

TPDD20A120C1P Silicon Carbide Schottky Diode

General Description

Topdiode 20A 1200V SiC diode is an ultrahigh performance power Schottky diode designed for power electronics systems, where high efficiency and high reliability are required. 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, SiC diodes are able to provide lower overall system costs in a variety of diverse applications.

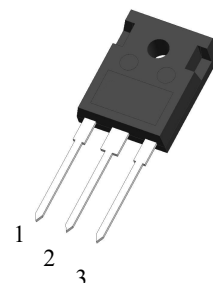
Features

- Zero Reverse Recovery Current
- Temperature-Independent Switching
- Extremely Fast Switching
- Positive Temperature Coefficient on V_F
- Low Switching Losses
- Higher Efficiency

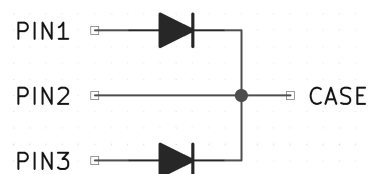
Applications

- Switch Mode Power Supplies (SMPS)
- Boost Diodes in PFC or DC/DC Stages
- Free Wheeling Diodes in Inverter Stages
- AC/DC Converters

Package TO-247-3



Equivalent Schematic



Summary

Symbol	Value
$I_{F(AV)}$	20A@164°C
V_{RRM}	1200V
$V_{F(typ.)}$	1.34V@25°C
$Q_{c(typ.)}$	61.4nC

Maximum ratings ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		1200	V
V_{RSM}	Surge Peak Reverse Voltage		1300	V
V_R	DC Peak Reverse Voltage		1200	V
I_F	Continuous Forward Current (Per Leg/Device)	$T_C=25^\circ\text{C}$	70/140	A
		$T_C=135^\circ\text{C}$	23.4/46.8	A
		$T_C=164^\circ\text{C}$	10/20	A
I_{FSM}	Non-Repetitive Peak Forward Surge Current(Per Leg)	$T_C=25^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Pulse	100	A
P_{tot}	Power Dissipation(Per Leg)	$T_C=25^\circ\text{C}$	232	W
		$T_C=110^\circ\text{C}$	100	W
T_J, T_{stg}	Operating Junction and Storage Temperature		-55 to +175	$^\circ\text{C}$
M	TO-247 Mounting Torque	M3 Screw	1	Nm
		6-32 Screw	8.8	lbf-in

Thermal Characteristics (Per Leg/Device)

Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Thermal Resistance from Junction to Case		0.65/0.33		$^\circ\text{C/W}$

Electrical Characteristics(Per Leg)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=10\text{A}$ $T_J=25^\circ\text{C}$		1.3	1.5	V
		$I_F=10\text{A}$ $T_J=175^\circ\text{C}$		1.8	2.2	V
I_R	Reverse Current	$V_R=1200\text{V}$ $T_J=25^\circ\text{C}$		2	100	μA
		$V_R=1200\text{V}$ $T_J=175^\circ\text{C}$		15	100	μA
Q_C	Total Capacitive Charge	$V_R=800\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		61.4		nC
C	Total Capacitance	$V_R=0\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		819		pF
		$V_R=400\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		58		pF
		$V_R=800\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		43		pF
E_C	Capacitance Stored Energy	$V_R=800\text{V}$		17.8		μJ

Note: This is a majority carrier diode, so there is no reverse recovery charge.

Typical Performance(Per Leg)

