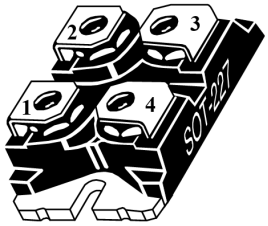
MSC2X31/30SDA070J Dual Silicon Carbide Schottky Barrier Diodes

Product Overview

The silicon carbide (SiC) power Schottky barrier diode (SBD) product line from Microsemi increases the performance over silicon diode solutions while lowering the total cost of ownership for high-voltage applications. MSC2X31/30SDA070J are dual 700 V, 30 A SiC SBD devices in a SOT-227 package.



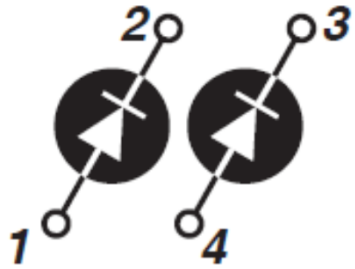


Figure 1 • Parallel MSC2X31SDA070J

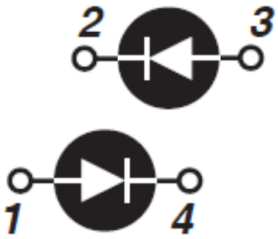


Figure 2 • Anti-parallel MSC2X30SDA070J

Features

The following are key features of the MSC2X31SDA070J and MSC2X30SDA070J devices:

- No reverse recovery
- Low forward voltage
- Low leakage current
- Avalanche-energy rated
- RoHS compliant
- Isolated voltage to 2500 V

Benefits

The following are benefits of the MSC2X31SDA070J and MSC2X30SDA070J devices:

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

Applications

The MSC2X31SDA070J and MSC2X30SDA070J devices are designed for the following applications:

- Power factor correction (PFC)
- Anti-parallel diode
  - Switch-mode power supply
  - Inverters/converters
  - Motor controllers
- Freewheeling diode
  - Switch-mode power supply
  - Inverters/converters
- Snubber/clamp diode

Device Specifications

This section shows the specifications of the MSC2X31SDA070J and MSC2X30SDA070J devices.

Absolute Maximum Ratings

The following table shows the absolute maximum ratings per diode of the MSC2X31SDA070J and MSC2X30SDA070J devices. T_C = 25 °C unless otherwise specified.

Table 1 • Absolute Maximum Ratings

Symbol	Parameter		Ratings	Unit
V_R	Maximum DC reverse voltage		700	V
I_F	Maximum DC forward current	T_C = 90 °C	30	A

The following table shows the thermal and mechanical characteristics of the MSC2X31SDA070J and MSC2X30SDA070J devices.

Table 2 • Thermal and Mechanical Characteristics

Symbol	Characteristics	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-case thermal resistance		0.95	1.38	°C/W
$V_{ISOLATION}$	RMS voltage (50 Hz–60 Hz sinusoidal waveform from terminals to mounting base for 1 minute)	2500			V
T_J, T_{STG}	Operating junction and storage temperature range	–55		175	°C
Wt	Package weight		1.03		oz
			29.2		g
	Mounting torque, M4 screw		10		lbf-in
			1.1		N.m

Electrical Performance

The following table shows the static characteristics per diode of the MSC2X31SDA070J and MSC2X30SDA070J devices. T_J = 25 °C unless otherwise specified.

Table 3 • Static Characteristics Per Diode

Symbol	Characteristics	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		1.8		
I_{RM}	Reverse leakage current	V_R = 700 V	T_J = 25 °C		1	200	µA
			T_J = 175 °C		10		
Q_C	Total capacitive charge	V_R = 400 V			83		nC
C_J	Junction capacitance	V_R = 200 V, f = 1 MHz			150		pF
		V_R = 400 V, f = 1 MHz			128		

Typical Performance Curves

This section shows the typical performance curves per diode of the MSC2X31SDA070J and MSC2X30SDA070J devices.

