C6D05170H

6th Generation 1700 V, 5 A Silicon Carbide Schottky Diode

Package Types: TO-247-2
Marking: C6D05170H

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.

Features

- Low Forward Voltage (V_F) Drop with Positive Temperature Coefficient
- Zero Reverse Recovery Current / Forward Recovery Voltage
- Temperature-Independent Switching Behavior
- Low Profile Package with Low Inductance

Applications

- Industrial Switched Mode Power Supplies
- Uninterruptible & AUX Power Supplies
- Boost for PFC & DC-DC Stages
- Solar Inverters

Maximum Ratings (T_C = 25°C Unless Otherwise Specified)

Parameter	Symbol	Value	Unit	Test Conditions	Notes
Repetitive Peak Reverse Voltage	V_{RRM}	1700	V		
DC Blocking Voltage	V_{DC}	1700			
Continuous Forward Current	I_F	21	A	T_C = 25 °C	Fig. 3
		11		T_C = 125 °C	
		7		T_C = 150 °C	
Repetitive Peak Forward Surge Current	I_{FRM}	32		T_C = 25 °C, t_p = 10 ms, Half Sine Wave	
		19		T_C = 110 °C, t_p = 10 ms, Half Sine Wave	
Non-Repetitive Forward Surge Current	I_{FSM}	87		T_C = 25 °C, t_p = 10 ms, Half Sine Wave	Fig. 8
		73		T_C = 110 °C, t_p = 10 ms, Half Sine Wave	
Non-Repetitive Peak Forward Surge Current	$I_{F,Max}$	630		T_C = 25 °C, t_p = 10 µs, Pulse	
		620		T_C = 110 °C, t_p = 10 µs, Pulse	
Power Dissipation	P_{tot}	110	W	T_C = 25 °C	Fig. 4
		47		T_C = 110 °C	
i^2t Value	$\int i^2t$	37	A^2s	T_C = 25 °C, t_p = 10 ms	
		26		T_C = 110 °C, t_p = 10 ms	

4600 Silicon Drive | Durham, NC 27703 | Tel: +1.919.313.5300 | wolfspeed.com/power

Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Notes
Forward Voltage	V_F	1.45	1.7	V	I_F = 5 A, T_j = 25 °C	Fig. 1
		2.0	2.8		I_F = 5 A, T_j = 175 °C	
Reverse Current	I_R	2	9	µA	V_R = 1700 V, T_j = 25 °C	Fig. 2
		12	45		V_R = 1700 V, T_j = 175 °C	
Total Capacitive Charge	Q_C	78		nC	V_R = 1700 V, T_j = 25 °C	Fig. 5
Total Capacitance	C	638		pF	V_R = 0 V, T_j = 25 °C, f = 1 MHz	Fig. 6
		34			V_R = 800 V, T_j = 25 °C, f = 1 MHz	
		34			V_R = 1700 V, T_j = 25 °C, f = 1 MHz	
Capacitance Stored Energy	E_c	51		µJ	V_R = 1700 V	Fig. 7

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

Thermal & Mechanical Characteristics

Parameter	Symbol	Value	Unit	Notes
Thermal Resistance, Junction to Case (Typical)	$R_{\theta, JC (TYP)}$	0.95	°C / W	
Thermal Resistance, Junction to Case (Maximum)	$R_{\theta, JC (MAX)}$	1.36		
Junction Temperature	T_j	-55 to +175	°C	
Case & Storage Temperature	T_c	-55 to +150		
Maximum Processing Temperature	T_{PROC}	325		10 min max.
TO-247 Mounting Torque	-	1	Nm	M3 Screw
		8.8	lbf-in	6-32 Screw

