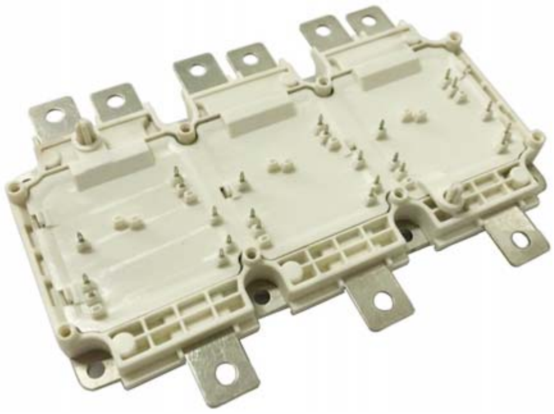
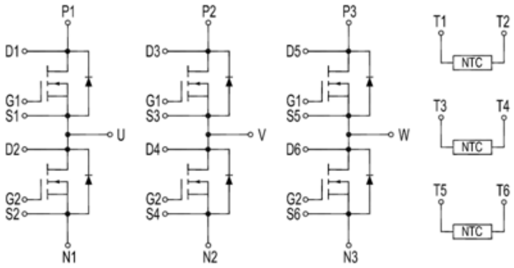
RSC300FF120C8NS-S04

Preliminary Data

SiC MOSFET Module



Notes: Signal terminal position to be defined.



Features：

- Automotive qualified base on AEC_Q101
- Ultra low loss
- High-frequency operation
- Zero turn-off tail current from MOSFET
- Normally-off, fail-safe device operation
- Easy of paralleling
- Low stray inductance
- >4kV DC 1 sec insulation
- Direct cooled pinfin base plate
- Toughened DBC substrates for superior reliability
- Integrated NTC temperature sensor
- Press fit signal terminals
- UL 94 V0 module frame
- Lead Free, Compliant with RoHS Requirement

Applications：

- Solar Inverter
- High Voltage DC/DC Converters
- Motor Drives
- EV Chargers
- UPS

Maximum Rated Values (T_F=25℃ unless otherwise specified)

Symbol	Description	Conditions	Value	Unit
V_{DSmax}	Drain-Source Voltage		1200	V
V_{GSmax}	Gate-Source Voltage	Absolute Maximum Values	-8/+19	V
V_{GSop}	Gate-Source Voltage	Recommended Operational Values	-4/+15	V
I_D	Continuous Drain Current	V_{GS}=15V, T_F=25℃	378	A
		V_{GS}=15V, T_F=100℃	300	A
$I_{D(pulse)}$	Pulsed Drain Current	Pulse width t_p limited by T_{Jmax}	720	A
P_D	Power Dissipation	T_F = 25℃, T_{Jmax}=175℃	630	W

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

Static Characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=114μA	1.20			kV
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =10V, I_D =69mA	1.8	2.5	3.6	V
		V_{DS} =10V, I_D =69mA, T_J =175℃		2.1		V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =1.2kV, V_{GS} =0V		8	1000	μA
I_{GSS}	Gate- Source Leakage Current	V_{DS} =0V, V_{GS} =15V		60	1000	nA
$R_{DS(on)}$	On State Resistance	V_{GS} =15V, I_D =240A	3.7	5.3	6.9	mΩ
		V_{GS} =15V, I_D =240A, T_J =175℃		9.6		mΩ
g_{fs}	Transconductance	V_{DS} =20V, I_D =240A		162		S
		V_{DS} =20V, I_D =240A, T_J =175℃		132		S
C_{iss}	Input Capacitance	V_{DS} =1000V, V_{GS} =0V, f =100kHz, V_{AC} =25mV		20.14		nF
C_{oss}	Output Capacitance			0.77		nF
C_{rss}	Reverse Transfer Capacitance			0.48		pF
$R_{G(int)}$	Internal Gate Resistance	f=1MHz, V_{AC}=25 mV		0.28		Ω

Q_G	Total Gate Charge	V_{DD}=800V, I_D=240A, V_{GS} = -4/15V		708		nC
Q_{GS}	Gate-Source Charge			240		nC
Q_{GD}	Gate-Drain (Miller) Charge			204		nC
$R_{\theta JF}$	Thermal Resistance, junction to cooling fluid	cooling fluid = 50% water; DV/Dt = 10,0 dm³/min		0.237		K/W

Reverse Diode Characteristics (T_F=25℃ unless otherwise specified)

Symbol	Description	Conditions	Min	Typ	Max	Unit
V_{SD}	Diode Forward Voltage	I_{SD} =120A, V_{GS} =-4V, T_J =25℃		4.6		V
		I_{SD} =120A, V_{GS} =-4V, T_J =175℃		4.0		V
t_{rr}	Reverse Recover Time	I_{SD} =240A, V_{GS} =-4V,V_R=800V, dif/dt=2850A/µs, T_J =175℃		162		ns
Q_{rr}	Reverse Recovery Charge			2.87		µC
I_{rrm}	Peak Reverse Recovery Current			162		A

Internal NTC-Thermistor Characteristic

R_{25}	T_F=25℃	5		kΩ
△R/R	T_F=100℃，R_{100} =481Ω		±5	%
P_{25}	T_F=25℃	50		mW
$B_{25/50}$	R_2=R_{25} exp[$B_{25/50}$(1/T_2-1/(298.15K))]	3380		K
$B_{25/80}$	R_2=R_{25} exp[$B_{25/80}$(1/T_2-1/(298.15K))]	3440		K

