

MSC010SDA120B
Datasheet
Zero Recovery Silicon Carbide Schottky Diode

Final
June 2018



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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:

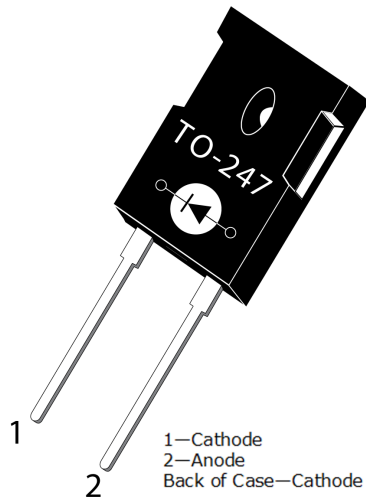
- Updated features and benefits in the [Product Overview](#) section.
- Updated the thermal and mechanical characteristics table.

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 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_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	$T_c = 25\text{ }^\circ\text{C}$	25	A
		$T_c = 135\text{ }^\circ\text{C}$	12	
		$T_c = 145\text{ }^\circ\text{C}$	9	
I_{FRM}	Repetitive peak forward surge current ($T_c = 25\text{ }^\circ\text{C}$, $t_p = 8.3\text{ ms}$, half sine wave)		38	
I_{FSM}	Non-repetitive forward surge current ($T_c = 25\text{ }^\circ\text{C}$, $t_p = 8.3\text{ ms}$, half sine wave)		75	
P_{tot}	Power dissipation	$T_c = 25\text{ }^\circ\text{C}$	115	W
		$T_c = 110\text{ }^\circ\text{C}$	50	
T_J, T_{STG}	Operating junction and storage temperature range		-55 to 175	$^\circ\text{C}$
T_L	Lead temperature for 10 seconds		300	
E_{AS}	Single pulse avalanche energy (starting $T_J = 25\text{ }^\circ\text{C}$, $L = 2.0\text{ mH}$, peak $I_L = 10\text{ A}$)		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	$^\circ\text{C}/\text{W}$
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	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	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, f = 1 MHz			55	pF
	Junction capacitance V _R = 800 V, T _J = 25 °C, f = 1 MHz			43	

