E4D02120E

4th Generation 1200 V, 2 A Silicon Carbide Schottky Diode

Description

With the performance advantages of a Silicon Carbide (SiC) Schottky Barrier diode, power electronics systems can expect to meet higher efficiency standards than Si-based solutions, while also reaching higher frequencies and power densities. SiC diodes can be easily paralleled to meet various application demands, without concern of thermal runaway. In combination with the reduced cooling requirements and improved thermal performance of SiC products, SiC diodes are able to provide lower overall system costs in a variety of diverse applications.





Package Type: TO-252-2
Marking: E4D02120

Features

- Low Forward Voltage (V_F) Drop with Positive Temperature Coefficient
- Zero Reverse Recovery Current / Forward Recovery Voltage
- Temperature-Independent Switching Behavior
- AEC-Q101 + HV-H3TRB Qualified, PPAP Capable

Applications

- Bootstrap Diode
- Boost Diodes in PFC
- Automotive Power Conversion
- PV Inverters
- Outdoor Power Conversion

Maximum Ratings (T_C = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit	Test Conditions	Note
Repetitive Peak Reverse Voltage	V_{RRM}	1200	V		
DC Blocking Voltage	V_{DC}	1200			
Continuous Forward Current	I_F	8	A	T_J = 25 °C	Fig. 3
		4		T_J = 135 °C	
		2		T_J = 160 °C	
Repetitive Peak Forward Surge Current	I_{FRM}	11		T_C = 25 °C, t_p = 10 ms, Half Sine Wave	
		7		T_C = 110 °C, t_p = 10 ms, Half Sine Wave	
Power Dissipation	P_{tot}	50	W	T_C = 25 °C	Fig. 4
		21		T_C = 110 °C	

Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Units	Test Conditions	Note
Forward Voltage	V_F	1.4	1.8	V	I_F = 2 A, T_J = 25 °C	Fig. 1
		1.9			I_F = 2 A, T_J = 175 °C	
Reverse Current	I_R	10	50	µA	V_R = 1200 V, T_J = 25 °C	Fig. 2
		40			V_R = 1200 V, T_J = 175 °C	
Total Capacitive Charge	Q_C	16		nC	V_R = 800 V, T_J = 25 °C	Fig. 5
Total Capacitance	C	153		pF	V_R = 0 V, T_J = 25 °C, f = 1 MHz	Fig. 6
		17			V_R = 400 V, T_J = 25 °C, f = 1 MHz	
		14			V_R = 800 V, T_J = 25 °C, f = 1 MHz	
Capacitance Stored Energy	E_C	5.6		µJ	V_R = 800 V	Fig. 7

Note:
SiC Schottky Diodes are majority carrier devices, so there is no reverse recovery charge.

Thermal & Mechanical Characteristics

Parameter	Symbol	Value	Units	Note
Thermal Resistance, Junction to Case (Typ.)	$R_{\theta, JC}$	2.99	°C / W	
Operating Junction & Storage Temperature	T_J, T_{stg}	-55 to +175	°C	Fig. 8
Maximum Processing Temperature	T_{PROC}	325		10 min. Maximum
Moisture Sensitivity Level	MSL	MSL 3		

Electrostatic Discharge (ESD) Classifications

Parameter	Symbol	Value
Human Body Model	HBM	Class 3B (≥ 8000 V)
Charge Device Model	CDM	Class C3 (≥ 1000 V)

