

Product Overview

3300V, 90A, Silicon Carbide (SiC) Schottky Diode, 2-lead T-MAX® package.

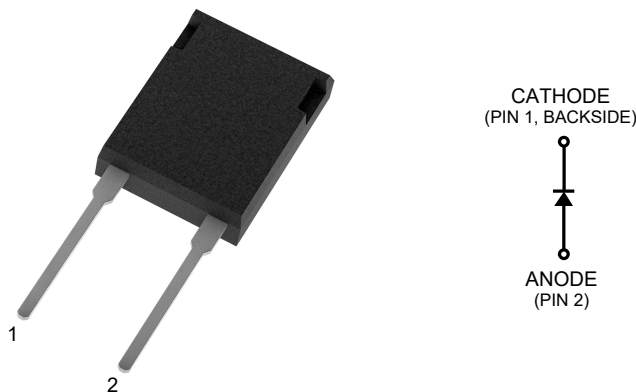


Table 1. Ordering Information

Catalog Part Number (CPN)	Package	Packing Media	Qualification
MSC090SDA330B2	T-MAX®	Tube	Industrial

Features

- No reverse recovery
- Low forward voltage
- Low leakage current
- 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		3300	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	144	A
		T _C = 135 °C	75	
		T _C = 145 °C	64	
I _{FRM}	Repetitive peak forward surge current (t _p = 8.3 ms, half sine wave)	T _C = 25 °C	258	
I _{FSM}	Non-repetitive forward surge current (t _p = 8.3 ms, half sine wave)		615	
P _{TOT}	Total power dissipation	T _C = 25 °C	1034	W
		T _C = 135 °C	276	
		T _C = 145 °C	207	

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	—	0.10	0.15	$^{\circ}\text{C}/\text{W}$
T_J, T_{STG}	Operating junction and storage temperature range	-55	—	175	$^{\circ}\text{C}$
T_L	Lead temperature for 10 seconds	—	—	300	
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	$I_F = 90\text{ A}, T_J = 25\text{ }^{\circ}\text{C}$	—	2.1	2.5	V
		$I_F = 90\text{ A}, T_J = 175\text{ }^{\circ}\text{C}$	—	4.3	—	
I_{RM}	Reverse leakage current	$V_R = 3300\text{ V}, T_J = 25\text{ }^{\circ}\text{C}$	—	15	95	μA
		$V_R = 3300\text{ V}, T_J = 175\text{ }^{\circ}\text{C}$	—	150	—	
Q_C	Total capacitive charge	$V_R = 1650\text{ V}$	—	927	—	nC
C_J	Junction capacitance	$V_R = 1\text{ V}, f = 1\text{ MHz}$	—	6326	—	pF
		$V_R = 1100\text{ V}, f = 1\text{ MHz}$	—	361	—	
		$V_R = 2200\text{ V}, f = 1\text{ MHz}$	—	256	—	

1.4 Typical Performance Curves

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

Figure 1-1. Forward Current vs. Forward Voltage

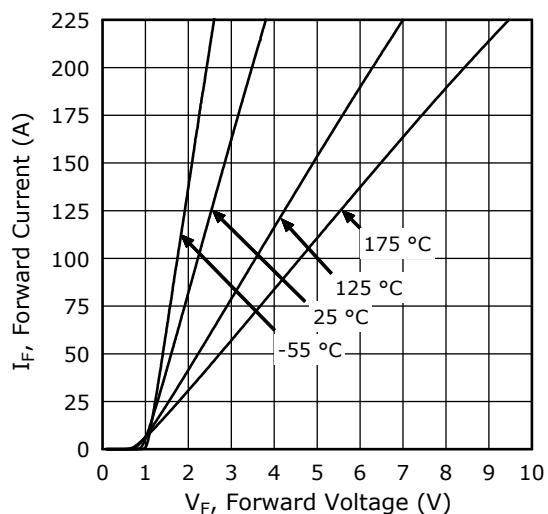


Figure 1-2. Maximum Forward Current vs. Case Temp.

