

**MSCDC200A170D1PAG**  
**Datasheet**  
**Phase Leg SiC Diodes Power Module**

December 2019



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a  **MICROCHIP** company

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# 1 Revision History

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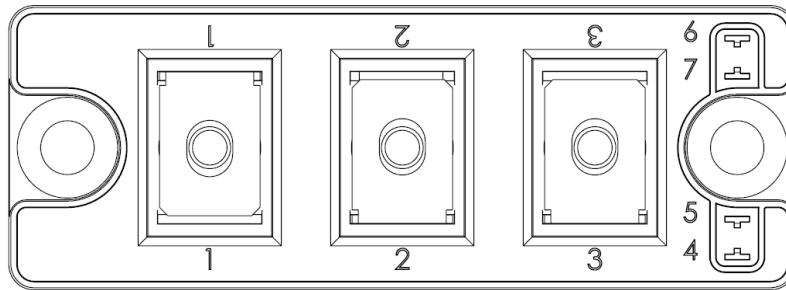
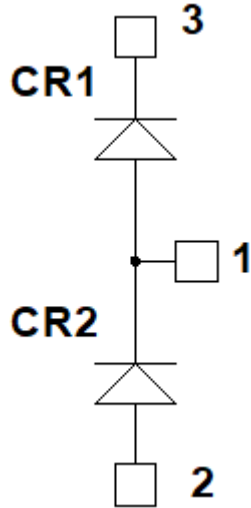
The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

## 1.1 Revision 1.0

Revision 1.0 was published in December 2019. It is the first publication of this document.

## 2 Product Overview

This section shows the product overview of the MSCDC200A170D1PAG device.



All ratings at  $T_j = 25^\circ\text{C}$ , unless otherwise specified.

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

### 2.1 Features

The following are key features of the MSCDC200A170D1PAG 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

### 2.2 Benefits

The following are benefits of the MSCDC200A170D1PAG device:

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

## 2.3 Applications

The MSCDC200A170D1PAG device is designed for the following applications:

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

## 3 Electrical Specifications

This section shows the electrical specifications of the MSCDC200A170D1PAG device.

### 3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per SiC diode of the MSCDC200A170D1PAG device.

**Table 1 • Absolute Maximum Ratings**

Symbol	Parameter		Max Ratings	Unit
$V_{RRM}$	Repetitive peak reverse voltage		1700	V
$I_F$	DC forward current	$T_C = 125\text{ }^{\circ}\text{C}$	200	A

The following table shows the thermal and package characteristics of the MSCDC200A170D1PAG device.

**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	$^{\circ}\text{C}$
$T_{JOP}$	Recommended junction temperature under switching conditions			-40	$T_{Jmax} - 25$	
$T_{STG}$	Storage temperature range			-40	125	
TC	Operating case temperature			-40	125	
Torque	Mounting torque	For terminals	M5	2	3.5	N.m
		To heatsink	M6	3	5	
Wt	Package weight				160	g

### 3.2 Electrical Performance

The following table shows the electrical characteristics per SiC diode of the MSCDC200A170D1PAG device.

**Table 3 • Electrical Characteristics**

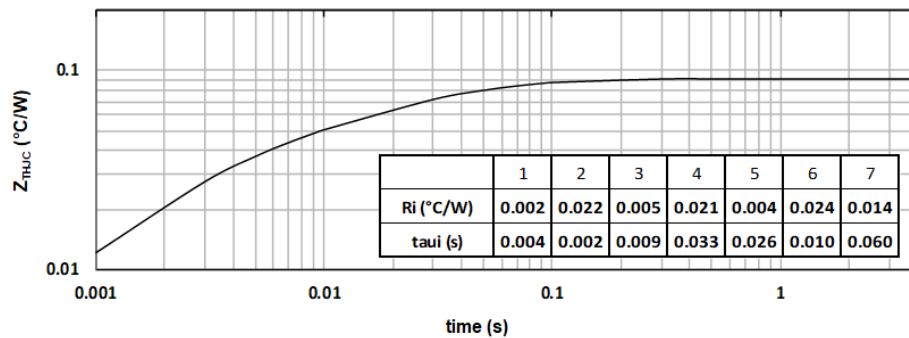
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
$V_F$	Diode forward voltage	$I_F = 200\text{ A}$	$T_J = 25\text{ }^{\circ}\text{C}$		1.5	1.8	V
			$T_J = 175\text{ }^{\circ}\text{C}$		2		
$I_{RM}$	Reverse leakage current	$V_R = 1700\text{ V}$	$T_J = 25\text{ }^{\circ}\text{C}$		200	800	$\mu\text{A}$
			$T_J = 175\text{ }^{\circ}\text{C}$		1000		

