

C6D10170H

6th Generation 1700 V, 10 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: C6D10170H

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	40	A	$T_c = 25^\circ\text{C}$	Fig. 3
		21		$T_c = 125^\circ\text{C}$	
		10		$T_c = 160^\circ\text{C}$	
Repetitive Peak Forward Surge Current	I_{FRM}	58	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
		32		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Peak Forward Surge Current	I_{FSM}	148	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	Fig. 8
		93		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Power Dissipation	P_{tot}	204	W	$T_c = 25^\circ\text{C}$	Fig. 4
		88		$T_c = 110^\circ\text{C}$	
i^2t Value	$\int i^2t$	109	A^2s	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}$	
		43		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}$	



Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Notes
Forward Voltage	V_F	1.45	1.7	V	$I_F = 10 \text{ A}, T_j = 25 \text{ }^\circ\text{C}$	Fig. 1
		2.0	2.8		$I_F = 10 \text{ A}, T_j = 175 \text{ }^\circ\text{C}$	
Reverse Current	I_R	4	18	μA	$V_R = 1700 \text{ V}, T_j = 25 \text{ }^\circ\text{C}$	Fig. 2
		24	90		$V_R = 1700 \text{ V}, T_j = 175 \text{ }^\circ\text{C}$	
Total Capacitive Charge	Q_C	126		nC	$V_R = 1700 \text{ V}, T_j = 25 \text{ }^\circ\text{C}$	Fig. 5
Total Capacitance	C	1227		pF	$V_R = 0 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	Fig. 6
		53			$V_R = 800 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	
		52			$V_R = 1700 \text{ V}, T_j = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$	
Capacitance Stored Energy	E_C	79		μJ	$V_R = 1700 \text{ V}$	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)	$R_{\theta, \text{JC (TYP)}}$	0.62	$^\circ\text{C} / \text{W}$	
Thermal Resistance, Junction to Case (Maximum)	$R_{\theta, \text{JC (MAX)}}$	0.73		
Junction Temperature	T_j	-55 to +175	$^\circ\text{C}$	
Case & Storage Temperature	T_c	-55 to +150		
TO-247 Mounting Torque	-	1	Nm	M3 Screw
		8.8	lbf-in	6-32 Screw