Module

Symbol	Description		Min	Typ	Max	Unit
V_{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=0Hz, t=1sec	4.2			kV
I_{tRMS}	Maximum RMS Module Terminal Current	T_F=75℃,T_{Ct}=105℃		500		A
Material of Module Base Plate			Copper			
Internal Isolation			Improved Al2O3 Ceramic			
d_{creep}	Terminal to heatsink			9.0		mm
	Terminal to Terminal			9.0		
d_{clear}	Terminal to heatsink			4.5		mm
	Terminal to Terminal			4.5		
CTI	Comparative Tracking Index		200			
T_J	Maximum Junction Temperature				175	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
L_{sCE}	Stray Inductance Module			7.6		nH
M	Power Terminals Screw: M5		2.5		5.0	N·m
M	Baseplate to Heatsink:M4		1.8		2.2	N·m
M	Screw PCB to frame		0.45	0.50	0.55	N·m
G	Weight			550		g

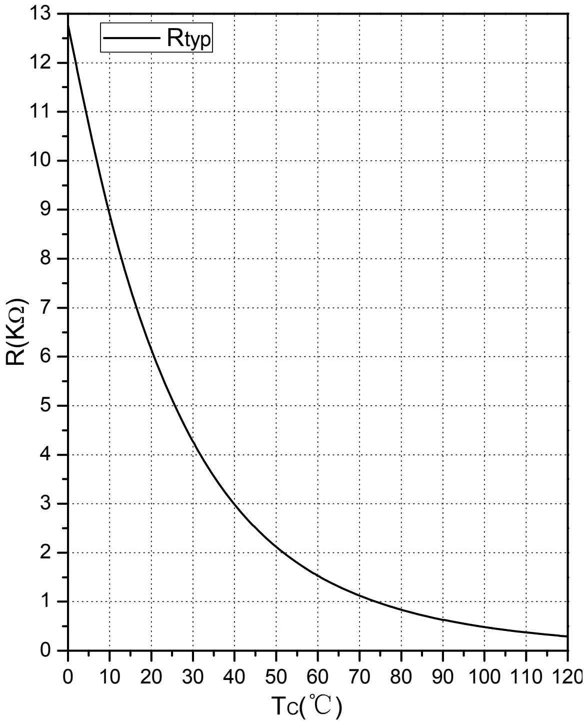
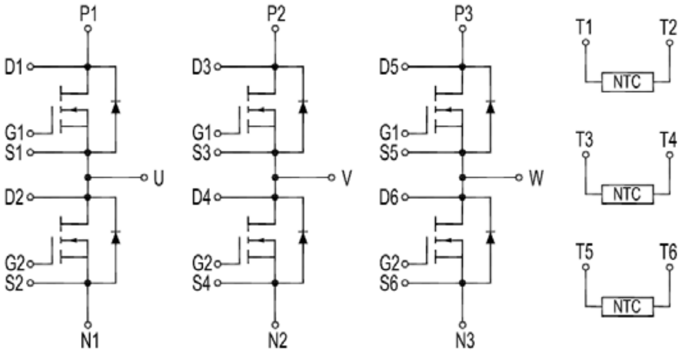
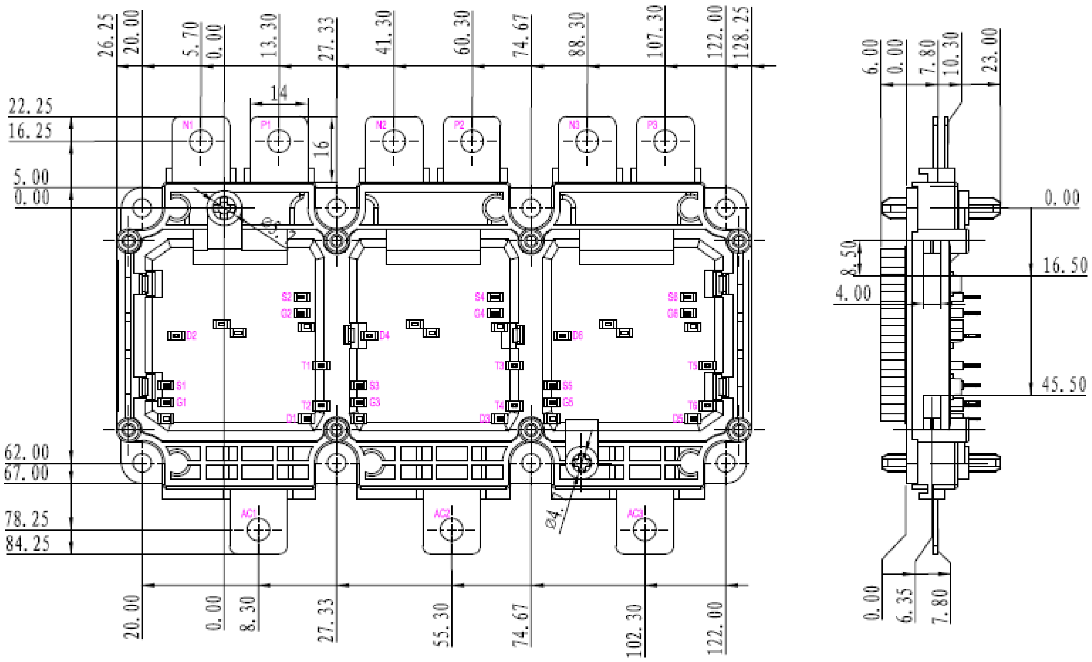


Fig.1 NTC Temperature Characteristics

Internal Circuit:



Package Outline (Unit: mm):



Notes: Signal terminal position to be defined.