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PCFFS05120AF Silicon Carbide Schottky Diode 1200 V, 5 A

Features

- Max Junction Temperature 175 °C
- · Avalanche Rated 55 mJ
- · High Surge Current Capacity
- · Positive Temperature Coefficient
- · Ease of Paralleling
- · No Reverse Recovery / No Forward Recovery

Applications

- · General Purpose
- · SMPS, Solar Inverter, UPS
- · Power Switching Circuits

Description

Silicon Carbide (SiC) Schottky Diodes use a completely new technology that provides superior switching performance and higher reliability compared to Silicon. No reverse recovery current, temperature dependent switching characteristics, and excellent thermal performance sets Silicon Carbide as the next generation of power semiconductor. System benefits include highest efficiency, faster operation frequency, increased power density, reduced EMI, and reduced system size and cost.

Die Information

• Wafer Diameter 6 inch

• Die Size 1,690 x 1,690 μm (include Scribe Lane)

Metallization

· Top Ti / TiN / AI 4μm · Back Ti/ NiV /Ag

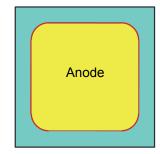
• Die Thickness Typ. $200\mu m$

· Bonding Pad Size

· Anode 1,110 × 1,110 μm

• Recommended Wire Bond (Note 1)

· Anode $12mil \times 1$



Electrical Characteristics on Wafer (Note 2) T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit	
V_R	Reverse Blocking Voltage	$I_R = 200 \mu A, T_C = 25 {}^{\circ}C$	1200	-	-	V	
V_{F}	Forward Voltage	I _F = 5A, T _C = 25 °C	1.20	-	1.75	V	
I _R	Reverse Current	V _R = 1200 V, T _C = 25 °C	-	-	200	μΑ	

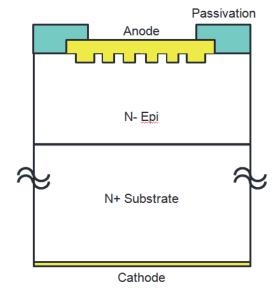
Notes:

- 1. Based on TO-247 package of ON Semiconductor
- 2. Tested 100% on wafer

Die Layout (Dimension: μm, except Scribe Lane)

1610 Anode

Cross Section



Passivation Information

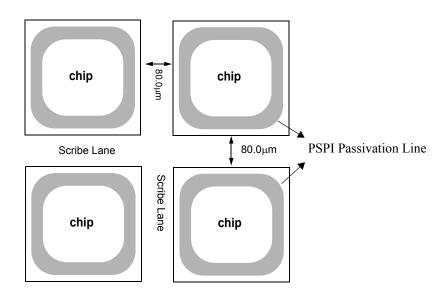
Passivation Area

- Passivation Material: Polymide (PSPI)

- Passivation Type: Local Passivation

- Passivation Thickness: 90KA

The Configuration of chips (Based on 6 inch wafer)



Sawn-on-film frame packing based on tested wafer

Absolute Maximum Ratings on TO-247 Package T_C = 25 °C unless otherwise noted.

Symbol	Parameter	Ratings	Unit	
V_{RRM}	Peak Repetitive Reverse Voltage	1200	V	
E _{AS}	Single Pulse Avalanche Energy	55	mJ	
l _F	Continuous Rectified Forward Current @ Tc < 148 °C		5	Α
I _{F, Max}	Non-Repetitive Peak Forward Surge Current	$T_C = 25 ^{\circ}\text{C}$, 10 µs	380	Α
		T _C = 150 °C, 10 μs	330	Α
I _{F,SM}	Non-Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3 \text{ ms}$	42	Α
I _{F,RM}	Repetitive Forward Surge Current	Half-Sine Pulse, t _p = 8.3 ms	21	Α
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +175	°C

Electrical Characteristics on TO-247 Package T_C = 25 °C unless otherwise noted.

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit	
		I _F = 5 A, T _C = 25 °C	-	1.45	1.75		
V _F		I _F = 5 A, T _C = 125 °C	-	1.7	2	V	
		I _F = 5 A, T _C = 175 °C	-	2	2.4		
I _R		V _R = 1200 V, T _C = 25 °C	-	-	200		
	Reverse Current	$V_R = 1200 \text{ V}, T_C = 125 ^{\circ}\text{C}$	-	-	300	μΑ	
		$V_R = 1200 \text{ V}, T_C = 175 ^{\circ}\text{C}$	-	-	400		
Q_C	Total Capacitive Charge	V = 800 V	-	37	-	nC	
С		V _R = 1 V, f = 100 kHz	-	337	-		
	Total Capacitance	$V_R = 400 \text{ V}, f = 100 \text{ kHz}$	-	33	-	pF	
		$V_R = 800 \text{ V}, f = 100 \text{ kHz}$	-	26	-		

Note 3: EAS of 55 mJ is based on starting T_J = 25 °C, L = 0.5 mH, I_{AS} = 15A, V = 150 V.

Typical Characteristics T_J = 25 °C unless otherwise noted.

Figure 1. Forward Characteristics

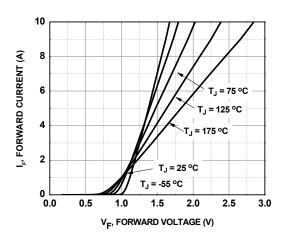


Figure 2. Reverse Characteristics

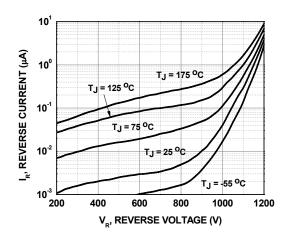


Figure 3. Reverse Characteristics

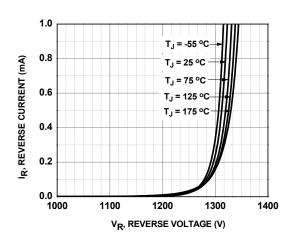


Figure 5. Power Derating

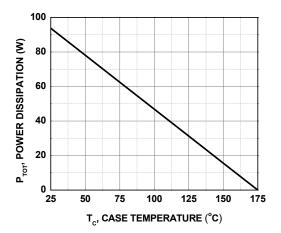


Figure 7. Capacitance vs. Reverse Voltage

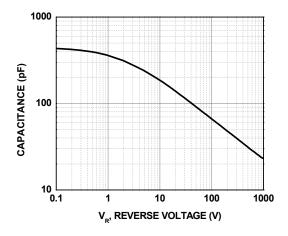


Figure 4. Current Derating

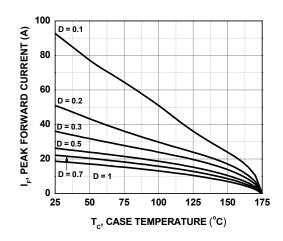


Figure 6. Capacitive Charge vs.
Reverse Voltage

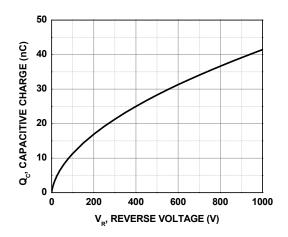
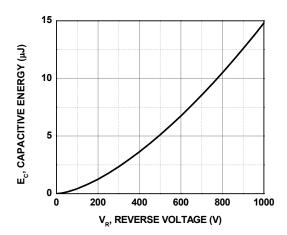


Figure 8. Capacitance Stored Energy



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