CSD04060–Silicon Carbide Schottky Diode

Zero Recovery® Rectifier

V_{RRM}	= 600 V
$I_{F(AVG)}$	= 4 A
Q_c	= 9 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_F

Package

TO-252-2

TO-220-2

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
- Power Factor Correction
  - Typical PFC P_{out} : 400W-800W
- Motor Drives
  - Typical Power : 0.5HP-2HP

Part Number	Package	Marking
CSD04060A	TO-220-2	CSD04060
CSD04060E	TO-252-2	CSD04060

Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	600	V		
V_{RSM}	Surge Peak Reverse Voltage	600	V		
V_{DC}	DC Blocking Voltage	600	V		
$I_{F(AVG)}$	Average Forward Current	4 7	A	T_C=150˚C T_C=125˚C	
$I_{F(PEAK)}$	Peak Forward Current	10	A	T_C=125˚, T_{REP}<1 mS, Duty=0.5	
I_{FRM}	Repetitive Peak Forward Surge Current	17.5 12.5	A	T_C=25˚C, t_p=10 ms, Half Sine Wave T_C=125˚C, t_p=10 ms, Half Sine Wave	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	38	A	T_C=25˚C, t_p=1.5 ms, Half Sine Wave	
I_{FSM}	Non-Repetitive Peak Forward Surge Current	110	A	T_C=25˚C, t_p=10 µs, Pulse	
P_{tot}	Power Dissipation	62.5 20.8	W	T_C=25˚C T_C=125˚C	
T_J , T_{stg}	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	1.5 2.0	1.8 2.4	V	I_F = 4 A T_J=25°C I_F = 4 A T_J=175°C	
I_R	Reverse Current	25 50	200 1000	µA	V_R = 600 V T_J=25°C V_R = 600 V T_J=175°C	
Q_C	Total Capacitive Charge	9		nC	V_R = 600 V, I_F = 4A di/dt = 500 A/µs T_J = 25°C	
C	Total Capacitance	220 26 20		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.	Unit
$R_{\theta JC}$	Thermal Resistance from Junction to Case	2.4	°C/W

