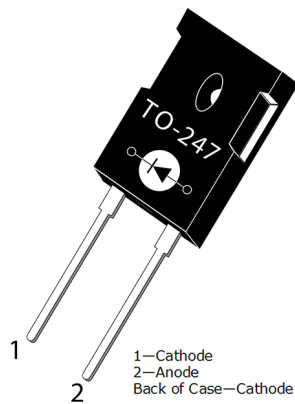


MSC050SDA0170B Zero Recovery Silicon Carbide Schottky Diode

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: $T_c = 25\text{ }^\circ\text{C}$ 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	$T_c = 25\text{ }^\circ\text{C}$	136	A
		$T_c = 135\text{ }^\circ\text{C}$	62	
		$T_c = 145\text{ }^\circ\text{C}$	51	
I_{FRM}	Repetitive peak forward surge current ($T_c = 25\text{ }^\circ\text{C}$, $t_p = 8.3\text{ ms}$, half sine wave)	192		
I_{FSM}	Non-repetitive forward surge current ($T_c = 25\text{ }^\circ\text{C}$, $t_p = 8.3\text{ ms}$, half sine wave)	432		
P_{tot}	Power dissipation	$T_c = 25\text{ }^\circ\text{C}$	652	W
		$T_c = 110\text{ }^\circ\text{C}$	282	
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 $T_J = 25\text{ }^\circ\text{C}$, $L = 0.08\text{ mH}$, peak $I_L = 50\text{ A}$)	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	$^\circ\text{C}/\text{W}$
Wt	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 A, T _J = 25 °C		1.5	1.8	V
		I _F = 50 A, T _J = 175 °C		2.0		
I _{RM}	Reverse leakage current	V _R = 1700 V, T _J = 25 °C		50	200	μA
		V _R = 1700 V, T _J = 175 °C		250		
Q _C	Total capacitive charge	V _R = 900 V, T _J = 25 °C		410		nC
C _J	Junction capacitance	V _R = 1 V, T _J = 25 °C, f = 1 MHz		4450		pF
	Junction capacitance	V _R = 600 V, T _J = 25 °C, f = 1 MHz		300		
	Junction capacitance	V _R = 900 V, T _J = 25 °C, f = 1 MHz		250		

