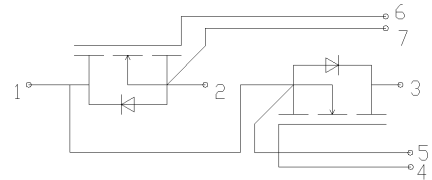


## General Description

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
- Ease of Paralleling
- Cu Baseplate and ZTA Internal Isolation



## Applications

- High Power Converters
- Motor Drives
- UPS Systems

## Ordering Informations

Order Number / Marking	HMSMQ300HF12M34
Package Type	34mm

## Key Parameters

Symbol	Parameter	Values			Unit	Test Conditions
<b>Absolute maximum rating</b>						
$V_{DS}$	Drain-source Voltage	1200			V	$T_c=25^\circ\text{C}$
$I_D$	Drain Current (continuous)	300			A	$T_c=25^\circ\text{C}$
$T_J$	Junction Temperature	175			$^\circ\text{C}$	-
Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static characteristics</b>						
$R_{DS(on)}$	Static Drain-source on Resistance	-	5.3	7.3	m $\Omega$	$V_{GS}=18\text{V}; I_D=150\text{A}; T_{VJ}=25^\circ\text{C}$
<b>Dynamic characteristics</b>						
$Q_G$	Total Gate Charge	-	714	-	nC	$V_{DD}=800\text{V}; V_{GS}=-5/+18\text{V}; I_D=150\text{A}; T_c=25^\circ\text{C}$
$Q_{GD}$	Gate-drain Charge	-	234.9	-		
<b>Source-drain diode</b>						
$Q_{RR}$	Reverse Recovery Charge	-	678	-	nC	$V_{GS}=-5/+18\text{V}; I_F=300\text{A}; V_R=900\text{V}; T_J=25^\circ\text{C}$

## 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)	300	A
$I_{DM}$	Drain Current (pulsed)	600	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

## MOSFET Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static characteristics (at <math>T_c=25^\circ\text{C}</math> unless otherwise specified)</b>						
$BV_{DS}$	Drain-source Breakdown Voltage	1200	-	-	V	$V_{GS}=0V$
$I_{DSS}$	Zero Gate Voltage Drain Current	-	-	300	$\mu\text{A}$	$V_{DS}=1200V; V_{GS}=0V$
$I_{GSS}$	Gate-body Leakage Current	-	-	3	$\mu\text{A}$	$V_{GS}=-10/+20V; V_{DS}=0V$
$V_{GS(th)}$	Gate Threshold Voltage	2	-	4	V	$V_{DS}=V_{GS}; I_D=30mA$
$R_{DS(on)}$	Static Drain-source on Resistance	-	5.3	7.3	m $\Omega$	$V_{GS}=18V; I_D=150A; T_{vj}=25^\circ\text{C}$
$V_{GS(on)}$	Recommended Turn-on Voltage	-	18	-	V	Static
$V_{GS(off)}$	Recommended Turn-off Voltage	-	-5	-	V	
$R_G$	Gate Resistance	-	1.1	-	$\Omega$	$V_{GS}=0V; f=1MHz$
<b>Dynamic characteristics (at <math>T_c=25^\circ\text{C}</math> unless otherwise specified)</b>						
$C_{iss}$	Input Capacitance	-	20.6	-	nF	$V_{DS}=1000V; f=1MHz; V_{AC}=25mV$
$C_{oss}$	Output Capacitance	-	0.86	-		
$C_{rss}$	Reverse Transfer Capacitance	-	39	-	pF	
$E_{on}$	Turn-on Switching Energy	-	22.7	-	mJ	$V_{DD}=900V; V_{GS}=-5/+18V; I_D=300A; \text{Load}=100\mu\text{H}$
$E_{off}$	Turn-off Switching Energy	-	16.9	-		
$Q_{GS}$	Gate-Source Charge	-	230.0	-	nC	$V_{DD}=800V; V_{GS}=-5/+18V; I_D=150A$
$Q_{GD}$	Gate-drain Charge	-	234.9	-		
$Q_G$	Total Gate Charge	-	714	-		
$t_{d(on)}$	Turn-on Delay Time	-	101.4	-	ns	$V_{DD}=900V; V_{GS}=-5/+18V; I_D=300A; R_{G(ext)}=5\Omega$
$t_r$	Rise Time	-	93.0	-		
$t_{d(off)}$	Turn-off Delay Time	-	256.1	-		
$t_f$	Fall Time	-	54.3	-		

