

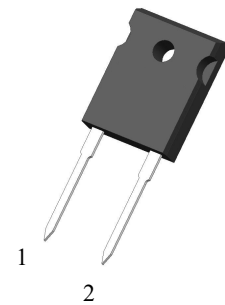
TPDH20S120C1P

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.

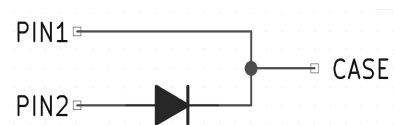
Package TO-247-2



Features

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

Equivalent Schematic



Applications

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

Summary

Symbol	Value
$I_{F(AV)}$	20A@159°C
V_{RRM}	1200V
$V_{F(typ.)}$	1.33V@25°C
$Q_C(typ.)$	131nC

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	$T_C=25^\circ\text{C}$	111	A
		$T_C=135^\circ\text{C}$	37	A
		$T_C=159^\circ\text{C}$	20	A
I_{FSM}	Non-Repetitive Peak Forward Surge Current	$T_C=25^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Pulse	190	A
P_{tot}	Power Dissipation	$T_C=25^\circ\text{C}$	317	W
		$T_C=110^\circ\text{C}$	137	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

Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Thermal Resistance from Junction to Case		0.47		$^\circ\text{C}/\text{W}$

Electrical Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=20\text{A}$ $T_J=25^\circ\text{C}$		1.33	1.5	V
		$I_F=20\text{A}$ $T_J=175^\circ\text{C}$		1.8	2.2	V
I_R	Reverse Current	$V_R=1200\text{V}$ $T_J=25^\circ\text{C}$		2	100	μA
		$V_R=1200\text{V}$ $T_J=175^\circ\text{C}$		8	400	μA
Q_C	Total Capacitive Charge	$V_R=800\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		131		nC
C	Total Capacitance	$V_R=0\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		1821		pF
		$V_R=400\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		123		pF
		$V_R=800\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		91		pF
E_C	Capacitance Stored Energy	$V_R=800\text{V}$		38		μJ

