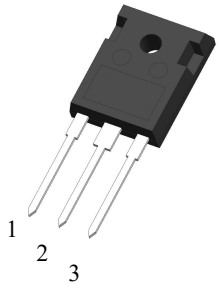
TPDD40A120C1P

Silicon Carbide Schottky Diode

General Description

Topdiode 40A 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-247-3



Features

Zero Reverse Recovery Current

Temperature-Independent Switching

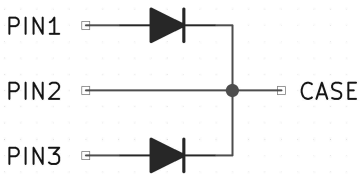
Extremely Fast Switching

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
$I_{F(AV)}$	40A@159℃
V_{RRM}	1200V
$V_{F(typ.)}$	1.33V@25℃
$Qc_{(typ.)}$	131nC

Maximum ratings (T_C = 25℃ 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℃	111/222	A
		T_C=135℃	37/74	A
		T_C=159℃	20/40	A
I_{FSM}	Non-Repetitive Peak Forward Surge Current(Per Leg)	T_C=25℃, t_p=10ms,Half Sine Pulse	190	A
P_{tot}	Power Dissipation(Per Leg)	T_C=25℃	317	W
		T_C=110℃	137	W
T_J, T_{stg}	Operating Junction and Storage Temperature		-55 to +175	℃
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		0.47/0.29		℃/W

Electrical Characteristics(Per Leg)

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

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

Typical Performance(Per Leg)

