

MSCDC150A170D1PAG
Datasheet
Phase Leg SiC Diodes Power Module

December 2019



a  **MICROCHIP** company

Contents

Revision History.....1

 1.1 Revision 1.0.....1

Product Overview.....2

 2.1 Features.....2

 2.2 Benefits.....2

 2.3 Applications.....3

Electrical Specifications.....4

 3.1 Absolute Maximum Ratings.....4

 3.2 Electrical Performance.....4

 3.3 Performance Curves.....5

Package Specifications.....6

 4.1 Package Outline Drawing.....6

1 Revision History

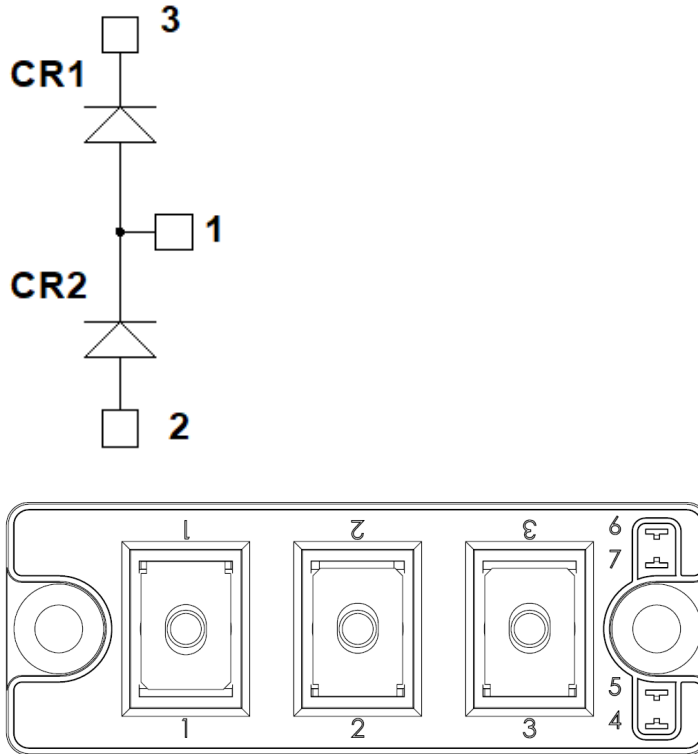
The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

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 MSCDC150A170D1PAG 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 MSCDC150A170D1PAG device:

- Silicon Carbide (SiC) Schottky Diode
 - Zero reverse recovery
 - Zero forward recovery
 - Temperature Independent switching behavior
 - Positive temperature coefficient on VF
- M5 power connectors
- Aluminum nitride (AlN) substrate for improved thermal performance

2.2 Benefits

The following are benefits of the MSCDC150A170D1PAG device:

- Stable temperature behavior
- Low losses
- Direct mounting to heatsink (isolated package)

- Low junction-to-case thermal resistance
- RoHS Compliant

2.3 Applications

The MSCDC150A170D1PAG device is designed for the following applications:

- Uninterruptible power supply (UPS)
- Switched mode power supplies
- Welding converters
- Motor control

3 Electrical Specifications

This section shows the electrical specifications of the MSCDC150A170D1PAG device.

3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per SiC diode of the MSCDC150A170D1PAG device.

Table 1 • Absolute Maximum Ratings

Symbol	Parameter		Max Ratings	Unit
V_{RRM}	Repetitive peak reverse voltage		1700	V
I_F	DC forward current	$T_C = 125\text{ }^{\circ}\text{C}$	150	A

The following table shows the thermal and package characteristics of the MSCDC150A170D1PAG 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	
TC	Operating case temperature			-40	125	
Torque	Mounting torque	For terminals	M5	2	3.5	N.m
		To heatsink	M6	3	5	
Wt	Package weight				160	g

3.2 Electrical Performance

The following table shows the electrical characteristics per SiC diode of the MSCDC150A170D1PAG device.

Table 3 • Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_F	Diode forward voltage	$I_F = 150\text{ A}$	$T_J = 25\text{ }^{\circ}\text{C}$		1.5	1.8	V
			$T_J = 175\text{ }^{\circ}\text{C}$		2		
I_{RM}	Reverse leakage current	$V_R = 1700\text{ V}$	$T_J = 25\text{ }^{\circ}\text{C}$		150	600	μA
			$T_J = 175\text{ }^{\circ}\text{C}$		750		

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
Q_C	Total capacitive charge	$V_R = 900\text{ V}$		1230		nC
C	Total capacitance	$f = 1\text{ MHz}, V_R = 600\text{ V}$		900		pF
		$f = 1\text{ MHz}, V_R = 900\text{ V}$		750		
R_{thJC}	Junction-to-case thermal resistance				0.121	$^{\circ}\text{C/W}$

3.3 Performance Curves

This section shows the typical performance curves for the MSCDC150A170D1PAG device.

