C2D20120D–Silicon Carbide Schottky Diode

Zero Recovery® Rectifier

V_{RRM} = 1200 V
I_F = 20 A
Q_c = 122 nC

Features

- 1200-Volt Schottky Rectifier
- Zero Reverse Recovery
- Zero Forward Recovery
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Swtitching
- Positive Temperature Coefficient on V_F

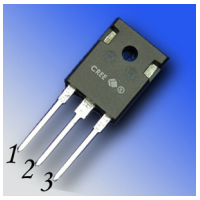
Benefits

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

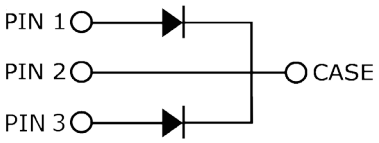
Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives

Package



TO-247-3



Part Number	Package	Marking
C2D20120D	TO-247-3	C2D20120

Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V		
V_{RSM}	Surge Peak Reverse Voltage	1200	V		
V_{DC}	DC Blocking Voltage	1200	V		
I_F	Continuous Forward Current (Per Leg/Device)	10/20 17/34	A	T_C=150°C T_C=125°C	
$I_{F(PEAK)}$	Peak Forward Current (Per Leg/Device)	25/50	A	T_C=125°C, T_{REP}<1 mS, Duty=0.5	
I_{FRM}	Repetitive Peak Forward Surge Current	50*	A	T_C=25°C, t_P=8.3 ms, Half Sine Wave	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	250*	A	T_C=25°C, t_P=10 µs, Pulse	
P_{tot}	Power Dissipation (Per Leg)	312* 104*	W	T_C=25°C T_C=125°C	
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +175	°C		
	TO-247 Mounting Torque	1 8.8	Nm lbf-in	M3 Screw 6-32 Screw	

** Per Device, * Per Leg

Electrical Characteristics (Per Leg)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.6 2.5	1.8 3.0	V	I_F = 10 A T_J=25°C I_F = 10 A T_J=175°C	
I_R	Reverse Current	10 20	200 1000	μA	V_R = 1200 V T_J=25°C V_R = 1200 V T_J=175°C	
Q_C	Total Capacitive Charge	61		nC	V_R = 1200 V, I_F = 10A d*i*/d*t* = 500 A/μs T_J = 25°C	
C	Total Capacitance	1000 80 59		pF	V_R = 0 V, T_J = 25°C, f = 1 MHz V_R = 200 V, T_J = 25°C, f = 1 MHz V_R = 400 V, T_J = 25°C, f = 1 MHz	

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

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.48** 0.24*		°C/W		

** Per Leg, * Both Legs

Typical Performance (Per Leg)