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

Typical Performance

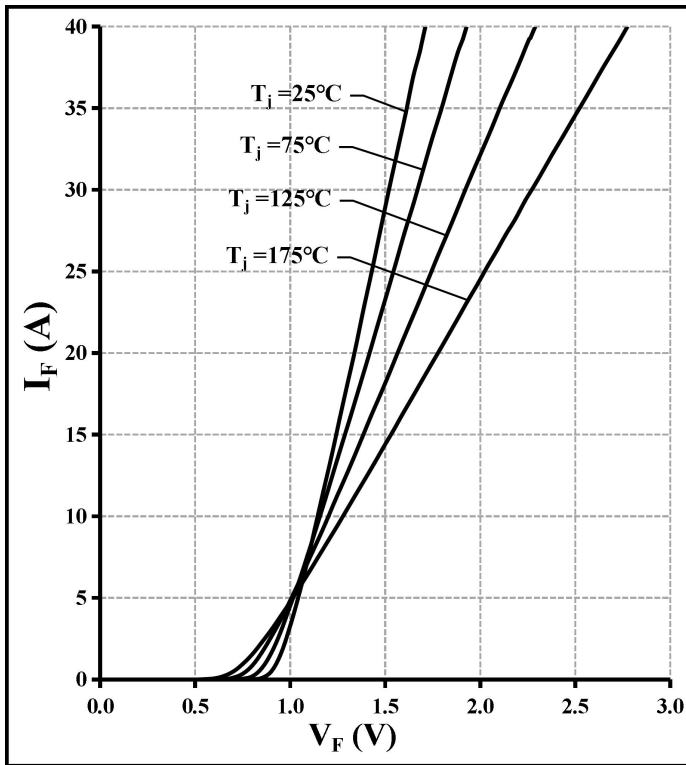


Figure 1: Forward Characteristics

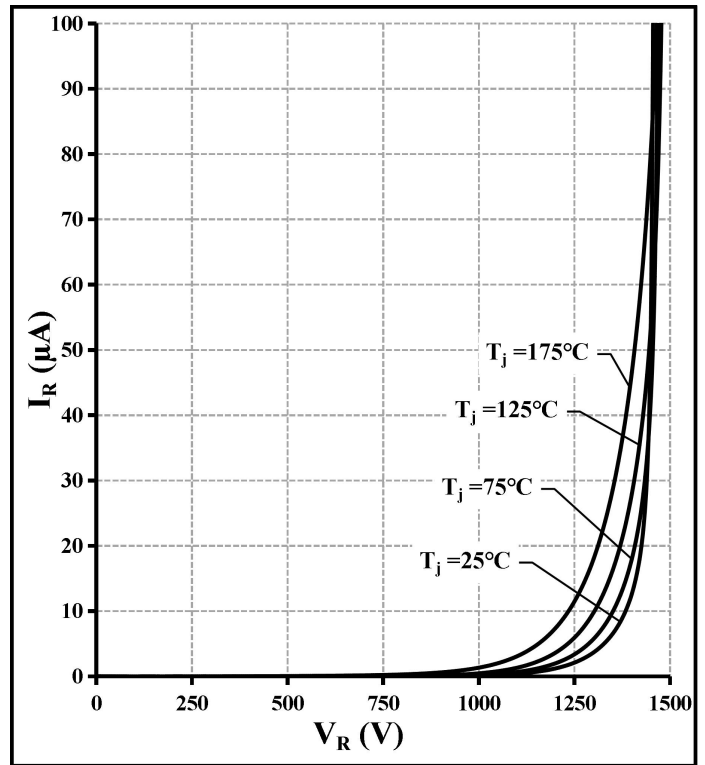


