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Silicon Carbide Schottky Diode

1700 V, 25 A

NDSH25170A

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
- These Devices are Halogen Free/BFR Free and are RoHS Compliant

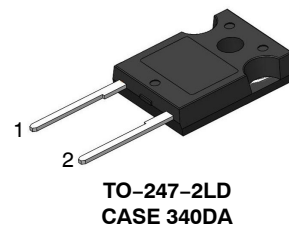
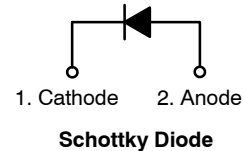
Applications

- SMPS, Solar Inverter, UPS
- Power Switching Circuits

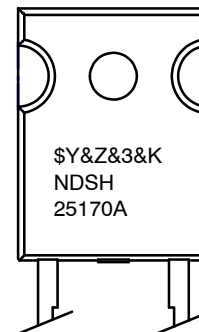


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MARKING DIAGRAM



\$Y	= ON Semiconductor Logo
&Z	= Assembly Plant Code
&3	= Numeric Date Code
&K	= Lot Code
NDSH25170A	= Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

NDSH25170A

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

Symbol	Parameter	Value	Unit	
V_{RRM}	Peak Repetitive Reverse Voltage	1700	V	
E_{AS}	Single Pulse Avalanche Energy (Note 1)	506	mJ	
I_F	Continuous Rectified Forward Current @ $T_C < 153^\circ\text{C}$	25	A	
	Continuous Rectified Forward Current @ $T_C < 135^\circ\text{C}$	35		
$I_{F, Max}$	Non-Repetitive Peak Forward Surge Current	$T_C = 25^\circ\text{C}$, 10 μs	1435	A
		$T_C = 150^\circ\text{C}$, 10 μs	1428	A
$I_{F, SM}$	Non-Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3$ ms	220	A
$I_{F, RM}$	Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3$ ms	66	A
P_{tot}	Power Dissipation	$T_C = 25^\circ\text{C}$	385	W
		$T_C = 150^\circ\text{C}$	64	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$	

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.

1. E_{AS} of 506 mJ is based on starting $T_J = 25^\circ\text{C}$, $L = 0.5$ mH, $I_{AS} = 45$ A, $V = 50$ V.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	0.39	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_F	Forward Voltage	$I_F = 25$ A, $T_J = 25^\circ\text{C}$	-	1.50	1.75	V
		$I_F = 25$ A, $T_J = 125^\circ\text{C}$	-	1.95	2.35	
		$I_F = 25$ A, $T_J = 175^\circ\text{C}$	-	2.32	2.8	
I_R	Reverse Current	$V_R = 1700$ V, $T_J = 25^\circ\text{C}$	-	0.08	40	μA
		$V_R = 1700$ V, $T_J = 125^\circ\text{C}$	-	0.58	60	
		$V_R = 1700$ V, $T_J = 175^\circ\text{C}$	-	4.24	100	
Q_C	Total Capacitive Charge	$V = 800$ V	-	169	-	nC
C	Total Capacitance	$V_R = 1$ V, $f = 100$ kHz	-	2025	-	μF
		$V_R = 400$ V, $f = 100$ kHz	-	155	-	
		$V_R = 800$ 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.

ORDERING INFORMATION

Part Number	Top Marking	Package	Shipping
NDSH25170A	NDSH25170A	TO-247-2LD (Pb-Free / Halogen Free)	30 Units / Tube