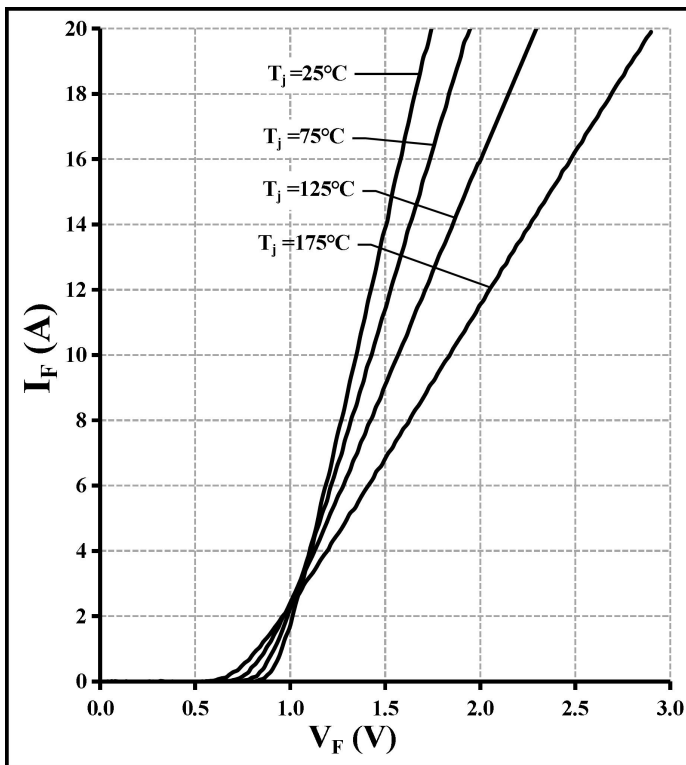


Figure 1: Forward Characteristics

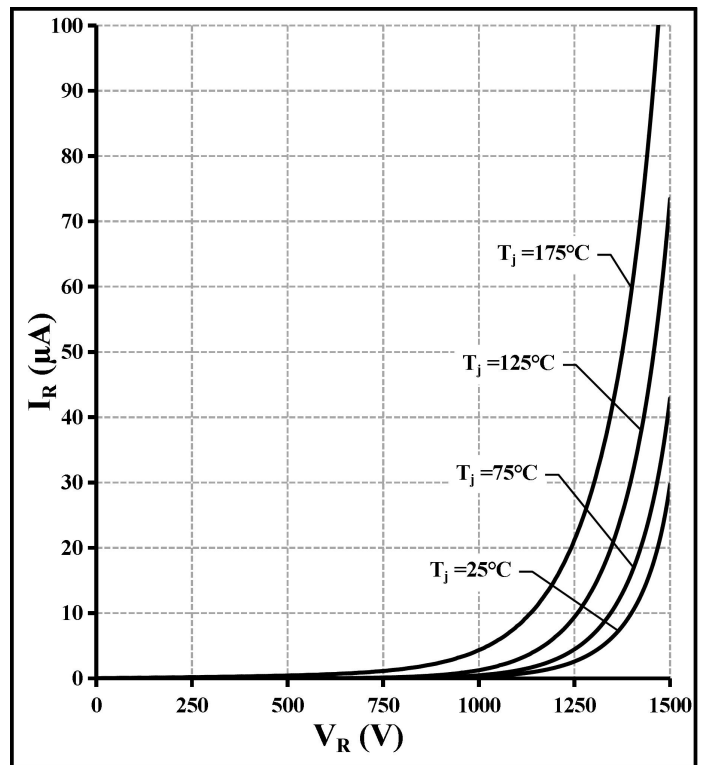


Figure 2: Reverse Characteristics

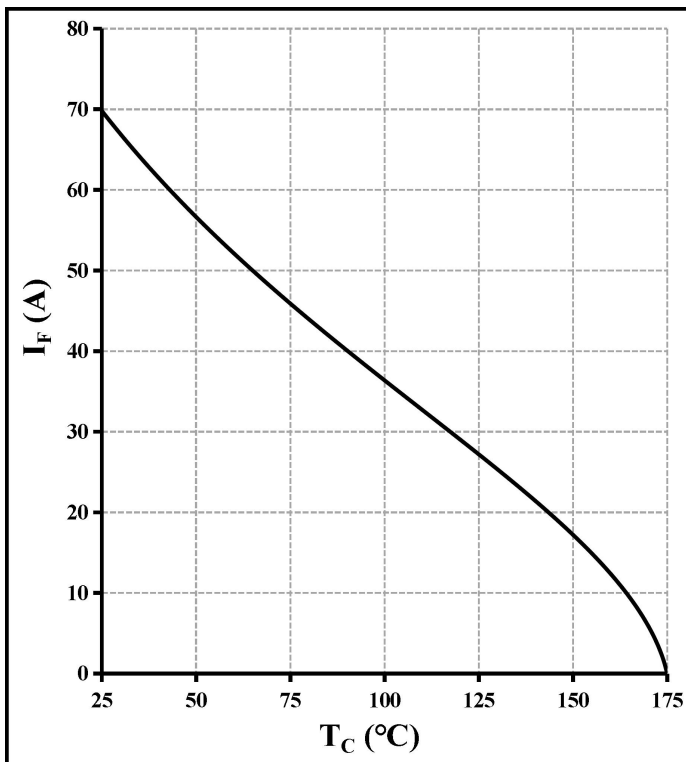


Figure 3: Current Derating

