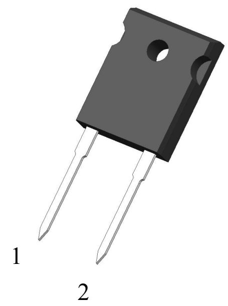
TPDH40S120C1P

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-247-2



Features

Zero Reverse Recovery Current

Positive Temperature Coefficient on V_F

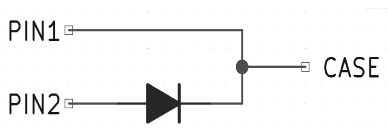
Temperature-Independent Switching

175°C Operating Junction Temperature

Reduction of Heat Sink Size

Low Switching Losses

Equivalent Schematic



Applications

Switch Mode Power Supplies

Power Factor Correction

Motor Drive, PV Inverter, Wind Power Station

Summary

Symbol	Value
$I_{F(AV)}$	40A@143°C
V_{RRM}	1200V
$V_{F(typ.)}$	1.5V
$Q_{C(typ.)}$	190nC

Maximum ratings (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	T_C=25°C	1200	V
V_{RSM}	Surge Peak Reverse Voltage	T_C=25°C	1200	V
V_{DC}	DC Blocking Voltage	T_C=25°C	1200	V
I_F	Continuous Forward Current	T_C=25°C	131	A
		T_C=143°C	40	A
I_{FSM}	Non-Repetitive Peak Forward Surge Current	T_C=25°C, t_p=10ms, Half Sine Wave	250	A
P_{tot}	Power Dissipation	T_C=25°C	338	W
T_J,T_{stg}	Operating Junction and Storage Temperature		-55 to +175	°C
M	TO-247 Mounting Torque	M3 Screw	1	Nm

Thermal Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Thermal Resistance from Junction to Case		0.53		°C/W
T_{sold}	Soldering Temperature		260		°C

Electrical Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=40A T_J=25°C		1.5	1.8	V
		I_F=40A T_J=175°C		2.0	2.3	V
I_R	Reverse Current	V_R=1200V T_J=25°C		2	100	µA
		V_R=1200V T_J=175°C		14	200	µA
Q_C	Total Capacitive Charge	V_R=800V T_J = 25°C		190		nC
C	Total Capacitance	V_R=0V T_J=25°C f=1MHz		2734		pF
		V_R=400V T_J=25°C f=1MHz		178		pF
		V_R=800V T_J=25°C f=1MHz		131		pF
E_C	Capacitance Stored Energy	V_R=800V		54.8		µJ