NDSH25170A

TYPICAL CHARACTERISTICS

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

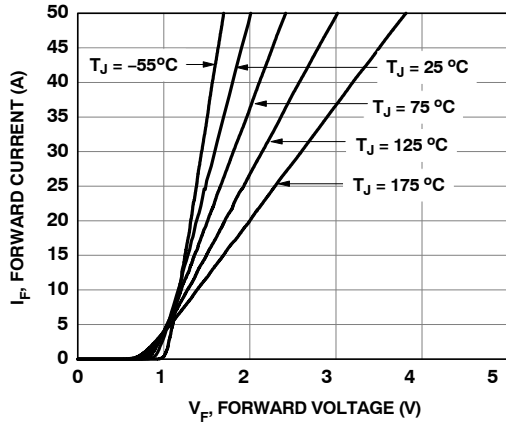


Figure 1. Forward Characteristics

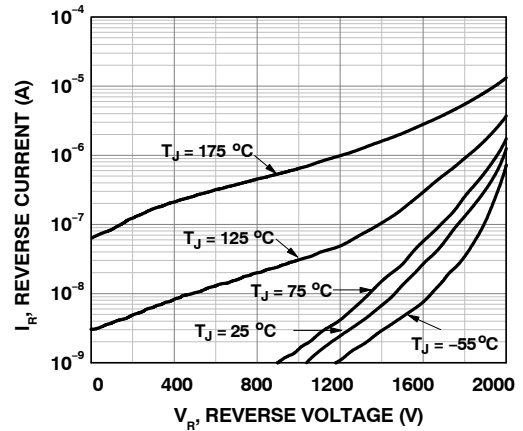


Figure 2. Reverse Characteristics

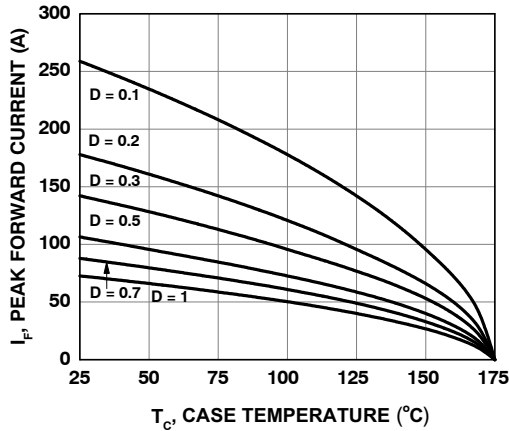


Figure 3. Current Derating

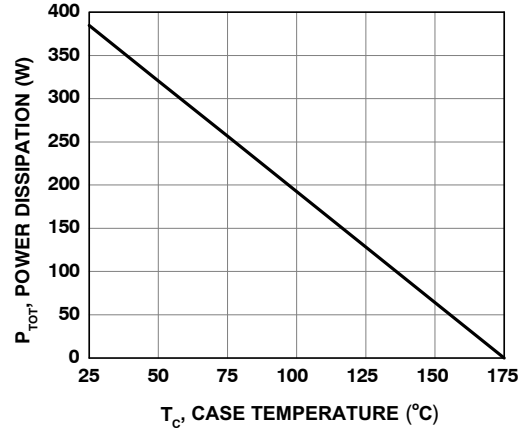


Figure 4. Power Derating

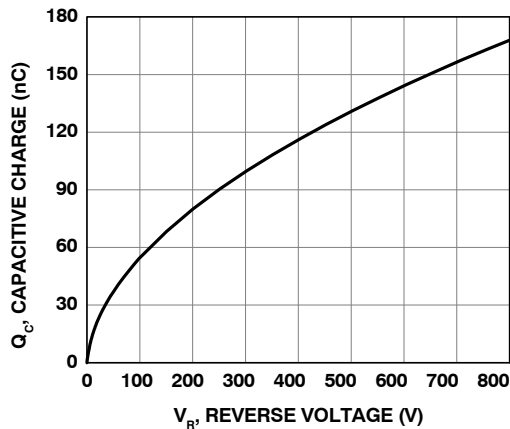


Figure 5. Capacitive Charge vs. Reverse Voltage

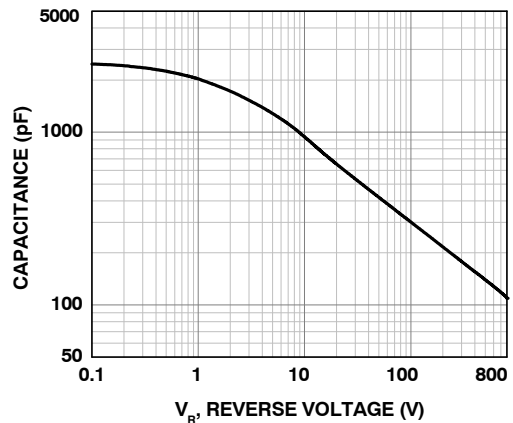


Figure 6. Capacitance vs. Reverse Voltage

NDSH25170A

TYPICAL CHARACTERISTICS

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

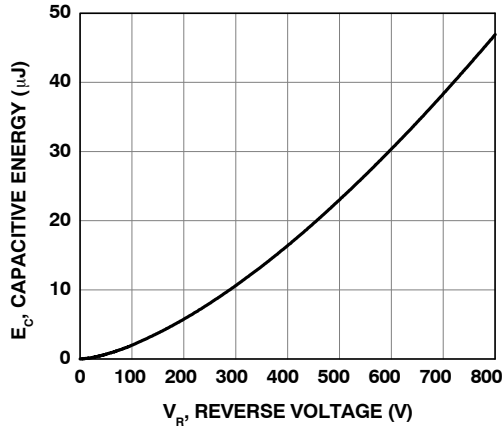


Figure 7. Capacitance Stored Energy

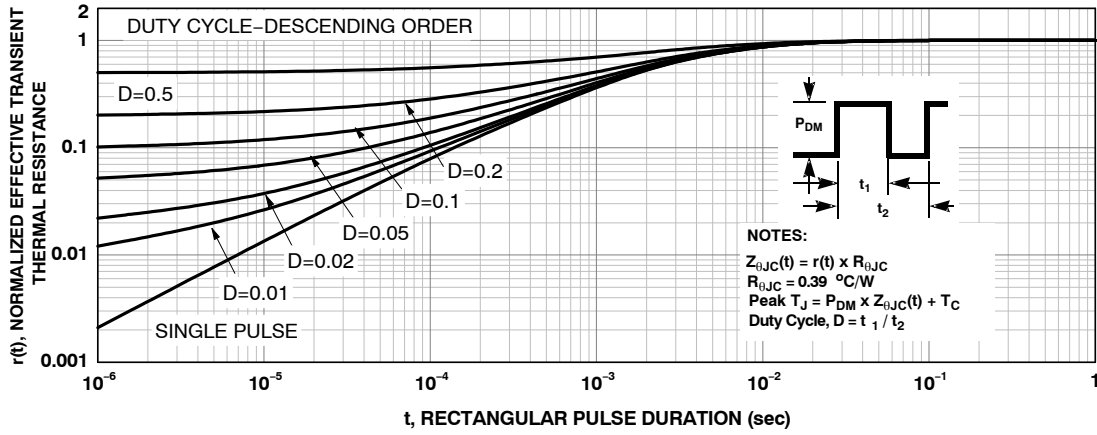