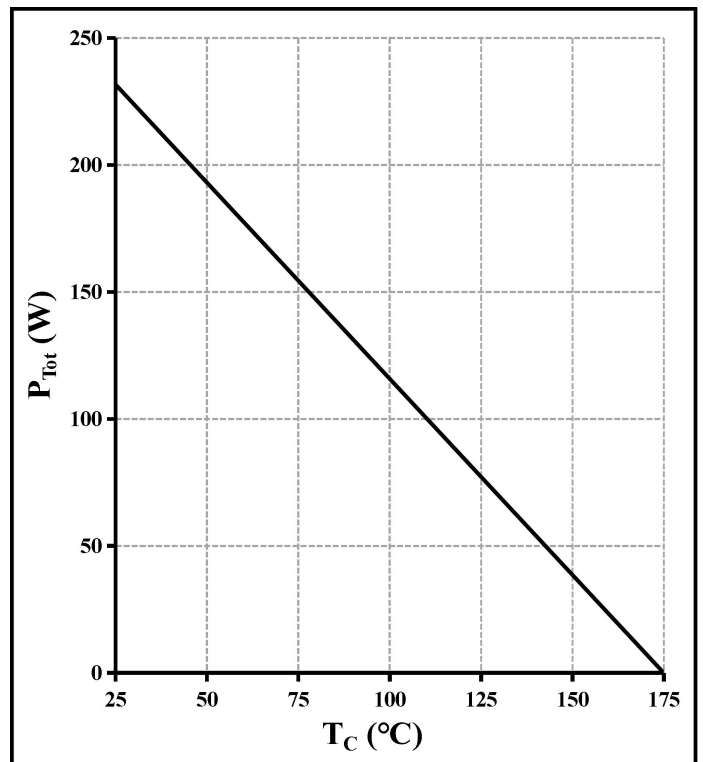


Figure 4: Power Derating

Typical Performance

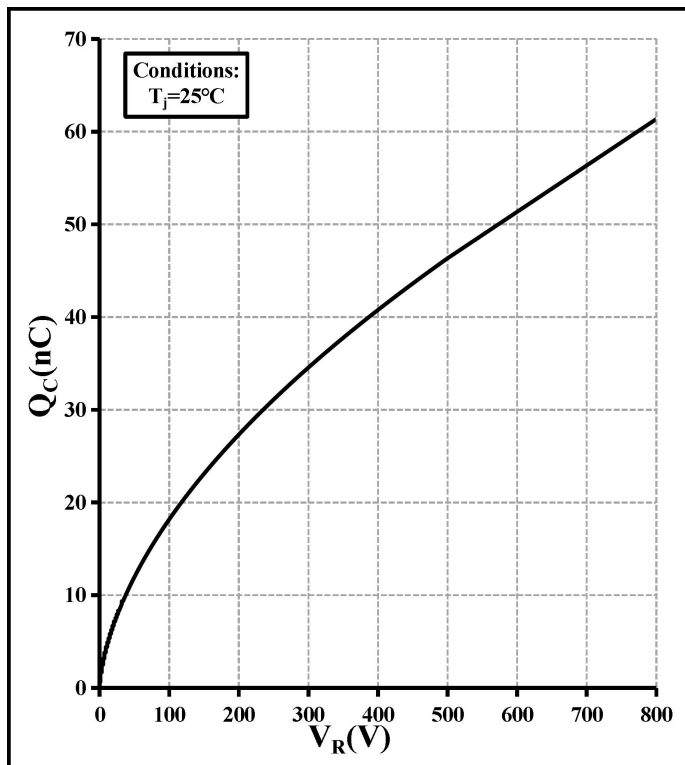


Figure 5: Recovery Charge vs Reverse Voltage

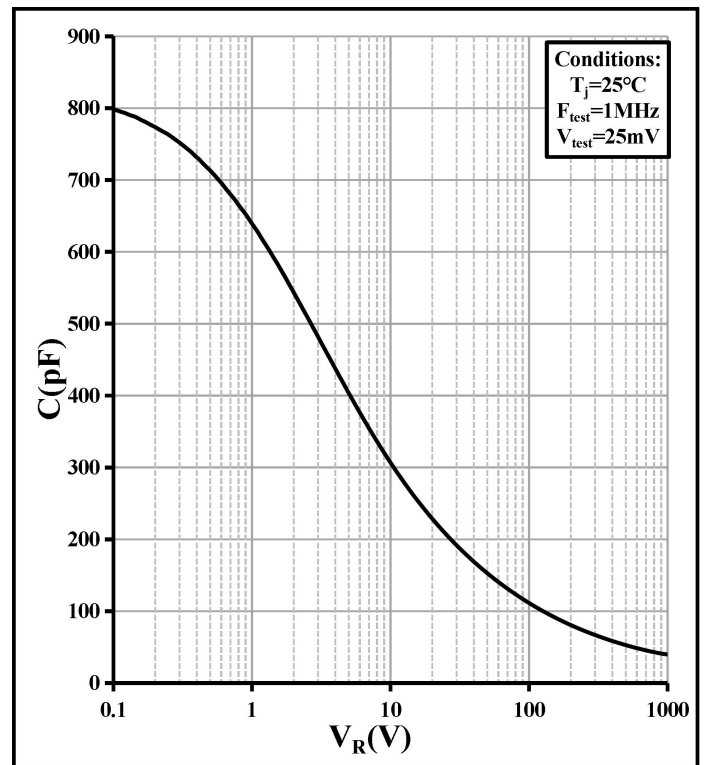