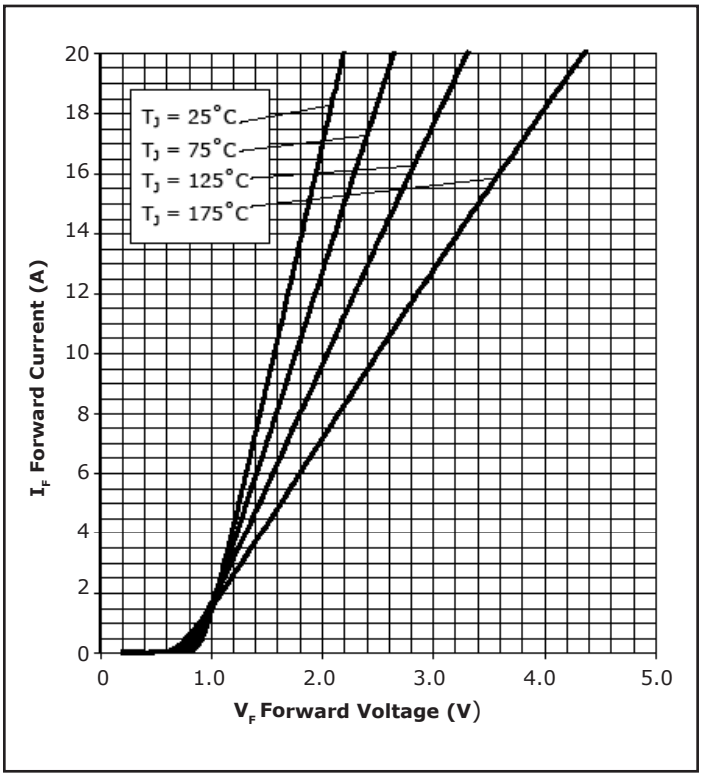


Figure 1. Forward Characteristics

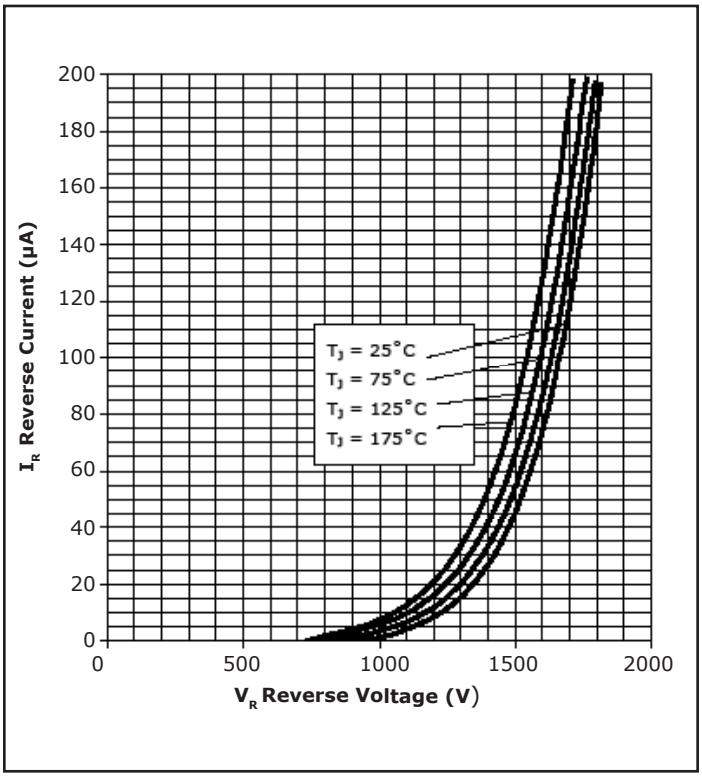


Figure 2. Reverse Characteristics

Typical Performance (Per Leg)