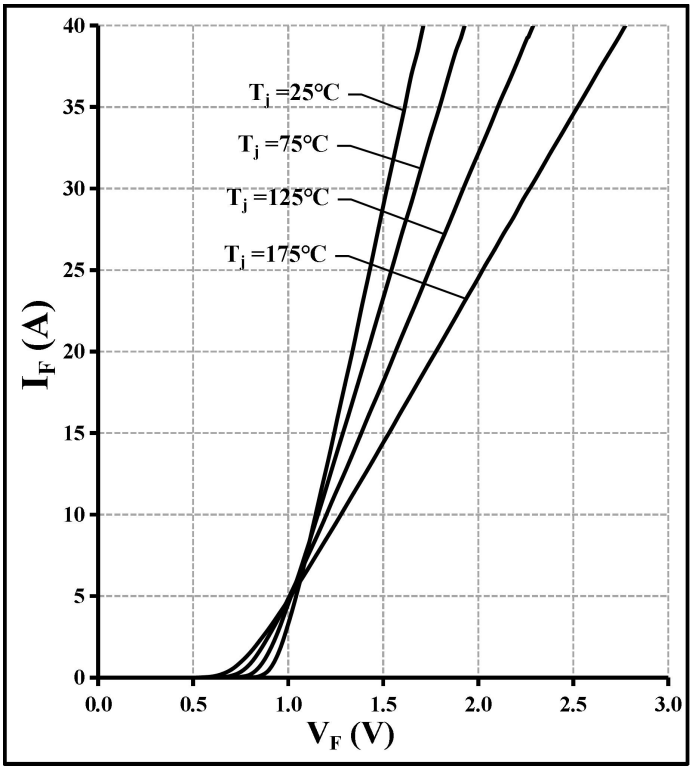


Figure 1: Forward Characteristics

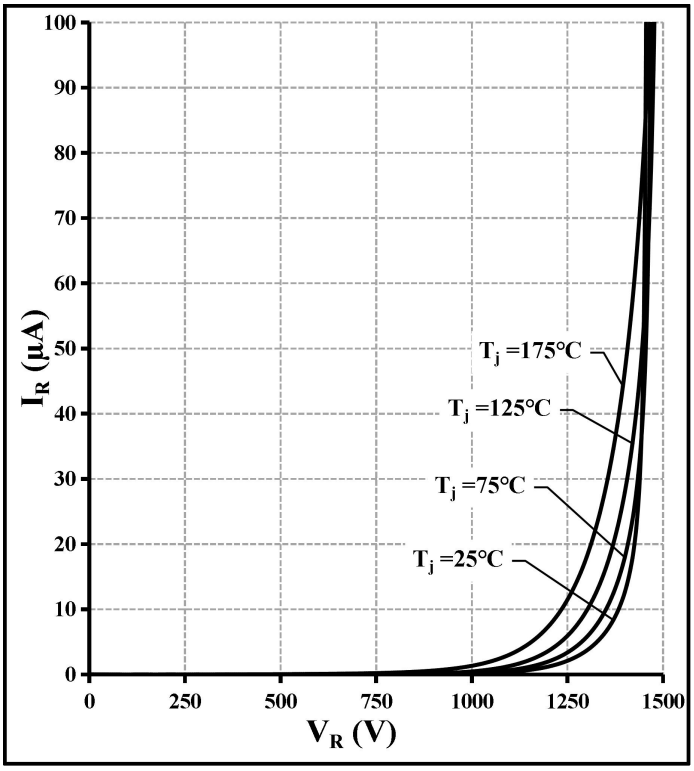


Figure 2: Reverse Characteristics

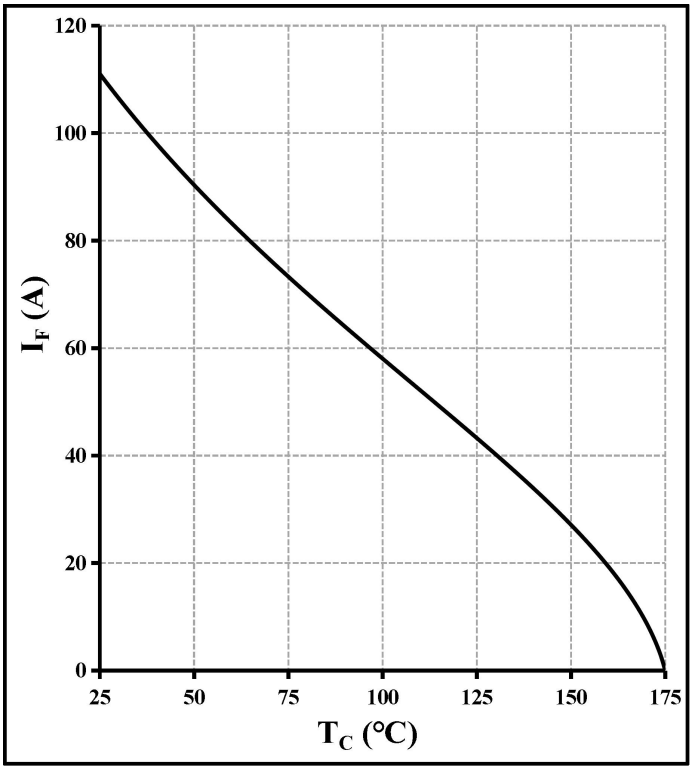