Typical Performance

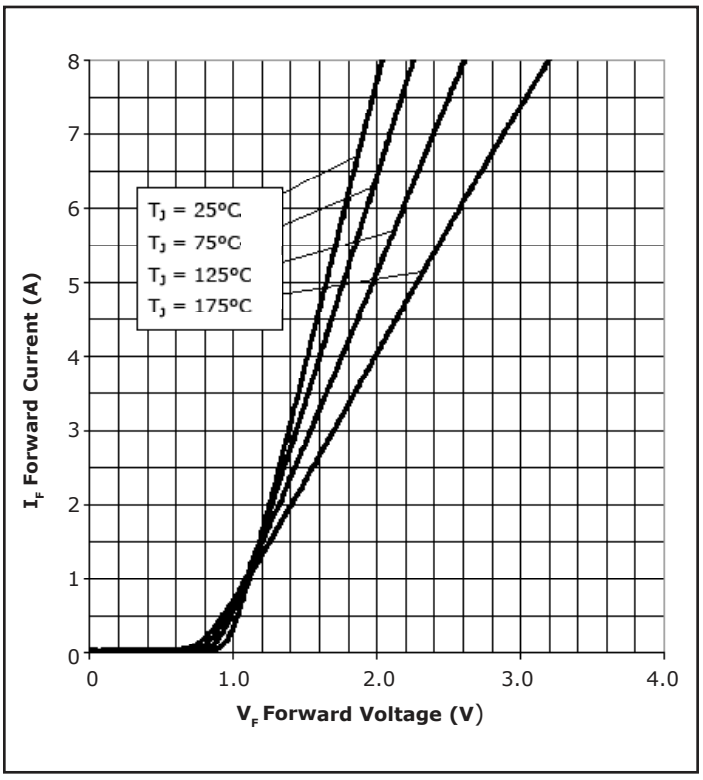


Figure 1. Forward Characteristics

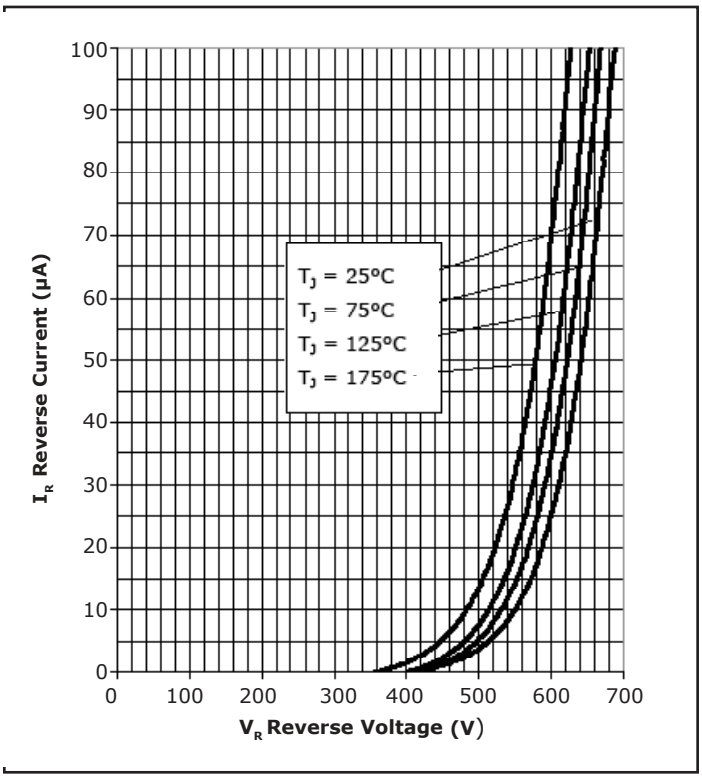


Figure 2. Reverse Characteristics

