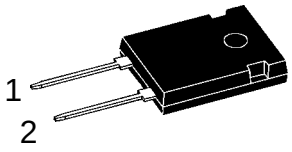
SiC Schottky Barrier Diode

CI20S120D3L2

Features

- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Switching
- Positive Temperature Coefficient on V_F

Package



TO-247-2

Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- Switch Mode Power Supplies (SMPS)
- Boost diodes in PFC or DC/DC stages
- Free Wheeling Diodes in Inverter stages
- AC/DC converters

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

Symbol	Parameter	Value	Unit	Test Conditions	Note
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	54.5 26 20	A	T_C=25°C T_C=135°C T_C=150°C	Fig. 3
I_{FRM}	Repetitive Peak Forward Surge Current	91 61	A	T_C=25°C, t_P=10 ms, Half Sine Pulse T_C=110°C, t_P=10 ms, Half Sine Pulse	
I_{FSM}	Non-Repetitive Forward Surge Current	130 110	A	T_C=25°C, t_P=10 ms, Half Sine Pulse T_C=110°C, t_P=10 ms, Half Sine Pulse	Fig. 8
$I_{F,Max}$	Non-Repetitive Peak Forward Current	1150 950	A	T_C=25°C, t_P=10 μs, Pulse T_C=110°C, t_P=10 μs, Pulse	Fig. 8
P_{tot}	Power Dissipation	250 112.5	W	T_C=25°C T_C=110°C	Fig. 4
dV/dt	Diode dV/dt ruggedness	200	V/ns	V_R=0-960V	
$\int i^2dt$	i^2t value	84.5 60.5	A^2s	T_C=25°C, t_P=10 ms T_C=110°C, t_P=10 ms	
T_J	Operating Junction Range	-55 to +175	°C		
T_{stg}	Storage Temperature Range	-55 to +135	°C		
	TO-220 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.5 2.0	1.6 2.8	V	I_F = 20 A T_J=25°C I_F = 20 A T_J=175°C	Fig. 1
I_R	Reverse Current	35 65	160 350	μA	V_R = 1200 V T_J=25°C V_R = 1200 V T_J=175°C	Fig. 2
Q_C	Total Capacitive Charge	99		nC	V_R = 800 V, I_F = 20A di/dt = 200 A/μs T_J = 25°C	Fig. 5
C	Total Capacitance	1500 93 67		pF	V_R = 0 V, T_J = 25°C, f = 1 MHz V_R = 400 V, T_J = 25°C, f = 1 MHz V_R = 800 V, T_J = 25°C, f = 1 MHz	Fig. 6
E_C	Capacitance Stored Energy	28		μJ	V_R = 800 V	Fig. 7

