中电国基南方集团有限公司

WS3A060065K

Silicon Carbide Schottky Diode

V_{RRM}	=	650	V
I_F (T_C≤135℃)	=	70	A**
Q_C	=	132	nC**

Features

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

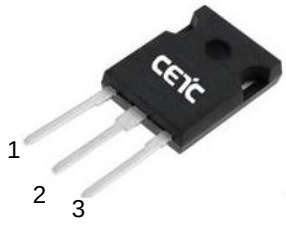
Benefits

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

Applications

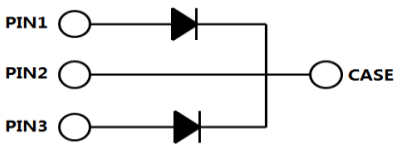
- Switch Mode Power Supplies
- Power Factor Correction
- Motor drive, PV Inverter, Wind Power Station

Package



RoHS

TO-247-3



Part Number	Package	Marking
WS3A060065K	TO-247-3	WS3A060065K

Maximum Ratings

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	650	V	T_C = 25˚C	
V_{RSM}	Surge Peak Reverse Voltage	650	V	T_C = 25˚C	
V_R	DC Blocking Voltage	650	V	T_C = 25˚C	
I_F	Forward Current (Per leg/Device)	35/70 30/60	A	T_C ≤ 135˚C T_C ≤ 140˚C	
I_{FSM}	Non-Repetitive Forward Surge Current	210*	A	T_C = 25˚C, t_p = 8.3ms, Half Sine Wave	
P_{tot}	Power Dissipation(Per leg/Device)	234/ 468	W	T_C = 25˚C	Fig.3
T_C	Maximum Case Temperature	140	˚C		
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to 175	˚C		
	TO-247 Mounting Torque	1	Nm	M3 Screw	

*Per Leg, **Per Device

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Electrical Characteristics (Per Leg)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.5 1.78	1.8 2.3	V	I_F = 30A, T_J = 25˚C I_F = 30A, T_J = 175˚C	Fig.1
I_R	Reverse Current	2 15	20 200	μA	V_R = 650V, T_J = 25˚C V_R = 650V, T_J = 175˚C	Fig.2
C	Total Capacitance	1805 176 145	/	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	66	/	nC	V_R = 650V, I_F = 30A 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	0.64* 0.32**	˚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)

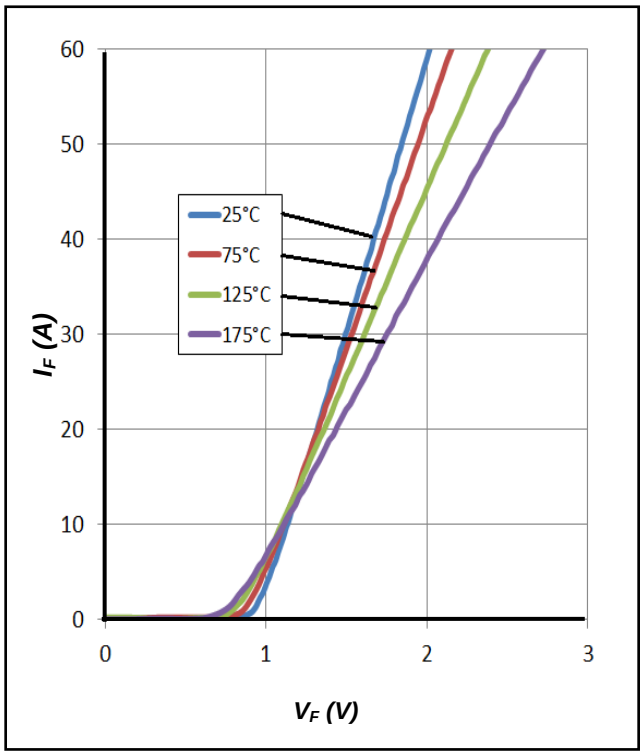

Figure 1. Forward Characteristics

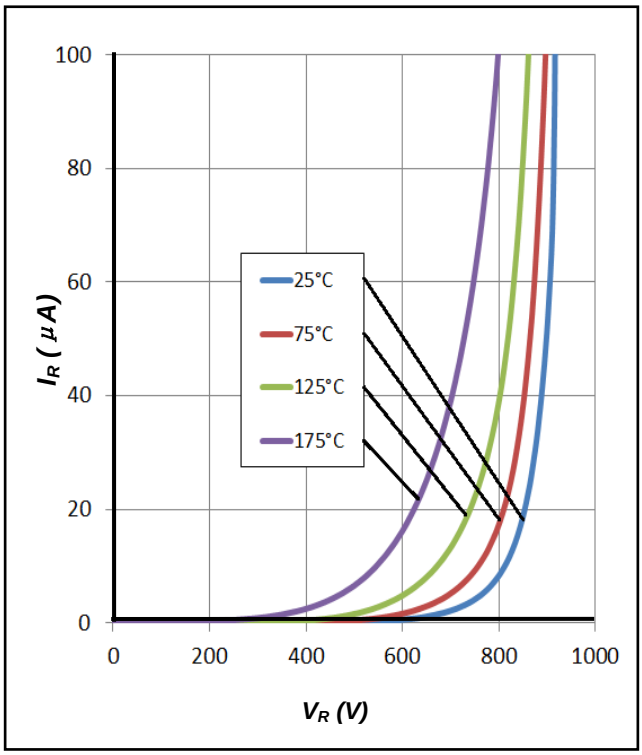

Figure 2. Reverse Characteristics

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Typical Performance (Per Leg)

