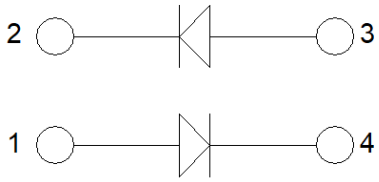
# MSC2X21-20DC120J SiC Diode Power Module

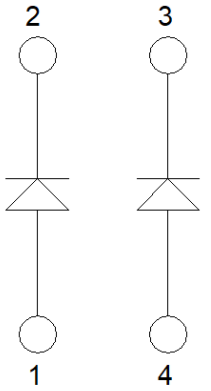
## 1 Product Overview

This section shows the product overview for the MSC2X21-20DC120J device.



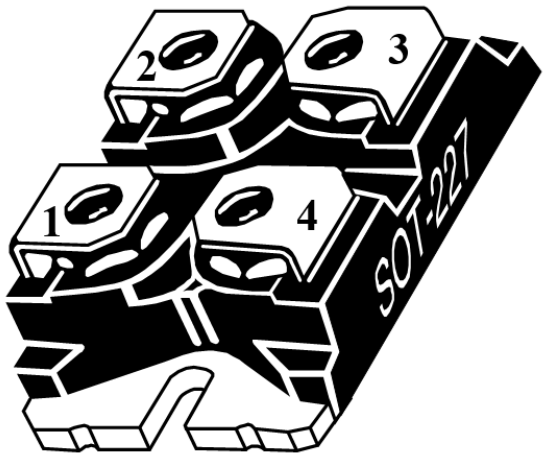

Anti-Parallel

MSC2X20DC120J




Parallel

MSC2X21DC120J




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 MSC2X21-20DC120J device:

- Silicon carbide (SiC) Schottky diode
  - Zero reverse recovery
  - Zero forward recovery
  - Temperature-independent switching behavior
  - Positive temperature coefficient on VF
- Very low stray inductance

## 1.2 Benefits

The following are benefits of the MSC2X21-20DC120J device:

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

## 1.3 Applications

The MSC2X21-20DC120J 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 MSC2X21-20DC120J device.

## 2.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings per SiC diode for the MSC2X21-20DC120J device.

**Table 1 • Absolute Maximum Ratings**

| Symbol | Parameter | | Maximum Ratings | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 1200 | V |
| $I_F$ | DC forward current | $T_C$ = 125 °C | 20 | A |

The following table shows the thermal and package characteristics of the MSC2X21-20DC120J.

**Table 2 • Thermal and Package Characteristics**

| Symbol | Characteristic | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| $V_{ISOL}$ | RMS isolation voltage, any terminal to case t =1 minute, 50 Hz/60 Hz | 2500 | | | V |
| $T_J$,$T_{STG}$ | Storage temperature range | –55 | | 175 | °C |
| $T_{JOP}$ | Recommended junction temperature under switching conditions | –55 | | $T_{Jmax}$–25 | |
| Torque | Mounting torque | | | 1.1 | N.m |
| Wt | Package weight | | 29.2 | | g |

## 2.2 Electrical Performance

The following table shows the electrical characteristics per SiC diode of the MSC2X21-20DC120J.

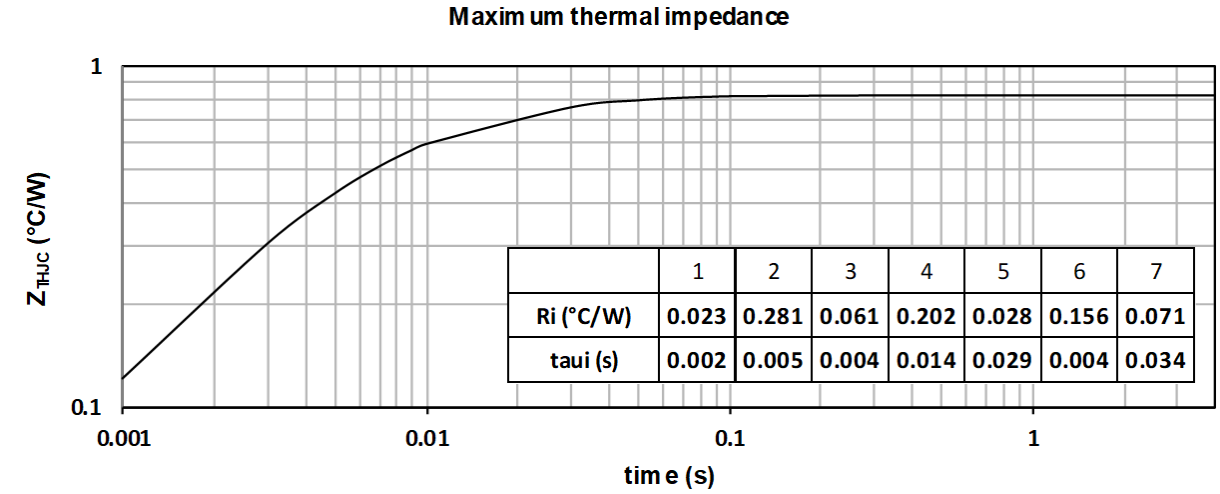
**Table 3 • Electrical Characteristics Per Diode**

| Symbol | Characteristic | Test Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_F$ | Diode forward voltage | $I_F$ = 30 A | $T_j$ = 25 °C | | 1.5 | 1.8 | V |
| | | | $T_j$ = 175 °C | | 2 | | |
| $I_{RM}$ | Reverse leakage current | $V_R$ = 1200 V | $T_j$ = 25 °C | | 20 | 600 | µA |
| | | | $T_j$ = 175 °C | | 300 | | |
| $Q_C$ | Total capacitive charge | $V_R$ = 600 V | | | 146 | | nC |
| C | Total capacitance | f = 1 MHz, $V_R$ = 400 V | | | 160 | | pF |
| | | f = 1 MHz, $V_R$ = 800 V | | | 118 | | |
| $R_{thJC}$ | Junction-to-case thermal resistance | | | | | 0.82 | °C/W |

## 2.3 Performance Curves

This section shows the typical performance curves for the MSC2X21-20DC120J device.

