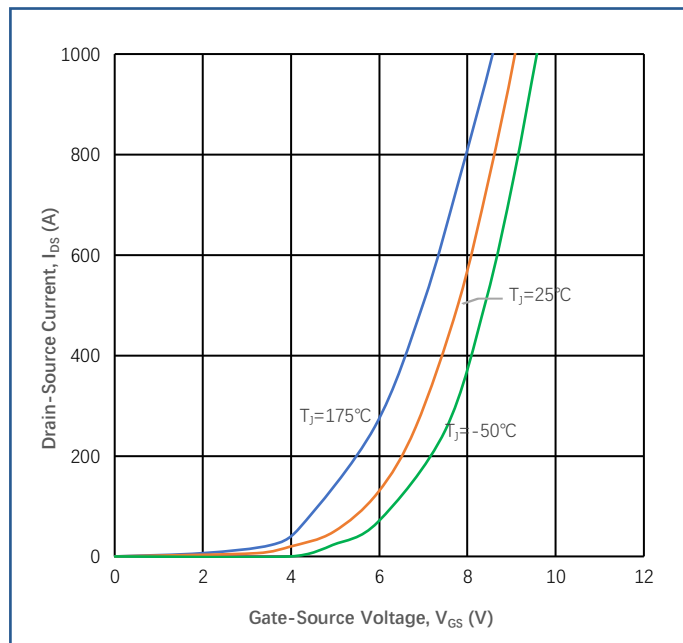


Figure 4
Transfer Characteristic for Various T_j

Typical Performance

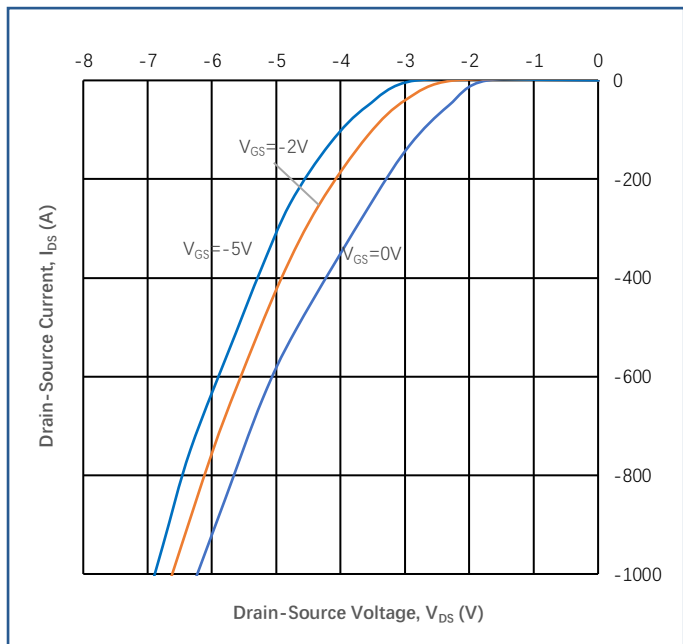


Figure 5
Body Diode Characteristic at 25°C