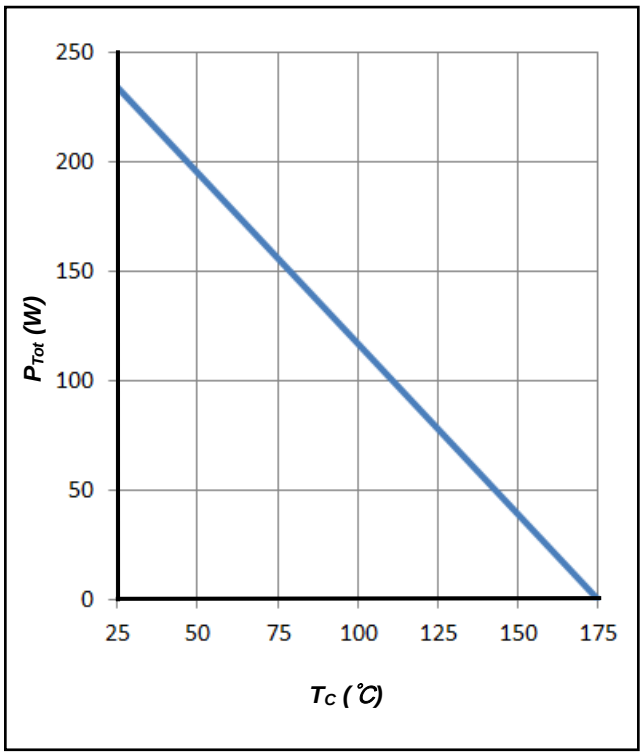

Figure 3. Power Derating

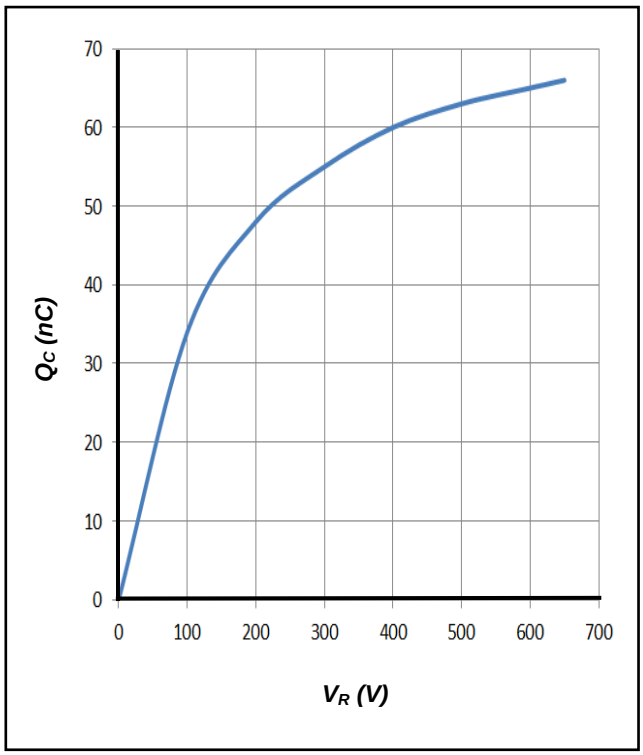

Figure 4. Total Capacitive Charge vs. Reverse Voltage

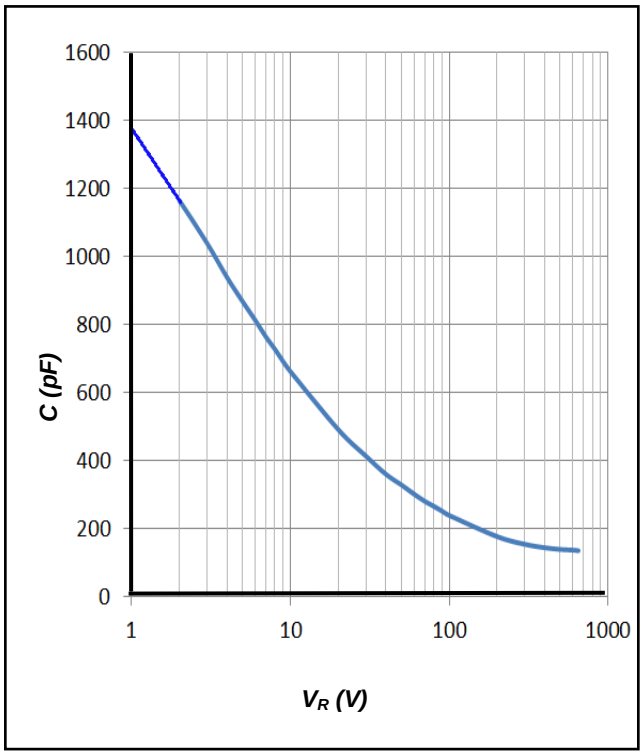

Figure 5. Total Capacitance vs. Reverse Voltage

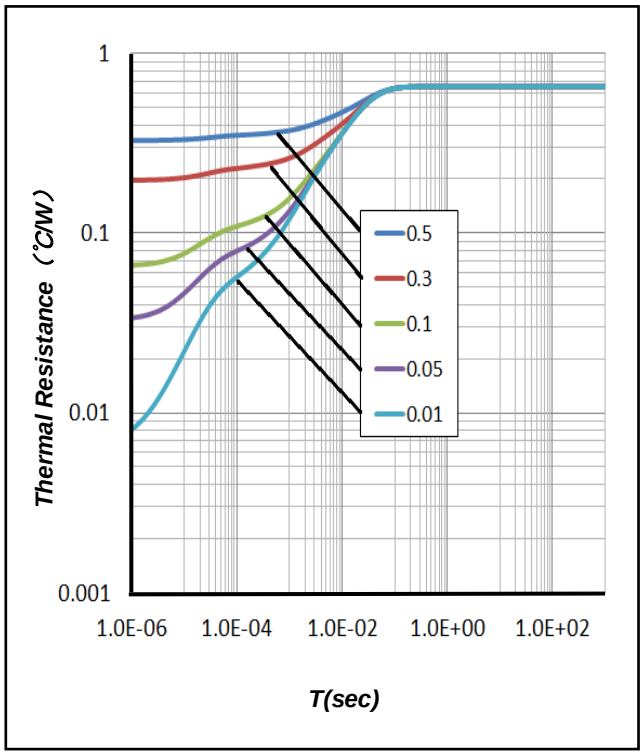

Figure 6. Transient Thermal Impedance

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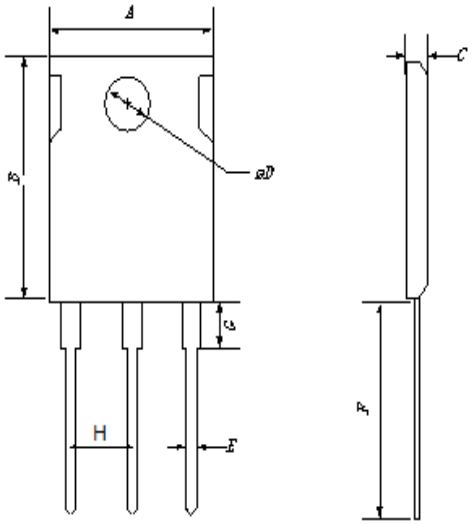
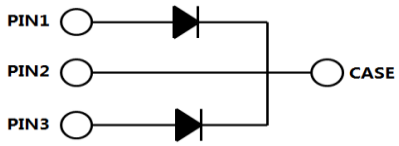
Package Dimensions

Package TO-247-3

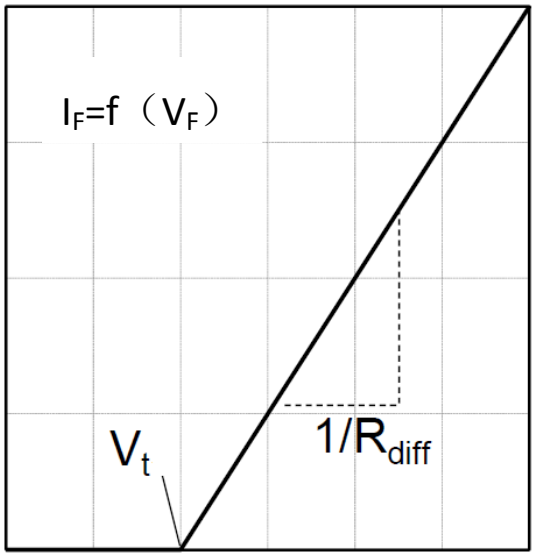




Symbol	Min. (mm)	Typ. (mm)	Max. (mm)
A	14.18	15.75	17.33
B	18.45	20.5	22.55
C	4.50	5.00	5.50
D	3.15	3.50	3.85
E	1.08	1.20	1.32
F	18.27	20.30	22.33
G	4.21	4.68	5.15
H	4.91	5.46	6.01

Simplified Diode Model (Per Leg)

Equivalent IV Curve for Model



Mathematical Equation

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

$V_t = -0.0011\times T_j + 0.98$ [V]

$R_{diff} = 3.38\times10^{-7}\times T_j^2 + 2.78\times10^{-5}\times T_j + 0.017$ [Ω]

Note:

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

I_F= Forward Current

Less than 60A

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