RSC90SG120B5H

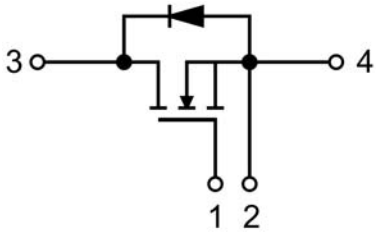
SiC MOSFET Module

Preliminary Data

Features:

- High Speed Switching
- Low Switching Losses
- Kelvin Reference for Stable Operation
- Simple to Drive
- Lead Free, Compliant with RoHS Requirement

Circuit Diagram



(1)G(Gate)
(2)S_G(Driver Source)
(3)D(Drain)
(4)S(Source)

Applications:

- Solar Inverters
- High Voltage DC/DC Converters
- SMPS, UPS
- Induction Heating and Welding
- EV Charging Stations
- Motor Drives

SiC MOSFET

Absolute Maximum Ratings (T_C=25℃unless otherwise specified)

Symbol	Description		Values	Units
V_{DSS}	Drain-Source Blocking Voltage		1200	V
V_{GSmax}	Gate-Source Voltage	Absolute Maximum Values	-10/+25	V
V_{GSop}		Recommended Operational Values	-5/+20	V
I_D	Continuous Drain Current	V_{GS}=20V, T_C=25℃	90	A
		V_{GS}=20V, T_C=100℃	66	A
$I_{D(pluse)}$	Pulsed Drain Current	Pulse width t_P limited by T_{Jmax}	240	A
P_D	Power Dissipation	T_C=25℃, T_J=175℃	600	W

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

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=3mA	1200			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=30mA	2.0	2.8	4.0	V
		V_{DS}=V_{GS}, I_D=30mA, T_J=175℃		1.9		V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=1200V, V_{GS}=0V			1	mA
I_{GSS+}	Gate-Source Leakage Current	V_{GS}=20V, V_{DS}=0V			200	nA
I_{GSS-}		V_{GS}=-5V, V_{DS}=0V			-200	nA
$R_{DS(on)}$	On State Resistance	V_{GS}=20V, I_{DS}=60A		26	33	mΩ
		V_{GS}=20V, I_{DS}=60A, T_J=175℃		45		mΩ
g_{fs}	Transconductance	V_{DS}=20V, I_{DS}=60A		24		S
C_{iss}	Input Capacitance	V_{DS}=1000V, f=200kHz, V_{GS}=0V, V_{AC}=25mV		4000		pF
C_{oss}	Output Capacitance			219		pF
C_{rss}	Reverse Transfer Capacitance			24		pF
E_{oss}	C_{oss} Stored Energy			123		μJ
Q_G	Total Gate Charge	V_{DS}=800V, V_{GS}=-5V to +20V, I_D=60A		174		nC
Q_{GS}	Gate-Source Charge			54		nC
Q_{GD}	Gate-Drain Charge			51		nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=800V, V_{GS}=-5V to +20V, I_D=60A, $R_{G(ext)}$=0.8Ω, L=325μH		14		ns
t_r	Rise Time			7		ns
$t_{d(off)}$	Turn-off Delay Time			19		ns
t_f	Fall Time			15		ns
E_{on}	Turn-on Switching Energy			576		μJ
E_{off}	Turn-off Switching Energy			120		μJ
$R_{G(int)-C}$	Internal Gate Resistance(chip)			1.0		Ω
$R_{G(int)-M}$	Internal Gate Resistance(module)			2.27		Ω
$R_{\theta JC}$	Thermal Resistance Junction-to-Case				0.25	℃/W

Built-in SiC Body Diode
Electrical Characteristics of Diode (T_C=25℃ unless otherwise specified)

