

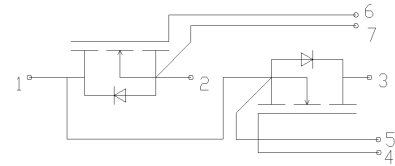
General Description

The H&M -34mm module incorporates H&M 's 1200V Gen3 N-channel SiC MOSFET.



Features

- High Current Density
- Low Inductive Design
- Low Switching Losses
- High-Frequency Operation
- Zero Turn-off Tail Current from MOSFET
- Normally-off, Fail-Safe Device Operation
- Copper Baseplate and ZTA Internal Isolation



Applications

- High Power Converters
- Motor Drives
- UPS Systems

Ordering Informations

Order Number / Marking	HMSMQ235HF12M34
Package Type	34mm

Key Parameters

Symbol	Parameter	Values			Unit	Test Conditions
Absolute maximum rating						
V_{DS}	Drain-Source Voltage	1200			V	$T_C=25^{\circ}C$
I_D	Drain Current (continuous)	235			A	$T_C=25^{\circ}C$
		160				$T_C=90^{\circ}C$
T_J	Junction Temperature	175			$^{\circ}C$	
Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
Static characteristics						
$R_{DS(on)}$	Static Drain-Source on Resistance	-	9	11	m Ω	$V_{GS}=18V; I_D=160A; T_{VJ}=25^{\circ}C$
		-	16.2	-		$V_{GS}=18V; I_D=160A; T_{VJ}=175^{\circ}C$
Dynamic characteristics						
Q_G	Total Gate Charge	-	625	-	nC	$V_{DD}=800V; V_{GS}=-5/+18V; I_D=100A; T_C=25^{\circ}C$
Q_{GD}	Gate-Drain Charge	-	165	-		
Source-drain diode						
Q_{RR}	Reverse Recovery Charge	-	3560	-	nC	$V_{GS}=-5/+18V; I_F=200A; V_R=600V; T_C=25^{\circ}C$

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	1200	V
V_{GS}	Gate-Source Voltage	-10/+22	V
I_D	Drain Current (continuous) ($T_c=25^\circ\text{C}$)	235	A
	Drain Current (continuous) ($T_c=90^\circ\text{C}$)	160	
I_{DM}	Drain Current (pulsed)	500	A
$T_{op}; T_{stg}$	Operating and Storage Temperature Range	-40 to +150	$^\circ\text{C}$
T_J	Junction Temperature	175	$^\circ\text{C}$
L_{Stray}	Stray Inductance	30	nH
V_{isol}	Isolation Test Voltage (f=50Hz; t=1min)	3.0	kV
M	Terminal Connection Torque (M5)	2.5 - 5.0	Nm
G	Weight	160	g
$R_{th Jh}$	Thermal Resistance, Junction-to-Heatsink	0.14	$^\circ\text{C}/\text{W}$