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

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.6	°C/W	Fig. 9

Typical Performance

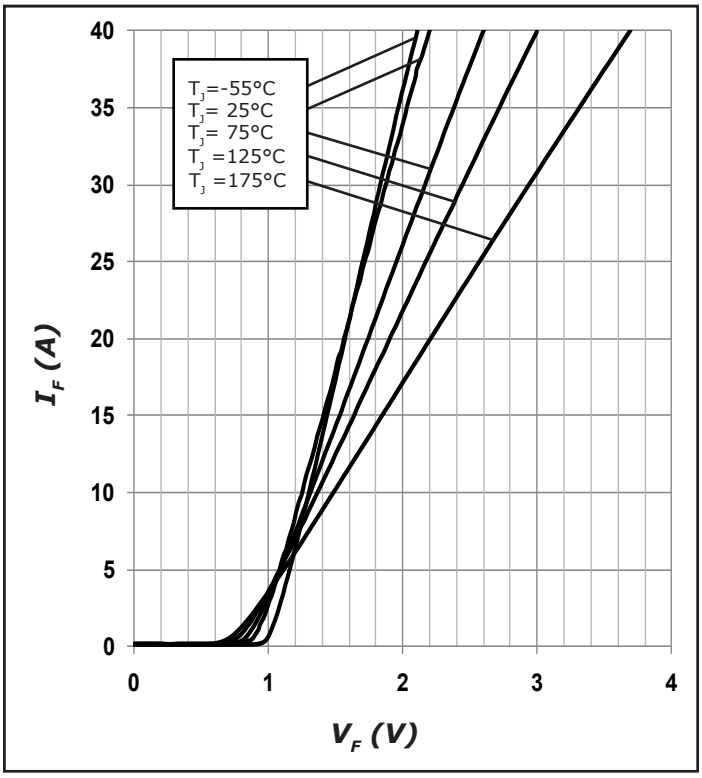


Figure 1. Forward Characteristics

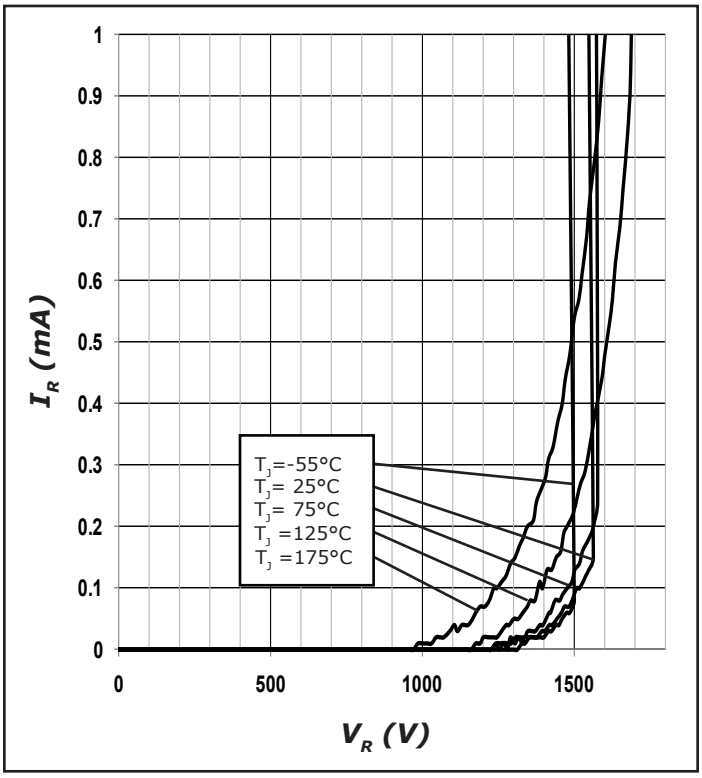


Figure 2. Reverse Characteristics

