C4D15120A–Silicon Carbide Schottky Diode

Z-Rec™ Rectifier

V_{RRM}	=	1200 V
I_F T_c<135°C	=	20 A
Q_c	=	96 nC

Features

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

Benefits

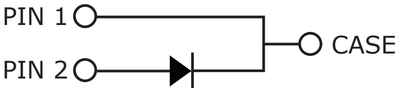
- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

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

Package

TO-220-2



Part Number	Package	Marking
C4D15120A	TO-220-2	C4D15120

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	15 20	A	T_C<150°C, no AC component T_C<135°C, no AC component	
I_{FRM}	Repetitive Peak Forward Surge Current	68 44	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	100 85	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	192 83	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-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	1.6 2.3	1.8 3	V	I_F = 15 A T_J=25°C I_F = 15 A T_J=175°C	
I_R	Reverse Current	35 120	200 300	μA	V_R = 1200 V T_J=25°C V_R = 1200 V T_J=175°C	
Q_C	Total Capacitive Charge	96		nC	V_R = 1200 V, I_F = 15A di/dt = 200 A/μs T_J = 25°C	
C	Total Capacitance	1200 70 50		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	

1. Note: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	0.78		°C/W		

Typical Performance

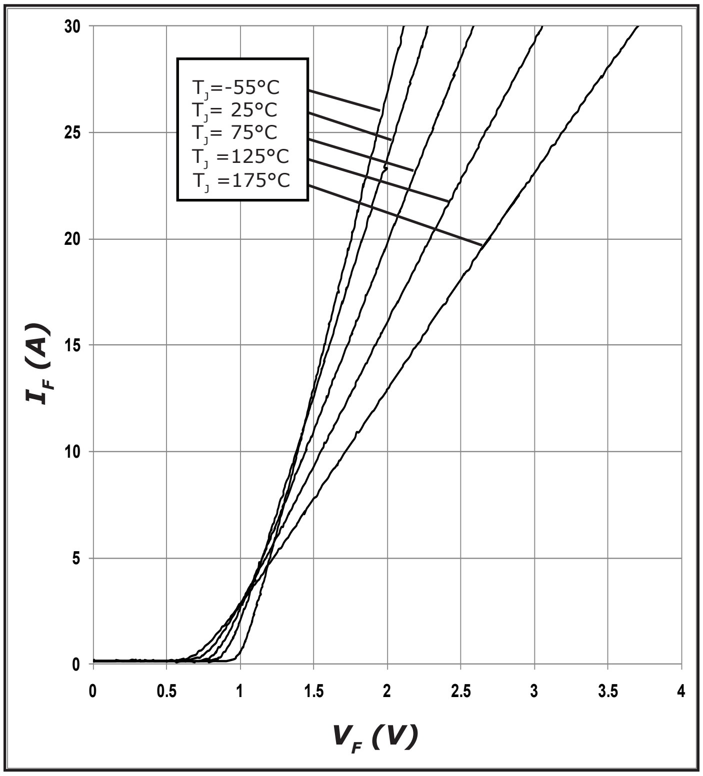


Figure 1. Forward Characteristics

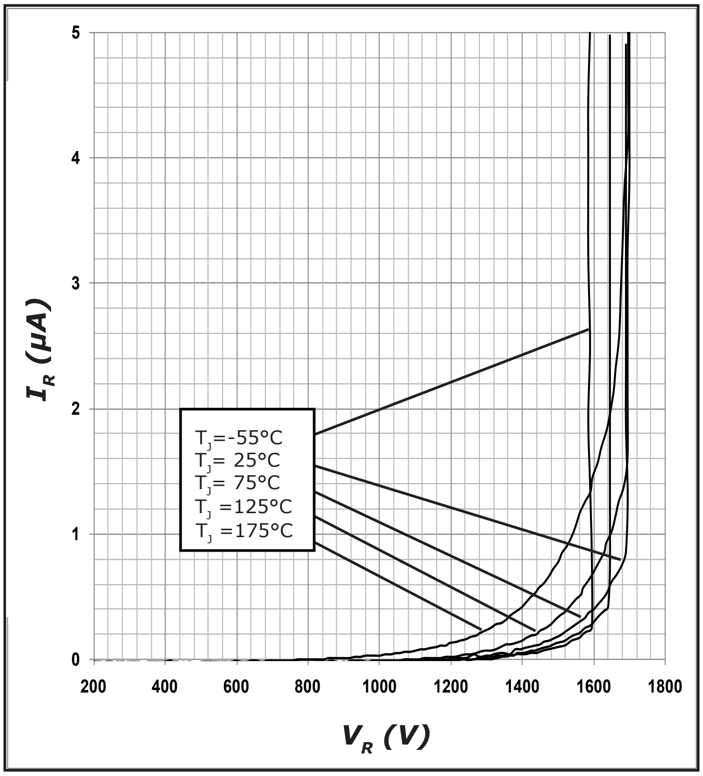


Figure 2. Reverse Characteristics

