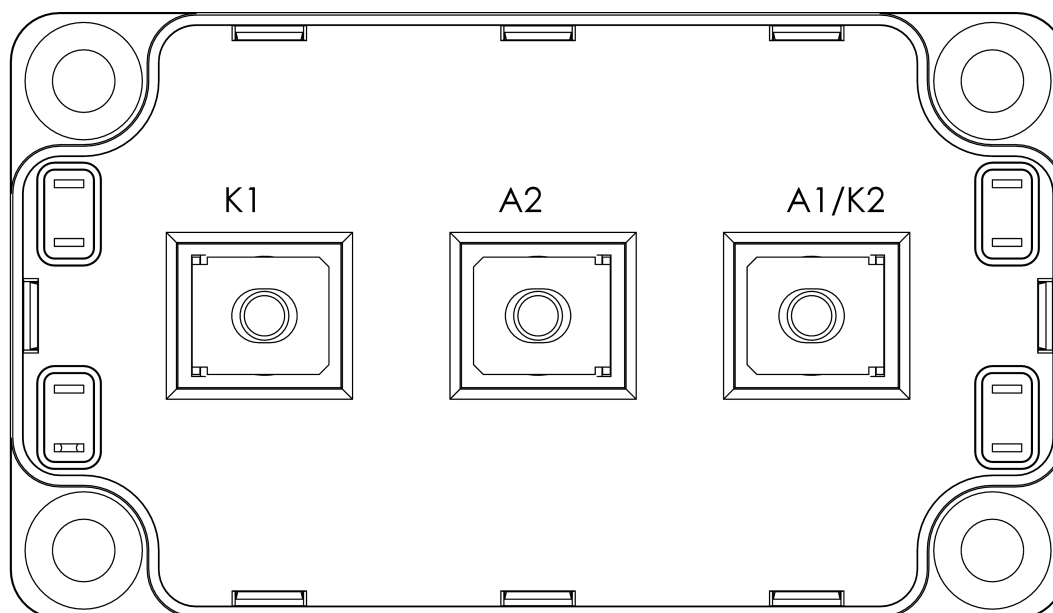
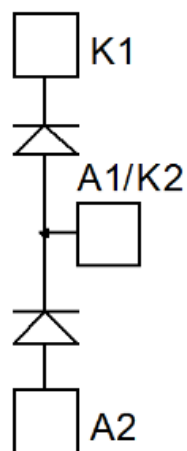


## MSCDC300A120AG SiC Diode Phase Leg Power Module

### 1 Product Overview

This section provides the product overview for the MSCDC300A120AG 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.

## 1.1 Features

The following are key features of the MSCDC300A120AG device:

- Silicon carbide (SiC) Schottky diode
  - Zero reverse recovery
  - Zero forward recovery
  - Temperature-independent switching behavior
  - Positive temperature coefficient on VF
- Low stray inductance
- M5 power connectors
- High level of integration
- Aluminum nitride (AlN) substrate for improved thermal performance

## 1.2 Benefits

The following are benefits of the MSCDC300A120AG device:

- Outstanding performance at high-frequency operation
- Low noise switching
- Direct mounting to heatsink (isolated package)
- Low junction-to-case thermal resistance
- RoHS compliant

## 1.3 Applications

The MSCDC300A120AG device is designed for the following applications:

- Uninterruptible power supply (UPS)
- Induction heating
- Welding equipment
- High-speed rectifiers

## 2 Electrical Specifications

This section provides the electrical specifications for the MSCDC300A120AG device.

### 2.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per diode for the MSCDC300A120AG device.

**Table 1 • Absolute Maximum Ratings**

Symbol	Parameter	Maximum Ratings	Unit
$V_{RRM}$	Repetitive peak reverse voltage	1200	V
$I_F$	DC forward current	$T_C = 90\text{ }^{\circ}\text{C}$ 300	A

The following table shows the thermal and package characteristics of the MSCDC300A120AG.

**Table 2 • Thermal and Package Characteristics**

Symbol	Characteristic			Min	Max	Unit
V <sub>ISOL</sub>	RMS isolation voltage, any terminal to case t =1 minute, 50 Hz/60 Hz			4000		V
T <sub>J</sub>	Operating junction temperature range			−40	175	°C
T <sub>JOP</sub>	Recommended junction temperature under switching conditions			−40	T <sub>Jmax</sub> −25	
T <sub>STG</sub>	Storage temperature range			−40	125	
T <sub>C</sub>	Operating case temperature			−40	125	
Torque	Mounting torque	To heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package weight				300	g

### 2.2 Electrical Performance

The following table shows the electrical characteristics per diode of the MSCDC300A120AG.