Figure 2: Reverse Characteristics

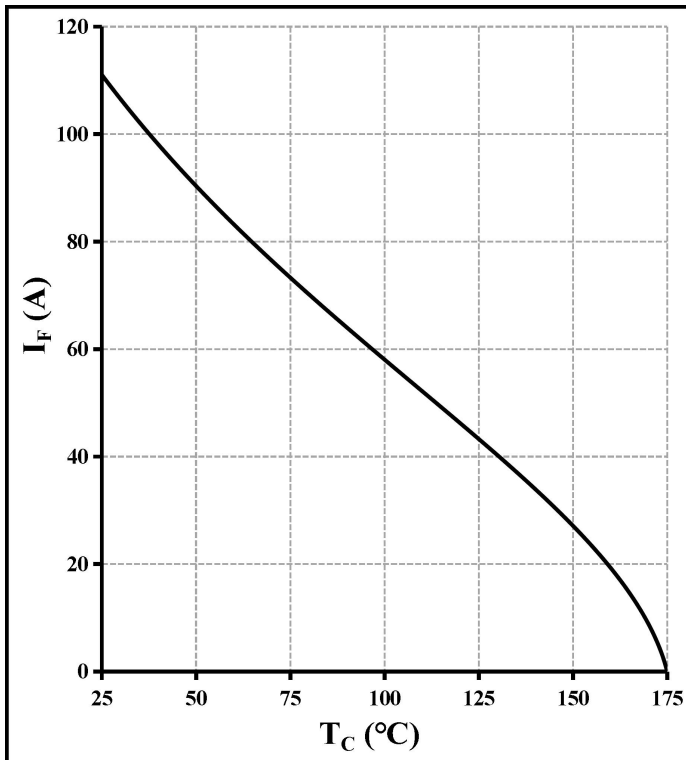


Figure 3: Current Derating

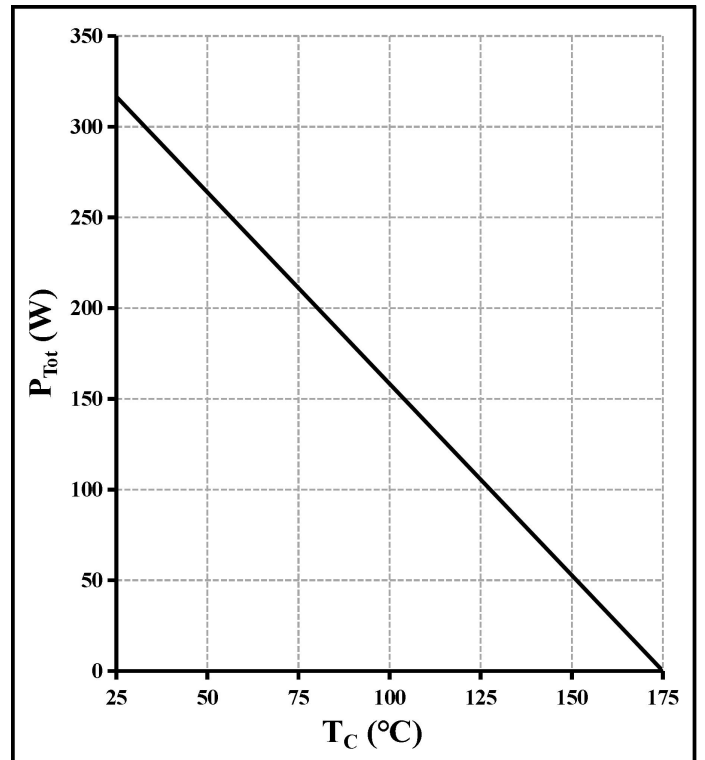


Figure 4: Power Derating

Typical Performance