Typical Performance

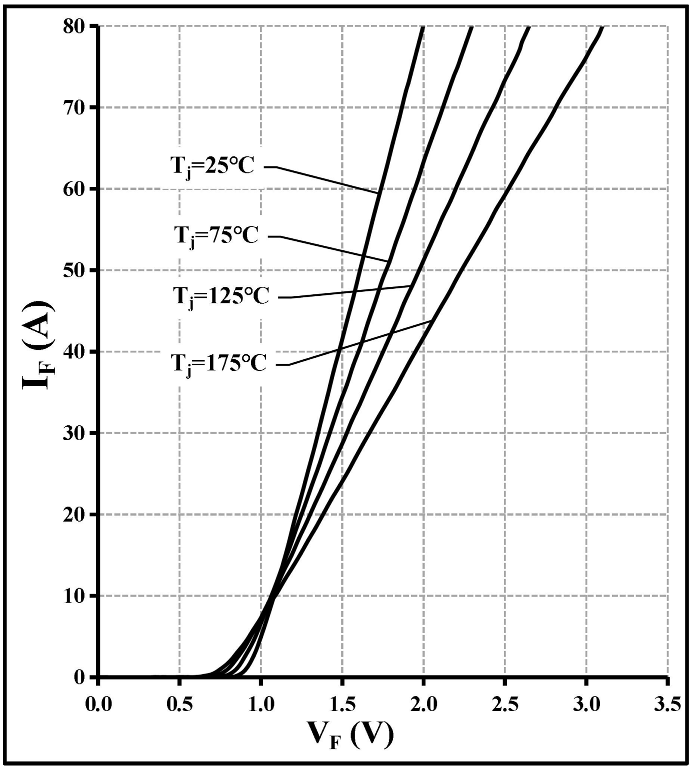


Figure 1: Forward Characteristics

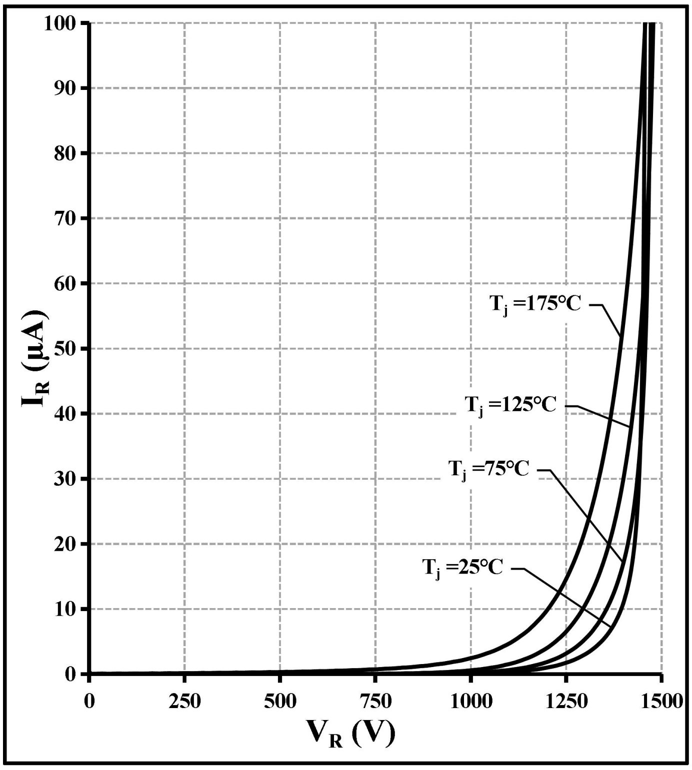


Figure 2: Reverse Characteristics

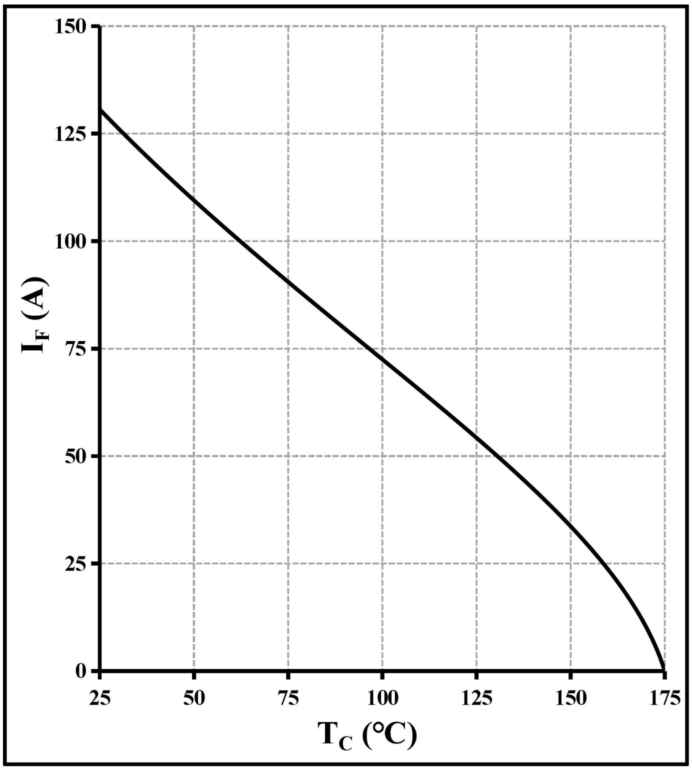


