

Product Overview

1700V, 50A, Silicon Carbide (SiC) Schottky Diode, TO-247.

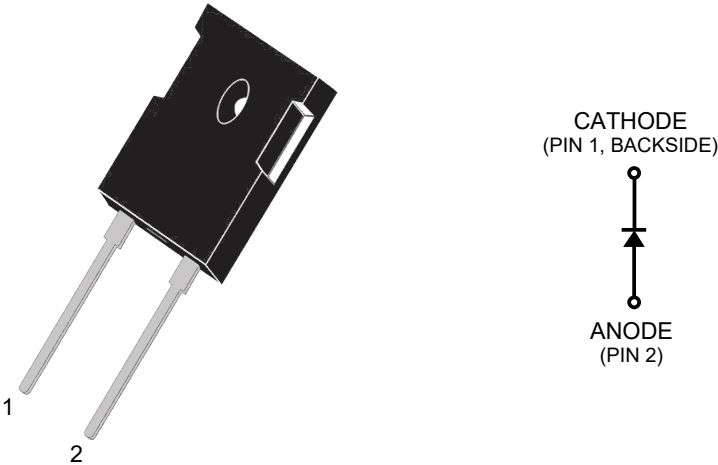


Table 1. Ordering Information

Catalog Part Number (CPN)	Package	Packing Media	Qualification
MSC050SDA170B	TO-247	Tube	Industrial
MSC050SDA170BVAO	TO-247	Tube	AEC-Q101

Features

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

Benefits

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

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

1. Device Specifications

This section shows the specifications of this device.

1.1. Absolute Maximum Ratings

The following table shows the absolute maximum ratings of this device.

Table 1-1. Absolute Maximum Ratings

Symbol	Parameter		Ratings	Unit
V _R	Maximum DC reverse voltage		1700	V
V _{RRM}	Maximum peak repetitive reverse voltage			
V _{RWM}	Maximum working peak reverse voltage			
I _F	Maximum DC forward current	T _C = 25 °C	133	A
		T _C = 135 °C	63	
		T _C = 145 °C	53	
I _{FRM}	Repetitive peak forward surge current (t _p = 8.3 ms, half sine wave)	T _C = 25 °C	192	
I _{FSM}	Non-repetitive forward surge current (t _p = 8.3 ms, half sine wave)		432	
P _{TOT}	Total power dissipation	T _C = 25 °C	588	W
		T _C = 135 °C	157	
		T _C = 145 °C	118	
E _{AS}	Single-pulse avalanche energy (starting T _J = 25 °C, peak I _L = 50A)		100	mJ

1.2. Thermal and Mechanical Characteristics

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

Table 1-2. Thermal and Mechanical Characteristics

Symbol	Characteristic/Test Conditions	Min.	Typ.	Max.	Unit
$R_{\theta JC}$	Junction-to-case thermal resistance	—	0.17	0.26	$^{\circ}\text{C/W}$
T_J, T_{STG}	Operating junction and storage temperature range	-55	—	175	$^{\circ}\text{C}$
T_L	Lead temperature for 10 seconds	—	—	300	
τ_M	Mounting torque, M3 screw for heat sink attachment (requires 1, not included)	—	0.8	—	N·m
Wt	Package weight	—	6.2	—	g

1.3. Electrical Performance

The following table shows the static characteristics of this device. $T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Table 1-3. 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
		$I_F = 50\text{ A}, T_J = 175\text{ }^{\circ}\text{C}$ ¹	—	2.0	—	
I_{RM}	Reverse leakage current	$V_R = 1700\text{ V}, T_J = 25\text{ }^{\circ}\text{C}$	—	4.0	75	μA
		$V_R = 1700\text{ V}, T_J = 175\text{ }^{\circ}\text{C}$ ¹	—	50	—	
Q_C	Total capacitive charge ²	$V_R = 900\text{ V}$	—	410	—	nC

Table 1-3. Static Characteristics (continued)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
C_j	Junction capacitance ²	$V_R = 1V, f = 1\text{ MHz}$	—	4450	—	pF
		$V_R = 600V, f = 1\text{ MHz}$	—	300	—	
		$V_R = 900V, f = 1\text{ MHz}$	—	250	—	

Notes:

1. The forward voltage (V_F) and reverse leakage current (I_{RM}) at 175°C are characterized, not 100% tested.
2. The dynamic characteristics (Q_C and C_j) are characterized, not 100% tested.

1.4. Typical Performance Curves

Data for performance curves are characterized, not 100% tested.

