

WMH004M120G1SA

N-Channel SiC Power MOSFET

V_{DS}	=	1200	V
$R_{DS(on),typ}(T_J=25^{\circ}C)$	=	4.2	m Ω
$I_D(T_H=100^{\circ}C)$	=	220	A

Features

- High current density
- Low switching losses
- Low diode forward voltage
- Built-in SiC schottky barrier diode

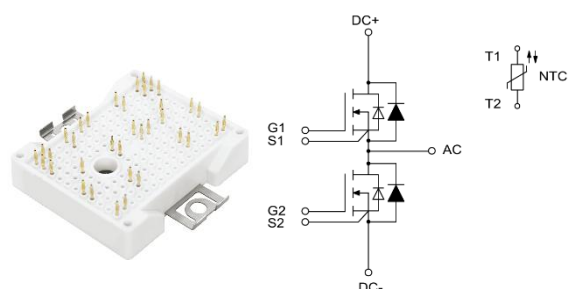
Benefits

- Si₃N₄ ceramic substrate with low thermal resistance
- Press-FIT contact technology
- Intergrated NTC temperature sensor
- Rugged mounting due to intergrated mouting clamps

Applications

- High Frequency converter/Inverters
- UPS systems
- DC-DC Converters
- EV Chargers
- Solar applications

Package



Part Number	Package
WMH004M120G1SA	E2B

Maximum Ratings (at T_J=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain-Source Voltage	1200	V	$V_{GS}=0V, I_D=1mA$	
V_{GSmax}	Gate-Source Voltage	-10/+23	V	Absolute maximum values	
V_{GSop}	Gate-Source Voltage	-5/+18	V	Recommended operational values	
I_D	Continuous Drain Current	310	A	$V_{GS}=18V, T_H=25^{\circ}C$	
		220		$V_{GS}=18V, T_H=100^{\circ}C$	
$I_{D(pulse)}$	Pulsed Drain Current	480	A	Pulse width t_p limited by T_{Jmax}	
P_D	Power Dissipation	600	W	$T_H=25^{\circ}C, T_J=175^{\circ}C$	
T_J	Operating Junction Temperature	-40 to +175	°C		
T_{STG}	Storage Temperature	-40 to +175	°C		

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.8	4.0	V	$V_{DS}=V_{GS}, I_D=100\text{mA}$	
		/	2.0	/		$V_{DS}=V_{GS}, I_D=100\text{mA}, T_J=175^{\circ}\text{C}$	
I_{DSS}	Zero Gate Voltage Drain Current	/	/	100	μA	$V_{DS}=1200\text{V}, V_{GS}=0\text{V}$	
I_{GSS+}	Gate-Source Leakage Current	/	/	500	nA	$V_{DS}=0\text{V}, V_{GS}=23\text{V}$	
I_{GSS-}	Gate-Source Leakage Current	/	/	500	nA	$V_{DS}=0\text{V}, V_{GS}=-10\text{V}$	
$R_{DS(on)}$	Drain-Source On-State Resistance	/	3.75		m Ω	$V_{GS}=18\text{V}, I_D=220\text{A}$	
		/	6.25	/		$V_{GS}=18\text{V}, I_D=220\text{A}, T_J=175^{\circ}\text{C}$	
g_{fs}	Transconductance	/	160	/	S	$V_{DS}=20\text{V}, I_{DS}=220\text{A}$	
		/	140	/		$V_{DS}=20\text{V}, I_{DS}=220\text{A}, T_J=175^{\circ}\text{C}$	
C_{iss}	Input Capacitance	/	18	/	nF	$V_{GS}=0\text{V}$	
C_{oss}	Output Capacitance	/	900	/	pF	$V_{DS}=800\text{V}$	
C_{rss}	Reverse Transfer Capacitance	/	40	/		$f=100\text{kHz}$	
E_{oss}	C_{oss} Stored Energy	/	304	/	μJ	$V_{AC}=25\text{mV}$	
E_{ON}	Turn-On Switching Energy	/	5.92	/	mJ	$V_{DS}=800\text{V}, V_{GS}=-5\text{V}/18\text{V}, I_D=180\text{A},$ $R_{G(on)}=5\Omega, R_{G(off)}=10\Omega, T_J=150^{\circ}\text{C}$	
E_{OFF}	Turn-Off Switching Energy	/	2.26	/			
$R_{G(int)}$	Internal Gate Resistance	/	0.3	/	Ω	$f=1\text{MHz}, V_{AC}=25\text{mV}$	
Q_{GS}	Gate to Source Charge	/	168	/	nC	$V_{DS}=800\text{V}$	
Q_{GD}	Gate to Drain Charge	/	84	/		$V_{GS}=-5\text{V}/18\text{V}$	
Q_G	Total Gate Charge	/	552	/		$I_D=220\text{A}$	

Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	2.0	/	V	$V_{GS}=-5\text{V}, I_{SD}=120\text{A}, T_J=25^{\circ}\text{C}$	
		2.6	/		$V_{GS}=-5\text{V}, I_{SD}=120\text{A}, T_J=175^{\circ}\text{C}$	
I_S	Continuous Diode Forward Current	/	175	A	$T_H=25^{\circ}\text{C}$	

Package Characteristics

Symbol	Parameter	Note or test condition	Characteristics			Unit
			Min.	Typ.	Max.	
	Internal isolation	Basic insulation	/	Si ₃ N ₄	/	
d _{Creep}	Creepage distance	terminal to heatsink	/	12.0	/	mm
		terminal to terminal	/	6.5	/	
d _{Clear}	Clearance	terminal to heatsink	/	10.0	/	mm
		terminal to terminal	/	5.0	/	
CTI	Comperative tracking index		/	>200	/	
L _p	Stray inductance module		/	7.5	/	nH
V _{ISOL}	Isolation test voltage	RMS, f=50Hz, t=1min		3		kV
R _{DD'+SS'}	Module lead resistance, terminals-chip	T _c =25°C, per switch	/	0.50	/	mΩ
R _{θJH}	Thermal Resistance from Junction to Heatsink		/	0.25	/	°C/W
F	Mounting force per clamp		40	/	80	N
G	Weight		/	40	/	g

NTC-Thermistor Characteristics

Symbol	Parameter	Value	Unit	Test Conditions	Note
T _{NTC}	NTC operating temperature range	-40 ~ +180	°C		
R ₂₅	NTC R25-value	10 ± 1%	kΩ	T _{NTC} = 25 ± 1% °C	
B _{25/85}	B-value	3610 ± 1%	K		

Package information

