MSC010SDA120B

Datasheet

Zero Recovery Silicon Carbide Schottky Diode

Final

June 2018

Microsemi

Power Matters.™

Contents

1 Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

1.1 Revision B

Revision B was published in June 2018. In Revision B, the following changes were made:

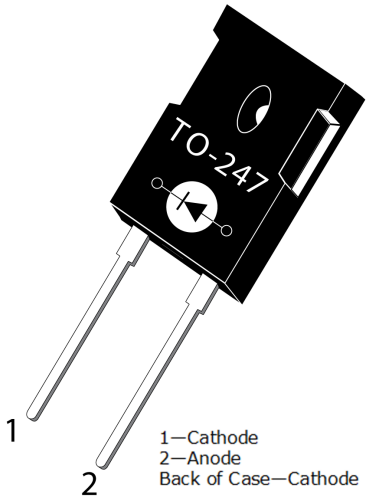
- Updated features and benefits in the Product Overview section.
- Updated the thermal and mechanical characteristics table.

1.2 Revision A

Revision A was published in December 2017. It is the first publication of this document.

2 Product Overview

This section shows the product overview for the MSC010SDA120B device.



2.1 Features

The following are key features of the MSC010SDA120B device:

- Ultra-fast recovery times
- Soft recovery chracteristics
- Low forward voltage
- Low leakage current
- Avalanche energy rated
- RoHS compliant

2.2 Benefits

The following are benefits of the MSC010SDA120B device:

- High switching frequency
- Low switching losses
- Low noise (EMI) switching
- Higher reliability systems
- Increased system power density

2.3 Applications

The MSC010SDA120B device is 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

3 Electrical Specifications

This section details the electrical specifications for the MSC010SDA120B device.

3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings for the MSC010SDA120B device.
All ratings: T_C = 25 °C unless otherwise specified.

Table 1 • Absolute Maximum Ratings

Symbol	Parameter		Ratings	Unit
V_R	Maximum DC reverse voltage		1200	V
V_{RRM}	Maximum peak repetitive reverse voltage			
V_{RWM}	Maximum working peak reverse voltage			
I_F	Maximum DC forward current	T_C = 25 °C	25	A
		T_C = 135 °C	12	
		T_C = 145 °C	9	
I_{FRM}	Repetitive peak forward surge current (T_C = 25 °C, t_p = 8.3 ms, half sine wave)		38	
I_{FSM}	Non-repetitive forward surge current (T_C = 25 °C, t_p = 8.3 ms, half sine wave)		75	
P_{tot}	Power dissipation	T_C = 25 °C	115	W
		T_C = 110 °C	50	
T_J , T_{STG}	Operating junction and storage temperature range		–55 to 175	°C
T_L	Lead temperature for 10 seconds		300	
E_{AS}	Single pulse avalanche energy (starting T_J = 25 °C, L = 2.0 mH, peak I_L = 10 A)		100	mJ

The following table shows the thermal and mechanical characteristics of the MSC010SDA120B device.

Table 2 • Thermal and Mechanical Characteristics

Symbol	Characteristic/Test Conditions	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-case thermal resistance		0.90	1.3	°C/W
W_T	Package weight		0.21		oz
			5.9		g
	Mounting torque, 6-32 or M3 screw			10	lbf-in
				1.1	N-m

3.2 Electrical Performance

The following table shows the static characteristics of the MSC010SDA120B device.

