

MSC2X31/30SDA120J 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. MSC2X31/30SDA120J are dual 1200 V, 30 A SiC SBD devices in a SOT-227 package.

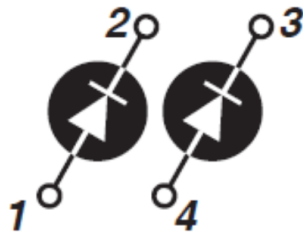
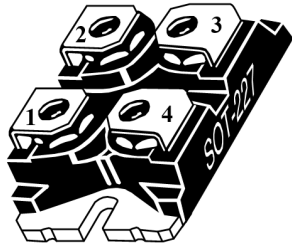


Figure 1 • Parallel MSC2X31SDA120J

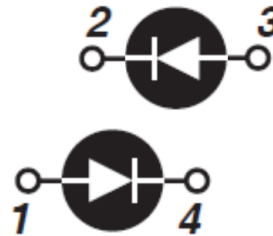


Figure 2 • Anti-parallel MSC2X30SDA120J

Features

The following are key features of the MSC2X31SDA120J and MSC2X30SDA120J 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 MSC2X31SDA120J and MSC2X30SDA120J devices:

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

Applications

The MSC2X31SDA120J and MSC2X30SDA120J 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 MSC2X31SDA120J and MSC2X30SDA120J devices.

Absolute Maximum Ratings

The following table shows the absolute maximum ratings per diode of the MSC2X31SDA120J and MSC2X30SDA120J devices. $T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Table 1 • Absolute Maximum Ratings

Symbol	Parameter	Ratings	Unit
V_R	Maximum DC reverse voltage	1200	V
I_F	Maximum DC forward current $T_C = 100\text{ }^{\circ}\text{C}$	30	A

The following table shows the thermal and mechanical characteristics of the MSC2X31SDA120J and MSC2X30SDA120J devices.

Table 2 • Thermal and Mechanical Characteristics

Symbol	Characteristics	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-case thermal resistance		0.60	0.87	$^{\circ}\text{C}/\text{W}$
$V_{ISOLATION}$	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	$^{\circ}\text{C}$
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 MSC2X31SDA120J and MSC2X30SDA120J devices. $T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Table 3 • Static Characteristics Per Diode

Symbol	Characteristics	Test Conditions		Min	Typ	Max	Unit
V_F	Forward voltage	$I_F = 30\text{ A}$			1.5	1.8	V
			$T_J = 175\text{ }^{\circ}\text{C}$		2.1		
I_{RM}	Reverse leakage current	$V_R = 1200\text{ V}$			9	200	μA
			$T_J = 175\text{ }^{\circ}\text{C}$		150		
Q_C	Total capacitive charge	$V_R = 600\text{ V}$			130		nC
C_J	Junction capacitance	$V_R = 400\text{ V}, f = 1\text{ MHz}$			141		pF
		$V_R = 800\text{ V}, f = 1\text{ MHz}$			105		

Typical Performance Curves

This section shows the typical performance curves per diode of the MSC2X31SDA120J and MSC2X30SDA120J devices.