Typical Performance

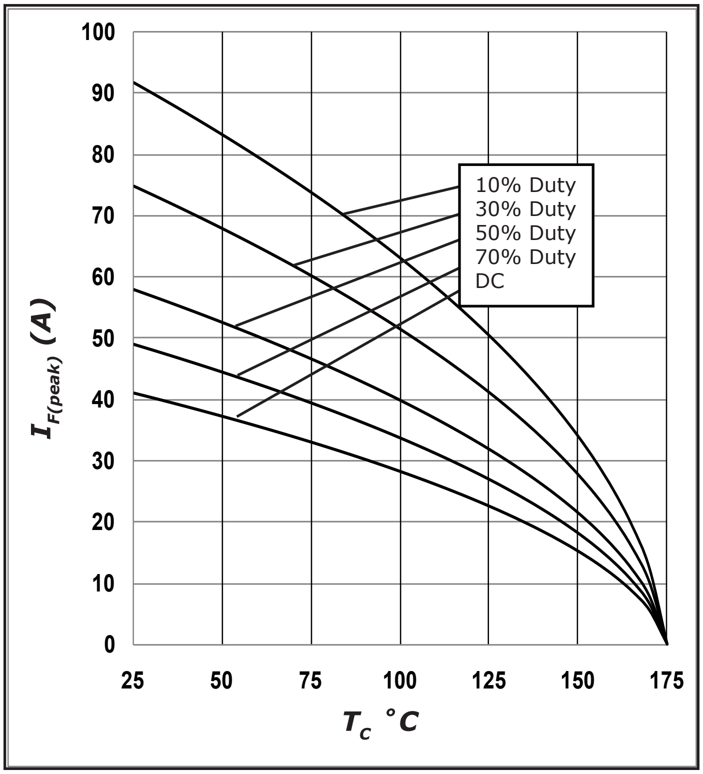


Figure 3. Current Derating

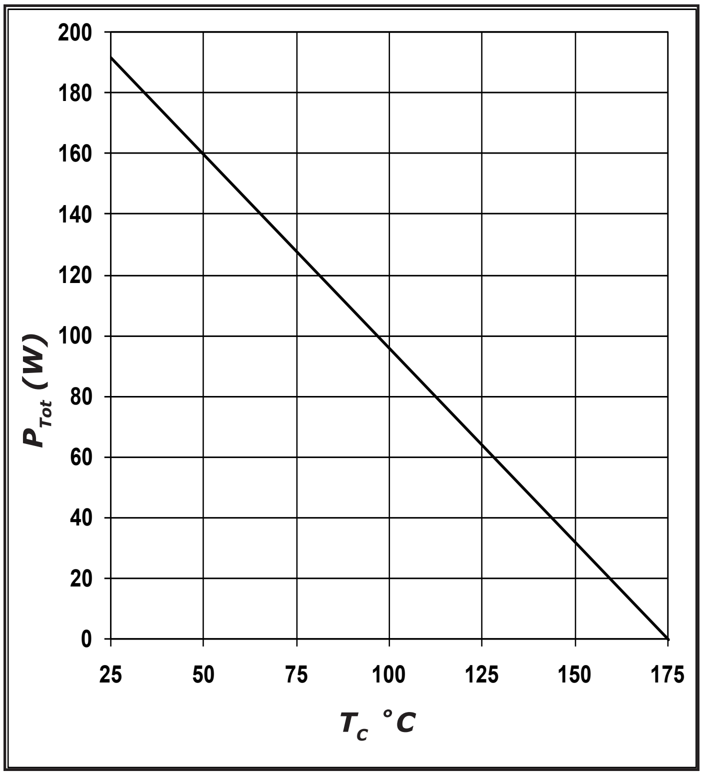


Figure 4. Power Derating

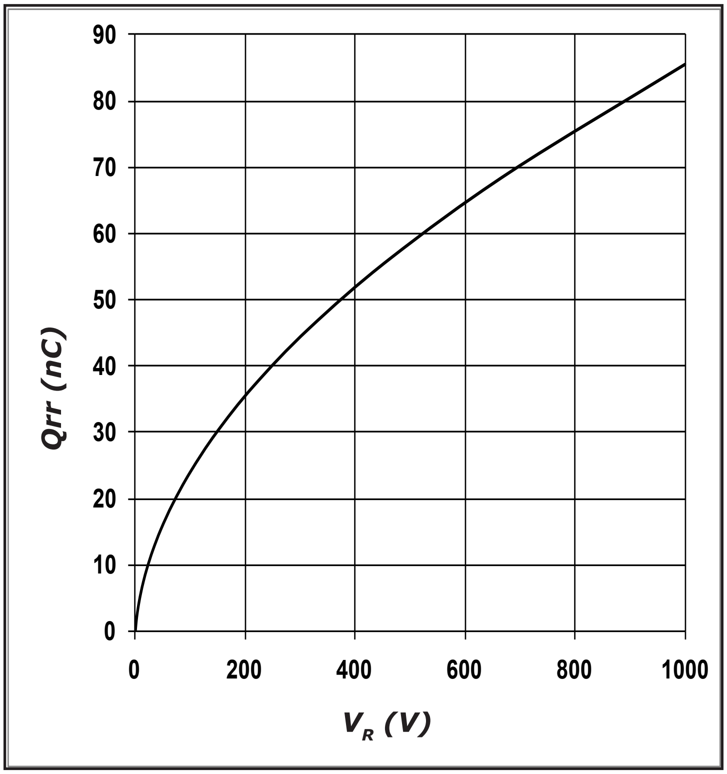


Figure 5. Recovery Charge vs. Reverse Voltage

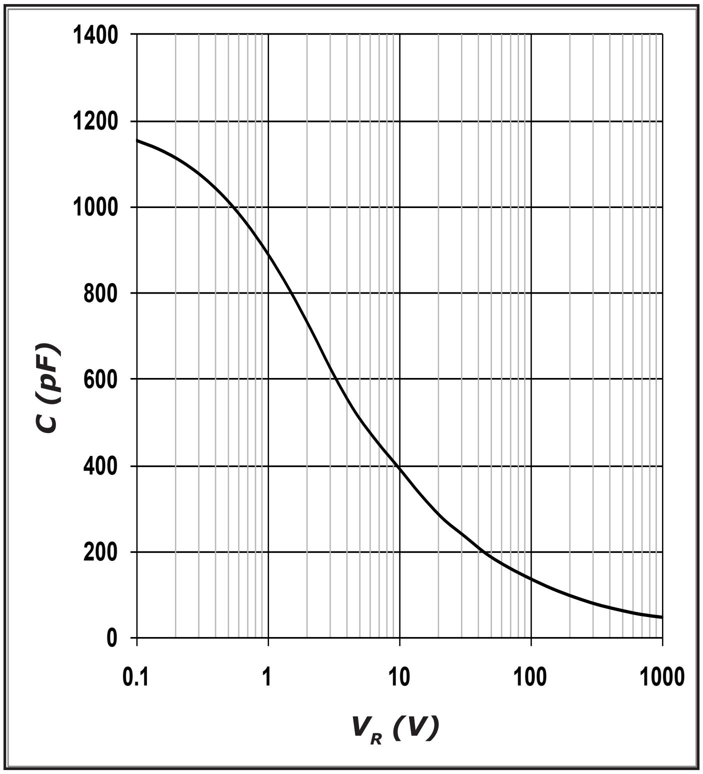


Figure 6. Capacitance vs. Reverse Voltage

Typical Performance

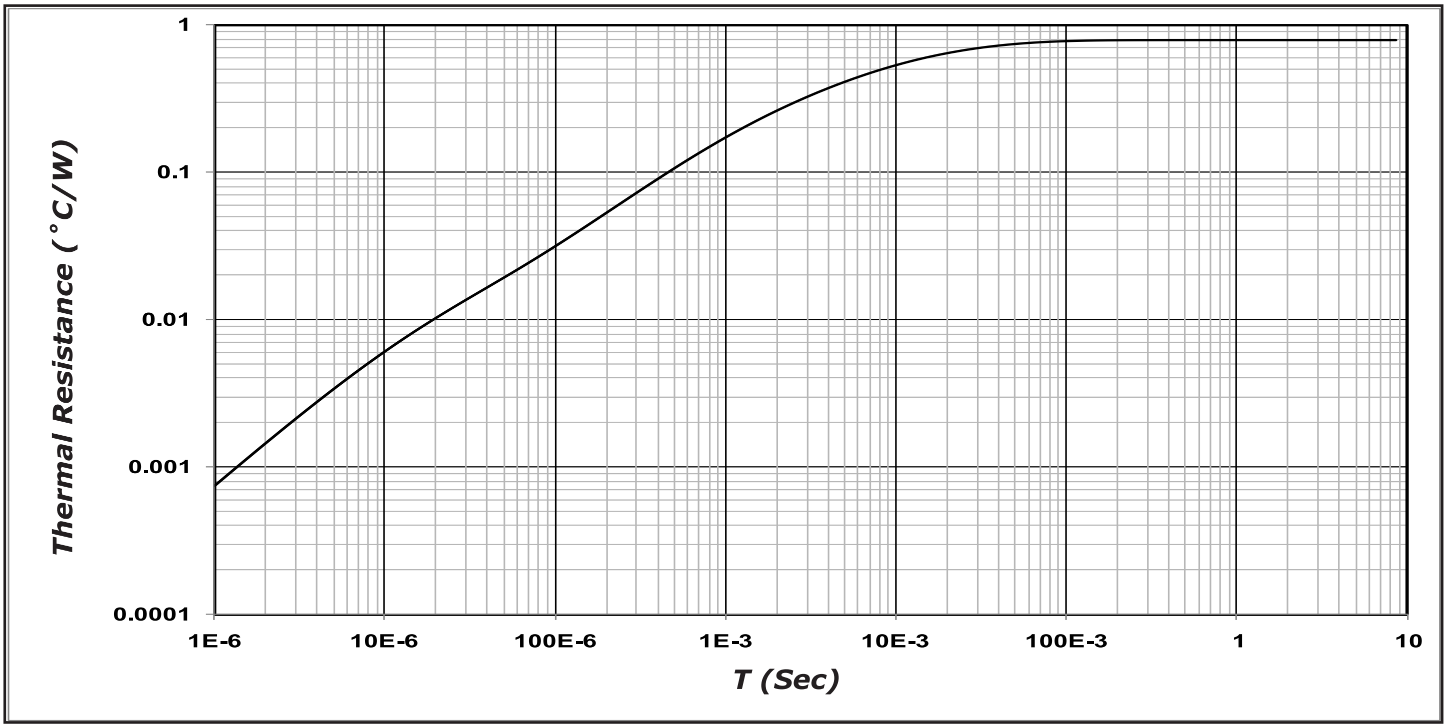
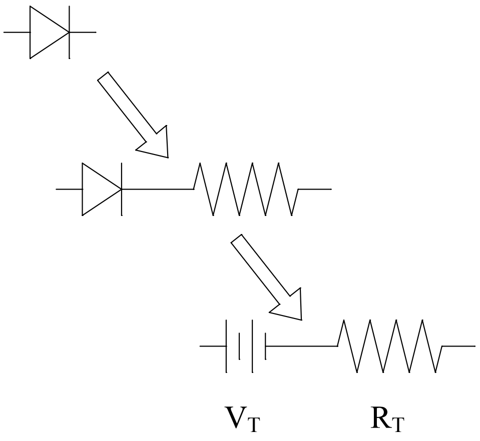