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	-	10	500	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	-	4	V	$V_{DS}=V_{GS}; I_D=50\text{mA}$
$R_{DS(on)}$	Static Drain-Source on Resistance	-	9	11	m Ω	$V_{GS}=18\text{V}; I_D=150\text{A}; T_{vj}=25^\circ\text{C}$
		-	16.2	-		$V_{GS}=18\text{V}; I_D=150\text{A}; T_{vj}=175^\circ\text{C}$
$V_{GS(on)}$	Recommended Turn-on Voltage	-	18	-	V	Static
$V_{GS(off)}$	Recommended Turn-off Voltage	-	-5	-	V	
R_G	Gate Resistance	-	1.1	-	Ω	$V_{GS}=0; f=1\text{MHz}$
Dynamic characteristics (at $T_c=25^\circ\text{C}$ unless otherwise specified)						
C_{iss}	Input Capacitance	-	12.8	-	nF	$V_{DS}=1000\text{V}; f=1\text{MHz}; V_{Ac}=25\text{mV}$
C_{oss}	Output Capacitance	-	0.55	-		
C_{riss}	Reverse Transfer Capacitance	-	20	-	pF	
E_{on}	Turn-on Energy	-	9.6	-	mJ	$V_{DD}=600\text{V}; V_{GS}=-5/+18\text{V}; I_D=200\text{A}; R_{G(ext)}=5\Omega; \text{Load}=100\mu\text{H}$
E_{off}	Turn-off Energy	-	1.0	-		
Q_{GS}	Gate-Source Charge	-	160	-	nC	$V_{DD}=800\text{V}; V_{GS}=-5/+18\text{V}; I_D=100\text{A}$
Q_{GD}	Gate-Drain Charge	-	165	-		
Q_G	Total Gate Charge	-	625	-		
$t_{d(on)}$	Turn-on Delay Time	-	92	-	ns	$V_{DD}=600\text{V}; V_{GS}=-5/+18\text{V}; I_D=200\text{A}; R_{G(ext)}=5\Omega; \text{Load}=100\mu\text{H}$
t_r	Rise Time	-	71	-		
$t_{d(off)}$	Turn-off Delay Time	-	227	-		
t_f	Fall Time	-	58	-		

Body 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	$V_{GS}=0V$; $I_F=160A$
I_S	Continuous Diode Forward Current	-	150	-	A	$V_{GS}=0V$; $T_C=25^\circ\text{C}$
t_{RR}	Reverse Recovery Time	-	39	-	ns	$V_{GS}=-5/+18V$; $I_F=200A$; $V_R=600V$
Q_{RR}	Reverse Recovery Charge	-	3560	-	nC	
I_{RRM}	Peak Reverse Recovery Current	-	50	-	A	

Typical Performance

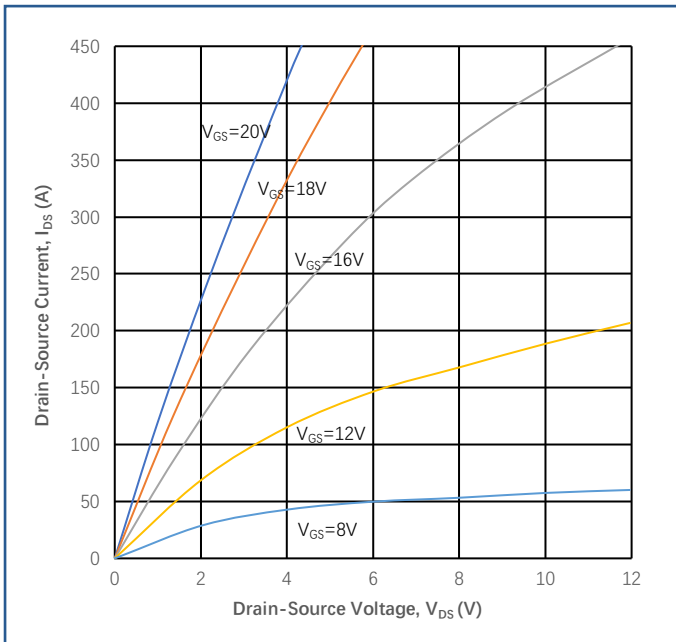


Figure 1
Output Characteristics ($T_j=25^\circ\text{C}$)

