

C6D20065A

6th Generation 650 V, 20 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-220-2
Marking: C6D20065A

Features

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

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}	650	V		
DC Blocking Voltage	V_{DC}	650			
Continuous Forward Current	I_F	66	A	$T_J = 25^\circ\text{C}$	Fig. 3
		33		$T_J = 125^\circ\text{C}$	
		21		$T_J = 150^\circ\text{C}$	
Repetitive Peak Forward Surge Current	I_{FRM}	75		$T_C = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
		42		$T_C = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Forward Surge Current	I_{FSM}	125		$T_C = 25^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	Fig. 8
		99		$T_C = 110^\circ\text{C}, t_p = 10\text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Peak Forward Surge Current	$I_{F,Max}$	1,475		$T_C = 25^\circ\text{C}, t_p = 10\text{ }\mu\text{s}, \text{Pulse}$	
		1,225	$T_C = 110^\circ\text{C}, t_p = 10\text{ }\mu\text{s}, \text{Pulse}$		
Power Dissipation	P_{tot}	166	W	$T_J = 25^\circ\text{C}$	Fig. 4
		72		$T_J = 110^\circ\text{C}$	
i^2t Value	$\int i^2t$	83	A^2s	$T_C = 25^\circ\text{C}, t_p = 10\text{ ms}$	
		51		$T_C = 110^\circ\text{C}, t_p = 10\text{ ms}$	



Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Notes
Forward Voltage	V_F	1.27	1.5	V	$I_F = 20\text{ A}, T_j = 25\text{ }^\circ\text{C}$	Fig. 1
		1.37	1.6		$I_F = 20\text{ A}, T_j = 175\text{ }^\circ\text{C}$	
Reverse Current	I_R	5	80	μA	$V_R = 650\text{ V}, T_j = 25\text{ }^\circ\text{C}$	Fig. 2
		40	400		$V_R = 650\text{ V}, T_j = 175\text{ }^\circ\text{C}$	
Total Capacitive Charge	Q_C	62		nC	$V_R = 400\text{ V}, T_j = 25\text{ }^\circ\text{C}$	Fig. 5
Total Capacitance	C	1,153		pF	$V_R = 0\text{ V}, T_j = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	Fig. 6
		120			$V_R = 200\text{ V}, T_j = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	
		96			$V_R = 400\text{ V}, T_j = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	
Capacitance Stored Energy	E_C	9.5		μJ	$V_R = 400\text{ V}$	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)	$R_{\theta, JC (TYP)}$	0.67	$^\circ\text{C} / \text{W}$	
Thermal Resistance, Junction to Case (Maximum)	$R_{\theta, JC (MAX)}$	0.86		
Junction Temperature	T_j	-55 to +175	$^\circ\text{C}$	
Case & Storage Temperature	T_c	-55 to +175		
Maximum Processing Temperature	T_{PROC}	325		10 min max.
TO-220 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

