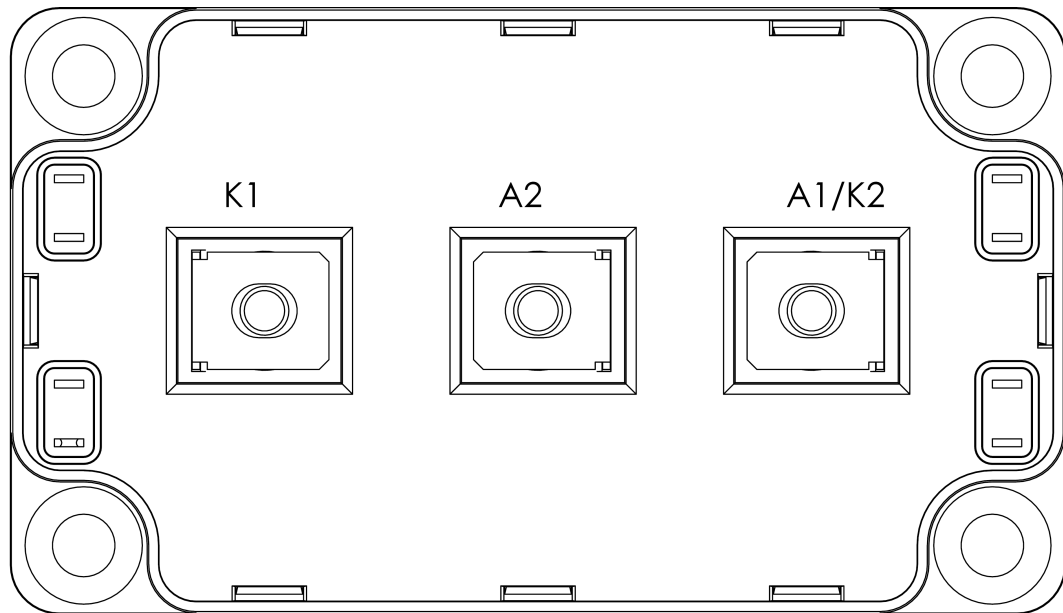
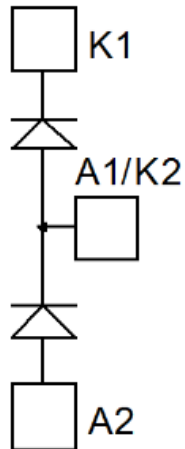


MSCDC600A120AG SiC Diode Phase Leg Power Module

1 Product Overview

This section provides the product overview for the MSCDC600A120AG 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 MSCDC600A120AG 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 MSCDC600A120AG 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 MSCDC600A120AG 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 MSCDC600A120AG device.

2.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per diode for the MSCDC600A120AG device.

Table 1 • Absolute Maximum Ratings

| Symbol | Parameter | Maximum Ratings | Unit |
|-----------|---------------------------------|--|------|
| V_{RRM} | Repetitive peak reverse voltage | 1200 | V |
| I_F | DC forward current | $T_C = 85\text{ }^\circ\text{C}$ 600* | A |

* Specification of SiC device, but output current must be limited due to size of power connectors.

The following table shows the thermal and package characteristics of the MSCDC600A120AG.

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 | | | |
| T_C | 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 MSCDC600A120AG.

Table 3 • Electrical Characteristics Per Diode

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|------------|-------------------------------------|--|-----------------------------------|------|------|--------------------|
| V_F | Diode forward voltage | $I_F = 600\text{ A}$ | $T_j = 25\text{ }^\circ\text{C}$ | 1.5 | 1.8 | V |
| | | | $T_j = 175\text{ }^\circ\text{C}$ | 2.1 | | |
| I_{RM} | Reverse leakage current | $V_R = 1200\text{ V}$ | $T_j = 25\text{ }^\circ\text{C}$ | 0.18 | 2.4 | mA |
| | | | $T_j = 175\text{ }^\circ\text{C}$ | 3 | | |
| Q_C | Total capacitive charge | $V_R = 600\text{ V}$ | | 2688 | | nC |
| C | Total capacitance | $f = 1\text{ MHz}, V_R = 400\text{ V}$ | | 2952 | | pF |
| | | $f = 1\text{ MHz}, V_R = 800\text{ V}$ | | 2184 | | |
| R_{thJC} | Junction-to-case thermal resistance | | | | 0.06 | $^\circ\text{C/W}$ |

2.3 Performance Curves

This section shows the typical performance curves for the MSCDC600A120AG device.

