

C6D06065G

650 V, 6 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.



TO-263-2



Package Types: TO-263-2

PN: C6D06065G

WolfSpeed, Inc. is in the process of rebranding its products and related materials pursuant to the entity name change from Cree, Inc. to WolfSpeed, Inc. During this transition period, products received may be marked with either the Cree name and/or logo or the WolfSpeed name and/or logo.

Applications

- Industrial power supplies
- Switch mode power supplies
- Server/telecom power supplies
- Power factor correction
- Solar inverter
- Uninterruptible power supply

Features

- Low forward voltage (V_f) drop with positive temperature coefficient
- Zero reverse recovery current/forward recovery voltage
- Temperature-independent switching behavior
- Low leakage current (I_R)

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

Parameter	Symbol	Value	Unit	Test Conditions	Note
Repetitive Peak Reverse Voltage	V_{RRM}	650	V		
DC Blocking Voltage	V_{DC}	650			
Continuous Forward Current	I_F	23	A	$T_c = 25\text{ }^\circ\text{C}$	Fig. 3
		12		$T_c = 125\text{ }^\circ\text{C}$	
		6		$T_c = 155\text{ }^\circ\text{C}$	
Repetitive Peak Forward Surge Current	I_{FRM}	25	A	$T_c = 25\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$, Half Sine Wave	
		14		$T_c = 110\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$, Half Sine Wave	
Non-Repetitive Peak Forward Surge Current	I_{FSM}	45	A	$T_c = 25\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$, Half Sine Wave	Fig. 8
		33		$T_c = 110\text{ }^\circ\text{C}$, $t_p = 10\text{ ms}$, Half Sine Wave	
	$I_{F,Max}$	620		$T_c = 25\text{ }^\circ\text{C}$, $t_p = 10\text{ }\mu\text{s}$, Pulse	
		570		$T_c = 110\text{ }^\circ\text{C}$, $t_p = 10\text{ }\mu\text{s}$, Pulse	
Power Dissipation	P_{tot}	73	W	$T_c = 25\text{ }^\circ\text{C}$	Fig. 4
		31		$T_c = 110\text{ }^\circ\text{C}$	



Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Unit	Test Conditions	Note
Drain-Source Voltage	V_F	1.27	1.40	V	$I_F = 6\text{ A}, T_J = 25\text{ }^\circ\text{C}$	Fig. 1
		1.37	1.50		$I_F = 6\text{ A}, T_J = 175\text{ }^\circ\text{C}$	
Reverse Current	I_R	2	20	μA	$V_R = 650\text{ V}, T_J = 25\text{ }^\circ\text{C}$	Fig. 2
		25	200		$V_R = 650\text{ V}, T_J = 175\text{ }^\circ\text{C}$	
Total Capacitive Charge	Q_C	22		nC	$V_R = 400\text{ V}, T_J = 25\text{ }^\circ\text{C}$	Fig. 5
Total Capacitance	C	393		pF	$V_R = 0\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	Fig. 6
		44			$V_R = 200\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	
		36			$V_R = 400\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	
Capacitance Stored Energy	E_C	3.5		μJ	$V_R = 400\text{ V}$	Fig. 7

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

Thermal & Mechanical Characteristics

Parameter	Symbol	Typ.	Unit	Note
Thermal Resistance, Junction to Case	$R_{\theta,JC}$	2.05	$^\circ\text{C/W}$	
Operating Junction & Storage Temperature	T_J, T_{stg}	-55 to +175	$^\circ\text{C}$	Fig. 9