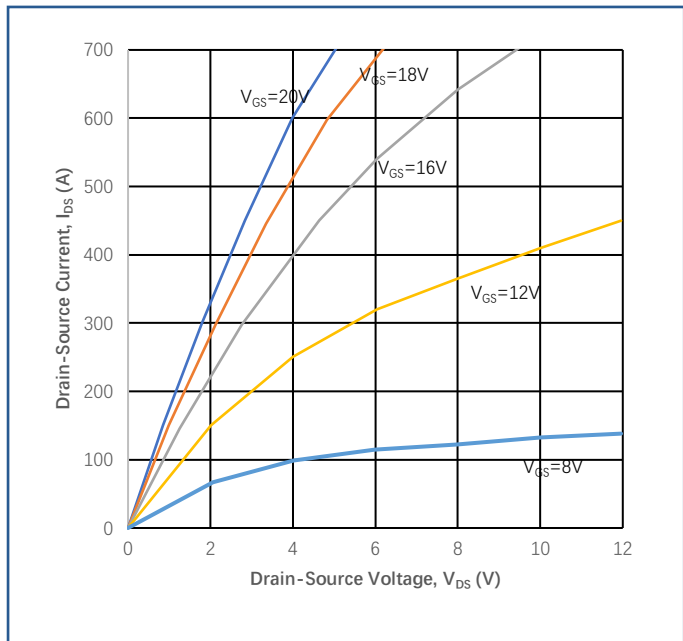
## Body Diode Characteristics (at $T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$V_{FSD}$	Forward Voltage	-	-	6	V	$V_{GS}=0V; I_F=150A$
$I_S$	Continuous Diode Forward Current	-	150	-	A	$V_{GS}=0V; T_C=25^\circ\text{C}$
$t_{RR}$	Reverse Recovery Time	-	32.8	-	ns	$V_{GS}=-5/+18V; I_F=300A; V_R=900V$
$Q_{RR}$	Reverse Recovery Charge	-	678	-	nC	
$I_{RRM}$	Peak Reverse Recovery Current	-	51.5	-	A	

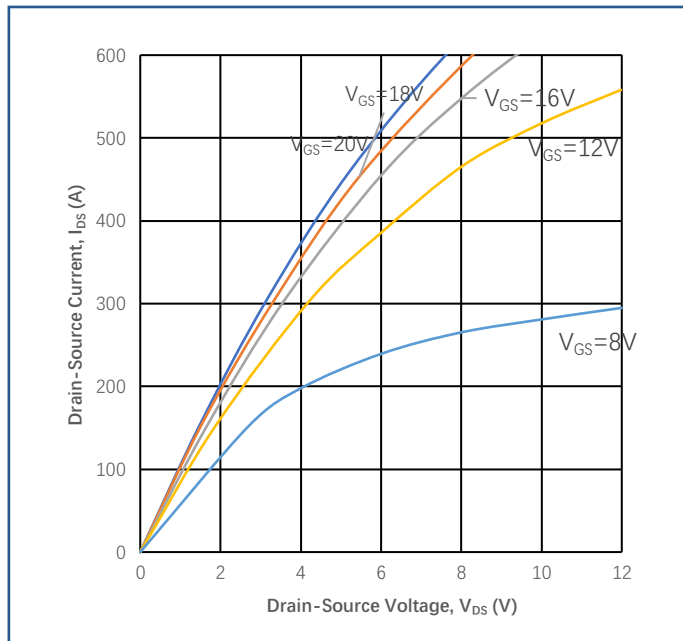
## Thermistor Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{thJC}$	Thermal Resistance, Junction-to-heatsink	-	0.14	-	$^\circ\text{C/W}$	-

