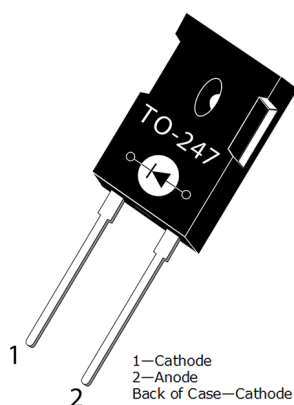


MSC050SDA0170B Zero Recovery Silicon Carbide Schottky Diode

1 Product Overview

This section shows the product overview for the MSC050SDA170B device.



1.1 Features

The following are key features of the MSC050SDA170B device:

- No reverse recovery
- Low forward voltage
- Low leakage current
- Avalanche energy rated
- RoHS compliant

1.2 Benefits

The following are benefits of the MSC050SDA170B device:

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

1.3 Applications

The MSC050SDA170B 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

2 Device Specifications

This section details the specifications for the MSC050SDA170B device.

2.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings for the MSC050SDA170B device.
All ratings: $T_c = 25^\circ\text{C}$ unless otherwise specified.

Table 1 • Absolute Maximum Ratings

Symbol	Parameter		Ratings	Unit
V _R	Maximum DC reverse voltage		1700	V
V _{RRM}	Maximum peak repetitive reverse voltage		1700	
V _{RWM}	Maximum working peak reverse voltage		1700	
I _F	Maximum DC forward current	T _C = 25 °C	136	A
		T _C = 135 °C	62	
		T _C = 145 °C	51	
I _{FRM}	Repetitive peak forward surge current (T _C = 25 °C, t _p = 8.3 ms, half sine wave)		192	
I _{FSM}	Non-repetitive forward surge current (T _C = 25 °C, t _p = 8.3 ms, half sine wave)		432	
P _{tot}	Power dissipation	T _C = 25 °C	652	W
		T _C = 110 °C	282	
T _J , T _{STG}	Operating junction and storage temperature range		–55 to 175	°C
T _L	Lead temperature for 10 seconds		300	
E _{AS}	Single pulse avalanche energy (starting T _J = 25 °C, L = 0.08 mH, peak I _L = 50 A)		100	mJ

The following table shows the thermal and mechanical characteristics of the MSC050SDA170B device.

Table 2 • Thermal and Mechanical Characteristics

Symbol	Characteristic/Test Conditions	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-case thermal resistance		0.15	0.23	$^\circ\text{C}/\text{W}$
W_t	Package weight		0.22		oz
			6.2		g
	Mounting torque, 6-32 or M3 screw			10	lbf-in
				1.1	N-m

2.2 Electrical Performance

The following table shows the static characteristics of the MSC050SDA170B device.

Table 3 • Static Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_F	Forward voltage	$I_F = 50\text{ A}$, $T_J = 25\text{ }^\circ\text{C}$		1.5	1.8	V
		$I_F = 50\text{ A}$, $T_J = 175\text{ }^\circ\text{C}$		2.0		
I_{RM}	Reverse leakage current	$V_R = 1700\text{ V}$, $T_J = 25\text{ }^\circ\text{C}$	50		200	μA
		$V_R = 1700\text{ V}$, $T_J = 175\text{ }^\circ\text{C}$	250			
Q_C	Total capacitive charge	$V_R = 900\text{ V}$, $T_J = 25\text{ }^\circ\text{C}$		410		nC
C_J	Junction capacitance	$V_R = 1\text{ V}$, $T_J = 25\text{ }^\circ\text{C}$, $f = 1\text{ MHz}$		4450		pF
	Junction capacitance	$V_R = 600\text{ V}$, $T_J = 25\text{ }^\circ\text{C}$, $f = 1\text{ MHz}$		300		
	Junction capacitance	$V_R = 900\text{ V}$, $T_J = 25\text{ }^\circ\text{C}$, $f = 1\text{ MHz}$		250		

2.3 Performance Curves

This section shows the typical performance curves for the MSC050SDA170B device.