Typical Performance

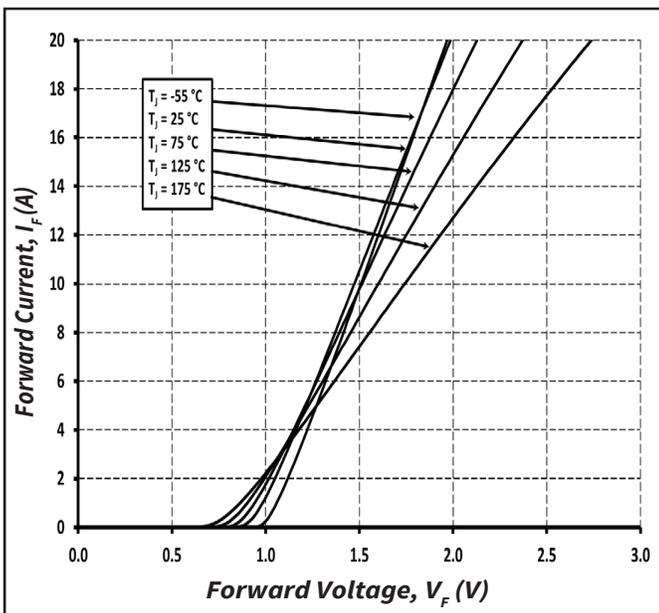


Figure 1. Forward Characteristics

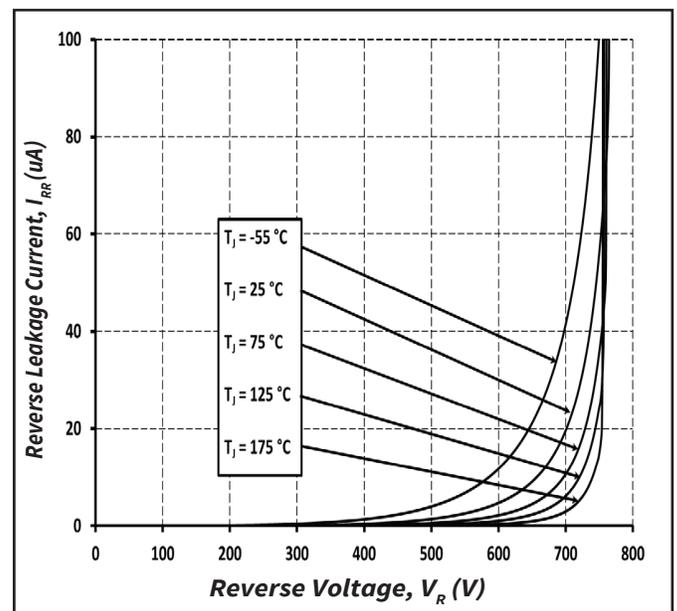


Figure 2. Reverse Characteristics



Typical Performance

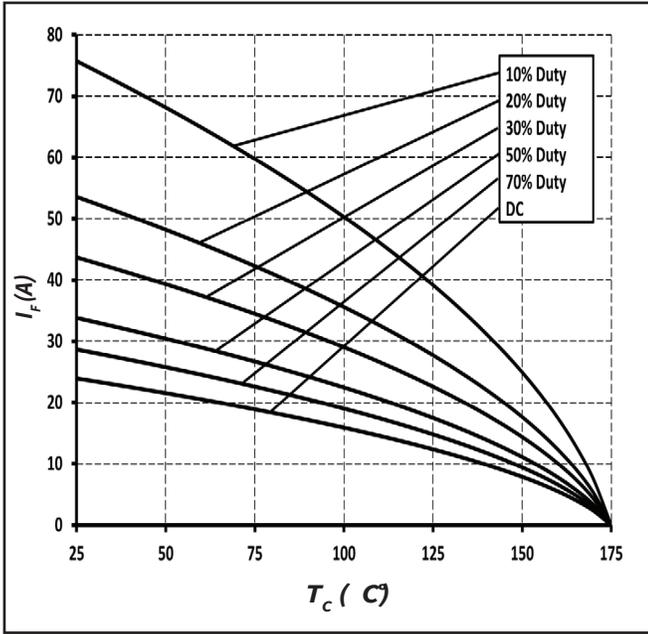


Figure 3. Current Derating