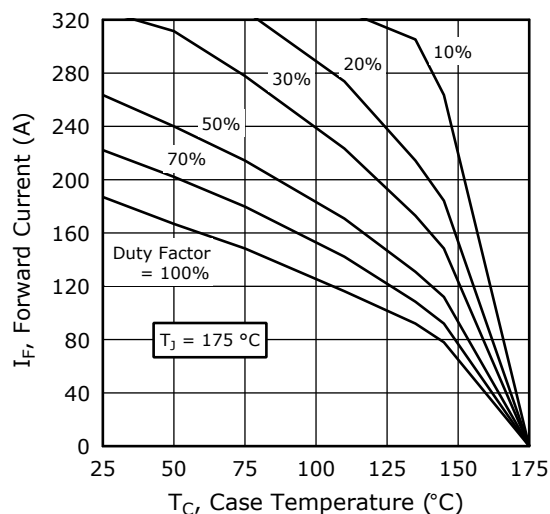


Figure 1-3. Maximum Power Dissipation vs. Case Temp.

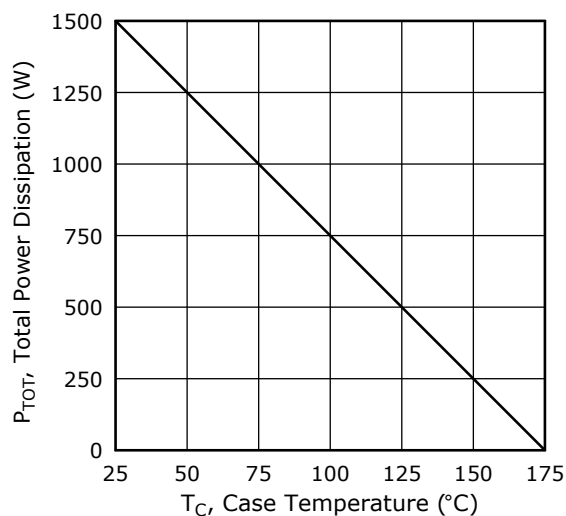


Figure 1-4. Reverse Current vs. Reverse Voltage

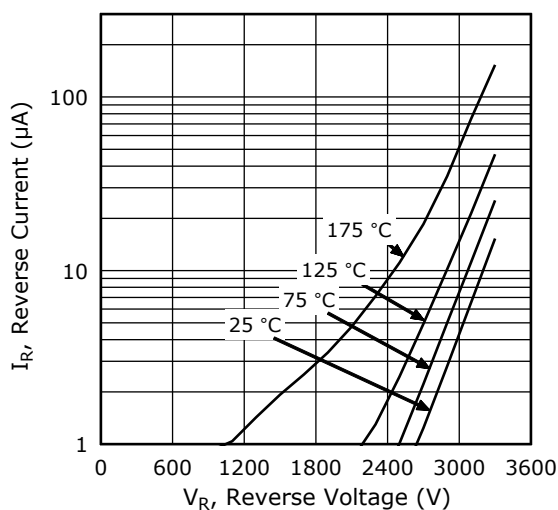