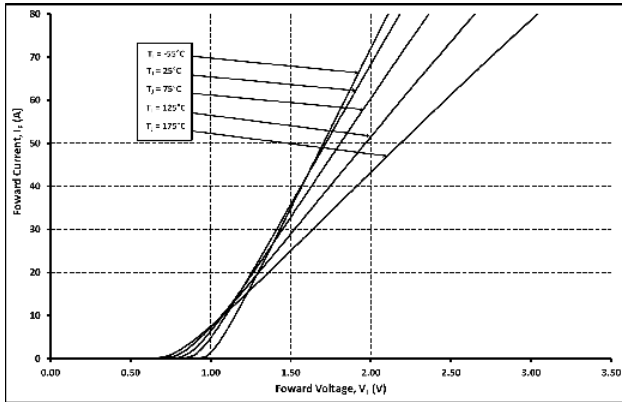


Figure 1
Forward Characteristics

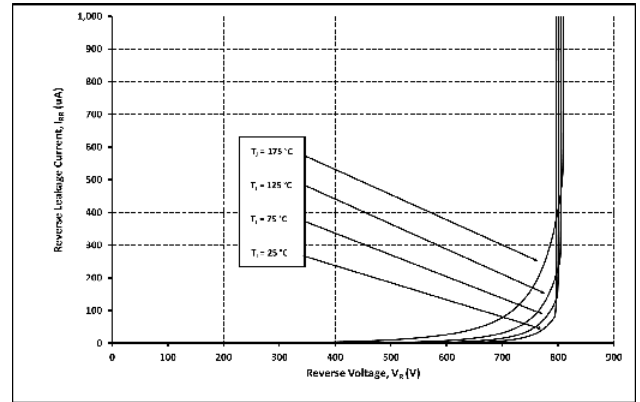


Figure 2
Reverse Characteristics

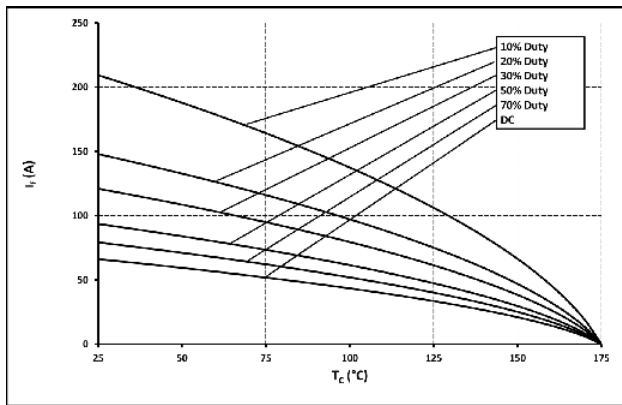


Figure 3
Current Derating

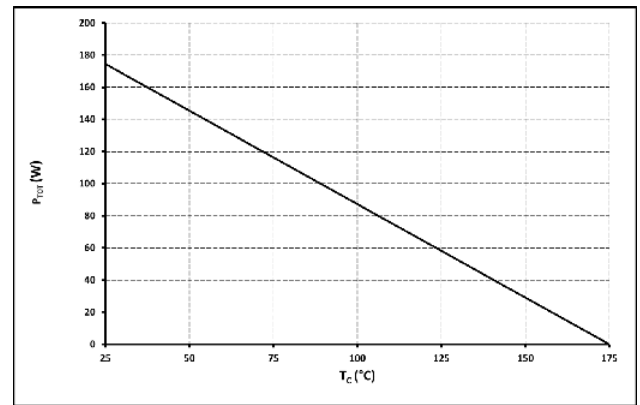


Figure 4
Power Derating

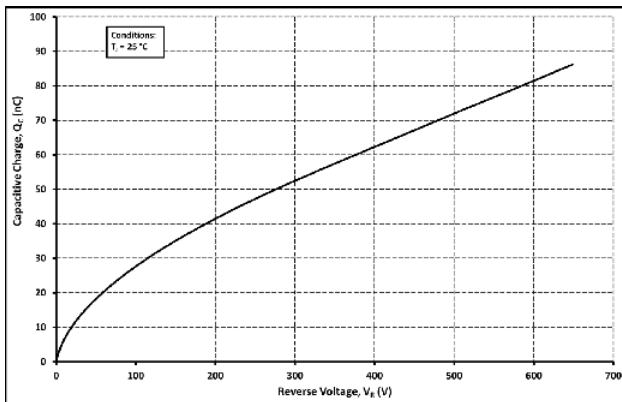


Figure 5
