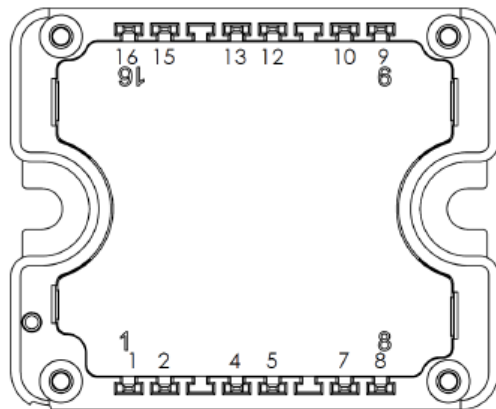
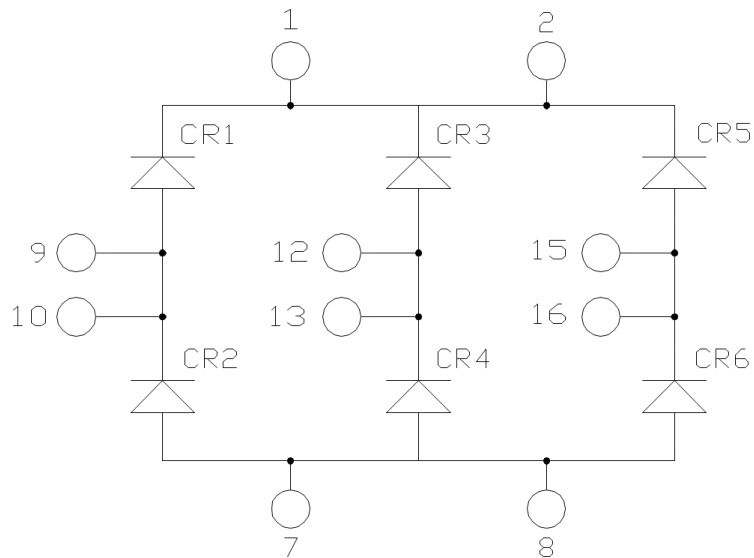


## MSCDC50X701AG SiC Diode 3 Phase Bridge Power Module

### 1 Product Overview

This section shows the product overview of the MSCDC50X701AG device.



All multiple inputs and outputs must be shorted together  
1/2 ; 7/8 ; 9/10 ; 12/13 ; 15/16

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.

## 1.1 Features

The following are key features of the MSCDC50X701AG device:

- Silicon carbide (SiC) Schottky Diode
  - Zero reverse recovery
  - Zero forward recovery
  - Temperature-independent switching behavior
  - Positive temperature coefficient on VF
- Very low stray inductance
- High blocking voltage
- Aluminum nitride (AlN) substrate for improved thermal performance

## 1.2 Benefits

The following are benefits of the MSCDC50X701AG device:

- Outstanding performance at high-frequency operation
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low profile
- RoHS compliant

## 1.3 Applications

The MSCDC50X701AG device is designed for the following applications:

- Welding converters
- Switched mode power supplies
- Uninterruptible power supplies
- Battery DC power supply

## 2 Electrical Specifications

This section shows the electrical specifications of the MSCDC50X701AG device.

### 2.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per SiC diode of the MSCDC50X701AG device.

**Table 1 • Absolute Maximum Ratings**

| Symbol    | Parameter                       | Maximum Ratings                        | Unit |
|-----------|---------------------------------|--|------|
| $V_{RRM}$ | Repetitive peak reverse voltage | 700                                    | V    |
| $I_F$     | DC forward current              | $T_C = 80\text{ }^\circ\text{C}$<br>50 | A    |

The following table shows the thermal and package characteristics of the MSCDC50X701AG 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             |                  |    |     |
| $T_C$      | Operating case temperature  | -40         | 125             |                  |    |     |
| Torque     | Mounting torque   | To heatsink | M4              | 2                | 3  | N.m |
| Wt         | Package weight  |             |                 |                  | 80 | g   |

### 2.2 Electrical Performance

The following table shows the electrical characteristics per SiC diode of the MSCDC50X701AG device.