2.3 Performance Curves

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

Figure 1 • Maximum Transient Thermal Impedance

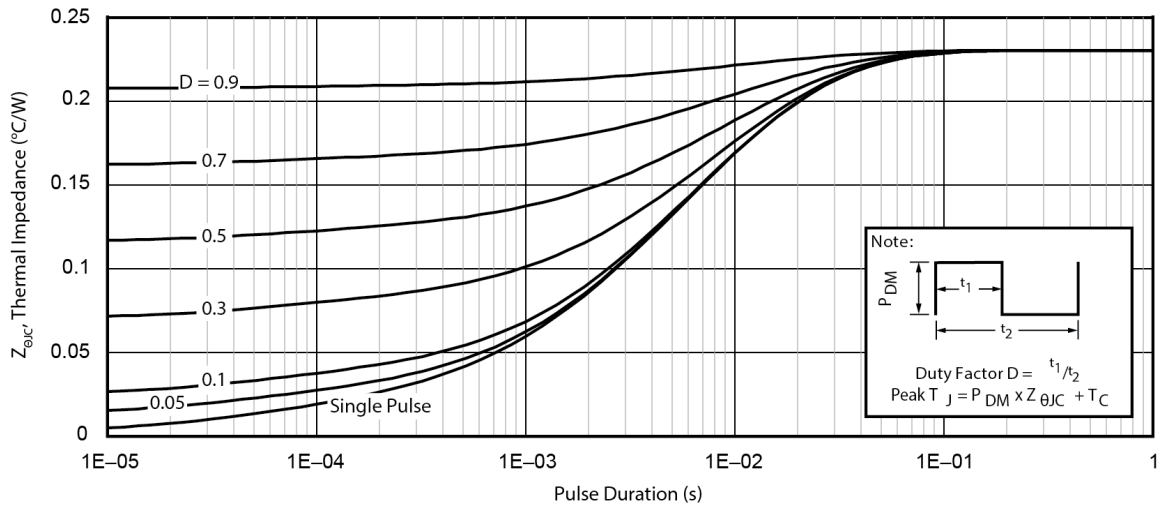


Figure 2 • Forward Current vs. Forward Voltage

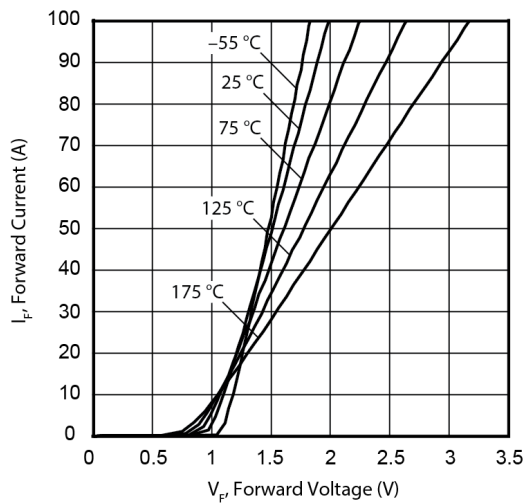


Figure 3 • Max. Forward Current vs. Case Temp.

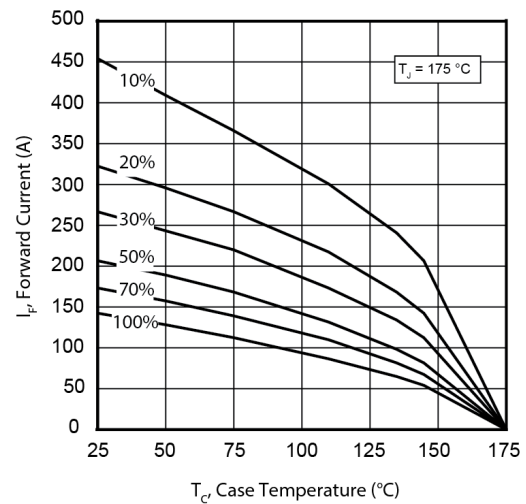


Figure 4 • Max. Power Dissipation vs. Case Temp.

