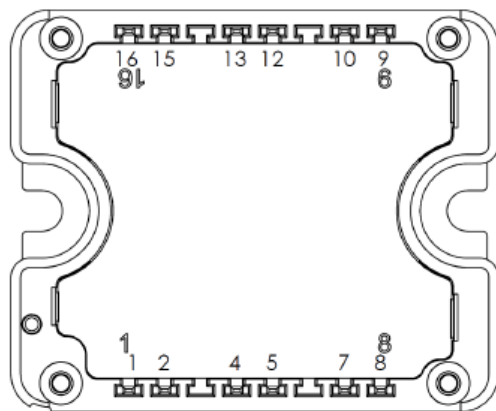
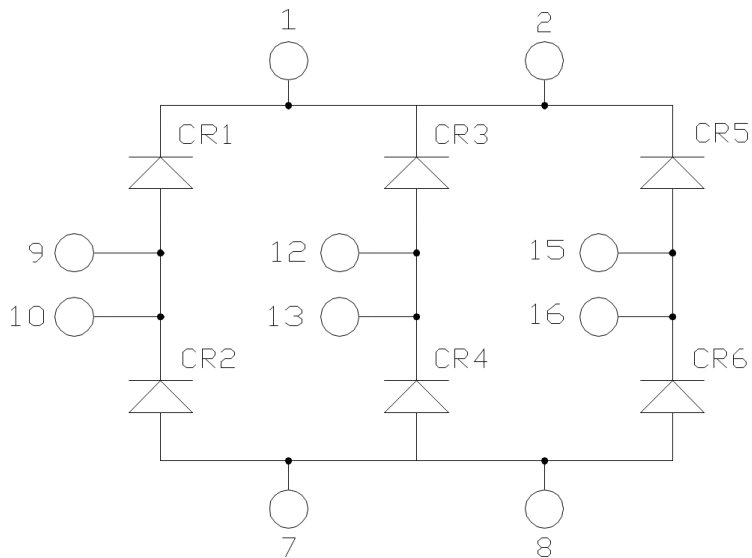


# MSCDC50X701AG SiC Diode 3 Phase Bridge Power Module

## 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	$T_C = 80\text{ }^\circ\text{C}$ 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	$I_F = 50\text{ A}$ $T_J = 25\text{ }^\circ\text{C}$ $T_J = 175\text{ }^\circ\text{C}$		1.5 1.9	1.8	V
$I_{RM}$	Reverse leakage current	$V_R = 700\text{ V}$ $T_J = 25\text{ }^\circ\text{C}$ $T_J = 175\text{ }^\circ\text{C}$		15 250	200	$\mu\text{A}$
$Q_C$	Total capacitive charge	$V_R = 400\text{ V}$		133		nC
C	Total capacitance	$f = 1\text{ MHz}, V_R = 200\text{ V}$ $f = 1\text{ MHz}, V_R = 400\text{ V}$		248 216		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