Typical Performance

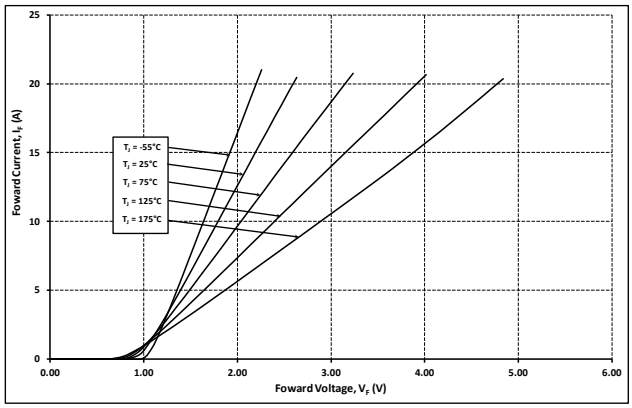


Figure 1
Forward Characteristics

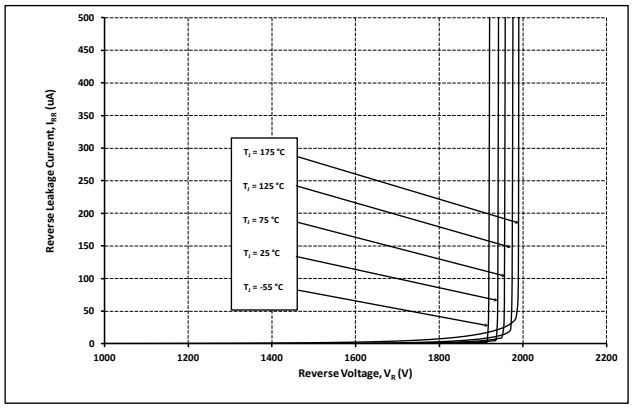


Figure 2
Reverse Characteristics

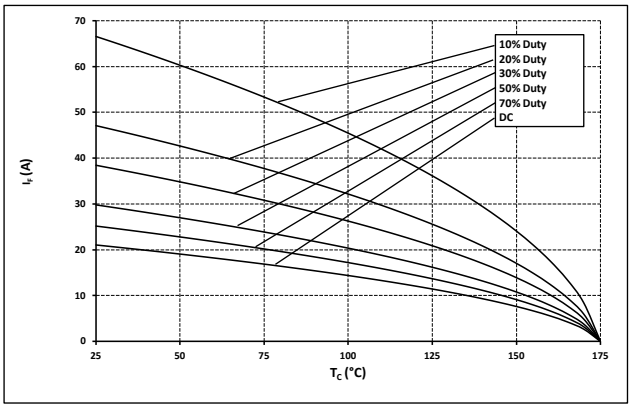


Figure 3
Current Derating

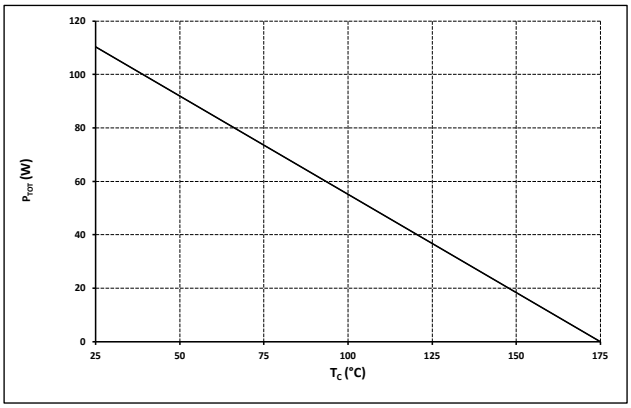


Figure 4
Power Derating

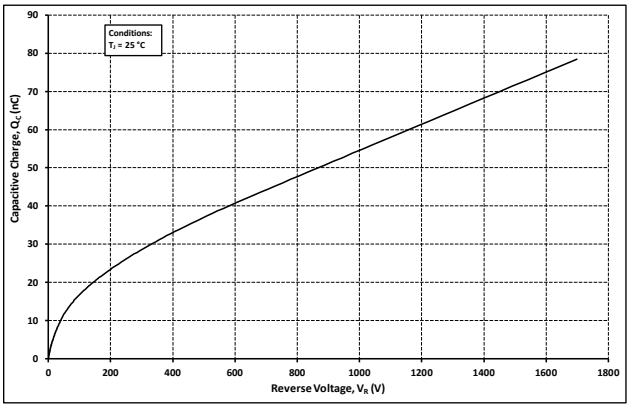


Figure 5
Total Capacitance Charge vs. Reverse Voltage