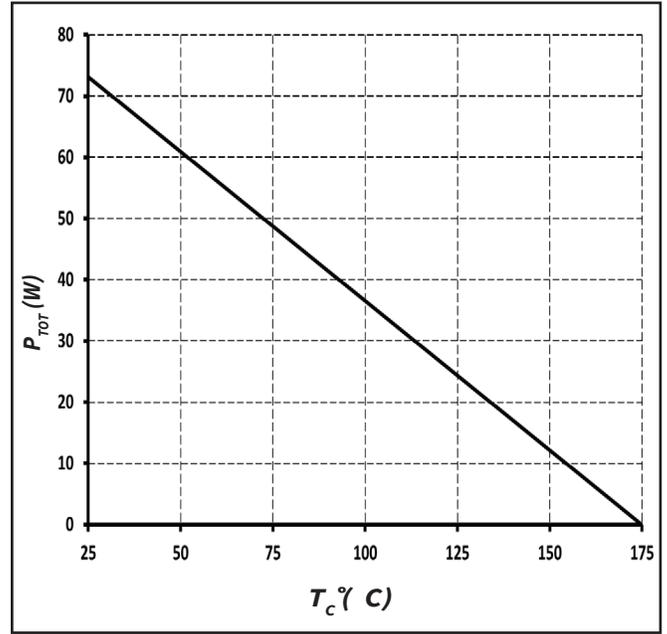


Figure 4. Power Derating

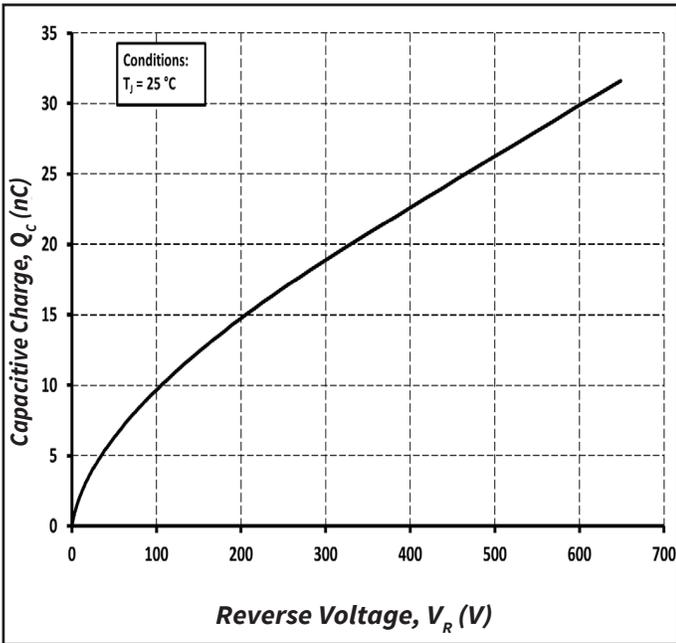


Figure 5. Total Capacitance Charge vs. Reverse Voltage

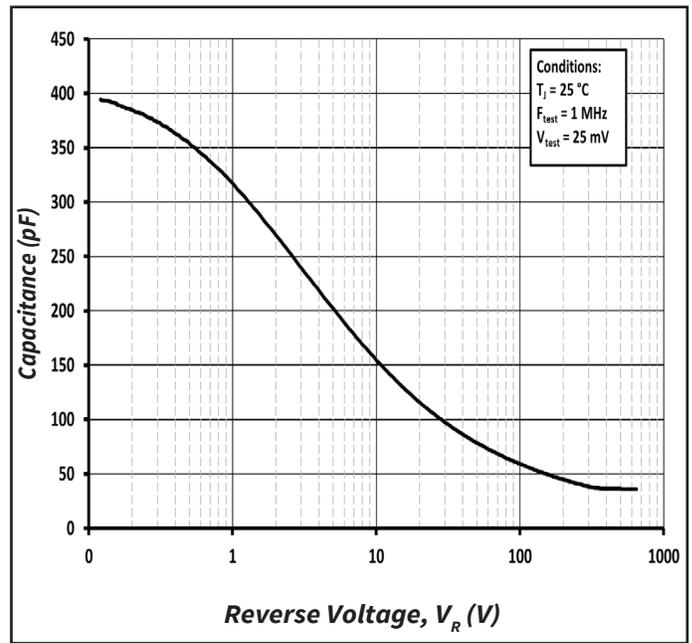


Figure 6. Capacitance vs. Reverse Voltage



Typical Performance