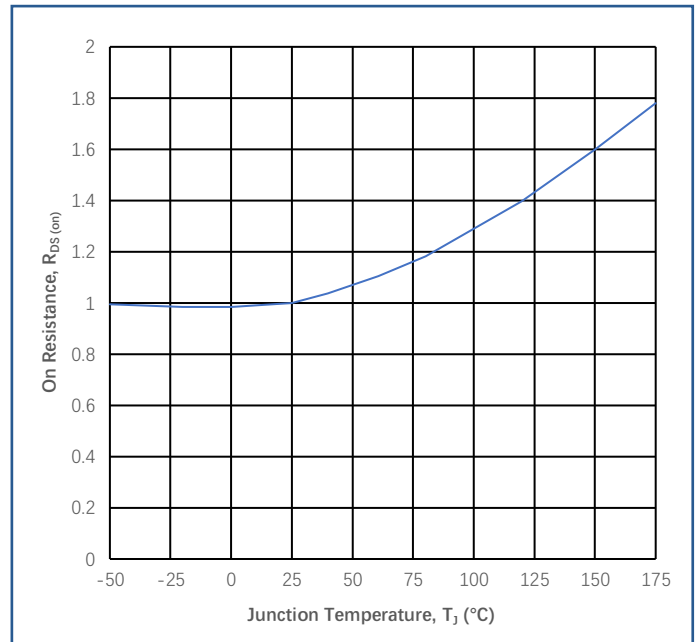


Figure 2
Normalized On-Resistance vs. T_j

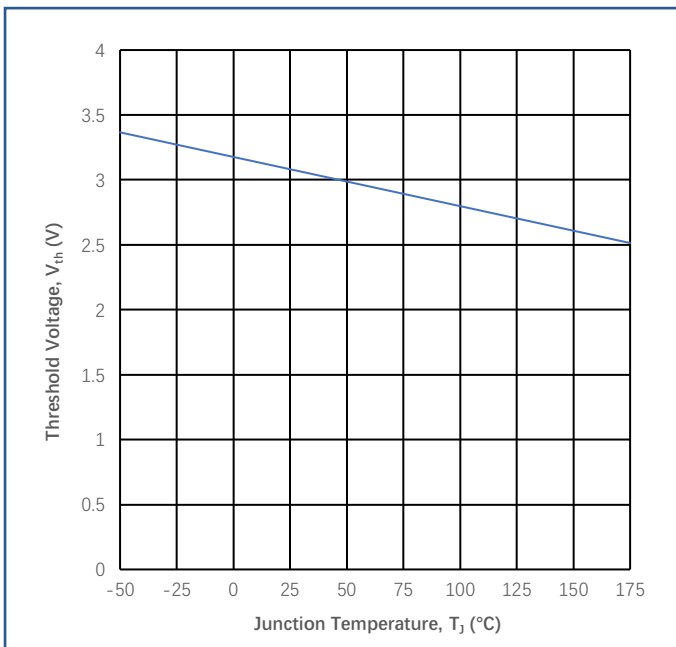


Figure 3
Threshold Voltage vs. Temperature