Total Capacitance Charge vs. Reverse Voltage

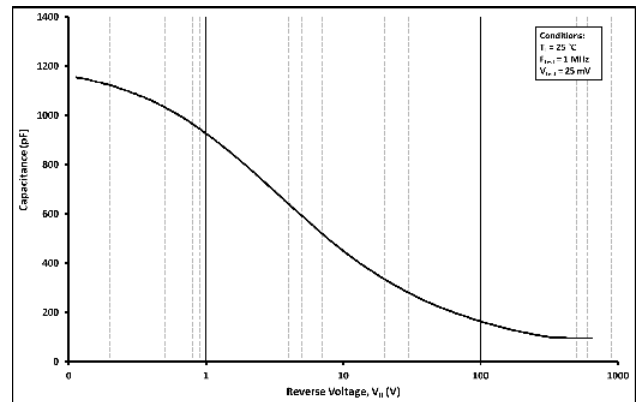


Figure 6
Capacitance vs. Reverse Voltage

Typical Performance

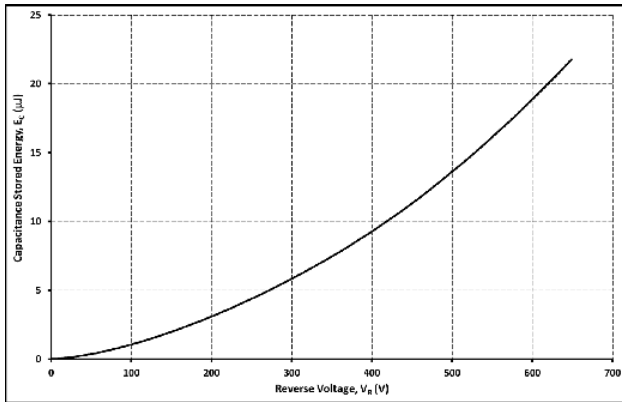


Figure 7
Capacitance Stored Energy

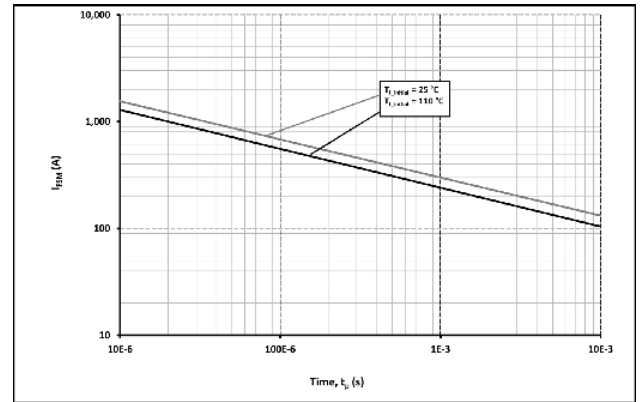


Figure 8
Non-Repetitive Peak Forward Surge Current vs. Pulse Duration (Sinusoidal Waveform)

