中电国基南方集团有限公司

WS3A030065K

Silicon Carbide Schottky Diode

V_{RRM}	=	650	V
I_F (T_C≤135℃)	=	36	A**
Q_C	=	72	nC**

Features

- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- Positive Temperature Coefficient on V_F
- Temperature-independent Switching
- 175°C Operating Junction Temperature

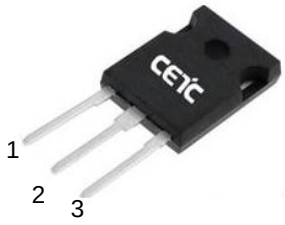
Benefits

- Replace Bipolar with Unipolar Device
- Reduction of Heat Sink Size
- Parallel Devices Without Thermal Runaway
- Essentially No Switching Losses

Applications

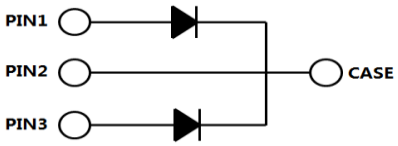
- Switch Mode Power Supplies
- Power Factor Correction
- AC/DC converters

Package



RoHS

TO-247-3



Part Number	Package	Marking
WS3A030065K	TO-247-3	WS3A030065K

Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	650	V	T_C = 25℃	
V_{RSM}	Surge Peak Reverse Voltage	650	V	T_C = 25℃	
V_R	DC Blocking Voltage	650	V	T_C = 25℃	
I_F	Forward Current (Per leg/Device)	39/78 18/36 15/30	A	T_C ≤ 25℃ T_C ≤ 135℃ T_C ≤ 151℃	
I_{FSM}	Non-Repetitive Forward Surge Current	135*	A	T_C = 25℃, t_p = 8.3ms, Half Sine Wave	
P_{tot}	Power Dissipation (Per leg/Device)	161/ 322	W	T_C = 25℃	Fig.3
T_C	Maximum Case Temperature	151	℃		
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to 175	℃		
	TO-247 Mounting Torque	1	Nm	M3 Screw	

*Per Leg, **Per Device

Electrical Characteristics (Per Leg)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.4 1.75	1.65 2.3	V	I_F = 15A, T_J = 25˚C I_F = 15A, T_J = 175˚C	Fig.1
I_R	Reverse Current	1 5	20 100	μA	V_R = 650V, T_J = 25˚C V_R = 650V, T_J = 175˚C	Fig.2
C	Total Capacitance	865 88 72	/	pF	V_R = 0V, T_J = 25˚C, f = 1MHz V_R = 200V, T_J = 25˚C, f = 1MHz V_R = 400V, T_J = 25˚C, f = 1MHz	Fig.5
Q_C	Total Capacitive Charge	36	/	nC	V_R = 650V, I_F = 15A di/dt = 200A/μs, T_J = 25˚C	Fig.4

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.93* 0.465**	˚C/W	Fig.6
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	80	˚C/W	
T_{sold}	Soldering Temperature	260	˚C	

*Per Leg, **Per Device

Typical Performance (Per Leg)