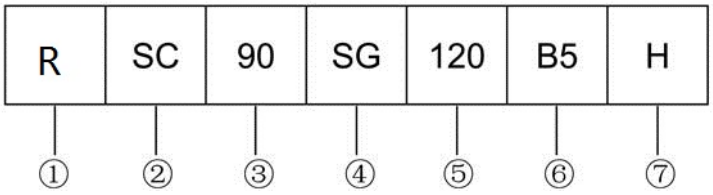
Symbol	Description	Conditions	Min.	Typ.	Max.	Units
I_S	Inverse Diode Continuous, Forward Current				102	A
V_{SD}	Diode Forward Voltage	I_{SD}=30A, V_{GS}=-5V		3.8		V
t_{rr}	Reverse Recovery Time	I_{SD}=60A, V_R=800V, V_{GS}=-5V, di/dt=8.5A/ns		10		ns
Q_{rr}	Reverse Recovery Charge			480		nC
I_{rr}	Peak Reverse Recovery Current			88		A

Module

Symbol	Description		Min.	Typ.	Max.	Units
V_{ISO}	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1minute	2500			V
Internal Isolation				Si_3N_4		
T_J	Maximum Junction Temperature				175	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-55		+175	℃
T_{stg}	Storage Temperature		-55		+175	℃
$R_{\theta CS}$	Case-to-Sink Thermally (Conductive Grease Applied)				0.21	℃/W
CTI	Comparative Tracking Index		200			
T	Power Terminals Screw:M4		1.1		1.5	N·m
T	Mounting Screw:M4		1.1		1.5	N·m
G	Weight			30		g

Ordering Information Table

Device code



① - MOSFET Module
② - SiC MOSFET
③ - Rated Current (90=90A)
④ - Circuit Configuration (Single)
⑤ - Rated Voltage (120=1200V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

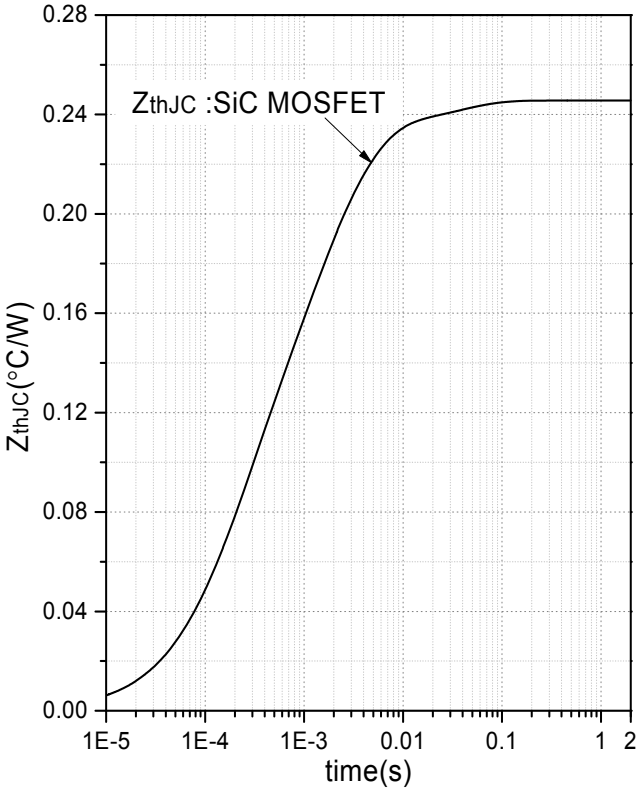
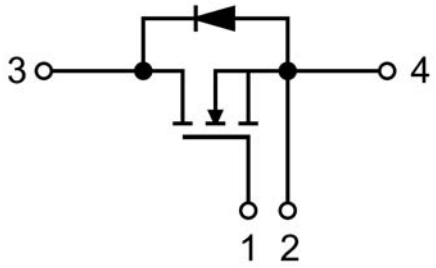


Fig.1 Transient Thermal Impedance (SiC MOSFET)

Internal Circuit



(1)G(Gate)
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Package Outline (Unit: mm):