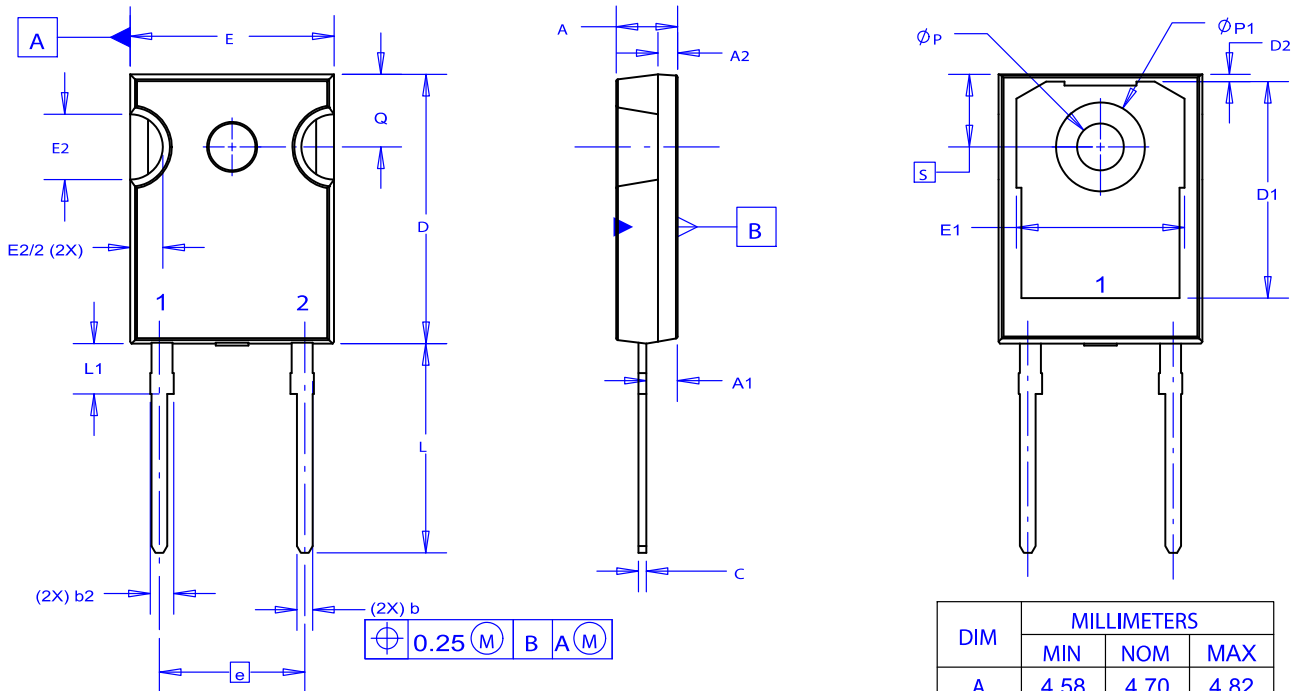


Figure 8. Junction-to-Case Transient Thermal Response Curve

NDSH25170A

PACKAGE DIMENSIONS


TO-247-2LD
CASE 340DA
ISSUE A



NOTES: UNLESS OTHERWISE SPECIFIED.

- A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5 - 2009.
- D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
- E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.20	2.40	2.60
A2	1.40	1.50	1.60
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
c	0.51	0.61	0.71
D	20.32	20.57	20.82
D1	13.08	~	~
D2	0.51	0.93	1.35
E	15.37	15.62	15.87
E1	12.81	~	~
E2	4.96	5.08	5.20
e	~	11.12	~
L	15.75	16.00	16.25
L1	3.69	3.81	3.93
ØP	3.51	3.58	3.65
ØP1	6.60	6.80	7.00
Q	5.34	5.46	5.58
S	5.34	5.46	5.58

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