

MSCDC50H1701AG
Datasheet
SiC Diode Full Bridge Power Module

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a  **MICROCHIP** company

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1 Revision History

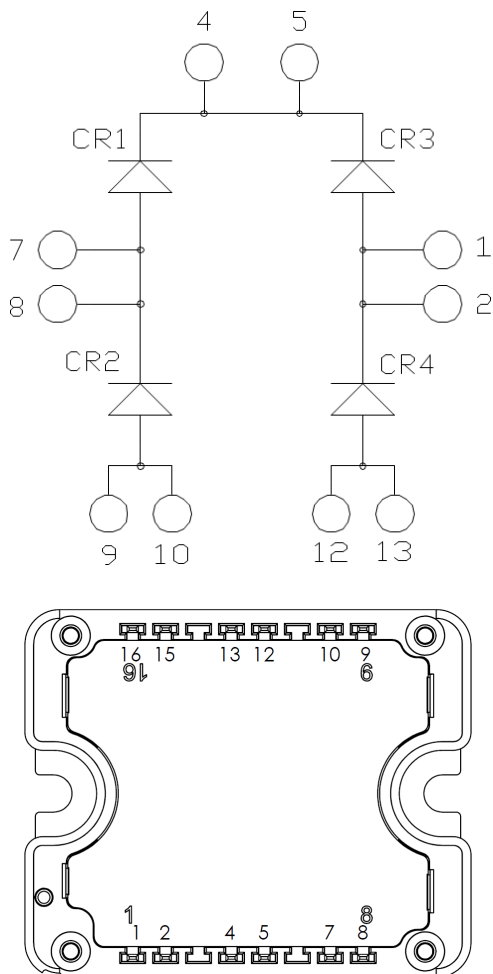
The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

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 MSCDC50H1701AG device.



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

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 MSCDC50H1701AG device:

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

- Very low stray inductance
- Aluminum nitrate (AlN) substrate for improved thermal performance

2.2 Benefits

The following are benefits of the MSCDC50H1701AG device:

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

2.3 Applications

The MSCDC50H1701AG device is designed for the following applications:

- Uninterruptible power supplies
- Induction heating
- Welding equipment
- High-speed rectifiers

3 Electrical Specifications

This section shows the electrical specifications of the MSCDC50H1701AG device.

3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per SiC diode of the MSCDC50H1701AG device

Table 1 • Absolute Maximum Ratings

Symbol	Parameter		Max Ratings	Unit
V_{RRM}	Repetitive peak reverse voltage		1700	V
I_F	DC forward current	$T_C = 125\text{ }^{\circ}\text{C}$	50	A

Table 2 • Thermal and Package Characteristics

Symbol	Characteristics			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

3.2 Electrical Performance

The following table shows the electrical characteristics per SiC diode of the MSCDC50H1701AG.

Table 3 • Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_F	Diode forward voltage	$I_F = 50\text{ A}$	$T_J = 25\text{ }^{\circ}\text{C}$		1.5	1.8	V
			$T_J = 175\text{ }^{\circ}\text{C}$		2		
I_{RM}	Reverse leakage current	$V_R = 1700\text{ V}$	$T_J = 25\text{ }^{\circ}\text{C}$		50	200	μA
			$T_J = 175\text{ }^{\circ}\text{C}$		250		
Q_C	Total capacitive charge	$V_R = 900\text{ V}$			410		nC

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C	Total capacitance	f = 1 MHz, V _R = 600 V		300		pF
		f = 1 MHz, V _R = 900 V		250		
R _{thJC}	Junction-to-case thermal resistance				0.32	°C/W

3.3 Typical Performance Curves

This following section shows the typical performance curves of the MSCDC50H1701AG device.

