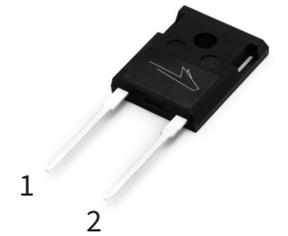


# C6D50065H

## 6th Generation 650 V, 50 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: C6D50065H

### 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 Power Supplies
- Uninterruptible & Aux Power Supplies
- Switch Mode Power Supplies
- Solar Inverters
- Boost for PFC & DC-DC Stages

### Maximum Ratings ( $T_c = 25^\circ\text{C}$ Unless Otherwise Specified)

Parameter	Symbol	Value	Unit	Test Conditions	Notes
Repetitive Peak Reverse Voltage	$V_{RRM}$	650	V		
DC Blocking Voltage	$V_{DC}$	650			
Continuous Forward Current	$I_F$	136	A	$T_c = 25^\circ\text{C}$	Fig. 3
		69		$T_c = 125^\circ\text{C}$	
		43		$T_c = 150^\circ\text{C}$	
Repetitive Peak Forward Surge Current	$I_{FRM}$	166	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
		94		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Forward Surge Current	$I_{FSM}$	303	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	Fig. 8
		268		$T_c = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Peak Forward Surge Current	$I_{F,Max}$	1500	A	$T_c = 25^\circ\text{C}, t_p = 10\text{ }\mu\text{s}, \text{Pulse}$	
		1320		$T_c = 110^\circ\text{C}, t_p = 10\text{ }\mu\text{s}, \text{Pulse}$	
Power Dissipation	$P_{tot}$	349	W	$T_j = 25^\circ\text{C}$	Fig. 4
		151		$T_j = 110^\circ\text{C}$	
$i^2t$ value	$\int i^2 dt$	459	$\text{A}^2\text{s}$	$T_c = 25\text{C}, t_p=10\text{ms}$	
		359		$T_c = 110\text{C}, t_p=10\text{ms}$	

## Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Notes
Forward Voltage	$V_F$	1.30	1.5	V	$I_F = 20\text{ A}, T_j = 25\text{ }^\circ\text{C}$	Fig. 1
		1.46	1.70		$I_F = 20\text{ A}, T_j = 175\text{ }^\circ\text{C}$	
Reverse Current	$I_R$	6	100	$\mu\text{A}$	$V_R = 650\text{ V}, T_j = 25\text{ }^\circ\text{C}$	Fig. 2
		65	400		$V_R = 650\text{ V}, T_j = 175\text{ }^\circ\text{C}$	
Total Capacitive Charge	$Q_C$	158		nC	$V_R = 400\text{ V}, T_j = 25\text{ }^\circ\text{C}$	Fig. 5
Total Capacitance	C	2819		pF	$V_R = 0\text{ V}, T_j = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	Fig. 6
		300			$V_R = 200\text{ V}, T_j = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	
		244			$V_R = 400\text{ V}, T_j = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	
Capacitance Stored Energy	$E_C$	24		$\mu\text{J}$	$V_R = 400\text{ V}$	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)	$R_{\theta, JC(TYP)}$	0.37	$^\circ\text{C} / \text{W}$	Max: 0.43
Junction Temperature	$T_j$	-55 to +175	$^\circ\text{C}$	
Case & Storage Temperature	$T_c$	-55 to +175		
TO-247 Mounting Torque	-	1	Nm	M3 Screw
		8.8	lbf-in	6-32 Screw

## Electrostatic Discharge (ESD) Classifications

Parameter	Symbol	Notes
Human Body Model	HBM	Class 3B ( $\geq 8000\text{ V}$ )
Charge Device Model	CDM	Class C3 ( $\geq 1000\text{ V}$ )