3.3 Performance Curves

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

Figure 1 • Maximum Transient Thermal Impedance

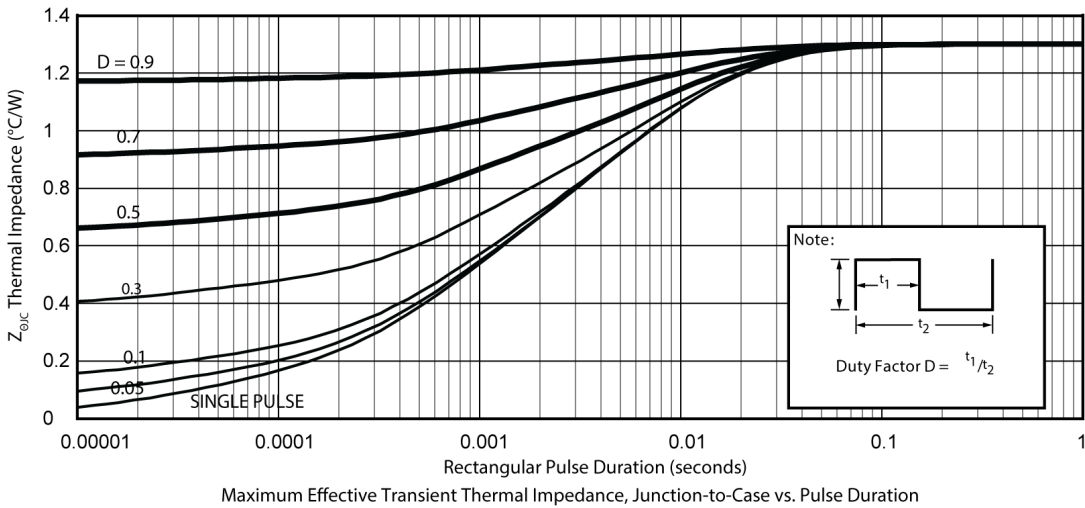


Figure 2 • Forward Current vs. Forward Voltage

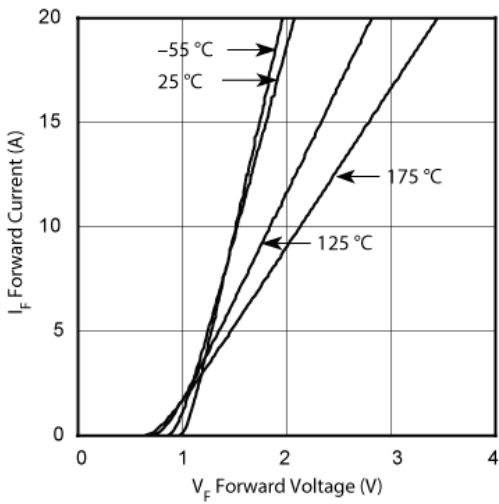


Figure 3 • Max. Forward Current vs. Case Temp.

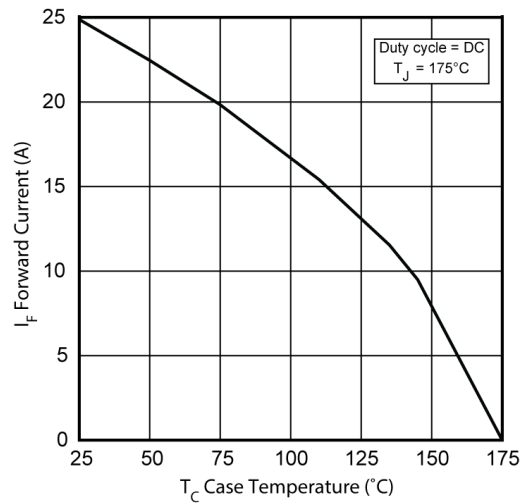


Figure 4 • Max. Power Dissipation vs. Case Temp.