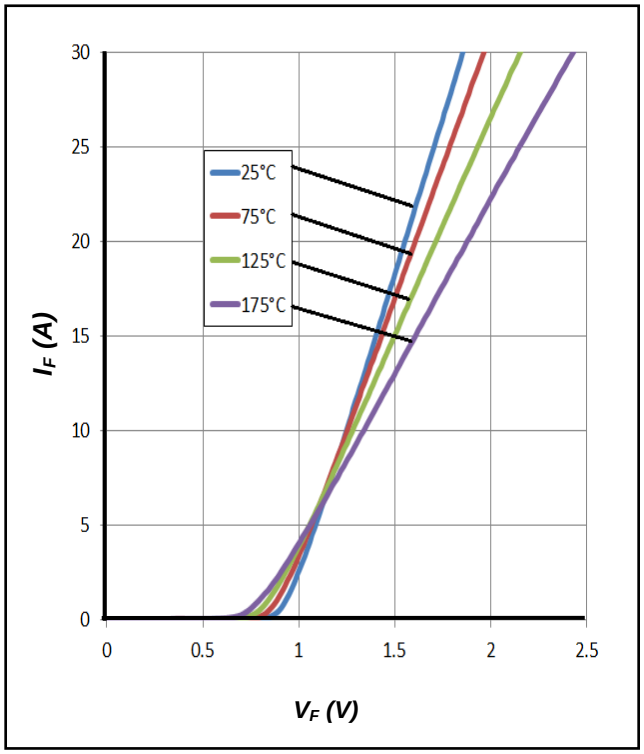


Figure 1. Forward Characteristics

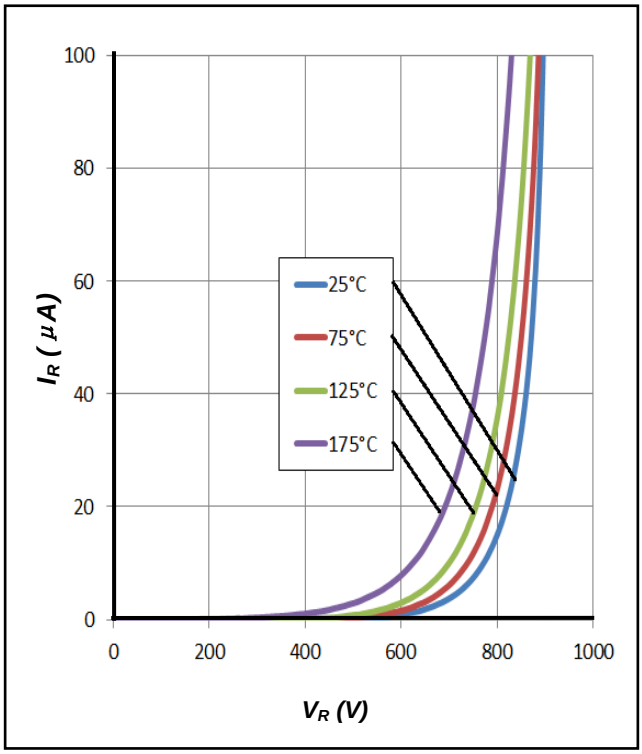


Figure 2. Reverse Characteristics

Typical Performance (Per Leg)