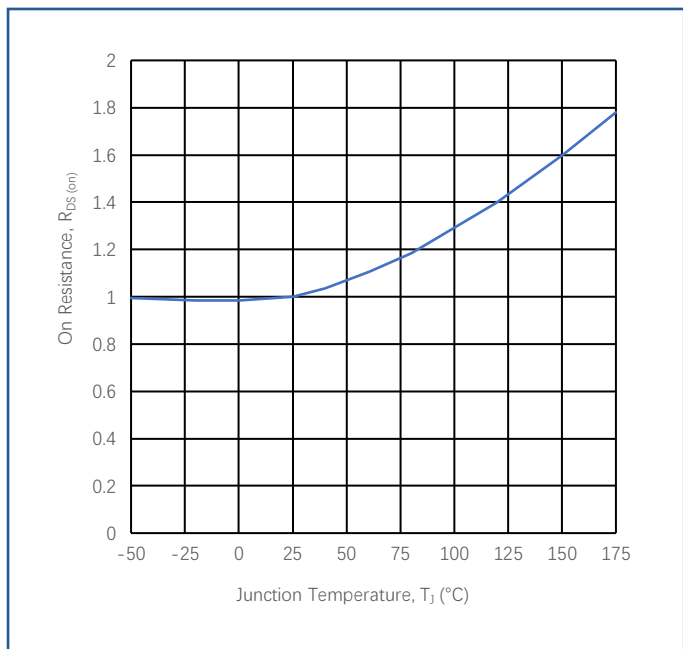
Typical Performance



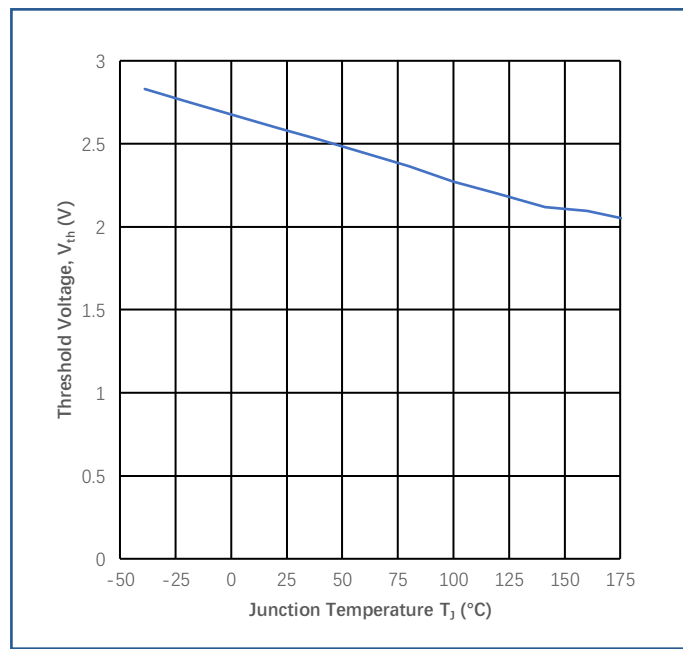
**Figure 1**  
Output Characteristics ( $T_J=25\text{ }^\circ\text{C}$ )