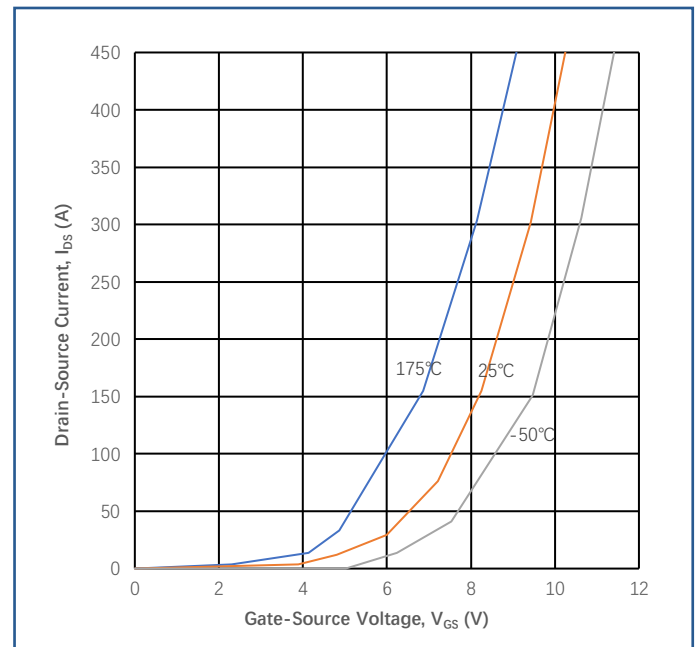


Figure 4
Transfer Characteristic for Various T_j

Typical Performance

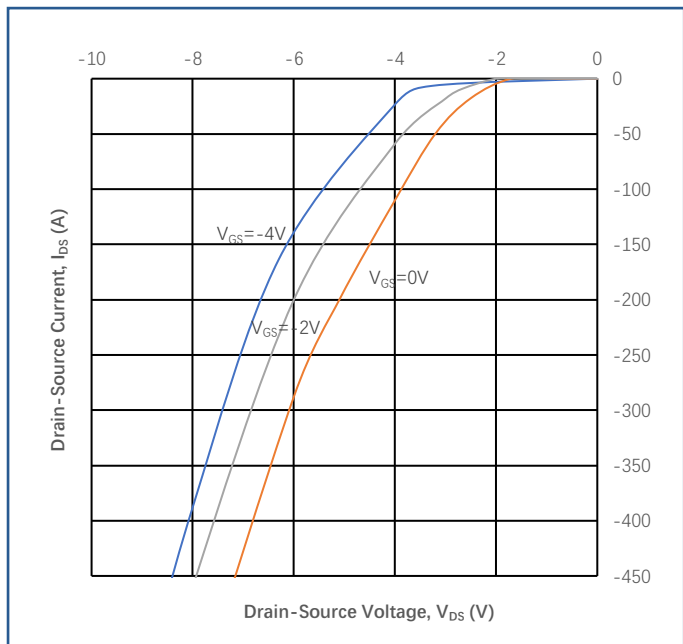


Figure 5
Body Diode Characteristic at 25°C

