

# C6D05170H

## 6th Generation 1700 V, 5 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 Types: TO-247-2  
Marking: C6D05170H

### 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 ( $T_c = 25^\circ\text{C}$ 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	$T_c = 25^\circ\text{C}$	Fig. 3
		11		$T_c = 125^\circ\text{C}$	
		7		$T_c = 150^\circ\text{C}$	
Repetitive Peak Forward Surge Current	$I_{FRM}$	32	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	Fig. 8
		19		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Forward Surge Current	$I_{FSM}$	87	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	Fig. 8
		73		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Peak Forward Surge Current	$I_{F,Max}$	630	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ }\mu\text{s}, \text{Pulse}$	
		620		$T_c = 110^\circ\text{C}, t_p = 10\text{ }\mu\text{s}, \text{Pulse}$	
Power Dissipation	$P_{tot}$	110	W	$T_c = 25^\circ\text{C}$	Fig. 4
		47		$T_c = 110^\circ\text{C}$	
i <sup>2</sup> t Value	$\int i^2t$	37	A <sup>2</sup> s	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}$	
		26		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}$	



## Electrical Characteristics

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

### Notes:

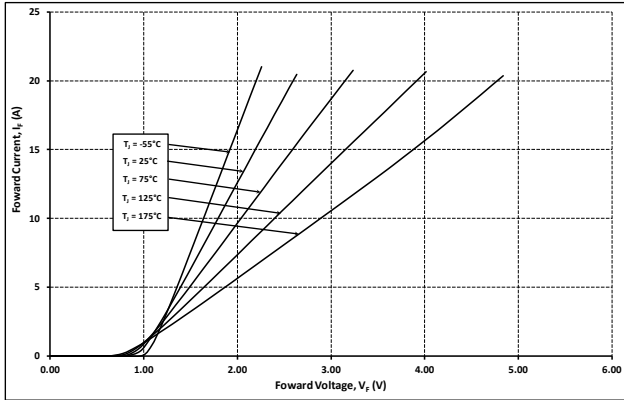
SiC Schottky Diodes are majority carrier devices, so there is no reverse recovery charge.

## Thermal & Mechanical Characteristics

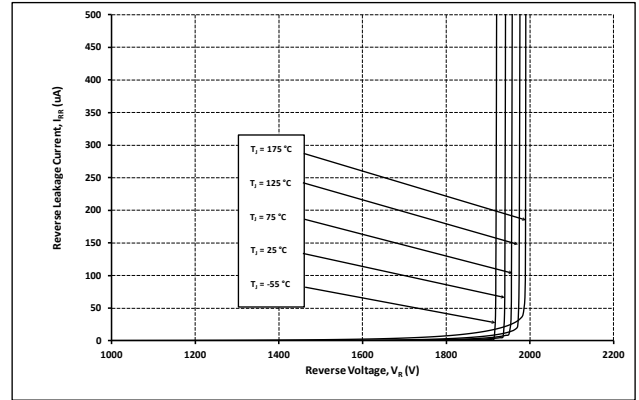
Parameter	Symbol	Value	Unit	Notes
Thermal Resistance, Junction to Case (Typical)	$R_{\theta, \text{JC (TYP)}}$	0.95	$^\circ\text{C} / \text{W}$	
Thermal Resistance, Junction to Case (Maximum)	$R_{\theta, \text{JC (MAX)}}$	1.36		
Junction Temperature	$T_j$	-55 to +175	$^\circ\text{C}$	
Case & Storage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



