

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from Europe, America and south Asia, supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts, Customers Priority, Honest Operation, and Considerate Service", our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip, ALPS, ROHM, Xilinx, Pulse, ON, Everlight and Freescale. Main products comprise IC, Modules, Potentiometer, IC Socket, Relay, Connector. Our parts cover such applications as commercial, industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: [info@chipsmall.com](mailto:info@chipsmall.com) Web: [www.chipsmall.com](http://www.chipsmall.com)

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

# CSD06060—Silicon Carbide Schottky Diode

## ZERO RECOVERY® RECTIFIER

**V<sub>RRM</sub>** = 600 V  
**I<sub>F(AVG)</sub>** = 6 A  
**Q<sub>c</sub>** = 17 nC

### Features

- 600-Volt Schottky Rectifier
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on V<sub>F</sub>

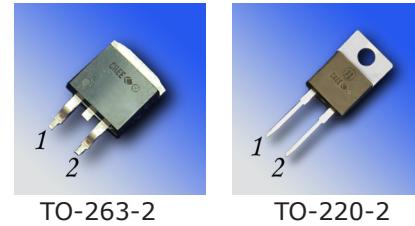
### Benefits

- 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
  - Typical PFC P<sub>out</sub> : 600W-1200W
- Motor Drives
  - Typical Power : 2HP-3HP

### Package



TO-263-2      TO-220-2



Part Number	Package	Marking
CSD06060A	TO-220-2	CSD06060
CSD06060G	TO-263-2	CSD06060

### Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions	Note
V <sub>RRM</sub>	Repetitive Peak Reverse Voltage	600	V		
V <sub>RSM</sub>	Surge Peak Reverse Voltage	600	V		
V <sub>DC</sub>	DC Blocking Voltage	600	V		
I <sub>F(AVG)</sub>	Average Forward Current	6 10	A	T <sub>C</sub> =150°C, DC T <sub>C</sub> =125°C, DC	
I <sub>F(Peak)</sub>	Peak Forward Current	15	A	T <sub>C</sub> =125°C, T <sub>REP</sub> <1 mS, Duty=0.5	
I <sub>FRM</sub>	Repetitive Peak Forward Surge Current	32 22	A	T <sub>C</sub> =25°C, t <sub>p</sub> = 10 ms, Half Sine Wave T <sub>C</sub> =125°C, t <sub>p</sub> =10 ms, Half Sine Wave	
I <sub>FSM</sub>	Non-Repetitive Peak Forward Surge Current	64	A	T <sub>C</sub> =25°C, t <sub>p</sub> = 1.5 mS, Half Sine Wave	
I <sub>FSM</sub>	Non-Repetitive Peak Forward Surge Current	200	A	T <sub>C</sub> =25°C, t <sub>p</sub> = 10 μs, Pulse	
P <sub>tot</sub>	Power Dissipation	83.3 27.8	W	T <sub>C</sub> =25°C T <sub>C</sub> =125°C	
T <sub>J</sub> , T <sub>stg</sub>	Operating Junction and Storage Temperature	-55 to +175	°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 1.9	1.8 2.4	V	$I_F = 6 \text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 6 \text{ A}$ $T_J = 175^\circ\text{C}$	
$I_R$	Reverse Current	50 100	200 1000	$\mu\text{A}$	$V_R = 600 \text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 600 \text{ V}$ $T_J = 175^\circ\text{C}$	
$Q_C$	Total Capacitive Charge	17		nC	$V_R = 600 \text{ V}$ , $I_F = 6 \text{ A}$ $di/dt = 500 \text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$	
C	Total Capacitance	340 40 30		pF	$V_R = 0 \text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1 \text{ MHz}$ $V_R = 200 \text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1 \text{ MHz}$ $V_R = 400 \text{ V}$ , $T_J = 25^\circ\text{C}$ , $f = 1 \text{ MHz}$	

Note:

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

## Thermal Characteristics

Symbol	Parameter	Typ.	Unit
$R_{\theta\text{JC}}$	Thermal Resistance from Junction to Case	1.8	$^\circ\text{C}/\text{W}$

