STARPOWER

SEMICONDUCTOR **SiC MOSFET**

MD24HTS120P8HT

1200V/2.42mΩ 6 in one-package

General Description

STARPOWER SiC MOSFET Power Module provides
very low $R_{DS(on)}$ as well as high blocking voltage.
It's designed for the applications such as
hybrid and electric vehicle.

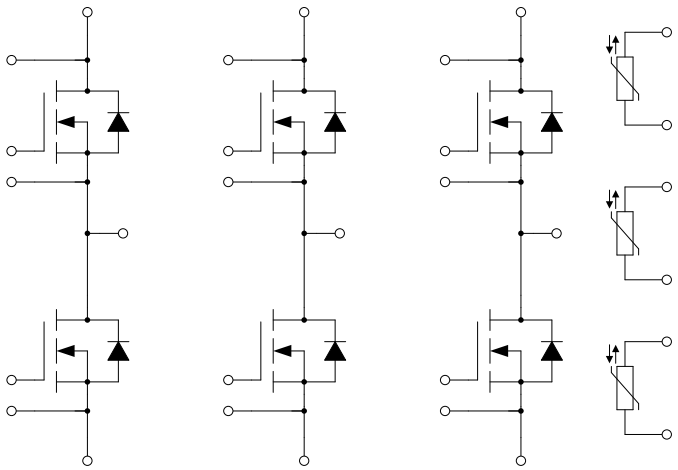
Features

- SiC power MOSFET
- High blocking voltage with low $R_{DS(on)}$
- Easy to parallel and simple to drive
- Low inductance case avoid oscillations
- Isolated copper pinfin baseplate using Si_3N_4 AMB technology

Typical Applications

- Automotive application
- Hybrid and electric vehicle
- Inverter for motor drive

Equivalent Circuit Schematic



Absolute Maximum Ratings T_F=25°C unless otherwise noted

MOSFET

Symbol	Description	Value	Unit
V_{DSS}	Drain-Source Voltage	1200	V
V_{GSSmax}	Gate-Source Voltage	-8/+19	V
V_{GSSop}	Gate-Source Voltage	-4/+15	V
I_D	Drain Current T_{vj}=175°C	463	A
I_{DRM}	Repetitive Peak Drain Current tp limited by T_{vjop}	926	A
P_D	Maximum Power Dissipation @ T_F=65°C T_{vj}=175°C	696	W

Body Diode

Symbol	Description	Value	Unit
I_S	Source Current T_{vj}=175°C	TBD	A

Module

Symbol	Description	Value	Unit
T_{vjmax}	Maximum Junction Temperature	175	°C
T_{vjop}	Operating Junction Temperature	-40 to +175	°C
T_{STG}	Storage Temperature Range	-40 to +125	°C
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	2500	V

MOSFET Characteristics T_F=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$R_{DS(on)}$	Static Drain-Source On-Resistance	I_D=88A,V_{GS}=15V, T_{vj}=25°C		2.42		mΩ
		I_D=88A,V_{GS}=15V, T_{vj}=175°C		4.24		
$V_{GS(th)}$	Gate-Source Threshold Voltage	I_D=110mA,V_{DS}=V_{GS}, T_{vj}=25°C	1.8	2.5	3.2	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=V_{DSS},V_{GS}=0V, T_{vj}=25°C			500	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=15V,V_{DS}=0V, T_{vj}=25°C			400	nA
R_{Gint}	Internal Gate Resistance			0.80		Ω
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=1000V, f=100kHz		31.0		nF
C_{oss}	Output Capacitance			1.10		nF
C_{rss}	Reverse Transfer Capacitance			0.06		nF
Q_g	Total Gate Charge	I_D=363A,V_{DS}=800V, V_{GS}=-4/+15V		1.25		μC
$t_{d(on)}$	Turn-On Delay Time	TBD		TBD		ns
t_r	Rise Time			TBD		ns
$t_{d(off)}$	Turn-Off Delay Time			TBD		ns
t_f	Fall Time			TBD		ns
E_{on}	Turn-On Switching Loss			TBD		mJ
E_{off}	Turn-Off Switching Loss			TBD		mJ
$t_{d(on)}$	Turn-On Delay Time	TBD		TBD		ns
t_r	Rise Time			TBD		ns
$t_{d(off)}$	Turn-Off Delay Time			TBD		ns
t_f	Fall Time			TBD		ns
E_{on}	Turn-On Switching Loss			TBD		mJ
E_{off}	Turn-Off Switching Loss			TBD		mJ
$t_{d(on)}$	Turn-On Delay Time	TBD		TBD		ns
t_r	Rise Time			TBD		ns
$t_{d(off)}$	Turn-Off Delay Time			TBD		ns
t_f	Fall Time			TBD		ns
E_{on}	Turn-On Switching Loss			TBD		mJ
E_{off}	Turn-Off Switching Loss			TBD		mJ

