中电国基南方集团有限公司

WS4A020065D

Silicon Carbide Schottky Diode

G4 MPS Technology

V_{RRM}	=	650	V
I_F ($T_C \leq 130^\circ C$)	=	30	A
Q_C	=	41	nC

Features

- New Thin Wafer Technology
- Low Forward Voltage Drop (V_F)
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- Positive Temperature Coefficient on V_F
- Temperature-independent Switching

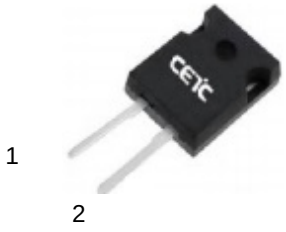
Benefits

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

Applications

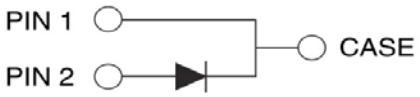
- Switch Mode Power Supplies
- Uninterruptible Power Supplies
- Motor drive, PV Inverter, Wind Power Station

Package



RoHS

TO-247-2



Part Number	Package	Marking
WS4A020065D	TO-247-2	WS4A020065D

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	30 20	A	$T_C \leq 135^\circ C$ $T_C \leq 154^\circ C$	
I_{FSM}	Non-Repetitive Forward Surge Current	160	A	T_C = 25℃, t_p = 8.3ms, Half Sine Wave	
P_{tot}	Power Dissipation	214	W	T_C = 25℃	Fig.3
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to 175	℃		
T_{sold}	Soldering Temperature	260	℃		

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.3 1.4	1.5 1.7	V	I_F = 20A, T_J = 25℃ I_F = 20A, T_J = 175℃	Fig.1
I_R	Reverse Current	10 40	100 400	μA	V_R = 650V, T_J = 25℃ V_R = 650V, T_J = 175℃	Fig.2
C	Total Capacitance	1210 124 90	/	pF	V_R = 0.1V, T_J = 25℃, f = 1MHz V_R =200V, T_J = 25℃, f = 1MHz V_R =400V, T_J = 25℃, f = 1MHz	Fig.5
Q_C	Total Capacitive Charge	41	/	nC	V_R = 400V, I_F = 20A di/dt = 200A/μs, T_J = 25℃	Fig.4

Thermal Characteristics

Symbol	Parameter	Typ.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.7	℃/W	Fig.6
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	80	℃/W	