## Typical Performance

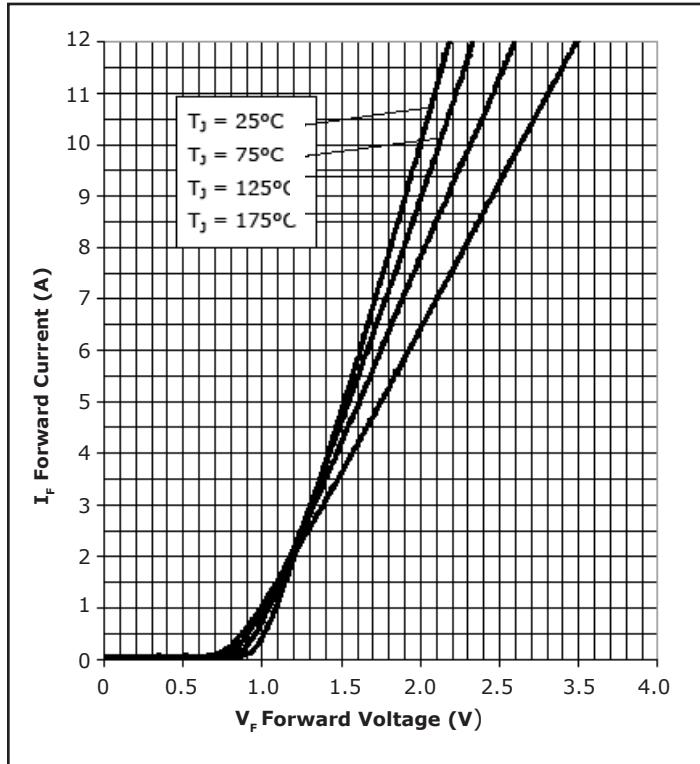


Figure 1. Forward Characteristics

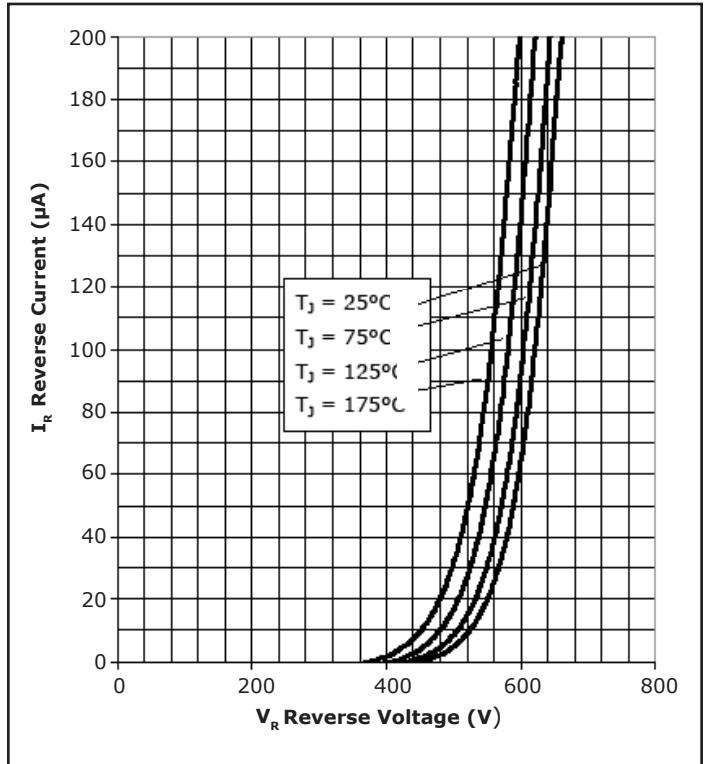


Figure 2. Reverse Characteristics

