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.

RoHS

Halogen-Free

Package Types: TO-247-2
Marking: C6D05170

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

Typical 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	

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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		
TO-247 Mounting Torque	-	1	Nm	M3 Screw
		8.8	lbf-in	6-32 Screw

Typical Performance

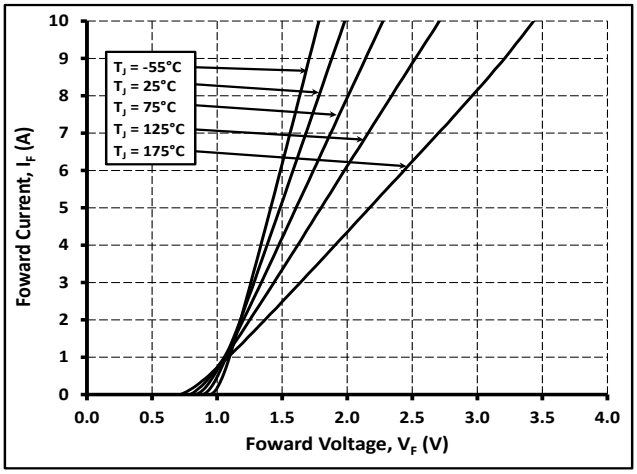


Figure 1
Forward Characteristics

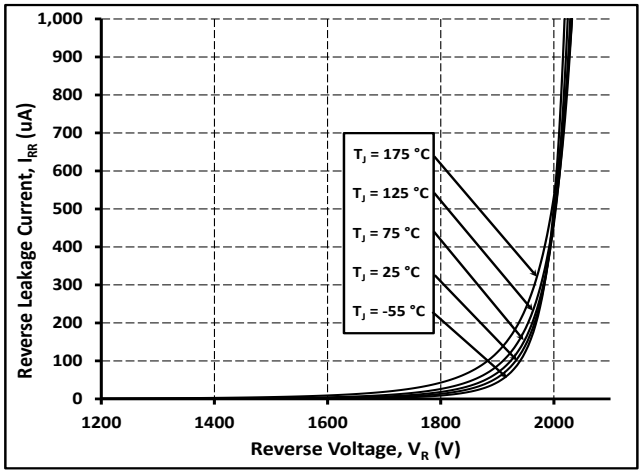


Figure 2
Reverse Characteristics

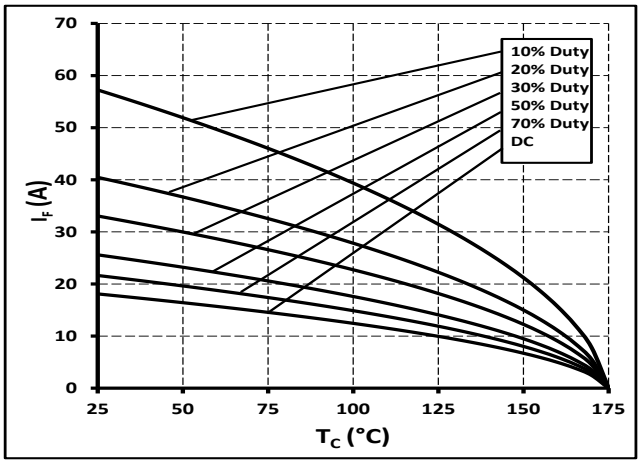


Figure 3
Current Derating

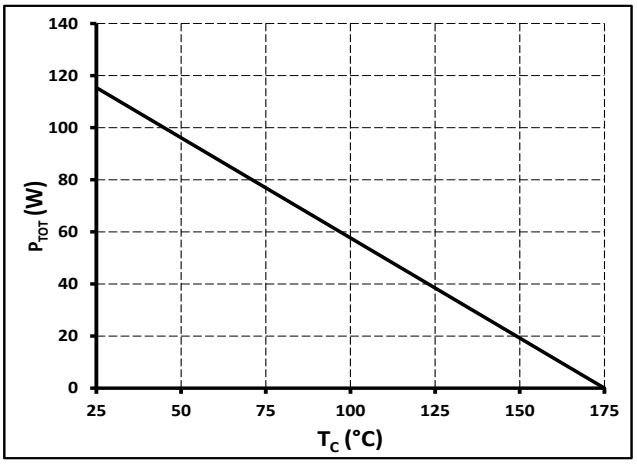


Figure 4