Typical Performance

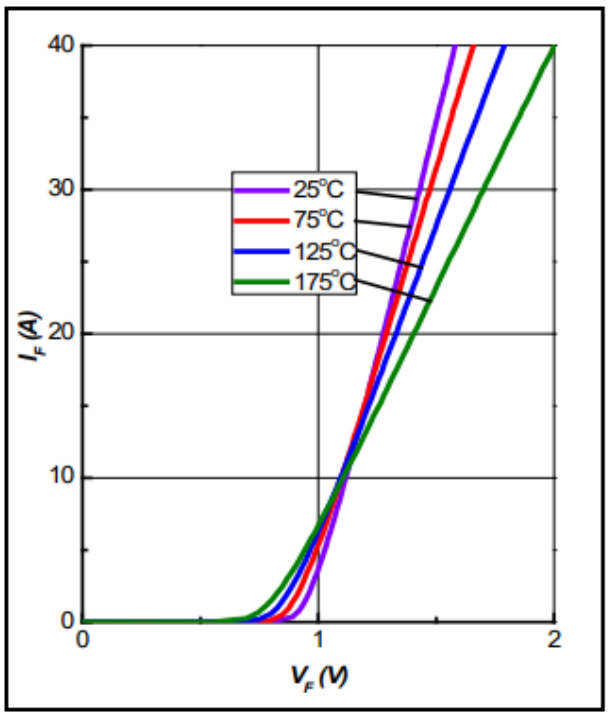


Figure 1. Forward Characteristics

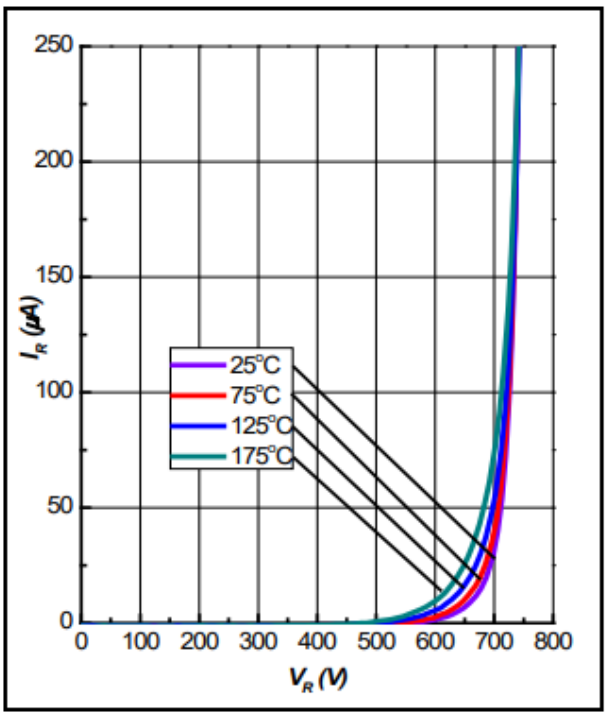


Figure 2. Reverse Characteristics

Typical Performance

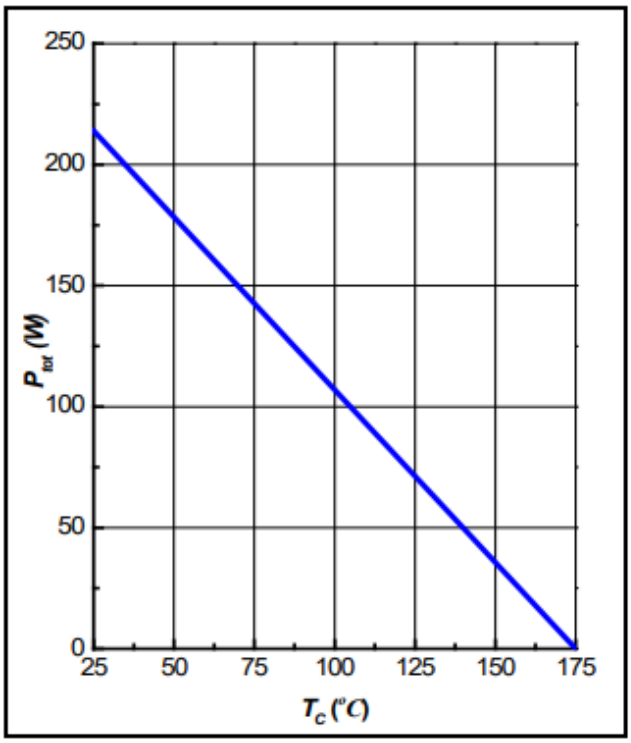


Figure 3. Power Derating