## Typical Performance

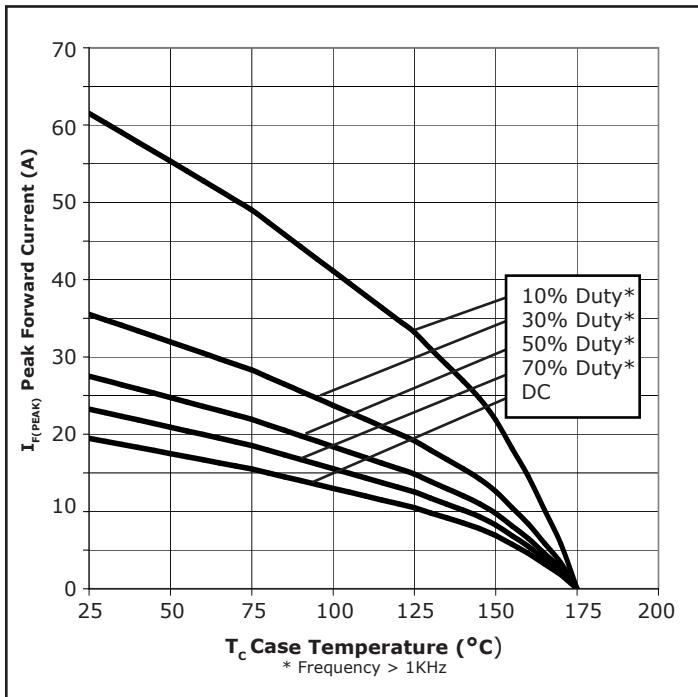


Figure 3. Current Derating

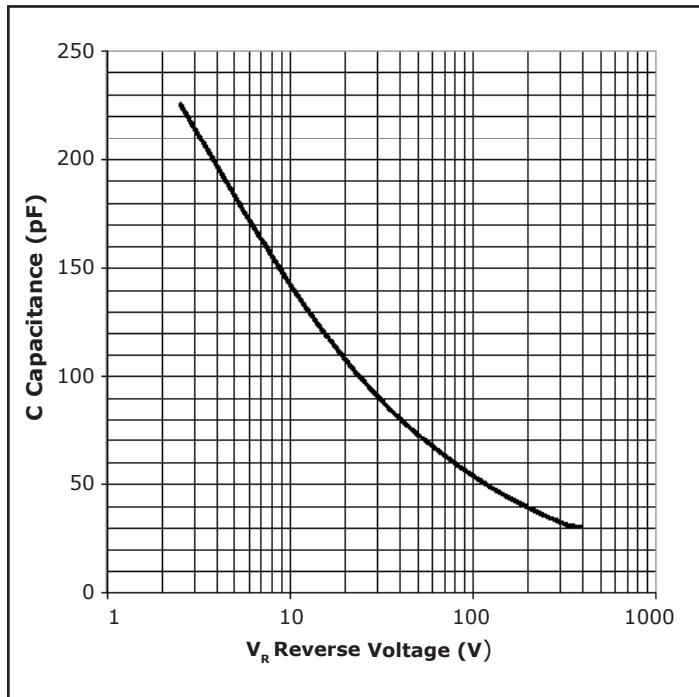


Figure 4. Capacitance vs. Reverse Voltage

