

# C3D03065E

## Silicon Carbide Schottky Diode

### Z-REC<sup>®</sup> RECTIFIER

$V_{RRM}$	=	650 V
$I_F (T_C=135^\circ\text{C})$	=	5.5 A
$Q_c$	=	6.7 nC

### Features

- 650-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  $V_F$

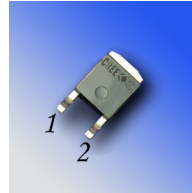
### Benefits

- 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



TO-252-2



Part Number	Package	Marking
C3D03065E	TO-252-2	C3D03065

### Maximum Ratings ( $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
$V_{RRM}$	Repetitive Peak Reverse Voltage	650	V		
$V_{RSM}$	Surge Peak Reverse Voltage	650	V		
$V_{DC}$	DC Blocking Voltage	650	V		
$I_F$	Continuous Forward Current	11.5 5.5 3	A	$T_C=25^\circ\text{C}$ $T_C=135^\circ\text{C}$ $T_C=160^\circ\text{C}$	
$I_{FRM}$	Repetitive Peak Forward Surge Current	18 13.5	A	$T_C=25^\circ\text{C}$ , $t_p=10$ mS, Half Sine Wave D=0.3 $T_C=110^\circ\text{C}$ , $t_p=10$ mS, Half Sine Wave D=0.3	
$I_{FSM}$	Non-Repetitive Peak Forward Surge Current	26 23	A	$T_C=25^\circ\text{C}$ , $t_p=10$ mS, Half Sine Wave D=0.3 $T_C=110^\circ\text{C}$ , $t_p=10$ mS, Half Sine Wave D=0.3	
$I_{FSM}$	Non-Repetitive Peak Forward Surge Current	100	A	$T_C=25^\circ\text{C}$ , $t_p=10$ $\mu\text{S}$ , Pulse	
$P_{tot}$	Power Dissipation	53 23	W	$T_C=25^\circ\text{C}$ $T_C=110^\circ\text{C}$	
$T_J, T_{stg}$	Operating Junction and Storage Temperature	-55 to +175	$^\circ\text{C}$		

## Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$V_F$	Forward Voltage	1.5 1.8	1.8 2.4	V	$I_F = 3\text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 3\text{ A}$ $T_J = 175^\circ\text{C}$	
$I_R$	Reverse Current	10 20	50 100	$\mu\text{A}$	$V_R = 650\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 650\text{ V}$ $T_J = 175^\circ\text{C}$	
$Q_C$	Total Capacitive Charge	6.7		nC	$V_R = 650\text{ V}$ , $I_F = 3\text{ A}$ $di/dt = 500\text{ A}/\mu\text{S}$ $T_J = 25^\circ\text{C}$	
C	Total Capacitance	155 13 12		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
$R_{\theta JC}$	TO-252 Package Thermal Resistance from Junction to Case	2.8	$^\circ\text{C}/\text{W}$