Figure 1 • Maximum Transient Thermal Impedance

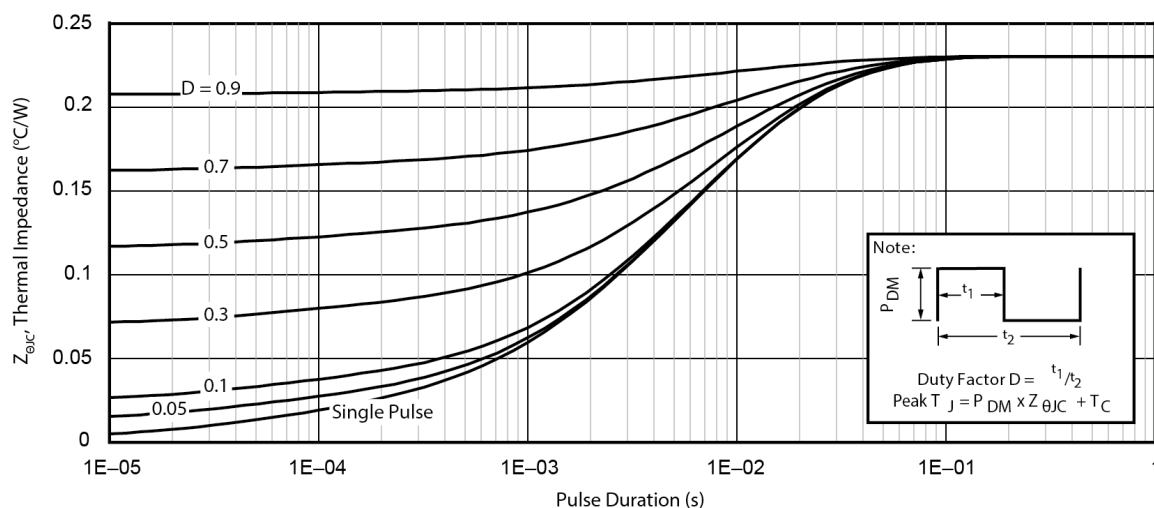


Figure 2 • Forward Current vs. Forward Voltage

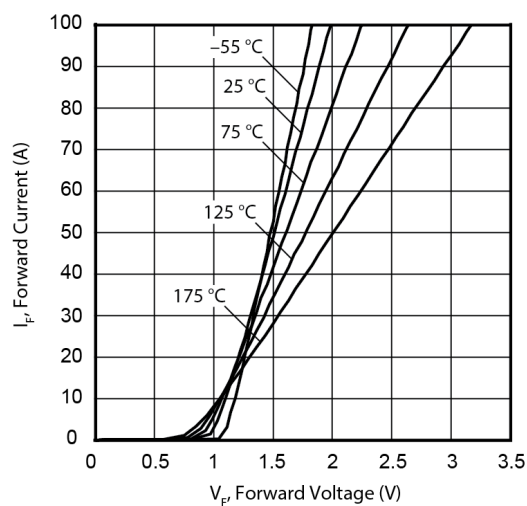


Figure 3 • Max. Forward Current vs. Case Temp.

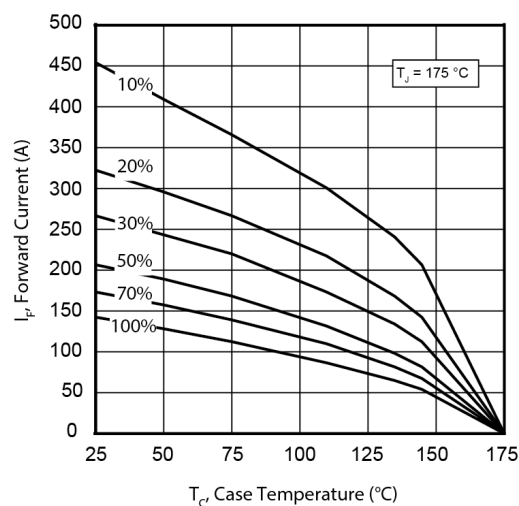


Figure 4 • Max. Power Dissipation vs. Case Temp.

