

**MSC010SDA120B**  
**Datasheet**  
**Zero Recovery Silicon Carbide Schottky Diode**

Final  
June 2018



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# 1 Revision History

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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.

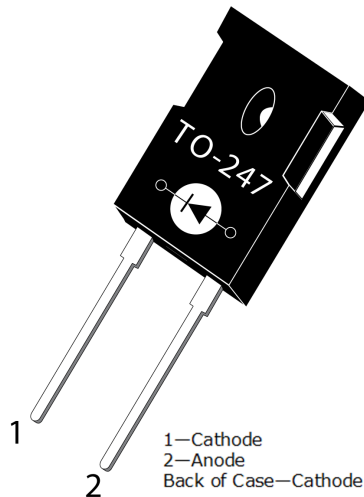
## 1.2 Revision A

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

## 2 Product Overview

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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 characteristics
- 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:  $T_c = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

**Table 1 • Absolute Maximum Ratings**

Symbol	Parameter	Ratings		Unit
V <sub>R</sub>	Maximum DC reverse voltage	1200		V
V <sub>RRM</sub>	Maximum peak repetitive reverse voltage			
V <sub>RWM</sub>	Maximum working peak reverse voltage			
I <sub>F</sub>	Maximum DC forward current	T <sub>C</sub> = 25 °C	25	A
		T <sub>C</sub> = 135 °C	12	
		T <sub>C</sub> = 145 °C	9	
I <sub>FRM</sub>	Repetitive peak forward surge current (T <sub>C</sub> = 25 °C, t <sub>p</sub> = 8.3 ms, half sine wave)	38		
I <sub>FSM</sub>	Non-repetitive forward surge current (T <sub>C</sub> = 25 °C, t <sub>p</sub> = 8.3 ms, half sine wave)	75		
P <sub>tot</sub>	Power dissipation	T <sub>C</sub> = 25 °C	115	W
		T <sub>C</sub> = 110 °C	50	
T <sub>J</sub> , T <sub>STG</sub>	Operating junction and storage temperature range	–55 to 175		°C
T <sub>L</sub>	Lead temperature for 10 seconds	300		
E <sub>AS</sub>	Single pulse avalanche energy (starting T <sub>J</sub> = 25 °C, L = 2.0 mH, peak I <sub>L</sub> = 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	$^{\circ}\text{C/W}$
$W_T$	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.