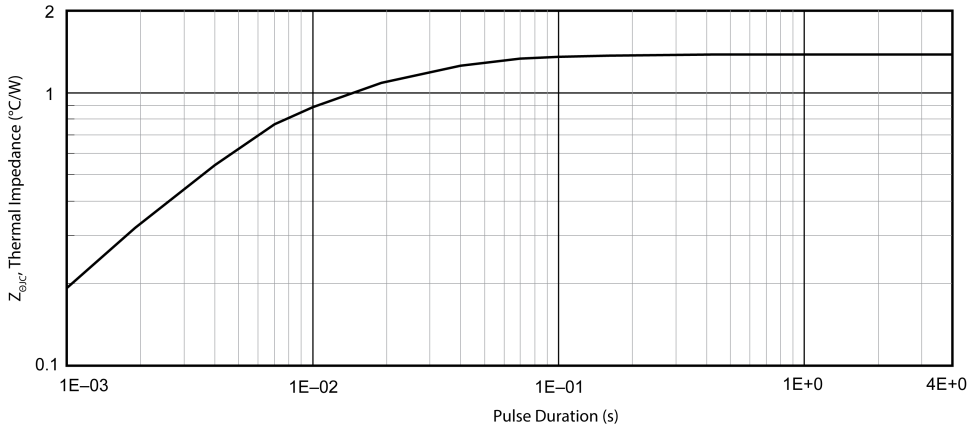


Figure 3 • Maximum Transient Thermal Impedance

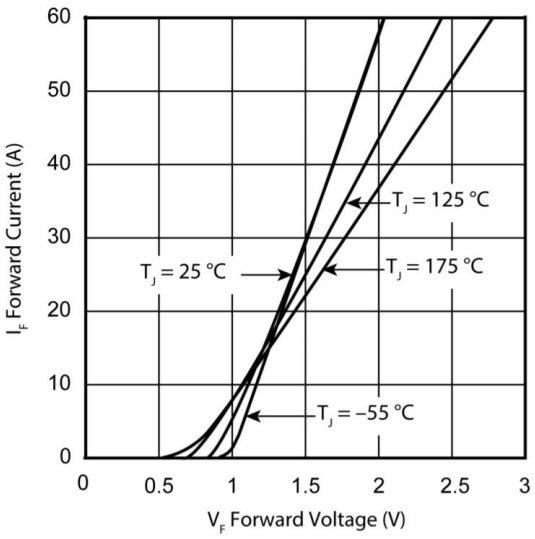


Figure 4 • Forward Current vs. Forward Voltage

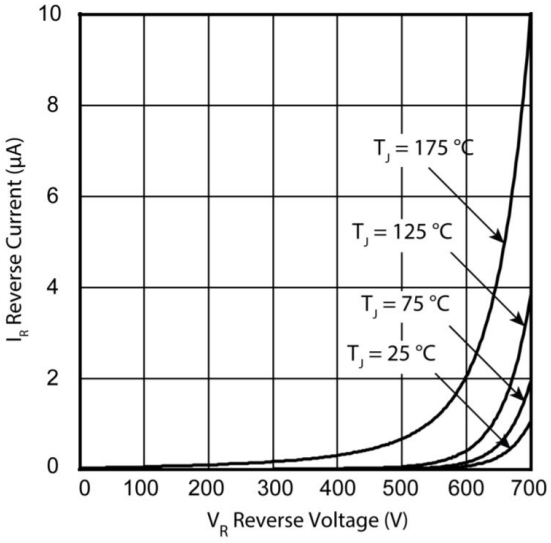


Figure 5 • Reverse Current vs. Reverse Voltage

Package Specification

This section shows the package specification of the MSC2X31SDA070J and MSC2X30SDA070J devices.

Package Outline Drawing

The following figure illustrates the SOT-227 package outline of the MSC2X31SDA070J and MSC2X30SDA070J devices. The dimensions in the figure below are in millimeters and (inches).

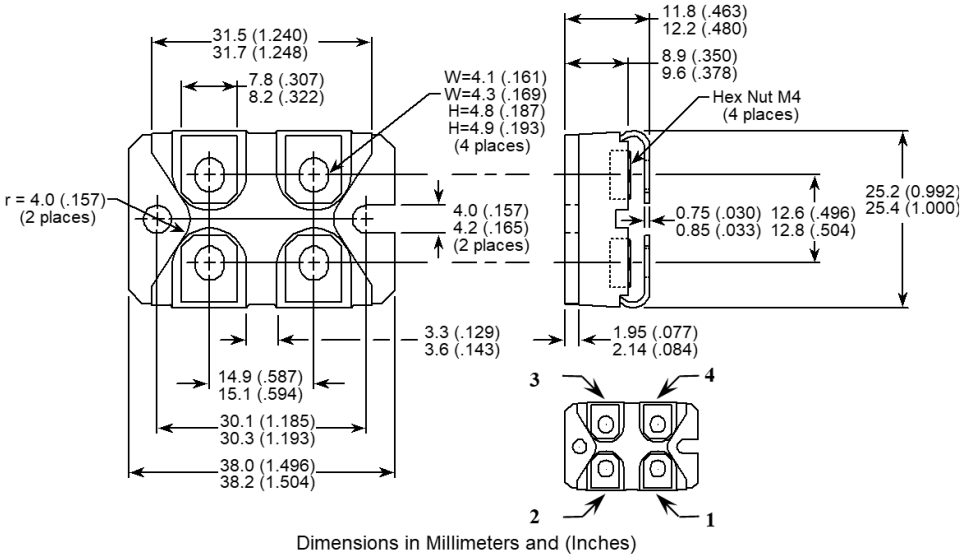


Figure 6 • Package Outline Drawing