Figure 6: Capacitance vs Reverse Voltage

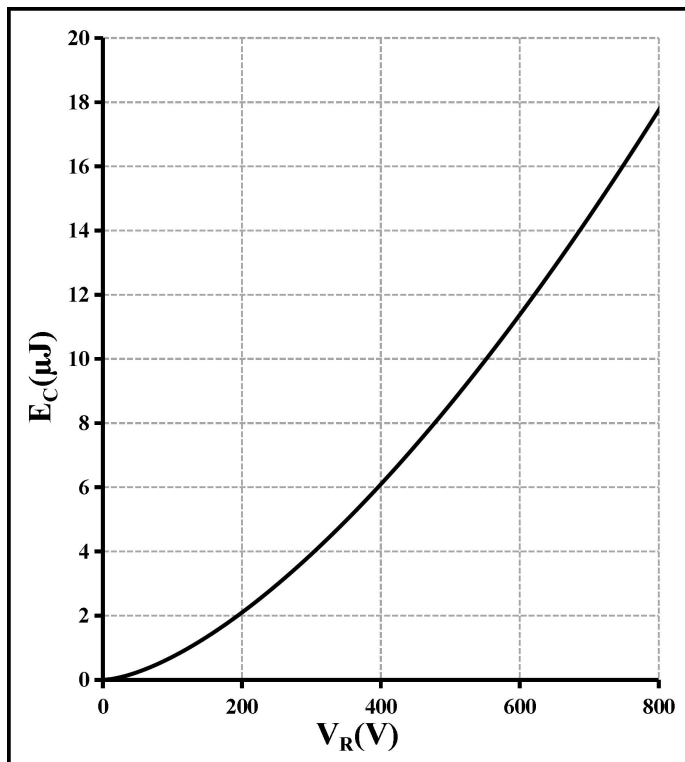


Figure 7: Typical Capacitance Stored Energy

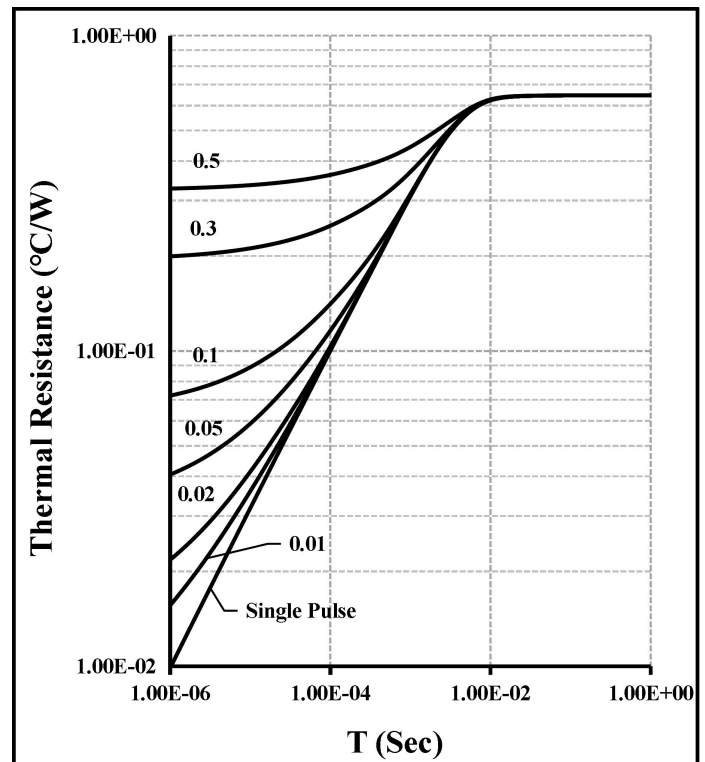


Figure 8: Transient Thermal Impedance