Figure 1 • Maximum Thermal Impedance

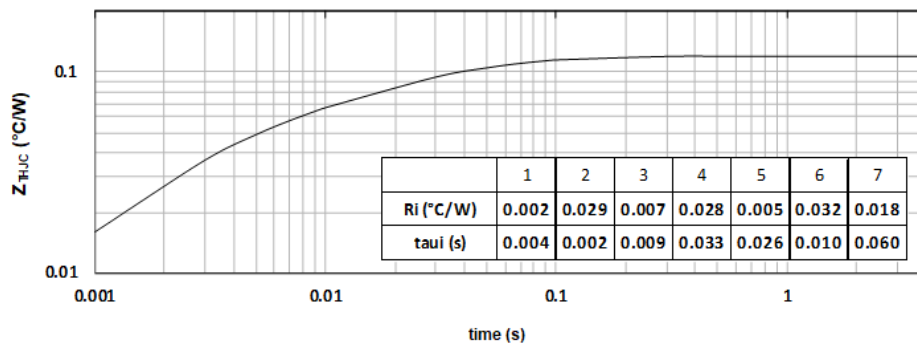


Figure 2 • Forward Characteristics

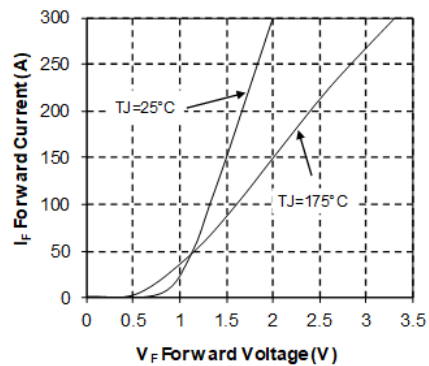
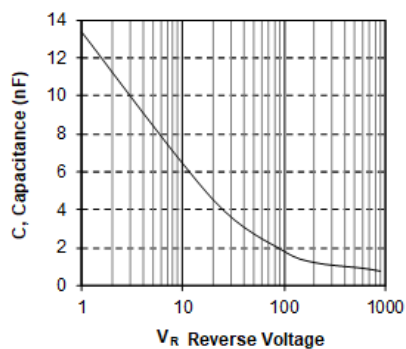


Figure 3 • Capacitance vs. Reverse Voltage



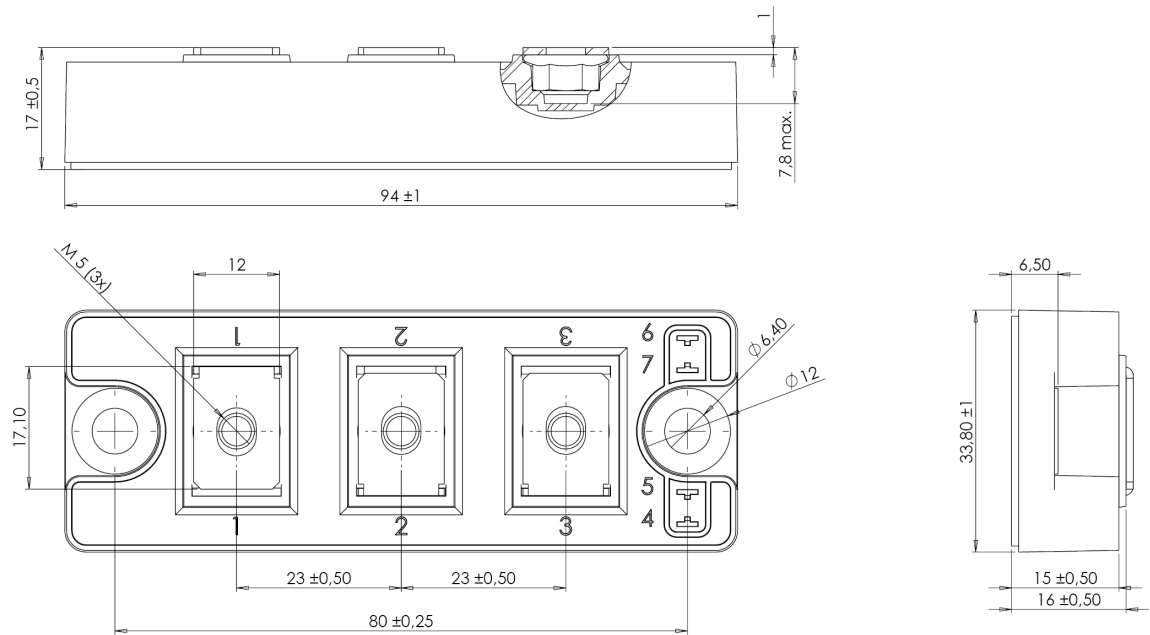
4 Package Specifications

This section shows the package specifications for the MSCDC150A170D1PAG device.

4.1 Package Outline Drawing

This section shows the package outline drawing of the MSCDC150A170D1PAG device. The dimensions in the following figure are in millimeters.

Figure 4 • Package Outline





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

© 2019 Microsemi. All rights reserved.
Microsemi and the Microsemi logo are trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.

Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice.

Microsemi, a wholly owned subsidiary of Microchip Technology Inc. (Nasdaq: MCHP), offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions; security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Learn more at www.microsemi.com.

MSCC-0344-DS-01044-1.0-1119