**Figure 2**  
Typical Output Characteristics ( $T_J=150\text{ }^\circ\text{C}$ )

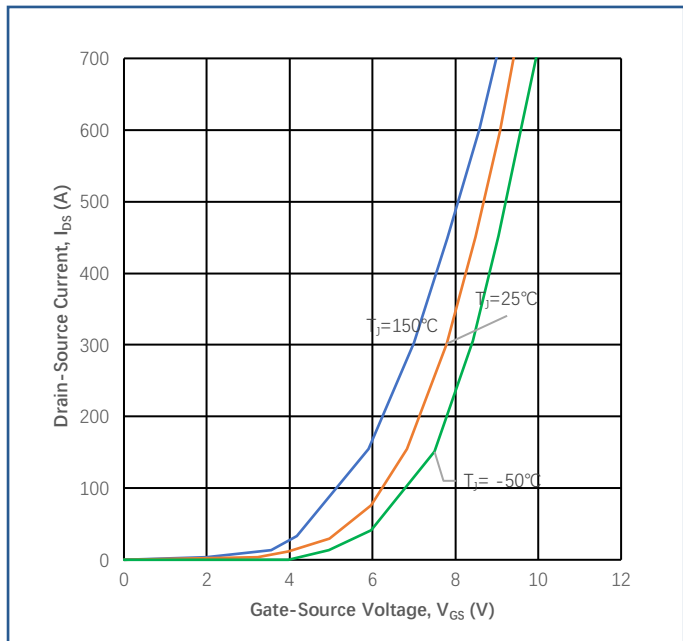


**Figure 3**  
Normalized on-resistance vs.  $T_J$

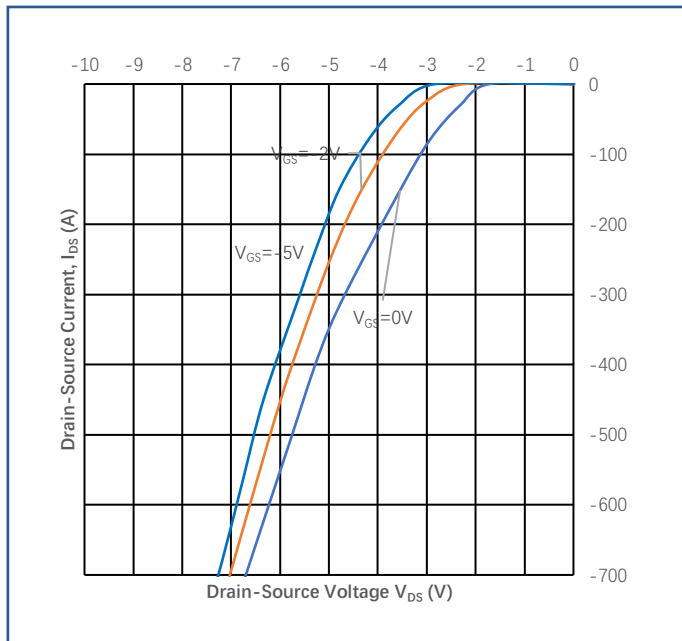


**Figure 4**  
Threshold Voltage vs. Temperature

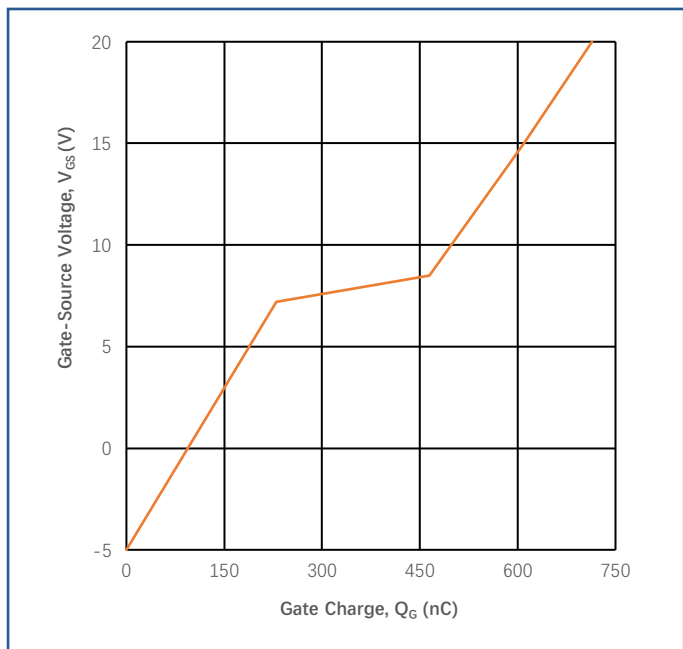
Typical Performance



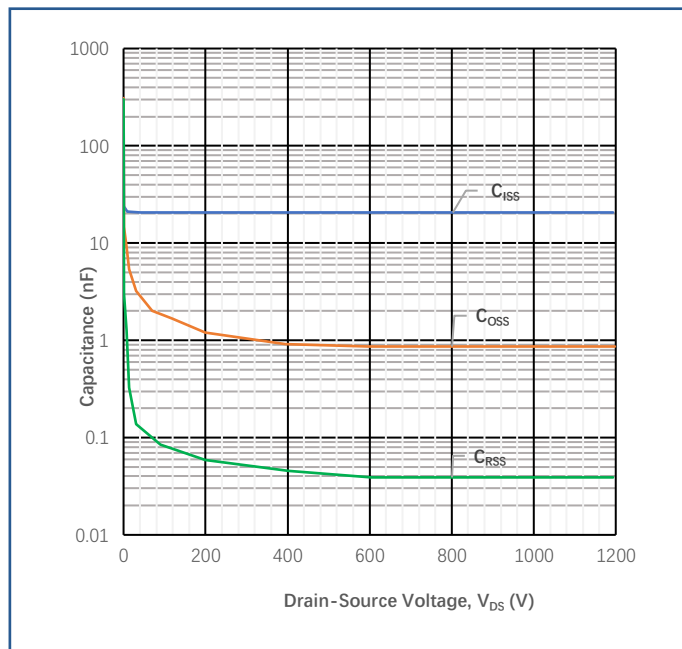
**Figure 5**  
Transfer Characteristic for Various  $T_j$