Typical Performance

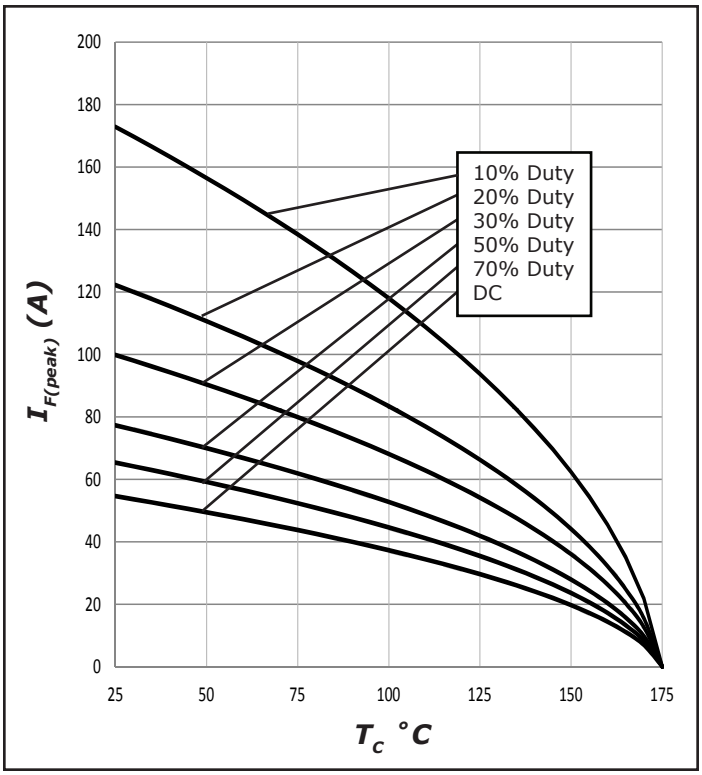


Figure 3. Current Derating

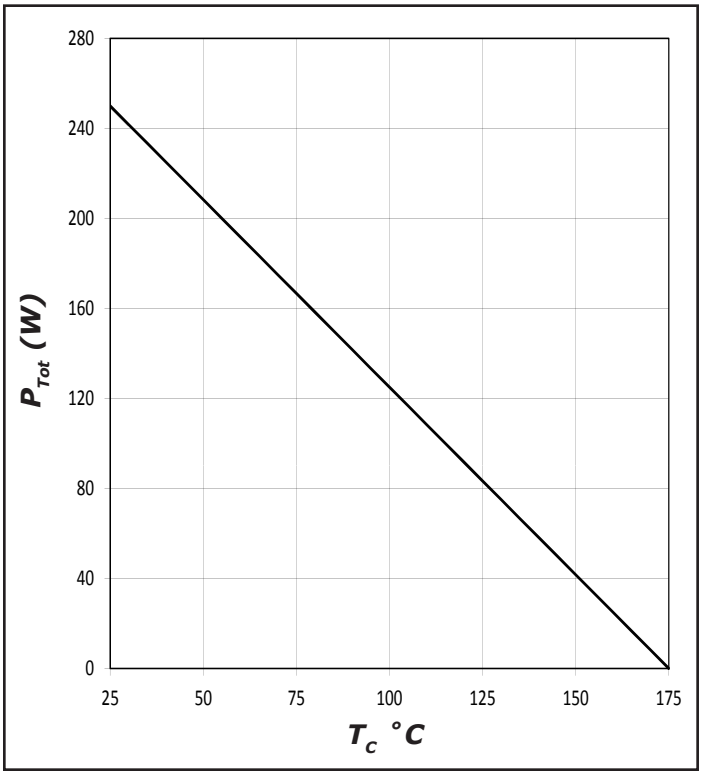


Figure 4. Power Derating

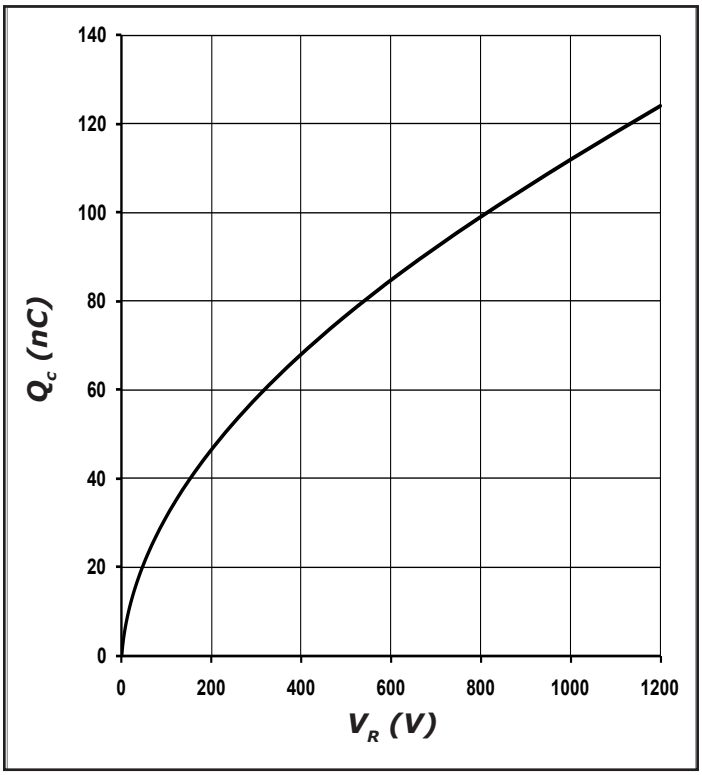


Figure 5. Recovery Charge vs. Reverse Voltage

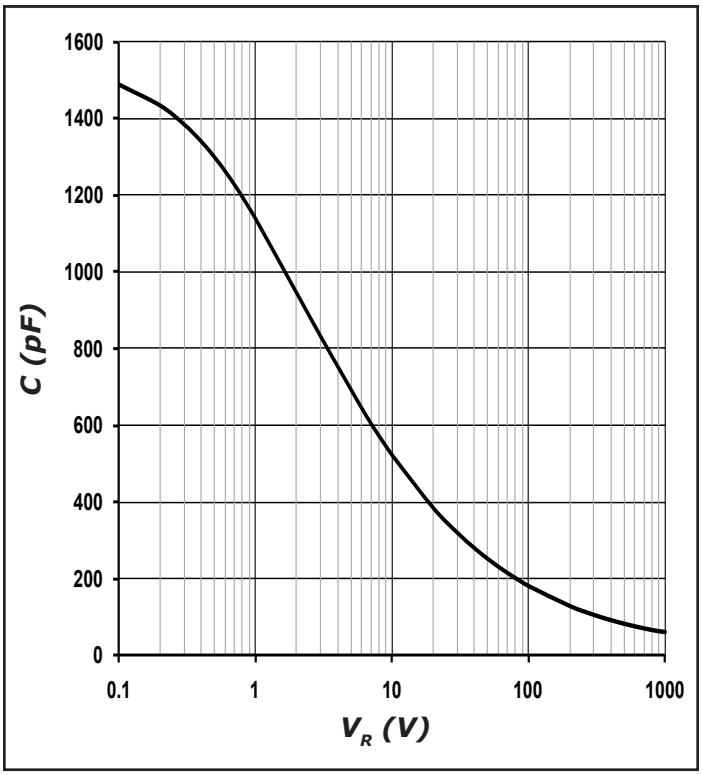