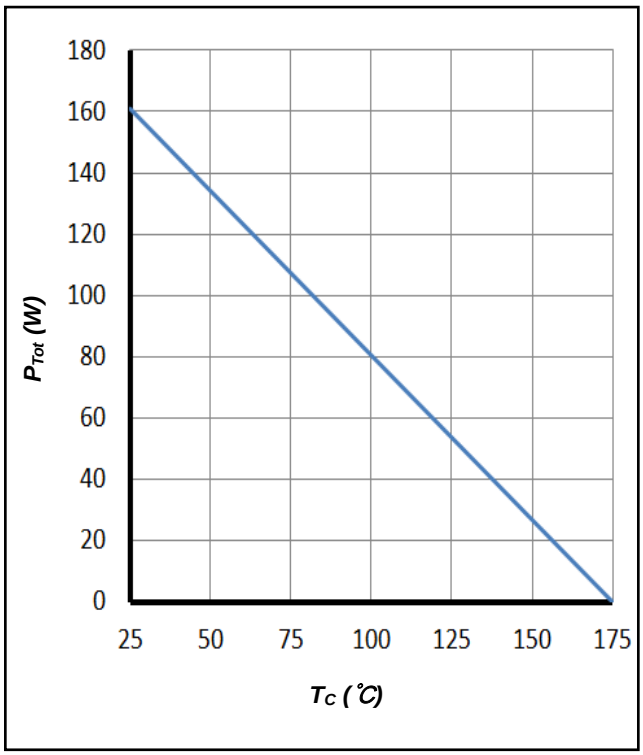


Figure 3. Power Derating

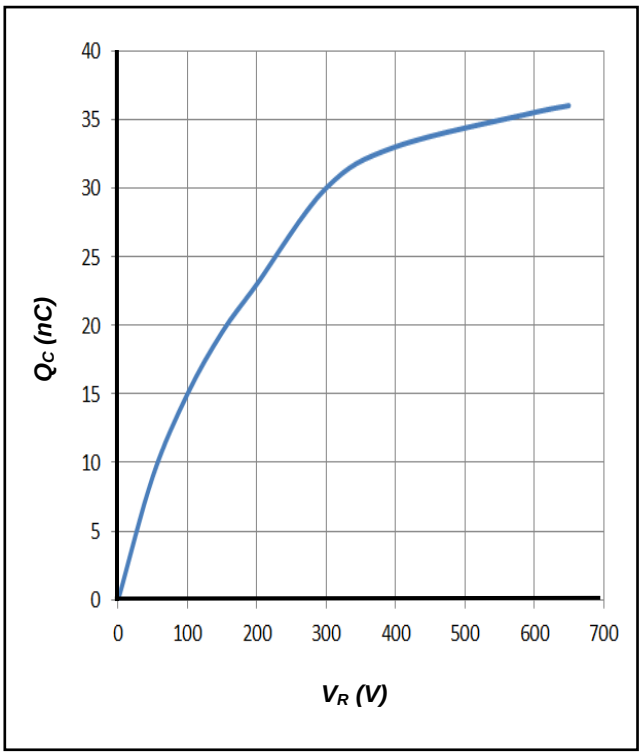


Figure 4. Total Capacitive Charge vs. Reverse Voltage

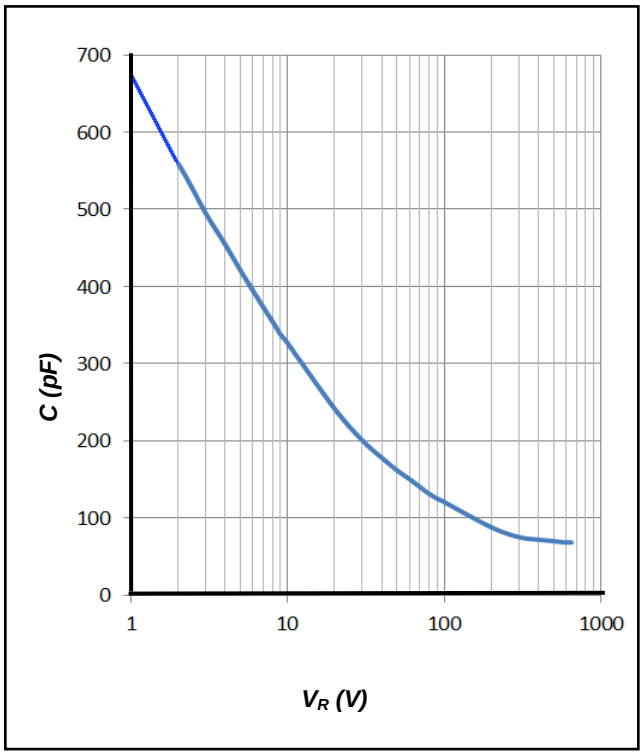


Figure 5. Total Capacitance vs. Reverse Voltage

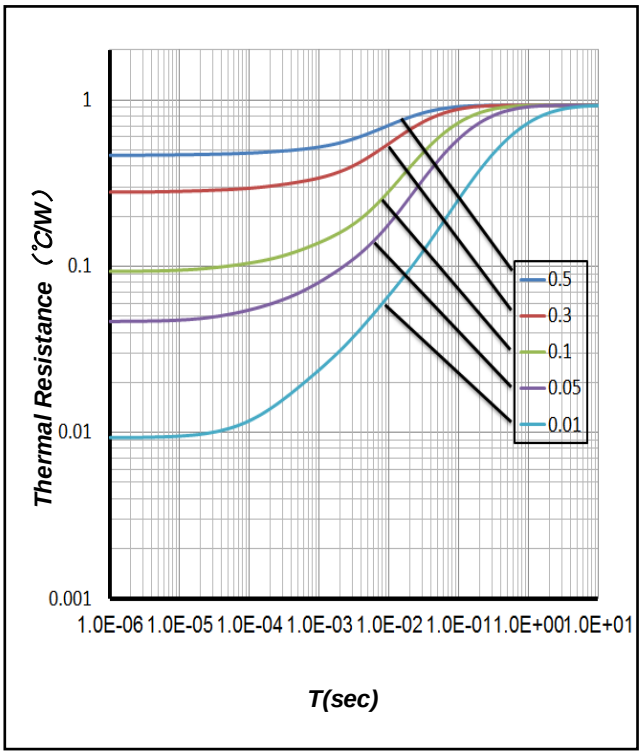
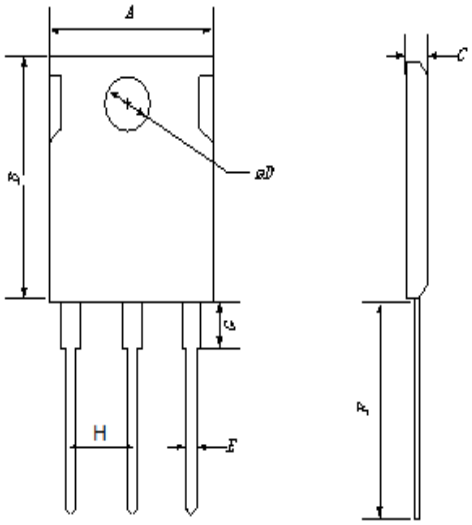
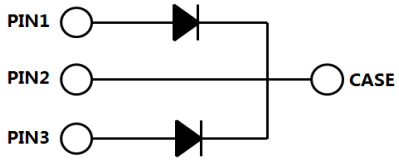