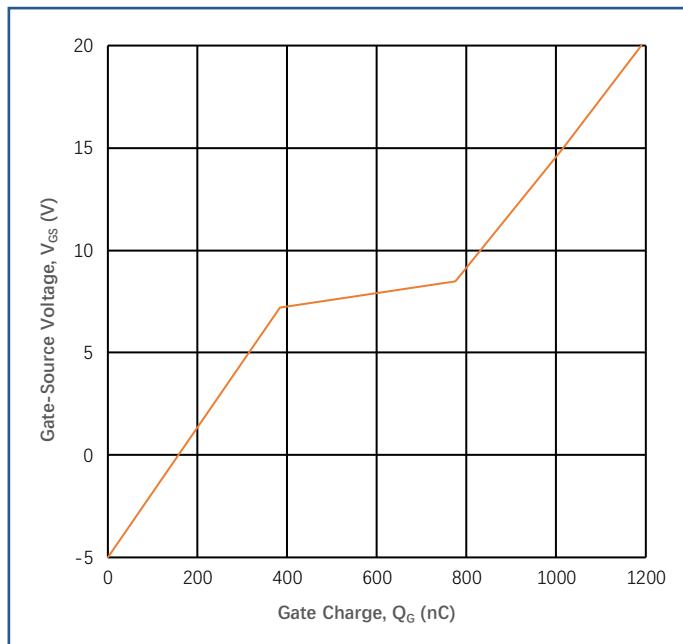


Figure 6
Typical Gate Charge Characteristics

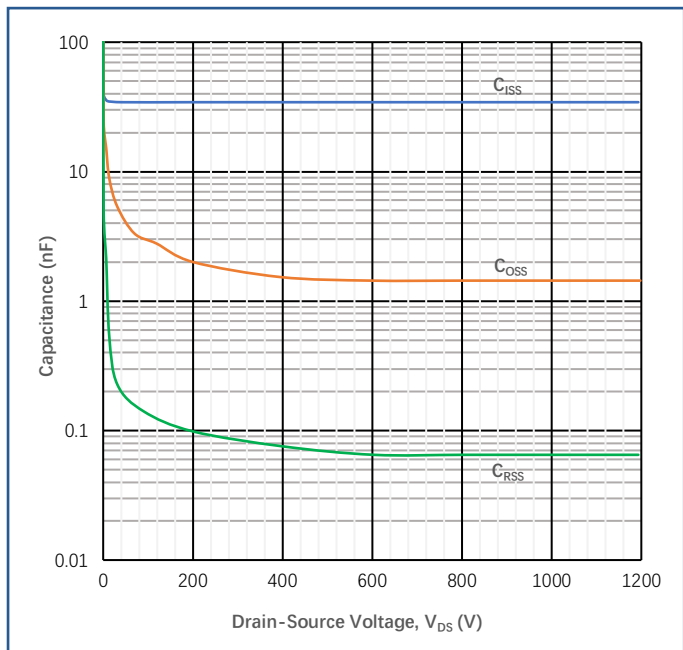


Figure 7
Typical Capacitances vs. Drain-Source Voltage

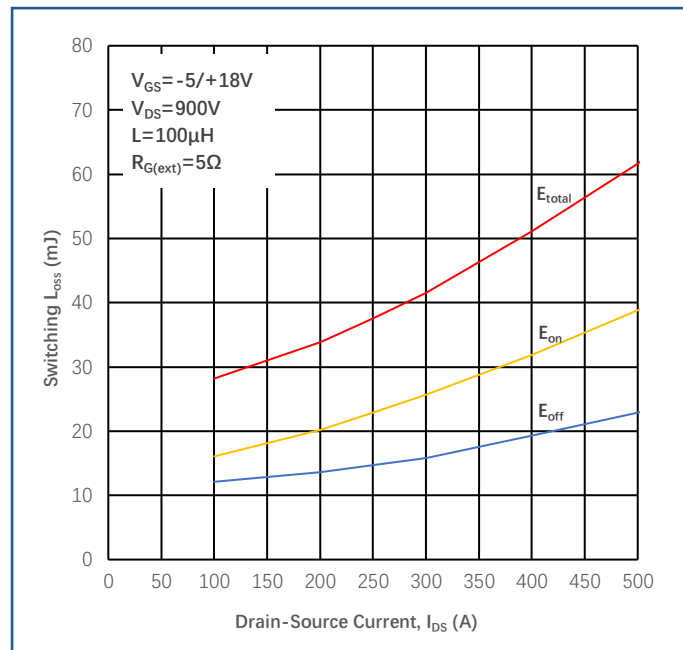


Figure 8
