

TPDD20A65C1P

Silicon Carbide Schottky Diode

General Description

Topdiode 20A 650V SiC diode is an ultrahigh performance power Schottky diode designed for high frequency applications where high efficiency and high reliability are required. The wide band gap material allows the design of a Schottky diode structure with lower leakage current and conduction losses.

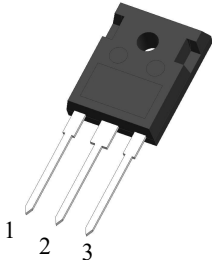
Feature

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

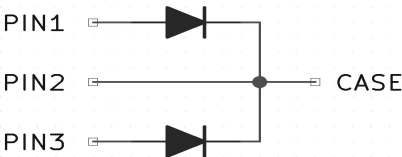
Applications

- 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@155°C
V_{RRM}	650V
$V_{F(typ.)}$	1.36V
$Q_{C(typ.)}$	25nC

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

Symbol	Parameter	Test Conditions	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_C=25^{\circ}\text{C}$	650	V
V_{RSM}	Surge Peak Reverse Voltage	$T_C=25^{\circ}\text{C}$	650	V
V_{DC}	DC Blocking Voltage	$T_C=25^{\circ}\text{C}$	650	V
I_F	Continuous Forward Current (Per Leg/Device)	$T_C=25^{\circ}\text{C}$	44.8/89.6	A
		$T_C=135^{\circ}\text{C}$	16/32	A
		$T_C=155^{\circ}\text{C}$	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 Wave	65	A
P_{tot}	Power Dissipation(Per Leg)	$T_C=25^{\circ}\text{C}$	115.4	W
		$T_C=110^{\circ}\text{C}$	50	W
T_J, T_{stg}	Operating Junction and Storage Temperature		-55 to +175	$^{\circ}\text{C}$

Thermal Characteristics(Per Leg/Device)

Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Thermal Resistance from Junction to Case		1.3/0.65		$^{\circ}\text{C/W}$

Electrical Characteristics(Per Leg)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=10\text{A}$ $T_J=25^{\circ}\text{C}$		1.36	1.6	V
		$I_F=10\text{A}$ $T_J=175^{\circ}\text{C}$		1.61	1.9	V
I_R	Reverse Current	$V_R=650\text{V}$ $T_J=25^{\circ}\text{C}$		0.2	10	μA
		$V_R=650\text{V}$ $T_J=175^{\circ}\text{C}$		1.2	100	μA
Q_C	Total Capacitive Charge	$V_R=400\text{V}$ $T_J=25^{\circ}\text{C}$		25		nC
C	Total Capacitance	$V_R=0\text{V}$ $T_J=25^{\circ}\text{C}$ $f=1\text{MHz}$		502		pF
		$V_R=200\text{V}$ $T_J=25^{\circ}\text{C}$ $f=1\text{MHz}$		47		pF
		$V_R=400\text{V}$ $T_J=25^{\circ}\text{C}$ $f=1\text{MHz}$		39		pF
E_C	Capacitance Stored Energy	$V_R=400\text{V}$		3.7		μJ

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

Typical Performance(Per Leg)