Typical Performance

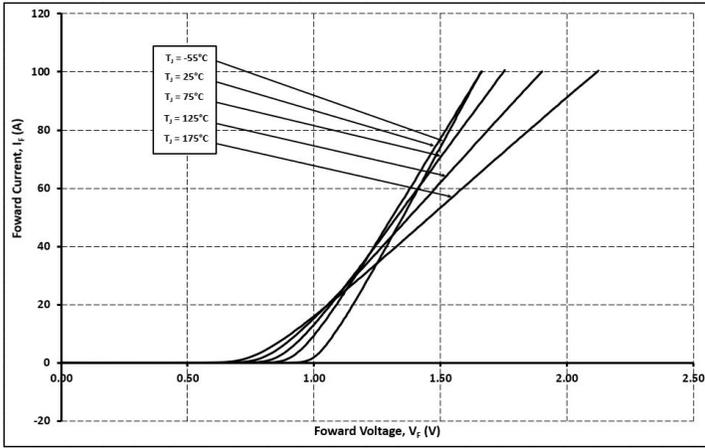


Figure 1  
Forward Characteristics

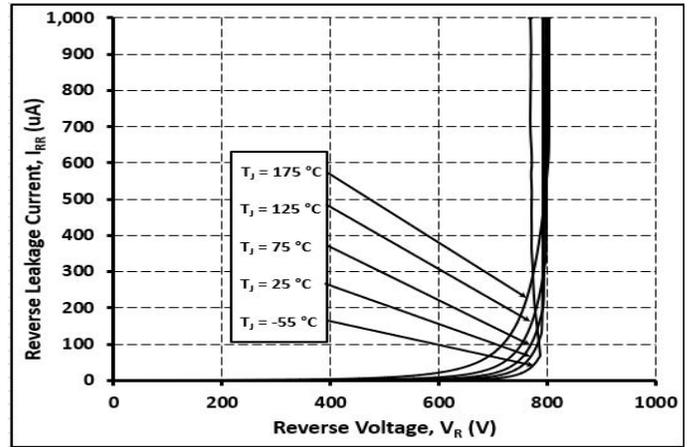


Figure 2  
Reverse Characteristics

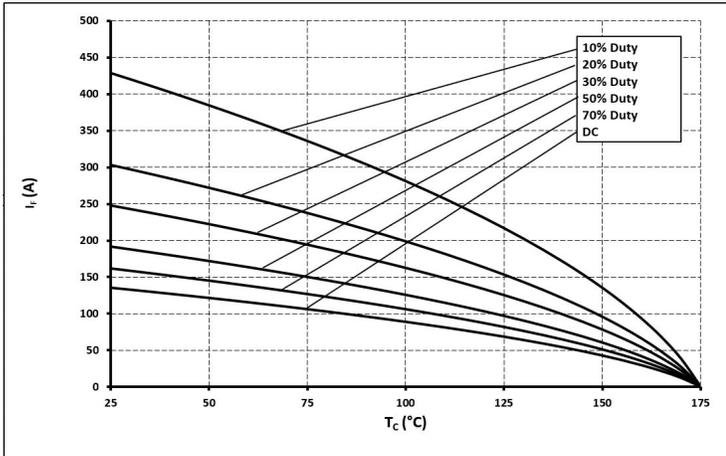


Figure 3  
Current Derating

