C4D40120D–Silicon Carbide Schottky Diode

Z-Rec™ Rectifier

V_{RRM}	=	1200 V
$I_{F;\ T_C<135°C}$	=	54 A
Q_c	=	260 nC

Features

- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Swtitching

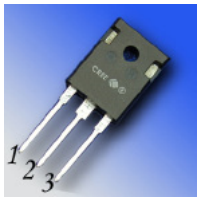
Benefits

- 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

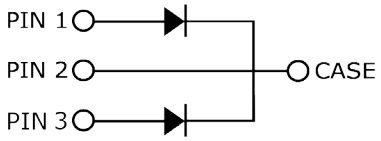
Package



TO-247-3

Halogen-Free

RoHS COMPLIANT



Part Number	Package	Marking
C4D40120D	TO-247-3	C4D40120

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 DC Current (Per Leg/Device)	27/54	A	T_C<135°C, no AC component	
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	
P_{tot}	Power Dissipation (Per Leg/Device)	266/532 114/228	W	T_C=25°C T_C=110°C	
T_c	Maximum Case Temperature	135	°C		
T_J	Operating Junction Range	-55 to +175	°C		
T_{stg}	Storage Temperature Range	-55 to +135	°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	1.5 2.2	1.8 3	V	I_F = 20 A T_J=25°C I_F = 20 A T_J=175°C	
I_R	Reverse Current	35 65	200 400	μA	V_R = 1200 V T_J=25°C V_R = 1200 V T_J=175°C	
Q_C	Total Capacitive Charge	130		nC	V_R = 1200 V, I_F = 20A d*i*/d*t* = 200 A/μs T_J = 25°C	
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	

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	0.29** 0.57*		°C/W		

** Per Device, * Per Leg

Typical Performance (Per Leg)