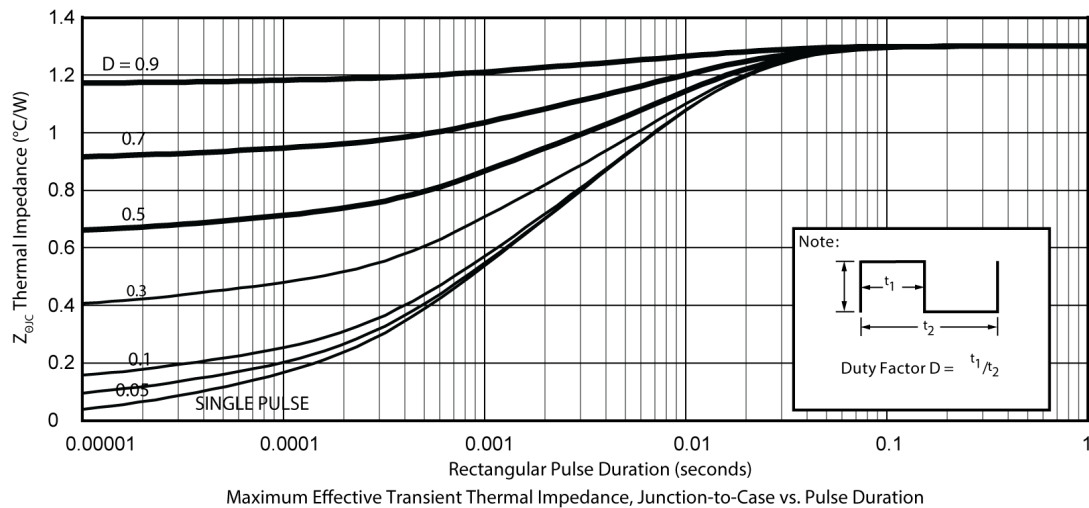
**Table 3 • Static Characteristics**

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

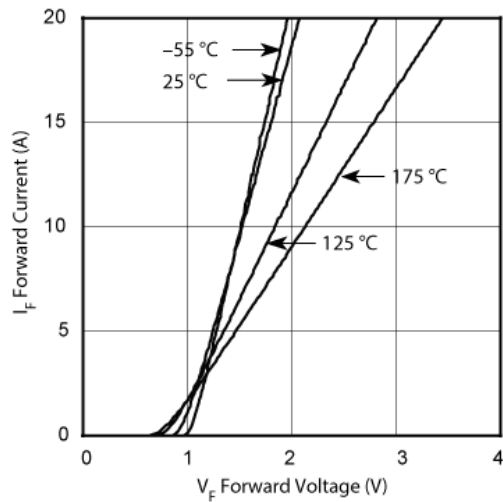
### 3.3 Performance Curves

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

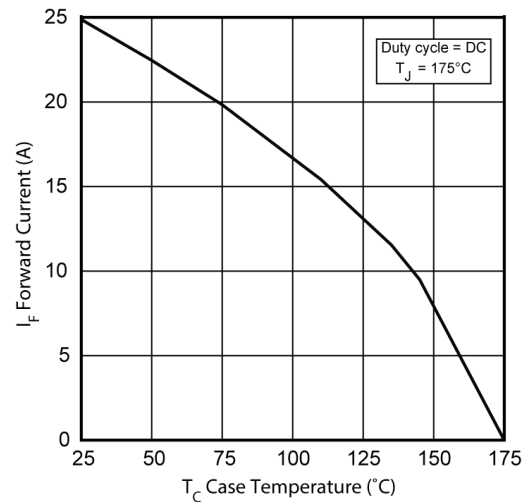
**Figure 1 • Maximum Transient Thermal Impedance**

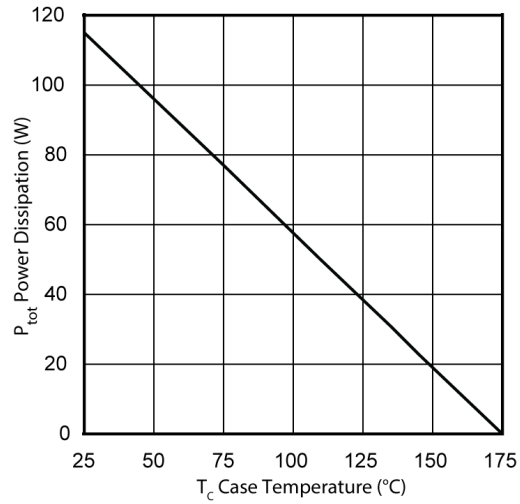
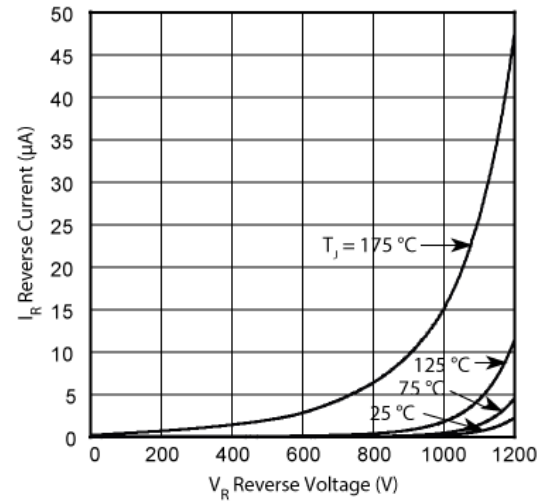
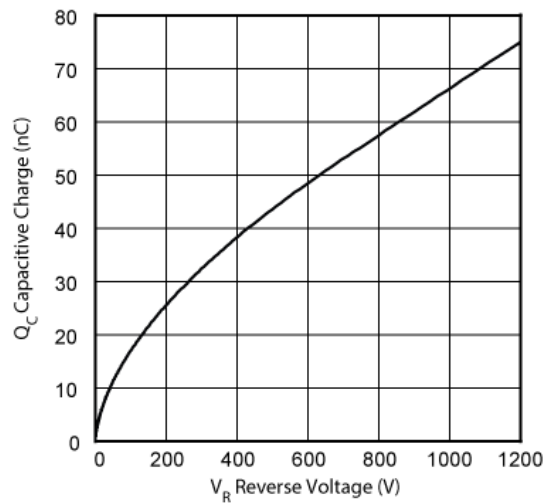
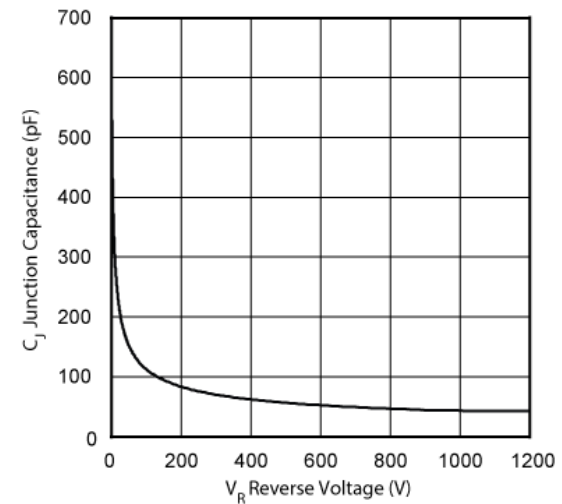