Figure 1-5. Total Charge vs. Reverse Voltage

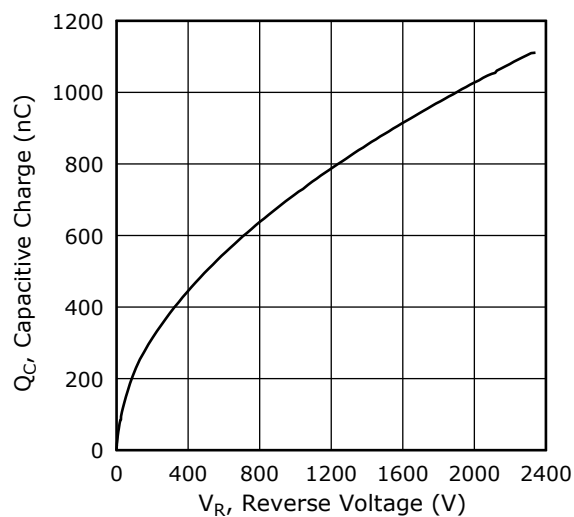


Figure 1-6. Capacitance vs. Reverse Voltage

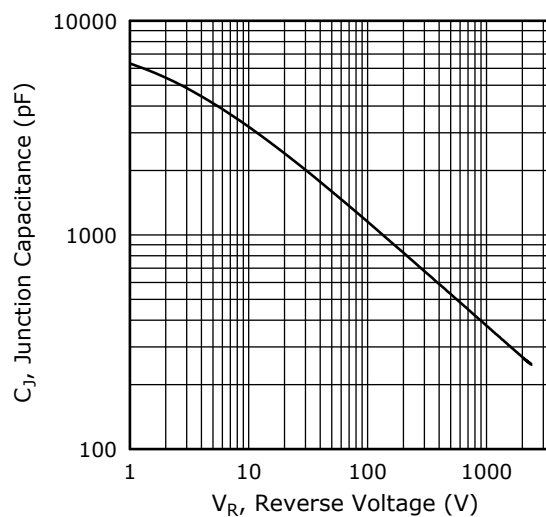
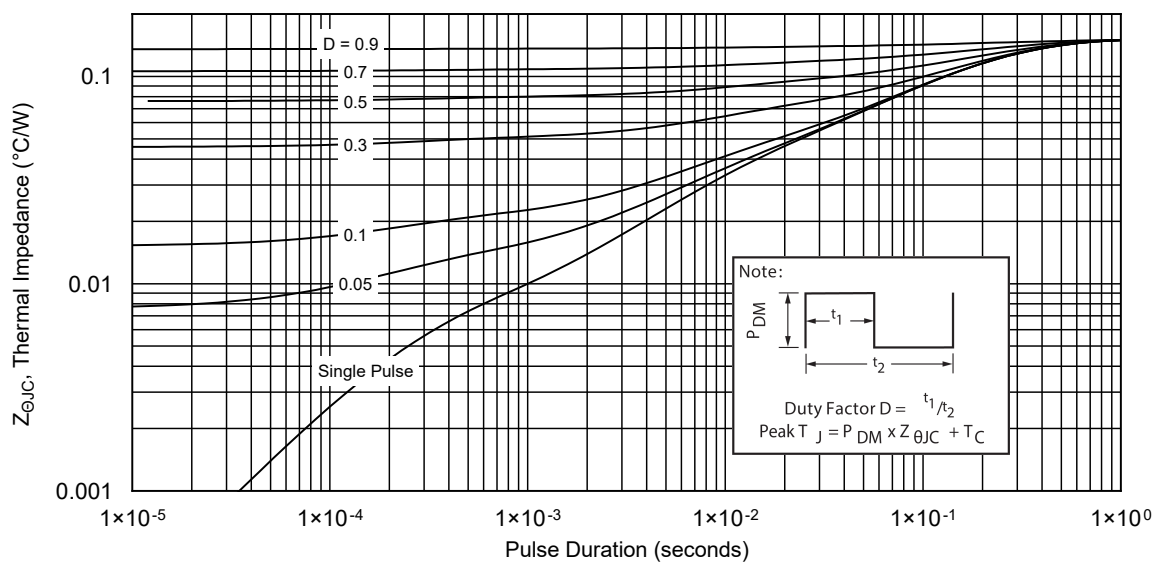