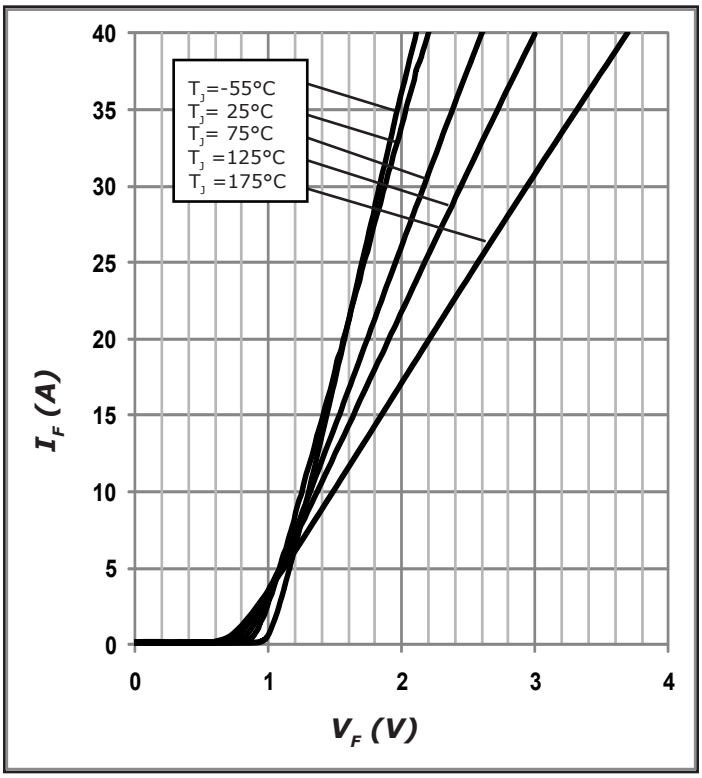


Figure 1. Forward Characteristics

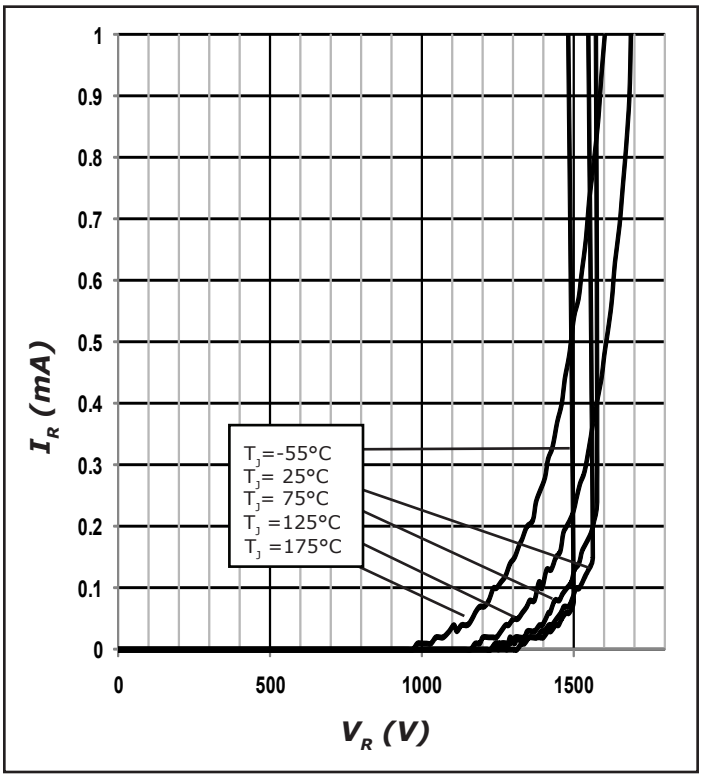


Figure 2. Reverse Characteristics

Typical Performance (Per Leg)