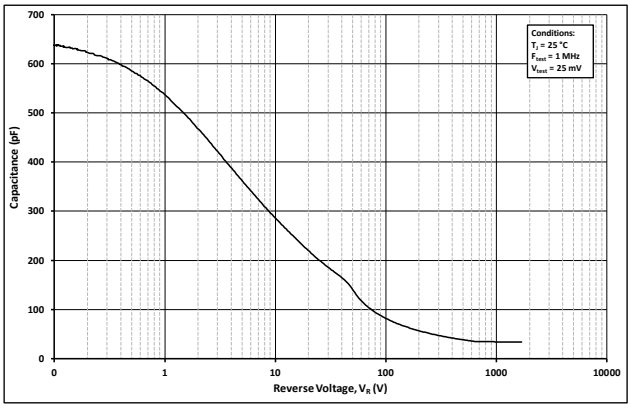


Figure 6
Capacitance vs. Reverse Voltage

Typical Performance

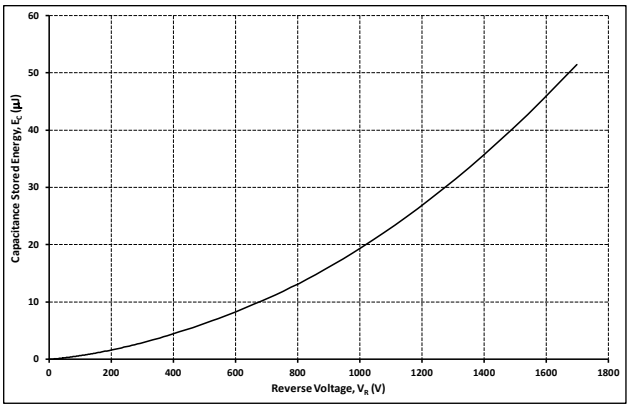


Figure 7

Capacitance Stored Energy

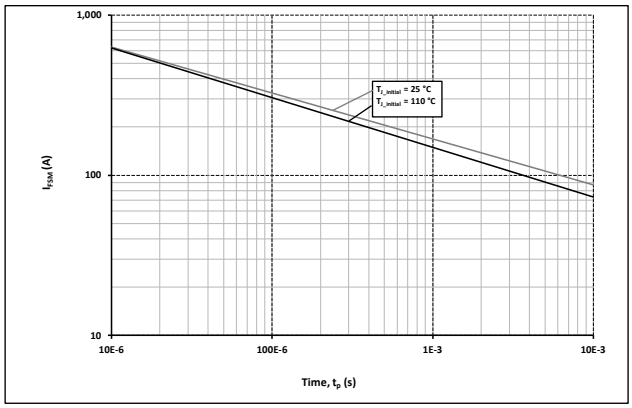


Figure 8

Non-Repetitive Peak Forward Surge Current vs. Pulse Duraion (Sinusouidal Waveform)

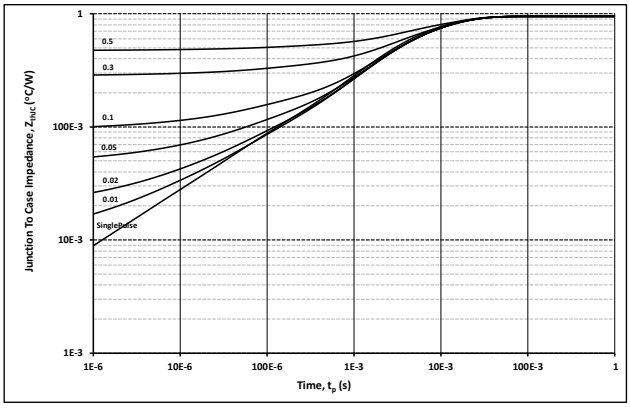
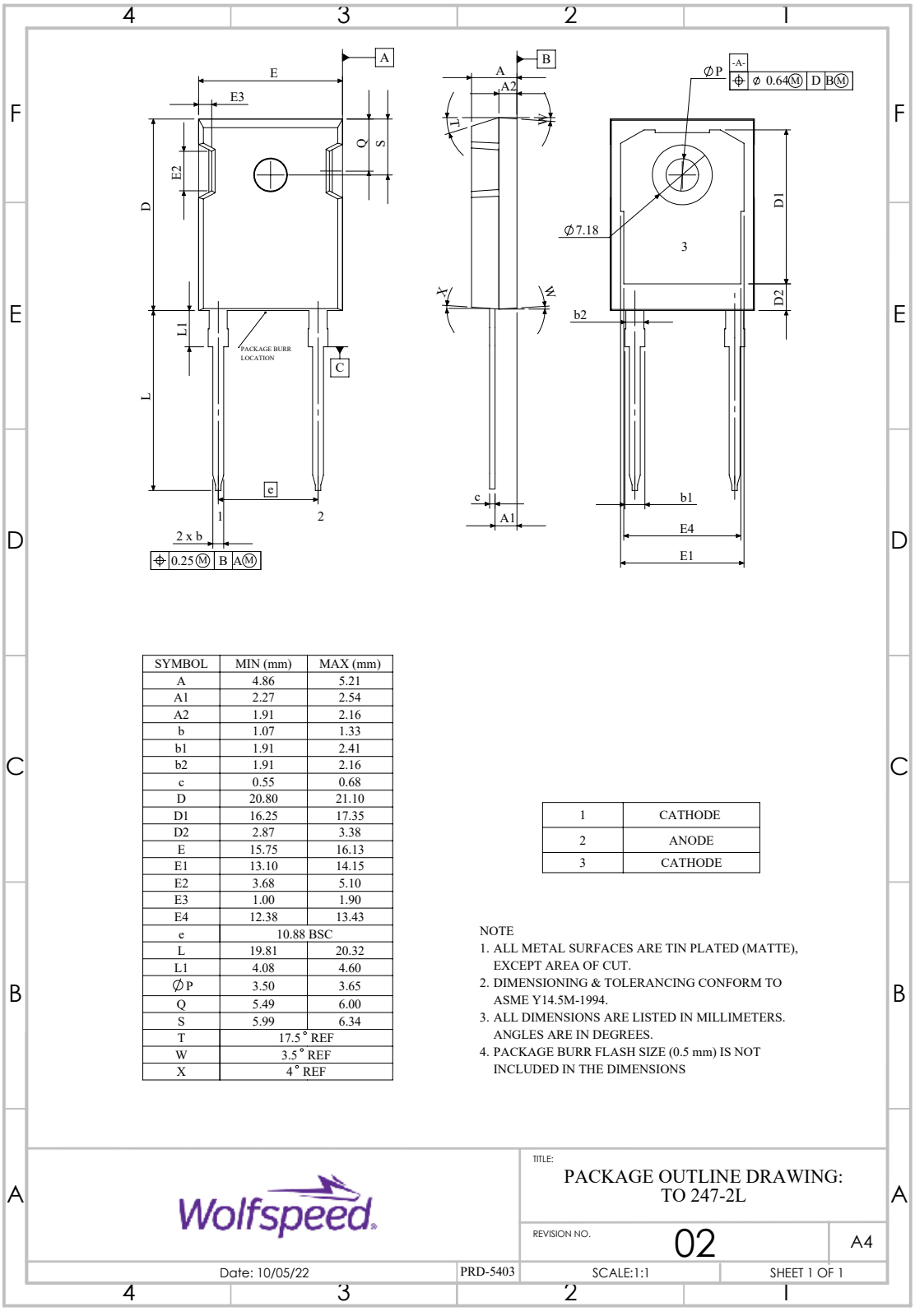


