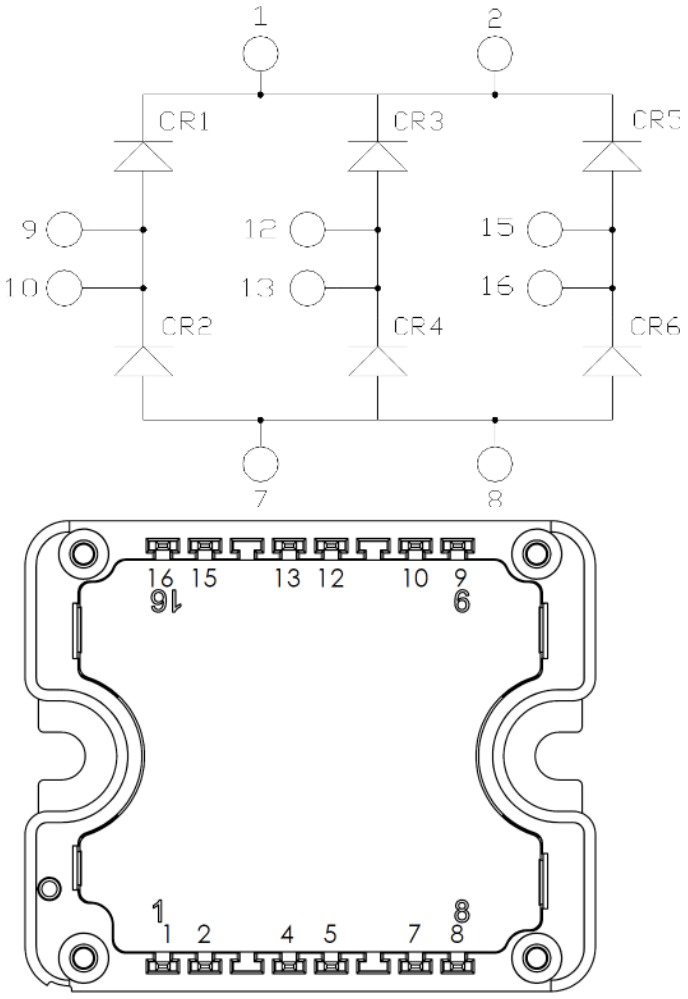
MSCDC50X1201AG Diode 3 Phase Bridge Power Module

1 Product Overview

This section shows the product overview for the MSCDC50X1201AG 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 MSCDC50X1201AG 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 nitride (AlN) substrate for improved thermal performance

1.2 Benefits

The following are benefits of the MSCDC50X1201AG 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 MSCDC50X1201AG device is designed for the following applications:

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

2 Electrical Specifications

This section shows the electrical specifications for the MSCDC50X1201AG device.

2.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per diode for the MSCDC50X1201AG 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 = 100 °C	50	A

The following table shows the thermal and package characteristics of the MSCDC50X1201AG.

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 diode of the MSCDC50X1201AG.

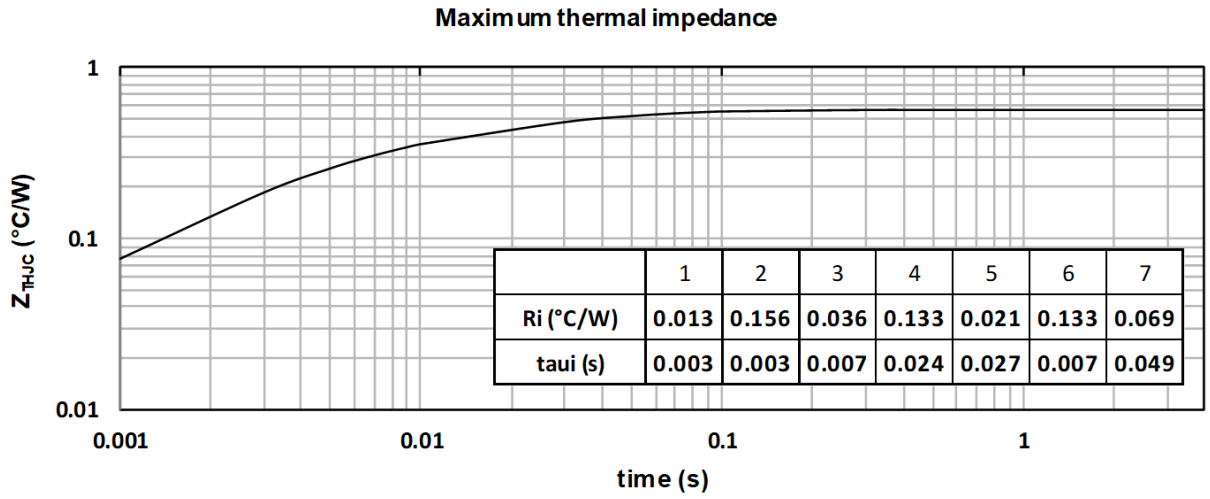
Table 3 • Electrical Characteristics Per Diode

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		2.1		
I_{RM}	Reverse leakage current	V_R = 1200 V	T_j = 25 °C		15	200	µA
			T_j = 175 °C		250		
Q_C	Total capacitive charge	V_R = 600 V			224		nC
C	Total capacitance	f = 1 MHz, V_R = 400 V			246		pF
		f = 1 MHz, V_R = 800 V			182		
R_{thJC}	Junction-to-case thermal resistance					0.56	°C/W

2.3 Performance Curves

This section shows the typical performance curves for the MSCDC50X1201AG device.

