

RSC60SD120B5H

SiC MOSFET Module

Preliminary Data

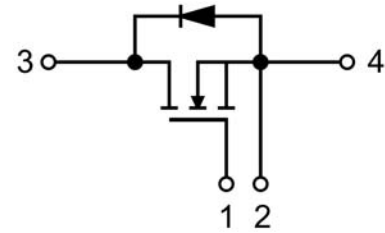
Features:

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

Applications:

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

Circuit Diagram



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

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	-10/+25
V_{GSop}		Recommended Operational Values	-5/+20
I_D	Continuous Drain Current	$V_{GS}=20\text{V}, T_C=25^\circ\text{C}$	60
		$V_{GS}=20\text{V}, T_C=100^\circ\text{C}$	44
$I_{D(pluse)}$	Pulsed Drain Current	Pulse width t_P limited by T_{Jmax}	160
P_D	Power Dissipation	$T_C=25^\circ\text{C}, T_J=175^\circ\text{C}$	405

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

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=2mA$	1200			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=20mA$	2.0	2.8	4.0	V
		$V_{DS}=V_{GS}, I_D=20mA, T_J=175^{\circ}\text{C}$		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	$V_{GS}=20V, I_{DS}=40A$		39	50	m Ω
		$V_{GS}=20V, I_{DS}=40A, T_J=175^{\circ}\text{C}$		67		m Ω
g_{fs}	Transconductance	$V_{DS}=20V, I_{DS}=40A$		16		S
C_{iss}	Input Capacitance	$V_{DS}=1000V, f=200kHz,$ $V_{GS}=0V, V_{AC}=25mV$		2672		pF
C_{oss}	Output Capacitance			146		pF
C_{rss}	Reverse Transfer Capacitance			16		pF
E_{oss}	C_{oss} Stored Energy			82		μJ
Q_G	Total Gate Charge	$V_{DS}=800V, V_{GS}=-5V \text{ to } +20V,$ $I_D=40A$		116		nC
Q_{GS}	Gate-Source Charge			36		nC
Q_{GD}	Gate-Drain Charge			34		nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=800V, V_{GS}=-5V \text{ to } +20V,$ $I_D=40A, R_{G(ext)}=1.3\Omega,$ $L=490\mu\text{H}$		12		ns
t_r	Rise Time			6		ns
$t_{d(off)}$	Turn-off Delay Time			18		ns
t_f	Fall Time			14		ns
E_{on}	Turn-on Switching Energy			385		μJ
E_{off}	Turn-off Switching Energy			80		μJ
$R_{G(int)-C}$	Internal Gate Resistance(chip)			1.5		Ω
$R_{G(int)-M}$	Internal Gate Resistance(module)			3.4		Ω
$R_{\theta JC}$	Thermal Resistance Junction-to-Case				0.37	$^{\circ}\text{C/W}$

Built-in SiC Body Diode

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

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
I_S	Inverse Diode Continuous, Forward Current				68	A
V_{SD}	Diode Forward Voltage	$I_{SD}=20\text{A}$, $V_{GS}=-5\text{V}$		3.8		V
t_{rr}	Reverse Recovery Time	$I_{SD}=40\text{A}$, $V_R=800\text{V}$, $V_{GS}=-5\text{V}$, $di/dt=8\text{A/ns}$		10		ns
Q_{rr}	Reverse Recovery Charge			320		nC
I_{rr}	Peak Reverse Recovery Current			60		A

Module

Symbol	Description	Min.	Typ.	Max.	Units
V_{ISO}	Isolation Voltage (All Terminals Shorted)	$f=50\text{Hz}$, 1minute	2500		V
Internal Isolation			Si ₃ N ₄		
T_J	Maximum Junction Temperature			175	°C
T_{JOP}	Maximum Operating Junction Temperature Range	-55		+175	°C
T_{stg}	Storage Temperature	-55		+175	°C
$R_{\theta CS}$	Case-to-Sink Thermally (Conductive Grease Applied)			0.21	°C/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

R	SC	60	SD	120	B5	H
①	②	③	④	⑤	⑥	⑦

- ① - MOSFET Module
- ② - SiC MOSFET
- ③ - Rated Current (60=60A)
- ④ - Circuit Configuration (Single)
- ⑤ - Rated Voltage (120=1200V)
- ⑥ - Package Type
- ⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

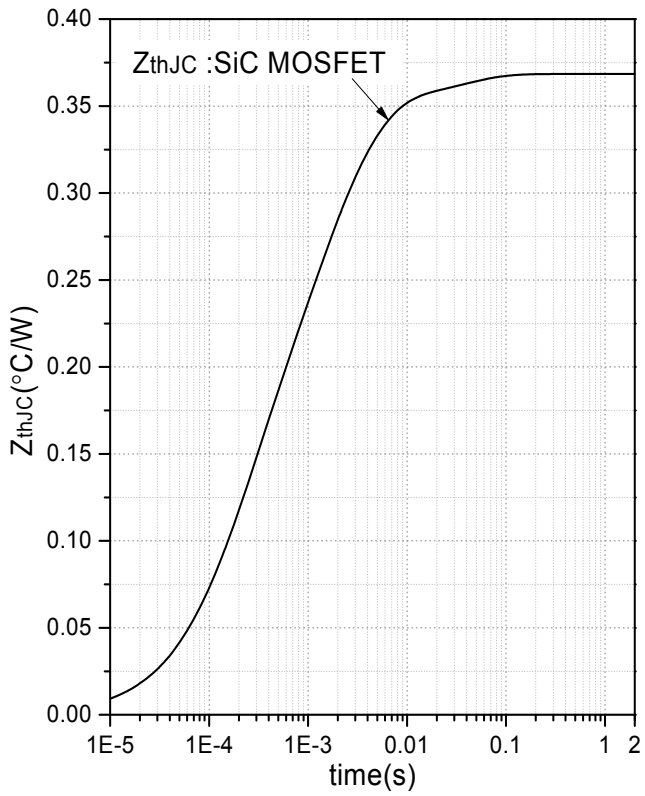


Fig.1 Transient Thermal Impedance (SiC MOSFET)

