

TPDG5S65C1P

Silicon Carbide Schottky Diode

General Description

Topdiode 5A 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.

Features

Zero Reverse Recovery Current

Temperature-Independent Switching Behavior

Extremely Fast Switching

Positive Temperature Coefficient on V_F

Low Switching Losses

Higher Efficiency

Applications

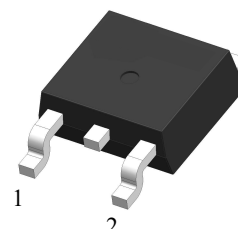
Switch Mode Power Supplies (SMPS)

Boost Diodes in PFC or DC/DC Stages

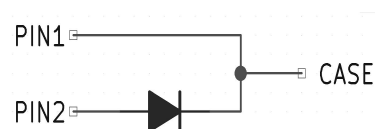
Free Wheeling Diodes in Inverter Stages

AC/DC Converters

Package TO-263



Equivalent Schematic



Summary

Symbol	Value
$I_{F(AV)}$	5A@157°C
V_{RRM}	650V
$V_{F(typ.)}$	1.4V
$Q_{C(typ.)}$	16.2 nC

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@Fig. 3	$T_C=25^\circ\text{C}$	22.8	A
		$T_C=135^\circ\text{C}$	8.5	A
		$T_C=157^\circ\text{C}$	5	A
I_{FSM}	Non-Repetitive Peak Forward Surge Current	$T_C=25^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Wave	45	A
P_{tot}	Power Dissipation@Fig. 4	$T_C=25^\circ\text{C}$	64	W
		$T_C=110^\circ\text{C}$	27.8	W
T_J, T_{stg}	Operating Junction and Storage Temperature		-55 to +175	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Thermal Resistance from Junction to Case@Fig. 8		2.3		$^\circ\text{C/W}$

Electrical Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage@Fig. 1	$I_F=5\text{A}$ $T_J=25^\circ\text{C}$		1.4	1.7	V
		$I_F=5\text{A}$ $T_J=175^\circ\text{C}$		1.65	2.0	V
I_R	Reverse Current@Fig. 2	$V_R=650\text{V}$ $T_J=25^\circ\text{C}$		1	10	μA
		$V_R=650\text{V}$ $T_J=175^\circ\text{C}$		11	50	μA
Q_C	Total Capacitive Charge@Fig. 5	$V_R=400\text{V}$ $T_J = 25^\circ\text{C}$		16.2		nC
C	Total Capacitance@Fig. 6	$V_R=0\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		285		pF
		$V_R=200\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		31		pF
		$V_R=400\text{V}$ $T_J=25^\circ\text{C}$ $f=1\text{MHz}$		23		pF
E_C	Capacitance Stored Energy @Fig. 7	$V_R=400\text{V}$		2.3		μJ