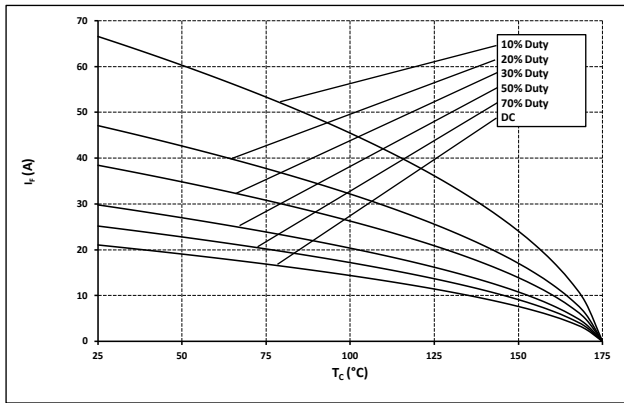
Typical Performance



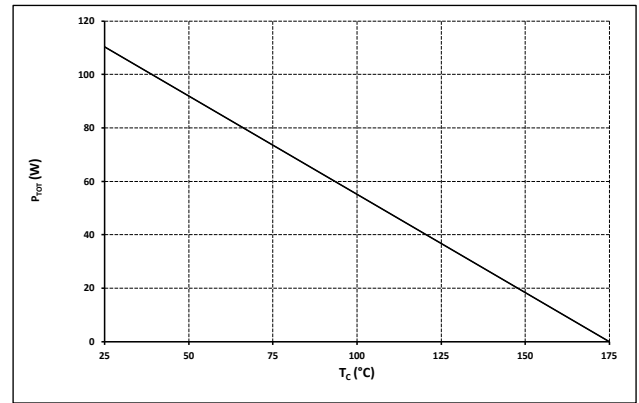
**Figure 1**  
Forward Characteristics



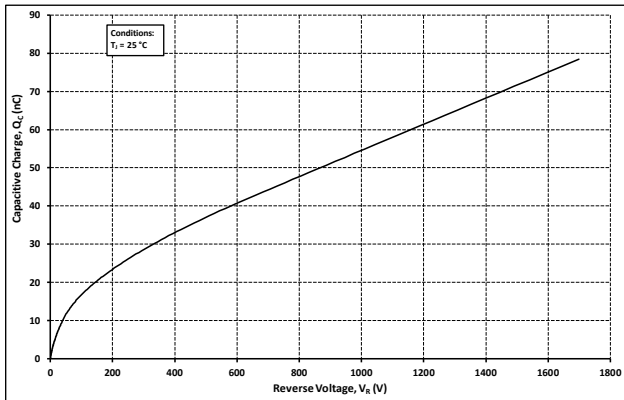
**Figure 2**  
Reverse Characteristics



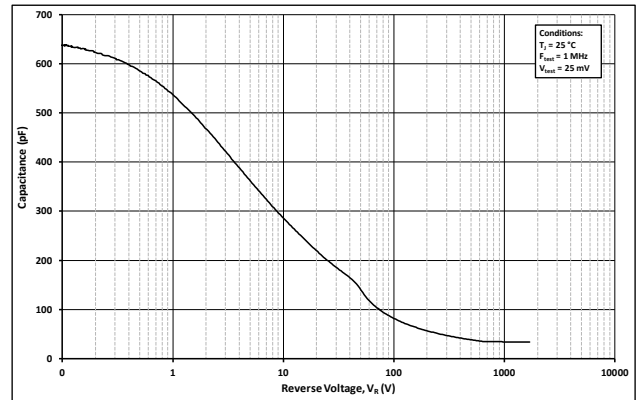
**Figure 3**  
Current Derating



**Figure 4**  
Power Derating



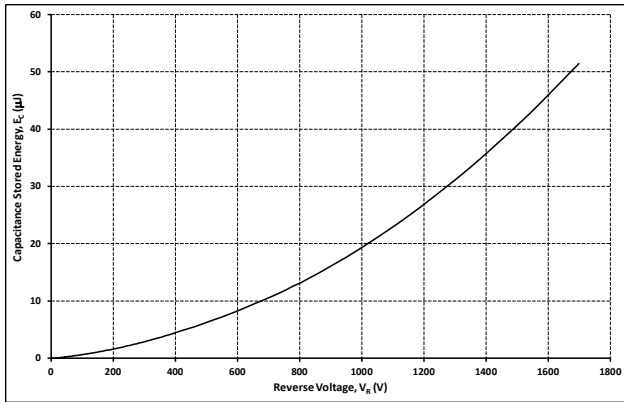
**Figure 5**  
Total Capacitance Charge vs. Reverse Voltage



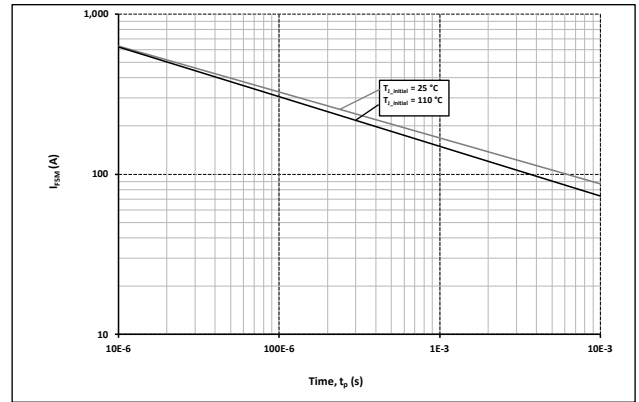
**Figure 6**  
Capacitance vs. Reverse Voltage



