

# Silicon Carbide (SiC) **Schottky Diode** - EliteSiC, 5 A, 1200 V, D1, Die

# PCFFS05120AF

#### 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.

#### **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**

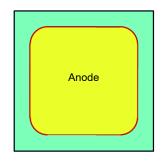
- General Purpose
- SMPS, Solar Inverter, UPS
- Power Switching Circuits

#### Die Information

- Wafer Diameter: 6 inch
- S RENTATIVE FOR ode Scribe Dane) • Die Size: 1,690 x 1,690 µm (Include Scribe Lane)
- Metallization
  - Top: Ti / TiN / AI 4 μm
  - Back: Ti/ NiV / Ag
- Die Thickness: Typ. 200 μm
- Bonding Pad Size
  - Anode: 1,110 x 1,110 μm
- Recommended Wire Bond (Note 1)
  - ♦ Anode: 12 mil x 1

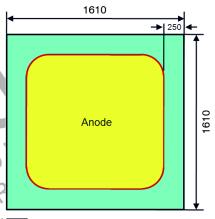
#### NOTE:

1. Based on TO-247 package of onsemi



#### **DIE LAYOUT**

(Dimension: µm, Except Scribe Lane)

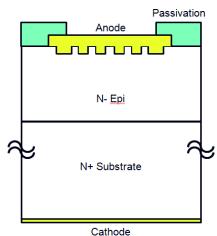


Passivation Area

Passivation Information

- · Passivation Material: Polymide (PSPI)
- Passivation Type: Local Passivation
- Passivation Thickness: 90KA

#### **CROSS SECTION**



# ORDERING INFORMATION

Part Number	Package	Die Size
PCFFS05120AF	N/A	1,690 x 1,690 μm (Include Scribe Lane)

#### PCFFS05120AF

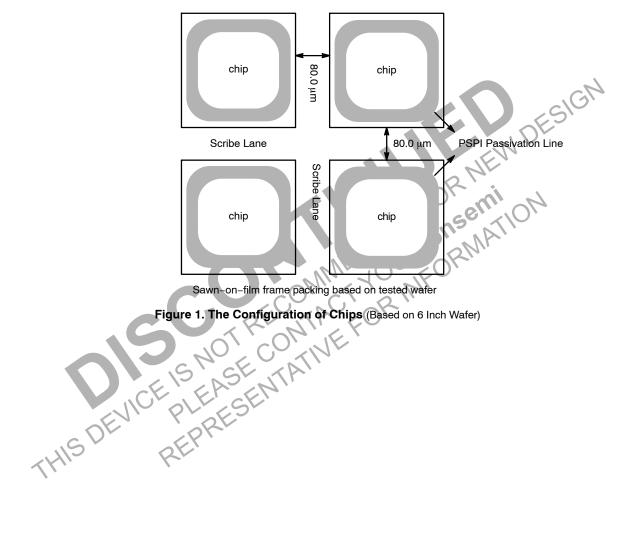
# ELECTRICAL CHARACTERISTICS ON WAFER (Note 2) (T<sub>C</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Тур	Max	Unit
V <sub>R</sub>	Reverse Blocking Voltage	$I_R = 200 \mu A, T_C = 25^{\circ}C$	1200	-	_	V
V <sub>F</sub>	Forward Voltage	I <sub>F</sub> = 5 A, T <sub>C</sub> = 25°C	1.20	-	1.75	V
I <sub>R</sub>	Reverse Current	V <sub>R</sub> = 1200 V, T <sub>C</sub> = 25°C	ı	-	200	μΑ

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Tested 100% on wafer

# The Configuration of Chips (Based on 6 Inch Wafer)



#### PCFFS05120AF

# ABSOLUTE MAXIMUM RATINGS ON TO-247 PACKAGE (T<sub>C</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Ratings	Unit	
V <sub>RRM</sub>	Peak Repetitive Reverse Voltage		1200	V
E <sub>AS</sub>	Single Pulse Avalanche Energy (Note 3)		55	mJ
I <sub>F</sub>	Continuous Rectified Forward Current @ T <sub>C</sub> < 148°C		5	Α
I <sub>F, Max</sub>	Non-Repetitive Peak Forward Surge Current	T <sub>C</sub> = 25°C, 10 μs	380	Α
		T <sub>C</sub> = 150°C, 10 μs	330	Α
I <sub>F,SM</sub>	Non-Repetitive Forward Surge Current	Half-Sine Pulse, t <sub>p</sub> = 8.3 ms	42	Α
I <sub>F,RM</sub>	Repetitive Forward Surge Current	Half-Sine Pulse, t <sub>p</sub> = 8.3 ms	21	Α
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range		-55 to +175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected. 3. EAS of 55 mJ is based on starting  $T_J = 25^{\circ}C$ , L = 0.5 mH,  $I_{AS} = 15$  A, V = 150 V.