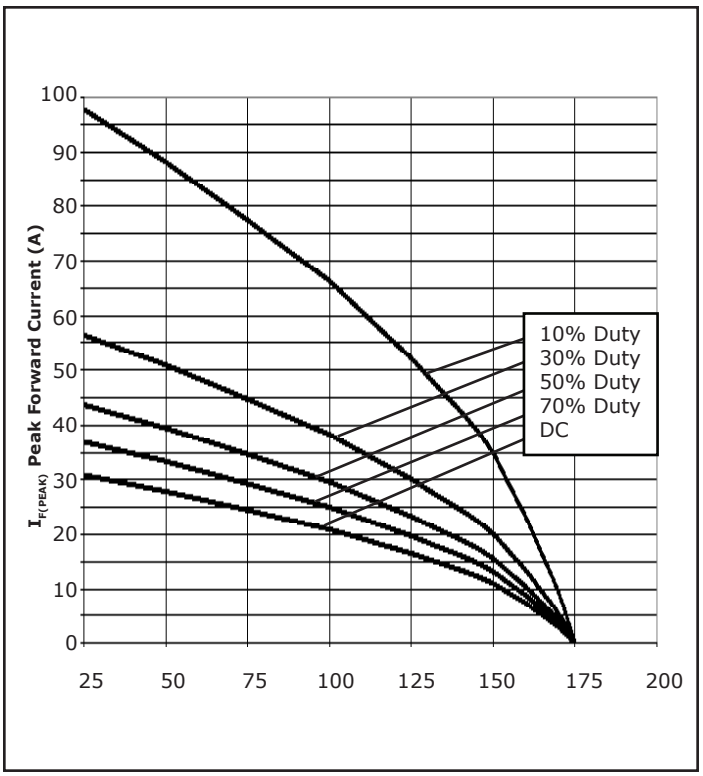


Figure 3. Current Derating

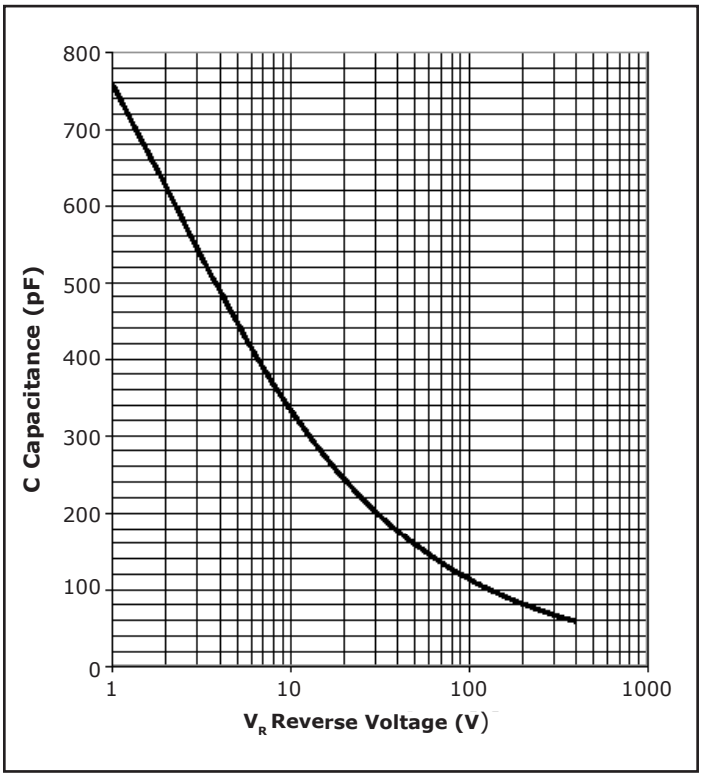


Figure 4. Capacitance vs. Reverse Voltage

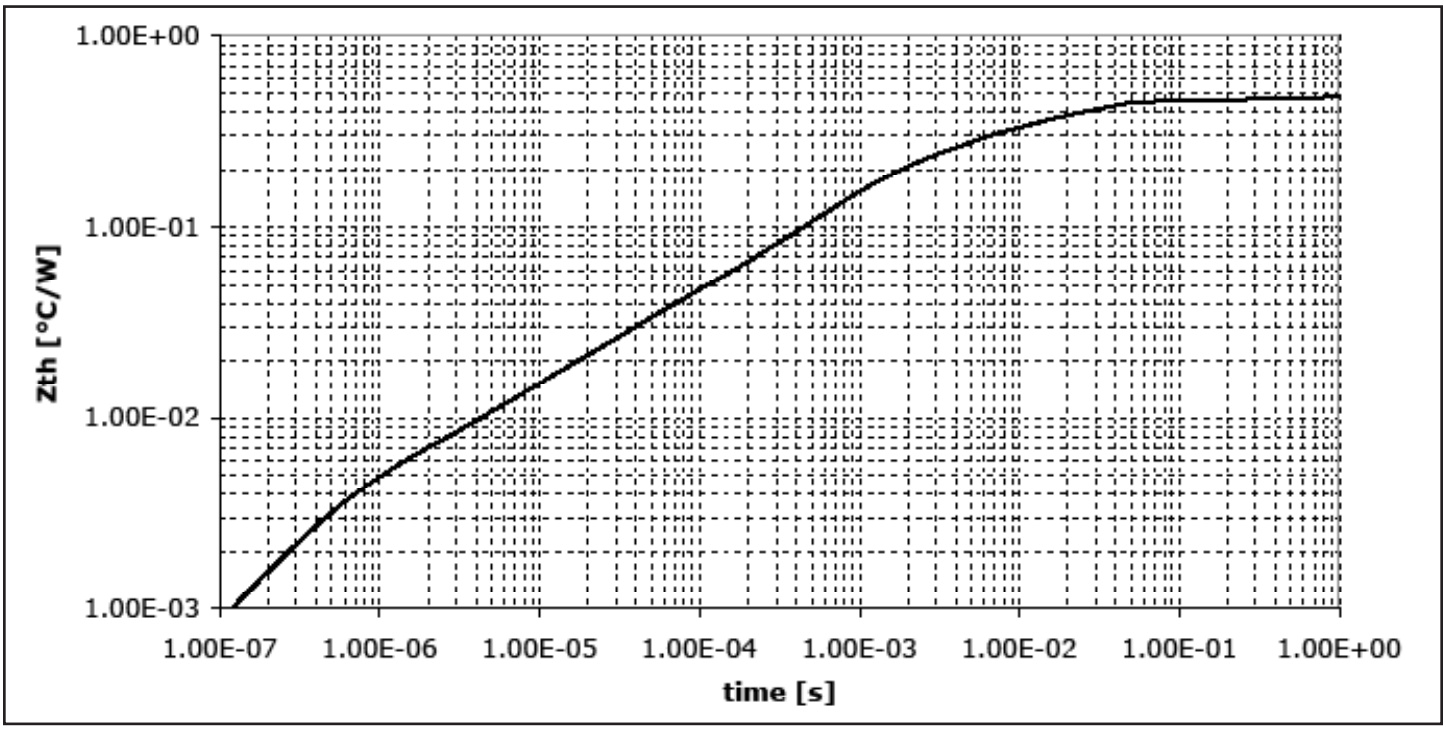
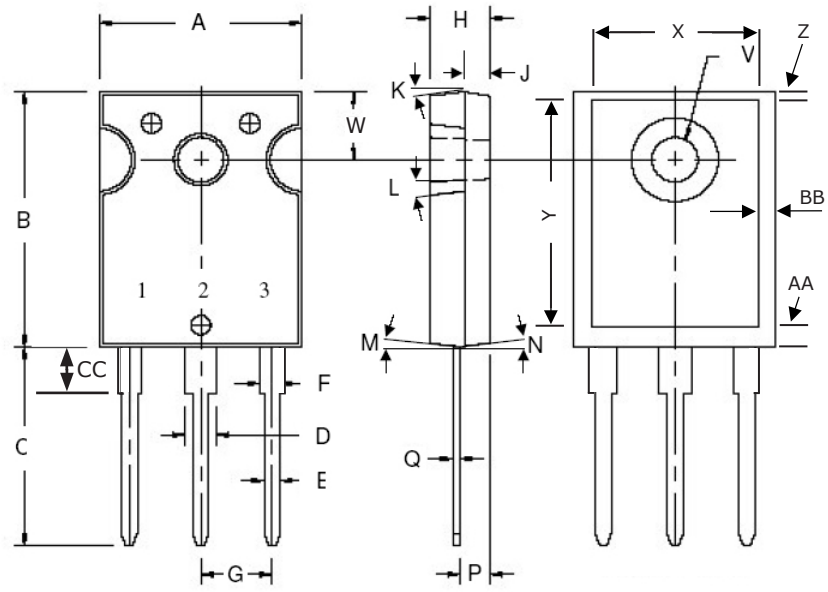
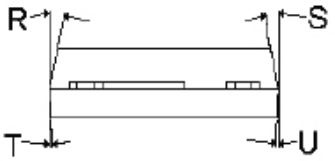