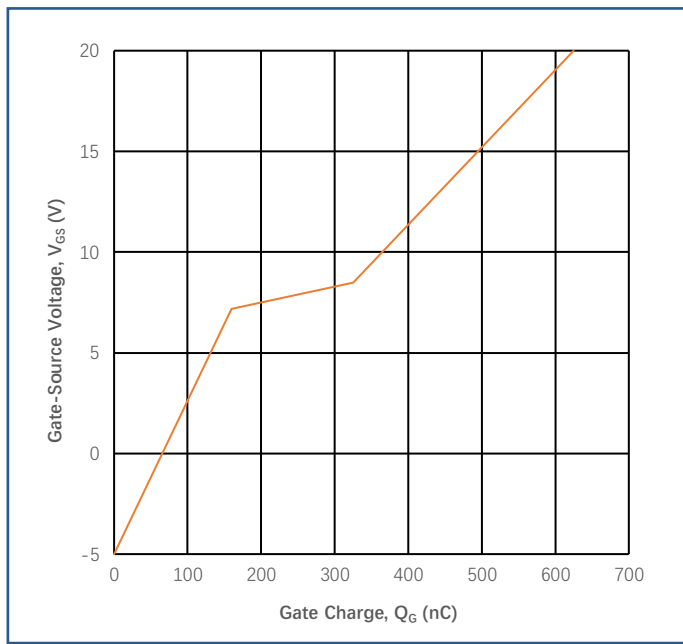


Figure 6
Typical Gate Charge Characteristics

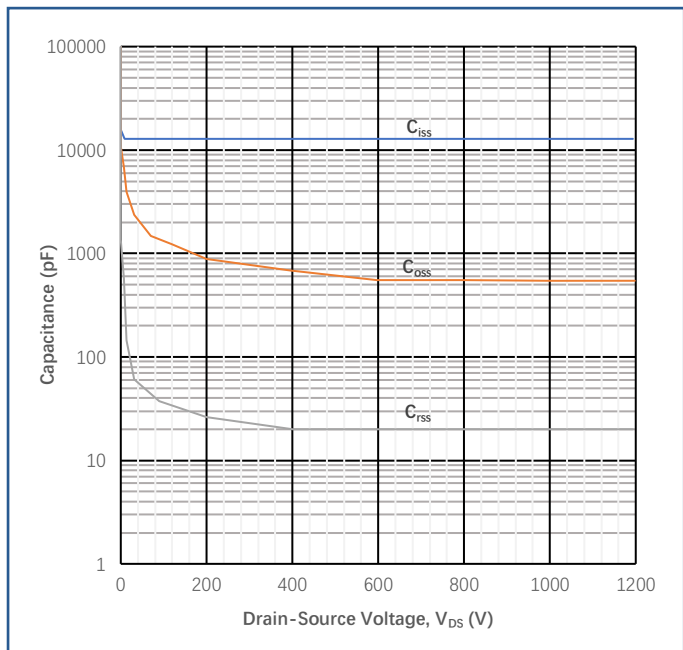


Figure 7
Typical Capacitances vs. V_{DS}

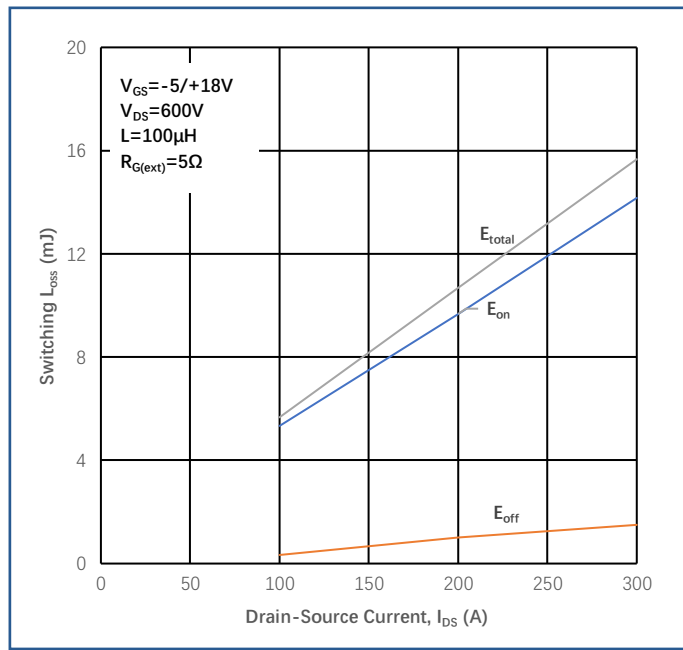