Figure 6. Transient Thermal Impedance

Package Dimensions

Package TO-247-3

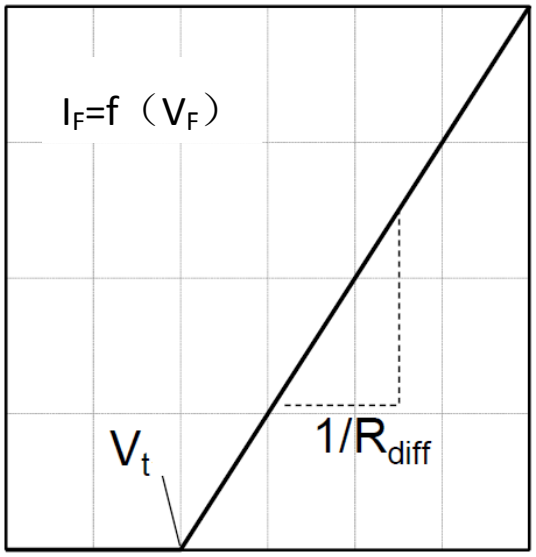




Symbol	Min. (mm)	Typ. (mm)	Max. (mm)
A	14.18	15.75	17.33
B	18.45	20.5	22.55
C	4.50	5.00	5.50
D	3.15	3.50	3.85
E	1.08	1.20	1.32
F	18.27	20.30	22.33
G	4.21	4.68	5.15
H	4.91	5.46	6.01

Simplified Diode Model (Per Leg)

Equivalent IV Curve for Model



Mathematical Equation

$$V_F=V_t + I_F \times R_{diff}$$

$$V_t = -0.0011 \times T_j + 0.982 \text{ [V]}$$

$$R_{diff} = 3.38 \times 10^{-7} \times T_j^2 + 2.78 \times 10^{-5} \times T_j + 0.0169 \text{ [}\Omega\text{]}$$

Note:

Tj = Diode Junction Temperature In Degrees Celsius, valid from 25°C to 175°C

I_F= Forward Current

Less than 60A

Notes

1) Before using our products, please contact our marketing managers and get the latest specifications.
2) Ongoing efforts are being made to improve the reliability and quality of the products by CETC, but the semiconductors can malfunction due to various factors.
Therefore, in order to prevent artificial damage or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. CETC doesn't have responsibility for any damages arising from the use of our products beyond the rating specified by CETC.
3) All the information contained in this document, such as the examples of application circuits, circuit constants, is provided only to illustrate the standard usage and operations of the products. The other relevant conditions must be taken into consideration when designing circuits for mass production.
4) The information specified in this document is intended only to show the typical functions and examples of application circuits for the products. CETC does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by CETC or any other parties. CETC shall have no responsibility whatsoever for any dispute arising from the use of such technical information.
5) The products specified in this document are not designed to be radiation tolerant.
6) For use of our products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a CETC representative: transportation equipment (cars, ships, trains, etc.), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, and power transmission systems.
7) Do not use our products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems and submarine repeaters.
8) CETC shall not be responsible for any damages or injury caused by non-compliance with the recommended usage conditions and specifications contained in this document.
9) CETC has used reasonable care to ensure the accuracy of the information contained in this document. However, CETC does not guarantee the information contained in this document is totally correct, and CETC doesn't have responsibility for any damages arising from any inaccuracy or misprint of such information.
10) Please use the products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a CETC marketing manager. CETC doesn't have responsibility for any damages or losses arising from disobedience to any relevant laws or regulations.
11) When providing our products and technologies contained in this document to other countries or regions, you must comply with the procedures and provisions stipulated by all the applicable export laws and regulations, including but not limited to the relevant laws or regulations.
12) The information contained in this document is subject to change without notice.
13) Neither part nor all of this file is allowed to be reprinted or reproduced without authorization of CETC.
14) CETC reserves the right to the final interpretation.

ADD: No.166 Zhengfang Middle Road, Jiangning District, Nanjing, Jiangsu Province
Contact Person: YONG YANG, NAN WANG
TEL：025-68005861, 13770574989