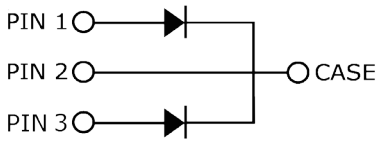
Figure 5. Transient Thermal Impedance

Package Dimensions

Package TO-247-3

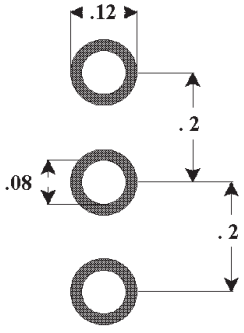






POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.605	.635	15.367	16.130
B	.800	.831	20.320	21.10
C	.780	.800	19.810	20.320
D	.095	.133	2.413	3.380
E	.046	.052	1.168	1.321
F	.060	.095	1.524	2.410
G	.215 TYP		5.460 TYP	
H	.175	.205	4.450	5.210
J	.075	.085	1.910	2.160
K	6°	21°	6°	21°
L	4°	6°	4°	6°
M	2°	4°	2°	4°
N	2°	4°	2°	4°
P	.090	.100	2.286	2.540
Q	.020	.030	.508	.762
R	9°	11°	9°	11°
S	9°	11°	9°	11°
T	2°	8°	2°	8°
U	2°	8°	2°	8°
V	.137	.144	3.487	3.658
W	.210	.248	5.334	6.300
X	.502	.557	12.751	14.150
Y	.637	.695	16.180	17.653
Z	.038	.052	0.964	1.321
AA	.110	.140	2.794	3.556
BB	.030	.046	0.766	1.168
CC	.161	.176	4.100	4.472

Recommended Solder Pad Layout



TO-247-3

Part Number	Package	Marking
C2D20120D	TO-247-3	C2D20120

"The levels of environmentally sensitive, persistent biologically toxic (PBT), persistent organic pollutants (POP), or otherwise restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), as amended through April 21, 2006."

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
Fax: +1.919.313.5451
www.cree.com/power