Inductive Switching Energy vs. Drain Current

Typical Performance

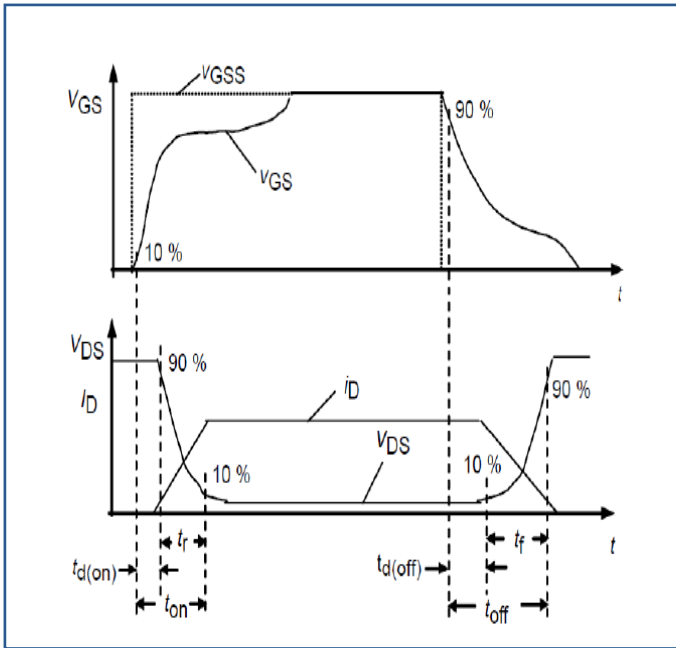


Figure 9
Switching Time Description

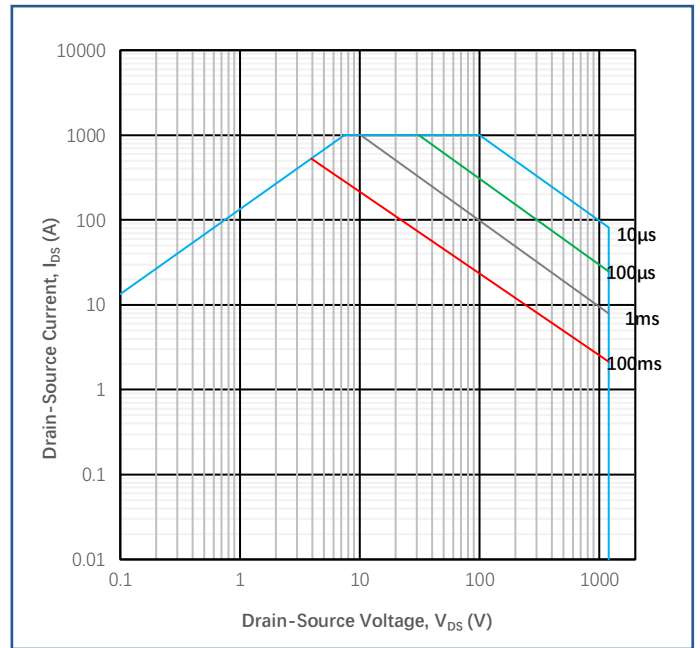
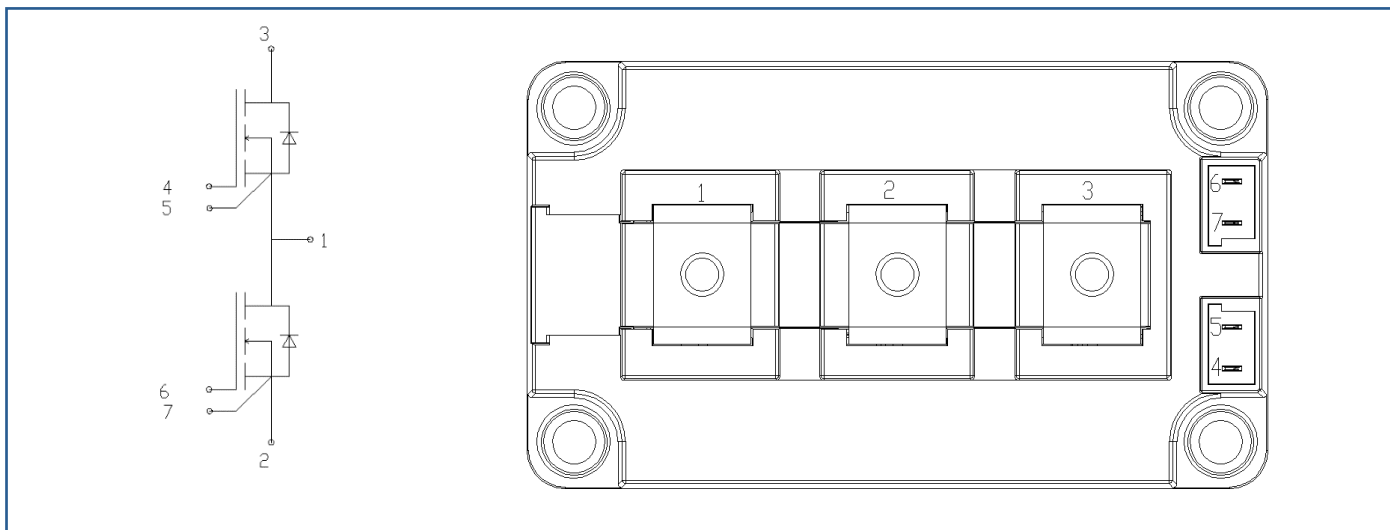
