

**MSCDC100H170AG**  
**Datasheet**  
**SiC Diode Full Bridge Power Module**

December 2019



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# 1 Revision History

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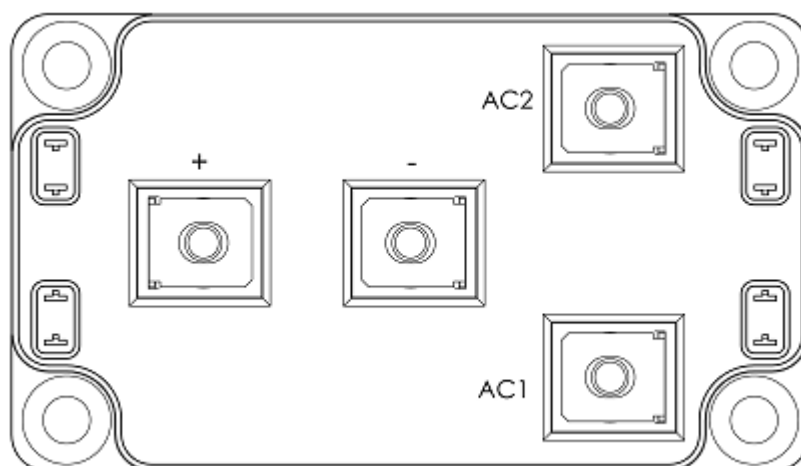
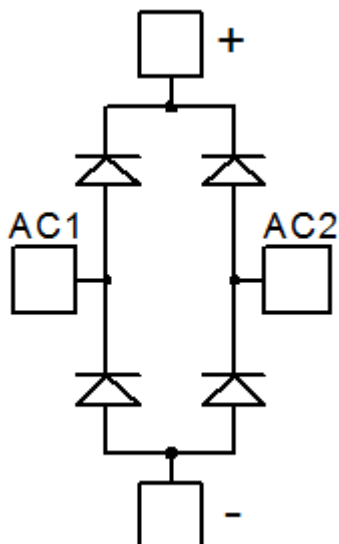
The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

## 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 MSCDC100H170AG device.



All ratings at  $T_j = 25\text{ }^{\circ}\text{C}$ , 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 MSCDC100H170AG device:

- Silicon Carbide (SiC) Schottky Diode
  - Zero reverse recovery
  - Zero forward recovery
  - Temperature independent switching behavior
  - Positive temperature coefficient on VF

- High blocking voltage
- Low stray inductance
- M5 power connectors
- Aluminum nitride (AlN) substrate for improved thermal performance

## 2.2 Benefits

The following are benefits of the MSCDC100H170AG device:

- Outstanding performance at high frequency operation
- Low losses
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- RoHS compliant

## 2.3 Applications

The MSCDC100H170AG device is designed for the following applications:

- Uninterruptible Power Supply (UPS)
- Induction heating
- Welding equipment
- High-speed rectifiers

## 3 Electrical Specifications

This section shows the electrical specifications of the MSCDC100H170AG device.

### 3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per SiC diode of the MSCDC100H170AG device.

**Table 1 • Absolute Maximum Ratings**

| Symbol    | Parameter                       |                                     | Max Ratings | Unit |
|-----------|---------------------------------|-------------------------------------|-------------|------|
| $V_{RRM}$ | Repetitive peak reverse voltage |                                     | 1700        | V    |
| $I_F$     | DC forward current              | $T_C = 125\text{ }^{\circ}\text{C}$ | 100         | A    |

**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             |                    |
| $T_C$      | Operating case temperature                                              |               |    | -40  | 125             |                    |
| Torque     | Mounting torque                                                         | To heatsink   | M6 | 3    | 5               | N.m                |
|            |                                                                         | For terminals | M5 | 2    | 3.5             |                    |
| Wt         | Package weight                                                          |               |    |      | 300             | g                  |

### 3.2 Electrical Performance

The following table shows the thermal and package characteristics of the MSCDC100H170AG device.

**Table 3 • Electrical Characteristics**

| Symbol   | Characteristic          | Test Conditions       |                                     | Min | Typ | Max | Unit          |
|----------|-------------------------|-----------------------|-------------------------------------|-----|-----|-----|---------------|
| $V_F$    | Diode forward voltage   | $I_F = 100\text{ A}$  | $T_J = 25\text{ }^{\circ}\text{C}$  |     | 1.5 | 1.8 | V             |
|          |                         |                       | $T_J = 175\text{ }^{\circ}\text{C}$ |     | 2   |     |               |
| $I_{RM}$ | Reverse leakage current | $V_R = 1700\text{ V}$ | $T_J = 25\text{ }^{\circ}\text{C}$  |     | 100 | 400 | $\mu\text{A}$ |
|          |                         |                       | $T_J = 175\text{ }^{\circ}\text{C}$ |     | 500 |     |               |

| Symbol     | Characteristic                      | Test Conditions                        | Min | Typ | Max   | Unit |
|------------|-------------------------------------|----------------------------------------|-----|-----|-------|------|
| $Q_C$      | Total capacitive charge             | $V_R = 900\text{ V}$                   |     | 820 |       | nC   |
| C          | Total capacitance                   | $f = 1\text{ MHz}, V_R = 600\text{ V}$ |     | 600 |       | pF   |
|            |                                     | $f = 1\text{ MHz}, V_R = 900\text{ V}$ |     | 500 |       |      |
| $R_{thJC}$ | Junction-to-case thermal resistance |                                        |     |     | 0.174 | °C/W |

### 3.3 Typical Performance Curves

This section shows the typical performance curves of the MSCDC100H70AG device.