Figure 3: Current Derating

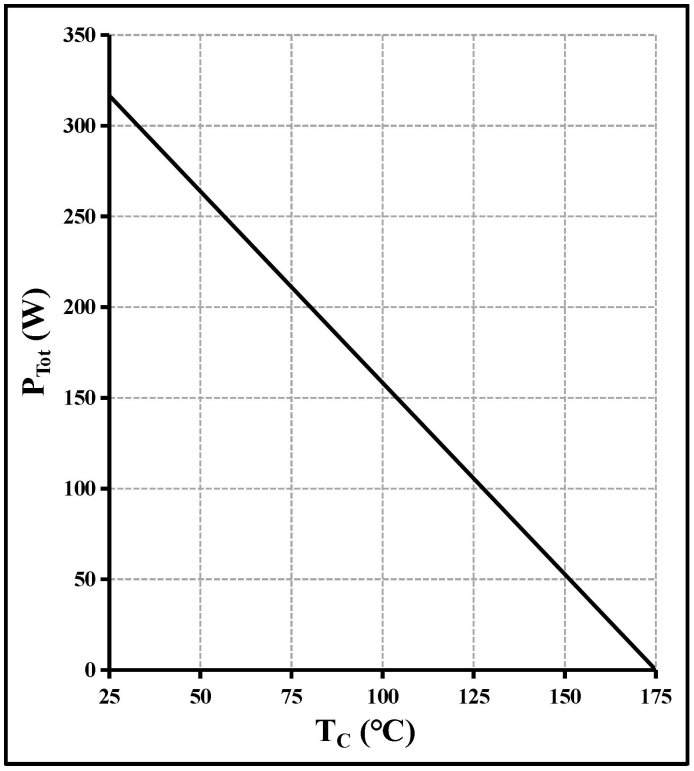


Figure 4: Power Derating

Typical Performance

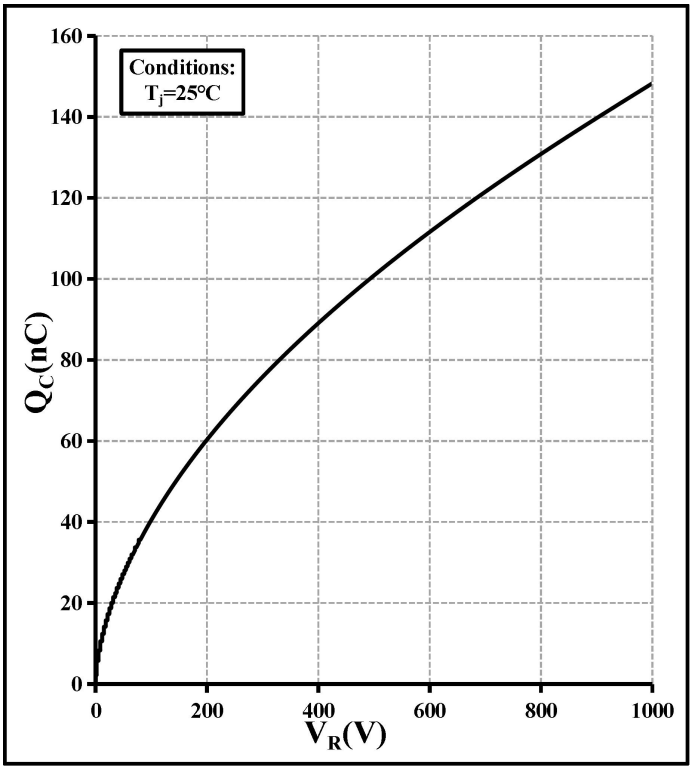


Figure 5: Recovery Charge vs Reverse Voltage