Typical Performance

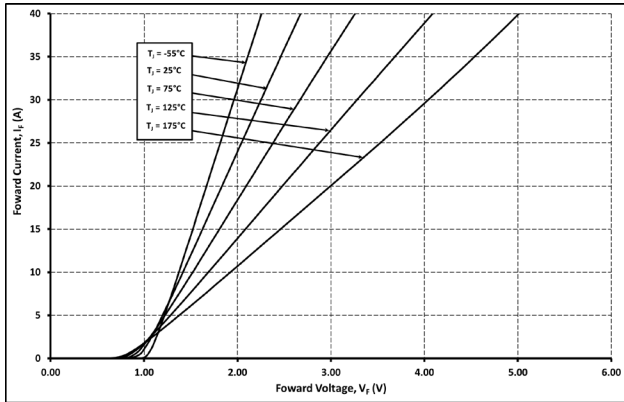


Figure 1
Forward Characteristics

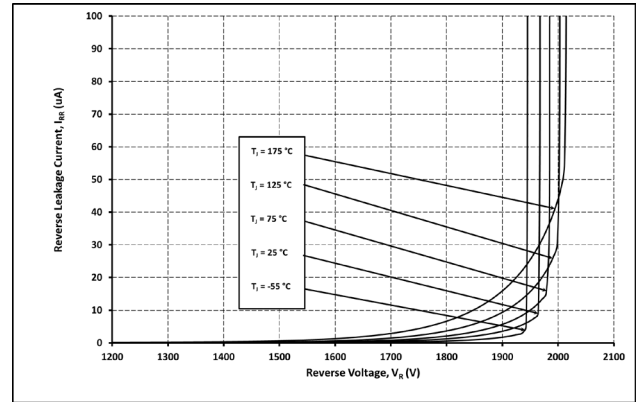


Figure 2
Reverse Characteristics

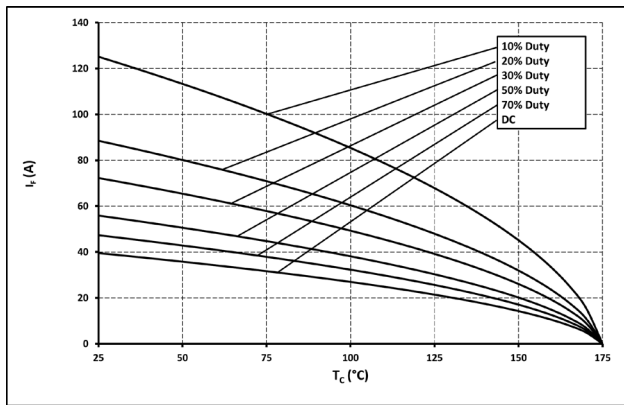


Figure 3
Current Derating

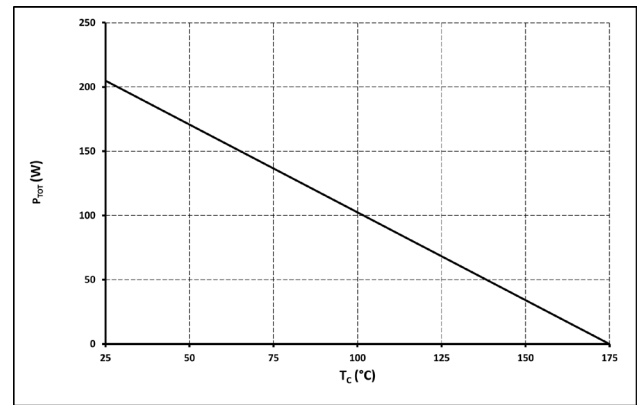


Figure 4
Power Derating

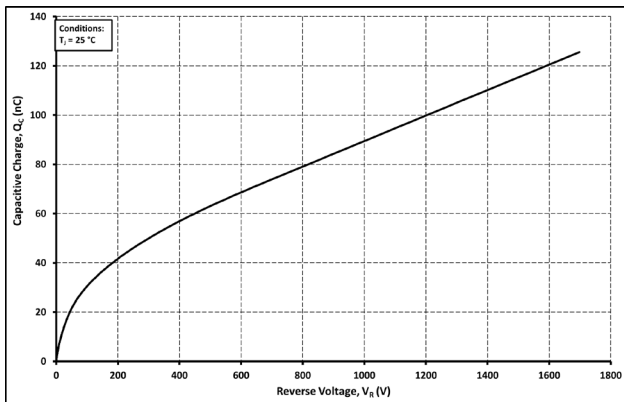


Figure 5
Total Capacitance Charge vs. Reverse Voltage

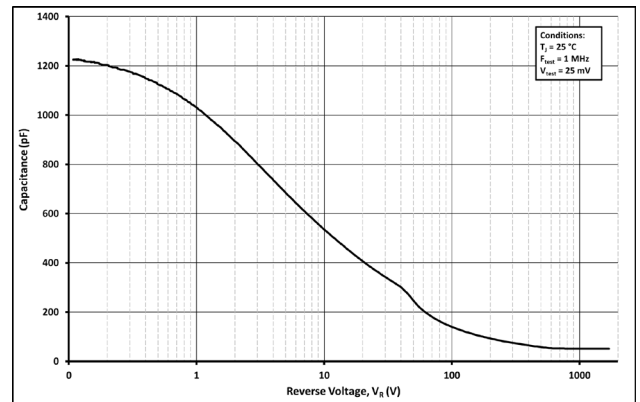


Figure 6
Capacitance vs. Reverse Voltage



Typical Performance

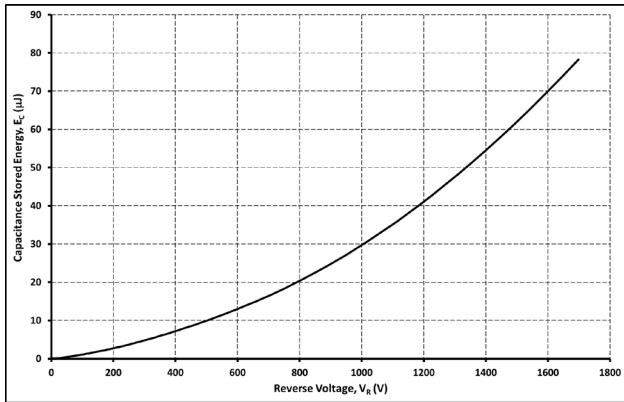


Figure 7
Capacitance Stored Energy

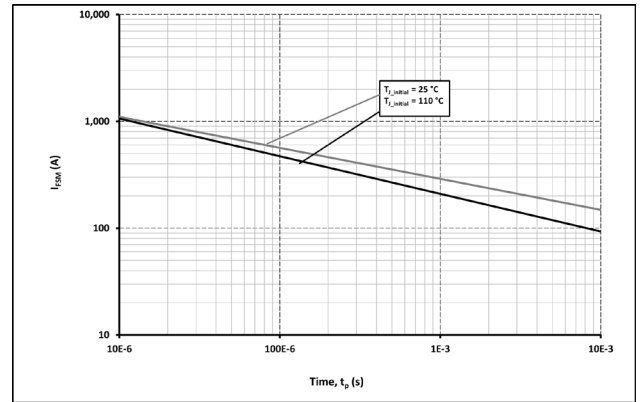


Figure 8
Non-Repetitive Peak Forward Surge Current vs. Pulse Duration (Sinusoidal Waveform)