Figure 3: Current Derating

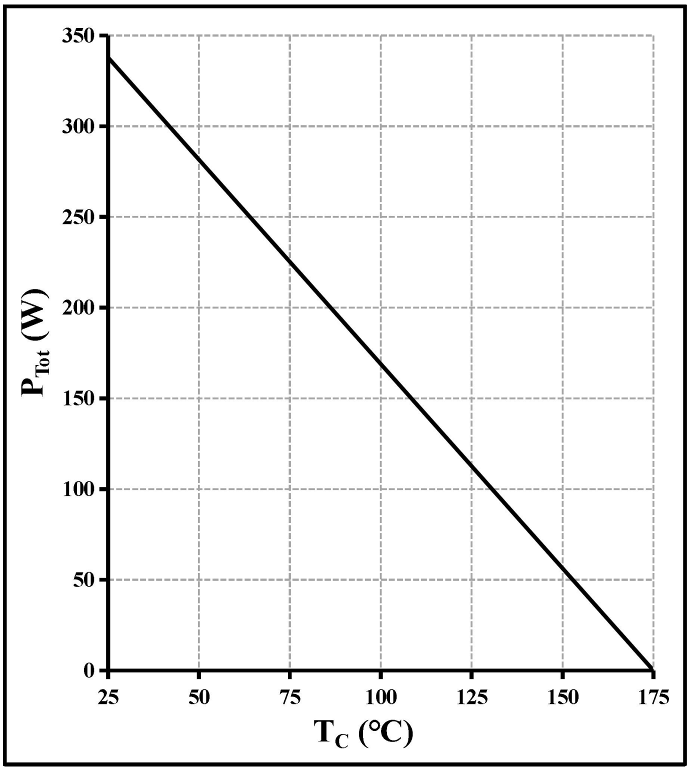


Figure 4: Power Derating

Typical Performance

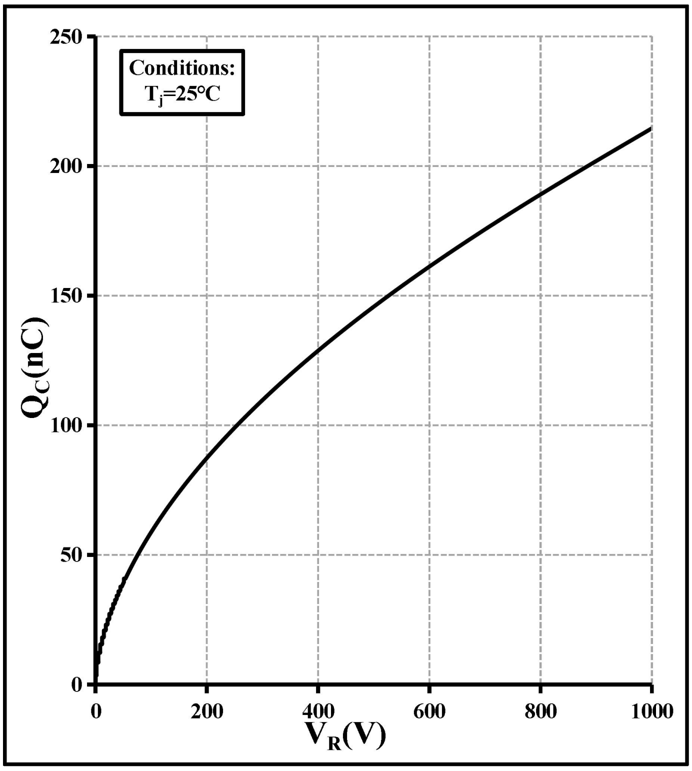


Figure 5: Total Capacitive Charge vs Reverse Voltage

