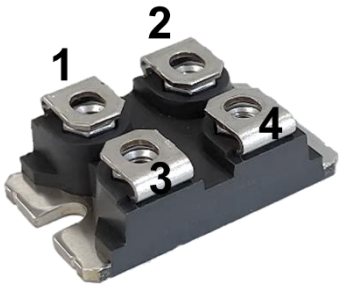
S1P12A120DDE

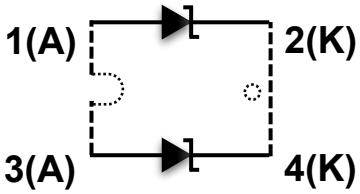
1200V / 120A SiC Schottky Diode Module

Features



- Superior Figure of Merit Q_C/I_F
- Zero Reverse Recovery Current / Zero forward recovery
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Low forward voltage
- Isolated back-side

Applications



- EV Fast Chargers
- Switch Mode Power Supplies
- Power Factor Correction
- Free Wheeling Diodes in Inverter Stages
- AC/DC Converters
- Solar Inverter
- Pulse Power

Table 1 Key performance and package parameters

Type	V_{RRM}	I_F (T_C = 110℃, $R_{th\ (j\text{-}c,max)}$)	$T_{j,max}$	Marking	Package
S1P12A120DDE	1200V	120A	175℃	S1P12A120DDE	SOT227

Table of contents

1、Maximum ratings

Table 2 Maximum rating (Tc = 25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage（Per Leg）	1200	V		
V_R	DC Peak Reverse Voltage	1200	V		
I_F	Continuous Forward Current (Per Leg)	120	A	Tc = 25˚C	
		80		Tc = 100˚C	
		60		Tc = 115˚C	
I_{FRM}	Repetitive Peak Forward Surge Current (Per Leg)	300	A	Tc =25˚C, tp=10ms	
I_{FSM}	Non-Repetitive Peak Forward Surge Current (Per Leg)	450	A	Tc = 25℃， tp = 10ms	
$\int i^2dt$	$\int i^2dt$ (Per Leg)	230	A^2s	Tc = 25℃， tp = 10 ms	
dV/dt	Diode Ruggedness (Per Leg)	200	V/ns	V_R = 0~960V	
P_{total}	Power dissipation (Per Leg)	375	W	T_C = 25˚C	
T_J ,T_{stg}	Operating Junction and storage temperature	-55 to +175	˚C		

2、Thermal / Packaging characteristics

Table 3 Thermal and packaging characteristics

Symbol	Description	Min.	Typ.	Max.	Unit	Note
R_{th-JC}	Thermal Resistance, Junction to Case	-	0.4	-	℃/W	
V_{ISO}	Isolation Test Voltage RMS, f=50Hz, t=1min	2.5	-	-	kV	
Creepage	Terminal to Heatsink Creepage Distance	-	8.5	-	mm	
	Terminal to Terminal Creepage Distance	-	10.5	-	mm	
Clearance	Terminal to Heatsink Clearance	-	6.8	-	mm	
	Terminal to Terminal Clearance	-	4.4	-	mm	
T_{jmax}	Maximum Junction Temperature	-	175	-	˚C	
T_{jop}	Operation Junction Temperature	-	-55 to +175	-	˚C	
T_{STG}	Storage Temperature Range	-	-55 to +175	-	˚C	
W	Weight	-	28.5	-	g	
T_M	Screws to Heatsink Mounting Torque	-	-	1.5	N·m	
T_C	Terminal Connection Torque (M4 *9mm)	-	-	1.3	N·m	

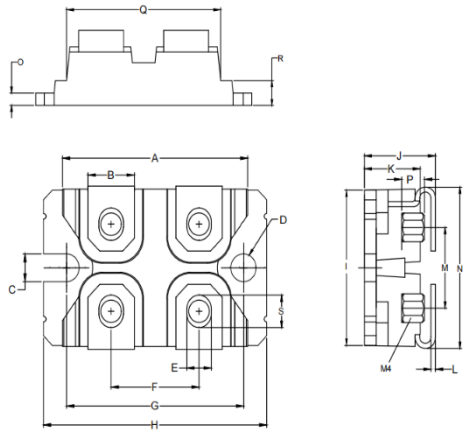
[1] Not subject to production test. Parameter verified by design/characterization.

3、Electrical characteristics

Table 4 SiC SBD characteristics (Per Leg)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
V_F	Diode Forward Voltage	-	1.5	1.8	V	I_F = 60A, T_j = 25°C	
		-	1.9	-	V	I_F = 60A, T_j = 175°C	
I_R	Reverse Current	-	2	200	μA	V_R = 1200V, T_j = 25°C	
Q_C	Total Capacitive Charge	-	288	-	nC	V_R = 800V， I_F = 60A di/dt = 200A/μs， T_j = 25°C	
C	Total Capacitance	-	4240	-	pF	V_R = 0V， T_j = 25°C, f = 1MHZ	
		-	208	-		V_R = 400V， T_j = 25°C, f = 1MHZ	
		-	152	-		V_R = 800V， T_j = 25°C, f = 1MHZ	

4、Package drawing



DiM	Millimeter	
	Min	Max
A	31.40	31.60
B	7.70	8.10
C	4.20	4.40
D	4.20	4.40
E	4.10	4.30
F	14.90	15.10
G	30.10	30.20
H	38.00	38.40
I	23.80	24.20
J	11.80	12.20
K	9.40	9.60
L	0.75	0.85
M	12.40	12.80
N	24.50	25.40
O	1.90	2.10
P	3.10	3.95
Q	26.60	27.00
R	3.80	4.20
S	5.10	5.40

Revision history

Document version	Date of release	Description of changes	
V01_00	2024-06-06	——	

Attention

1. **Rohs compliance**

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/ EC (RoHS2), as implemented January 2, 2013.

2. **REACH compliance**

REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Sichain representative to insure you get the most up-to-date REACH SVHC Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

3. With respect to information regarding the application of the product, Sichain hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

4. Any information given in this documents subject to customer's compliance with its obligations and any applicable legal requirements, norms and standards concerning any use of the product of Sichain in any customer's applications.

5. Specifications of any and all products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment.

6. Due to technical requirements products may contain dangerous substances. For information on the types in question please contact Sichain office.

7. Except as otherwise explicitly approved by Sichain in a written document signed by authorized representatives of Sichain, Sichain' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

8. For use of our products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a Sichain representatives, for example but not limited to: transportation equipment, primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, and power transmission systems.