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

Typical Performance

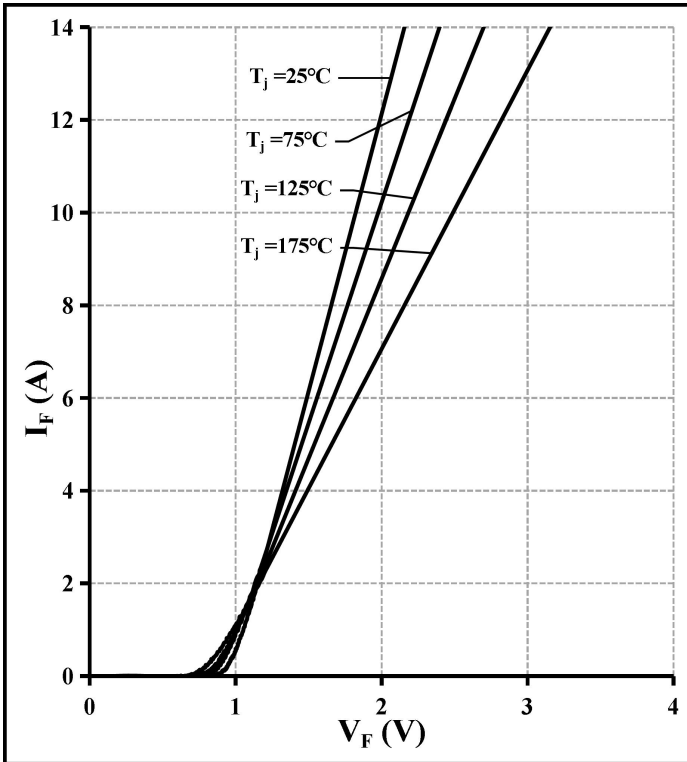


Figure 1: Forward Characteristics

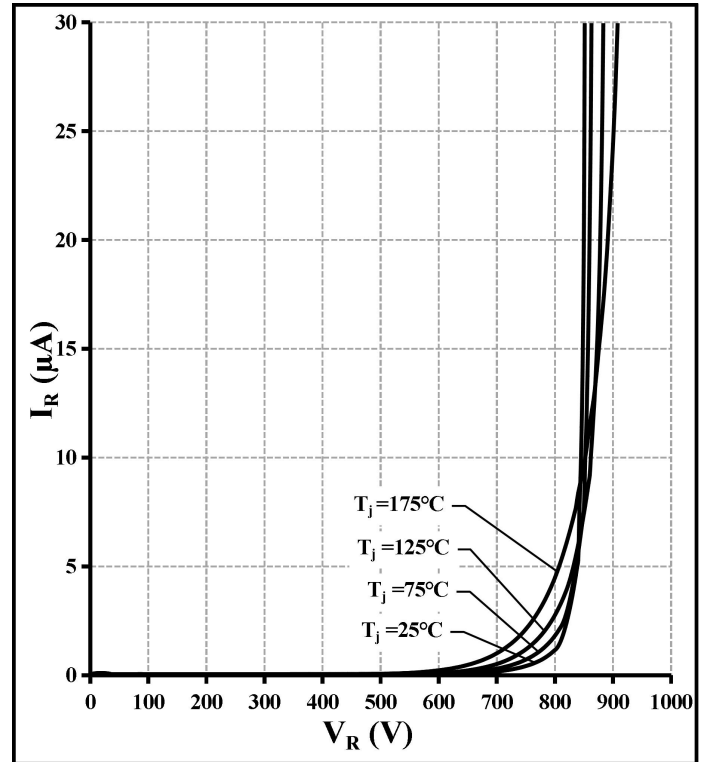


Figure 2: Reverse Characteristics