Figure 7. Transient Thermal Impedance

Diode Model



$$Vf_T = V_T + If * R_T$$

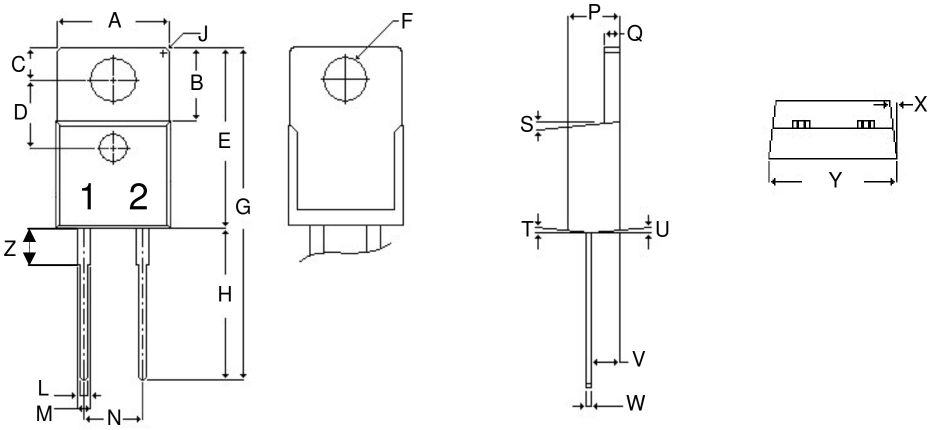
$$V_T = 0.97 + (T_j * -2.12*10^{-3})$$

$$R_T = 0.031 + (T_j * 3.92*10^{-4})$$

Note: T_j is diode junction temperature in degrees Celsius

Package Dimensions

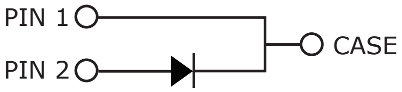
Package TO-220-2



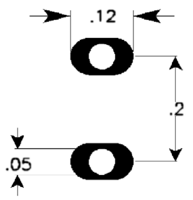
POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.381	.410	9.677	10.414
B	.235	.255	5.969	6.477
C	.100	.120	2.540	3.048
D	.223	.337	5.664	8.560
E	.590	.615	14.986	15.621
F	.143	.153	3.632	3.886
G	1.105	1.147	28.067	29.134
H	.500	.550	12.700	13.970
J	R 0.197		R 0.197	
L	.025	.036	.635	.914
M	.045	.055	1.143	1.397
N	.195	.205	4.953	5.207
P	.165	.185	4.191	4.699
Q	.048	.054	1.219	1.372
S	3°	6°	3°	6°
T	3°	6°	3°	6°
U	3°	6°	3°	6°
V	.094	.110	2.388	2.794
W	.014	.025	.356	.635
X	3°	5.5°	3°	5.5°
Y	.385	.410	9.779	10.414
z	.130	.150	3.302	3.810

NOTE:

1. Dimension L, M, W apply for Solder Dip Finish



Recommended Solder Pad Layout



TO-220-2

Part Number	Package	Marking
C4D15120A	TO-220-2	C4D15120

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