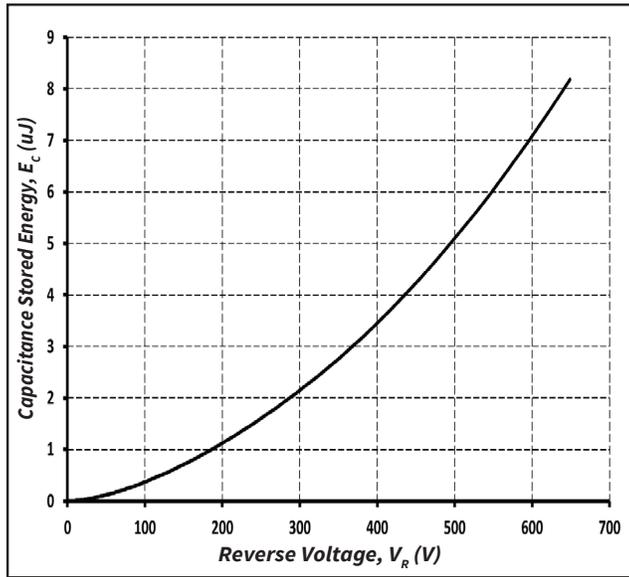


Figure 7. Capacitance Stored Energy

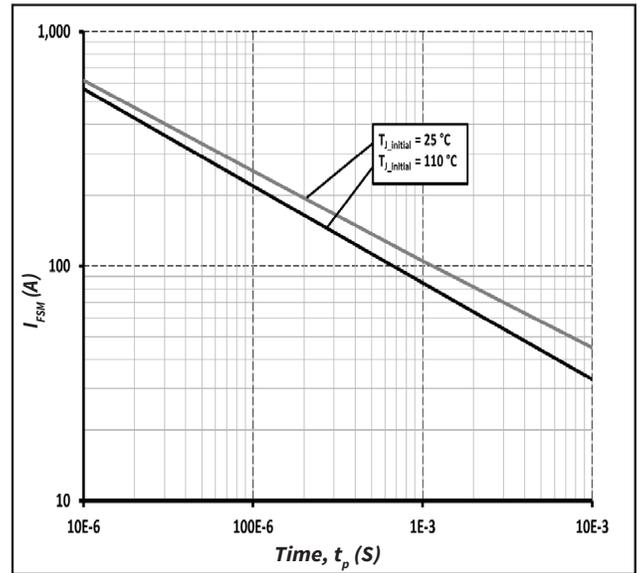


Figure 8. Non-Repetitive Peak Forward Surge Current (Sine Wave)

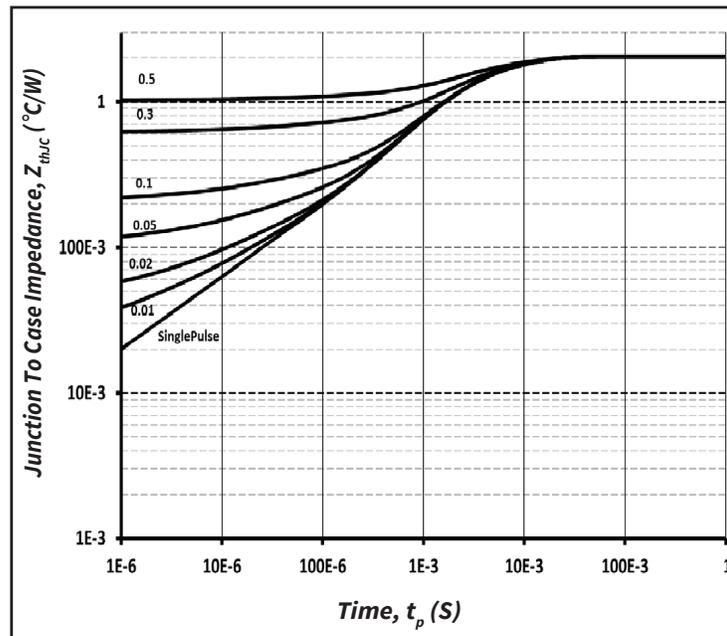
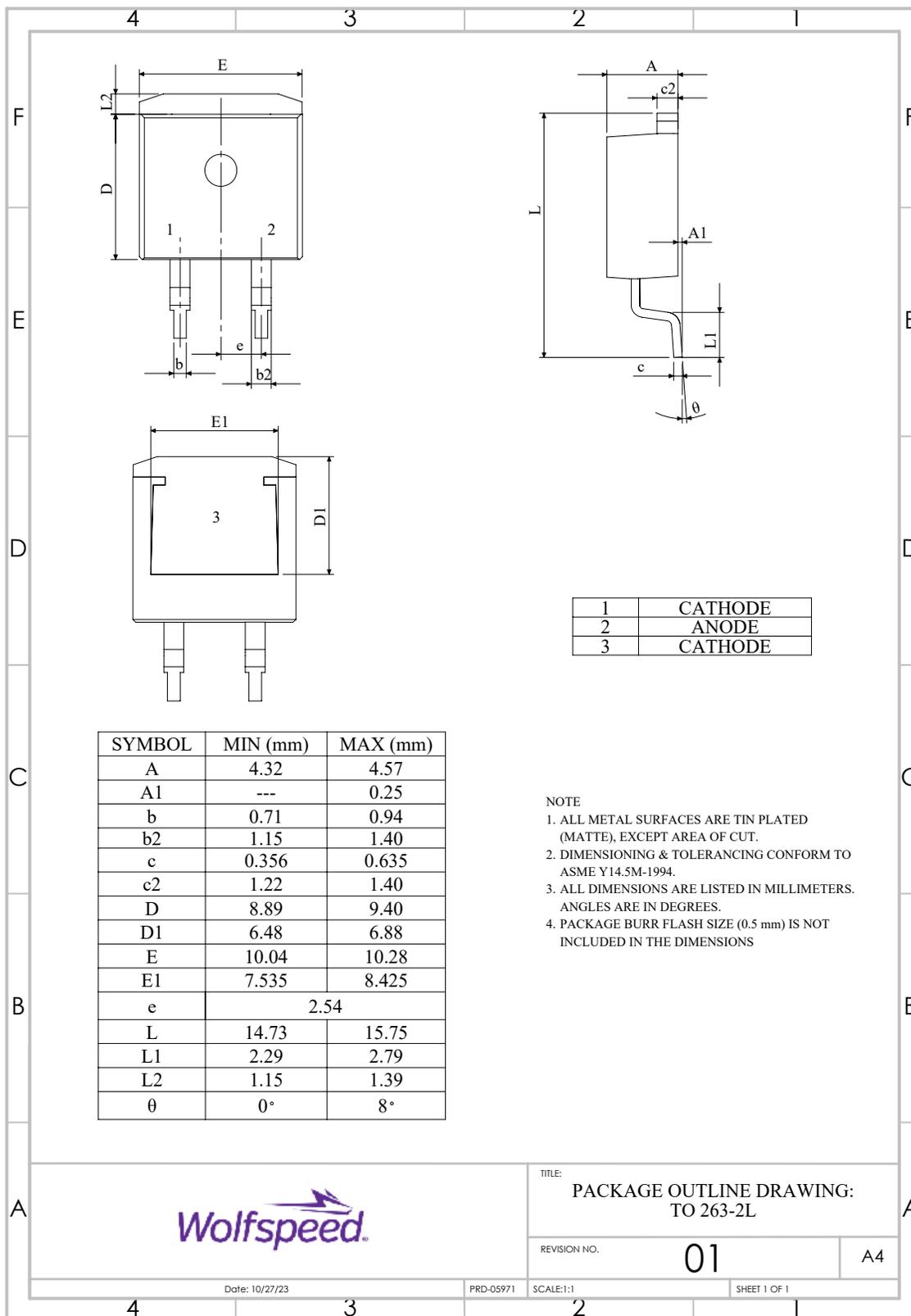


