

# C6D06065G

## 6<sup>th</sup> Generation 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.



Package Type: TO-263-2  
Marking: C6D06065

### 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 ( $I_r$ )

### Applications

- Industrial Power Supplies
- Switch Mode Power Supplies
- Server / Telecom Power Supplies
- Power Factor Correction
- Solar Inverter
- Uninterruptible Power Supply

### Maximum Ratings ( $T_c = 25^\circ\text{C}$ 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	$T_J = 25^\circ\text{C}$	Fig. 3
		12		$T_J = 125^\circ\text{C}$	
		6		$T_J = 155^\circ\text{C}$	
Repetitive Peak Forward Surge Current	$I_{FRM}$	25	A	$T_c = 25^\circ\text{C}, t_p = 10 \text{ ms}, \text{Half Sine Wave}$	Fig. 8
		14		$T_c = 110^\circ\text{C}, t_p = 10 \text{ ms}, \text{Half Sine Wave}$	
		45		$T_c = 25^\circ\text{C}, t_p = 10 \text{ ms}, \text{Half Sine Wave}$	
Non-Repetitive Peak Forward Surge Current	$I_{FSM}$	33	A	$T_c = 110^\circ\text{C}, t_p = 10 \text{ ms}, \text{Half Sine Wave}$	Fig. 8
		620		$T_c = 25^\circ\text{C}, t_p = 10 \mu\text{s}, \text{Pulse}$	
		570		$T_c = 110^\circ\text{C}, t_p = 10 \mu\text{s}, \text{Pulse}$	
Power Dissipation	$P_{tot}$	73	W	$T_J = 25^\circ\text{C}$	Fig. 4
		31		$T_J = 110^\circ\text{C}$	



## Electrical Characteristics

Parameter	Symbol	Typ.	Max.	Units	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	$\mu\text{A}$	$V_R = 650 \text{ V}, T_J = 25 \text{ }^\circ\text{C}$	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		$\mu\text{J}$	$V_R = 400 \text{ V}$	Fig. 7

Note:

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

## Thermal & Mechanical Characteristics

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



Typical Performance

Figure 1. Forward Characteristics

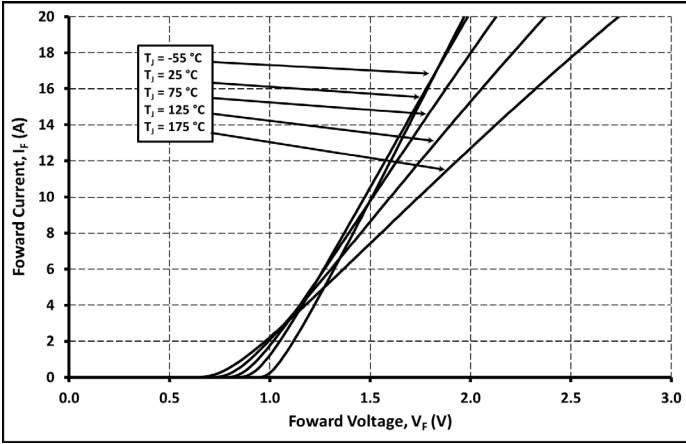


Figure 2. Reverse Characteristics

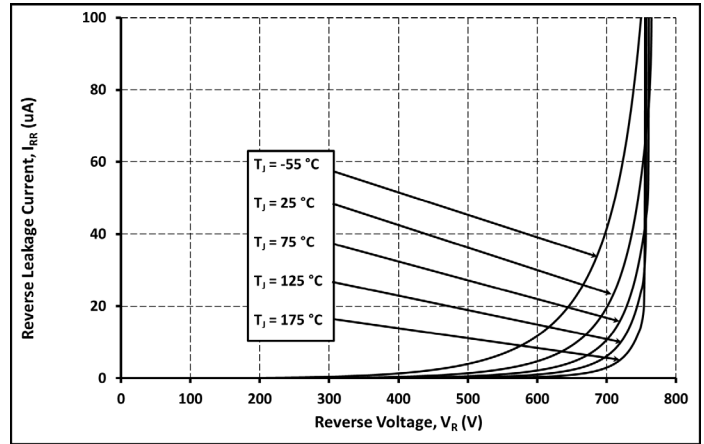


Figure 3. Current Derating

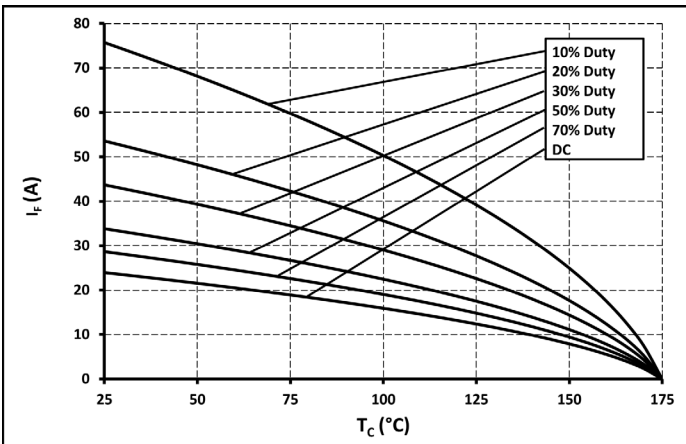


Figure 4. Power Derating

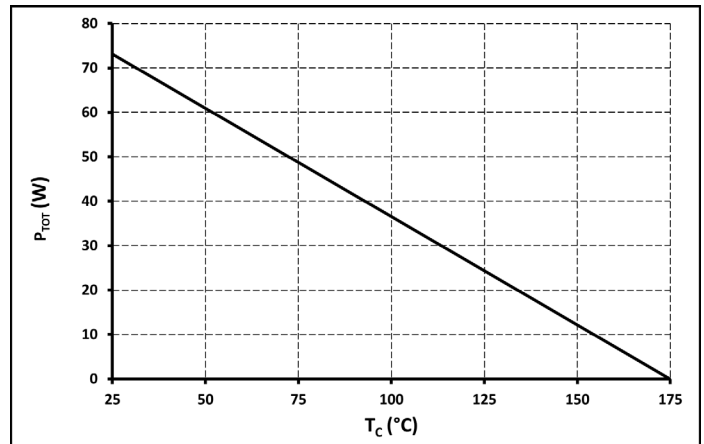


Figure 5. Total Capacitance Charge vs. Reverse Voltage

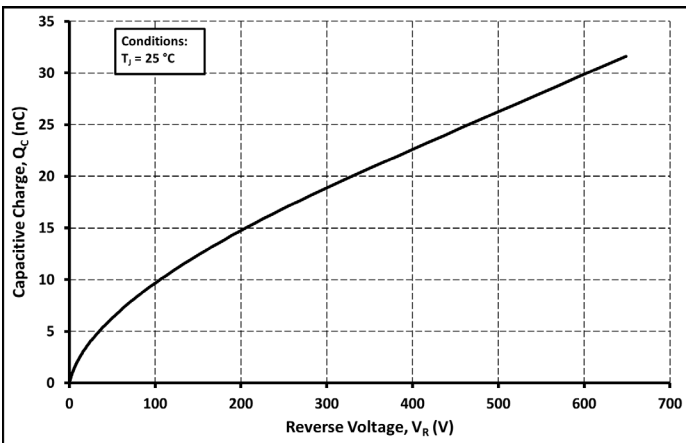
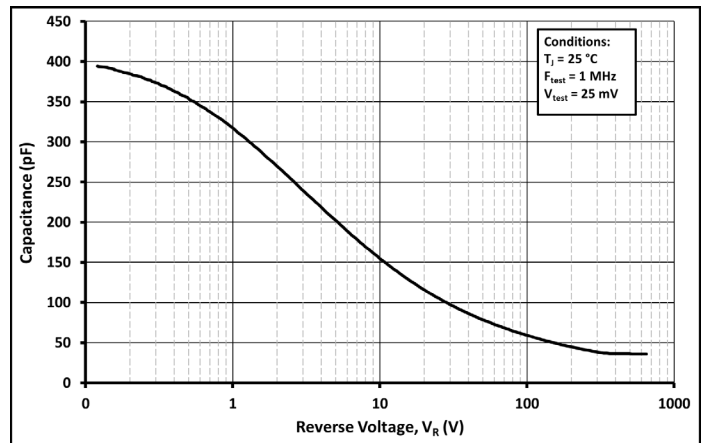


Figure 6. Capacitance vs. Reverse Voltage





Typical Performance

Figure 7. Capacitance Stored Energy

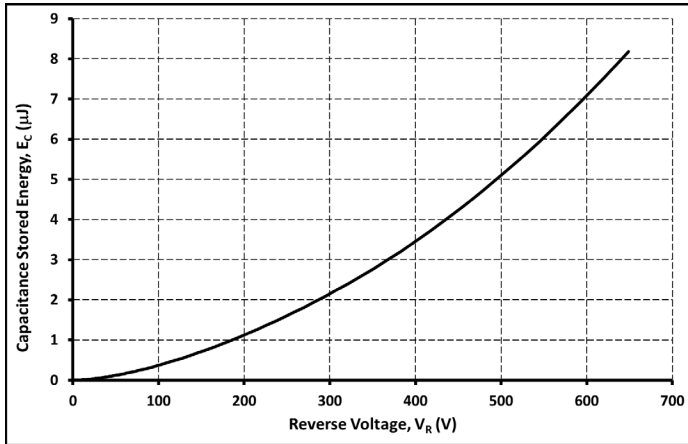


Figure 8. Non-Repetitive Peak Forward Surge Current (Sine Wave)