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$Q_C$	Total capacitive charge	$V_R = 900\text{ V}$		1640		nC
C	Total capacitance	$f = 1\text{ MHz}, V_R = 600\text{ V}$		1200		pF
		$f = 1\text{ MHz}, V_R = 900\text{ V}$		1000		
$R_{thJC}$	Junction-to-case thermal resistance				0.092	$^{\circ}\text{C/W}$

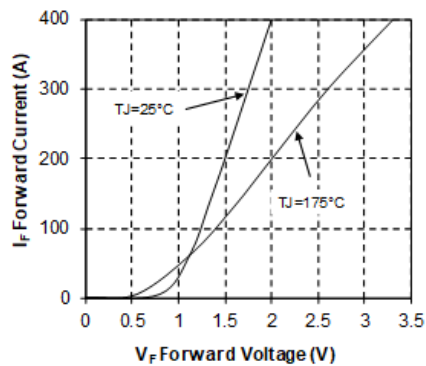
### 3.3 Performance Curves

This section shows the typical performance curves for the MSCDC200A170D1PAG device.

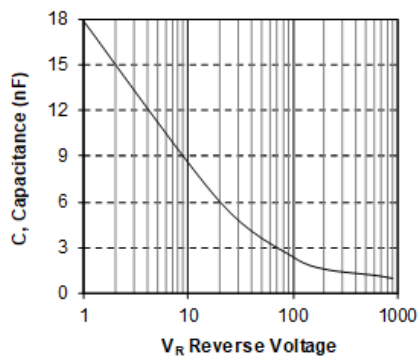
**Figure 1 • Maximum Thermal Impedance**



**Figure 2 • Forward Characteristics**



**Figure 3 • Capacitance vs. Reverse Voltage**



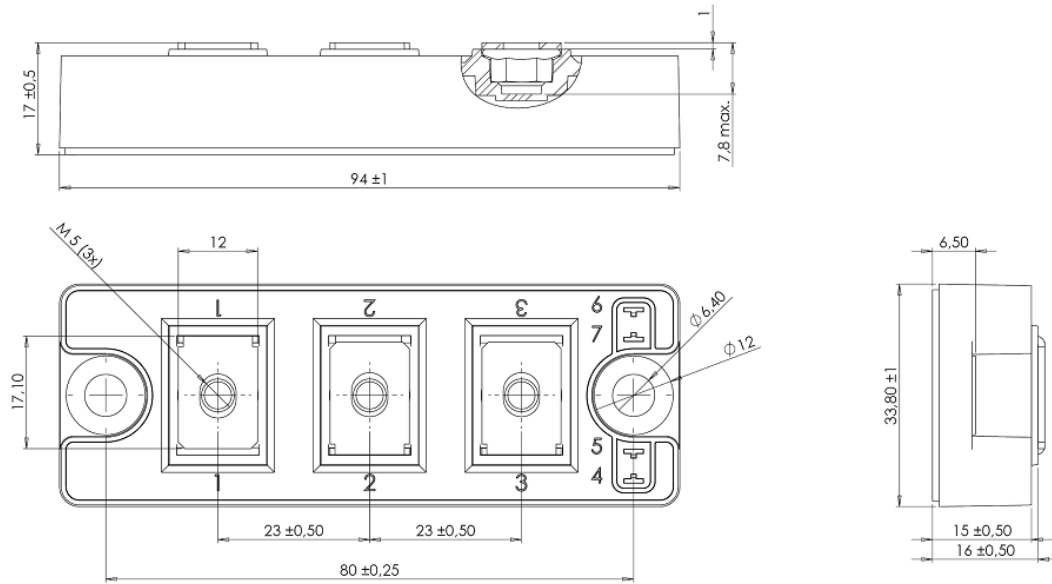
## 4 Package Specifications

This section shows the package specifications of the MSCDC200A170D1PAG device.

## 4.1 Package Outline Drawing

This section shows the package outline drawing of the MSCDC200A170D1PAG device. The dimensions in the following figure are in millimeters.

### Figure 4 • Package Outline Drawing







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MSCC-0344-DS-01046-1.0-1119

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