Figure 9. Transient Thermal Impedance



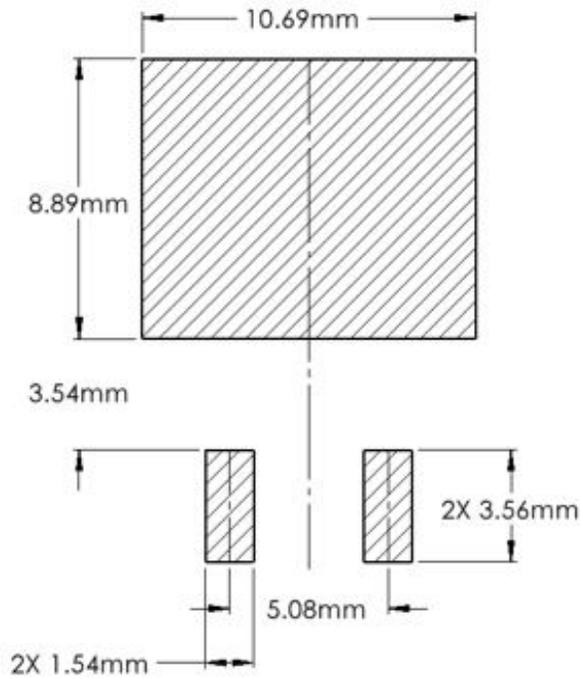
Package Dimensions

Package: TO-263-2





Recommended Solder Pad Layout



Part Number	Package	Marking
C6D06065G	TO-263-2	C6D06065

Electrostatic Discharge (ESD) Classifications

Parameter	Symbol	Class
Human Body Model	HBM	Class 3B (≥ 8000 V)
Charge Device Model	CDM	Class C3 (≥ 1000 V)



Revision History

Current Revision	Date of Release	Description of Changes
0	July-2021	Initial Release
1	October-2023	Updated Wolfspeed branding, package drawing, and solder pad layout (Not Released)
2	November-2023	Corrected Package Drawing L and L1



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