Figure 1-7. Maximum Transient Thermal Impedance



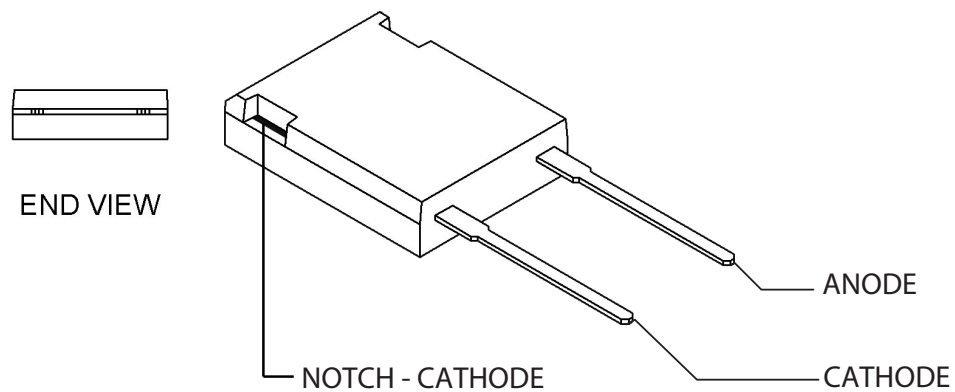
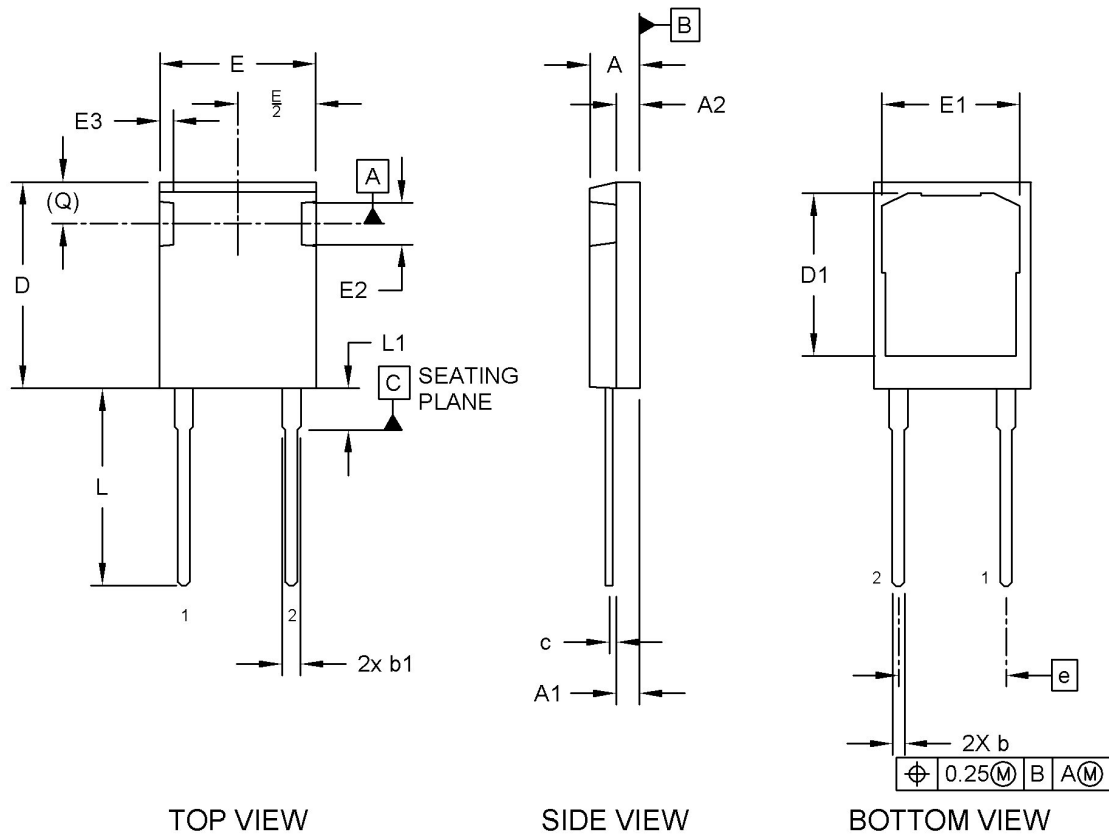
2. Package Specification

This section shows the package specification of this device.

2.1 Package Outline Drawing

The following figure illustrates the T-MAX[®] package outline of this device.

