

# Silicon Carbide Schottky Diode

## 1700 V, 25 A

### NDC25170A

#### 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 independent switching characteristics, and excellent thermal performance sets Silicon Carbide as the next generation of power semiconductor. System benefits include highest efficiency, faster operating frequency, increased power density, reduced EMI, and reduced system size and cost.

#### Features

- Max Junction Temperature 175°C
- Avalanche Rated 506 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery / No Forward Recovery

#### Applications

- Industrial Motor Loads, Wind Generation Inverter, Solar Inverter, UPS
- Power Switching Circuits

#### Die Information

- Wafer Diameter: 6 inch
- Die Size: 4000 x 4000  $\mu\text{m}$  (include Scribe Lane)
- Metallization:
  - ◆ Top: Ti/TiN/AlSiCu
  - ◆ Back: Ti/NiV/Ag
- Die Thickness: Typ. 200  $\mu\text{m}$
- Bonding Pad Size:
  - ◆ Anode: 3324 x 3324  $\mu\text{m}$
- Recommended Wire Bond (Note 1)
  - ◆ Anode: 20 mil x 3

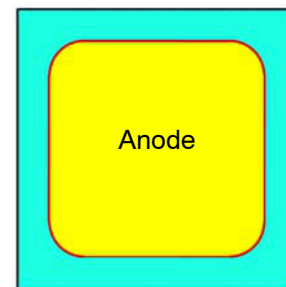
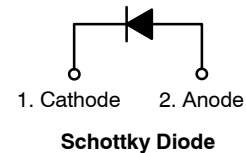
#### NOTE:

1. Based on TO-247 package

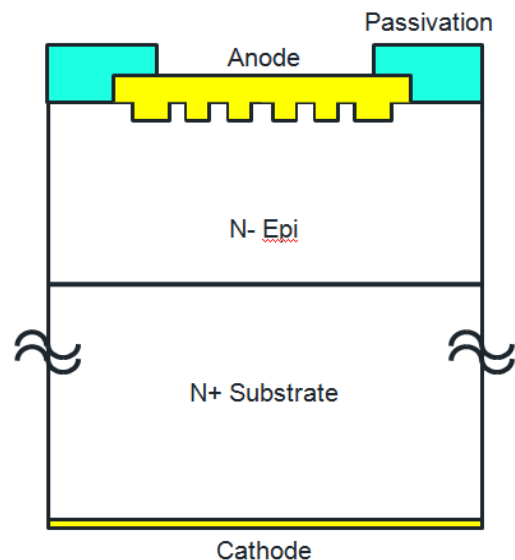


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#### CROSS SECTION



#### ORDERING INFORMATION

See detailed ordering and shipping information on page 3 of this data sheet.

# NDC25170A

## ABSOLUTE MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Value	Unit	
V <sub>RRM</sub>	Peak Repetitive Reverse Voltage	1700	V	
E <sub>AS</sub>	Single Pulse Avalanche Energy (Notes 2 and 4)	506	mJ	
I <sub>F</sub>	Continuous Rectified Forward Current @ T <sub>C</sub> < 153°C	25	A	
	Continuous Rectified Forward Current @ T <sub>C</sub> < 135°C	35		
I <sub>F, Max</sub>	Non-Repetitive Peak Forward Surge Current	T <sub>C</sub> = 25°C, 10 μs	1435	A
		T <sub>C</sub> = 150°C, 10 μs	1428	A
I <sub>F, SM</sub>	Non-Repetitive Forward Surge Current	Half-Sine Pulse, t <sub>p</sub> = 8.3 ms	220	A
P <sub>tot</sub>	Power Dissipation	T <sub>C</sub> = 25°C	385	W
		T <sub>C</sub> = 150°C	64	W
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.

2. E<sub>AS</sub> of 506 mJ is based on starting T<sub>J</sub> = 25°C, L = 0.5 mH, I<sub>AS</sub> = 45 A, V = 50 V.
3. I<sub>F, Max</sub>, and I<sub>F, SM</sub> surge test value are limited by measurement limitation, it's not product capability
4. DC, E<sub>AS</sub> and Curve test result base on TO247 package

## THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
R <sub>θJC</sub>	Thermal Resistance, Junction to Case, Max	0.39	°C/W