Figure 1-1. Forward Current vs. Forward Voltage

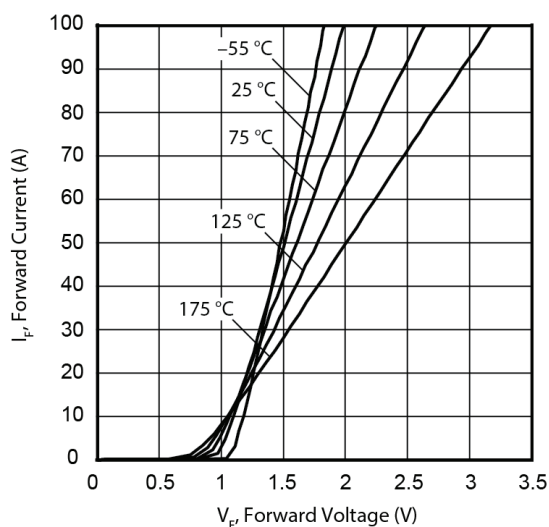


Figure 1-2. Maximum Forward Current vs. Case Temp.

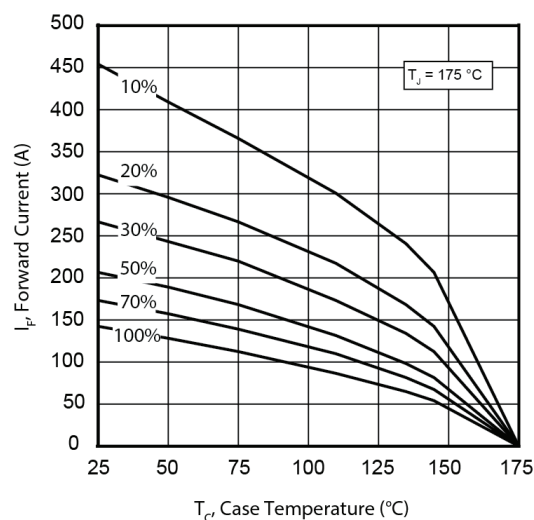


Figure 1-3. Maximum Power Dissipation vs. Case Temp.

