

C3D02060E Silicon Carbide Schottky Diode

Z- Rec^{TM} Rectifier

Features

- 600-Volt Schottky Rectifier
- Optimized for PFC Boost Diode Application
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- 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
 - Typical PFC P_{out}: 300W-450W

Package



V_{RRM} =

Q

 $I_{F}(T_{c}=135^{\circ}C) = 4 \text{ A}$

=

600 V

4.8 nC

TO-252-2



Part Number	Package	Marking	
C3D02060E	TO-252-2	C3D02060	

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	Continuous Forward Current	8 4 2	A	T _c =25°C T _c =135°C T _c =162°C	
I _{frm}	Repetitive Peak Forward Surge Current	12 9	А	$T_c=25$ °C, $t_p=10$ mS, Half Sine Wave D=0.3 $T_c=110$ °C, $t_p=10$ mS, Half Sine Wave D=0.3	
I _{FSM}	Non-Repetitive Peak Forward Surge Current	21 19	А	$T_c=25$ °C, $t_p=10$ mS, Half Sine Wave D=0.3 $T_c=110$ °C, $t_p=10$ mS, Half Sine Wave D=0.3	
I _{FSM}	Non-Repetitive Peak Forward Surge Current	65	А	$T_c=25^{\circ}C$, $t_p=10 \ \mu$ S, Pulse	
P _{tot}	Power Dissipation	39.5 17	W	$T_c=25^{\circ}C$ $T_c=110^{\circ}C$	
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	Тур.	Max.	Unit	Test Conditions	Note
V _F	Forward Voltage	1.5 1.8	1.7 2.4	V	$I_{F} = 2 A T_{J} = 25^{\circ}C$ $I_{F} = 2 A T_{J} = 175^{\circ}C$	
I _R	Reverse Current	10 20	50 100	μA	$V_{R} = 600 V T_{J} = 25^{\circ}C$ $V_{R} = 600 V T_{J} = 175^{\circ}C$	
Q _c	Total Capacitive Charge	4.8		nC	$V_{R} = 600 \text{ V}, I_{F} = 2A$ $di/dt = 500 \text{ A}/\mu\text{s}$ $T_{J} = 25^{\circ}\text{C}$	
С	Total Capacitance	120 12 11		pF	$ \begin{array}{l} V_{_R} = 0 \ V, \ T_{_J} = 25 \ ^\circ C, \ f = 1 \ \text{MHz} \\ V_{_R} = 200 \ V, \ T_{_J} = 25 \ ^\circ C, \ f = 1 \ \text{MHz} \\ V_{_R} = 400 \ V, \ T_{_J} = 25 \ ^\circ C, \ f = 1 \ \text{MHz} \end{array} $	

Note:

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

Thermal Characteristics

	Symbol	Parameter	Тур.	Unit
ſ	$R_{_{ ext{ hetaJC}}}$	TO-252 Package Thermal Resistance from Junction to Case	3.8	°C/W

Typical Performance

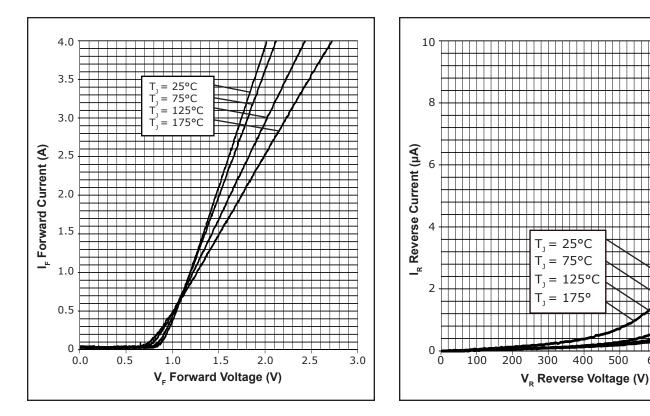
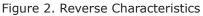