Typical Performance

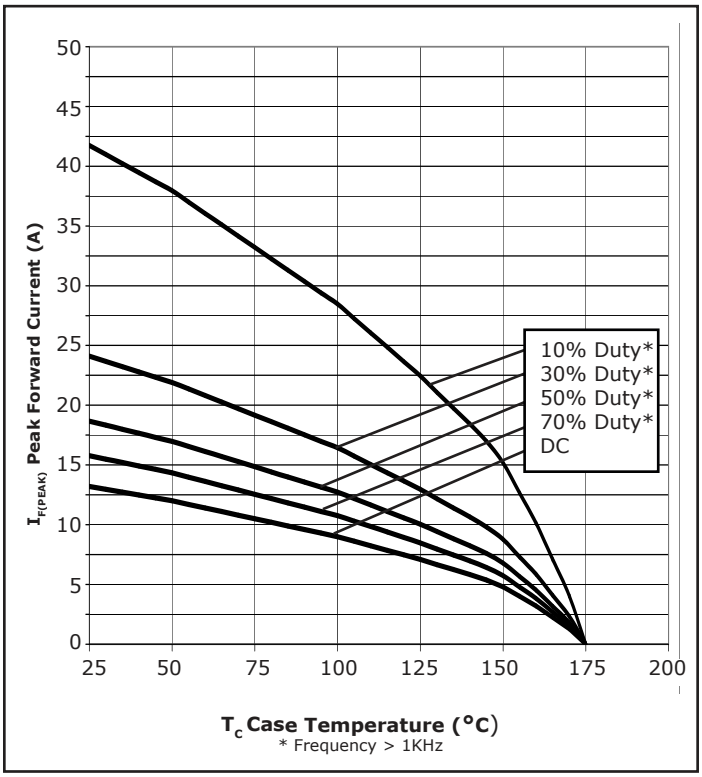


Figure 3. Current Derating

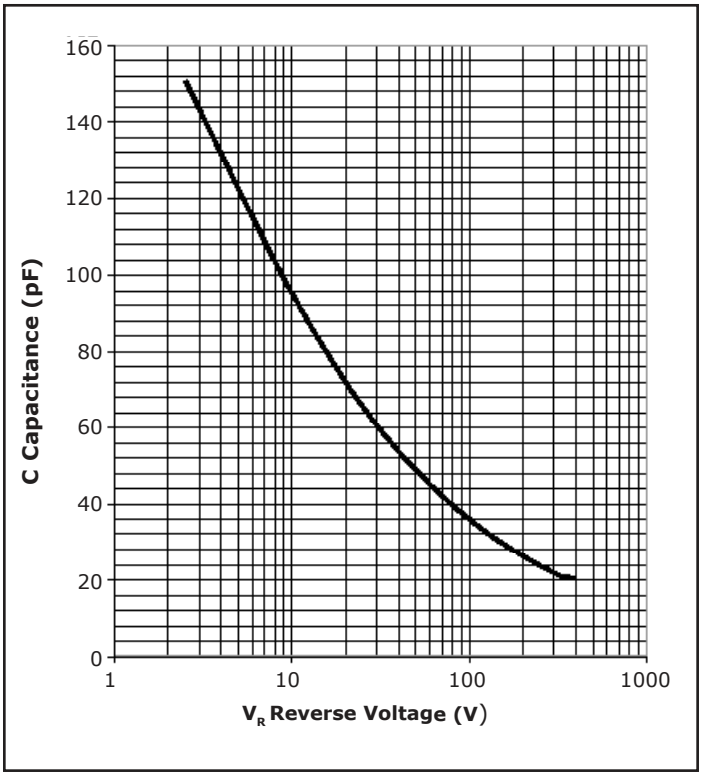


Figure 4. Capacitance vs. Reverse Voltage