**Figure 2 • Forward Current vs. Forward Voltage**



**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**



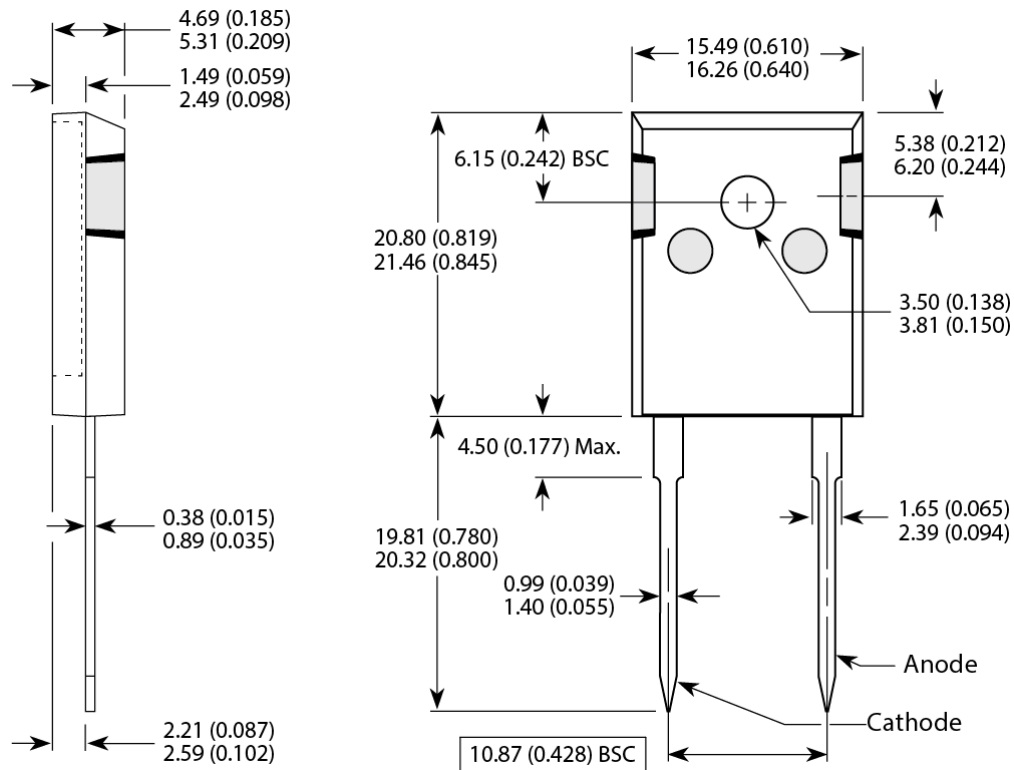
## 4 Package Specification

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**



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