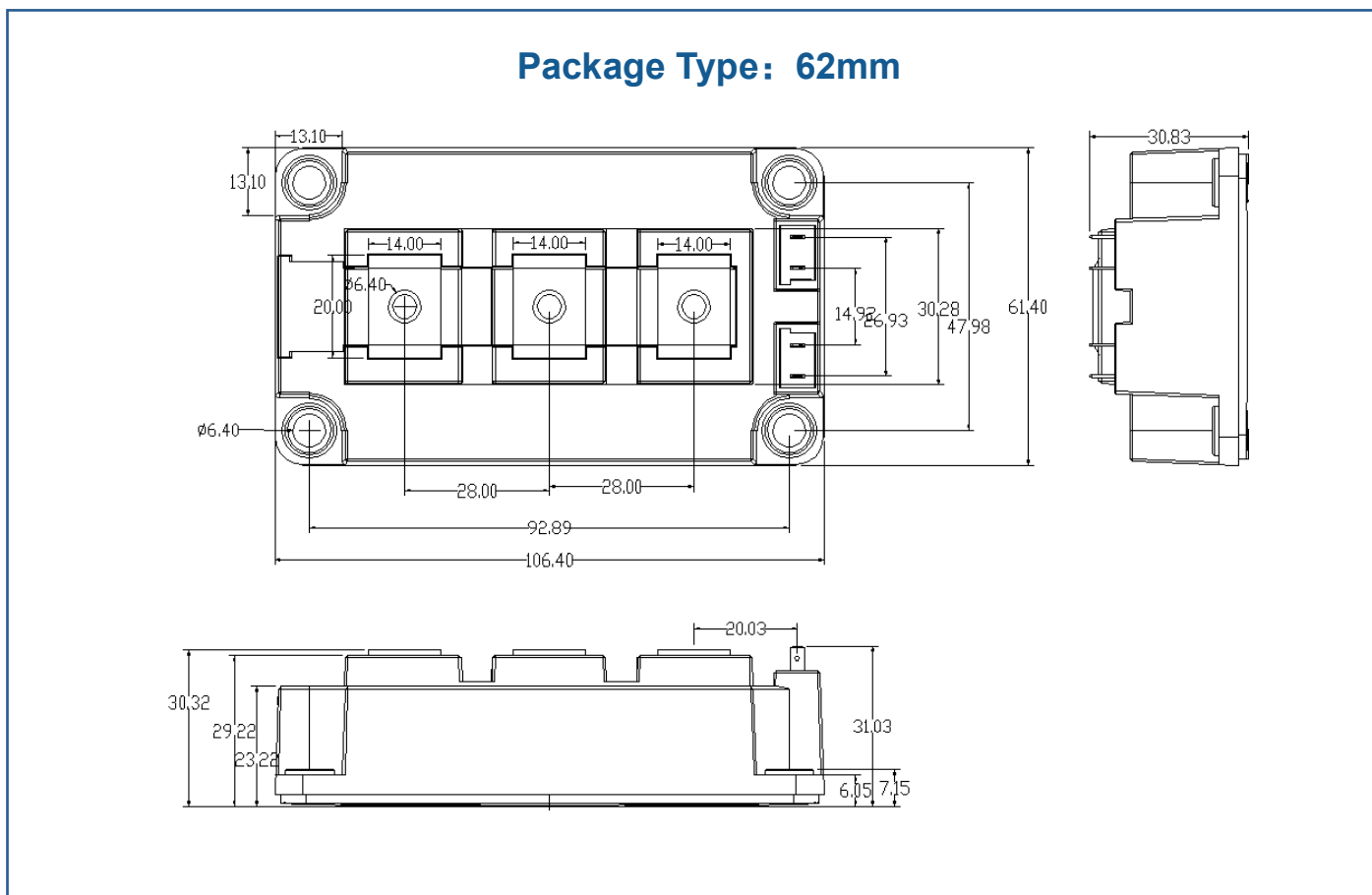


Figure 10
Safe Operating Area

Circuit Diagram Headline



Package Dimensions (mm)



未标注线性公差按 GB/1804-2000c 级执行	公差分段	0.5-3	3-6	6-30	30-120	120-400
	c 级	±0.2	±0.3	±0.5	±0.8	±1.2