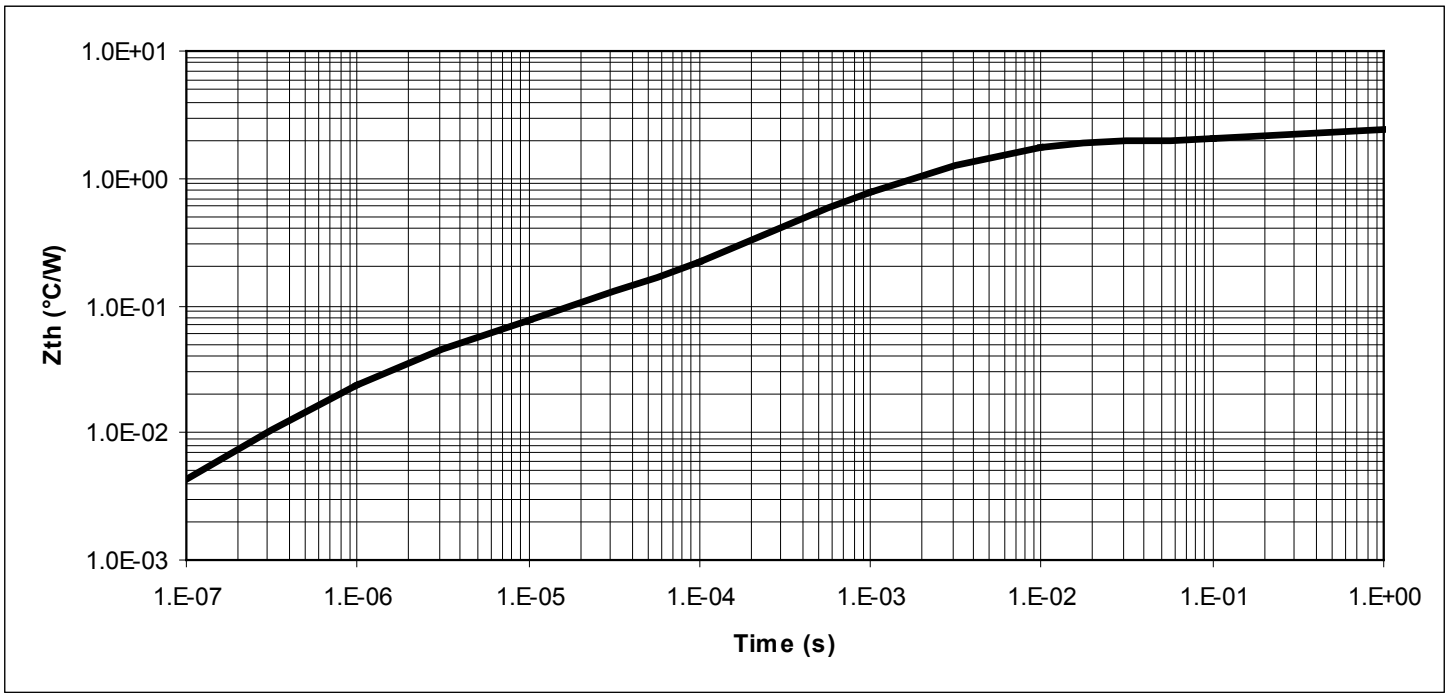


Figure 5. Transient Thermal Impedance

Typical Performance

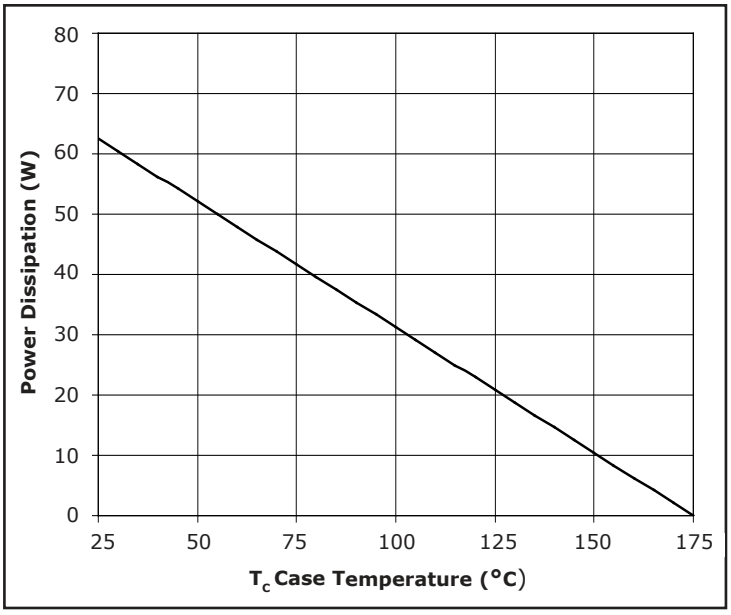
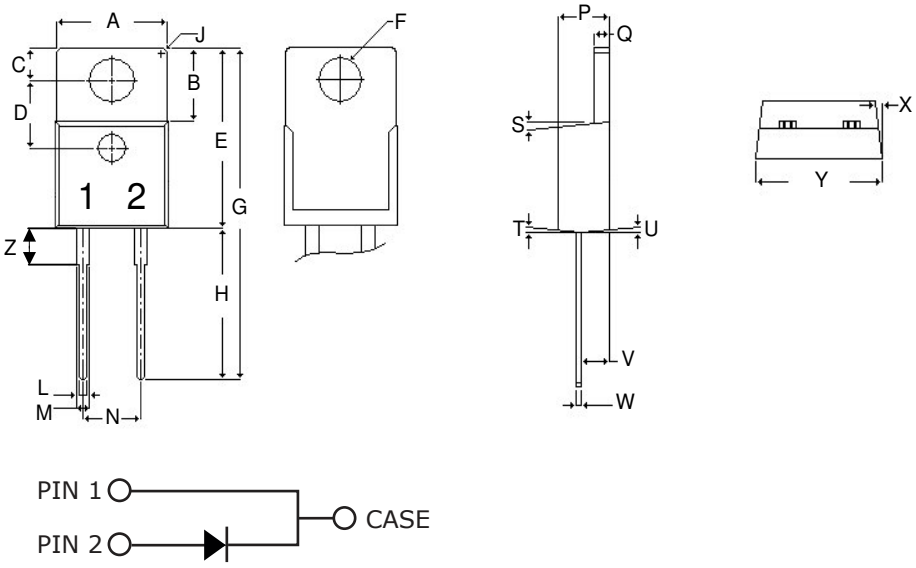