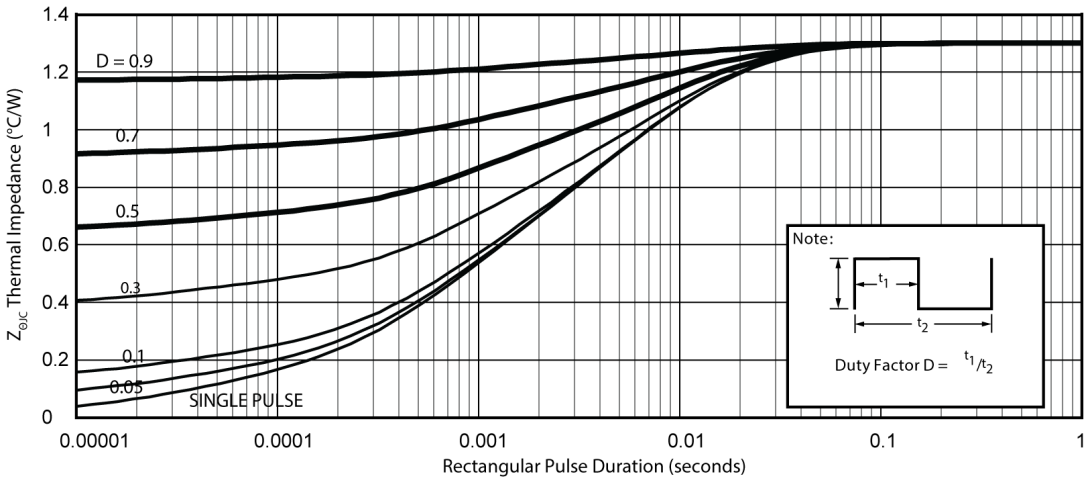
Table 3 • Static Characteristics

Symbol	Characteristic/Test Conditions		Min	Typ	Max	Unit
V_F	Forward voltage	I_F = 10 A, T_J = 25 °C		1.5	1.8	V
		I_F = 10 A, T_J = 175 °C		2.1		
I_{RM}	Reverse leakage current	V_R = 1200 V, T_J = 25 °C		3	200	µA
		V_R = 1200 V, T_J = 175 °C		50		
Q_C	Total capacitive charge V_R = 600 V, T_J = 25 °C			48		nC
C_J	Junction capacitance V_R = 400 V, T_J = 25 °C, ƒ = 1 MHz			55		pF
	Junction capacitance V_R = 800 V, T_J = 25 °C, ƒ = 1 MHz			43		

3.3 Performance Curves

This section shows the typical performance curves for the MSC010SDA120B device.

Figure 1 • Maximum Transient Thermal Impedance



Maximum Effective Transient Thermal Impedance, Junction-to-Case vs. Pulse Duration

Figure 2 • Forward Current vs. Forward Voltage

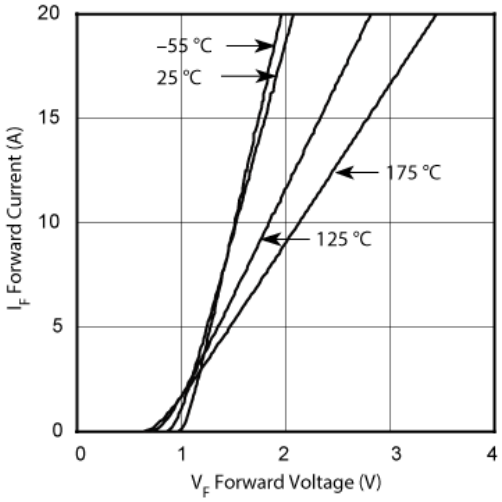


Figure 3 • Max. Forward Current vs. Case Temp.

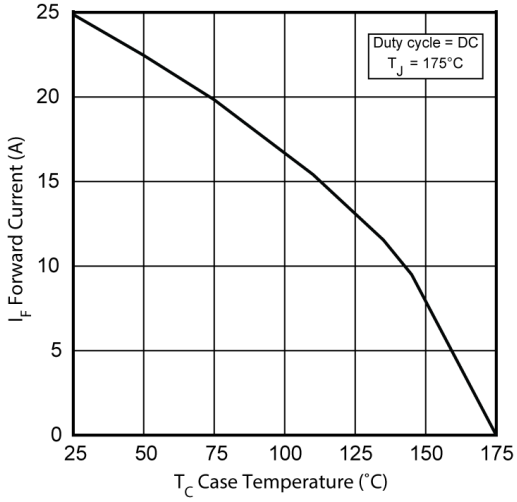


Figure 4 • Max. Power Dissipation vs. Case Temp.