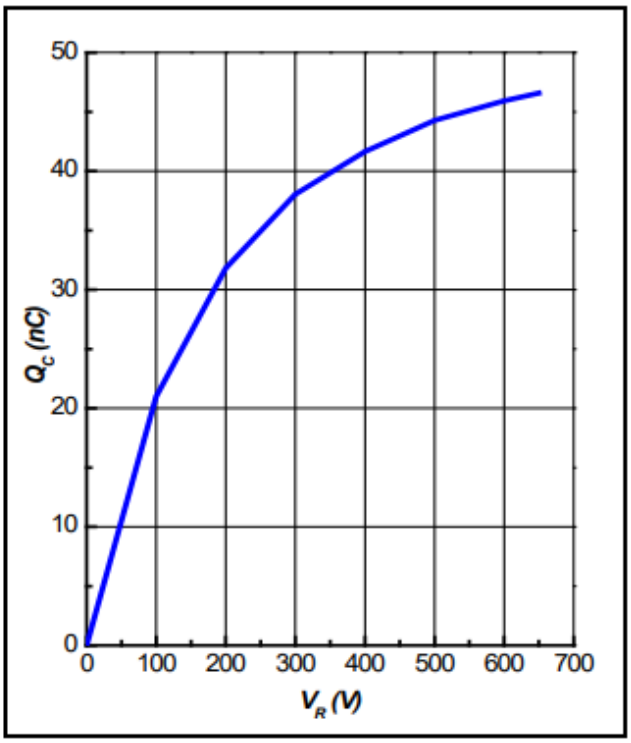


Figure 4. Total Capacitive Charge vs. Reverse Voltage

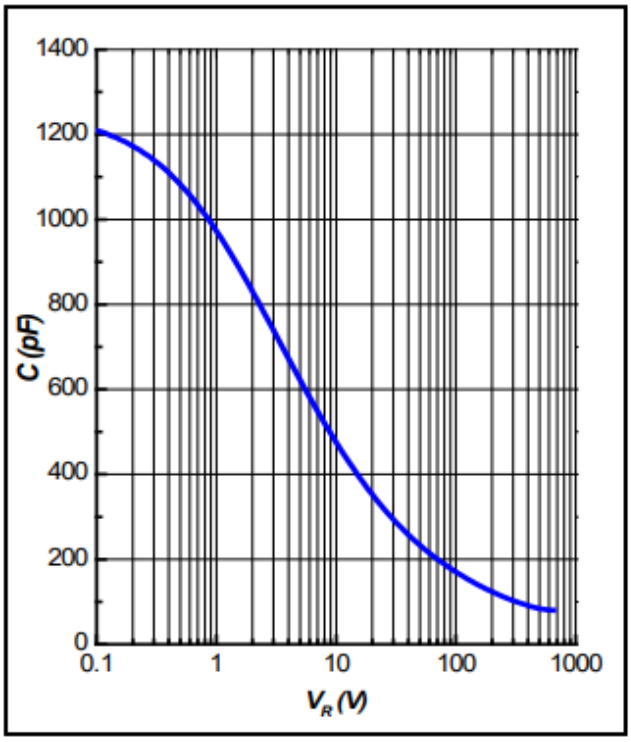


Figure 5. Total Capacitance vs. Reverse Voltage

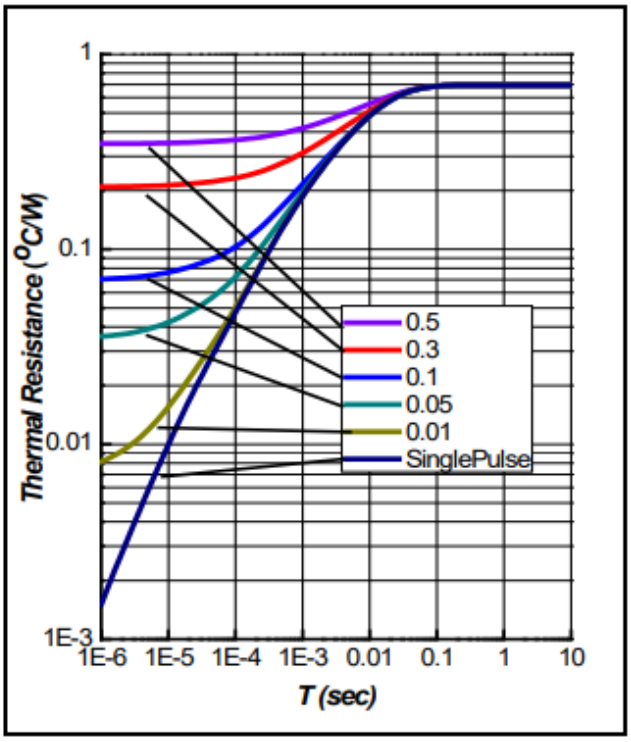
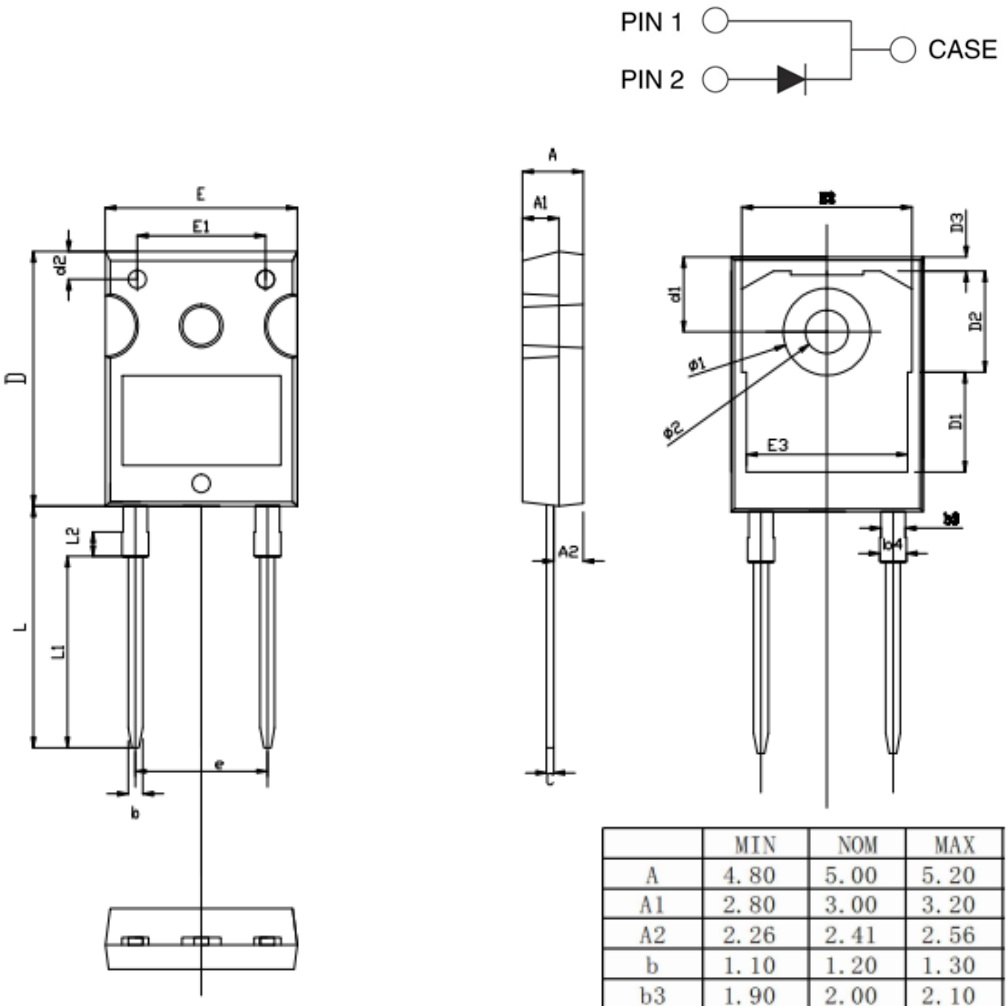