Typical Performance

Figure 1. Forward Characteristics

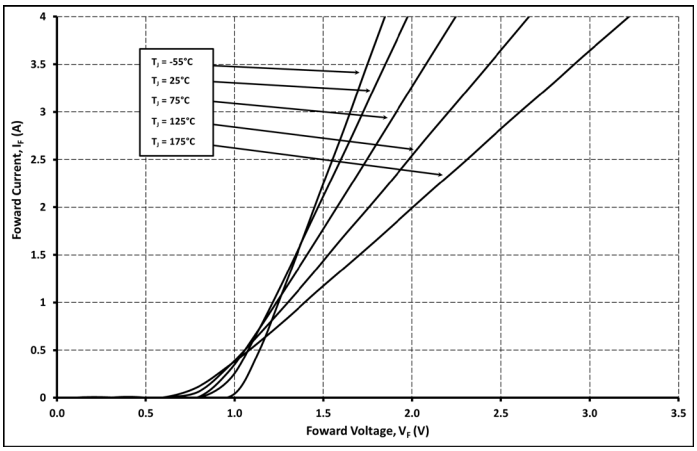


Figure 2. Reverse Characteristics

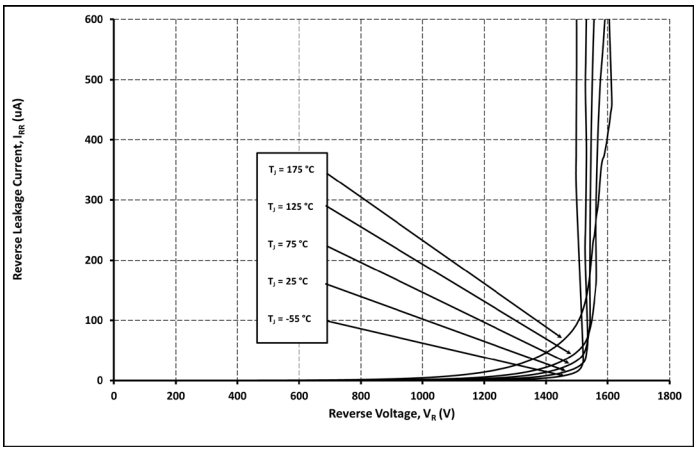


Figure 3. Current Derating

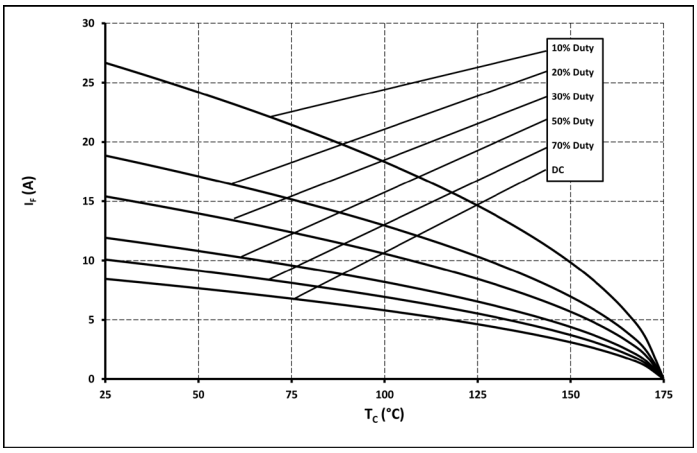


Figure 4. Power Derating

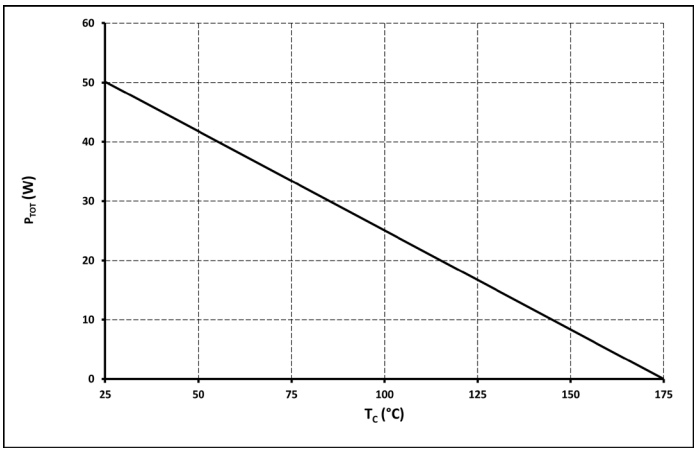