Figure 6. Power Derating

Package Dimensions

Package TO-220-2

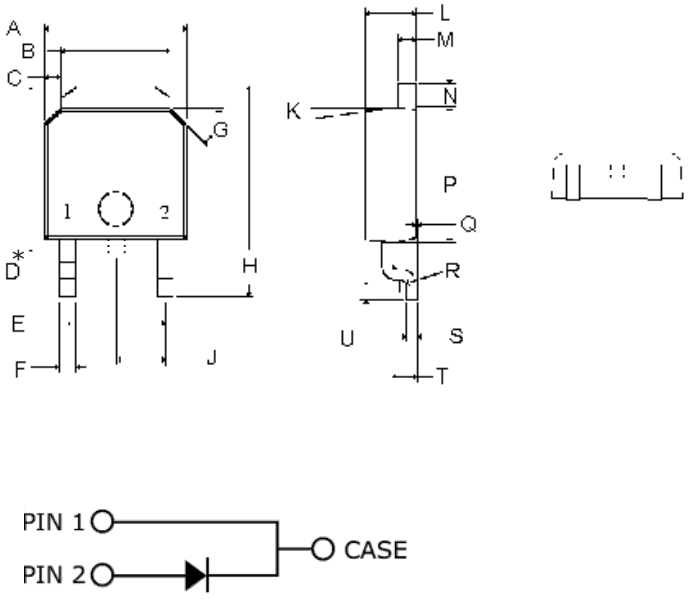


POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.381	.410	9.677	10.414
B	.235	.255	5.969	6.477
C	.100	.120	2.540	3.048
D	.223	.337	5.664	8.560
E	.590	.615	14.986	15.621
F	.143	.153	3.632	3.886
G	1.105	1.147	28.067	29.134
H	.500	.550	12.700	13.970
J	R 0.197		R 0.197	
L	.025	.036	.635	.914
M	.045	.055	1.143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

Package Dimensions

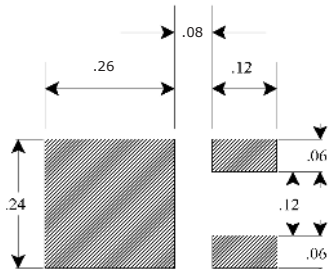
Package TO-252-2



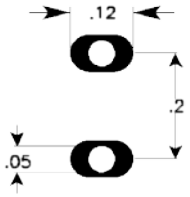
POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.255	.265	6.477	6.731
B	.197	.205	5.004	5.207
C	.027	.033	.686	.838
D*	.270	.322	6.858	8.179
E	.178	.182	4.521	4.623
F	.025	.035	.635	.889
G	44°	46°	44°	46°
H	.382	.397	9.703	10.084
J	.090 TYP		2.286 TYP	
K	6°	8°	6°	8°
L	.086	.094	2.184	2.388
M	.030	.034	.762	.864
N	.040	.044	1.016	1.118
P	.235	.245	5.969	6.223
Q	0.00	.004	0.00	.102
R	R0.01 TYP		R0.31 TYP	
S	.017	.023	.428	.588
T	.040	.044	1.016	1.118
U	.021	.027	.534	1.118

Note:
* Tab "D" may not be present

Recommended Solder Pad Layout



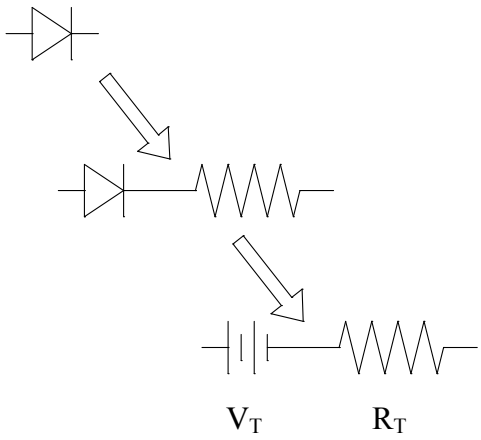
TO-252-2



TO-220-2

Part Number	Package	Marking
CSD04060A	TO-220-2	CSD04060
CSD04060E	TO-252-2	CSD04060

Diode Model



$$Vf_T = V_T + If * R_T$$

$$V_{T=} 0.965 + (T_j * -1.3*10^{-3})$$
$$R_{T=} 0.096 + (T_j * 1.06*10^{-3})$$

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 "

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