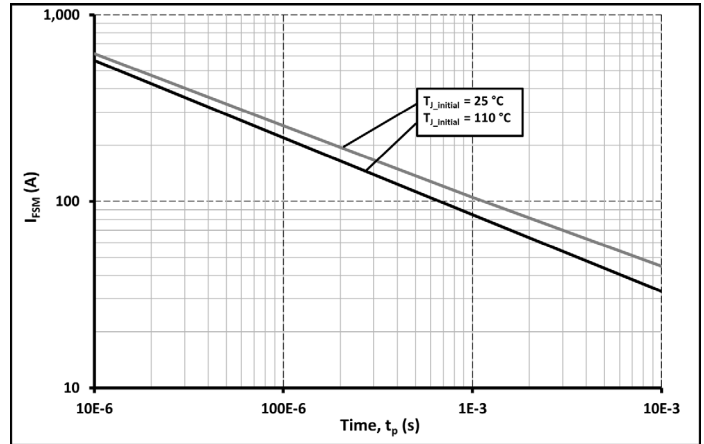
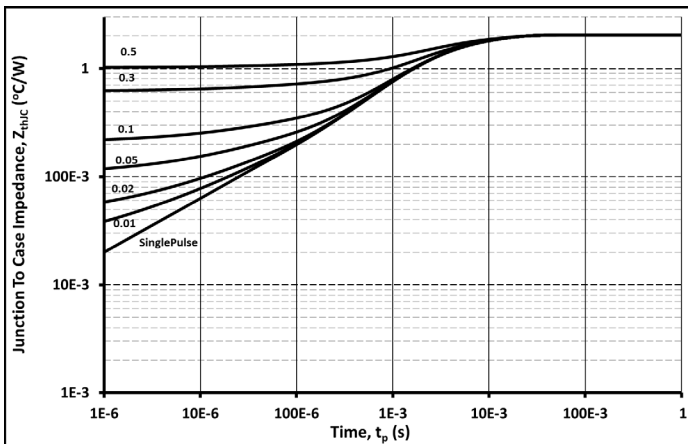


Figure 9. Transient Thermal Impedance



Electrostatic Discharge (ESD) Classifications

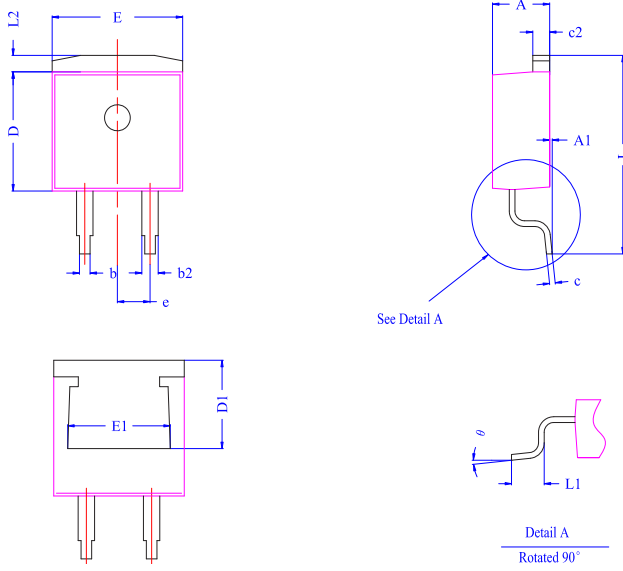
Parameter	Symbol	Class
Human Body Model	HBM	Class 3B ( $\geq 8000$ V)
Charge Device Model	CDM	Class C3 ( $\geq 1000$ V)



### Package Dimensions

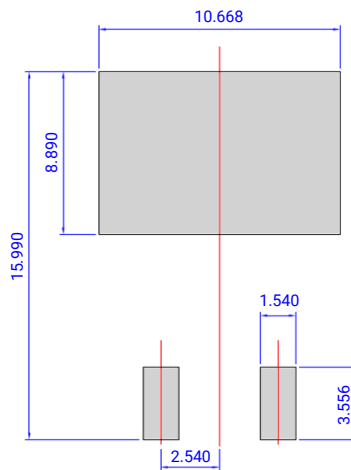
Package: TO-263-2

All dimensions in mm.



Dim	Min	Typ	Max
A	4.32	4.445	4.57
A1	--	0.20	0.25
b	0.71	0.825	0.94
b2	1.15	1.275	1.4
c	0.356	0.4955	0.635
c2	1.22	1.31	1.4
D	8.89	9.145	9.4
D1	6.48	6.78	6.88
E	10.04	10.16	10.28
E1	7.535	7.980	8.425
e	2.54		
L	14.73	15.24	15.75
L1	2.29	2.54	2.79
L2	1.15	1.27	1.39
θ	0°	4°	8°

### Recommended Solder Pad Layout



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



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