



MSC27FF120C7H

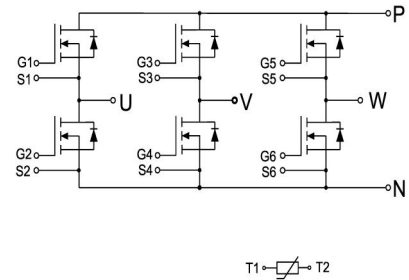
SiC MOSFET Module

Preliminary Datasheet

Features:

- High Speed Switching
- Low Switching Losses
- Simple to Drive
- Lead Free, Compliant with RoHS Requirement

Circuit Diagram



Applications:

- Solar Inverters
- High Voltage DC/DC Converters
- SMPS, UPS
- Motor Drives

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	-8/+19	V
V _{GSop}		Recommended Operational Values	-4/+15	V
I _D	Continuous Drain Current	V _{GS} =15V, T _C =25°C	90	A
		V _{GS} =15V, T _C =100°C	67	A
I _{D (pulse)}	Pulsed Drain Current	Pulse width t _P limited by T _{Jmax}	152	A
P _D	Power Dissipation	T _C =25°C, T _J =175°C	147	W



Electrical Characteristics of MOSFET (T_C=25°C unless otherwise specified)

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V	1200			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = 10.7mA	1.8	2.7	4.0	V
		V _{DS} =V _{GS} , I _D = 10.7mA, T _J =175°C		2.2		V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =1200V, V _{GS} =0V			1	mA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =15V, V _{DS} =0V			200	nA
R _{DS(on)}	On State Resistance	V _{GS} =15V, I _D =36A		28	40	mΩ
		V _{GS} =15V, I _D =36A, T _J =175°C		49		mΩ
g _{fs}	Transconductance	V _{DS} =20V, I _{DS} =38A		33		S
C _{iss}	Input Capacitance	V _{DS} =1000V, f=100kHz, V _{GS} =0V		3470		pF
C _{oss}	Output Capacitance			110		pF
C _{rss}	Reverse Transfer Capacitance			9		pF
E _{oss}	C _{oss} Stored Energy			68		μJ
Q _G	Total Gate Charge	V _{DD} =800V, V _{GS} =-4V to +15V, I _D =38A		136		nC
Q _{GS}	Gate-Source Charge			35		nC
Q _{GD}	Gate-Drain Charge			38		nC
t _{d(on)}	Turn-on Delay Time	V _{DD} =800V, V _{GS} =-4V to +15V, I _D =38A		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 Energy			TBD		mJ
E _{off}	Turn-off Switching Energy			TBD		mJ
R _{G-C}	Internal Gate Resistance(chip)			4.1		Ω
R _{G-M}	Internal Gate Resistance(module)			0		Ω
R _{θJC}	Thermal Resistance Junction-to-Case (per SiC MOSFET)				1.02	°C/W



Built-in SiC Body Diode

Electrical Characteristics of Diode (T_C=25°C unless otherwise specified)

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
I _S	Inverse Diode Continuous, Forward Current				90	A
I _{SM}	Inverse Diode Direct Current, Pulsed				152	A
V _{SD}	Diode Forward Voltage	I _{SD} =36A, V _{GS} =-4V		5.9		V
t _{rr}	Reverse Recovery Time	I _{SD} =38A, V _R =800V, V _{GS} =-4V		56		ns
Q _{rr}	Reverse Recovery Charge			590		nC
I _{rrm}	Peak Reverse Recovery Current			34		A

Internal NTC-Thermistor Characteristics

Symbol	Conditions	Min.	Typ.	Max.	Units
R ₂₅	T _C =25°C		22		kΩ
ΔR/R	T _C =100°C, R ₁₀₀ =1481Ω	-3		+3	%
P ₂₅	T _C =25°C		200		mW
B _{25/50}	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15K))]$		3950		K
B _{25/80}	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15K))]$		3982		K
B _{25/100}	$R_2=R_{25} \exp[B_{25/100}(1/T_2-1/(298.15K))]$		3998		K

Module

Symbol	Description	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 60s		2500	V
T _J	Maximum Junction Temperature			175	°C
T _{JOP}	Maximum Operating Junction Temperature Range	-55		+150	°C
T _{stg}	Storage Temperature	-55		+125	°C
CTI	Comparative Tracking Index	225			
R _{θCS}	Case-to-Sink Thermally (Conductive Grease Applied)			0.05	°C/W
T	Mounting Screw:M4	1.5		2.0	N·m
G	Weight		31		g