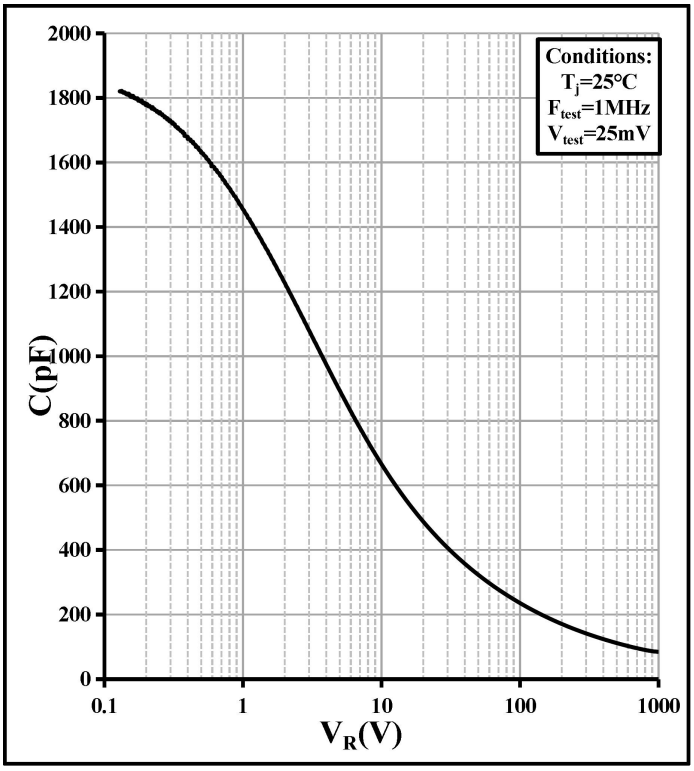


Figure 6: Capacitance vs Reverse Voltage

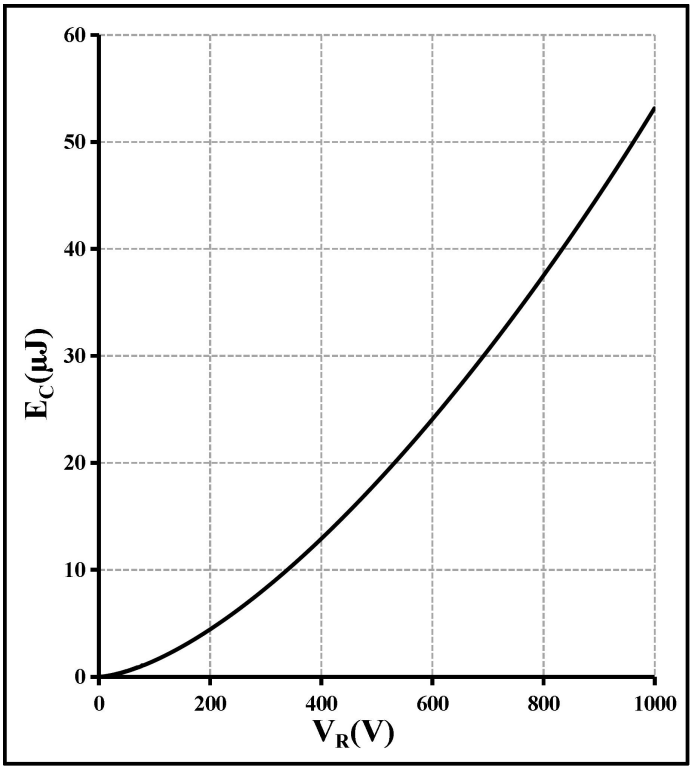


Figure 7: Typical Capacitance Stored Energy