Body Diode Characteristics T_F=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	I_{SD}=44A,V_{GS}=-4V, T_{vj}=25°C		4.20		V
		I_{SD}=44A,V_{GS}=-4V, T_{vj}=175°C		TBD		
Q_r	Diode Reverse Recovery Charge	TBD		TBD		µC
I_{rrm}	Peak Reverse Recovery Current			TBD		A
E_{rec}	Reverse Recovery Energy			TBD		mJ
Q_r	Diode Reverse Recovery Charge	TBD		TBD		µC
I_{rrm}	Peak Reverse Recovery Current			TBD		A
E_{rec}	Reverse Recovery Energy			TBD		mJ
Q_r	Diode Reverse Recovery Charge	TBD		TBD		µC
I_{rrm}	Peak Reverse Recovery Current			TBD		A
E_{rec}	Reverse Recovery Energy			TBD		mJ

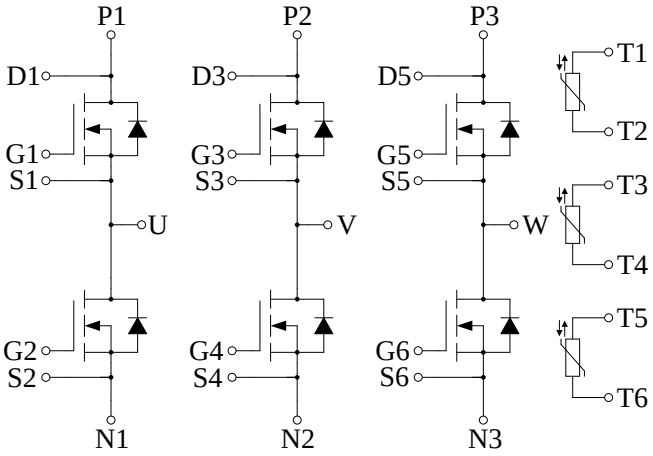
NTC Characteristics T_F=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated Resistance			5.0		kΩ
ΔR/R	Deviation of R_{100}	T_C=100 °C,R_{100}=493.3Ω	-5		5	%
P_{25}	Power Dissipation				20.0	mW
$B_{25/50}$	B-value	$R_2=R_{25}exp[B_{25/50}(1/T_2-1/(298.15K))]$		3375		K
$B_{25/80}$	B-value	$R_2=R_{25}exp[B_{25/80}(1/T_2-1/(298.15K))]$		3411		K
$B_{25/100}$	B-value	$R_2=R_{25}exp[B_{25/100}(1/T_2-1/(298.15K))]$		3433		K