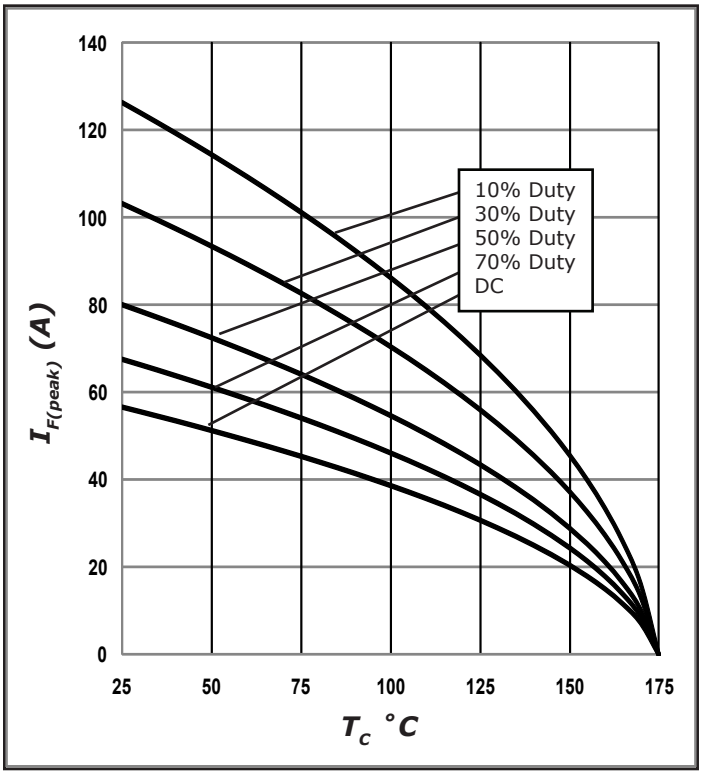


Figure 3. Current Derating

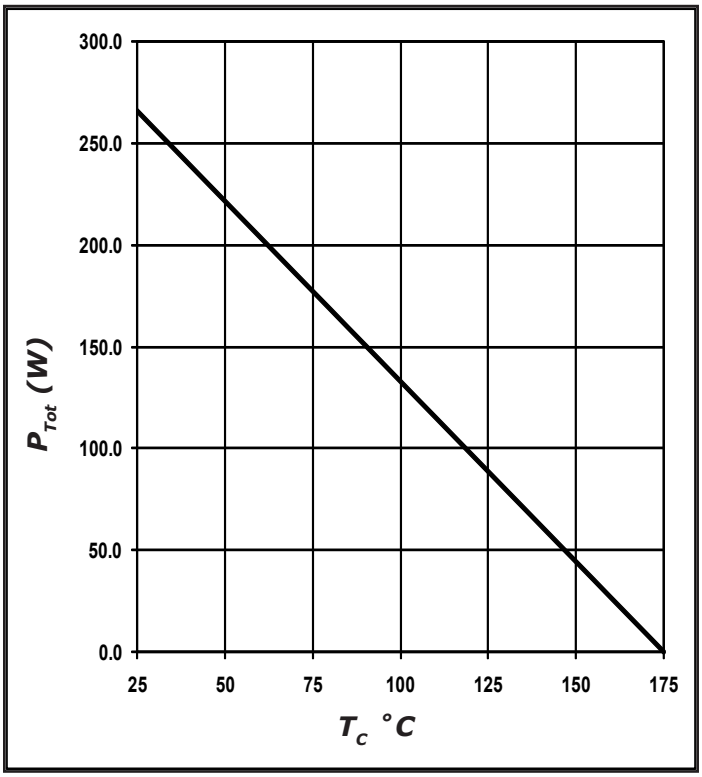


Figure 4. Power Derating

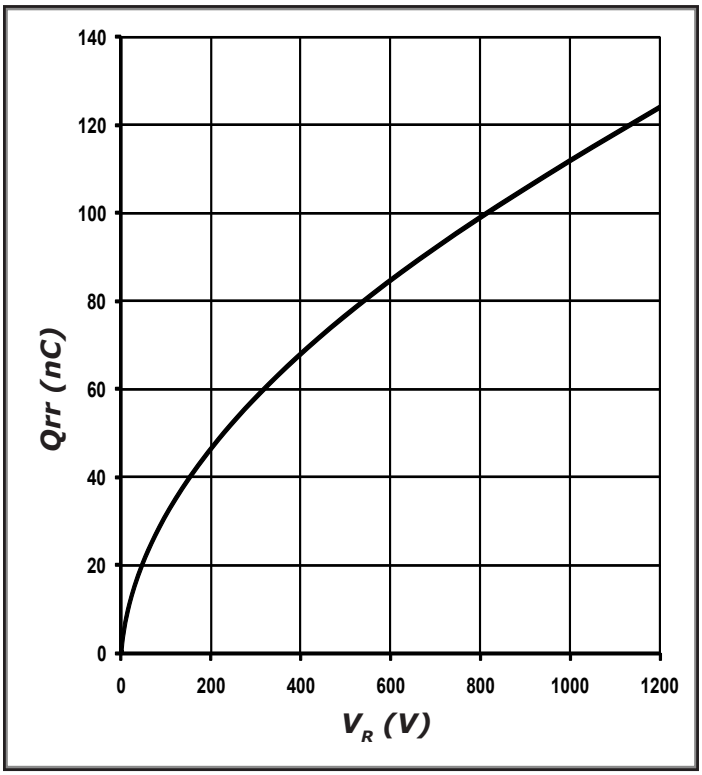


Figure 5. Recovery Charge vs. Reverse Voltage