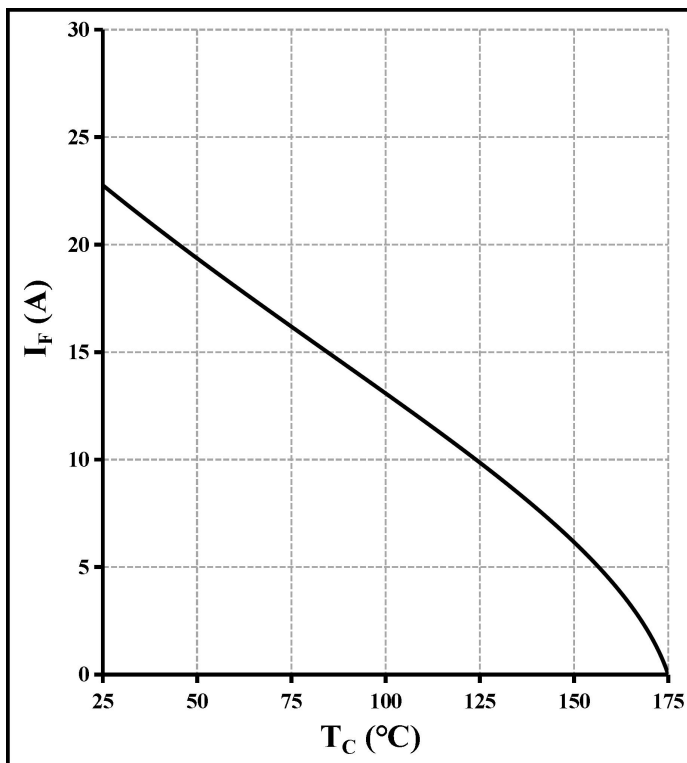


Figure 3: Current Derating

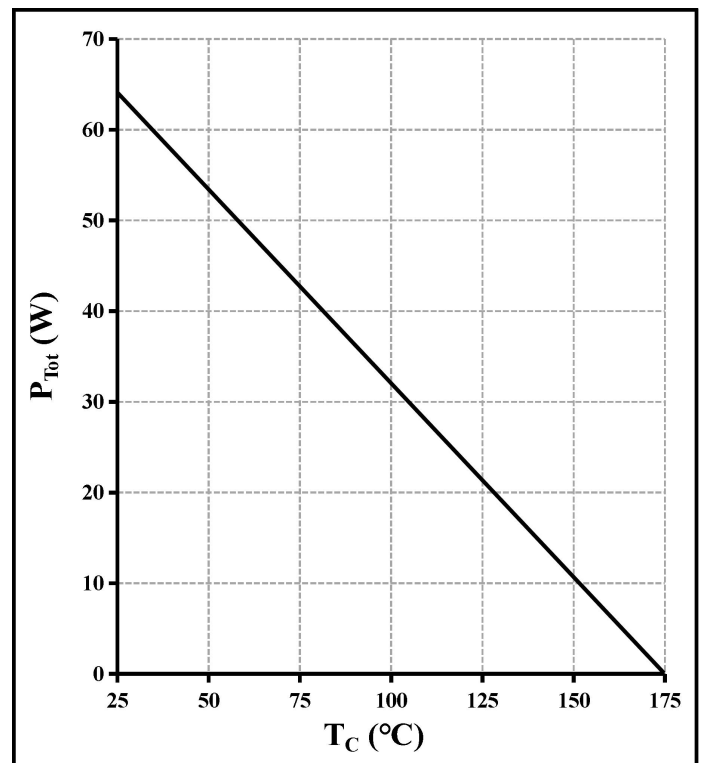


Figure 4: Power Derating

Typical Performance

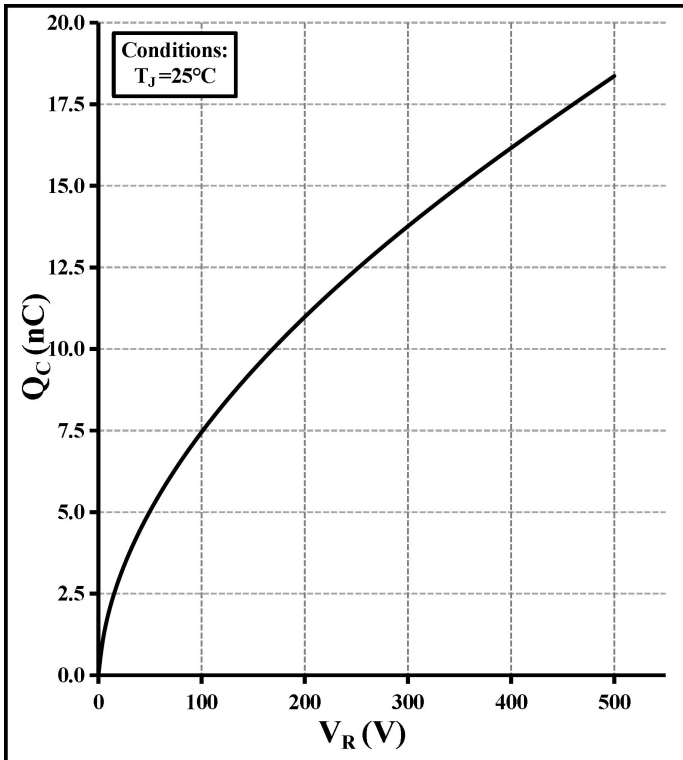


Figure 5: Total Capacitive Charge vs Reverse Voltage