Figure 2-1. Package Outline Drawing



The following table shows the T-MAX dimensions and should be used in conjunction with the package outline drawing.

Table 2-1. T-MAX Dimensions

Symbol	Description	Min. (mm)	Max. (mm)
N	Number of leads	2	
e	Pitch	10.88 BSC	
A	Overall height	4.83	5.21
A1	Tab to lead	2.29	2.54
A2	Back side to notch	1.91	2.16
b	Lead width	1.07	1.33
b1	Lead shoulder width (X2)	1.91	2.41
c	Lead thickness	0.55	0.68
L	Lead length	19.81	20.32
L1	Lead shoulder length	3.70	4.00
D	Molded body length	20.80	21.10
D1	Thermal pad length	16.25	17.65
E	Molded body width	15.75	16.13
E1	Thermal pad width	13.10	14.15
E2	Notch length	3.68	5.10
E3	Notch to body edge	1.00	1.90
Q	Notch center to body edge	5.49	6.00

Note: Dimensioning and tolerancing per ASME Y14.5M.

- BSC: Basic dimension. Theoretically exact value shown without tolerances.

3. Revision History

Table 3-1. Revision History

Revision	Date	Description
C	01/2025	The following changes are made in this revision of the document: • Added Table 1. • Updated I_F and P_{TOT} ratings in Table 1-1. • Updated typical and maximum $R_{\theta JC}$ values in Table 1-2. • Updated Figure 1-7.
B	07/2024	The following changes are made in this revision of the document: • Updated Product Overview. • Updated Table 1-1 and Table 1-3. • Updated Typical Performance Curves. • Updated Package Outline Drawing.
A	03/2022	Document created.

Microchip Information

Trademarks

The “Microchip” name and logo, the “M” logo, and other names, logos, and brands are registered and unregistered trademarks of Microchip Technology Incorporated or its affiliates and/or subsidiaries in the United States and/or other countries (“Microchip Trademarks”). Information regarding Microchip Trademarks can be found at <https://www.microchip.com/en-us/about/legal-information/microchip-trademarks>.

ISBN: 979-8-3371-0286-3

Legal Notice

This publication and the information herein may be used only with Microchip products, including to design, test, and integrate Microchip products with your application. Use of this information in any other manner violates these terms. Information regarding device applications is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. Contact your local Microchip sales office for additional support or, obtain additional support at www.microchip.com/en-us/support/design-help/client-support-services.

THIS INFORMATION IS PROVIDED BY MICROCHIP “AS IS”. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTIES RELATED TO ITS CONDITION, QUALITY, OR PERFORMANCE.

IN NO EVENT WILL MICROCHIP BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL, OR CONSEQUENTIAL LOSS, DAMAGE, COST, OR EXPENSE OF ANY KIND WHATSOEVER RELATED TO THE INFORMATION OR ITS USE, HOWEVER CAUSED, EVEN IF MICROCHIP HAS BEEN ADVISED OF THE POSSIBILITY OR THE DAMAGES ARE FORESEEABLE. TO THE FULLEST EXTENT ALLOWED BY LAW, MICROCHIP’S TOTAL LIABILITY ON ALL CLAIMS IN ANY WAY RELATED TO THE INFORMATION OR ITS USE WILL NOT EXCEED THE AMOUNT OF FEES, IF ANY, THAT YOU HAVE PAID DIRECTLY TO MICROCHIP FOR THE INFORMATION.

Use of Microchip devices in life support and/or safety applications is entirely at the buyer’s risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Microchip Devices Code Protection Feature

Note the following details of the code protection feature on Microchip products:

- Microchip products meet the specifications contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is secure when used in the intended manner, within operating specifications, and under normal conditions.
- Microchip values and aggressively protects its intellectual property rights. Attempts to breach the code protection features of Microchip products are strictly prohibited and may violate the Digital Millennium Copyright Act.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of its code. Code protection does not mean that we are guaranteeing the product is “unbreakable”. Code protection is constantly evolving. Microchip is committed to continuously improving the code protection features of our products.