Figure 1 • Maximum Transient Thermal Impedance



	1	2	3	4	5	6	7
Ri (°C/W)	0.013	0.156	0.036	0.133	0.021	0.133	0.069
taui (s)	0.003	0.003	0.007	0.024	0.027	0.007	0.049

Figure 2 • Forward Current vs Forward Voltage

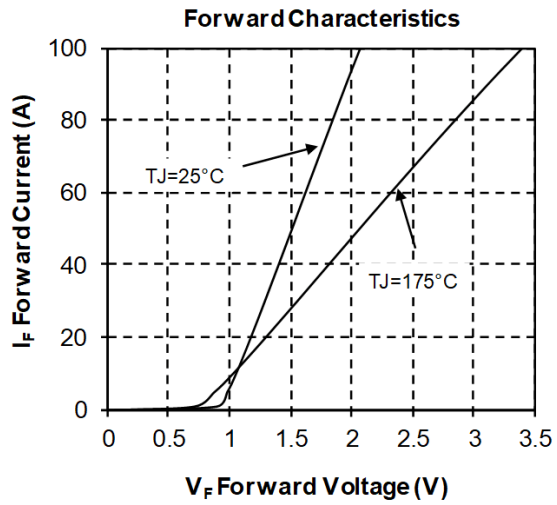
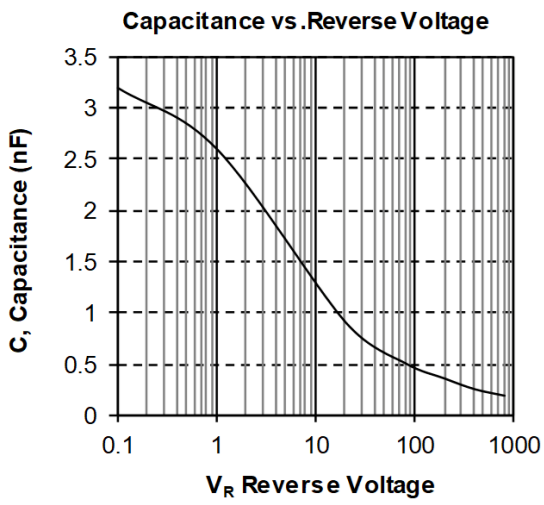


Figure 3 • Capacitance vs. Reverse Voltage



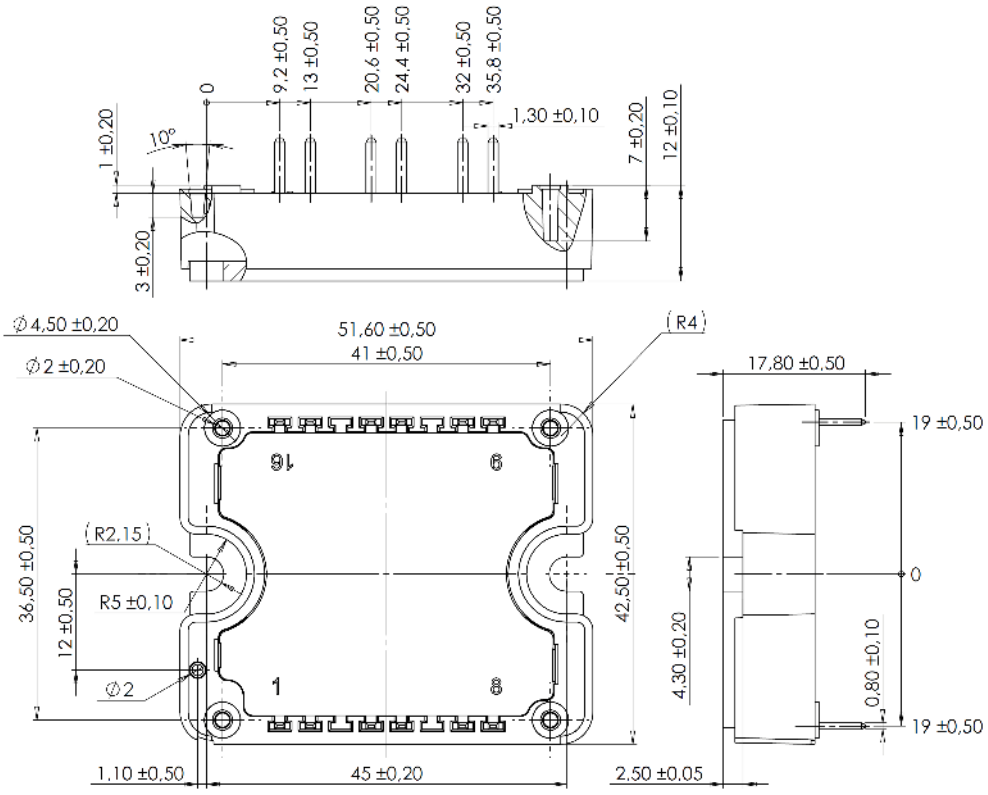
3 Package Specifications

This section shows the package specifications for the MSCDC50X1201AG device.

3.1 Package Outline Drawing

This section shows the package outline drawing of the MSCDC50X1201AG device. 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
www.microsemi.com

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. Microsemi is headquartered in Aliso Viejo, California, and has approximately 4,800 employees globally. Learn more at www.microsemi.com.

MSCC-0344-DS-01009-1.0-0619 | June 2019 | Final