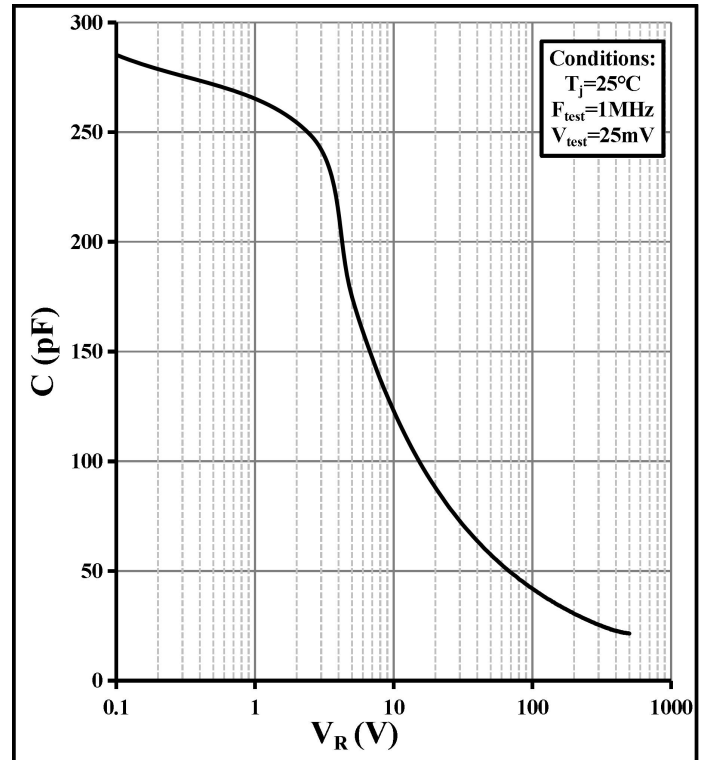


Figure 6: Capacitance vs Reverse Voltage

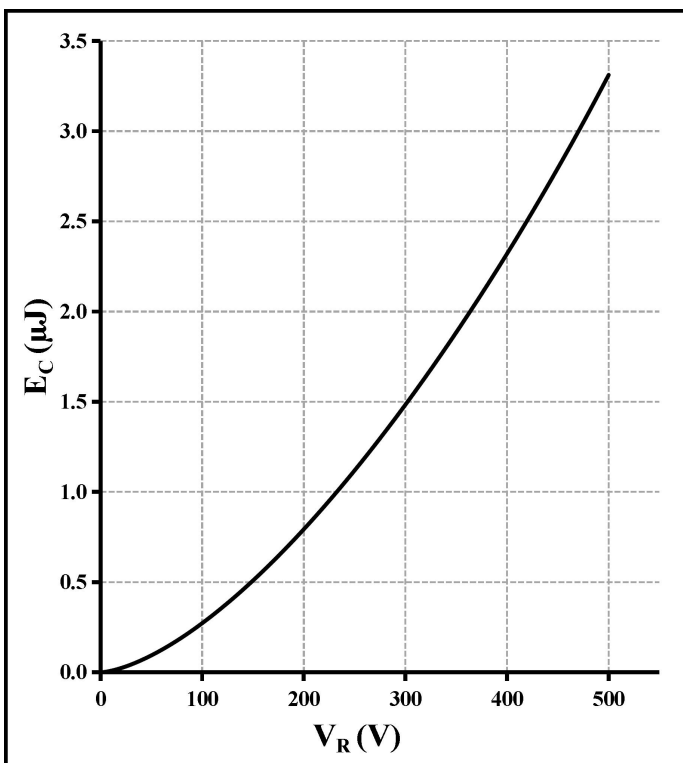


Figure 7: Typical Capacitance Stored Energy

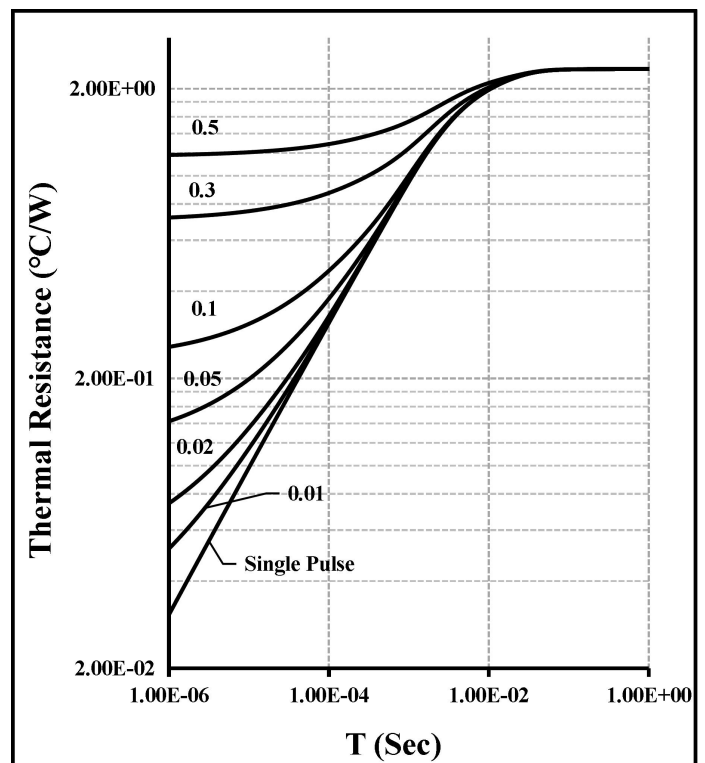


Figure 8: Transient Thermal Impedance

