



MSC200HF120T1WH

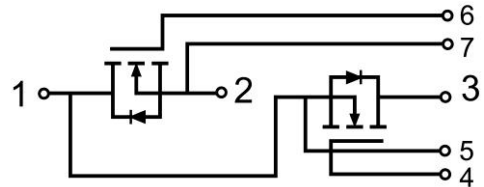
SiC MOSFET Module

Preliminary Datasheet

Features:

- High Frequency Switching
- High Blocking Voltage with Low $R_{DS(on)}$
- Simple to Drive
- Lead Free, Compliant with RoHS Requirement
- Copper Baseplate and Aluminum Oxide Insulator

Circuit Diagram



Applications:

- Solar Inverters
- Motor Drives
- EV Charging
- High Voltage DC-DC Converters
- SMPS、UPS
- Smart Grid Transmission and Distribution
- Induction Heating and Welding

SiC MOSFET

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

Symbol	Description		Values	Units
V_{DSS}	Drain-Source Blocking Voltage		1200	V
V_{GSmax}	Gate-Source Voltage	Absolute Maximum Values	-10/+23	V
V_{GSop}		Recommended Operational Values	-5/+18	V
I_D	Continuous Drain Current	$V_{GS}=18\text{V}, T_C=25^{\circ}\text{C}$	240	A
		$V_{GS}=18\text{V}, T_C=100^{\circ}\text{C}$	170	A
$I_{D(pulse)}$	Pulsed Drain Current	Pulse Width is Limited by T_{Jmax}	500	A
P_D	Power Dissipation	$T_C=25^{\circ}\text{C}, T_J=175^{\circ}\text{C}$	411	W



Electrical Characteristics of MOSFET ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =1mA	1200			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =68mA	2.0	2.6	4.0	V
		V _{DS} =V _{GS} , I _D =68mA, T _J =175℃		1.8		V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =1200V, V _{GS} =0V			1	mA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =+23V, V _{DS} =0V			200	nA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =-10V, V _{DS} =0V			-200	nA
R _{DS(on)}	On State Resistance	V _{GS} =18V, I _D =150A		8.0	11.0	mΩ
		V _{GS} =18V, I _D =150A, T _J =175℃		14.5		mΩ
g _{fs}	Transconductance	V _{DS} =20V, I _{DS} =150A		82.8		S
		V _{DS} =20V, I _{DS} =150A, T _J =175℃		73.0		S
C _{iss}	Input Capacitance	V _{DS} =1000V, f=100kHz, V _{GS} =0V, V _{AC} =25mV		12.28		nF
C _{oss}	Output Capacitance			0.46		
C _{rss}	Reverse Transfer Capacitance			0.04		
E _{oss}	C _{oss} Stored Energy				208	
Q _G	Total Gate Charge	V _{DS} =800V, V _{GS} =-5V/+18V, I _D =60A		482		nC
Q _{GS}	Gate-Source Charge			118		nC
Q _{GD}	Gate-Drain Charge			66		nC
E _{on}	Turn-On Switching Energy	V _{DS} =800V, V _{GS} =-5V/+18V I _D =60A, R _G =1.25Ω		2.8		mJ
E _{off}	Turn-Off Switching Energy			1.0		mJ
R _{G(int)}	Internal Gate Resistance			2.05		Ω
R _{θJC}	Thermal Resistance Junction-to-Case (per SiC MOSFET)				0.36	℃/W



Built-in SiC Body Diode

Electrical Characteristics of Diode ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
I_S	Inverse Diode Continuous, Forward Current	$T_C=25^{\circ}\text{C}$			240	A
V_{SD}	Diode Forward Voltage	$I_{SD}=75\text{A}, V_{GS}=-5\text{V}, T_J=25^{\circ}\text{C}$		3.9		V
		$I_{SD}=75\text{A}, V_{GS}=-5\text{V}, T_J=175^{\circ}\text{C}$		3.6		V
t_{rr}	Reverse Recover Time	$V_R=800\text{V}, I_{SD}=60\text{A}, di/dt=2200\text{A/ns}$		63		ns
Q_{rr}	Reverse Recovery Charge			1260		nC
I_{rrm}	Peak Reverse Recovery Current			38		A

Module

Symbol	Description		Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted)	$f=50\text{Hz}, t=1\text{min}$	2500			V
T_J	Maximum Junction Temperature				175	$^{\circ}\text{C}$
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+175	$^{\circ}\text{C}$
T_{stg}	Storage Temperature		-40		+125	$^{\circ}\text{C}$
CTI	Comparative Tracking Index		200			
$R_{\theta CS}$	Case-to-Sink Thermally (Conductive Grease Applied)				0.07	$^{\circ}\text{C/W}$
M	Power Terminals Screw:M6		3.0		5.0	N·m
M	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			150		g



Ordering Information Table

Device code	M	SC	200	HF	120	T1W	H
	①	②	③	④	⑤	⑥	⑦

- ① - MOSFET Module
- ② - SiC MOSFET
- ③ - Rated Current (200=200A)
- ④ - Circuit Configuration (Half Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



Revision	Notes
01	Initial Release

Announcement

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The released datasheet would be issued with “REV.” + “alphabet characters”.