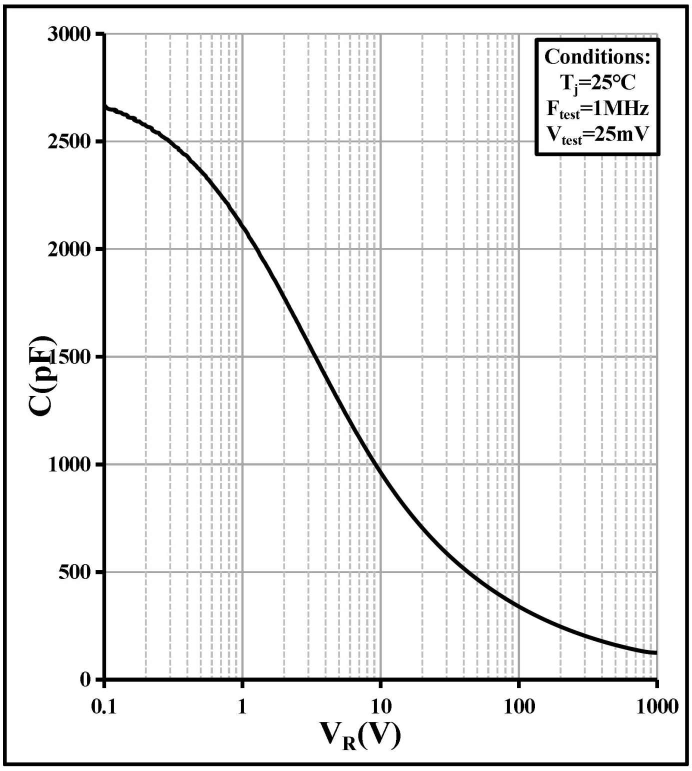


Figure 6: Total Capacitance vs Reverse Voltage

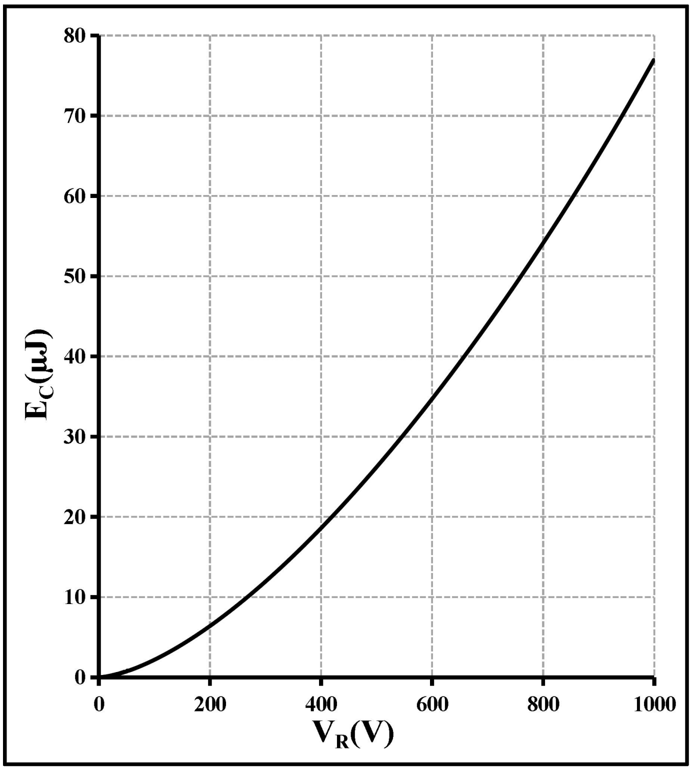


Figure 7: Typical Capacitance Stored Energy

