MSC010SDA120B Datasheet Zero Recovery Silicon Carbide Schottky Diode

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.

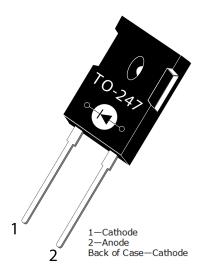
1.2 Revision A

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 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
VR	Maximum DC reverse voltage	1200	V	
Vrrm	Maximum peak repetitive reverse voltage			
Vrwm	Maximum working peak reverse voltage		_	
l _F	Maximum DC forward current	Tc = 25 °C	25	Α
		Tc = 135 °C	12	
		Tc = 145 °C	9	_
IFRM	Repetitive peak forward surge current (Tc = 25 °C, t_p = 8.3 ms, half sine wave)		38	
Ifsм	Non-repetitive forward surge current (T_c = 25 °C, t_P = 8.3 ms, half sine wave)		75	_
P _{tot}	Power dissipation	Tc = 25 °C	115	W
		Tc = 110 °C	50	
Tı , Tstg	Operating junction and storage temperature range		-55 to 175	°C
Tι	Lead temperature for 10 seconds		300	_
Eas	Single pulse avalanche energy (starting T_1 = 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	Тур	Max	Unit
Rejc	Junction-to-case thermal resistance		0.90	1.3	°C/W
WT	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

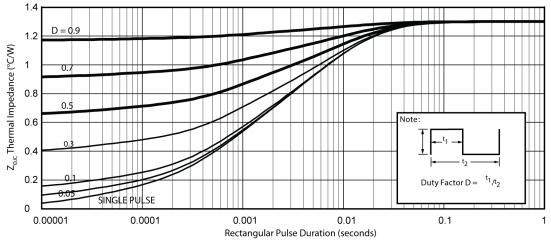
Symbol	Characteristic/Test Conditions		Min	Тур	Max	Unit
VF	Forward voltage	I _F = 10 A, T _J = 25 °C	1.5	1.5	1.8	V
		I _F = 10 A, T _J = 175 °C		2.1		=
Irm	Reverse leakage current	V _R = 1200 V, T _J = 25 °C		3	200	μΑ
		V _R = 1200 V, T _J = 175 °C		50		=
Q c	Total capacitive charge V_R = 600 V, T_J = 25 °C			48		nC
Cı	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	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



 ${\it Maximum Effective Transient Thermal Impedance, Junction-to-Case \ vs. \ Pulse \ Duration}$

Figure 2 • Forward Current vs. Forward Voltage

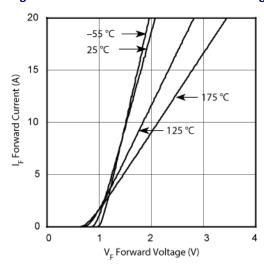


Figure 3 • Max. Forward Current vs. Case Temp.

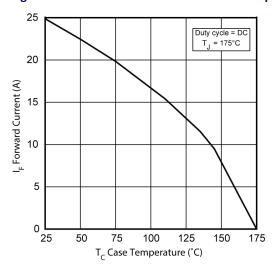




Figure 4 • Max. Power Dissipation vs. Case Temp.

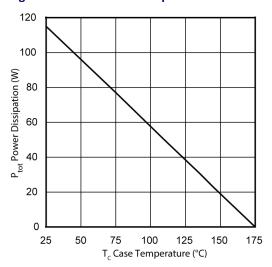


Figure 6 • Total Capacitive Charge vs. Reverse Voltage

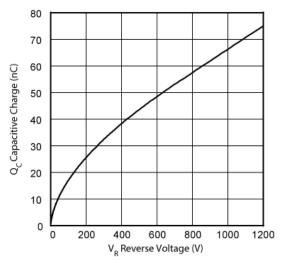


Figure 5 • Reverse Current vs. Reverse Voltage

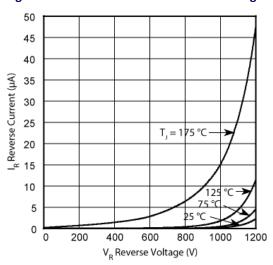
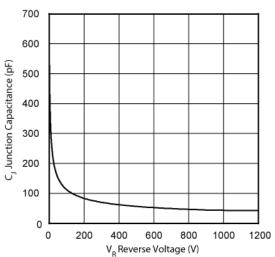


Figure 7 • Junction Capacitance vs. Reverse Voltage





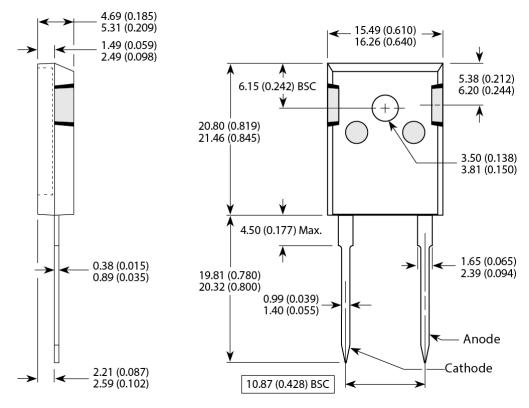
4 Package Specification

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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