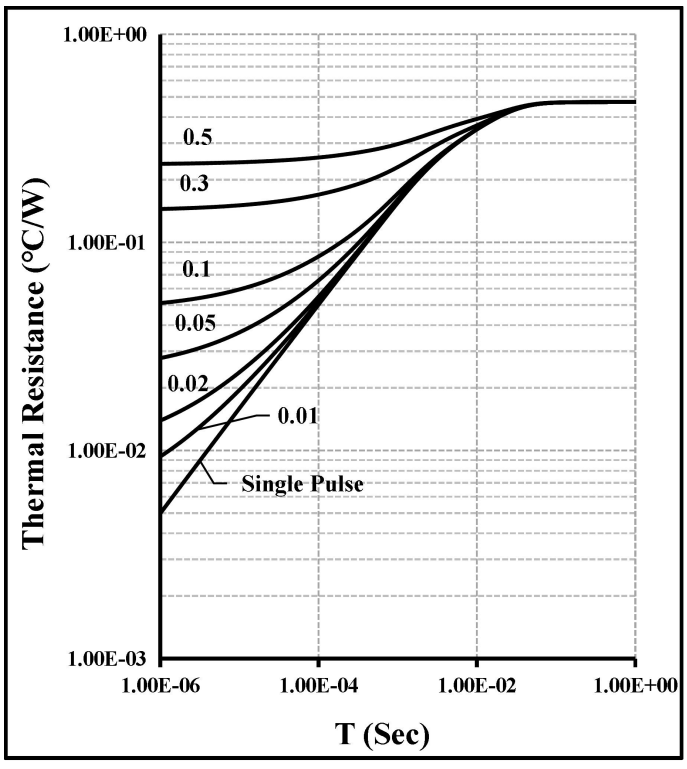
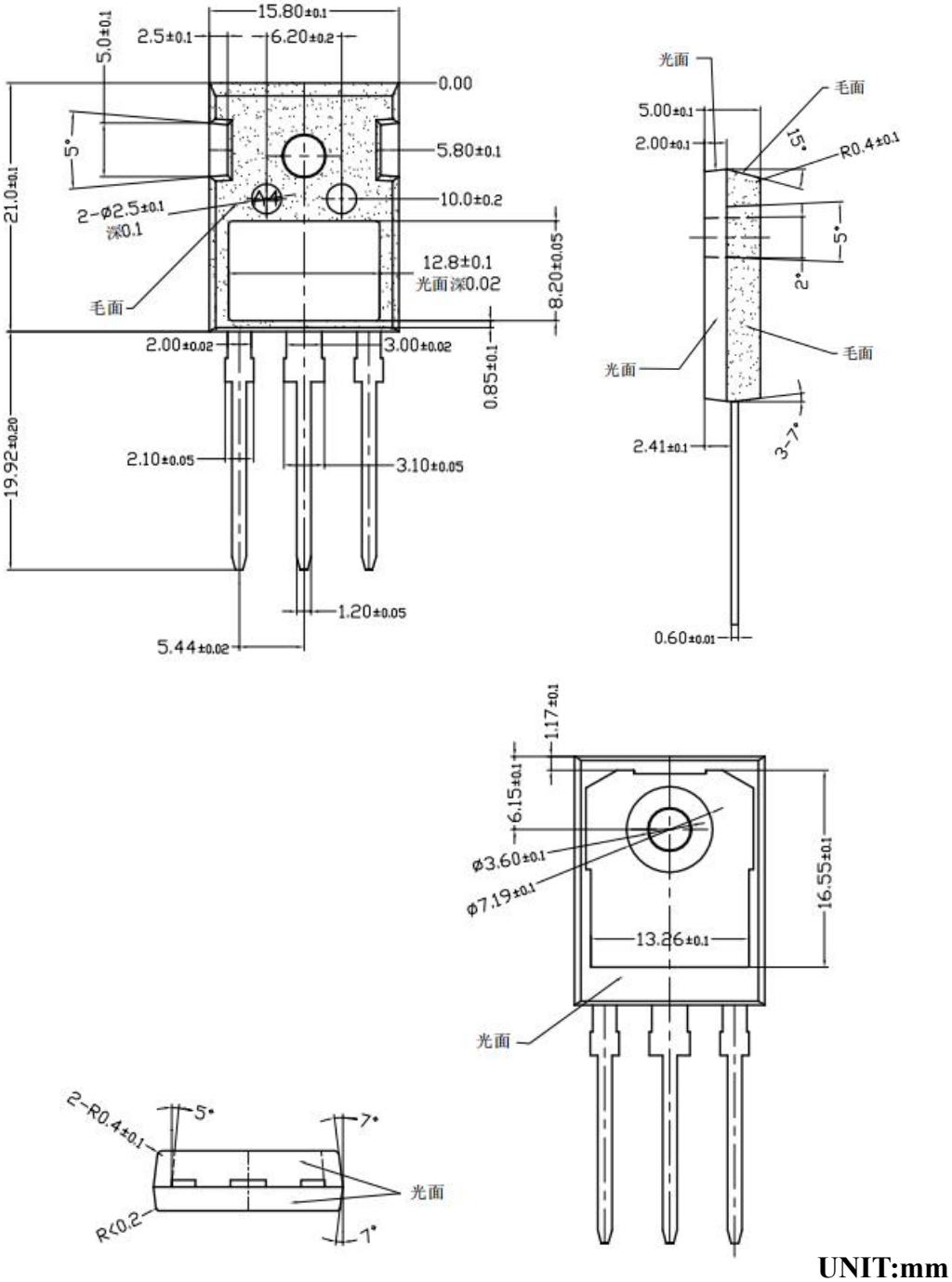


Figure 8: Transient Thermal Impedance

Package information

TO-247-3



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