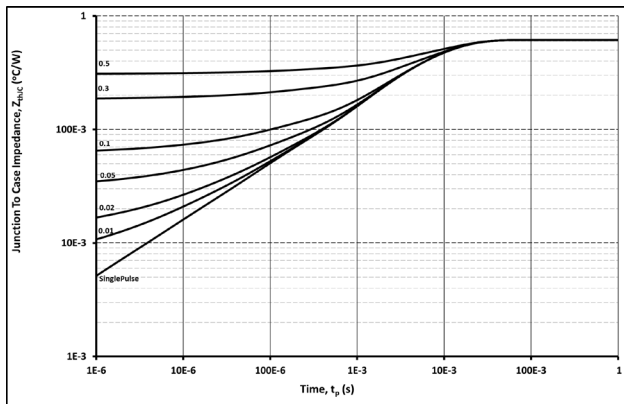
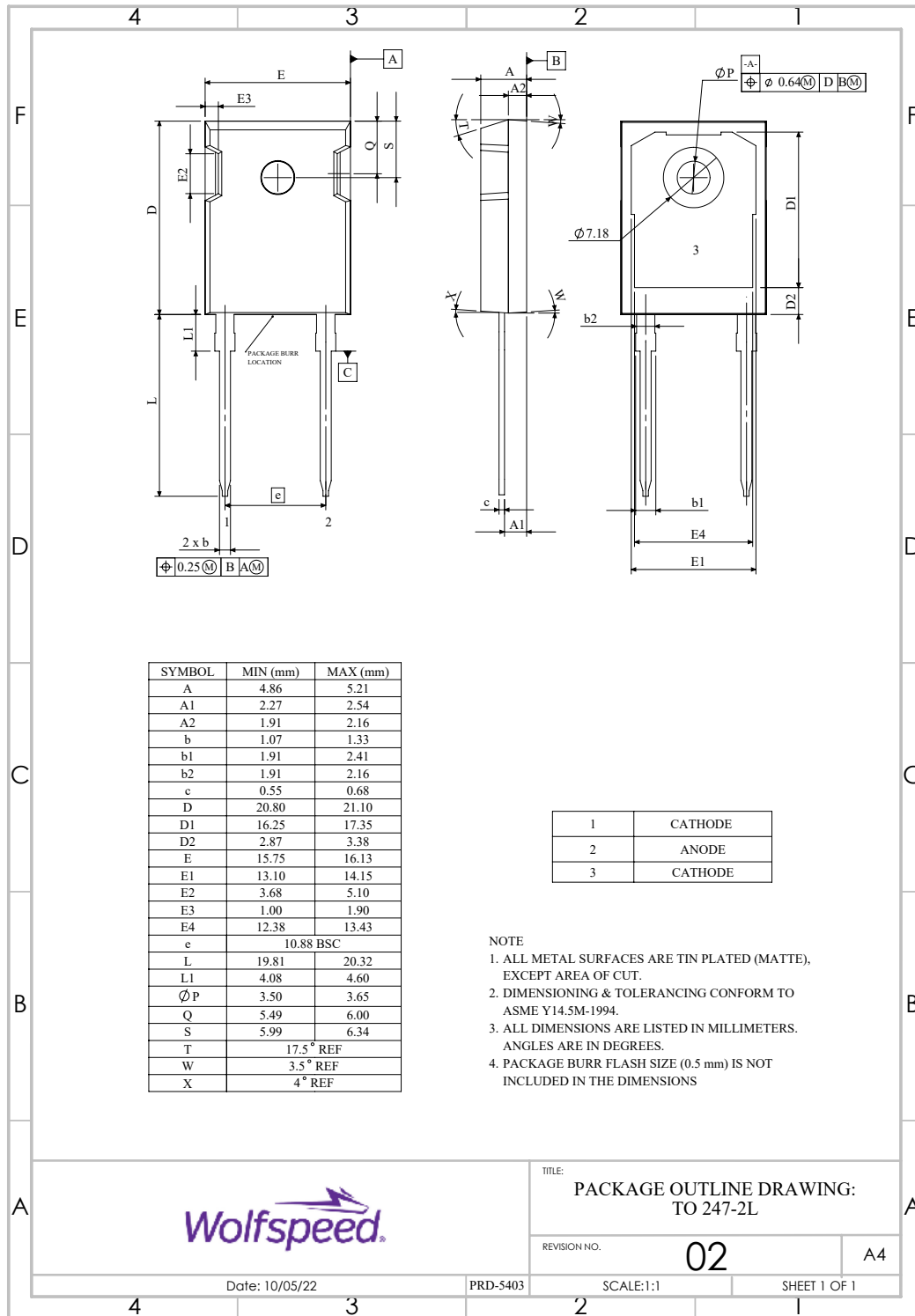


Figure 9
Transient Thermal Impedance



Package Dimensions & Pin-Out

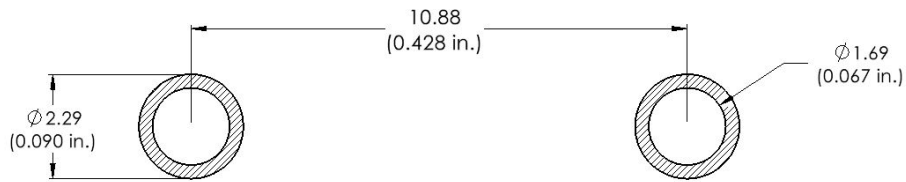
Package: TO-247-2 (All dimensions are in mm)





Recommended Solder Pad Layout

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



Product Ordering Information

Order Number	Packing Type
C6D10170H	Tube

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



Revision History

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