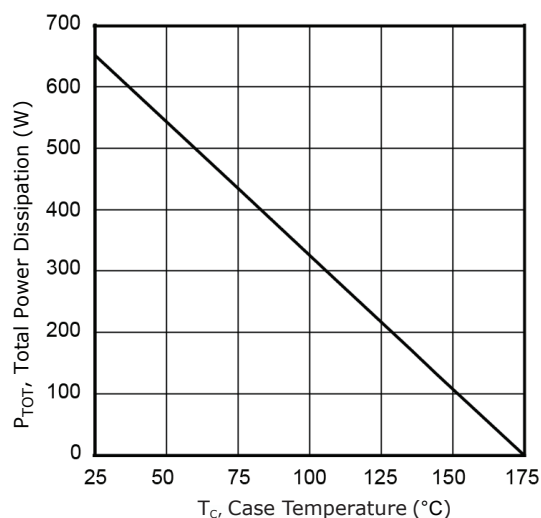


Figure 1-4. Reverse Current vs. Reverse Voltage

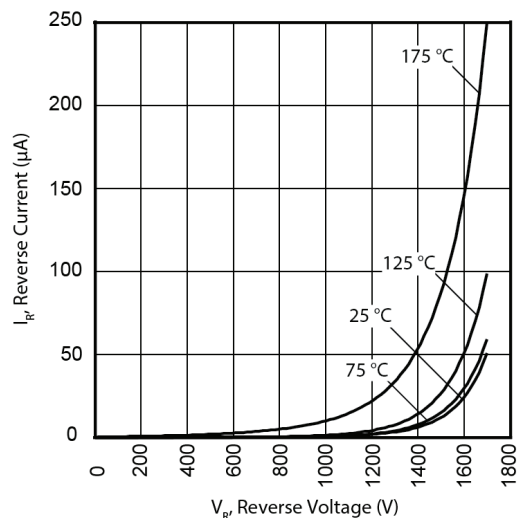


Figure 1-5. Total Charge vs. Reverse Voltage

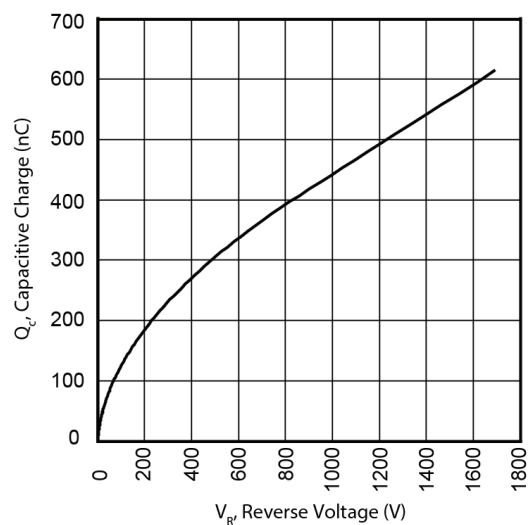


Figure 1-6. Capacitance vs. Reverse Voltage

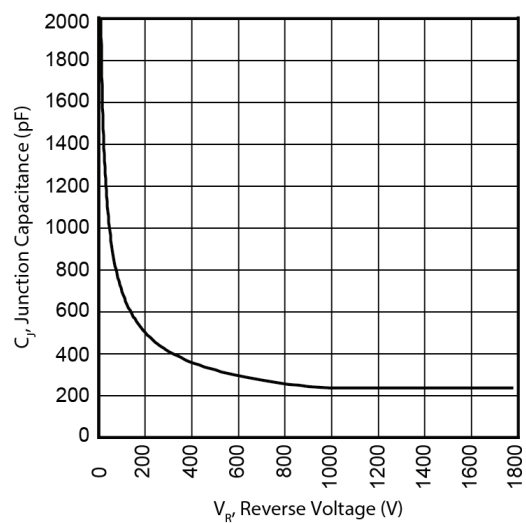
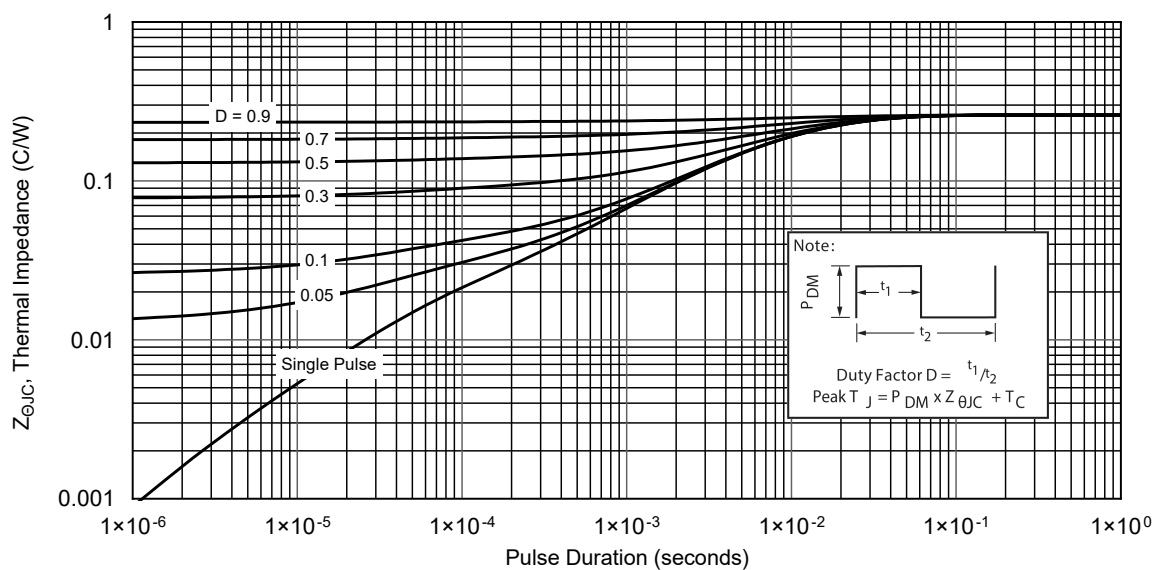