Figure 1 • Maximum Transient Thermal Impedance

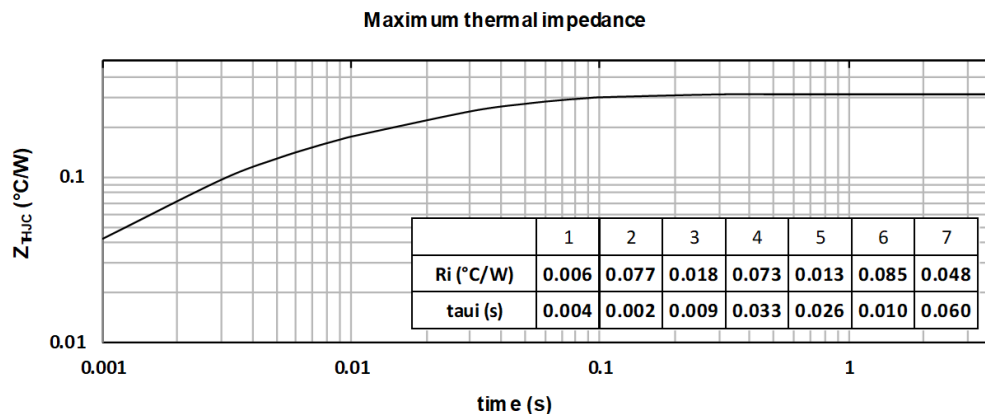


Figure 2 • Forward Current vs. Forward Voltage

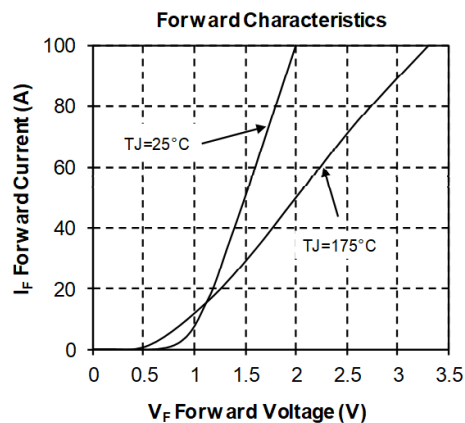
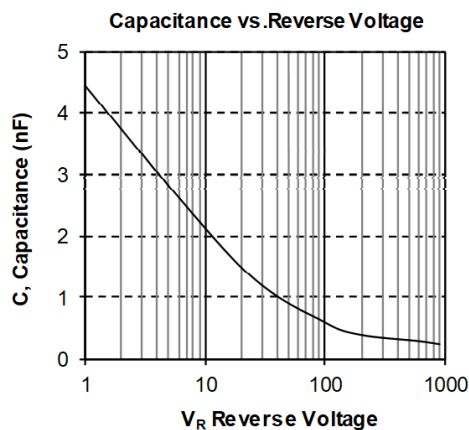


Figure 3 • Capacitance vs. Reverse Voltage



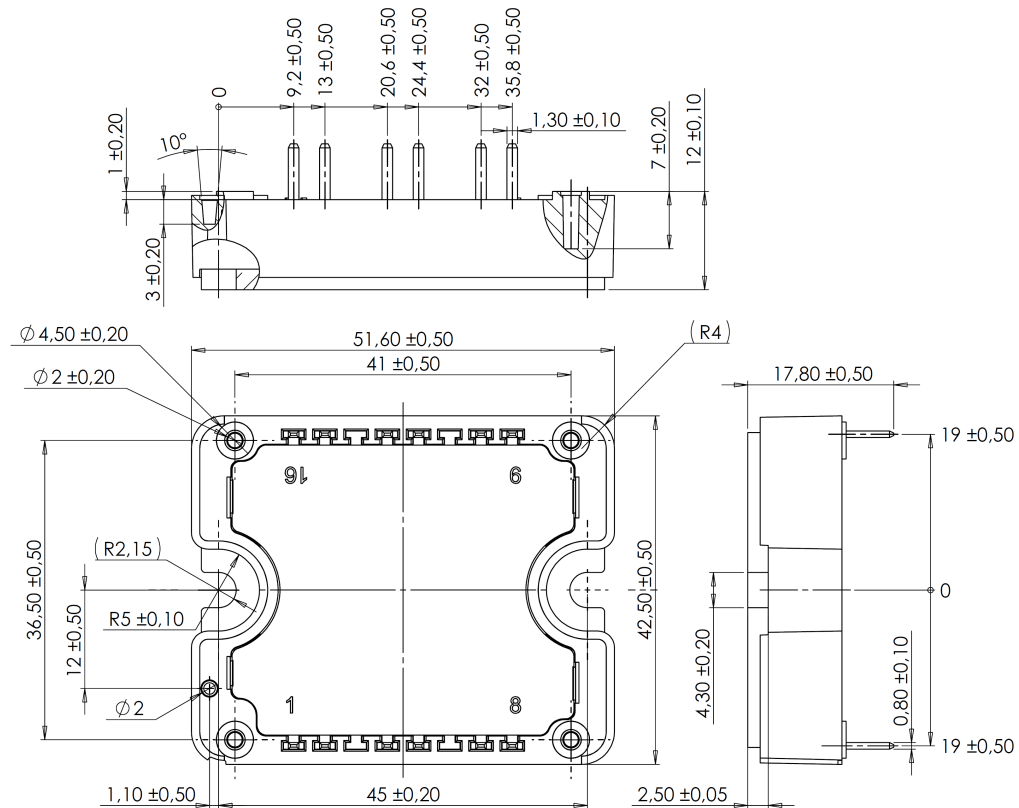
4 Package Specification

This section shows the package specification of the MSCDC50H1701AG device.

4.1 Package Outline Drawing

The following image illustrates the package outline of the MSCDC50H1701AG device. The dimensions are in millimeters.

Figure 4 • Package Outline Drawing





Microchip Technology Inc.
2355 West Chandler Blvd.
Chandler, Arizona, USA 85224-6199

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
www.microsemi.com

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