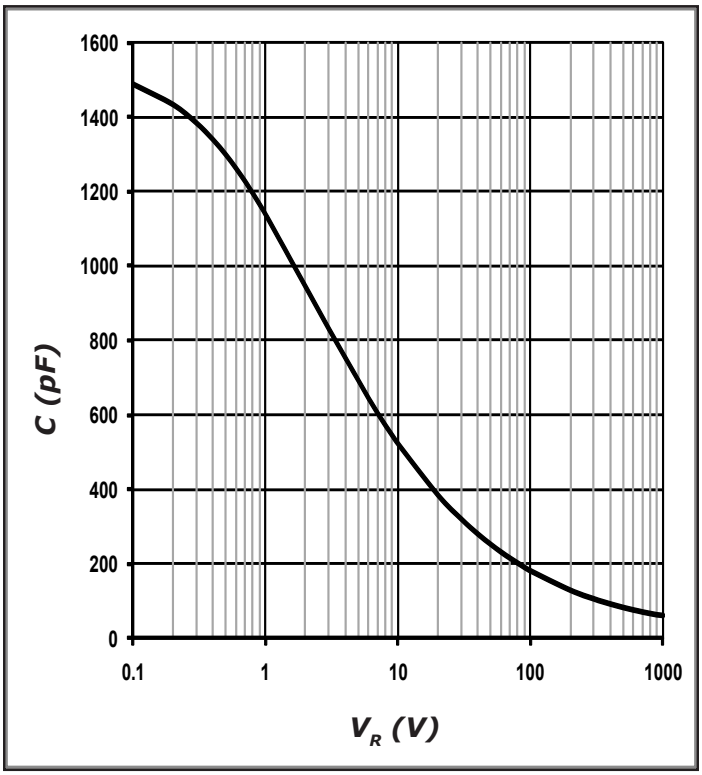


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance (Per Leg)

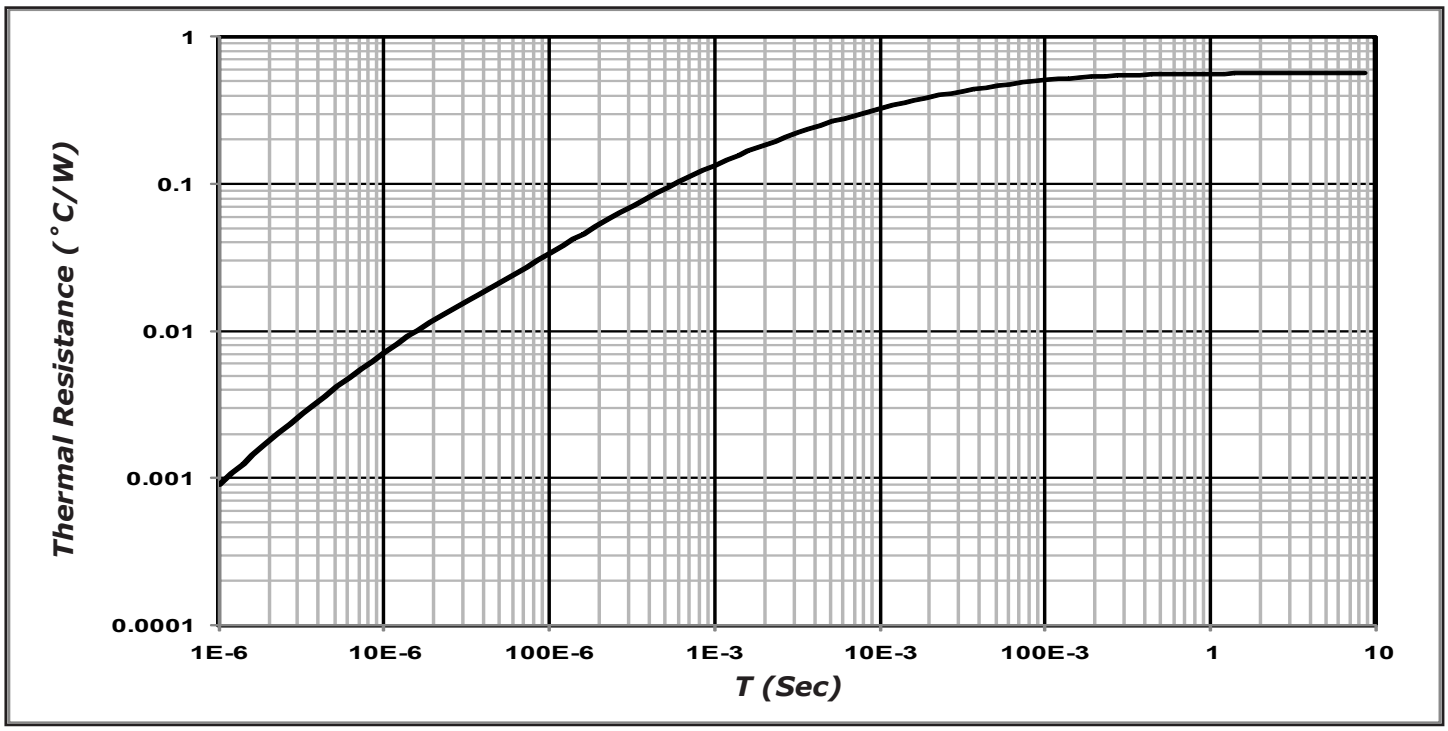
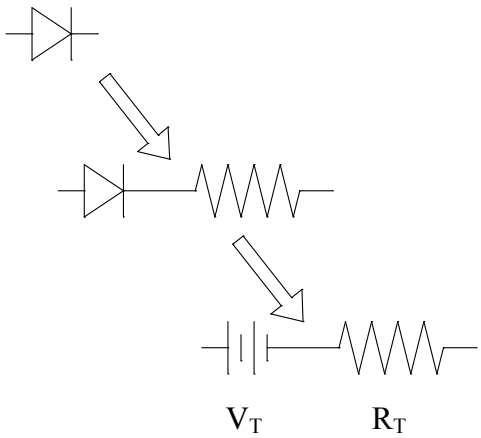