Figure 8
Inductive Switching Energy vs. Drain Current

Typical Performance

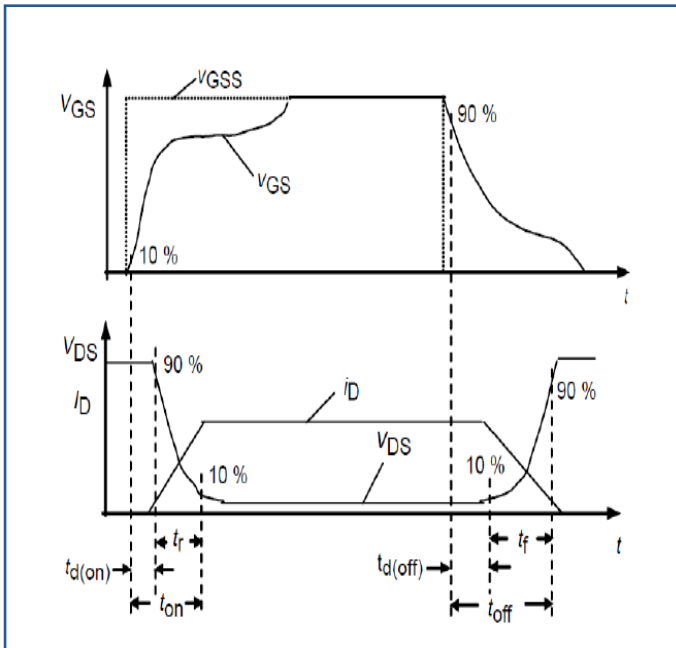


Figure 9
Switching Time Description