Figure 5. Total Capacitance Charge vs. Reverse Voltage

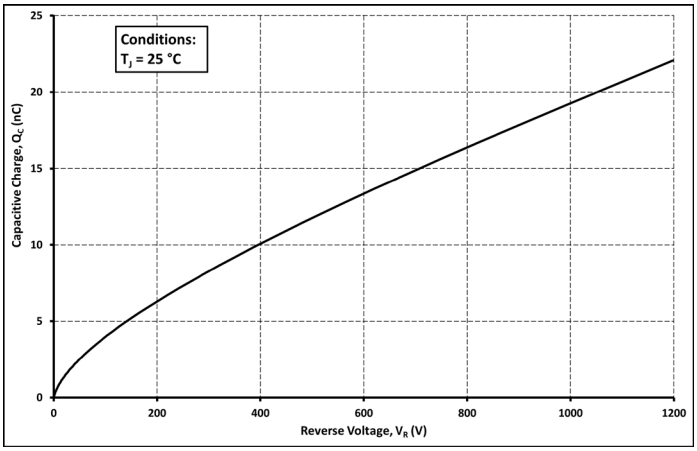
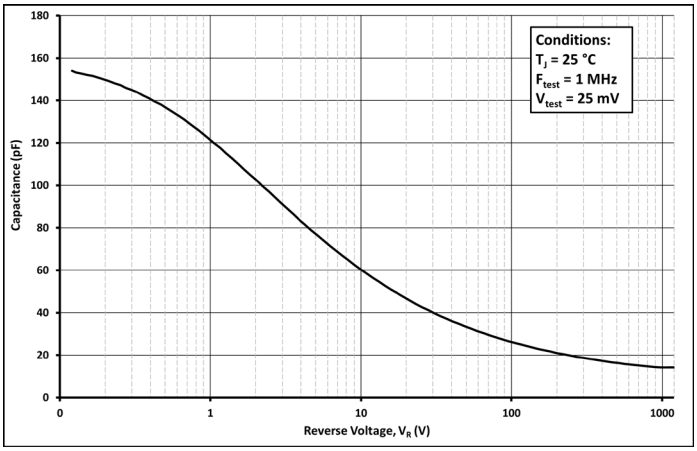


Figure 6. Capacitance vs. Reverse Voltage



Typical Performance

Figure 7. Capacitance Stored Energy

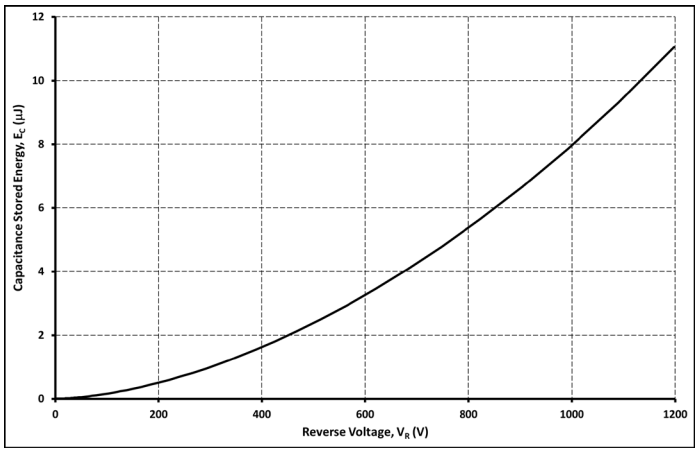
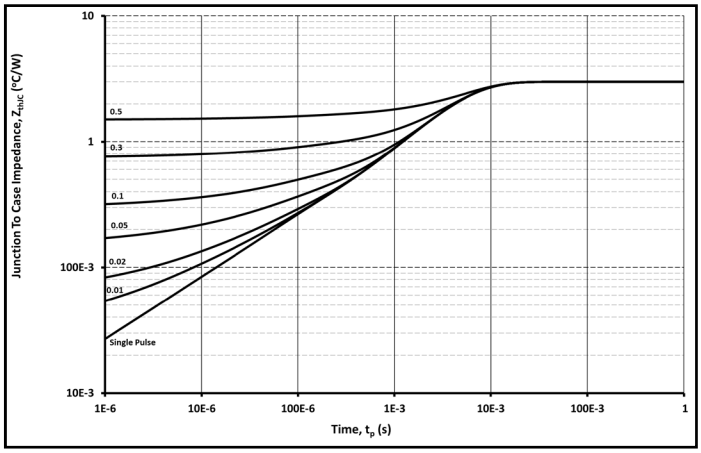