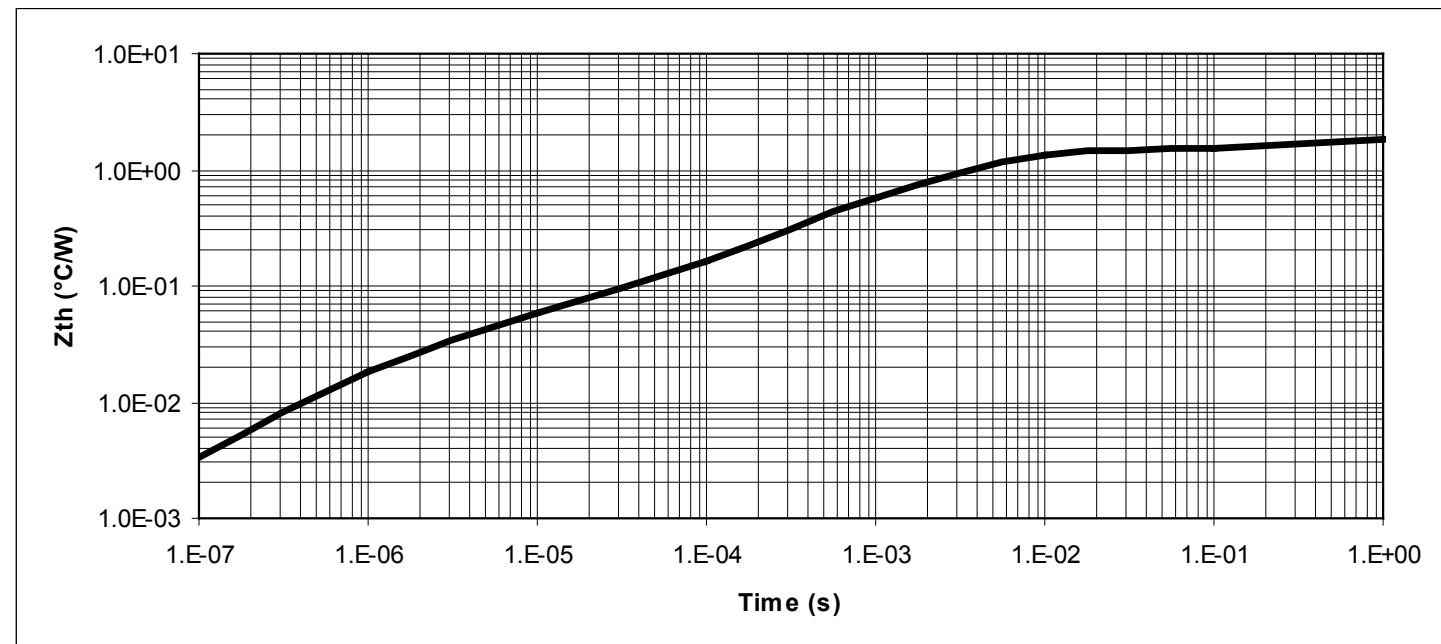


Figure 5. Transient Thermal Impedance

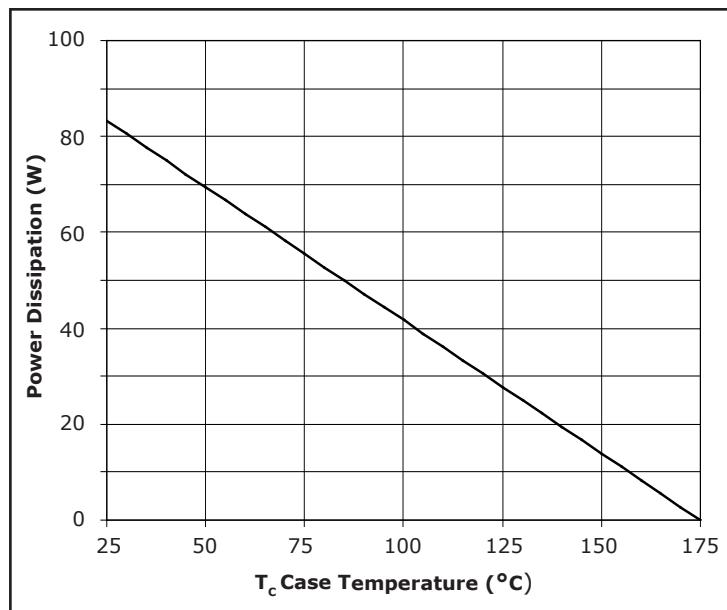
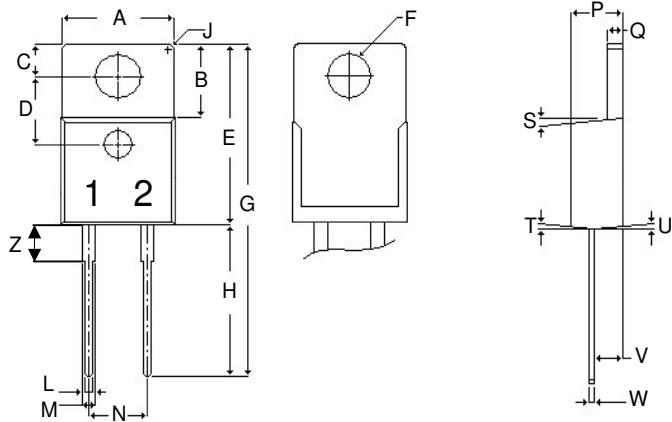
**Typical Performance**

