MSC015SDA120B Datasheet Zero Recovery Silicon Carbide Schottky Diode

May 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.

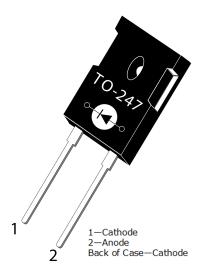
1.1 Revision A

Revision A was published in May 2018. It is the first publication of this document.



2 Product Overview

This section shows the product overview for the MSC015SDA120B device.



2.1 Features

The following are key features of the MSC015SDA120B 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 MSC015SDA120B device:

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

2.3 Applications

The MSC015SDA120B 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 shows the electrical specifications for the MSC015SDA120B device.

3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings for the MSC015SDA120B device. All ratings at $T_c = 25$ °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	1200	
V _{RWM}	Maximum working peak reverse voltage	1200	_
l _F	Maximum DC forward current (Tc = 25 °C)	39	Α
	Maximum DC forward current (Tc = 135 °C)	17	_
	Maximum DC forward current (Tc = 145 °C)	14	_
IFRM	Repetitive peak forward surge current	55	
	(Tc = 25 °C, t_p = 8.3 ms, half sine wave)		
İfsm	Non-repetitive forward surge current	109	
	(T _c = 25 °C, t_p = 8.3 ms, half sine wave)		
P _{tot}	Power dissipation (Tc = 25 °C)	17 14 55	W
	Power dissipation (Tc = 110 °C)	72	_
Tл , Tsтg	Operating junction and storage temperature range	-55 to 175	°C
Lead temperature for 10 seconds		300	_
Eas	Single pulse avalanche energy	100	mJ
	(starting T_1 = 25 °C, L = 0.89 mH, peak I_L = 15 A)		

The following table shows the thermal and mechanical characteristics of the MSC015SDA120B.

Table 2 • Thermal and Mechanical Characteristics

Symbol	Characteristic/Test Conditions	Min	Тур	Max	Unit
Rejc	Junction-to-case thermal resistance		0.62	0.90	°C/W
WT	Package weight		0.22		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 MSC015SDA120B.

Table 3 • Static Characteristics

Symbol	Characteristic	Test Conditions	Туре	Max	Unit
VF	Forward voltage	I _F = 15 A, T _J = 25 °C	1.5	1.8	V
		I _F = 15 A, T _J = 175 °C	2.0		=
IRM	Maximum reverse leakage count	V _R = 1200 V, T _J = 25 °C	10	200	μΑ
		V _R = 1200 V, T _J = 175 °C	50		=
Qc	Total capacitive charge	V _R = 600 V, T _J = 25 °C	73		nC
Cı	Junction capacitance	V _R = 1 V, T _J = 25 °C, f = 1 MHz	906		pF
	Junction capacitance	V _R = 400 V, T _J = 25 °C, f = 1 MHz	80		_
	Junction capacitance	V _R = 800 V, T _J = 25 °C, f = 1 MHz	59		_



3.3 Performance Curves

This section shows the typical performance curves for the MSC015SDA120B device.

Figure 1 • Maximum Transient Thermal Impedance

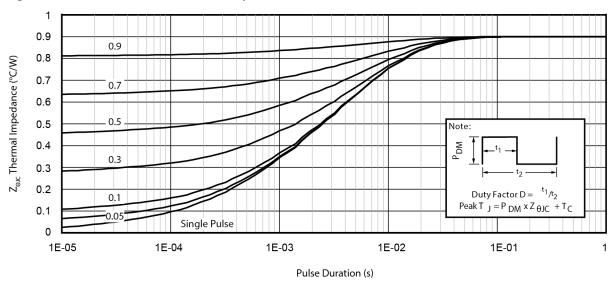


Figure 2 • Forward Current vs Forward Voltage

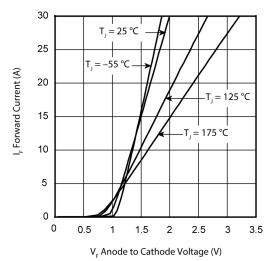


Figure 3 • Max Forward Current vs Case Temperature

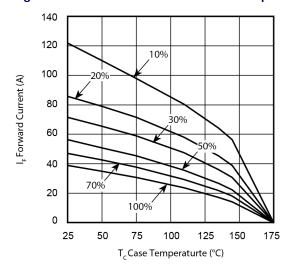




Figure 4 • Max Power Dissipation vs Case Temperature

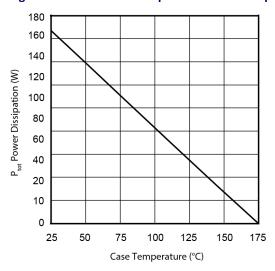


Figure 6 • Total Capacitive Charge vs. Reverse Voltage

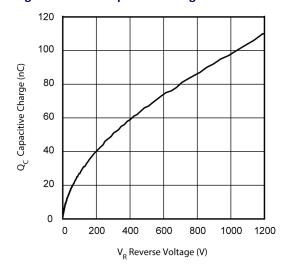


Figure 5 • Reverse Current vs Reverse Voltage

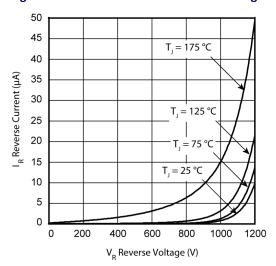
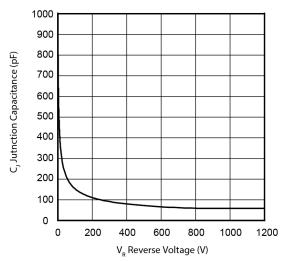


Figure 7 • Junction Capacitance vs Reverse Voltage





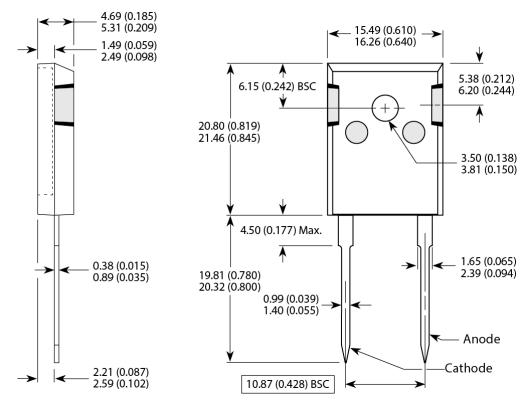
4 Package Specification

This section shows the package specification for the MSC015SDA120B device.

4.1 Package Outline Drawing

This section shows the TO-247 package outline drawing of the MSC015SDA120B device. The dimensions in the figure below are in millimeters and (inches).

Figure 8 • Package Outline Drawing







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