MSCDC100KK170D1PAG

Datasheet

Dual Common Cathode SiC Diodes Power Module

December 2019

Contents

1 Revision History

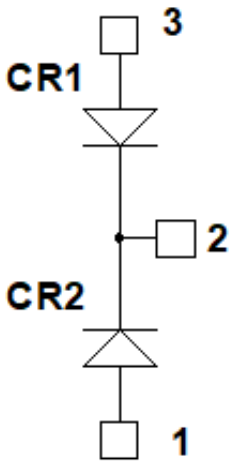
The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

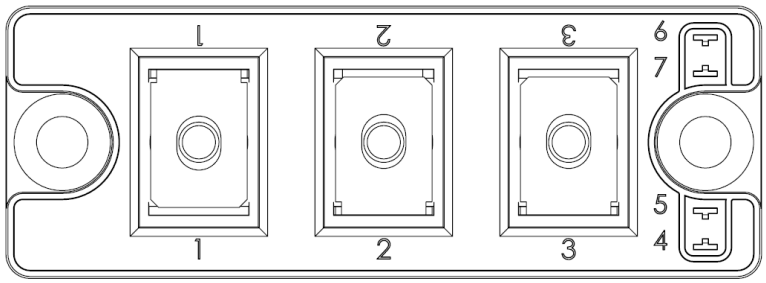
1.1 Revision 1.0

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 MSCDC100KK170D1PAG device.





All ratings at Tj = 25 °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 MSCDC100KK170D1PAG device:

- 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 MSCDC100KK170D1PAG device:

- Stable temperature behavior
- Low losses

- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- RoHS Compliant

2.3 Applications

The MSCDC100KK170D1PAG device is designed for the following applications:

- Uninterruptible power supplies (UPS)
- Switched mode power supplies
- Welding converters

3 Electrical Specifications

This section shows the electrical specifications of the MSCDC100KK170D1PAG device.

3.1 Absolute maximum Ratings

The following table shows the absolute maximum ratings per SiC diode of the MSCDC100KK170D1PAG 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 °C	100	A

The following table shows the thermal and package characteristics of the MSCDC100KK170D1PAG 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	
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 MSCDC100KK170D1PAG device.

Table 3 • Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_F	Diode forward voltage	I_F = 100 A	T_j = 25 °C		1.5	1.8	V
			T_j = 175 °C		2		
I_{RM}	Reverse leakage current	V_R = 1700 V	T_j = 25 °C		100	400	µA
			T_j = 175 °C		500		

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
Q_C	Total capacitive charge	V_R = 900 V		820		nC
C	Total capacitance	f = 1 MHz, V_R = 600 V		600		pF
		f = 1 MHz, V_R = 900 V		500		
R_{thJC}	Junction-to-case thermal resistance				0.174	°C/W

3.3 Performance Curves

This section shows the typical performance curves for the MSCDC100KK170D1PAG device.

Figure 1 • Maximum Thermal Impedance

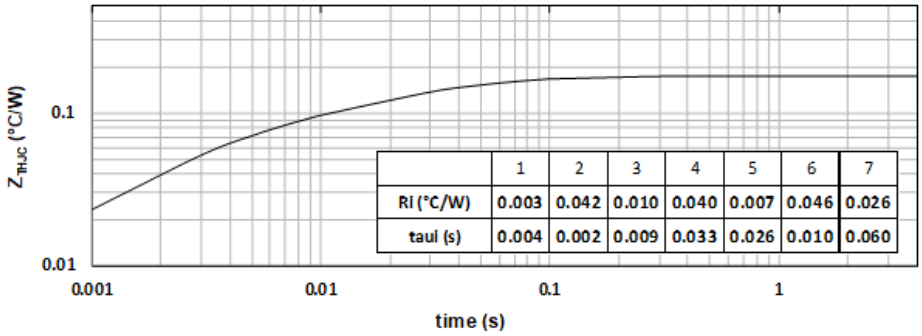


Figure 2 • Forward Characteristics

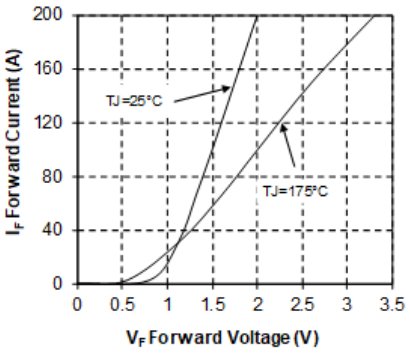
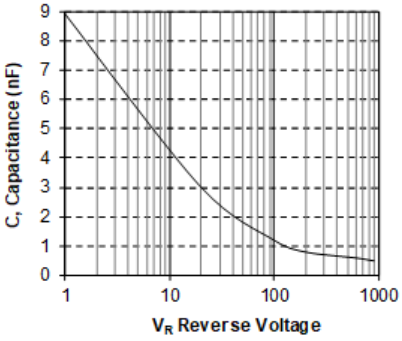


Figure 3 • Capacitance vs. Reverse Voltage



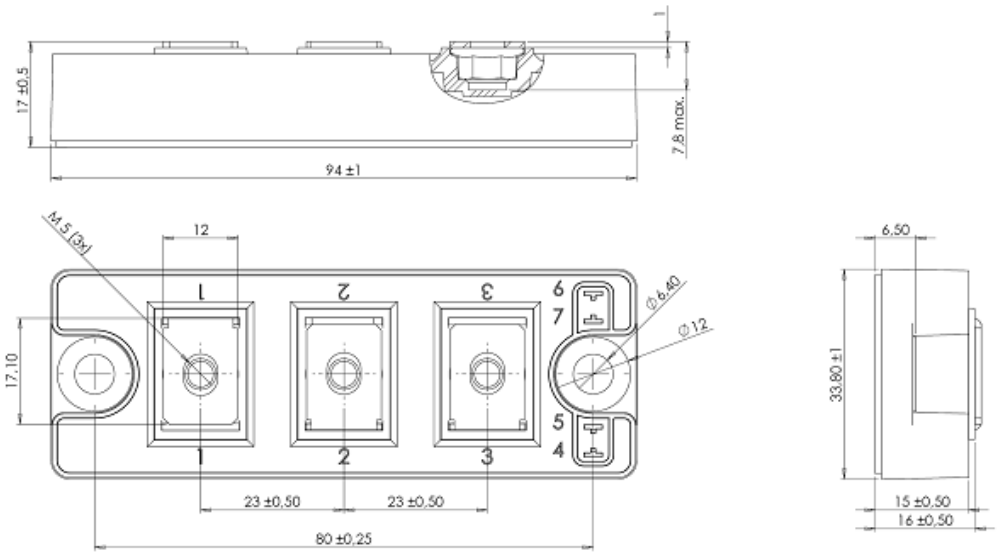
4 Package Specifications

This section shows the package specifications for the MSCDC100KK170D1PAG device.

4.1 Package Outline Drawing

This section shows the package outline drawing of the MSCDC100KK170D1PAG device. The dimensions in the following figure are in millimeters.

Figure 4 • Package Outline



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