Module Characteristics T_F=25°C unless otherwise noted

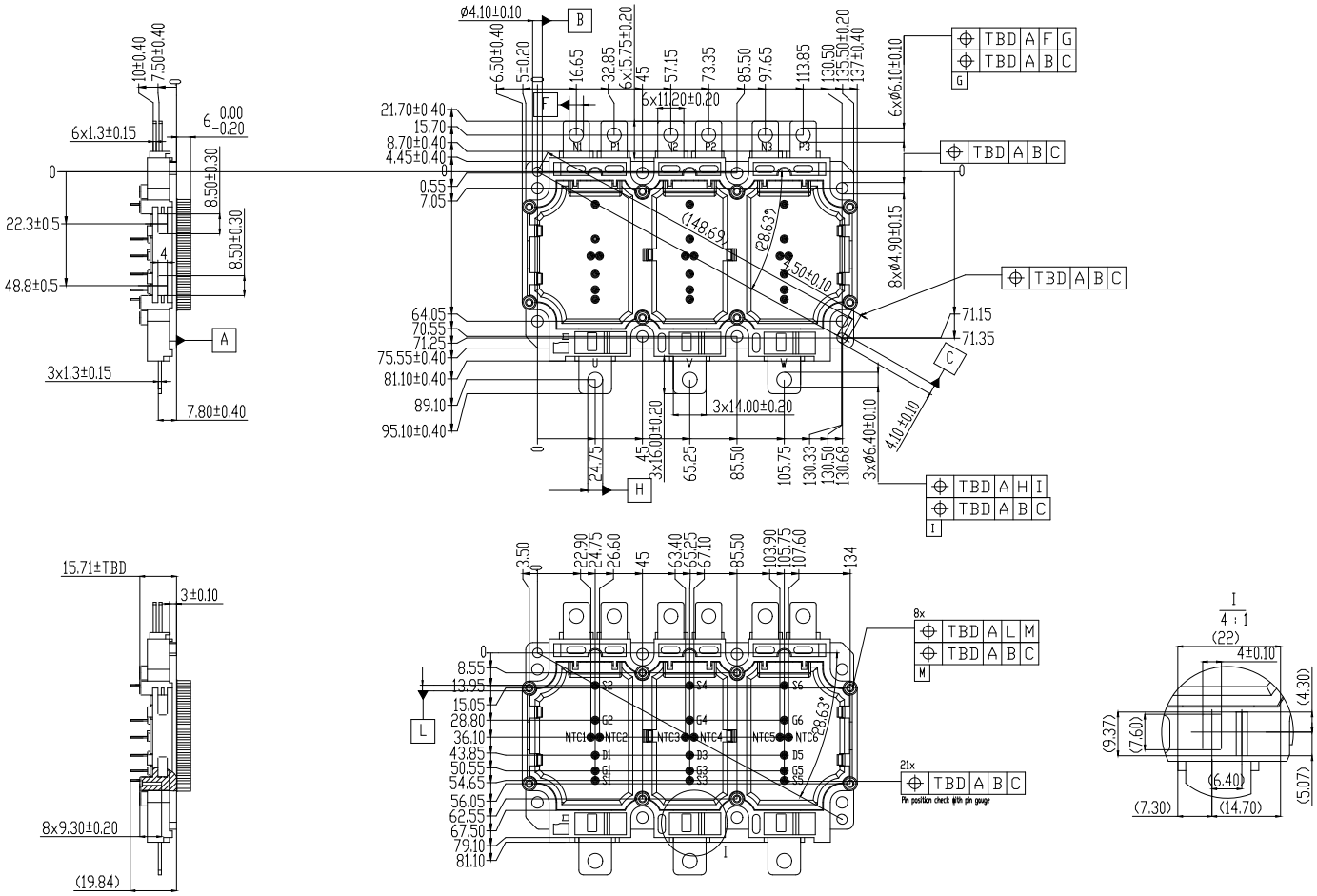
Symbol	Parameter	Min.	Typ.	Max.	Unit
L_{CE}	Stray Inductance		TBD		nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal to Chip		TBD		mΩ
R_{thJF}	Junction-to-Cooling Fluid (per MOSFET) △V/△t=8.0dm³/min,T_F=65°C		0.144	0.158	K/W
G	Weight of Module		TBD		g

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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