

WMC007M230G1AA

N-Channel SiC Power MOSFET

V_{DS}	=	2300	V
$R_{DS(on),typ}(T_J=25^{\circ}C)$	=	7.2	m Ω
$I_D(T_H=80^{\circ}C)$	=	170	A

Features

- High current density
- Low switching losses
- Low diode forward voltage
- T-type Module

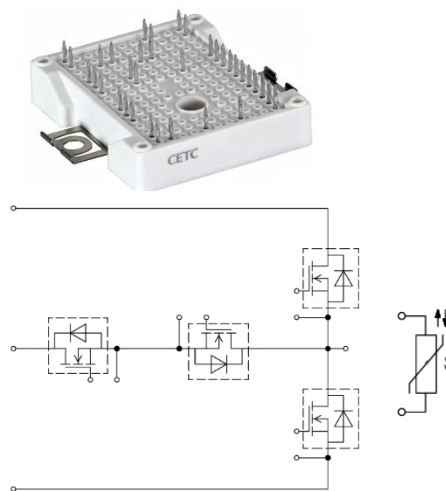
Benefits

- AlN ceramic substrate with low thermal resistance
- Press-FIT contact technology
- Integrated NTC temperature sensor
- Rugged mounting due to integrated mounting clamps

Applications

- AC and DC Motor Control
- UPS and SMPS
- Inverter for Motor Drive
- DC-DC Converters
- Solar Applications

Package



Part Number	Package
WMC007M230G1AA	E2B

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

Buck Switch(MOSFET,T1/T2)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain-Source Voltage	2300	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	210	A	$V_{GS}=18V, T_H=25^{\circ}C$	
		170		$V_{GS}=18V, T_H=80^{\circ}C$	
$I_{D(pulse)}$	Pulsed Drain Current	420	A	Pulse width t_p limited by T_{Jmax}	
P_D	Power Dissipation	680	W	$T_H=25^{\circ}C, T_J=175^{\circ}C$	
T_J	Operating Junction Temperature	-40 to +175	$^{\circ}C$		
T_{STG}	Storage Temperature	-40 to +175	$^{\circ}C$		



Boost Switch(MOSFET,T3/T4)

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	205	A	V _{GS} =18V, T _H =25°C	
		165		V _{GS} =18V, T _H =80°C	
I _{D(pulse)}	Pulsed Drain Current	410	A	Pulse width t _p limited by T _{Jmax}	
P _D	Power Dissipation	540	W	T _H =25°C, T _J =175°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)

Buck Switch(MOSFET,T1/T2)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.9	4.0	V	$V_{DS}=V_{GS}, I_D=60\text{mA}$	
		/	2.1	/		$V_{DS}=V_{GS}, I_D=60\text{mA}, T_J=175^{\circ}\text{C}$	
I_{DSS}	Zero Gate Voltage Drain Current	/	/	100	μA	$V_{DS}=2300\text{V}, V_{GS}=0\text{V}$	
I_{GSS+}	Gate-Source Leakage Current	/	/	100	nA	$V_{DS}=0\text{V}, V_{GS}=23\text{V}$	
I_{GSS-}	Gate-Source Leakage Current	/	/	100	nA	$V_{DS}=0\text{V}, V_{GS}=-10\text{V}$	
$R_{DS(on)}$	Drain-Source On-State Resistance	/	6.7	9.3	m Ω	$V_{GS}=18\text{V}, I_D=170\text{A}$	
		/	15.0	/		$V_{GS}=18\text{V}, I_D=170\text{A}, T_J=175^{\circ}\text{C}$	
g_{fs}	Transconductance	/	195	/	S	$V_{DS}=20\text{V}, I_{DS}=170\text{A}$	
		/	165	/		$V_{DS}=20\text{V}, I_{DS}=170\text{A}, T_J=175^{\circ}\text{C}$	
C_{iss}	Input Capacitance	/	18.9	/	nF	$V_{GS}=0\text{V}$	
C_{oss}	Output Capacitance	/	420	/	pF	$V_{DS}=1200\text{V}$	
C_{rss}	Reverse Transfer Capacitance	/	45	/		$f=1\text{MHz}$	
E_{oss}	C_{oss} Stored Energy	/	300	/	μJ	$V_{AC}=25\text{mV}$	
$R_{G(int)}$	Internal Gate Resistance	/	0.6	/	Ω	$f=1\text{MHz}, V_{AC}=25\text{mV}$	
Q_{GS}	Gate to Source Charge	/	180	/	nC	$V_{DS}=1200\text{V}$	
Q_{GD}	Gate to Drain Charge	/	186	/		$V_{GS}=-5\text{V}/18\text{V}$	
Q_G	Total Gate Charge	/	840	/		$I_D=170\text{A}$	