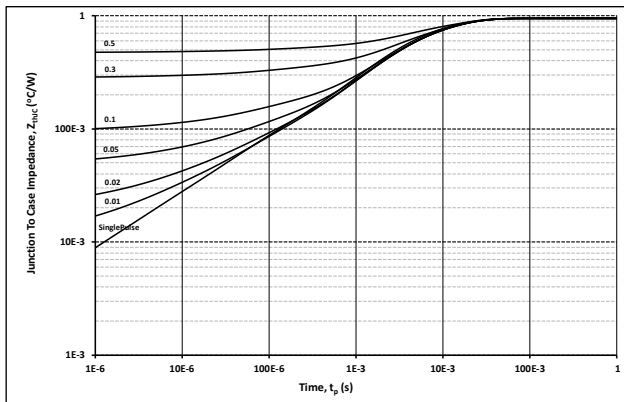
Typical Performance



**Figure 7**  
Capacitance Stored Energy



**Figure 8**  
Non-Repetitive Peak Forward Surge Current vs. Pulse Duration (Sinusoidal Waveform)

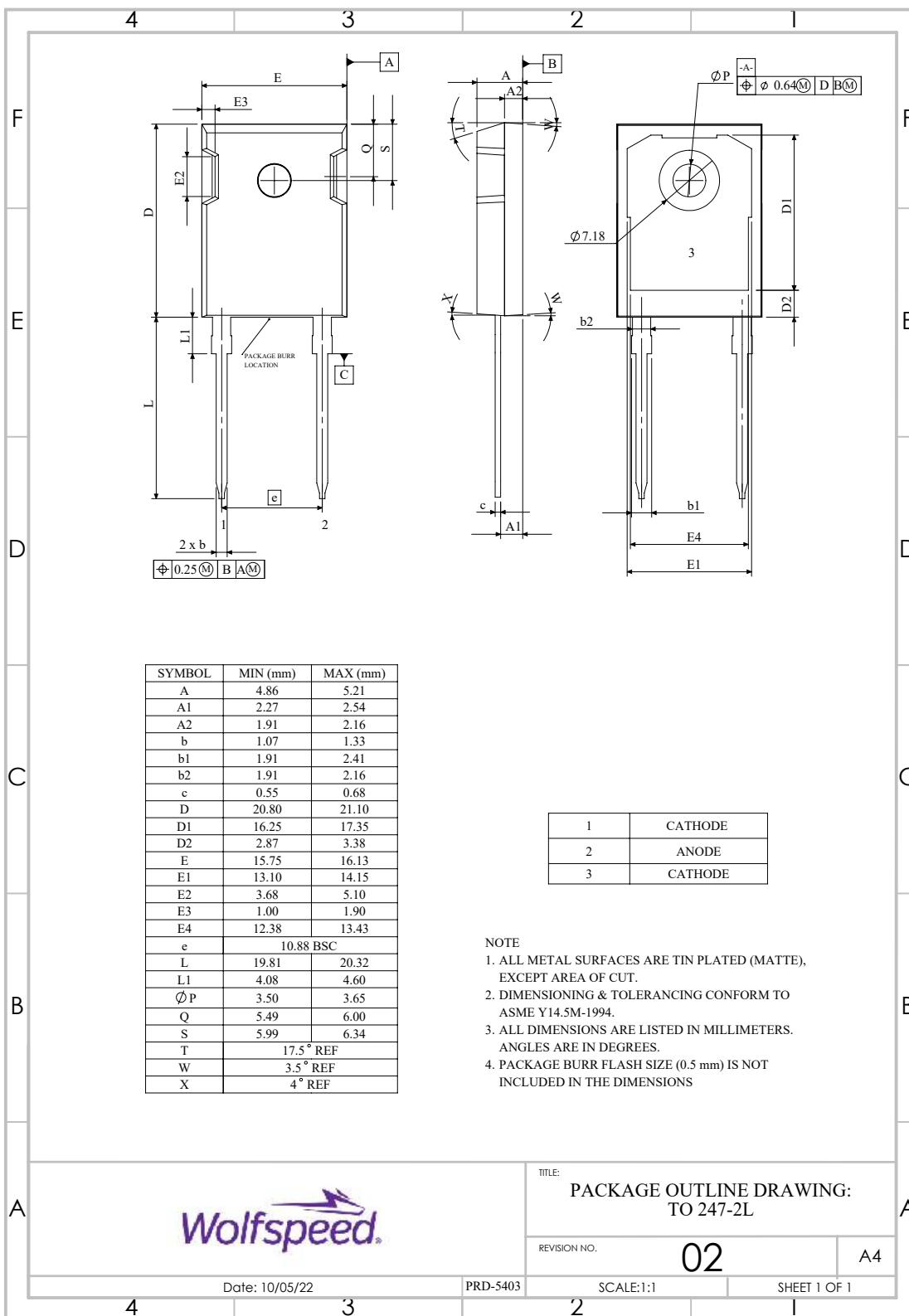


**Figure 9**  
Transient Thermal Impedance



### Package Dimensions & Pin-Out

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



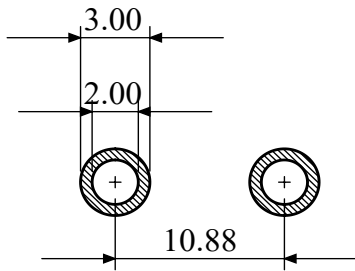
TITLE: PACKAGE OUTLINE DRAWING: TO 247-2L

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

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### **Contact info:**

4600 Silicon Drive  
Durham, NC 27703 USA  
Tel: +1.919.313.5300  
[www.wolfspeed.com/power](http://www.wolfspeed.com/power)