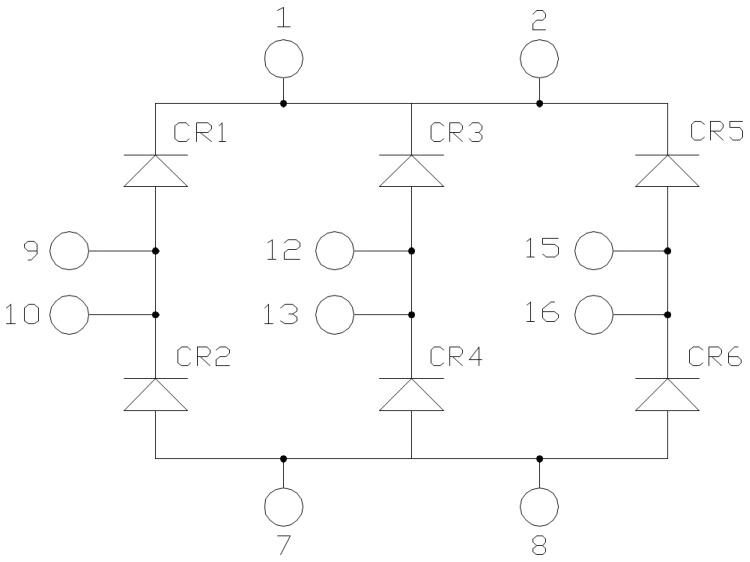
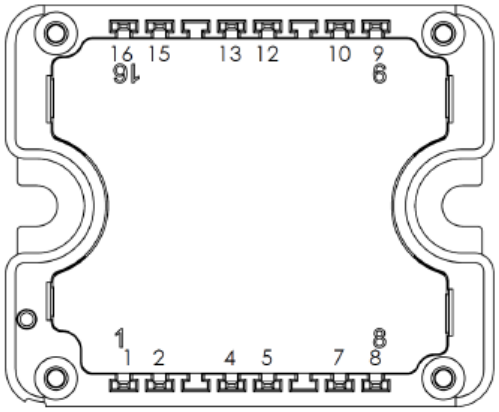
MSCDC50X701AG SiC Diode 3 Phase Bridge Power Module

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 °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 °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	°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.

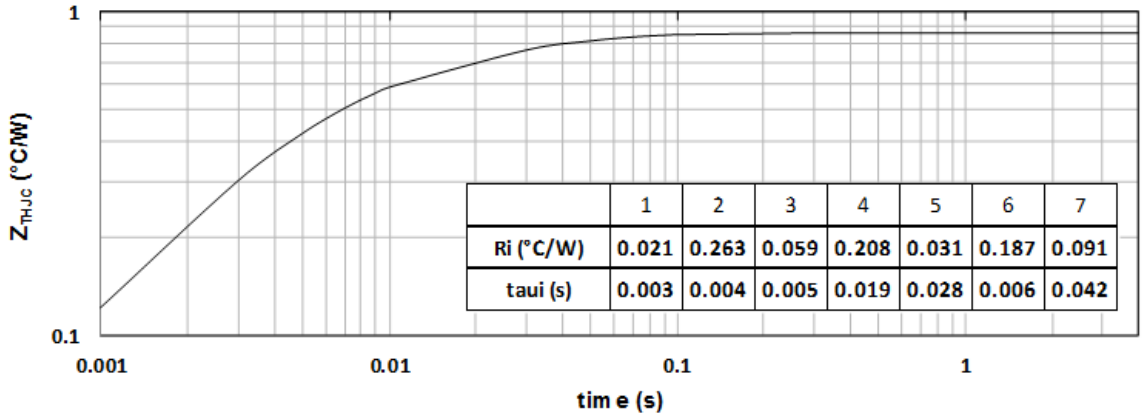
Table 3 • Electrical Characteristics

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

2.3 Typical Performance Curves

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

Figure 1 • Maximum Transient Thermal Impedance



	1	2	3	4	5	6	7
Ri (°C/W)	0.021	0.263	0.059	0.208	0.031	0.187	0.091
taui (s)	0.003	0.004	0.005	0.019	0.028	0.006	0.042