# ELECTRICAL CHARACTERISTICS ON TO-247 PACKAGE (T<sub>C</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Тур	Max	Unit
$V_{F}$	Forward Voltage	I <sub>F</sub> = 5 A, T <sub>C</sub> = 25°C	-	1.45	1.75	V
		I <sub>F</sub> = 5 A, T <sub>C</sub> = 125°C	1 - 1	1.7	2	
		I <sub>F</sub> = 5 A, T <sub>C</sub> = 175°C	-	2	2.4	
I <sub>R</sub>	Reverse Current	V <sub>R</sub> = 1200 V, T <sub>C</sub> = 25°C		O, -W,	200	μΑ
		V <sub>R</sub> = 1200 V, T <sub>C</sub> = 125°C	C-D	50 T	300	
		V <sub>R</sub> = 1200 V, T <sub>C</sub> = 175°C	10 - Q	D. WY	400	
$Q_{C}$	Total Capacitive Charge	V = 800 V	(A)	37	-	nC
С	Total Capacitance	V <sub>R</sub> = 1 V, f = 100 kHz	40-17k	337	-	pF
		$V_R = 400 \text{ V, } f = 100 \text{ kHz}$	0R-11	33	-	
		V <sub>R</sub> = 800 V, f = 100 kHz	0.7	26	_	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

# CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

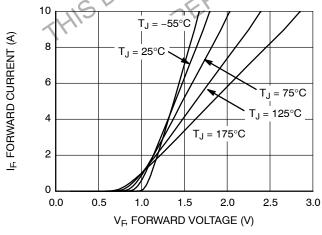


Figure 2. Forward Characteristics

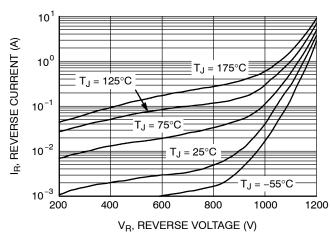
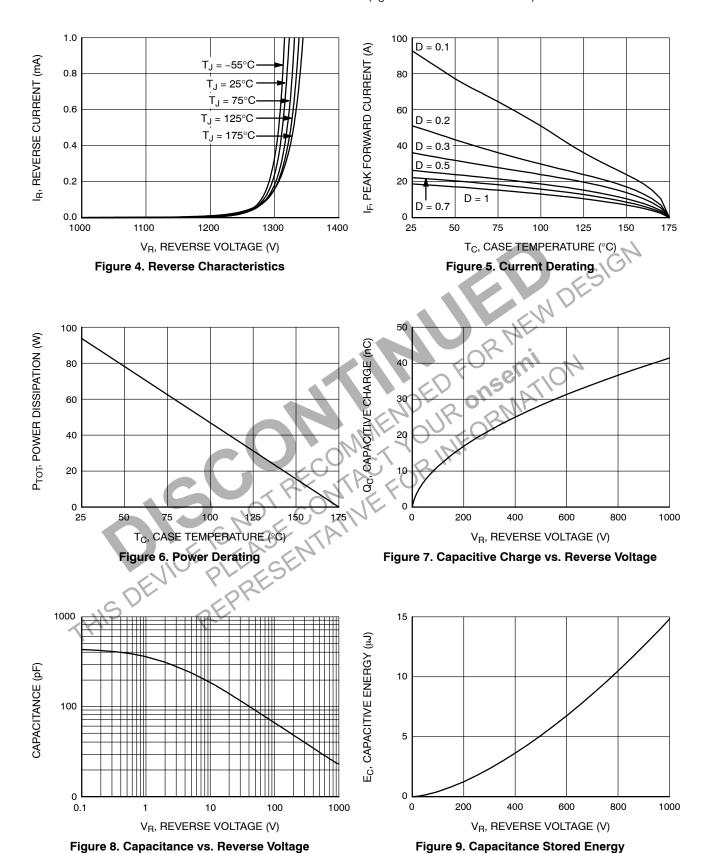


Figure 3. Reverse Characteristics

# PCFFS05120AF

# TYPICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)



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