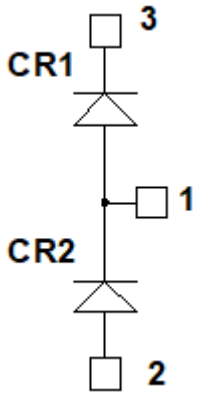
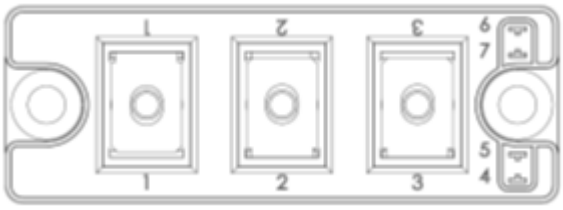
MSCDC200A120D1PAG Phase leg SiC diodes Power Module

1 Product Overview

This section shows the product overview for the MSCDC200A120D1PAG device.





All ratings at T_j = 25°C, unless otherwise specified.

Caution: These devices are sensitive to electrostatic discharge. Proper handling procedures should be followed.

1.1 Features

The following are key features of the MSCDC200A120D1PAG device:

- Silicon Carbide (SiC) Schottky Diode
  - Zero reverse recovery
  - Zero forward recovery
  - Temperature independent switching behavior
  - Positive temperature coefficient on VF
- M5 power connectors
- Aluminum nitride (AlN) substrate for improved thermal performance

1.2 Benefits

The following are benefits of the MSCDC200A120D1PAG device:

- Stable temperature behavior
- Low losses
- Direct mounting to heatsink (isolated package)
- Low junction-to-case thermal resistance
- RoHS compliant

1.3 Applications

The MSCDC200A120D1PAG device is designed for the following applications:

- Uninterruptible power supply (UPS)
- Switched mode power supply
- Welding converters
- Motor control

2 Electrical Specifications

This section shows the electrical specifications for the MSCDC200A120D1PAG device.

2.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per SiC diode for the MSCDC200A120D1PAG device.

Table 1 • Absolute Maximum Ratings

Symbol	Parameter		Maximum Ratings	Unit
V_{RRM}	Repetitive peak reverse voltage		1200	V
I_F	DC forward current	T_C = 95 °C	200	A

The following table shows the thermal and package characteristics of the MSCDC200A120D1PAG.

Table 2 • Thermal and Package Characteristics

Symbol	Characteristic			Min	Max	Unit
V_{ISOL}	RMS isolation voltage, any terminal to case t =1 minute, 50 Hz/60 Hz			4000		V
T_J	Operating junction temperature range			–40	175	°C
T_{JOP}	Recommended junction temperature under switching conditions			–40	T_{Jmax}–25	
T_{STG}	Storage temperature range			–40	125	
T_C	Operating case temperature			–40	125	
Torque	Mounting torque	To heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package weight				160	g

2.2 Electrical Performance

The following table shows the electrical characteristics per SiC diode of the MSCDC200A120D1PAG.

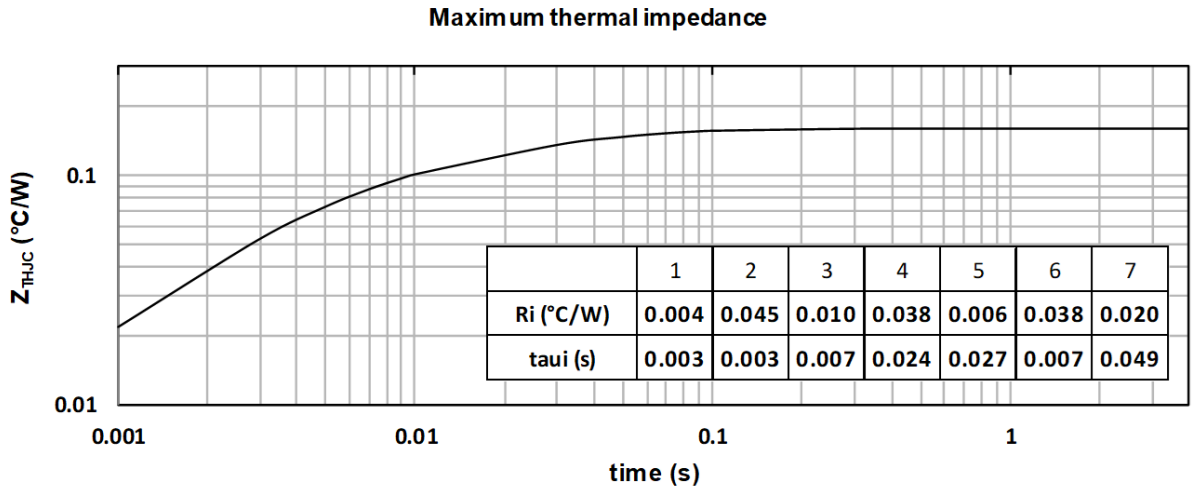
Table 3 • Electrical Characteristics Per Diode