Power Derating

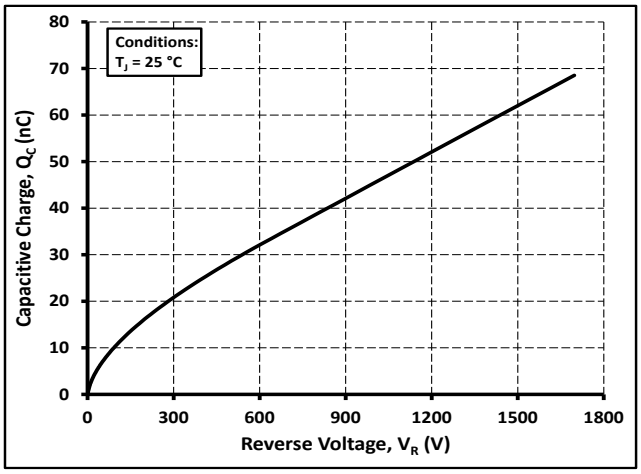


Figure 5
Total Capacitance Charge vs. Reverse Voltage

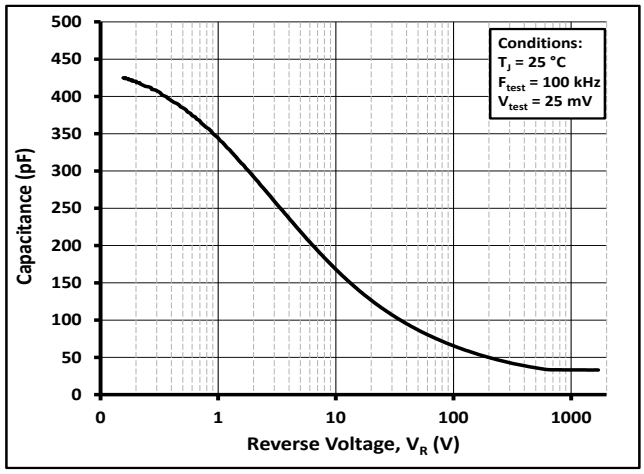


Figure 6
Capacitance vs. Reverse Voltage

Typical Performance

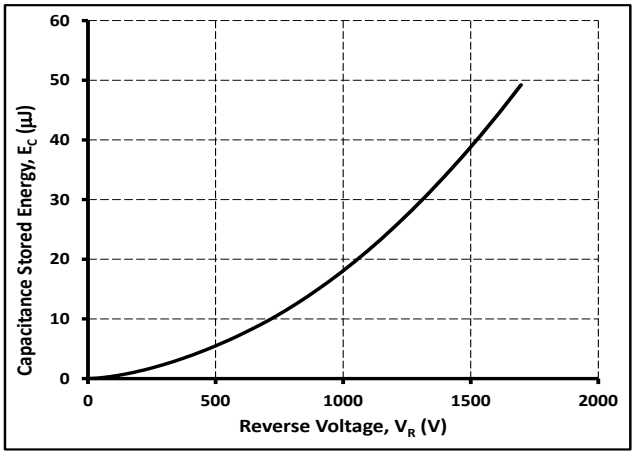


Figure 7

Capacitance Stored Energy

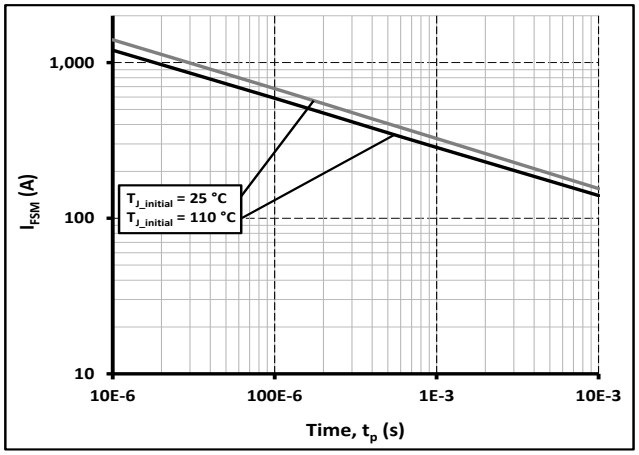


Figure 8

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

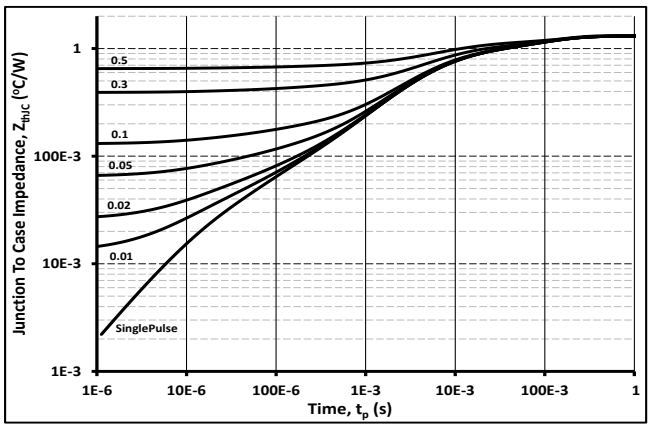
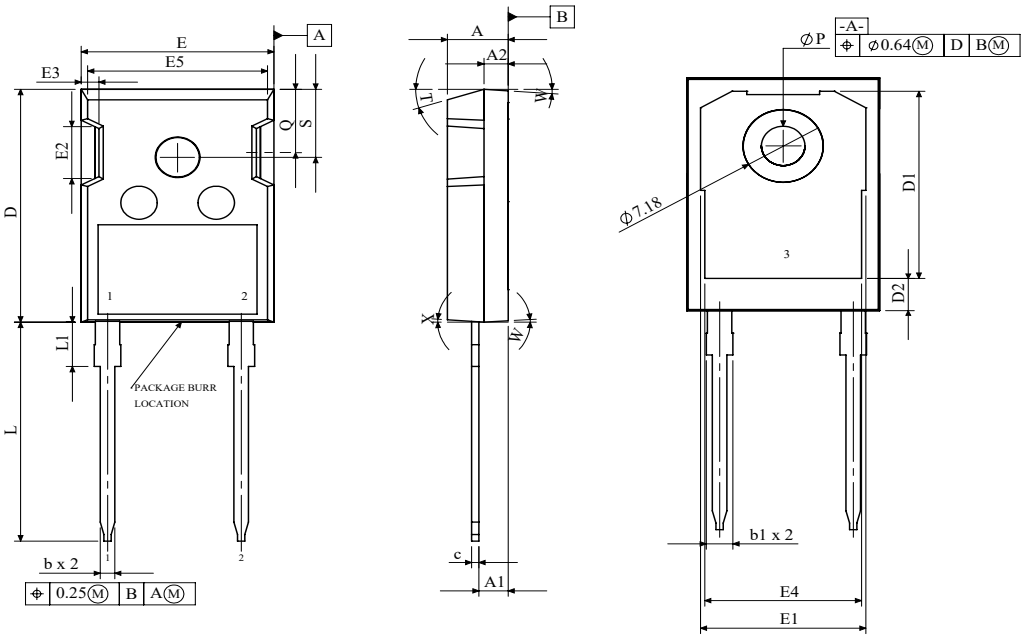


Figure 9

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	2.29	2.54
A2	1.91	2.16
b	1.07	1.33
b1	1.91	2.41
c	0.55	0.68
D	20.80	21.10
D1	16.25	17.35
D2	2.86	3.16
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
E5	14.65	15.05
e	10.88 BSC	
L	19.81	20.32
L1	4.10	4.40
ØP	3.51	3.65
Q	5.49	6.00
S	6.04	6.30
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

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TITLE: PACKAGE OUTLINE DRAWING: TO 247-2L

Date: 3/4/24

REVISION NO. 03

A4

PRD 05403 SCALE:1:1 SHEET 1 OF 1

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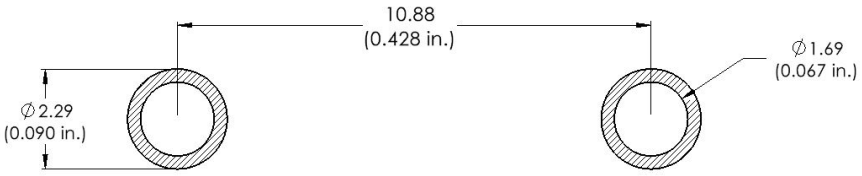
Recommended Solder Pad Layout

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



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
1	August - 2024	Notes and Disclaimers POD Updated Solder Pad Updated

Notes & Disclaimer

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