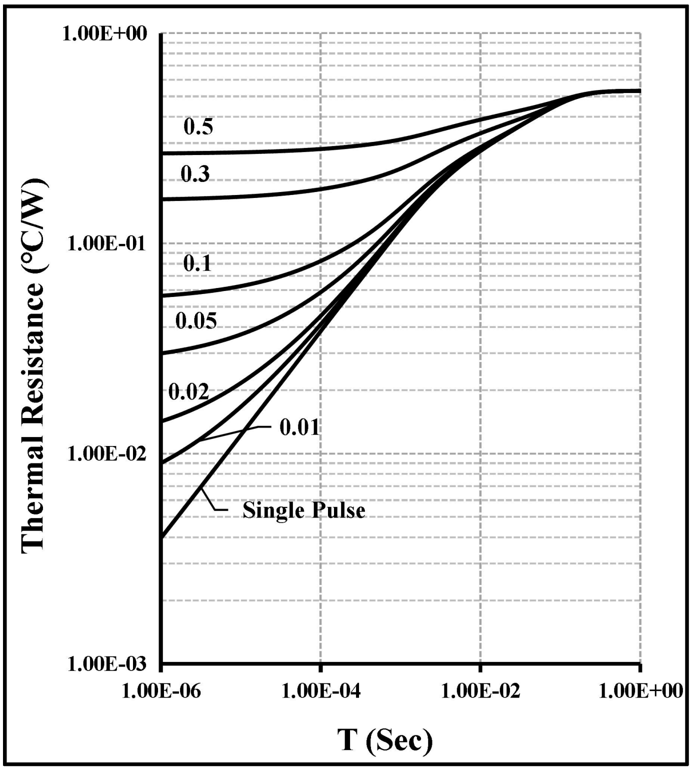
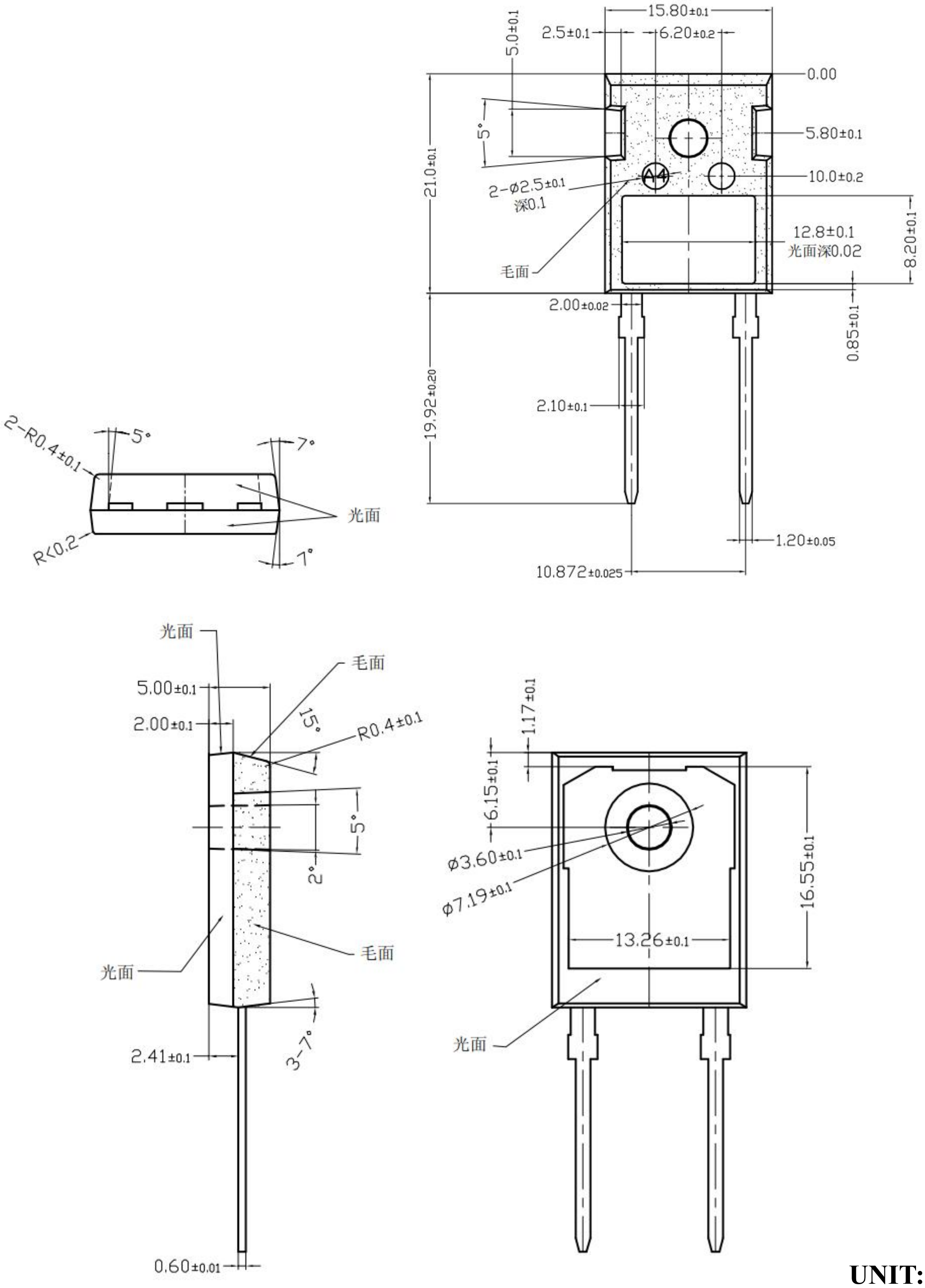


Figure 8: Transient Thermal Impedance

Package information

TO-247-2



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