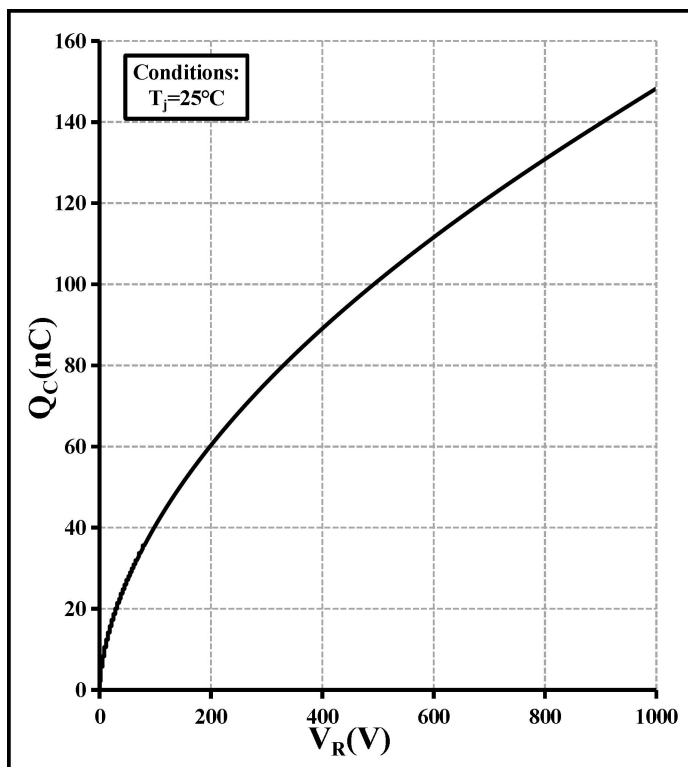


Figure 5: Recovery Charge vs Reverse Voltage

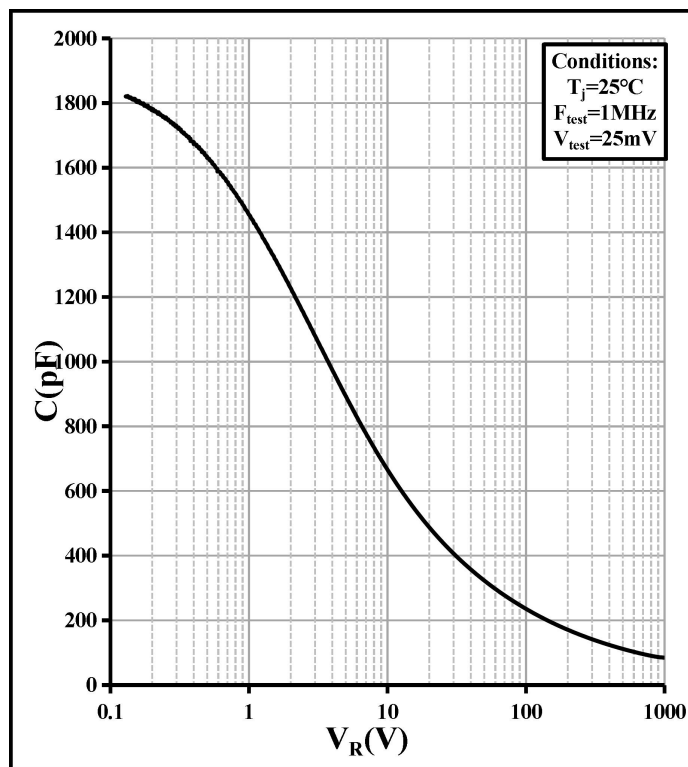


Figure 6: Capacitance vs Reverse Voltage

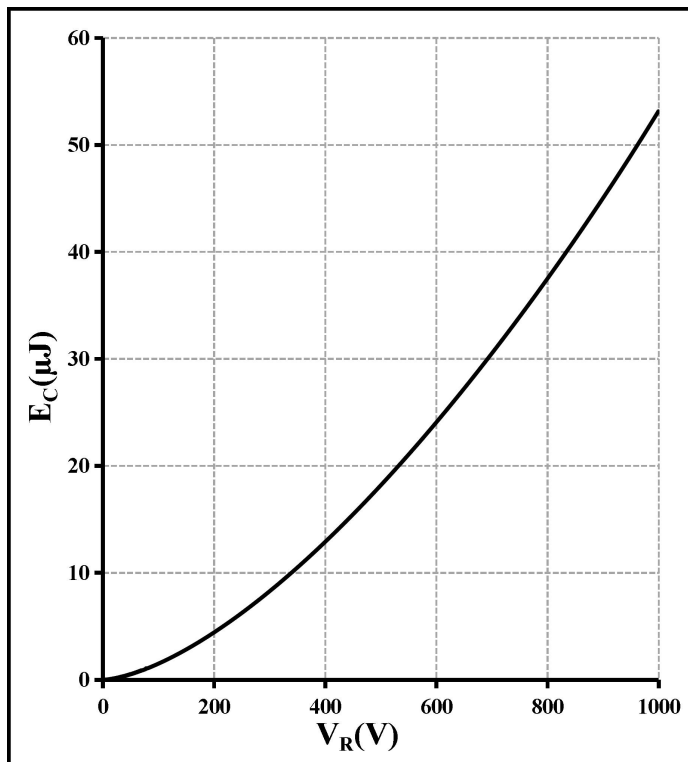