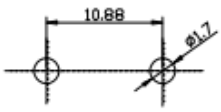
Figure 6. Transient Thermal Impedance

Package Dimensions

Package TO-247-2



RECOMMENDED LAND PATTERN

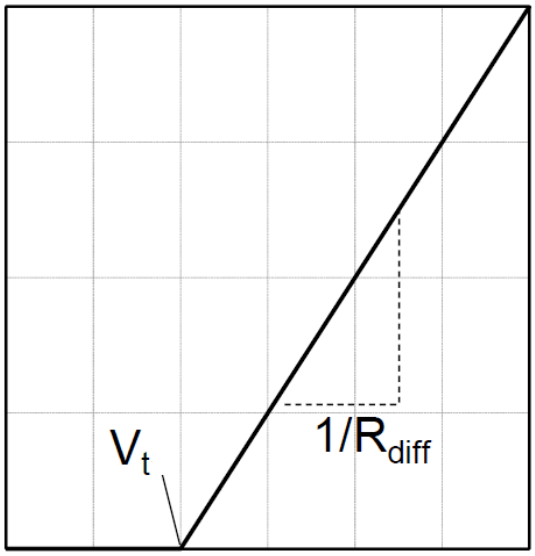


UNIT: mm

	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.80	3.00	3.20
A2	2.26	2.41	2.56
b	1.10	1.20	1.30
b3	1.90	2.00	2.10
b4	2.00	–	2.20
c	0.50	0.60	0.70
D	20.80	21.00	21.20
D1		8.23	
D2		8.32	
D3		1.17	
d1	6.00	6.15	6.30
d2	2.20	2.30	2.40
E	15.60	15.80	16.00
E1		10.50	
E2		14.02	
E3		13.50	
e		10.88	
L	19.72	19.92	20.12
L1		15.79	
L2		1.98	
⌀1	7.10	7.19	7.30
⌀2	3.50	3.60	3.70

Simplified Diode Model

Equivalent IV Curve for Model



Mathematical Equation

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

$V_t = -0.001 \times T_j + 0.99[V]$

$R_{diff} = 3.64 \times 10^{-7} \times T_j^2 - 2.27 \times 10^{-5} \times T_j + 0.015[\Omega]$

Note:

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

I_F= Forward Current

Less than 40A

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