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

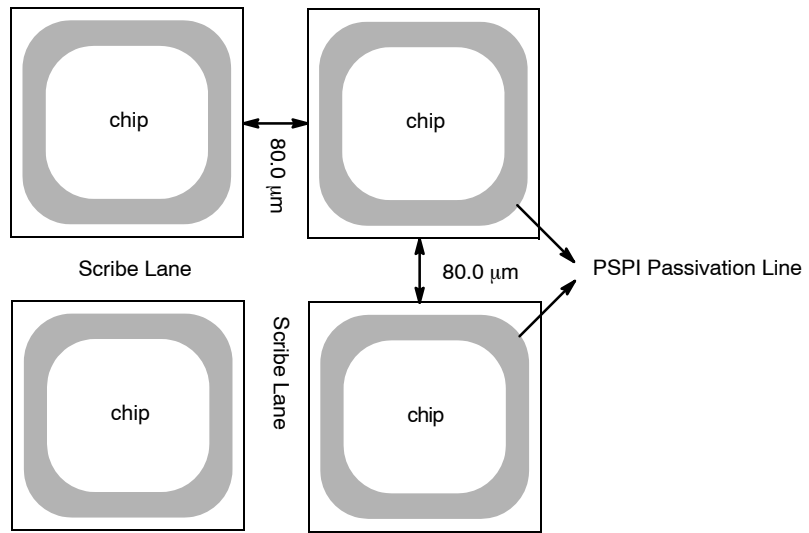
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V <sub>F</sub>	Forward Voltage	I <sub>F</sub> = 25 A, T <sub>J</sub> = 25°C	-	1.50	1.75	V
		I <sub>F</sub> = 25 A, T <sub>J</sub> = 125°C	-	1.95	2.35	
		I <sub>F</sub> = 25 A, T <sub>J</sub> = 175°C	-	2.32	2.8	
I <sub>R</sub>	Reverse Current	V <sub>R</sub> = 1700 V, T <sub>J</sub> = 25°C	-	0.08	40	μA
		V <sub>R</sub> = 1700 V, T <sub>J</sub> = 125°C	-	0.58	60	
		V <sub>R</sub> = 1700 V, T <sub>J</sub> = 175°C	-	4.24	100	
Q <sub>C</sub>	Total Capacitive Charge	V = 800 V	-	169	-	nC
C	Total Capacitance	V <sub>R</sub> = 1 V, f = 100 kHz	-	2025	-	pF
		V <sub>R</sub> = 400 V, f = 100 kHz	-	155	-	
		V <sub>R</sub> = 800 V, f = 100 kHz	-	109	-	

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.

# NDC25170A

## The Configuration of Chips

(Based on 6 inch Wafer)



Sawn-on-film frame packing based on tested wafer

### ORDERING INFORMATION

Part Number	Die Size with SL ( $\mu\text{m}$ )	Package	Shipping
NDC25170A	4000 x 4000	N/A	Wafer Sales

# NDC25170A

## TYPICAL CHARACTERISTICS

( $T_J = 25^\circ\text{C}$  unless otherwise noted)