Figure 7: Typical Capacitance Stored Energy

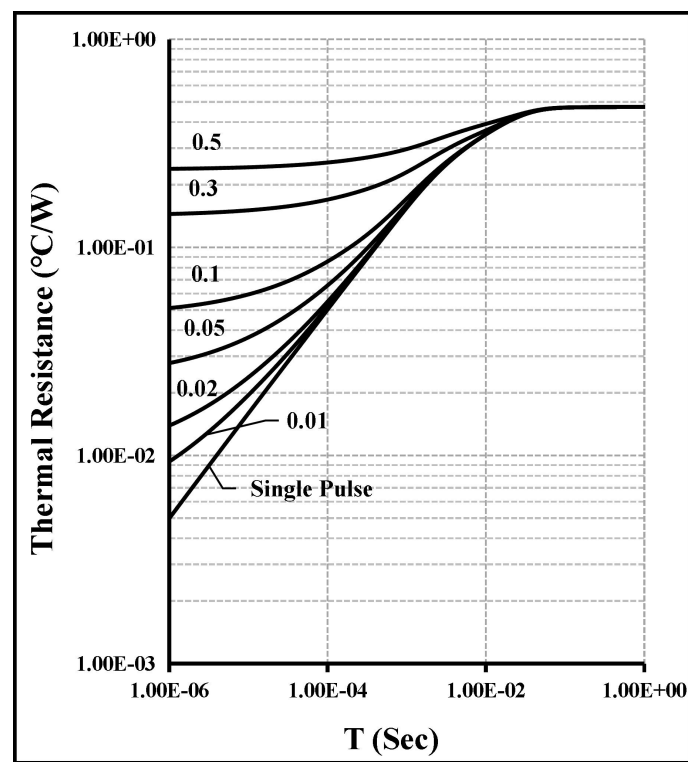
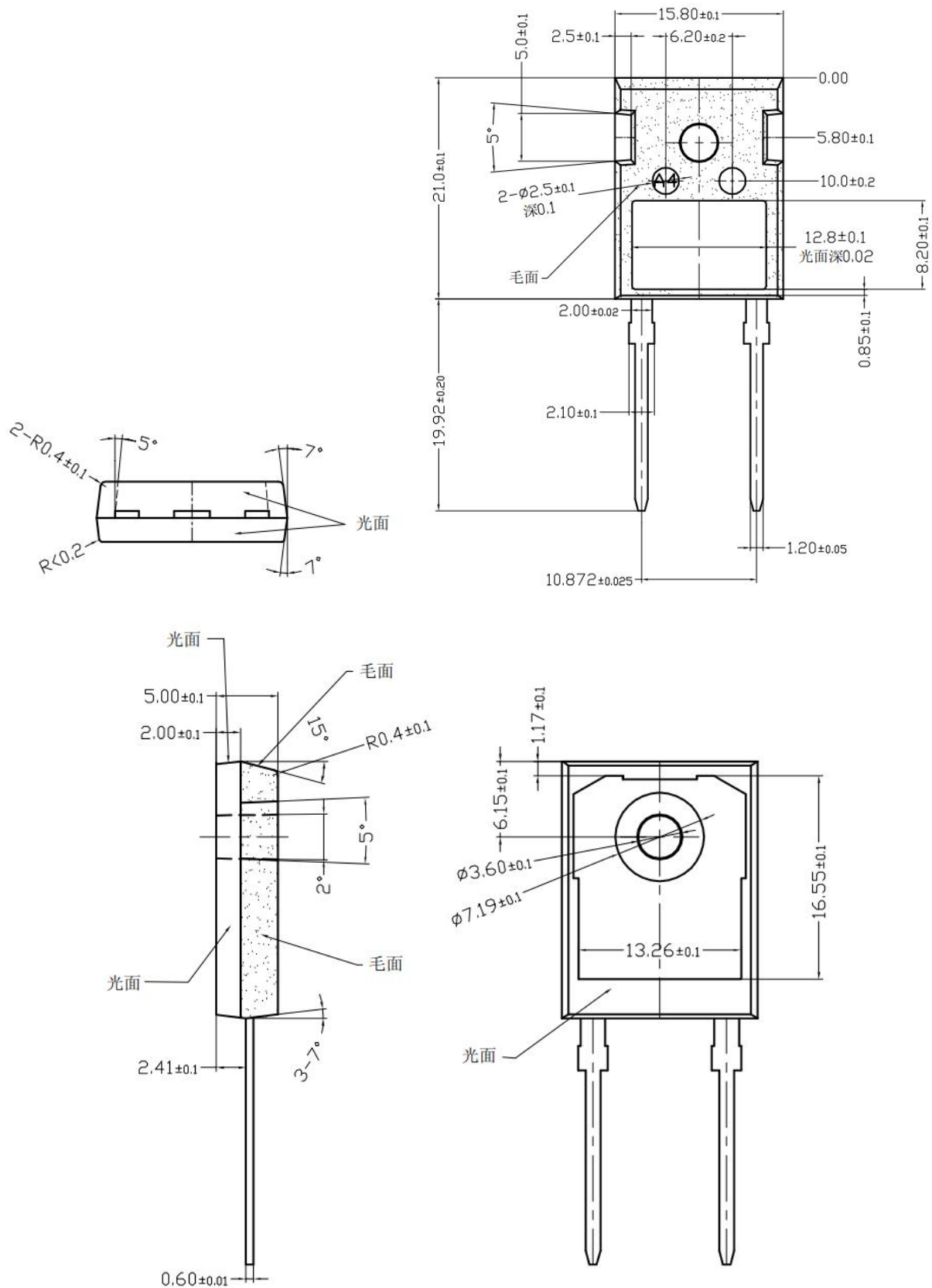


Figure 8: Transient Thermal Impedance

Package information

TO-247-2



UNIT:mm