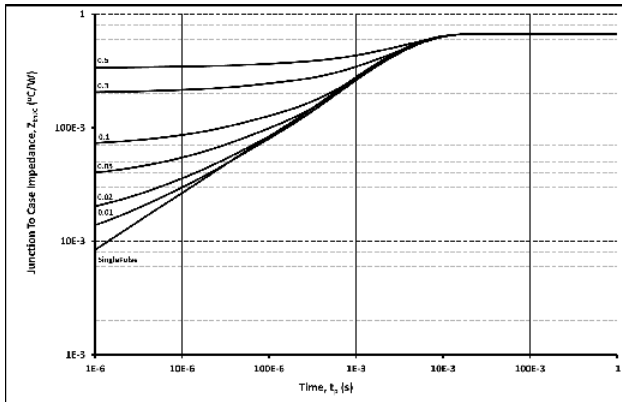
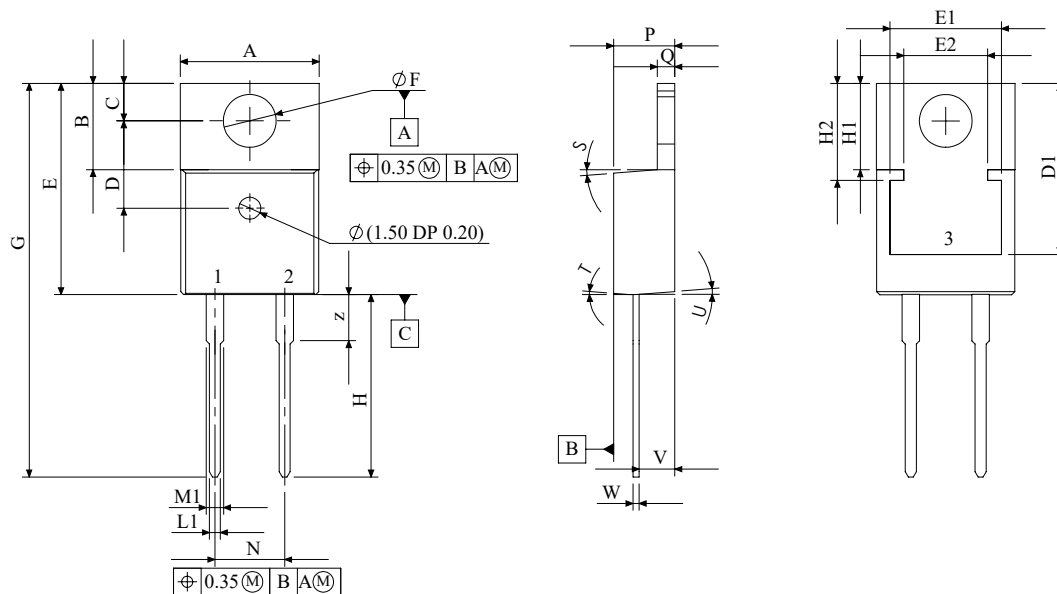


Figure 9
Transient Thermal Impedance

Package Dimensions & Pin-Out

Package: TO-220-2

All dimensions are in mm.



SYMBOL	MIN (mm)	MAX (mm)
A	9.677	10.414
B	5.969	6.477
C	2.540	3.048
D	5.664	8.560
D1	12.450 REF	
E	14.986	15.621
E1	8.120 REF	
E2	6.100 REF	
F	3.632	3.886
G	28.067	29.134
H	12.700	13.970
H1	6.223 REF	
H2	7.040 REF	
L1	0.635	0.914
M1	1.143	1.397
N	4.953	5.207
P	4.191	4.699
Q	1.219	1.372
S	3°	6°
T	3°	6°
U	3°	6°
V	2.388	2.794
W	0.356	0.635
W1	0.356	0.520
X	3°	5.5°
Y	9.779	10.414
Z	3.302	3.810

1	CATHODE
2	ANODE
3	CATHODE

NOTE

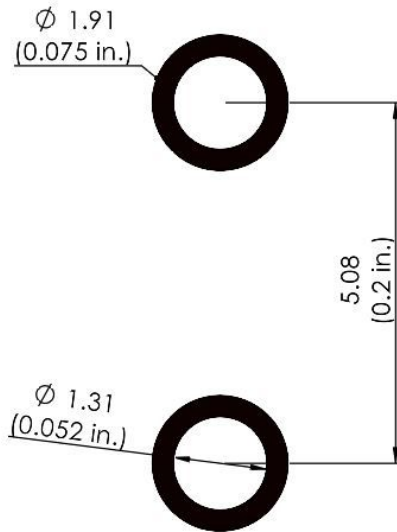
1. ALL METAL SURFACES ARE TIN PLATED (MATTE), EXCEPT AREA OF CUT.
2. DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.5M-1994.
3. ALL DIMENSIONS ARE LISTED IN MILLIMETERS. ANGLES ARE IN DEGREES.
4. PACKAGE BURR FLASH SIZE (0.5 mm) IS NOT INCLUDED IN THE DIMENSIONS



Recommended Solder Pad Layout

Primary dimensions shown in mm.

Learn more about recommended soldering profiles in [this application note](#).



Product Ordering Information

Order Number	Packing Type
C6D20065A	Tube

Learn more about power device packing & shipment information in [this application note](#).

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



Notes & Disclaimer

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