**Figure 1 • Maximum Transient Thermal Impedance**




| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Ri (°C/W) | 0.023 | 0.281 | 0.061 | 0.202 | 0.028 | 0.156 | 0.071 |
| taui (s) | 0.002 | 0.005 | 0.004 | 0.014 | 0.029 | 0.004 | 0.034 |

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

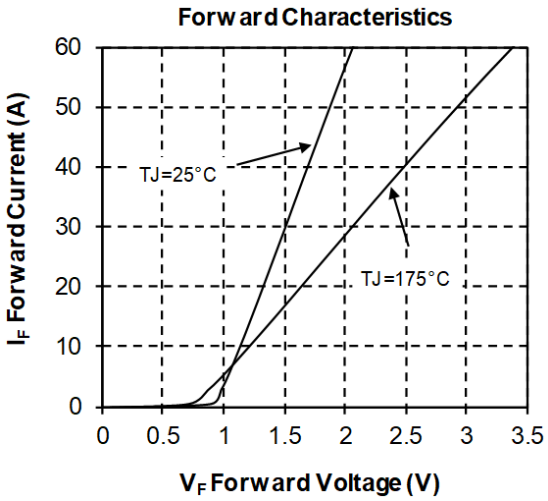
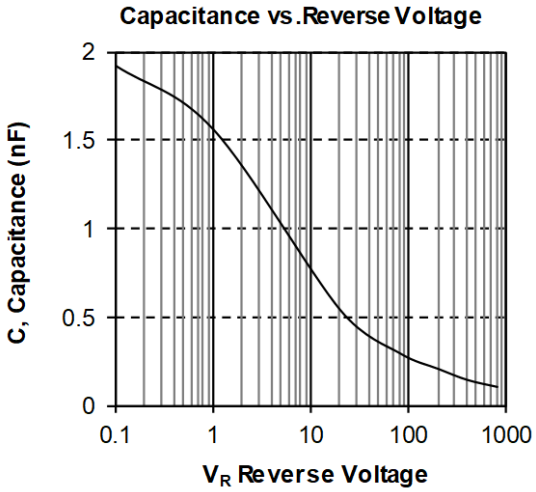



**Figure 3 • Capacitance vs. Reverse Voltage**



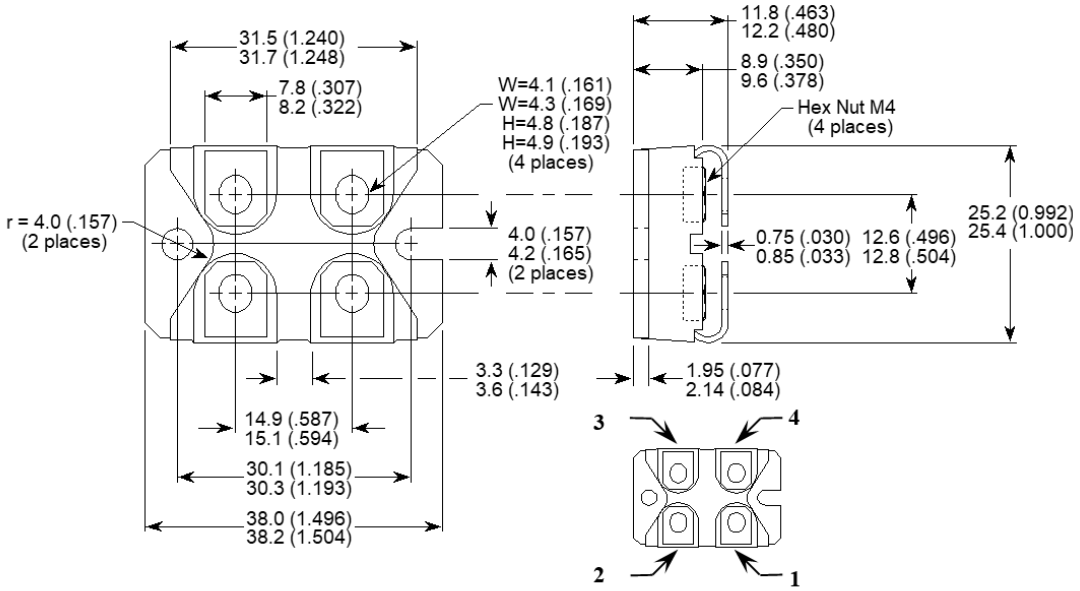
# 3 Package Specifications

This section shows the package specifications for the MSC2X21-20DC120J device.

## 3.1 Package Outline Drawing

This section shows the package outline drawing of the MSC2X21-20DC120J device. The dimensions in the following figure are in millimeters.

**Figure 4 • Package Outline Drawing**




Dimensions in Millimeters and (Inches)

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