Figure 2 • Forward Current vs. Forward Voltage

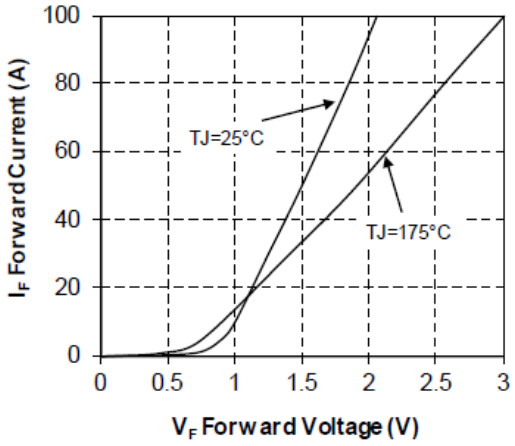
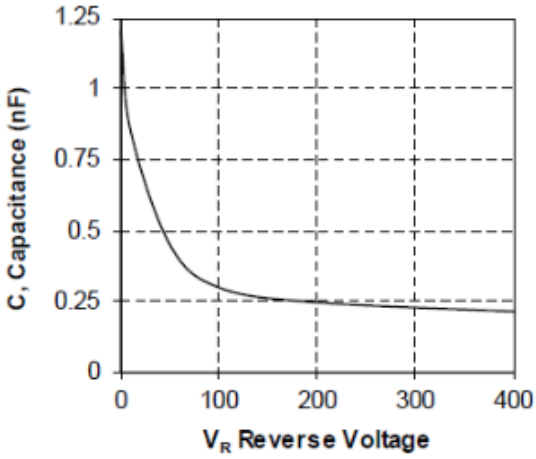


Figure 3 • Capacitance vs. Reverse Voltage



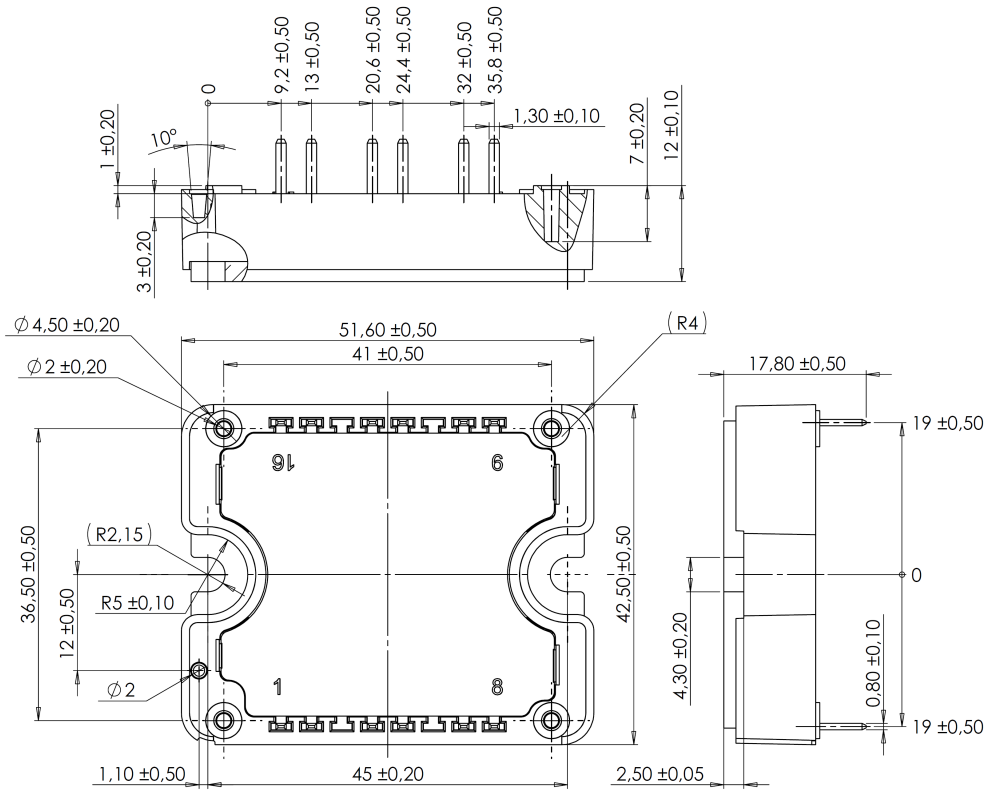
3 Package Specifications

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



Microsemi Headquarters
One Enterprise, Aliso Viejo,
CA 92656 USA
Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Sales: +1 (949) 380-6136
Fax: +1 (949) 215-4996
Email: sales.support@microsemi.com
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