Figure 1 • Maximum Transient Thermal Impedance

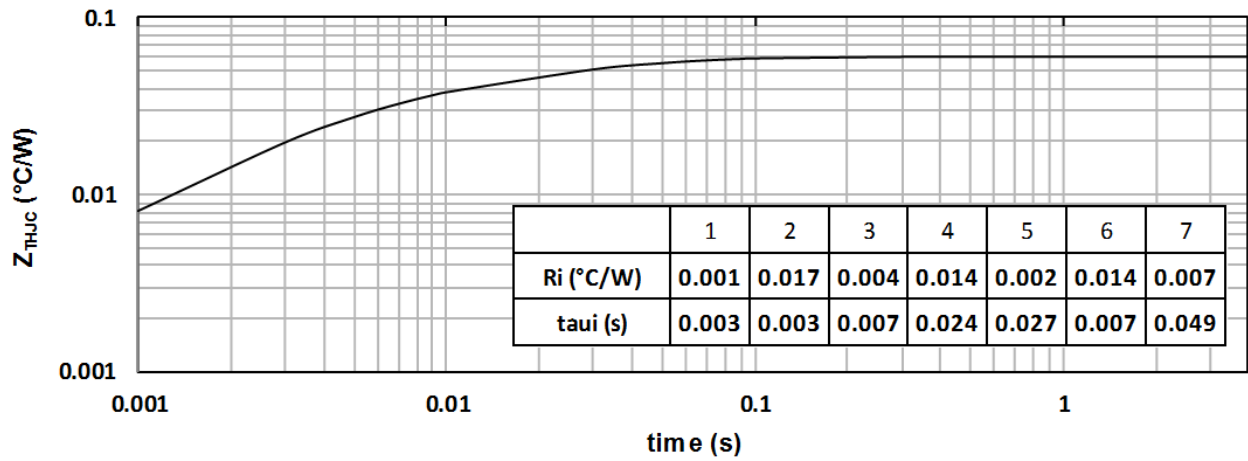


Figure 2 • Forward Current vs. Forward Voltage

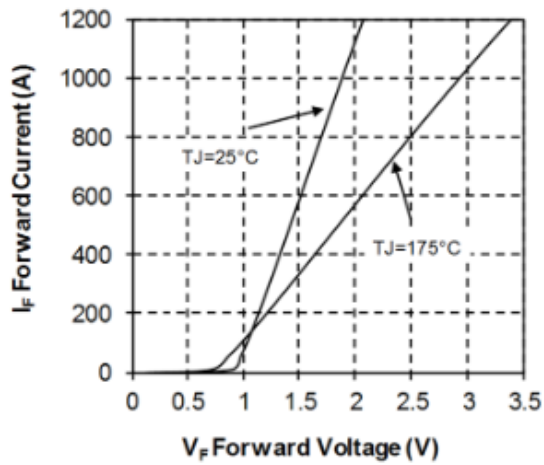
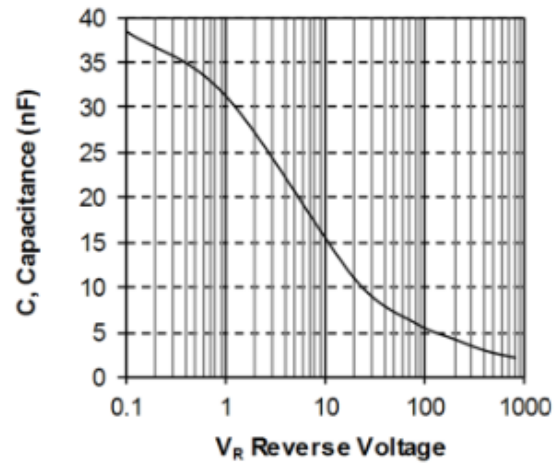


Figure 3 • Capacitance vs. Reverse Voltage



3 Package Specifications

This section shows the package specifications for the MSCDC600A120AG device.

3.1 Package Outline Drawing

The following drawing shows the package outline of the MSCDC600A120AG device. The dimensions in the following figure are in millimeters.

Figure 4 • Package Outline Drawing