Ordering Information Table

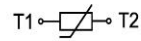
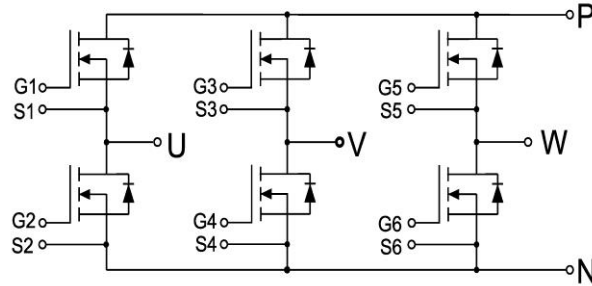
Device code

M	SC	27	FF	120	C7	H
①	②	③	④	⑤	⑥	⑦

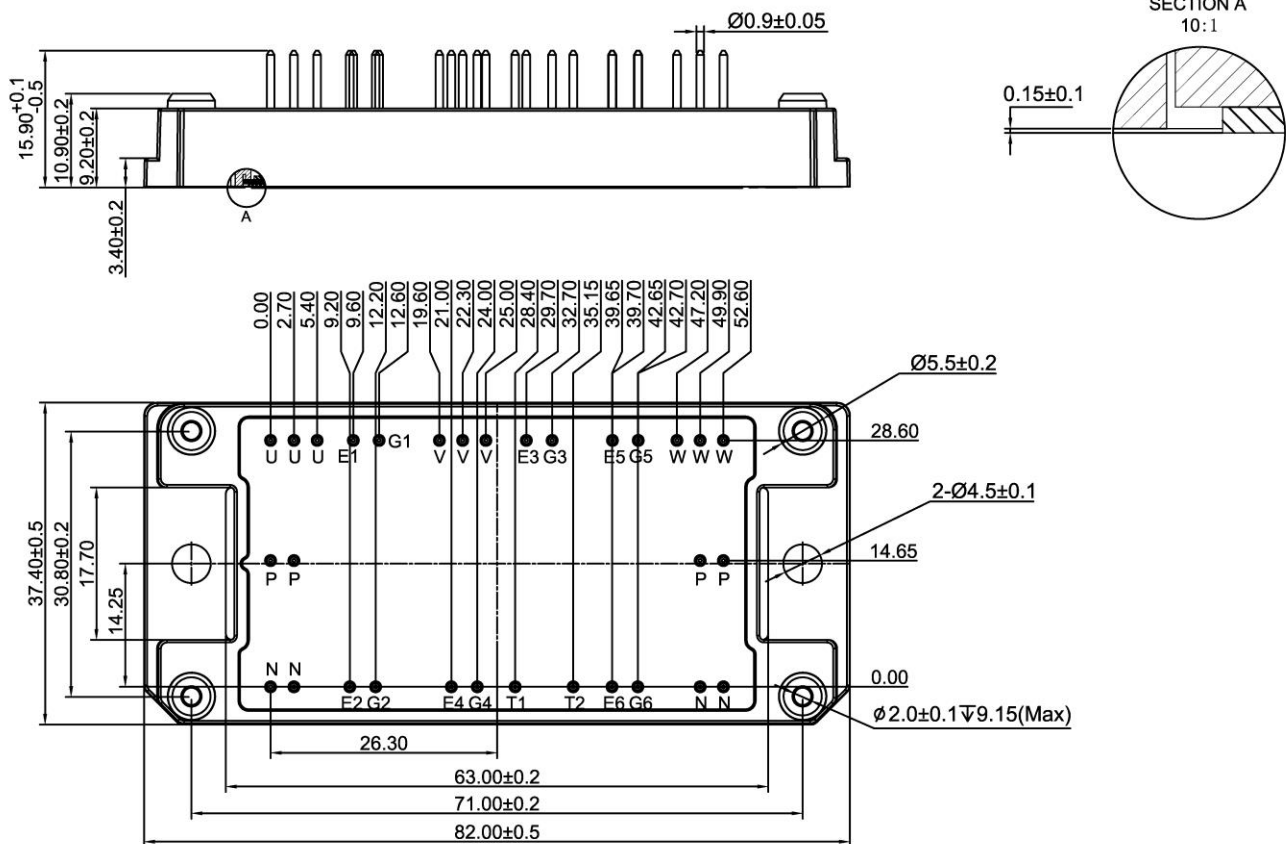
- ① - MOSFET Module
- ② - SiC MOSFET
- ③ - Rated Current (27=27A)
- ④ - Circuit Configuration (Full Bridge)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)



Internal Circuit:



Package Outline (Unit: mm):





Revision	Notes
01	Initial Release

Announcement

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