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

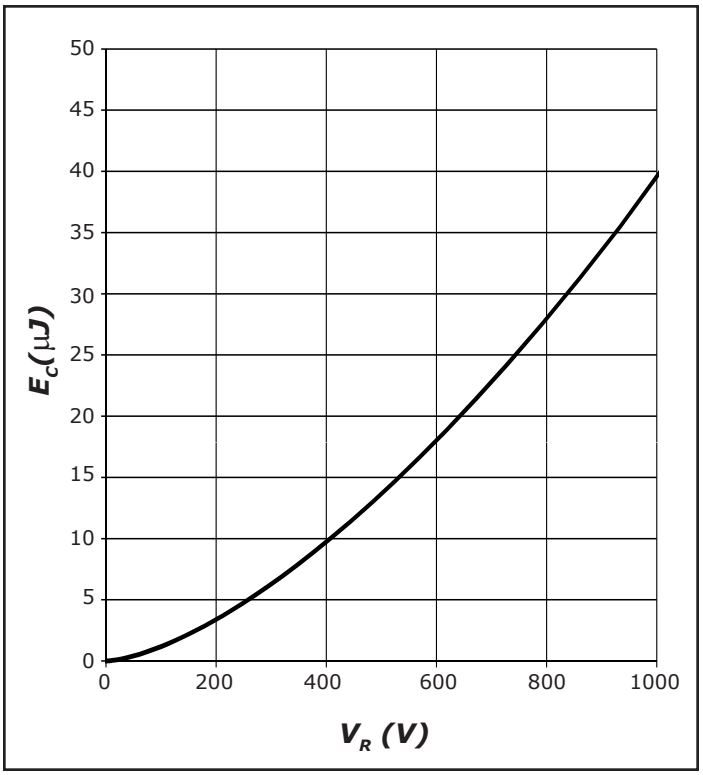


Figure 7. Typical Capacitance Stored Energy

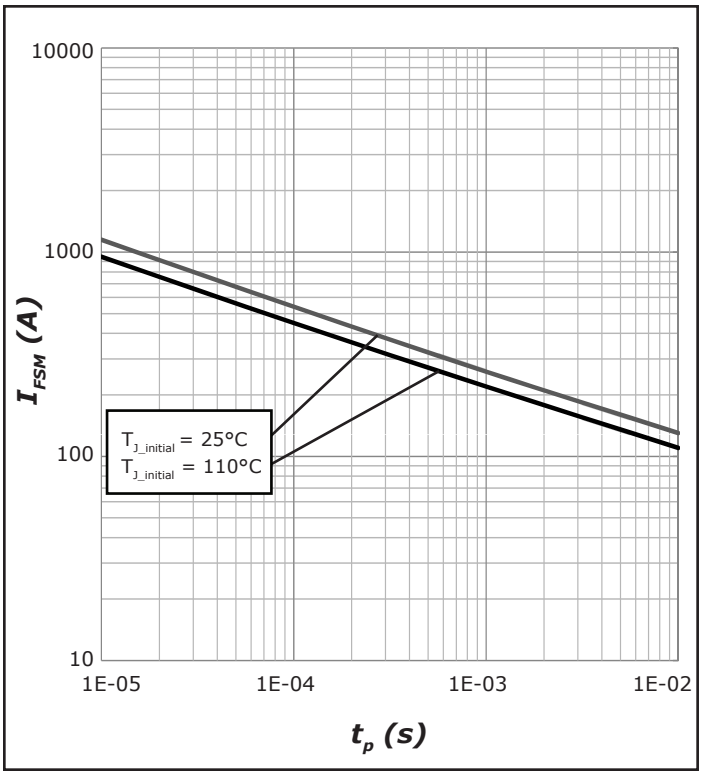


Figure 8. Non-Repetitive Peak Forward Surge Current versus Pulse Duration (sinusoidal waveform)