**Figure 6**  
Body Diode Characteristic



**Figure 7**  
Gate Charge Characteristics



**Figure 8**  
Capacitances vs.  $V_{DS}$

Typical Performance

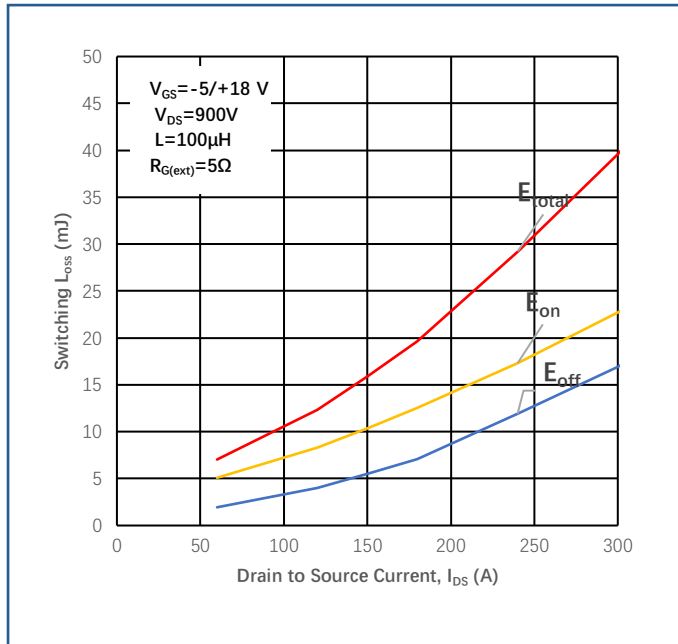


Figure 9

Inductive Switching Energy vs. Drain Current

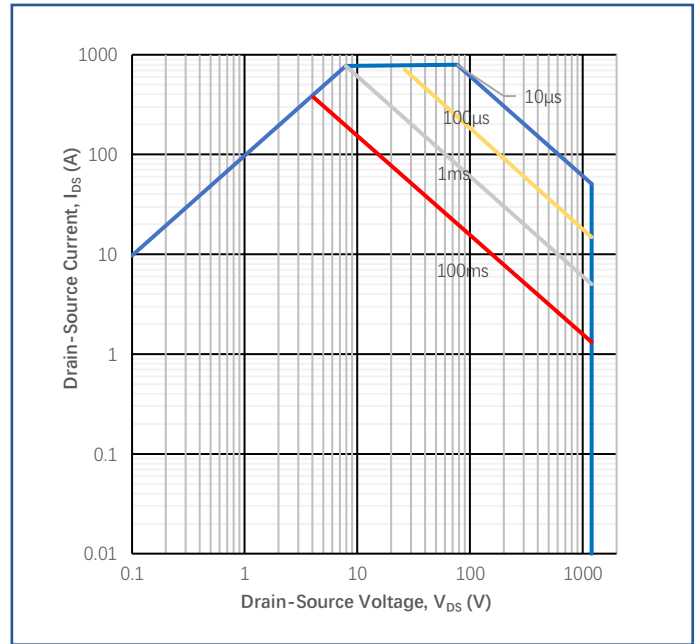
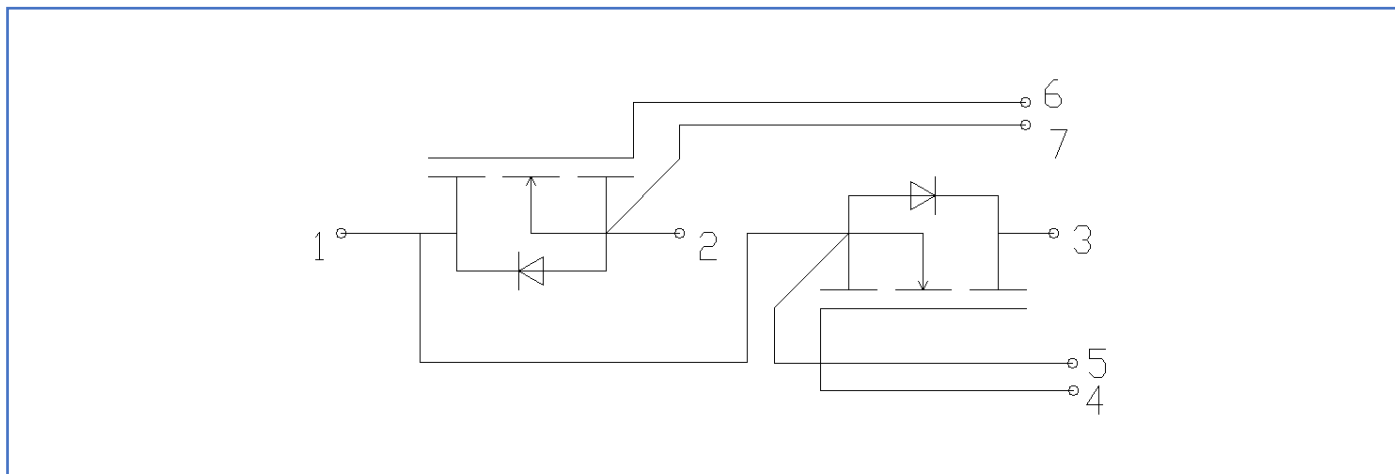