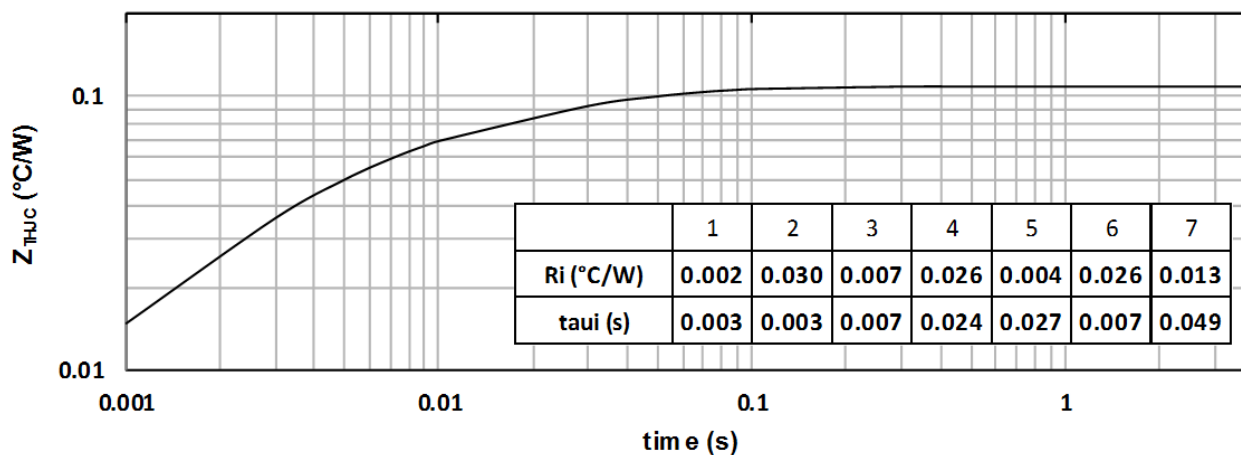
**Table 3 • Electrical Characteristics Per Diode**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_F$	Diode forward voltage	$I_F = 300\text{ A}$ $T_J = 25\text{ }^{\circ}\text{C}$		1.5	1.8	V
		$T_J = 175\text{ }^{\circ}\text{C}$		2.1		
$I_{RM}$	Reverse leakage current	$V_R = 1200\text{ V}$ $T_J = 25\text{ }^{\circ}\text{C}$		0.09	1.2	mA
		$T_J = 175\text{ }^{\circ}\text{C}$		1.5		
$Q_C$	Total capacitive charge	$V_R = 600\text{ V}$		1344		nC
C	Total capacitance	$f = 1\text{ MHz}, V_R = 400\text{ V}$		1476		pF
		$f = 1\text{ MHz}, V_R = 800\text{ V}$		1092		
$R_{thJC}$	Junction-to-case thermal resistance				0.109	$^{\circ}\text{C/W}$

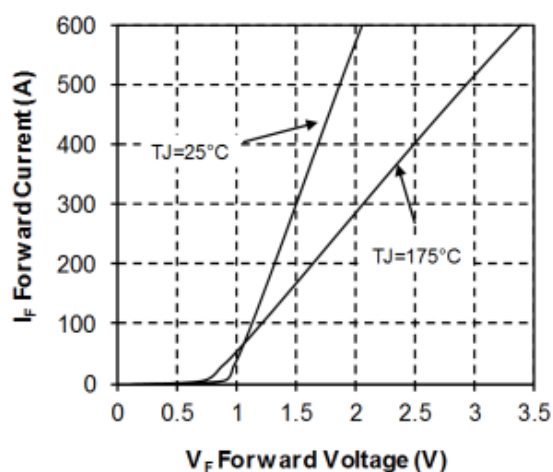
## 2.3 Performance Curves

This section shows the typical performance curves for the MSCDC300A120AG device.

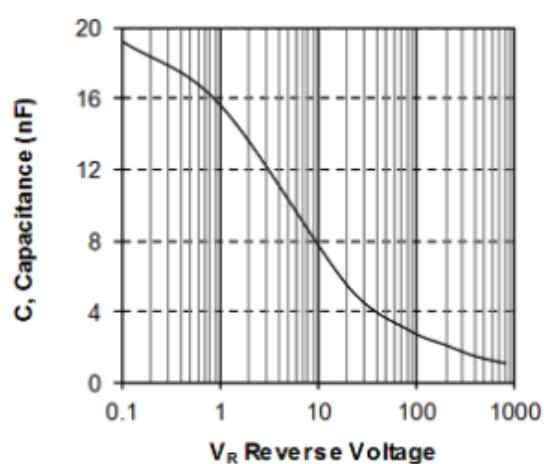
**Figure 1 • Maximum Transient Thermal Impedance**



**Figure 2 • Forward Current vs. Forward Voltage**



**Figure 3 • Capacitance vs. Reverse Voltage**





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MSCC-0344-DS-01012 | June 2019 | Final

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