**Table 3 • Electrical Characteristics**

| Symbol     | Characteristic                      | Test Conditions   | Min | Typ        | Max  | Unit               |
|------------|-------------------------------------|---|-----|------------|------|--------------------|
| $V_F$      | Diode forward voltage               | $I_F = 50\text{ A}$<br>$T_J = 25\text{ }^\circ\text{C}$<br>$T_J = 175\text{ }^\circ\text{C}$  |     | 1.5<br>1.9 | 1.8  | V                  |
| $I_{RM}$   | Reverse leakage current             | $V_R = 700\text{ V}$<br>$T_J = 25\text{ }^\circ\text{C}$<br>$T_J = 175\text{ }^\circ\text{C}$ |     | 15<br>250  | 200  | $\mu\text{A}$      |
| $Q_C$      | Total capacitive charge             | $V_R = 400\text{ V}$  |     | 133        |      | nC                 |
| C          | Total capacitance                   | $f = 1\text{ MHz}, V_R = 200\text{ V}$<br>$f = 1\text{ MHz}, V_R = 400\text{ V}$              |     | 248<br>216 |      | pF                 |
| $R_{thJC}$ | Junction-to-case thermal resistance |   |     |            | 0.86 | $^\circ\text{C/W}$ |

## 2.3 Typical Performance Curves

This section shows the typical performance curves of the MSCDC50X701AG device.