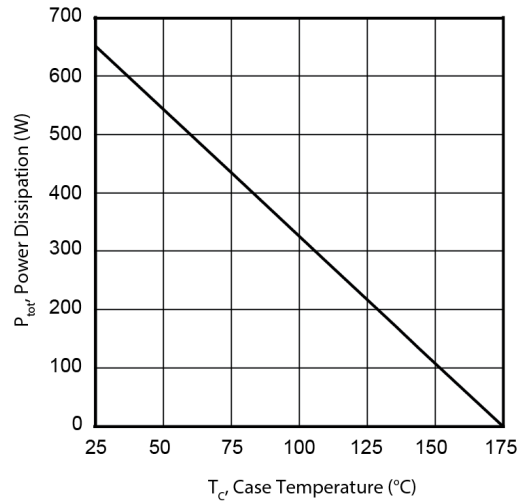


Figure 5 • Reverse Current vs. Reverse Voltage

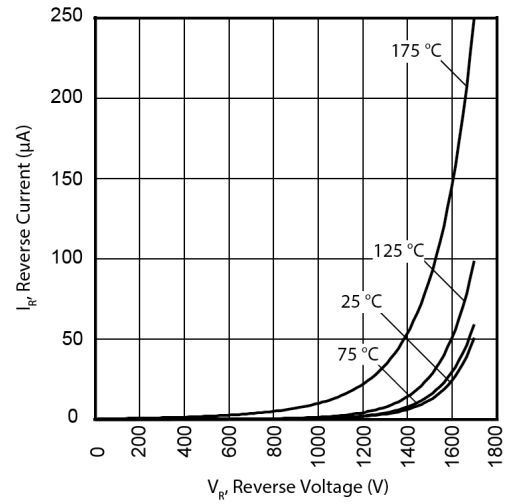


Figure 6 • Total Capacitive Charge vs. Reverse Voltage

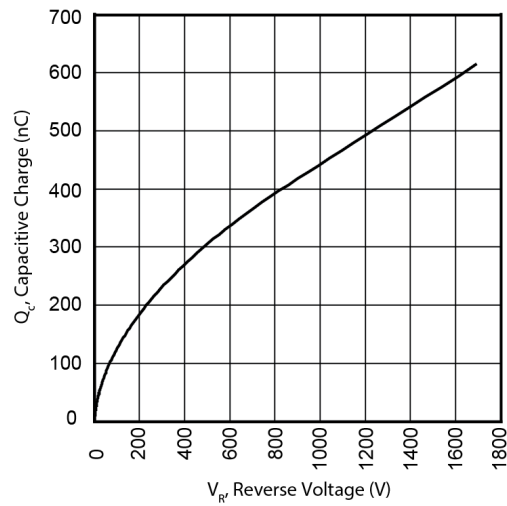
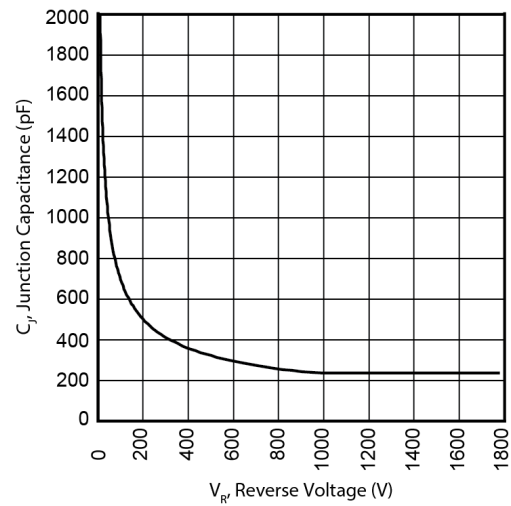


Figure 7 • Junction Capacitance vs. Reverse Voltage



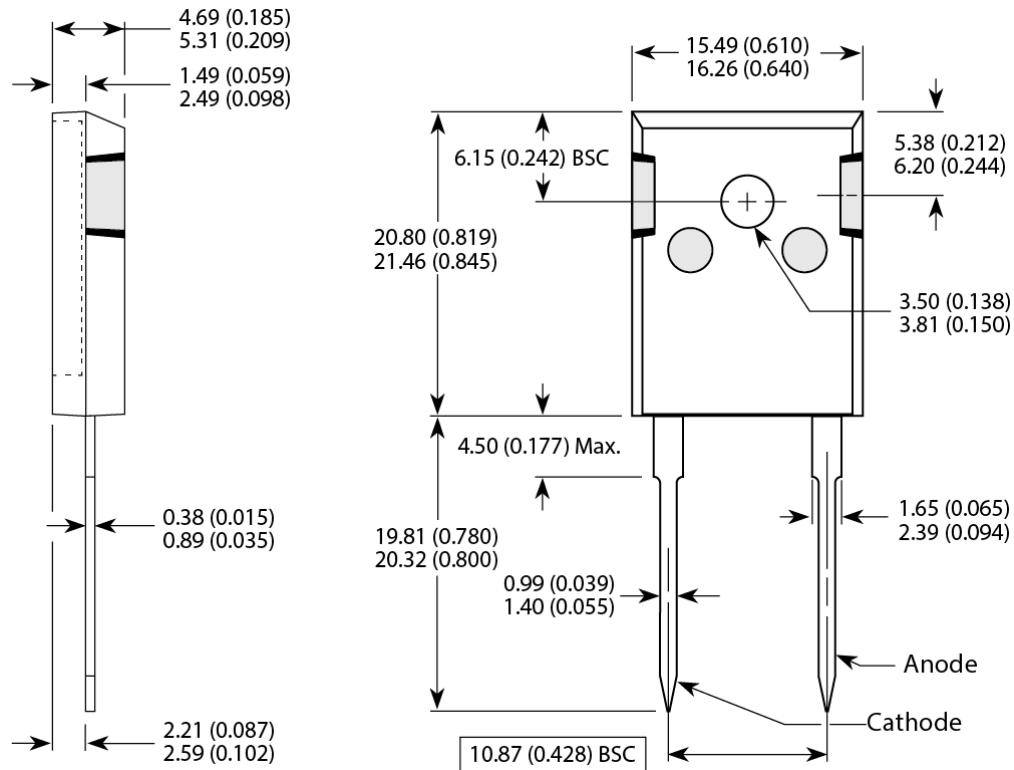
3 Package Specification

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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