MSC050SDA070B Datasheet Zero Recovery Silicon Carbide Schottky Diode

May 2018





Contents

1	Revis	sion History	1
	1.1	sion History Revision A	. 1
2		uct Overview	
	2.1	Features	. 2
	2.2	Benefits	. 2
	2.3	Applications	. 2
		• •	
3	Elect	trical Specifications	3
	3.1	Absolute Maximum Ratings	. 3
	3.2	Electrical Performance	. 4
	3.3	Performance Curves	. 5
		age Specification	
	4.1	Package Outline Drawing	. 7



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.

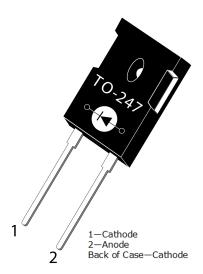
1.1 Revision A

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 MSC050SDA070B device.



2.1 Features

The following are key features of the MSC050SDA070B 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 MSC050SDA070B device:

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

2.3 Applications

The MSC050SDA070B 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 MSC050SDA070B device.

3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings for the MSC050SDA070B device.

All ratings: Tc = 25 °C unless otherwise specified.

Table 1 • Absolute Maximum Ratings

Symbol	Parameter	Ratings	Unit
VR	Maximum DC reverse voltage	700	V
VRRM	Maximum peak repetitive reverse voltage	700	_
V _{RWM}	Maximum working peak reverse voltage	700	_
l _F	Maximum DC forward current (Tc = 25 °C)	88	Α
	Maximum DC forward current (Tc = 135 °C)	39	_
	Maximum DC forward current (T _c = 145 °C)	32	_
IFRM	Repetitive peak forward surge current	128	_
	$(T_c = 25 ^{\circ}\text{C}, t_p = 10 \text{ms}, \text{half sine wave})$		
IFSM	Non-repetitive forward surge current	124	
	$(T_c = 25 ^{\circ}\text{C}, t_p = 10 \text{ms}, \text{ half sine wave})$		
P _{tot}	Power dissipation (Tc = 25 °C)	283	W
	Power dissipation (Tc = 110 °C)	123	_
Tл , Tsтg	Operating and storage temperature range	-55 to 175	°C
Tι	Lead temperature for 10 seconds	300	
Eas	Single-pulse avalanche energy	100	mJ
	(starting $T_1 = 25$ °C, $L = 0.08$ mH, peak $I_L = 50$ A)		

The following table shows the thermal and mechanical characteristics of the MSC050SDA70B device.

Table 2 • Thermal and Mechanical Characteristics

Symbol	Characteristic	Min	Тур	Max	Unit
Rejc	Junction-to-case thermal resistance		0.37	0.53	°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 MSC050SDA070B device.

Table 3 • Static Characteristics

Symbol	Characteristic	Test Conditions	Тур	Max	Unit
VF	Forward voltage	I _F = 50 A, T _J = 25 °C	1.5	1.8	V
		I _F = 50 A, T _J = 175 °C	1.9		_
Irm	Reverse leakage current	V _R = 700 V, T _J = 25 °C	15	200	μΑ
		V _R = 700 V, T _J = 175 °C	250		_
Qc	Total capacitive charge	V _R = 400 V, T _J = 25 °C	133		nC
Cı	Junction capacitance	V _R = 1 V, T _J = 25 °C, f = 1 MHz	2034		pF
	Junction capacitance	V _R = 200 V, T _J = 25 °C, f = 1 MHz	248		=
	Junction capacitance	V _R = 400 V, T _J = 25 °C, f = 1 MHz	216		_



3.3 Performance Curves

This section shows the typical performance curves for the MSC050SDA070B device.

Figure 1 • Maximum Transient Thermal Impedance

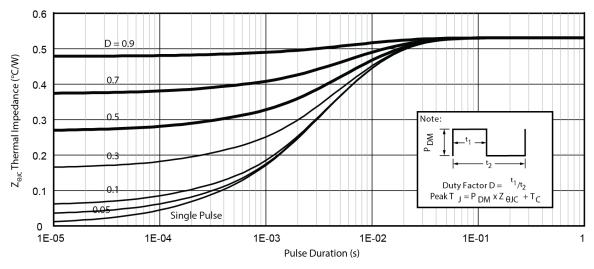


Figure 2 • Forward Current vs Forward Voltage

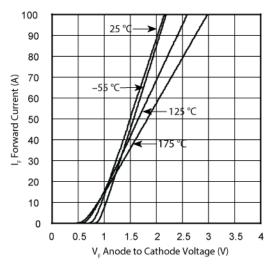


Figure 3 • Max Forward Current vs Case Temp

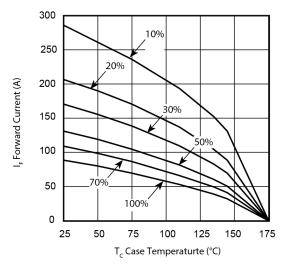




Figure 4 • Max Power Dissipation vs Case Temp

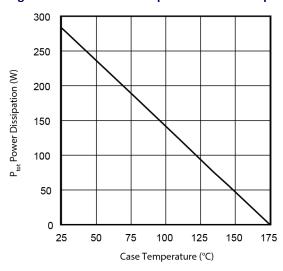


Figure 6 • Total Capacitive Charge vs. Reverse Voltage

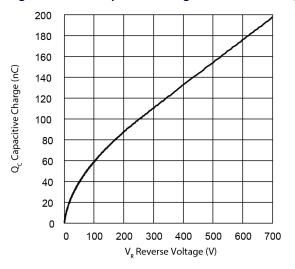


Figure 5 • Reverse Current vs. Reverse Voltage

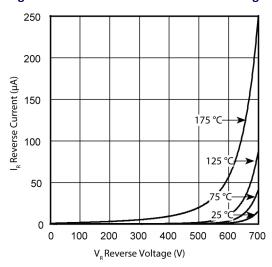
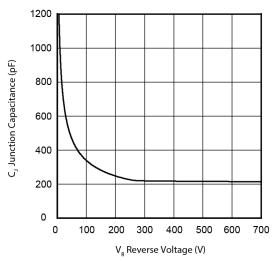


Figure 7 • Junction Capacitance vs Reverse Voltage





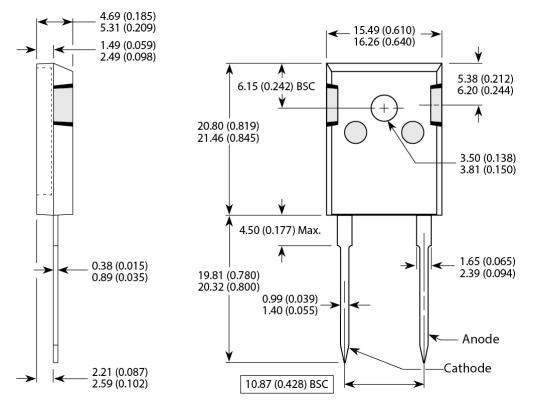
4 Package Specification

This section outlines the package specification for the MSC050SDA070B device.

4.1 Package Outline Drawing

This section shows the TO-247 package drawing of the MSC050SDA070B device. Dimensions are in millimeters and (inches).

Figure 8 • Package Outline Drawing







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