Figure 1 • Maximum Transient Thermal Impedance

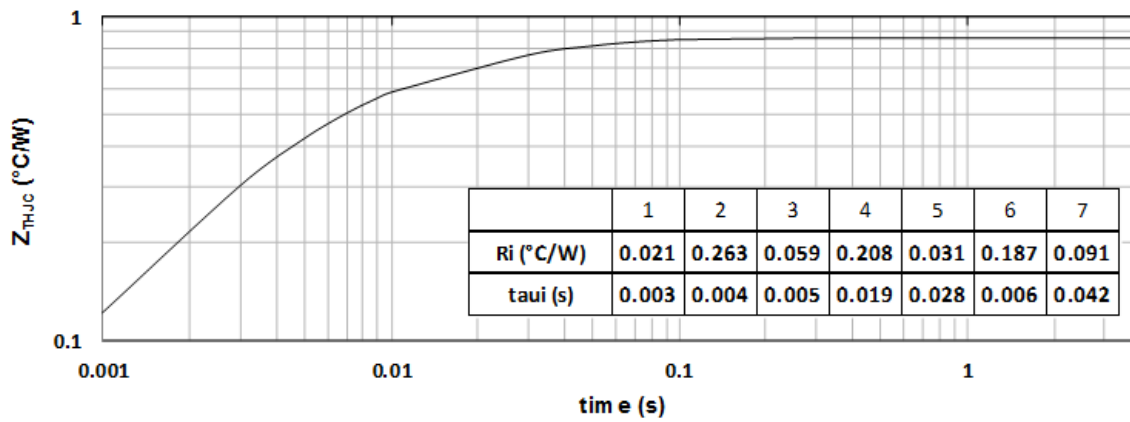


Figure 2 • Forward Current vs. Forward Voltage

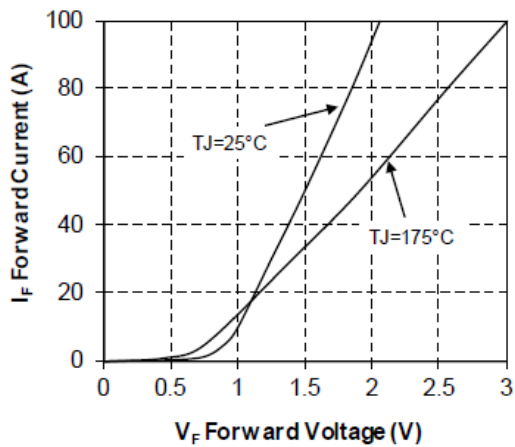
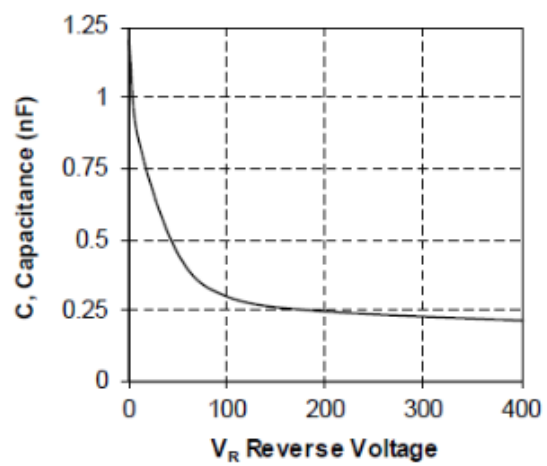


Figure 3 • Capacitance vs. Reverse Voltage



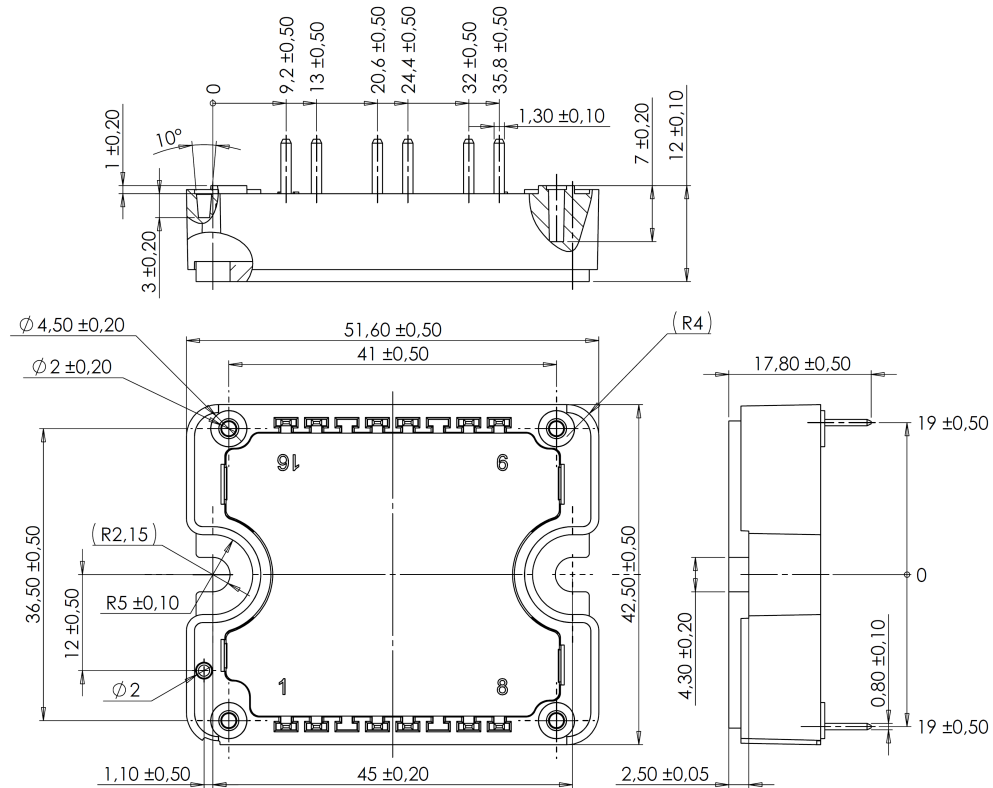
## 3 Package Specifications

This section shows the package specifications for the MSCDC50X701AG device.

### 3.1 Package Outline Drawing

The package outline of the MSCDC50X701AG device is illustrated in this section. The dimensions in the following figure are in millimeters.

Figure 4 • Package Outline Drawing





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MSCC-0344-DS-01023-1.0-0619 | June 2019 | Final

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