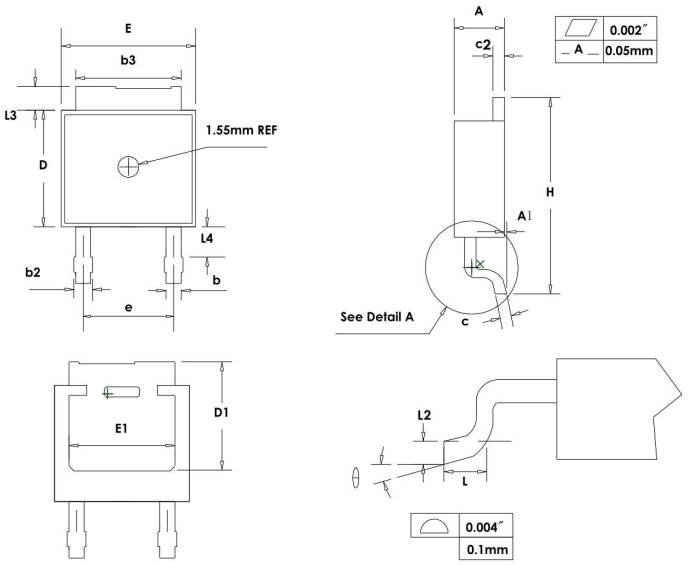
Figure 8. Transient Thermal Impedance



Package Dimensions

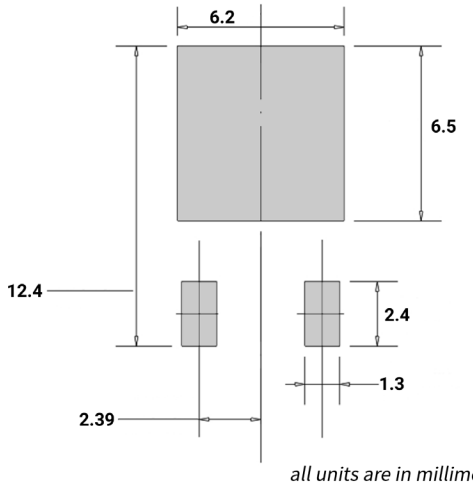
Package: TO-252-2

All dimensions in mm.



SYMBOL	MILLIMETERS	
	MIN	MAX
A	2.159	2.413
A1	0	0.13
b	0.64	0.89
b2	0.653	1.143
b3	5.004	5.6
c	0.457	0.61
c2	0.457	0.864
D	5.867	6.248
D1	5.21	-
E	6.35	7.341
E1	4.32	-
e	4.58 BSC	
H	9.65	10.414
L	1.106	1.78
L2	0.51 BSC	
L3	0.889	1.27
L4	0.64	1.01
θ	0°	8°

Recommended Solder Pad Layout



all units are in millimeters

Learn more about recommended soldering profiles in this application note.

Notes

This document and the information contained herein are subject to change without notice. Any such change shall be evidenced by the publication of an updated version of this document by Cree. No communication from any employee or agent of Cree or any third party shall effect an amendment or modification of this document. No responsibility is assumed by Cree for any infringement of patents or other rights of third parties which may result from use of the information contained herein. No license is granted by implication or otherwise under any patent or patent rights of Cree.

Not withstanding any application-specific information, guidance, assistance, or support that Cree may provide, the buyer of this product is solely responsible for determining the suitability of this product for the buyer's purposes, including without limitation for use in the applications identified in the next bullet point, and for the compliance of the buyers' products, including those that incorporate this product, with all applicable legal, regulatory, and safety-related requirements.

This product has not been designed or tested for use in, and is not intended for use in, applications in which failure of the product would reasonably be expected to cause death, personal injury, or property damage, including but not limited to equipment implanted into the human body, life-support machines, cardiac defibrillators, and similar emergency medical equipment, aircraft navigation, communication, and control systems, aircraft power and propulsion systems, air traffic control systems, and equipment used in the planning, construction, maintenance, or operation of nuclear facilities.

RoHS Compliance
The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree representative or from the Product Documentation sections of www.cree.com.

REACh Compliance
REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact your Cree representative to ensure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

For more information, please contact:

4600 Silicon Drive
Durham, North Carolina, USA 27703
www.wolfspeed.com/power

© 2021 Cree, Inc. All rights reserved. Wolfspeed® and the Wolfspeed logo are registered trademarks of Cree, Inc.