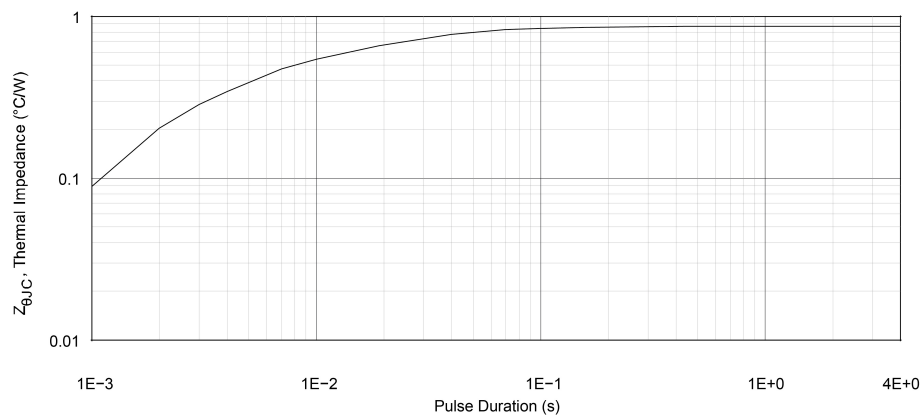


Figure 3 • Maximum Transient Thermal Impedance

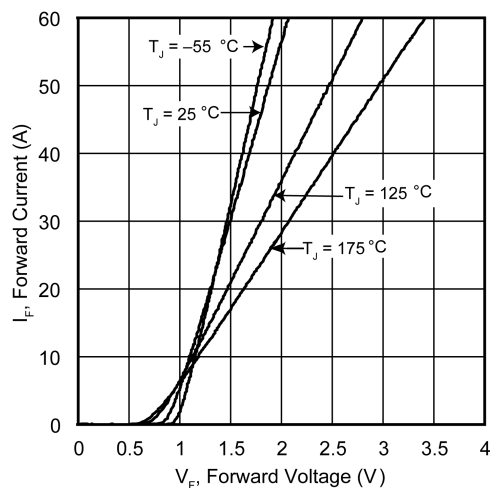


Figure 4 • Forward Current vs. Forward Voltage

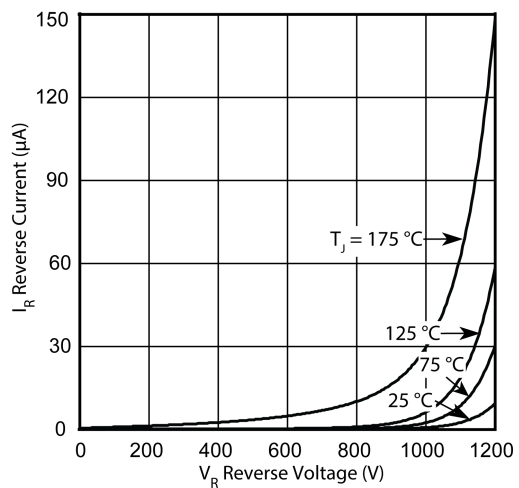


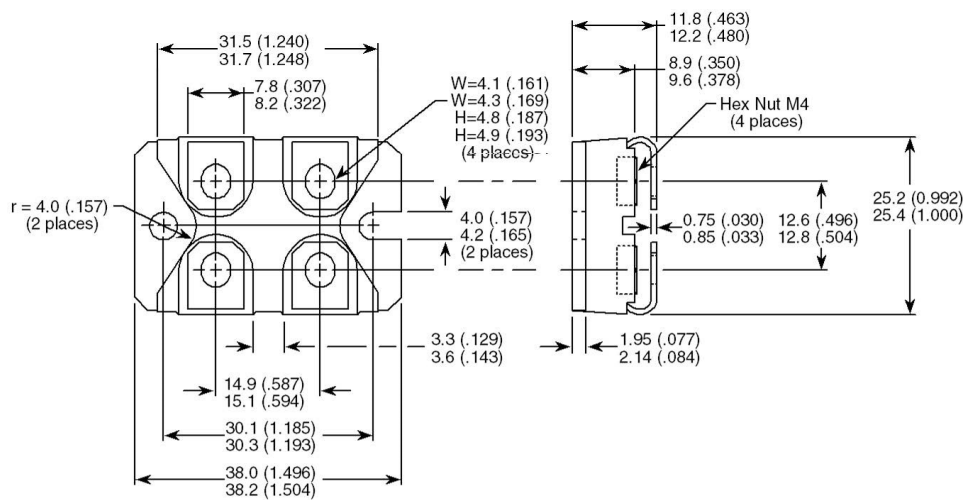
Figure 5 • Reverse Current vs. Reverse Voltage

Package Specification

This section shows the package specification of the MSC2X31SDA120J and MSC2X30SDA120J devices.

Package Outline Drawing

The following figure illustrates the SOT-227 package outline of the MSC2X31SDA120J and MSC2X30SDA120J devices. The dimensions in the following figure are in millimeters and (inches).



Dimensions in Millimeters and (Inches)

Figure 6 • Package Outline Drawing

**Microsemi**

2355 W. Chandler Blvd.
Chandler, AZ 85224 USA

Within the USA: +1 (480) 792-7200
Fax: +1 (480) 792-7277

www.microsemi.com © 2020 Microsemi and its corporate affiliates. All rights reserved. Microsemi and the Microsemi logo are trademarks of Microsemi Corporation and its corporate affiliates. All other trademarks and service marks are the property of their respective owners.

Microsemi's product warranty is set forth in Microsemi's Sales Order Terms and Conditions. Information contained in this publication is provided for the sole purpose of designing with and using Microsemi products. Information regarding device applications and the like is provided only for your convenience and may be superseded by updates. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is your responsibility to ensure that your application meets with your specifications. THIS INFORMATION IS PROVIDED "AS IS." MICROSEMI MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL MICROSEMI BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL LOSS, DAMAGE, COST OR EXPENSE WHATSOEVER RELATED TO THIS INFORMATION OR ITS USE, HOWEVER CAUSED, EVEN IF MICROSEMI HAS BEEN ADVISED OF THE POSSIBILITY OR THE DAMAGES ARE FORESEEABLE. TO THE FULLEST EXTENT ALLOWED BY LAW, MICROSEMI'S TOTAL LIABILITY ON ALL CLAIMS IN RELATED TO THIS INFORMATION OR ITS USE WILL NOT EXCEED THE AMOUNT OF FEES, IF ANY, YOU PAID DIRECTLY TO MICROSEMI FOR THIS INFORMATION. Use of Microsemi devices in life support, mission-critical equipment or applications, and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend and indemnify Microsemi from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microsemi intellectual property rights unless otherwise stated.

Microsemi Corporation, a subsidiary of Microchip Technology Inc. (Nasdaq: MCHP), and its corporate affiliates are leading providers of smart, connected and secure embedded control solutions. Their easy-to-use development tools and comprehensive product portfolio enable customers to create optimal designs which reduce risk while lowering total system cost and time to market. These solutions serve more than 120,000 customers across the industrial, automotive, consumer, aerospace and defense, communications and computing markets. Headquartered in Chandler, Arizona, the company offers outstanding technical support along with dependable delivery and quality. Learn more at www.microsemi.com.

053-4104 | October 2020 | Released