Boost Switch(MOSFET,T3/T4)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{GS(th)}$	Gate Threshold Voltage	2.0	2.8	4.0	V	$V_{DS}=V_{GS}, I_D=50mA$	
		/	2.0	/		$V_{DS}=V_{GS}, I_D=50mA, T_J=175^{\circ}C$	
I_{DSS}	Zero Gate Voltage Drain Current	/	/	100	μA	$V_{DS}=1200V, V_{GS}=0V$	
I_{GSS+}	Gate-Source Leakage Current	/	/	100	nA	$V_{DS}=0V, V_{GS}=23V$	
I_{GSS-}	Gate-Source Leakage Current	/	/	100	nA	$V_{DS}=0V, V_{GS}=-10V$	
$R_{DS(on)}$	Drain-Source On-State Resistance	/	7.5	/	m Ω	$V_{GS}=18V, I_D=110A$	
		/	12.5	/		$V_{GS}=18V, I_D=110A, T_J=175^{\circ}C$	
g_{fs}	Transconductance	/	80	/	S	$V_{DS}=20V, I_{DS}=110A$	
		/	70	/		$V_{DS}=20V, I_{DS}=110A, T_J=175^{\circ}C$	
C_{iss}	Input Capacitance	/	9	/	nF	$V_{GS}=0V$	
C_{oss}	Output Capacitance	/	300	/	pF	$V_{DS}=800V$	
C_{rss}	Reverse Transfer Capacitance	/	20	/		$f=100kHz$	
E_{oss}	C_{oss} Stored Energy	/	152	/	μJ	$V_{AC}=25mV$	
$R_{G(int)}$	Internal Gate Resistance	/	0.6	/	Ω	$f=1MHz, V_{AC}=25mV$	
Q_{GS}	Gate to Source Charge	/	84	/	nC	$V_{DS}=800V$	
Q_{GD}	Gate to Drain Charge	/	42	/		$V_{GS}=-5V/18V$	
Q_G	Total Gate Charge	/	276	/		$I_D=110A$	

Reverse Diode Characteristics

Buck Switch(MOSFET,T1/T2)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V _{SD}	Diode Forward Voltage	4.1	/	V	V _{GS} =-5V, I _{SD} =120A, T _J =25℃	
		3.6	/		V _{GS} =-5V, I _{SD} =120A, T _J =175℃	
I _S	Continuous Diode Forward Current	/	105	A	T _H =80℃	

Boost Switch(MOSFET,T3/T4)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V _{SD}	Diode Forward Voltage	3.9	/	V	V _{GS} =-5V, I _{SD} =75A, T _J =25℃	
		3.6	/		V _{GS} =-5V, I _{SD} =75A, T _J =175℃	
I _S	Continuous Diode Forward Current	/	90	A	T _H =80℃	

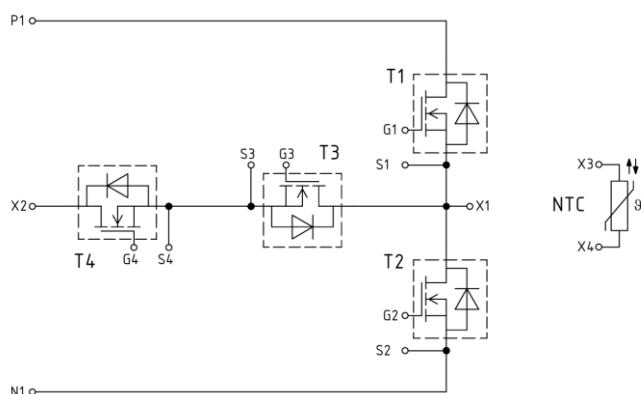
Package Characteristics

Symbol	Parameter	Note or test condition	Characteristics			Unit
			Min.	Typ.	Max.	
	Internal isolation	Basic insulation	/	AIN	/	
CTI	Comperative tracking index		600	/	/	
L _p	Stray inductance module		/	20	/	nH
R _{pkg}	Package Resistance	T _H =80°C		0.5		mΩ
V _{ISOL}	Isolation test voltage	RMS, f=50Hz, t=1min	5	/	/	kV
R _{θJH}	Thermal Resistance from Junction to Heatsink(MOSFET,T1/T2)		/	0.22	/	°C/W
R _{θJH}	Thermal Resistance from Junction to Heatsink(MOSFET,T3/T4)		/	0.28	/	°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		

Circuit Diagram



Package information