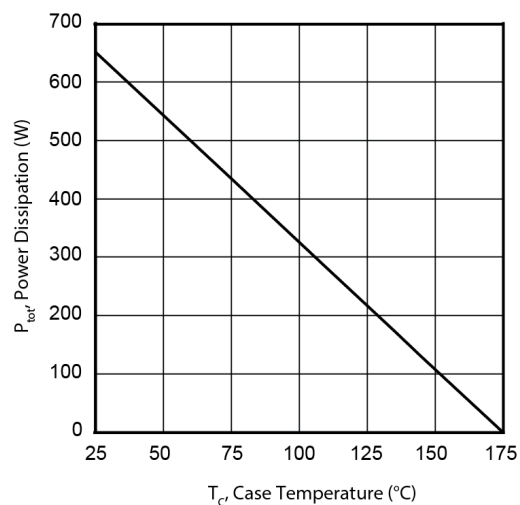


Figure 5 • Reverse Current vs. Reverse Voltage

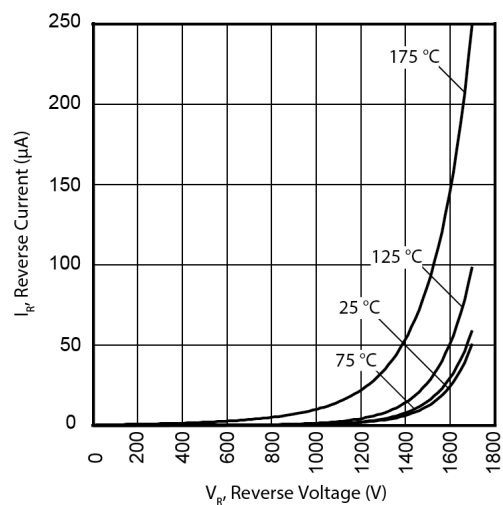


Figure 6 • Total Capacitive Charge vs. Reverse Voltage

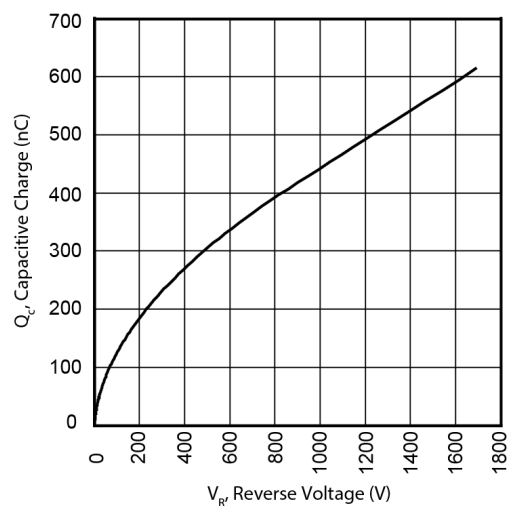
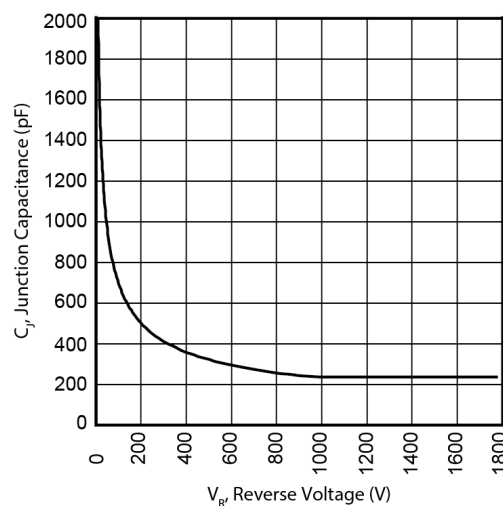


Figure 7 • Junction Capacitance vs. Reverse Voltage



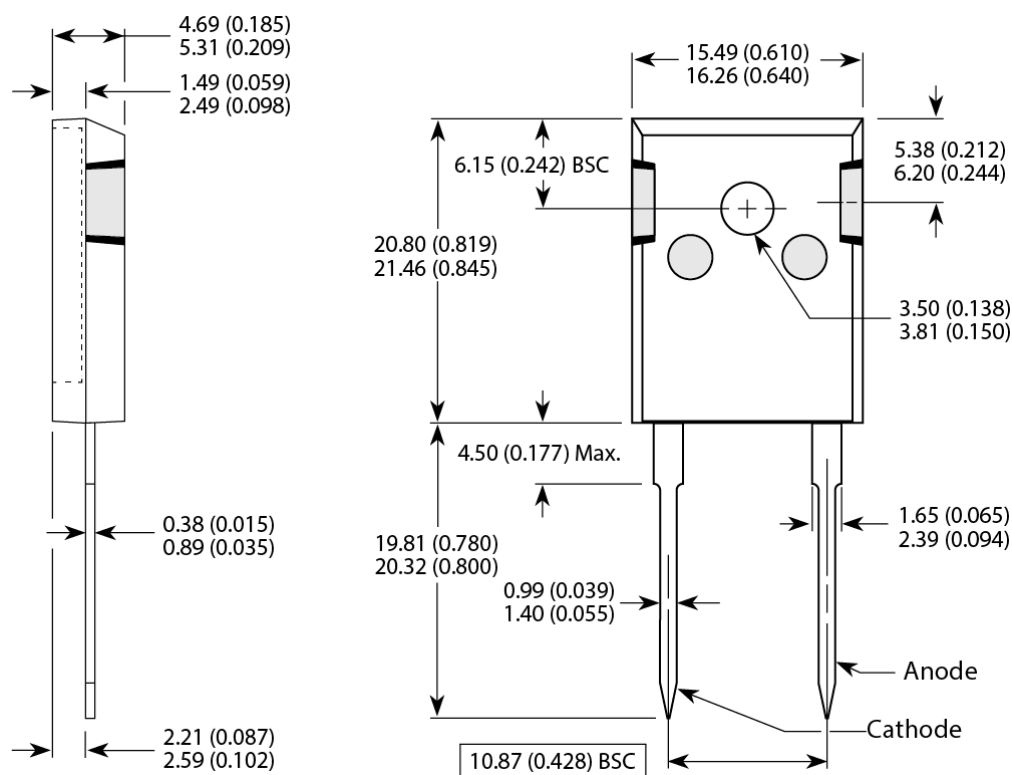
3 Package Specification

This section outlines the package specification for the MSC050SDA170B device.

3.1 Package Outline Drawing

This section details the TO-247 package drawing of the MSC050SDA170B device. Dimensions are in millimeters and (inches).

Figure 8 • Package Outline Drawing



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