Figure 1 • Maximum Transient Thermal Impedance

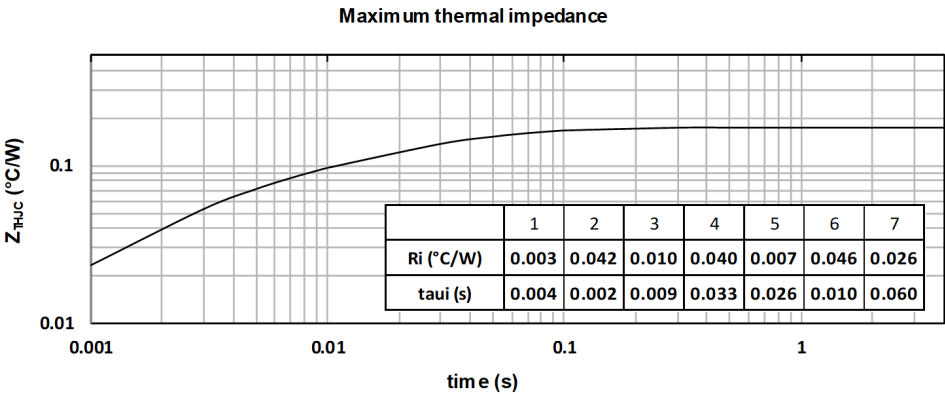


Figure 2 • Forward Current vs. Forward Voltage

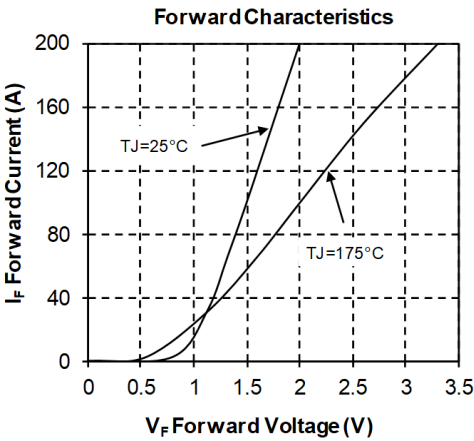
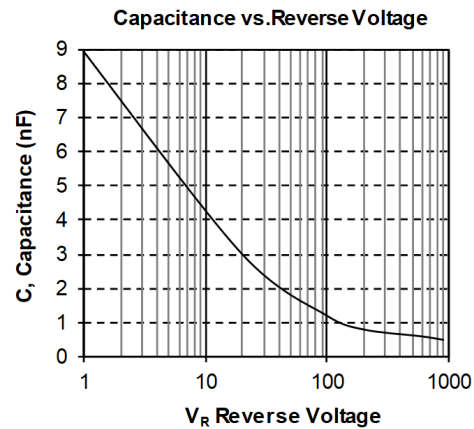


Figure 3 • Capacitance vs. Reverse Voltage



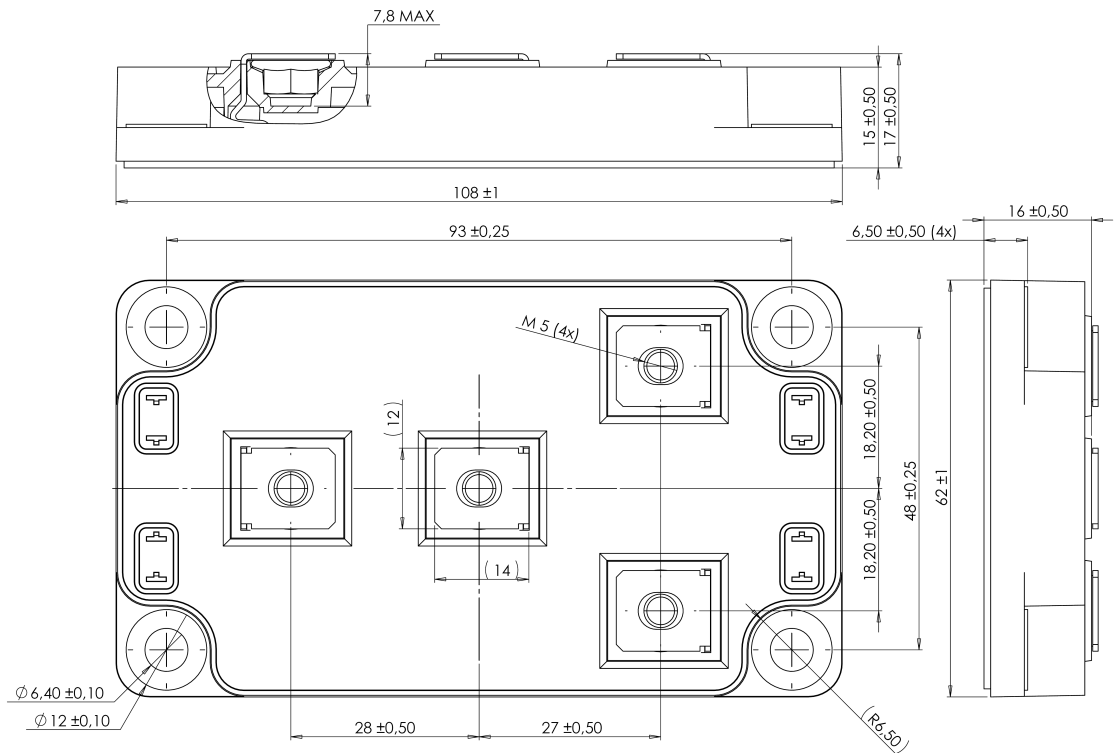
## 4 Package Specification

This section shows the package specifications for the MSCDC100H170AG device.

### 4.1 Package Outline Drawing

The following image illustrates the MSCDC100H170AG device. The dimensions in the following figure are in millimeters.

**Figure 4 • Package Outline Drawing**





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