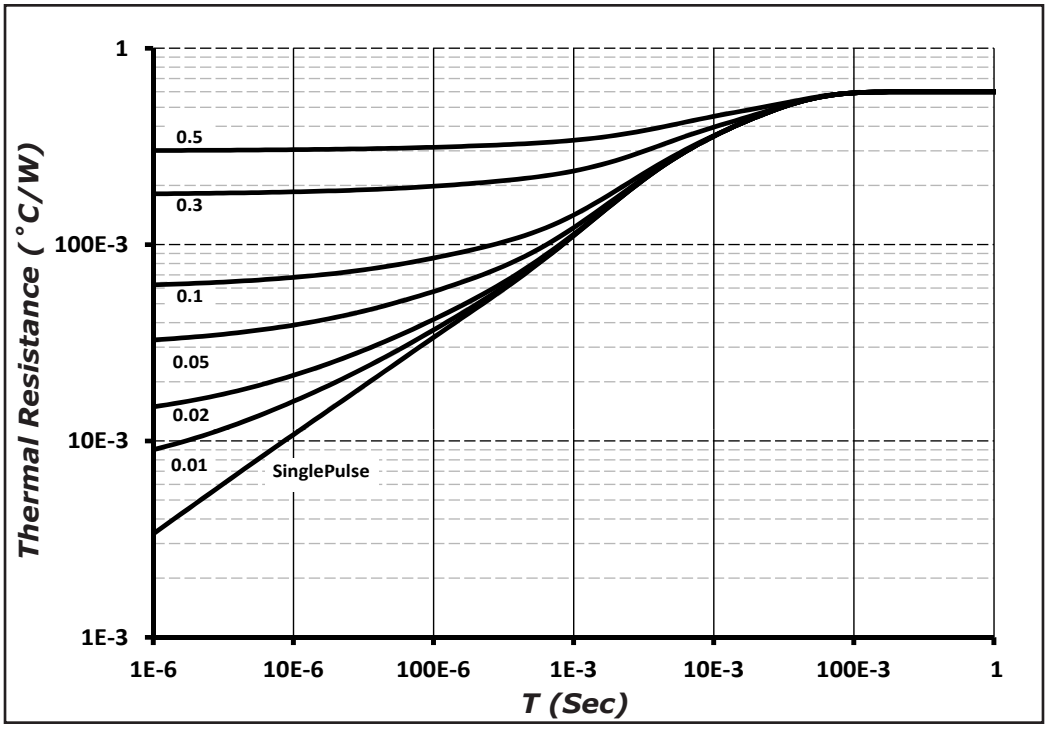
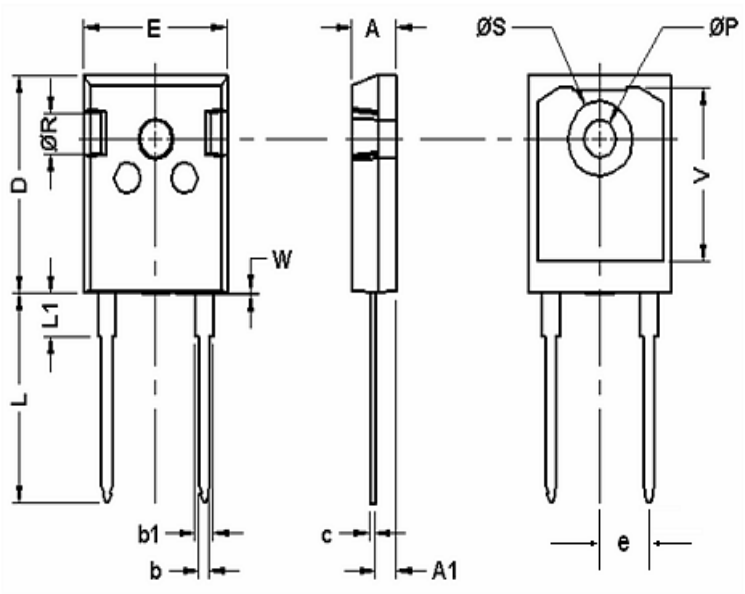


Figure 9. Transient Thermal Impedance

Package Dimensions



POS	Inches		Millimeters	
	Min	Max	Min	Max
A	0.185	0.209	4.70	5.31
A1	0.087	0.102	2.21	2.59
b	0.040	0.055	1.02	1.40
b1	0.065	0.088	1.65	2.23
C	0.016	0.031	0.41	0.79
D	0.819	0.845	20.80	21.46
E	0.61	0.640	15.49	16.26
e	0.215	0.215	5.46	5.46
L	0.78	0.80	19.81	20.32
L1	0.164	0.176	4.17	4.47
øP	0.140	0.144	3.56	3.66
Q	0.212	0.244	5.38	6.20
øR	0.135	0.157	3.43	3.99
øS	0.278	0.288	7.06	7.32
V	0.652	0.662	16.56	16.81
W	0.000	0.006	0.00	0.15

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