Figure 1. Forward Characteristics



400

500

600 700

800



Typical Performance

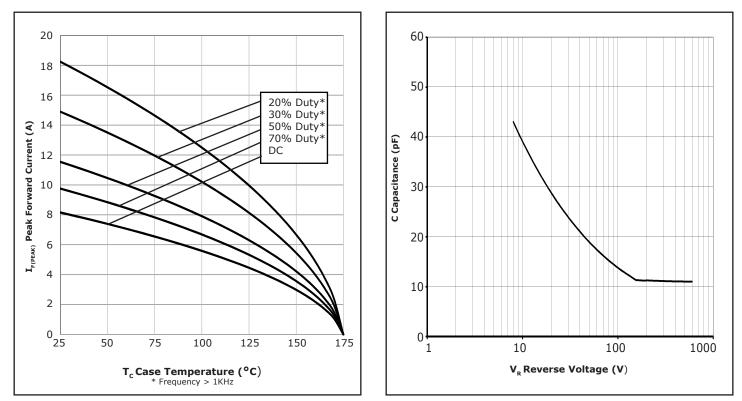


Figure 3. Current Derating

Figure 4. Capacitance vs. Reverse Voltage

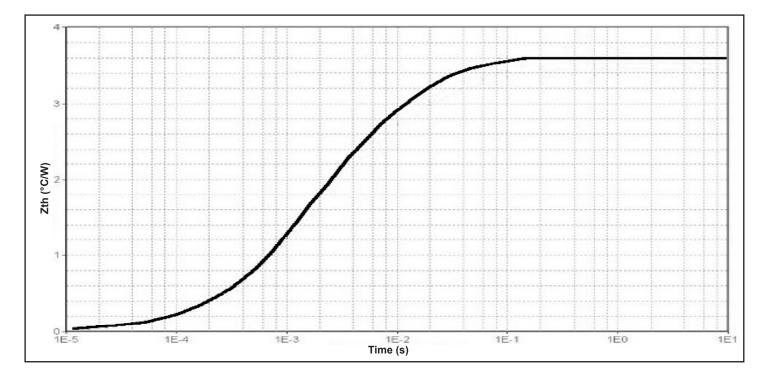


Figure 5. Transient Thermal Impedance



Typical Performance

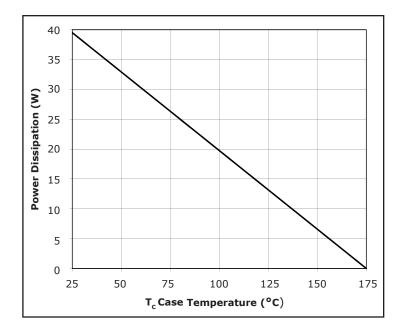
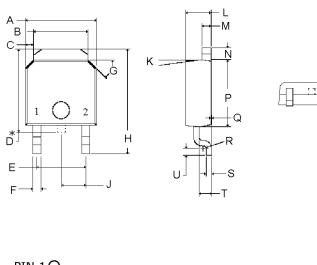


Figure 6. Power Derating

Package Dimensions

Package TO-252-2





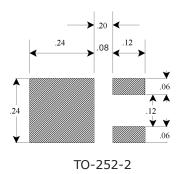
POS	Inc	hes	Millimeters		
POS	Min	Max	Min	Мах	
А	.250	.289	6.350	7.341	
В	.197	.215	5.004	5.461	
С	.027	.050	.686	1.270	
D*	.270	.322	6.858	8.179	
E	.178	.182	4.521	4.623	
F	.025	.045	.635	1.143	
G	44°	46°	44°	46°	
Н	.380	.410	9.652	10.414	
J	.090 TYP		2.286 TYP		
К	6°	8°	6°	8°	
L	.086	.094	2.184	2.388	
М	.018	.034	.457	.864	
Ν	.035	.050	.889	1.270	
Р	.231	.246	5.867	6.248	
Q	0.00	.005	0.00	.127	
R	R0.010 TYP		R0.254 TYP		
S	.017	.023	.432	.584	
Т	.038	.045	.965	1.143	
U	.021	.029	.533	.737	

Note:

* Tab "D" may not be present



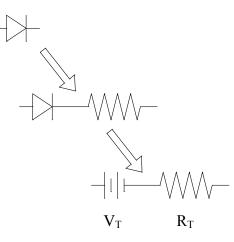
Recommended Solder Pad Layout



Part Number	Package	Marking	
C3D02060E	TO-252-2	C3D02060	

Note: Recommended soldering profiles can be found in the applications note here: http://www.cree.com/power_app_notes/soldering

Diode Model



$$Vf_T = V_T + If^*R_T$$

$$V_T = 0.98 + (T_J^* - 1.7^* 10^{-3})$$

 $R_T = 0.21 + (T_J^* 1.71^* 10^{-3})$

Note: T_i = Diode Junction Temperature In Degrees Celsius



Notes

• RoHS Compliance

The levels of RoHS 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 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree representative or from the Product Documentation sections of www.cree.com.

• REACh Compliance

REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Cree representative to insure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

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 \bigcirc 2013 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.

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