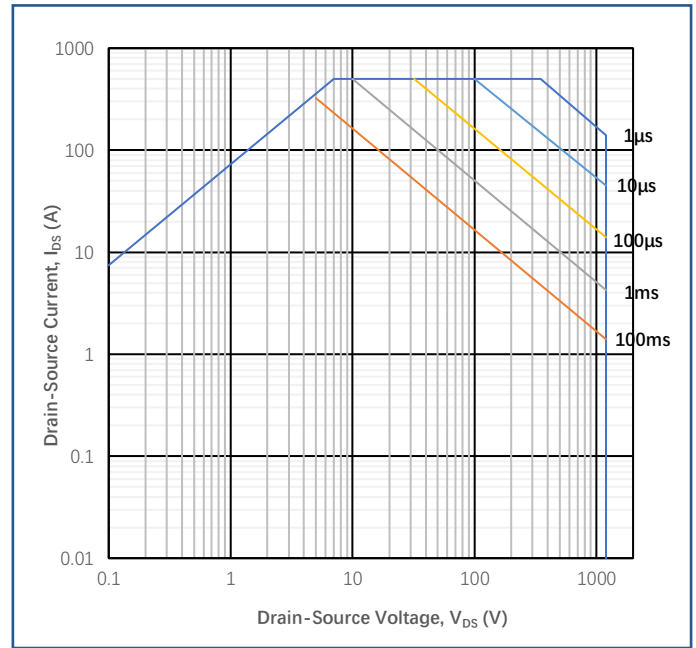
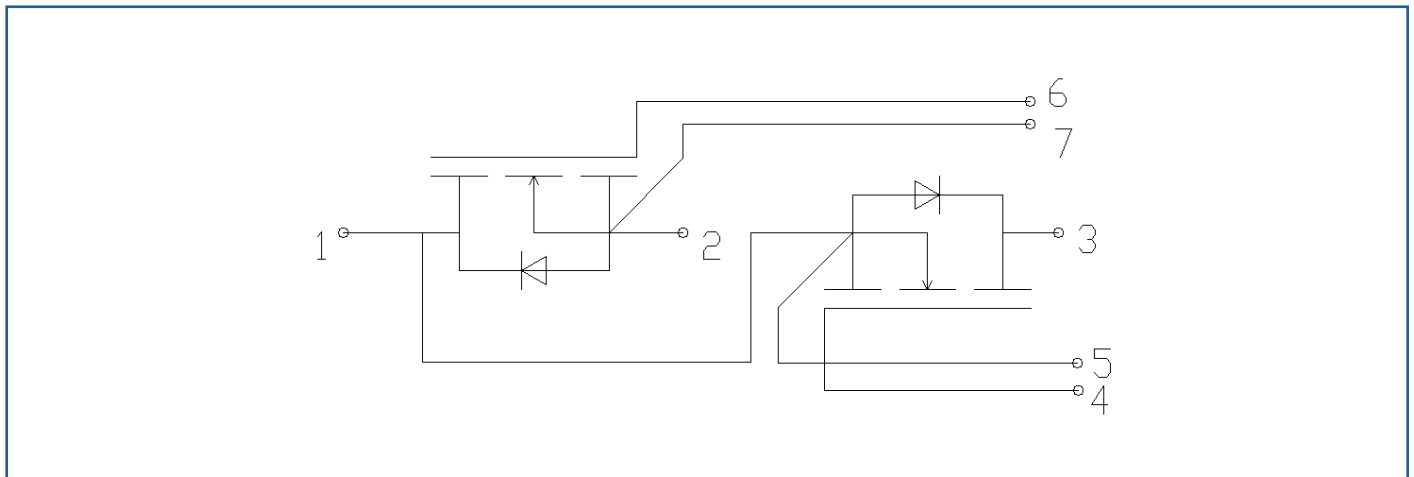
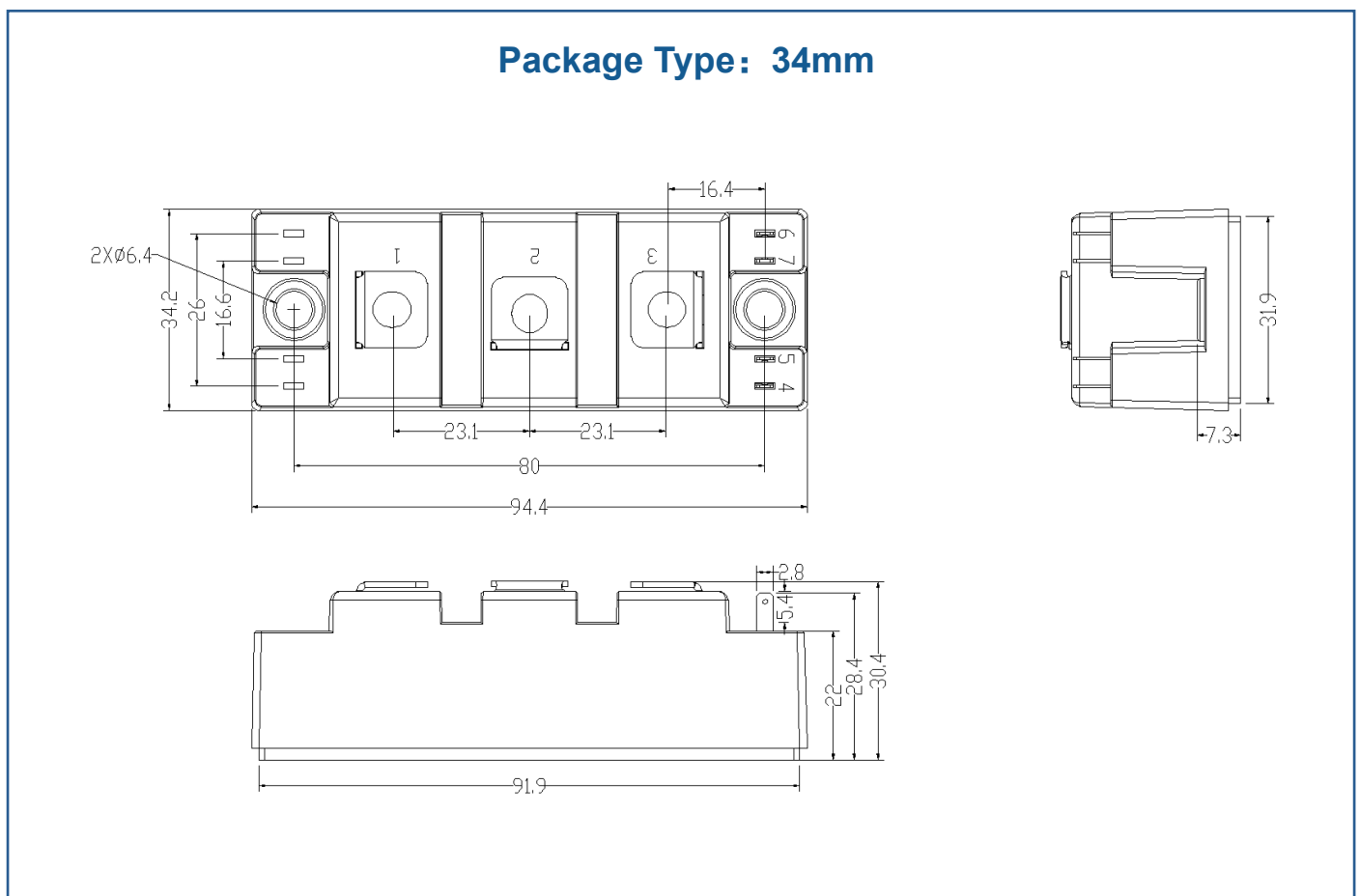


Figure 10
Safe Operating Area

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