## Typical Performance

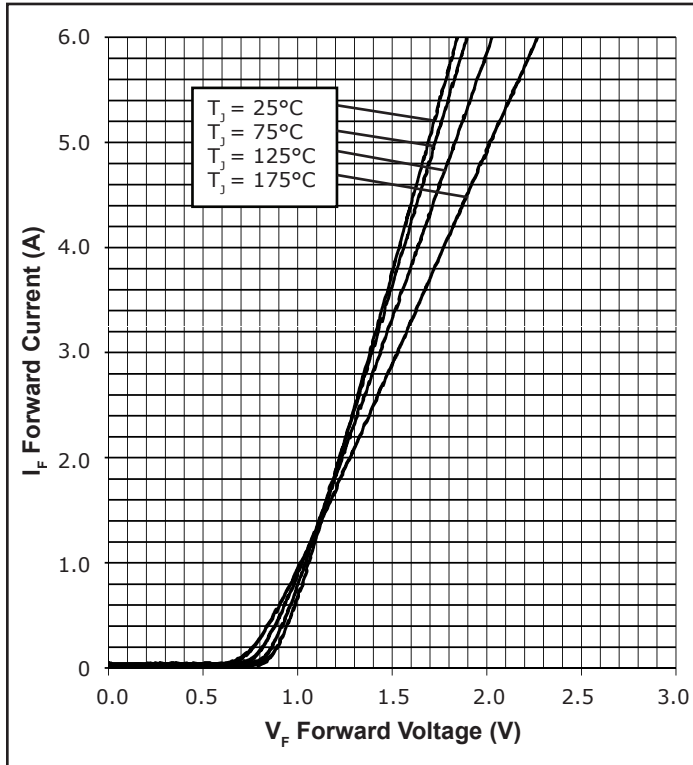


Figure 1. Forward Characteristics

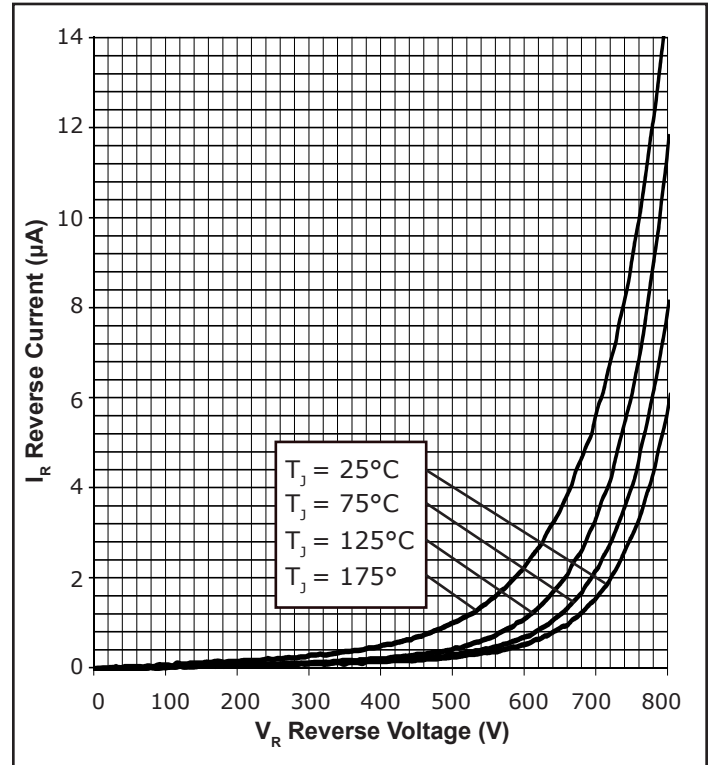


Figure 2. Reverse Characteristics

### Typical Performance

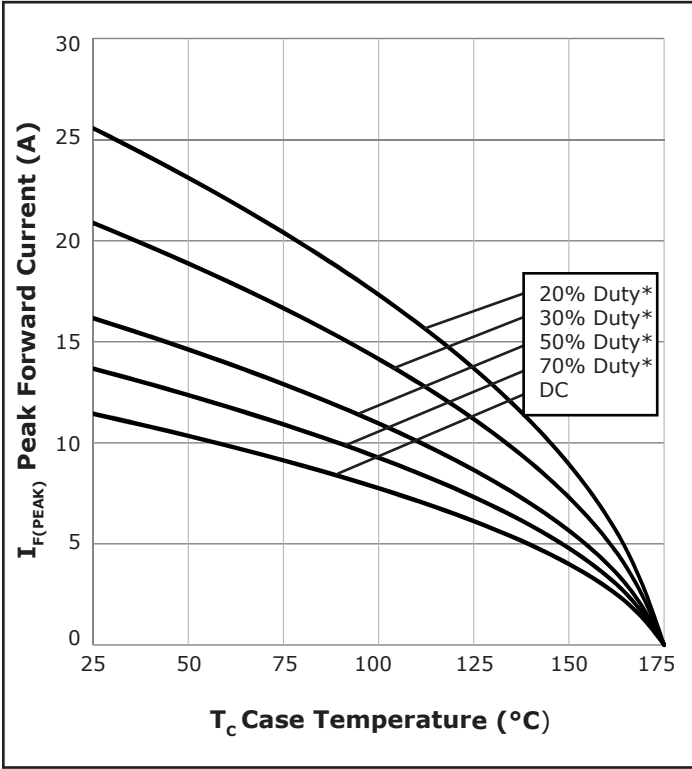


Figure 3. Current Derating

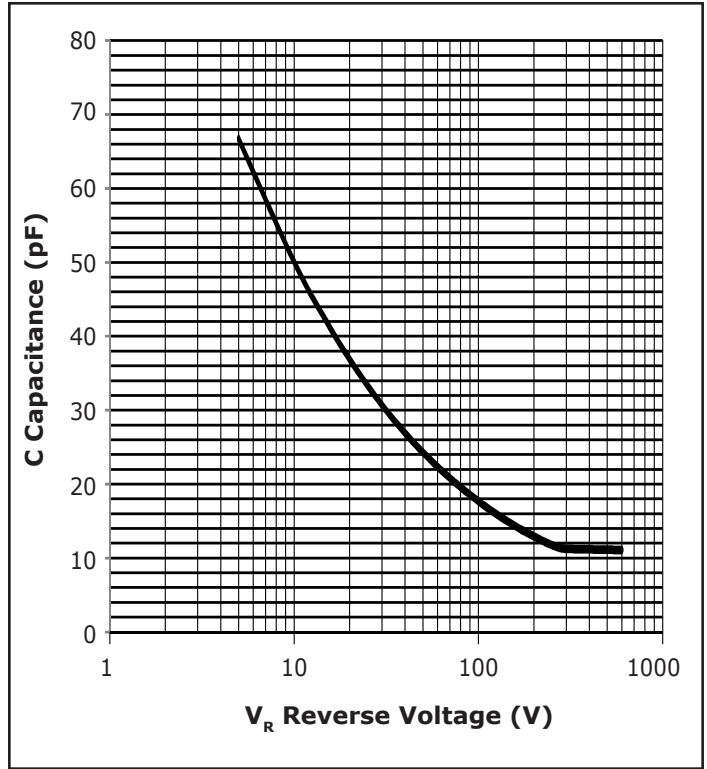


Figure 4. Capacitance vs. Reverse Voltage

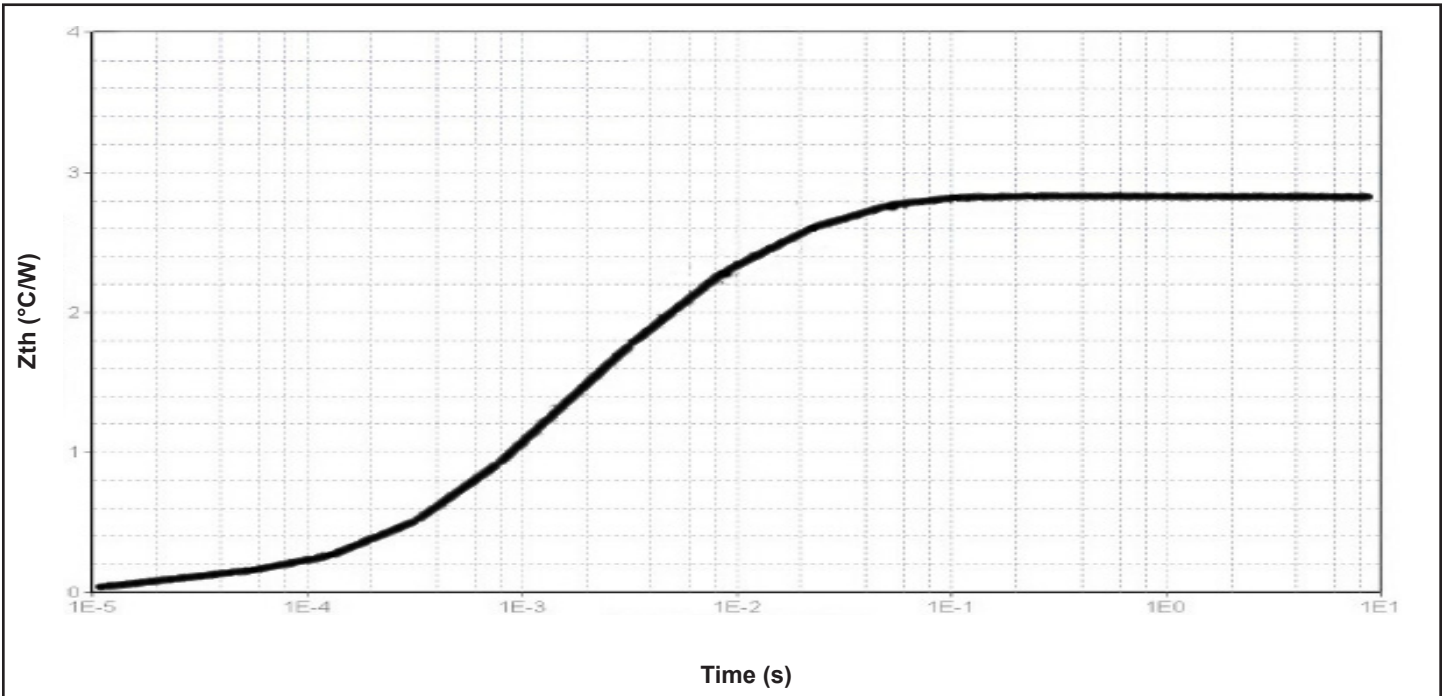


Figure 5. Transient Thermal Impedance

## Typical Performance

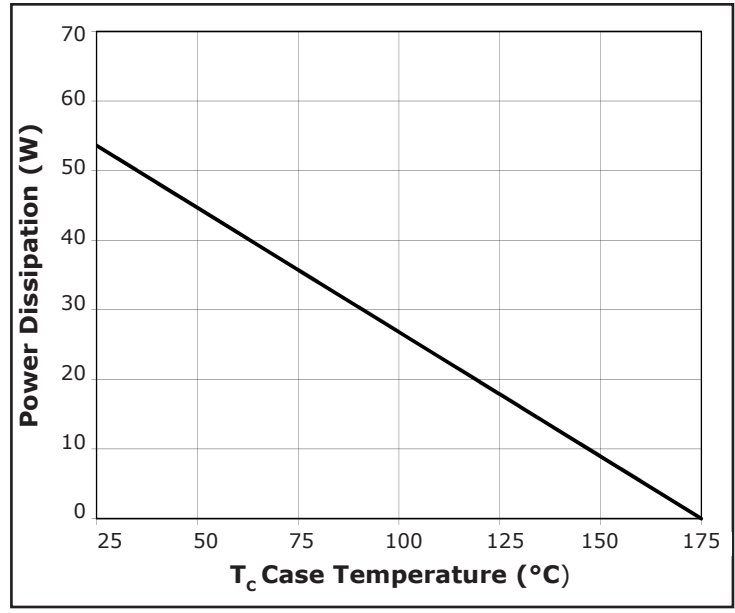
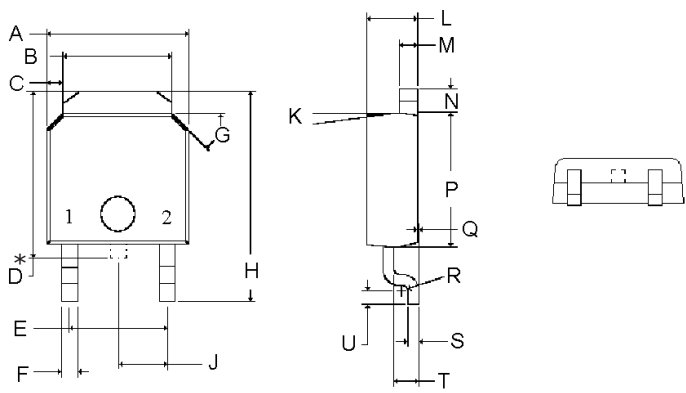


Figure 6. Power Derating

## Package Dimensions

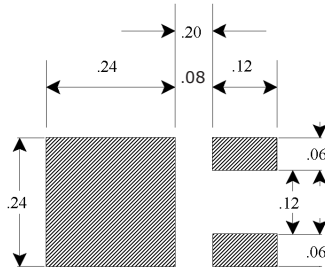
Package TO-252-2



POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.250	.289	6.350	7.341
B	.197	.215	5.004	5.461
C	.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°
H	.380	.410	9.652	10.414
J	.090 TYP		2.286 TYP	
K	6°	8°	6°	8°
L	.086	.094	2.184	2.388
M	.018	.034	.457	.864
N	.035	.050	.889	1.270
P	.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
T	.038	.045	.965	1.143
U	.021	.029	.533	.737

Note:  
\* Tab "D" may not be present

## Recommended Solder Pad Layout



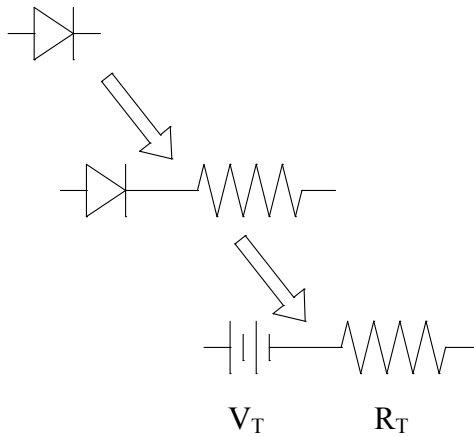
TO-252-2

Part Number	Package	Marking
C3D03065E	TO-252-2	C3D03065

Note: Recommended soldering profiles can be found in the applications note here: [http://www.cree.com/power\\_app\\_notes/soldering](http://www.cree.com/power_app_notes/soldering)



## Diode Model



$$V_T = V_T + I_f * R_T$$

$$V_T = 1.01 + (T_j * -1.26 * 10^{-3})$$

$$R_T = 0.14 + (T_j * 1.13 * 10^{-3})$$

Note: T<sub>j</sub> = Diode Junction Temperature In Degrees Celsius, valid from 25°C to 175°C



## Notes

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- **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](http://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, or air traffic control systems.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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