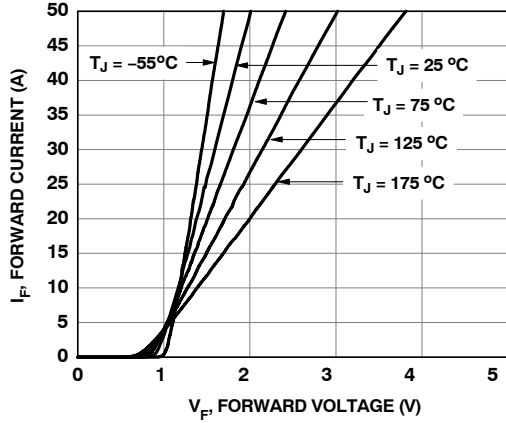


Figure 1. Forward Characteristics

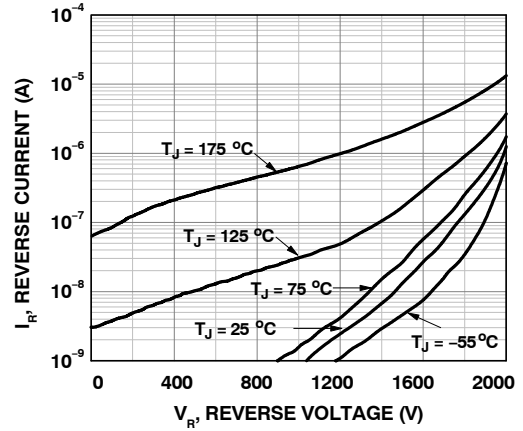


Figure 2. Reverse Characteristics

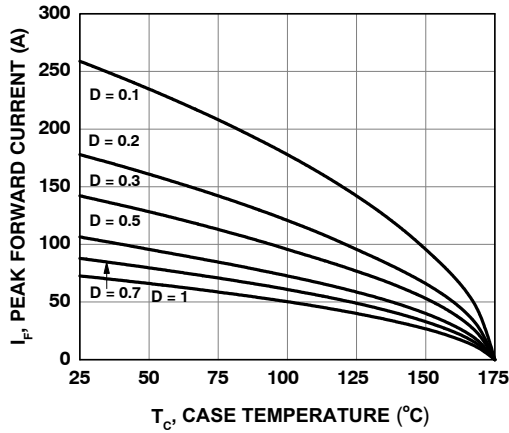


Figure 3. Current Derating

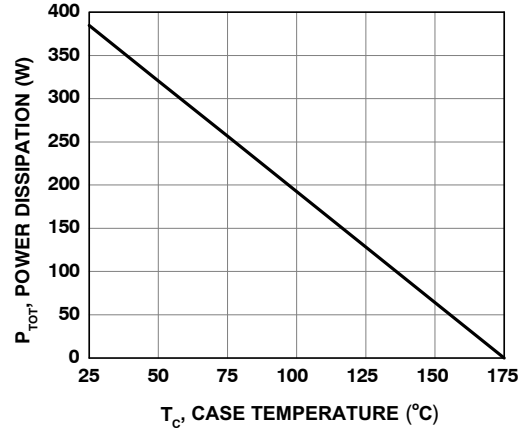


Figure 4. Power Derating

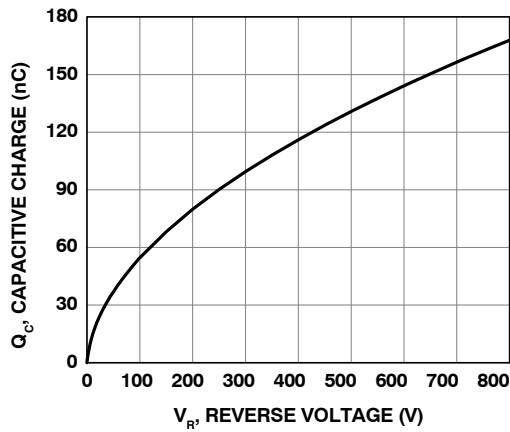


Figure 5. Capacitive Charge vs. Reverse Voltage

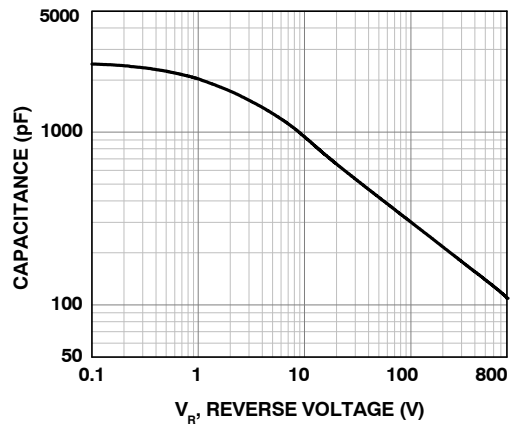


Figure 6. Capacitance vs. Reverse Voltage

TYPICAL CHARACTERISTICS

( $T_J = 25^\circ\text{C}$  unless otherwise noted)

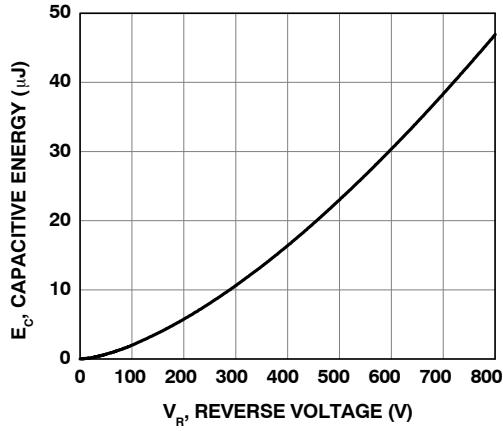


Figure 7. Capacitance Stored Energy

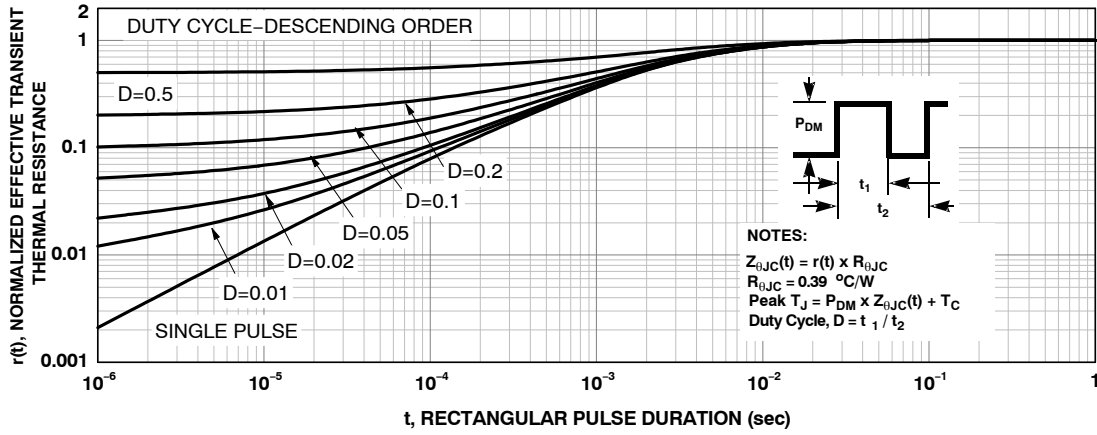


Figure 8. Junction-to-Case Transient Thermal Response Curve

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