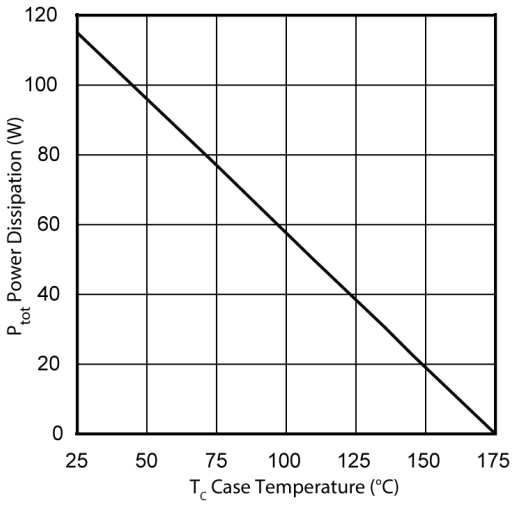


Figure 5 • Reverse Current vs. Reverse Voltage

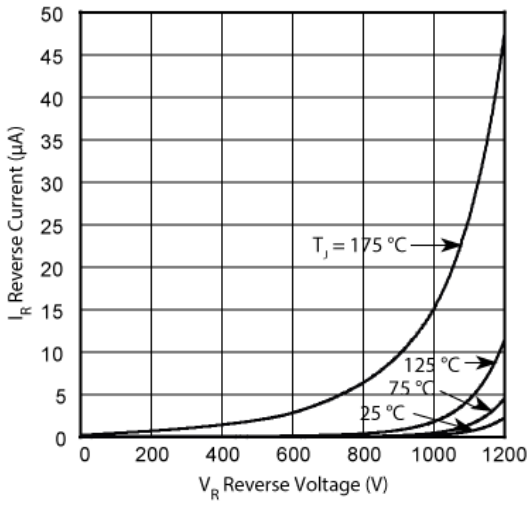


Figure 6 • Total Capacitive Charge vs. Reverse Voltage

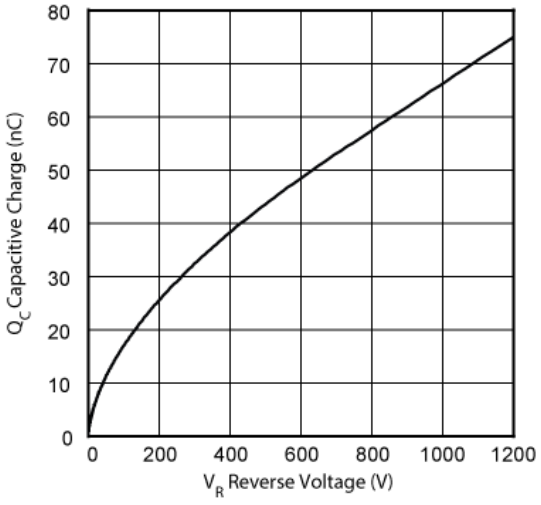
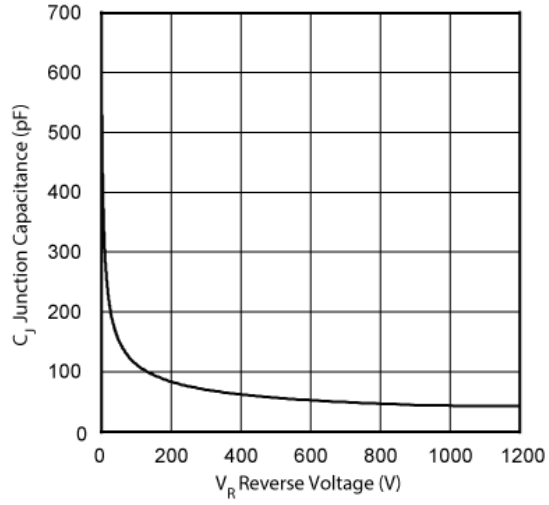


Figure 7 • Junction Capacitance vs. Reverse Voltage



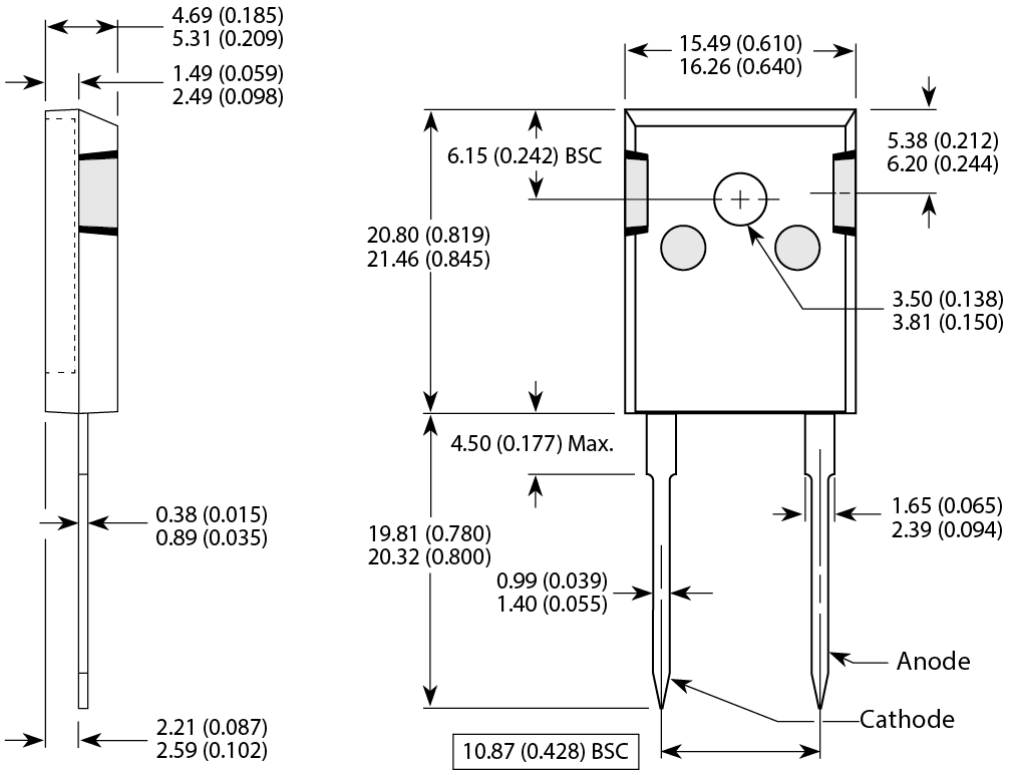
4 Package Specification

This section outlines the package specification for the MSC010SDA120B device.

4.1 Package Outline Drawing

This section details the TO-247 package drawing of the MSC010SDA120B device. Dimensions are in millimeters and (inches).

Figure 8 • Package Outline Drawing



Microsemi Corporate Headquarters
One Enterprise, Aliso Viejo,
CA 92656 USA
Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Fax: +1 (949) 215-4996
Email: sales.support@microsemi.com
www.microsemi.com

Microsemi Corporation (Nasdaq: MSCC) 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.

053-4081