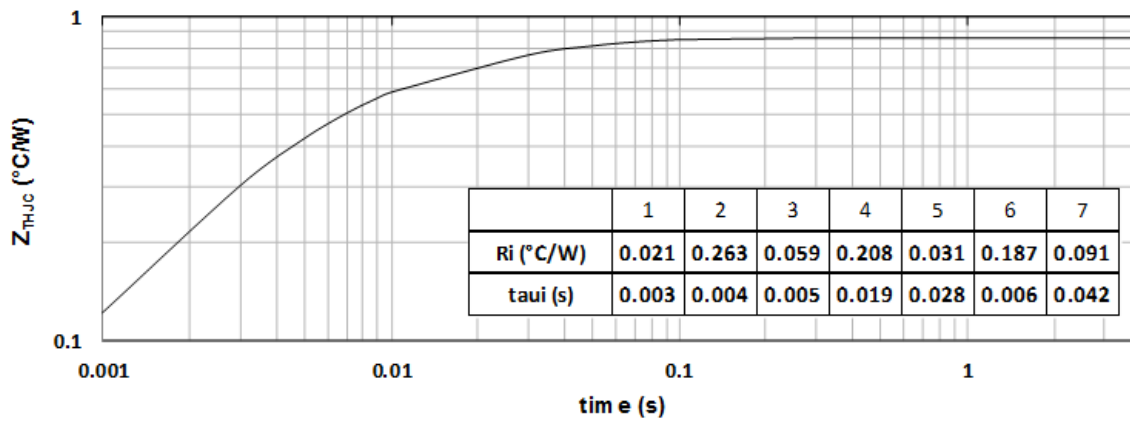


Figure 2 • Forward Current vs. Forward Voltage

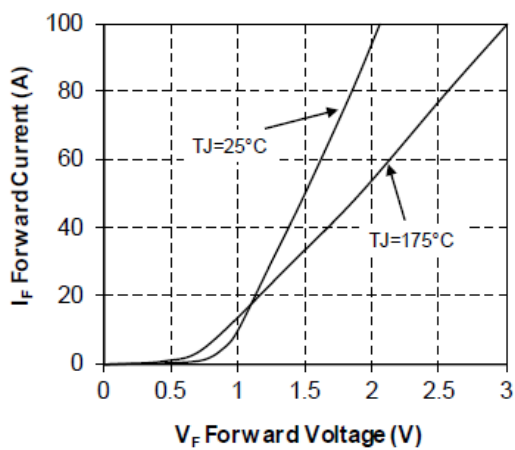
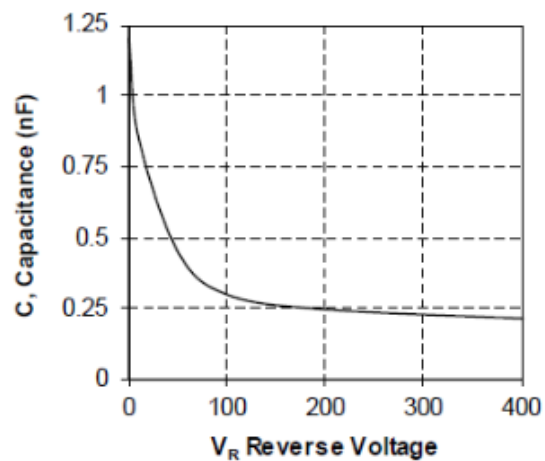


Figure 3 • Capacitance vs. Reverse Voltage



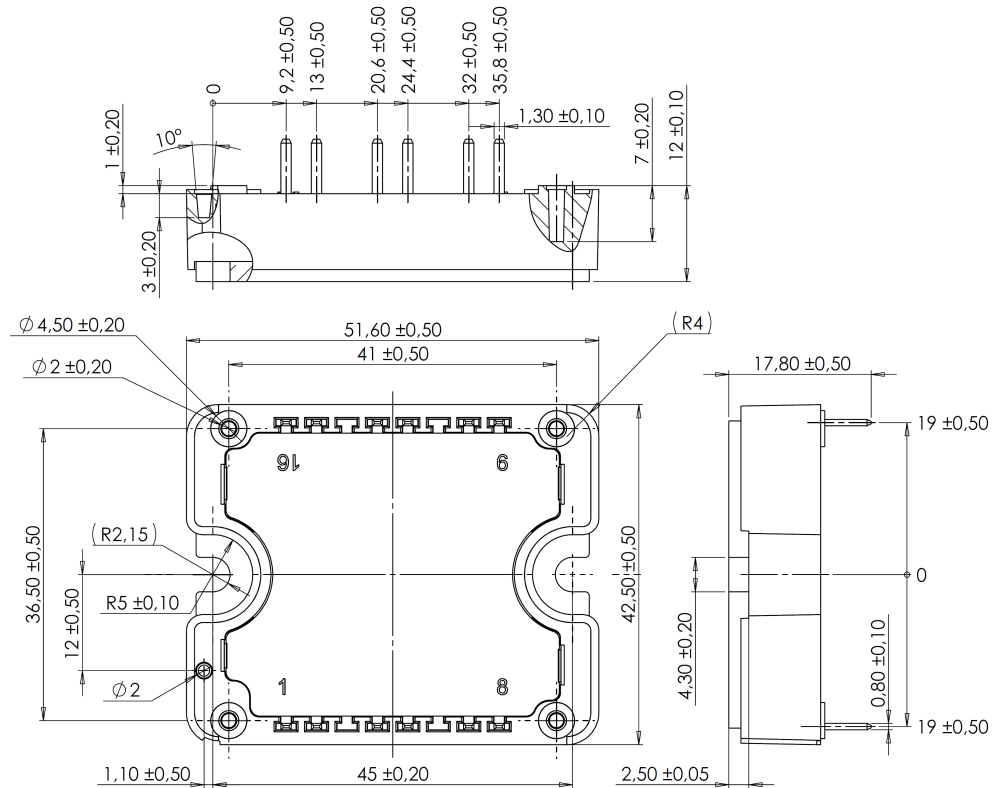
### 3 Package Specifications

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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