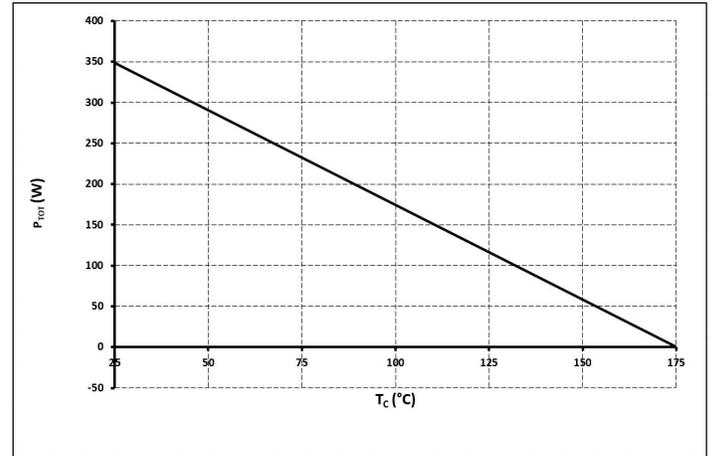


Figure 4  
Power Derating

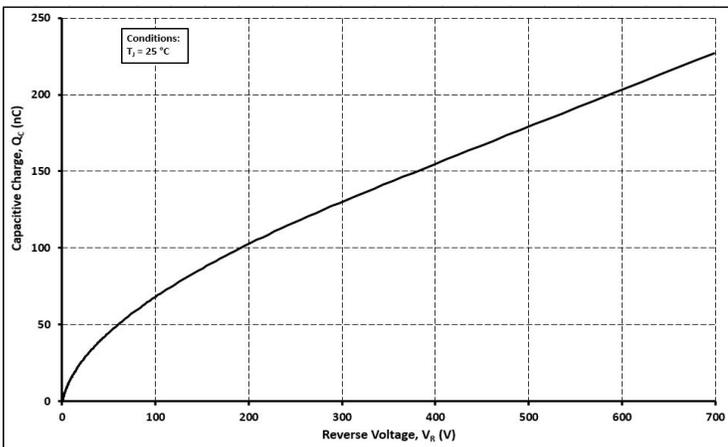


Figure 5  
Total Capacitance Charge vs. Reverse Voltage

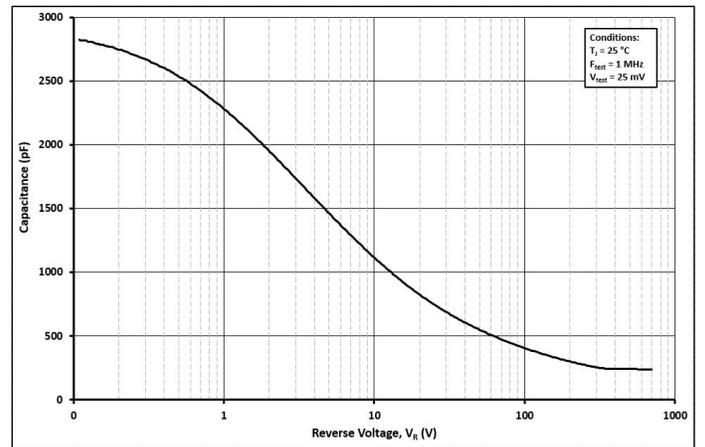
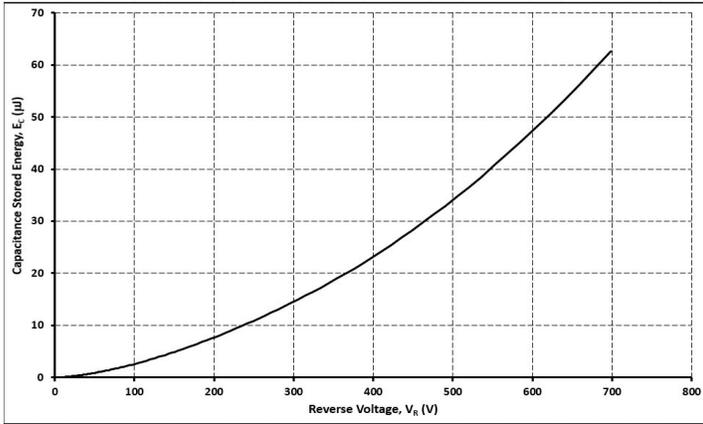