Figure 9

Transient Thermal Impedance

Package Dimensions & Pin-Out

Package: TO-247-2 (All dimensions are in mm)



SYMBOL	MIN (mm)	MAX (mm)
A	4.86	5.21
A1	2.27	2.54
A2	1.91	2.16
b	1.07	1.33
b1	1.91	2.41
b2	1.91	2.16
c	0.55	0.68
D	20.80	21.10
D1	16.25	17.35
D2	2.87	3.38
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	10.88 BSC	
L	19.81	20.32
L1	4.08	4.60
ØP	3.50	3.65
Q	5.49	6.00
S	5.99	6.34
T	17.5° REF	
W	3.5° REF	
X	4° REF	

1	CATHODE
2	ANODE
3	CATHODE

NOTE
1. ALL METAL SURFACES ARE TIN PLATED (MATTE), EXCEPT AREA OF CUT.
2. DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.5M-1994.
3. ALL DIMENSIONS ARE LISTED IN MILLIMETERS. ANGLES ARE IN DEGREES.
4. PACKAGE BURR FLASH SIZE (0.5 mm) IS NOT INCLUDED IN THE DIMENSIONS

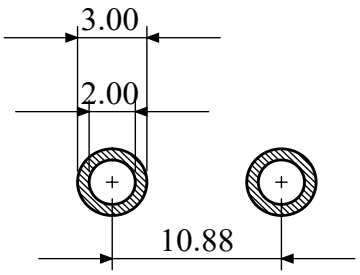
Wolfspeed

TITLE: PACKAGE OUTLINE DRAWING: TO 247-2L

REVISION NO. 02 | A4

Date: 10/05/22 | PRD-5403 | SCALE:1:1 | SHEET 1 OF 1

Recommended Solder Pad Layout



Product Ordering Information

Order Number	Packing Type
C6D05170H	Tube

REACh, RoHS, and Halogen-Free compliance documentation available for this product.

Revision History

Document Version	Date of Release	Description of changes
0	November-2022	Initial datasheet

Notes & Disclaimer

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 Wolfspeed. No communication from any employee or agent of Wolfspeed or any third party shall effect an amendment or modification of this document. No responsibility is assumed by Wolfspeed 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 Wolfspeed.

Notwithstanding any application-specific information, guidance, assistance, or support that Wolfspeed 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 Wolfspeed representative or from the Product Documentation sections of www.wolfspeed.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 Wolfspeed 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.

Contact info:

4600 Silicon Drive
Durham, NC 27703 USA
Tel: +1.919.313.5300
www.wolfspeed.com/power

© 2022 Wolfspeed, Inc. All rights reserved. Wolfspeed® and the Wolfstreak logo are registered trademarks and the Wolfspeed logo is a trademark of Wolfspeed, Inc.
The information in this document is subject to change without notice.