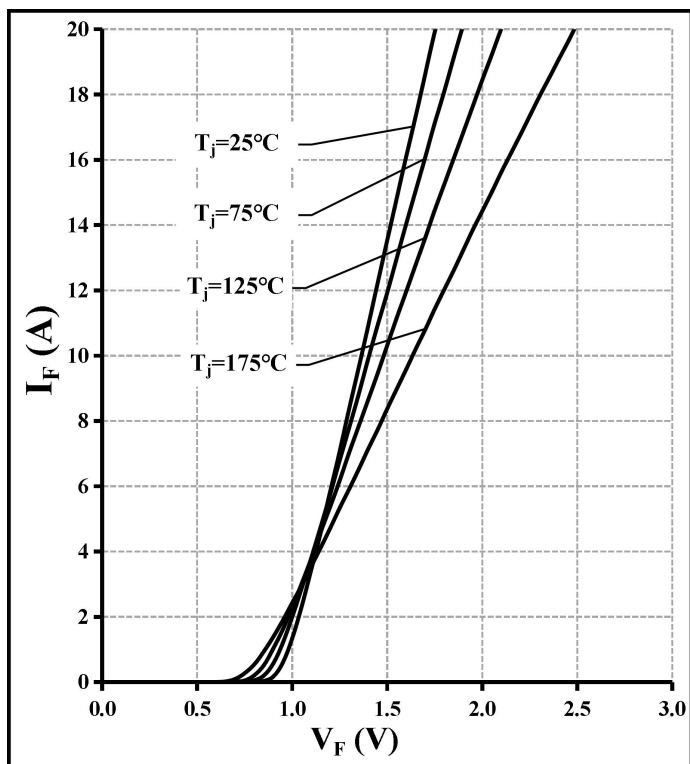


Figure 1: Forward Characteristics

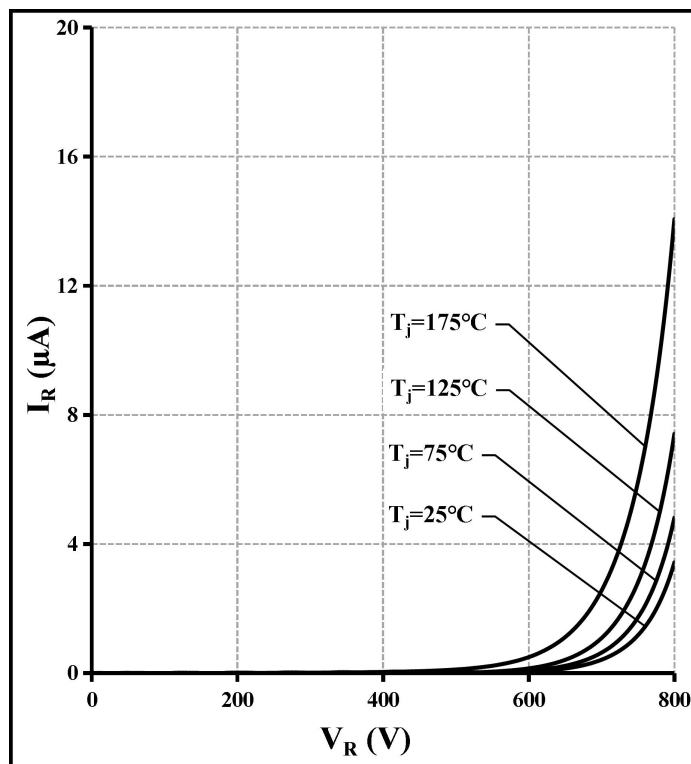


Figure 2: Reverse Characteristics