Figure 7. Transient Thermal Impedance

Diode Model



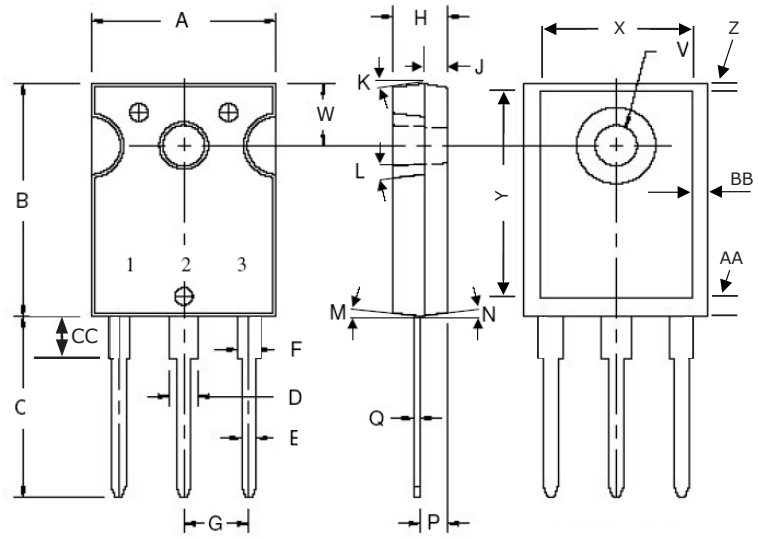
$$V_{fT} = V_T + If * R_T$$

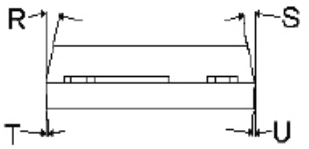
$$V_T = 0.97 + (T_J * -1.40 * 10^{-3})$$
$$R_T = 0.023 + (T_J * 2.71 * 10^{-4})$$

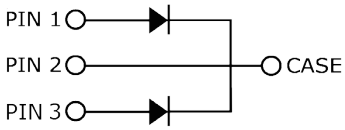
Note: T_j = Diode Junction Temperature In Degrees Celcius

Package Dimensions

Package TO-247-3

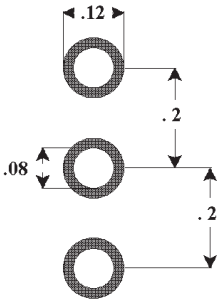






POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.605	.635	15.367	16.130
B	.800	.831	20.320	21.10
C	.780	.800	19.810	20.320
D	.095	.133	2.413	3.380
E	.046	.052	1.168	1.321
F	.060	.095	1.524	2.410
G	.215 TYP		5.460 TYP	
H	.175	.205	4.450	5.210
J	.075	.085	1.910	2.160
K	6°	21°	6°	21°
L	4°	6°	4°	6°
M	2°	4°	2°	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
C4D40120D	TO-247-3	C4D40120

"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

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Cree, Inc.:
C4D40120D