Figure 1-7. Maximum Transient Thermal Impedance



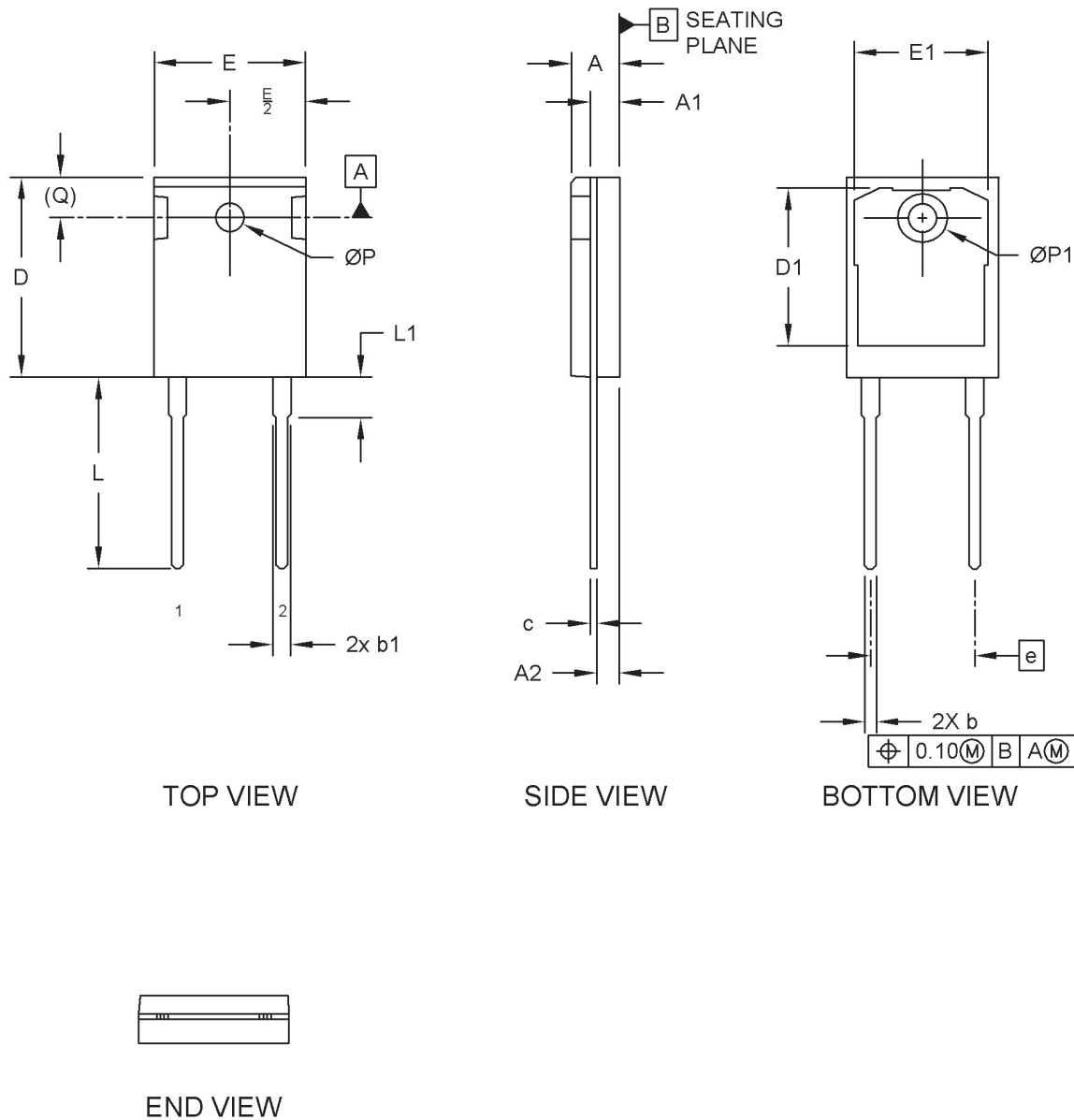
2. Package Specification

This section shows the package specification of this device.

2.1. Package Outline Drawing

The following figure illustrates the 2-lead TO-247 package outline of this device.

Figure 2-1. Package Outline Drawing



The following table shows the 2-lead TO-247 dimensions and should be used in conjunction with the package outline drawing.

Table 2-1. 2-Lead TO-247 Dimensions

Symbol	Description	Min. (mm)	Max. (mm)
N	Number of leads	2	
e	Pitch	10.88 BSC	
A	Overall height	4.69	5.31
A1	Tab height	1.50	2.49
A2	Seating plane to lead	2.21	2.59
b	Lead width	1.02	1.40
b1	Lead shoulder width (X2)	1.65	2.41
c	Lead thickness	0.41	0.79
L	Lead length	19.81	20.32
L1	Lead shoulder length	3.99	4.50
D	Molded body length	20.80	21.46
D1	Thermal pad length	16.25	17.50
E	Total width	15.49	16.26
E1	Thermal pad width	13.10	14.50
Q	Hole center to tab edge	6.15 REF	
ØP	Hole diameter	3.50	3.81
ØP1	Thermal pad hole diameter	7.18 REF	

Notes:

Dimensioning and tolerancing per ASME Y14.5M.

- BSC: Basic dimension. Theoretically exact value shown without tolerances.
- REF: Reference dimension, usually without tolerance, for information purposes only.

3. Revision History

Table 3-1. Revision History

Revision	Date	Description
A	09/2025	Document migrated from Microsemi template to Microchip template; Assigned Microchip literature number DS-00005788A, which replaces the previous Microsemi literature number 053-4095.
Initial release (Microsemi Revision A)	04/2019	Document created.

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