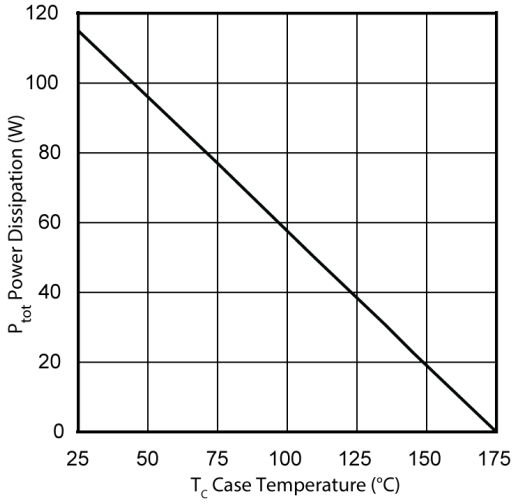


Figure 5 • Reverse Current vs. Reverse Voltage

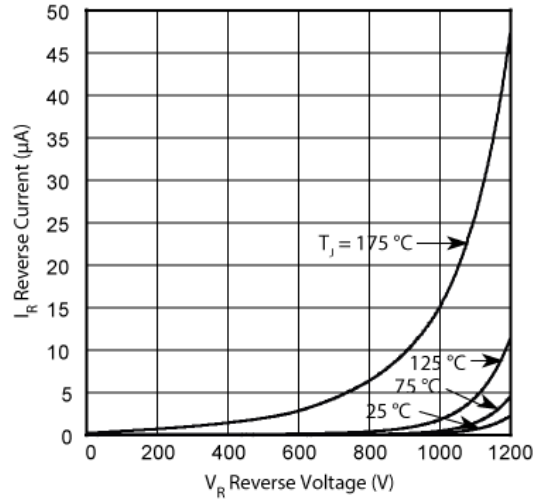


Figure 6 • Total Capacitive Charge vs. Reverse Voltage

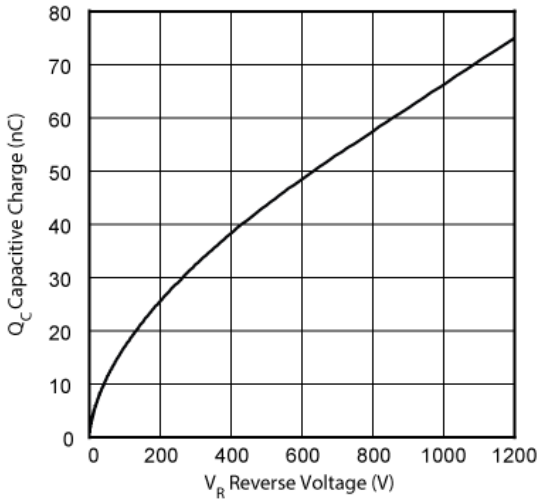
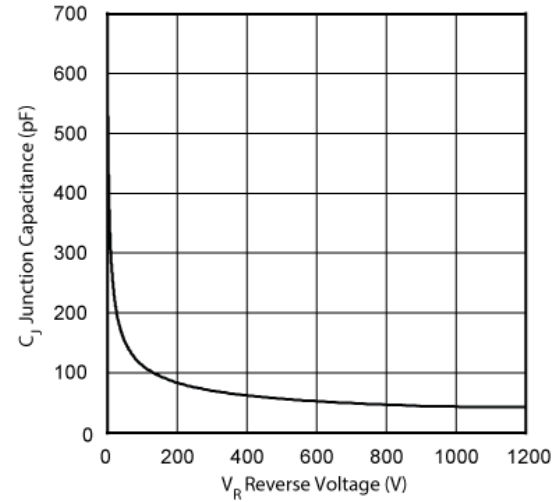


Figure 7 • Junction Capacitance vs. Reverse Voltage



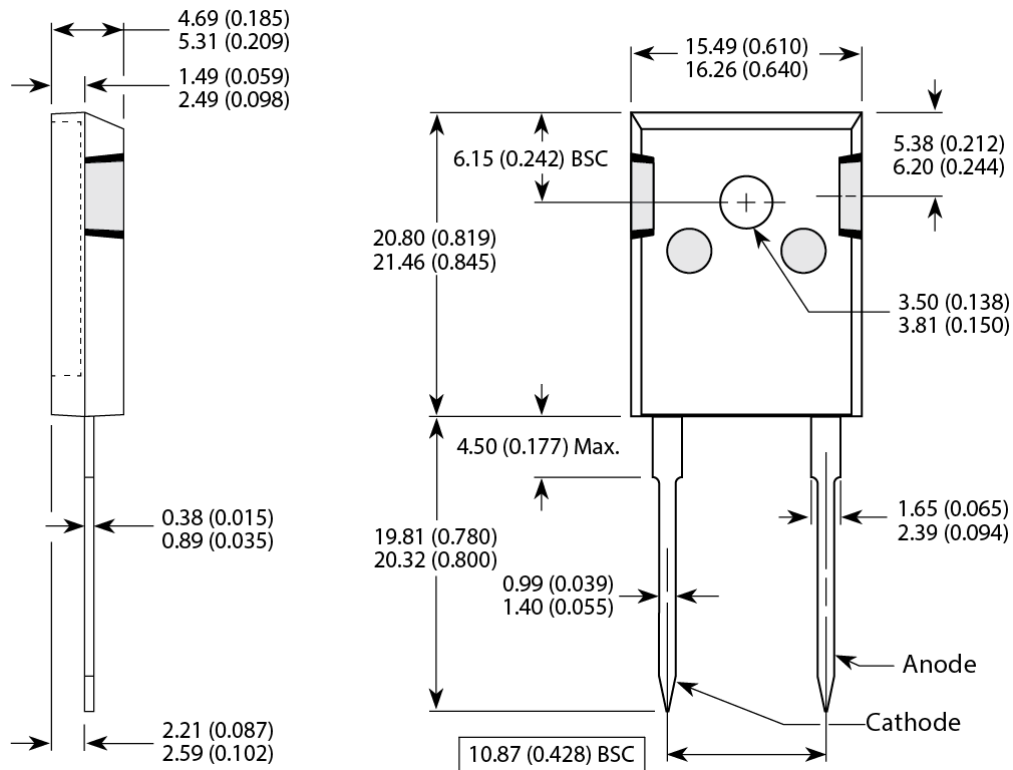
4 Package Specification

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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