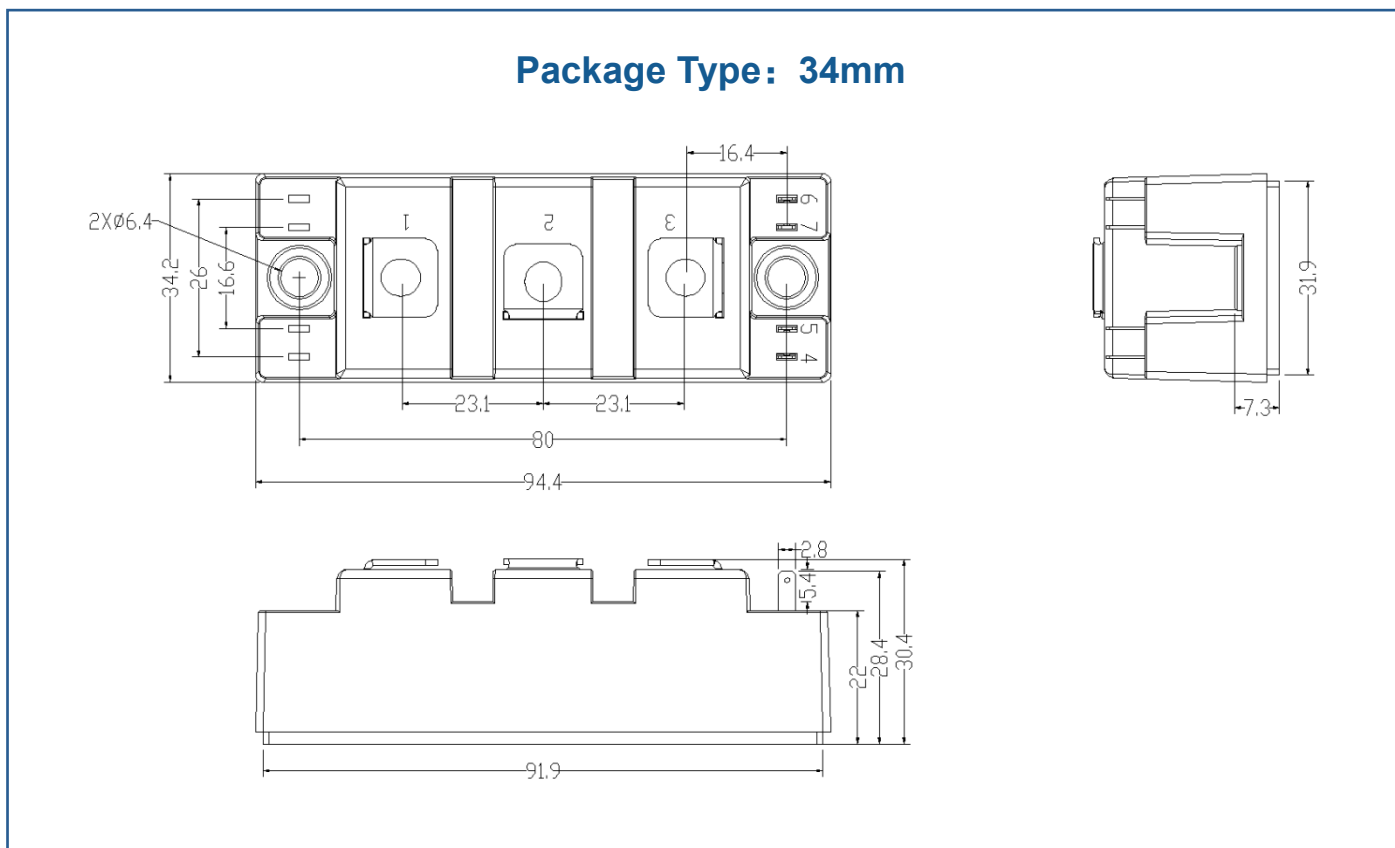
Figure 10

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