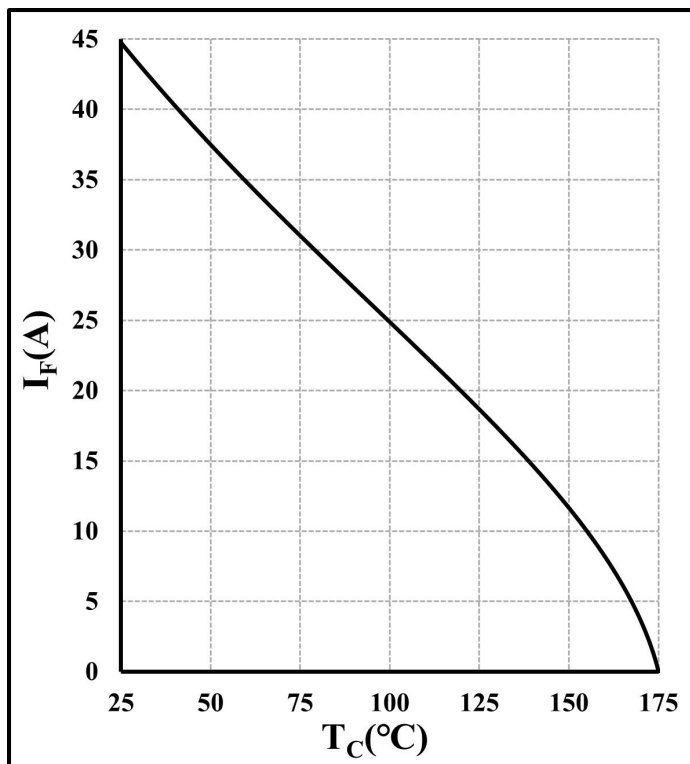


Figure 3: Current Derating

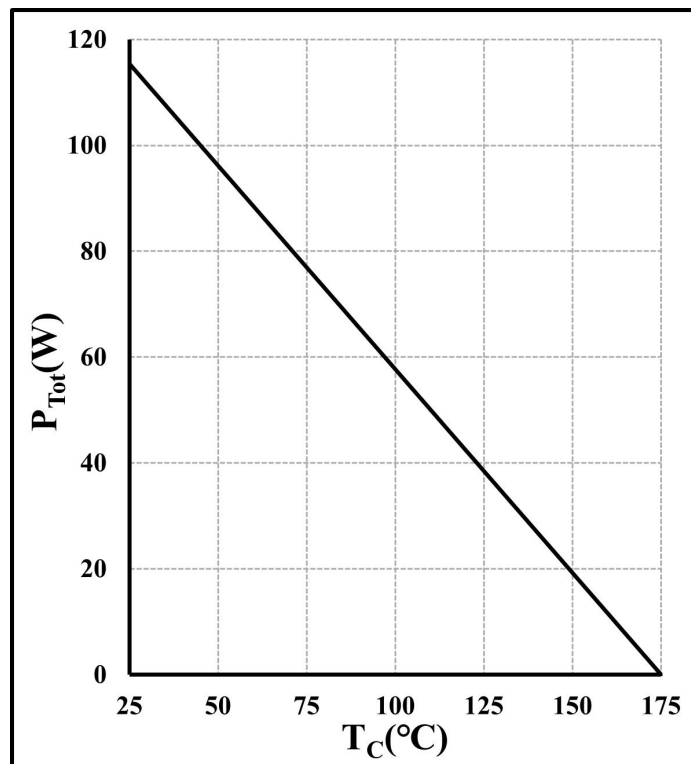


Figure 4: Power Derating

Typical Performance(Per Leg)