Figure 6  
Capacitance vs. Reverse Voltage

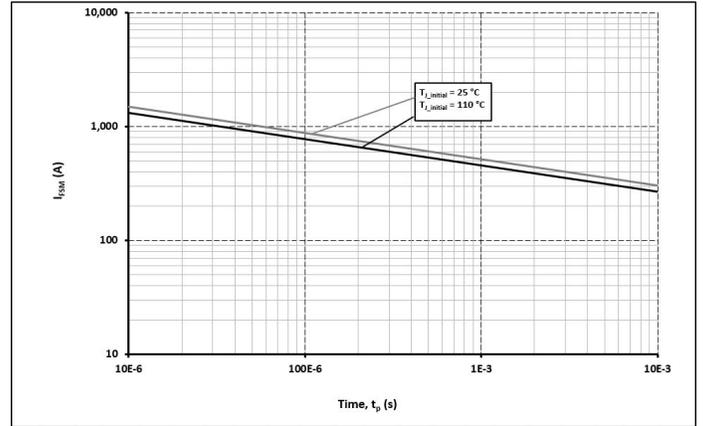


**Typical Performance**



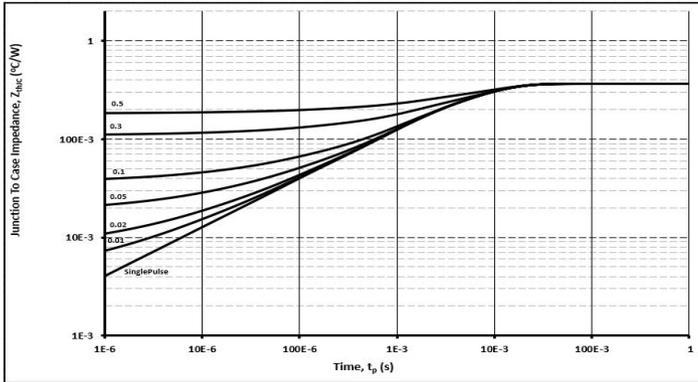
**Figure 7**

Capacitance Stored Energy



**Figure 8**

Non-Repetitive Peak Forward Surge Current vs. Pulse Duration

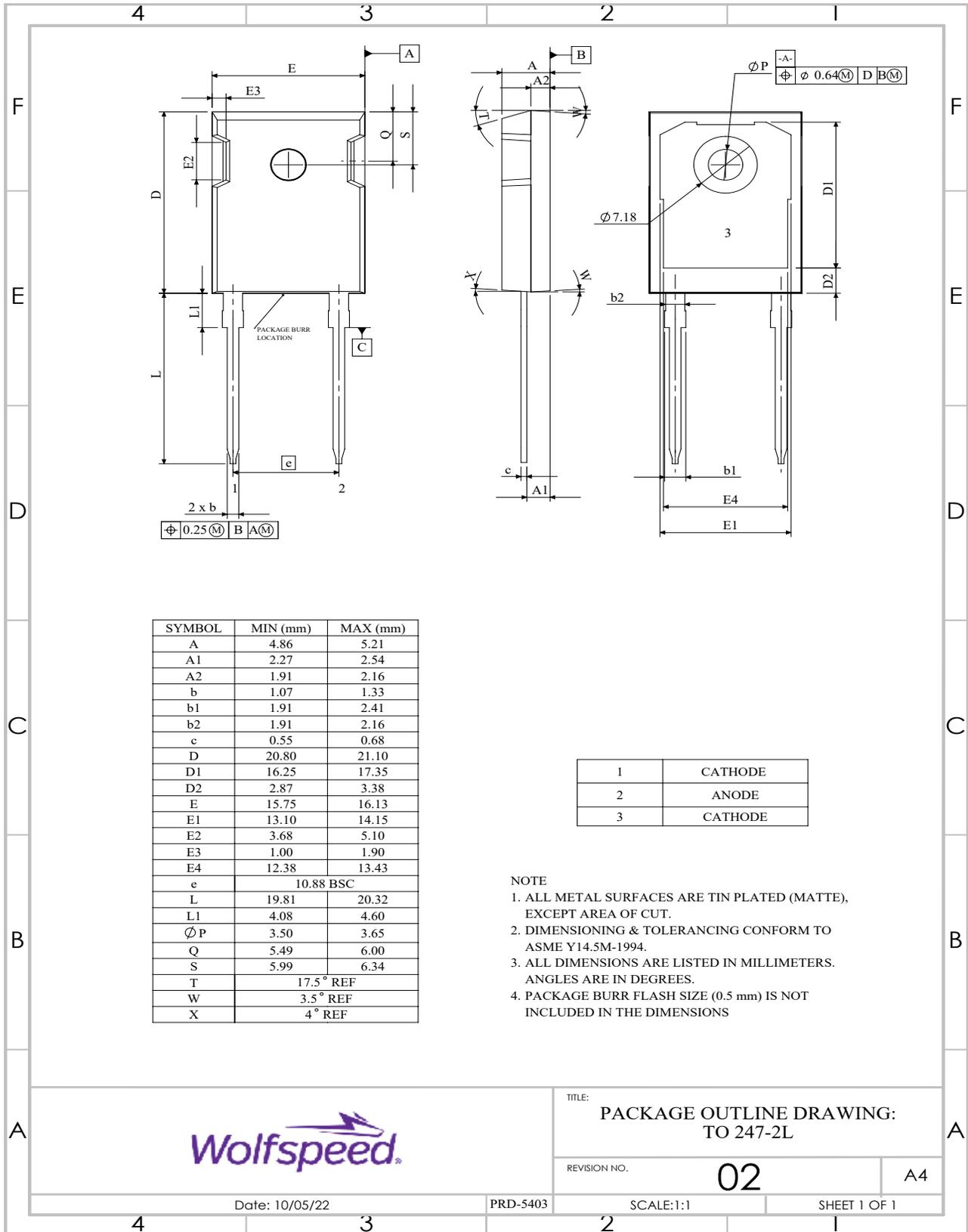


**Figure 9**

Transient Thermal Impedance

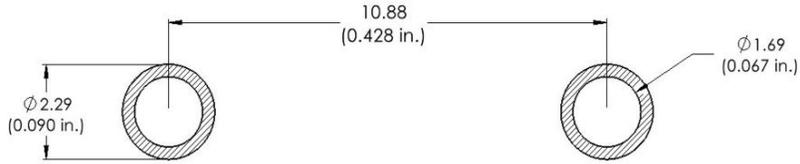
### Package Dimensions & Pin-Out

Package: TO-247-2



### Recommended Solder Pad Layout

Primary dimensions shown in mm.



### Product Ordering Information

Order Number	Packing Type
C6D50065H	Tube

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



## Revision History

Document Version	Date of Release	Description of Changes
0	April-2023	Initial Release

## Notes & Disclaimer

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