Figure 6. Power Derating

## Package Dimensions

### Package TO-220-2



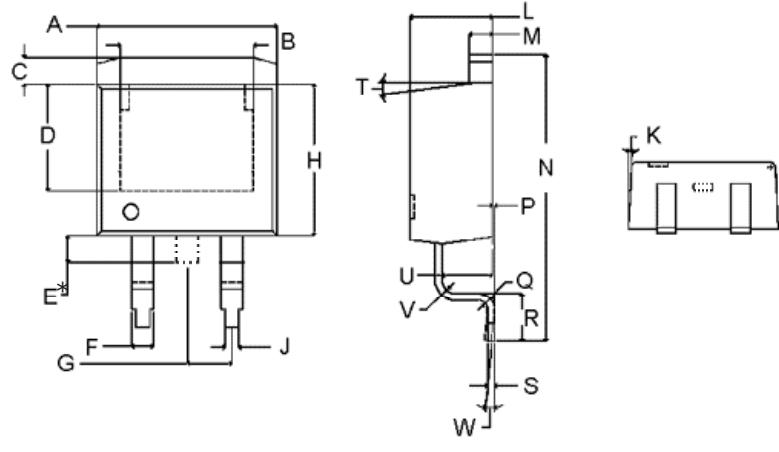
POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.381	.410	9.677	10.414
B	.235	.255	5.969	6.477
C	.100	.120	2.540	3.048
D	.223	.337	5.664	8.560
E	.590	.615	14.986	15.621
F	.143	.153	3.632	3.886
G	1.105	1.147	28.067	29.134
H	.500	.550	12.700	13.970
J	R 0.197		R 0.197	
L	.025	.036	.635	.914
M	.045	.055	1.143	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:

- Dimension L, M, W apply for Solder Dip Finish

## Package Dimensions

### Package TO-263-2

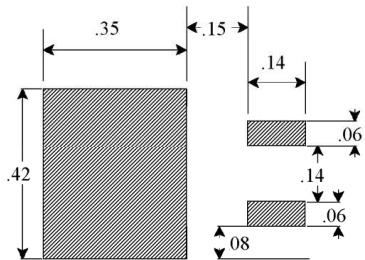


POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.396	.406	10.058	10.312
B	.297	.303	7.544	7.696
C	.057	.063	1.448	1.600
D	.237	.243	6.015	6.167
E*	0.00	.070	0.00	1.778
F	.048	.062	1.219	1.575
G	.100 TYP		2.540 TYP	
H	.335	.345	8.509	8.763
J	.028	.034	.711	.864
K	2°	4°	2°	4°
L	.170	.180	4.318	4.572
M	.048	.052	1.219	1.321
N	.595	.615	15.113	15.621
P	0.00	.10	0.00	.254
Q	R0.018 TYP	R0.022 TYP	R0.457 TYP	R0.559 TYP
R	.090	.110	2.286	2.794
S	.013	.017	.330	.432
T	6.5°	8.5°	6.5°	8.5°
U	.103	.107	2.616	2.718
V	R0.028 TYP	R0.032 TYP	R0.711 TYP	R0.813 TYP
W	—	5.0°	—	5.0°

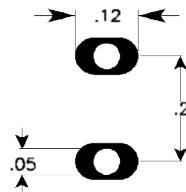
#### Note:

\* Tab "E" may not be present

## Recommended Solder Pad Layout



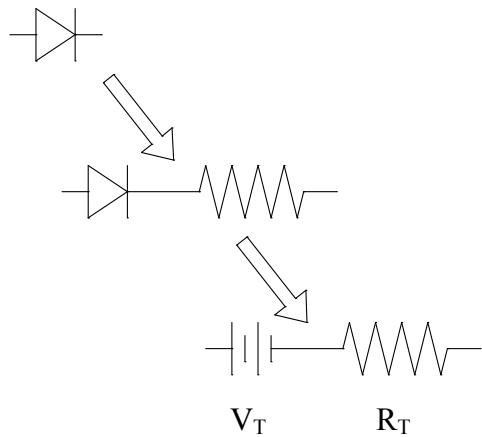
TO-263-2



TO-220-2

Part Number	Package	Marking
CSD06060A	TO-220-2	CSD06060
CSD06060G	TO-263-2	CSD06060

## Diode Model



$$Vf_T = V_T + I_f * R_T$$

$$V_T = 0.975 + (T_j * -1.0 * 10^{-3})$$

$$R_T = 0.09 + (T_j * 0.51 * 10^{-3})$$

Note:  $T_j$  = Diode Junction Temperature In Degrees Celcius

"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. This part number was released previously with Sn/Pb solder plating as a standard industry finish. For more information please contact power\_sales@cree.com "

This product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, cardiac defibrillators or similar emergency medical equipment, aircraft navigation or communication or control systems, air traffic control systems, or weapons systems.

Copyright © 2006-2009 Cree, Inc. All rights reserved. The information in this document is subject to change without notice. Cree, the Cree logo, and Zero Recovery are registered trademarks of Cree, Inc.