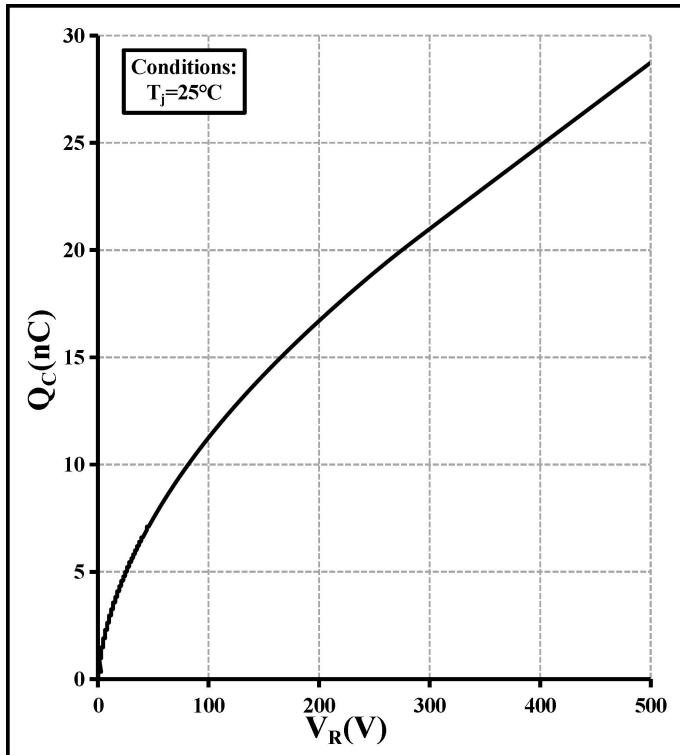


Figure 5: Total Capacitive Charge vs Reverse Voltage

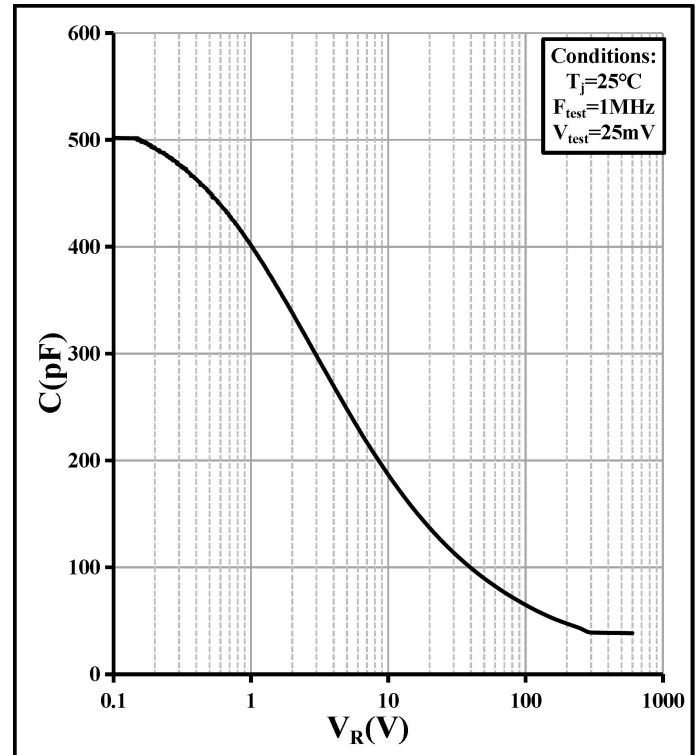


Figure 6: Capacitance vs Reverse Voltage

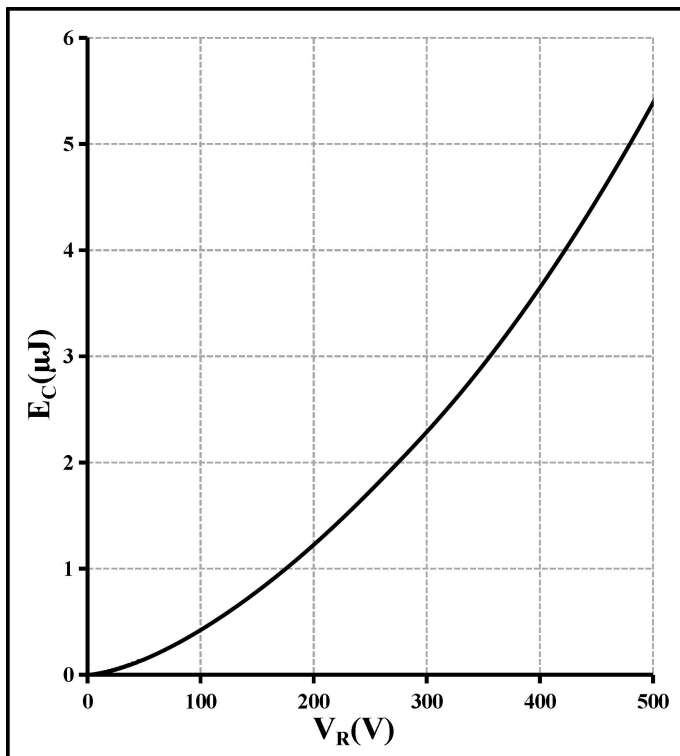


Figure 7: Typical Capacitance Stored Energy

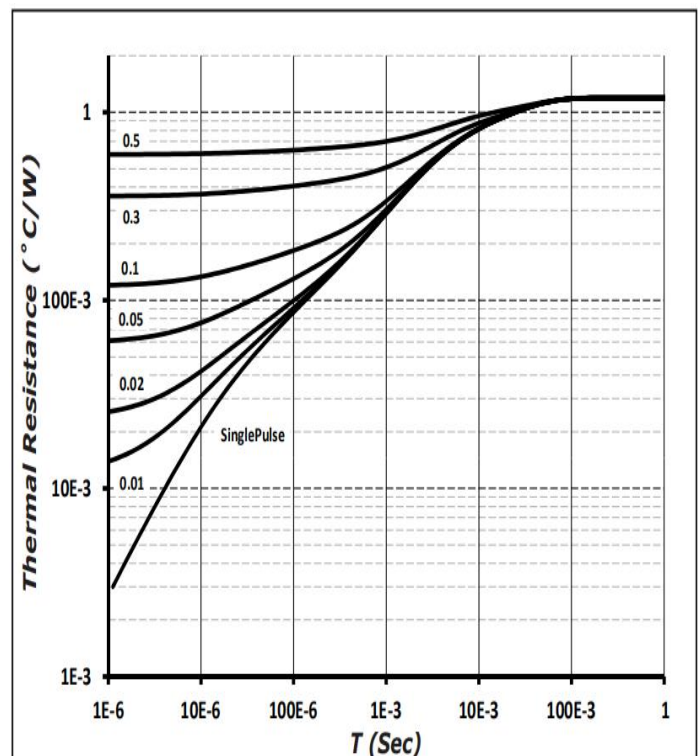


Figure 8: Transient Thermal Impedance