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_F	Diode forward voltage	I_F = 200 A	T_j = 25 °C		1.5	1.8	V
			T_j = 175 °C		2.1		
I_{RM}	Reverse leakage current	V_R = 1200 V	T_j = 25 °C		60	800	µA
			T_j = 175 °C		1000		
Q_C	Total capacitive charge	V_R = 600 V			896		nC
C	Total capacitance	f = 1 MHz, V_R = 400 V			984		pF
		f = 1 MHz, V_R = 800 V			728		
R_{thJC}	Junction-to-case thermal resistance					0.16	°C/W

2.3 Performance Curves

This section shows the typical performance curves for the MSCDC200A120D1PAG device.

Figure 1 • Maximum Transient Thermal Impedance



	1	2	3	4	5	6	7
Ri (°C/W)	0.004	0.045	0.010	0.038	0.006	0.038	0.020
taui (s)	0.003	0.003	0.007	0.024	0.027	0.007	0.049

Figure 2 • Forward Current vs Forward Voltage

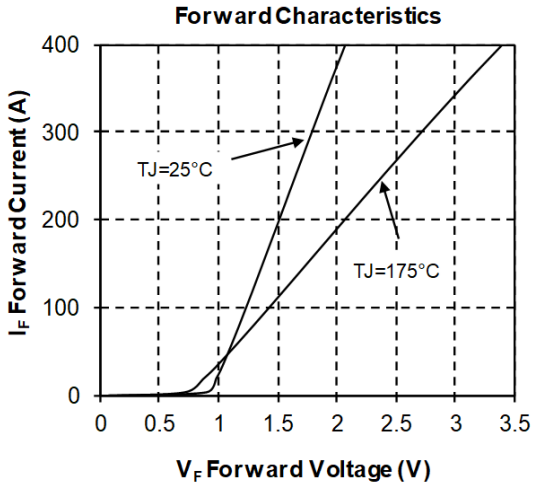
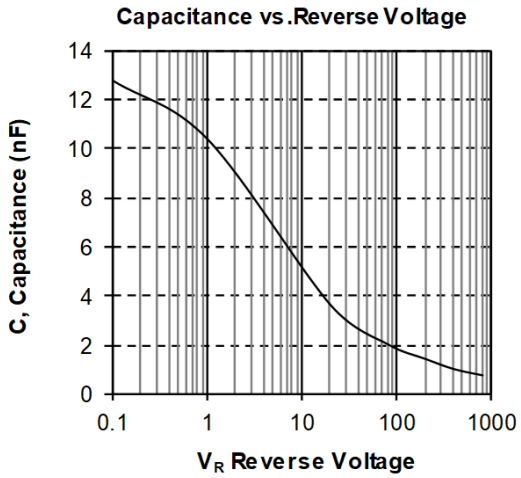


Figure 3 • Capacitance vs. Reverse Voltage



3 Package Specifications

This section shows the package specifications for the MSCDC200A120D1PAG device.

3.1 Package Outline Drawing

This section shows the package outline drawing of the MSCDC200A120D1PAG device. The dimensions in the following figure are in millimeters.

Figure 4 • Package Outline Drawing