

Silicon Carbide (SiC) Schottky Diode - EliteSiC, 40 A, 1200 V, D3, TO-247-3L

NDSH40120CDN

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.

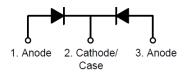
Features

- Max Junction Temperature 175°C
- Avalanche Rated 166 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery / No Forward Recovery
- This Device is Halide Free and RoHS Compliant with Exemption 7a, Pb–Free 2LI (on second level interconnection)

1

Applications

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

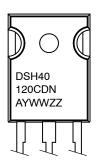


Schottky Diode



TO-247-3LD CASE 340CX

MARKING DIAGRAM



DSH40120CDN = Specific Device Code
A = Assembly Plant Code
YWW = Date Code (Year & Week)

ZZ = Lot Code

ORDERING INFORMATION

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

NDSH40120CDN

ABSOLUTE MAXIMUM RATINGS (T_J = 25°C unless otherwise noted) (per leg)

Symbol	Parameter	Value	Unit	
V_{RRM}	Peak Repetitive Reverse Voltage		1200	V
E _{AS}	Single Pulse Avalanche Energy (Note 1)		166	mJ
lF	Continuous Rectified Forward Current @ T _C < 149°C		20*/40**	Α
	Continuous Rectified Forward Current @ T _C < 1	26*/52**		
I _{F, Max}	Non-Repetitive Peak Forward Surge Current	T _C = 25°C, 10 μs	907	Α
		T _C = 150°C, 10 μs	838	А
I _{F,SM}	Non-Repetitive Forward Surge Current	Half-Sine Pulse, t _p = 8.3 ms	123	Α
I _{F,RM}	Repetitive Forward Surge Current	Half-Sine Pulse, t _p = 8.3 ms	49	Α
Ptot	Power Dissipation	T _C = 25°C	217	W
		T _C = 150°C	36	W
T _J , T _{STG}	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.

THERMAL CHARACTERISTICS (per leg)

Symbol	Parameter	Value	Unit
$R_{ heta JC}$	Thermal Resistance, Junction to Case, Max	0.69*/0.39**	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max	40	°C/W

^{*}Per leg.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted) (per leg)

Symbol	Parameter	Test Condition	Min	Тур	Max	Unit
V _F	Forward Voltage	I _F = 20 A, T _J = 25°C	=	1.36	1.75	V
		I _F = 20 A, T _J = 125°C	-	1.60	-	
		I _F = 20 A, T _J = 175°C	-	1.81	-	
I _R	Reverse Current	V _R = 1200 V, T _J = 25°C	-	2.39	200	μΑ
		V _R = 1200 V, T _J = 125°C	-	6.91	200	
		V _R = 1200 V, T _J = 175°C	-	16.6	200	
$Q_{\mathbb{C}}$	Total Capacitive Charge	V = 800 V	-	95	-	nC
С	Total Capacitance	V _R = 1 V, f = 100 kHz	-	1494	-	pF
		V _R = 400 V, f = 100 kHz	-	80	-	
		V _R = 800 V, f = 100 kHz	-	60	=	

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
NDSH40120CDN	DSH40120CDN	TO-247-3LD (Pb-Free / Halogen Free)	30 Units / Tube

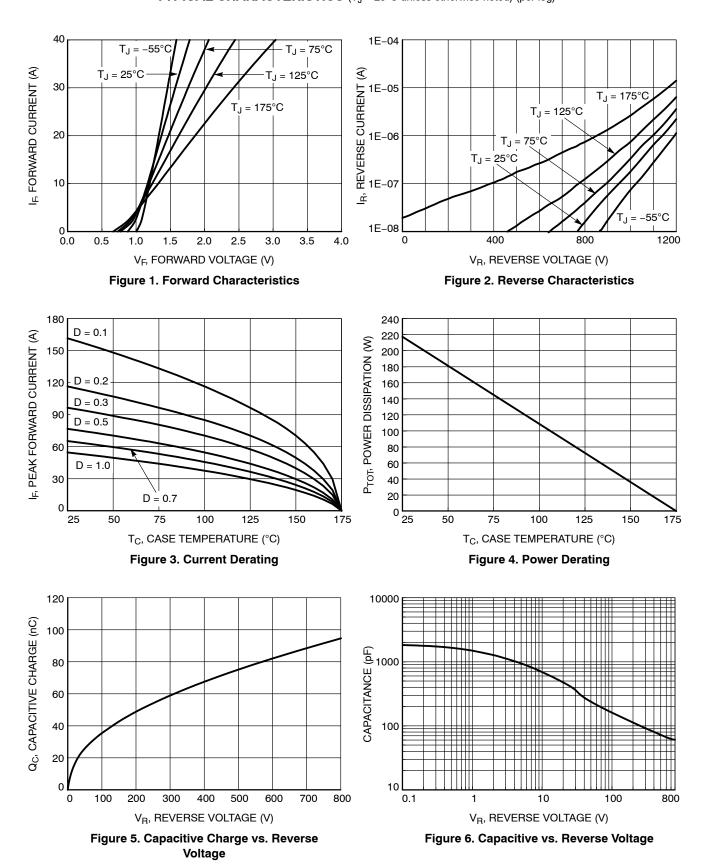
^{*}Per leg. ** Per device.

^{1.} E_{AS} of 166 mJ is based on starting T_J = 25°C, L = 0.5 mH, I_{AS} = 25.8 A, V = 50 V.

^{**} Per device.

NDSH40120CDN

TYPICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted) (per leg)



NDSH40120CDN

$\textbf{TYPICAL CHARACTERISTICS} \ (T_J = 25^{\circ}\text{C unless otherwise noted}) \ (\text{per leg})$

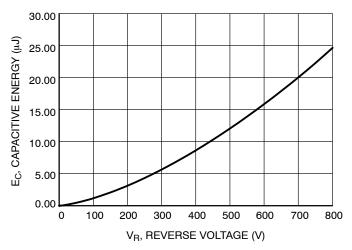


Figure 7. Capacitance Stored Energy

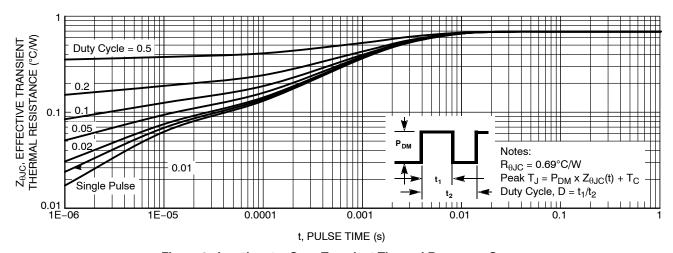
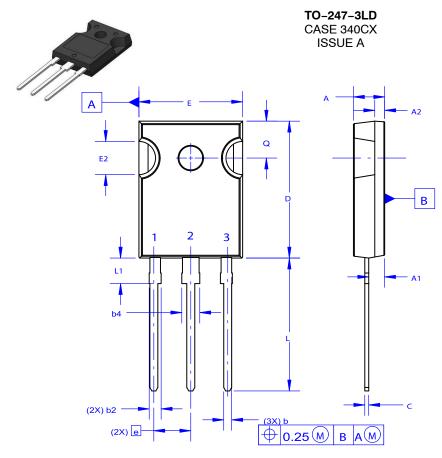


Figure 8. Junction-to-Case Transient Thermal Response Curve

DATE 06 JUL 2020





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.

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code A = Assembly Location

Y = Year WW = Work Week G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " •", may or may not be present. Some products may not follow the Generic Marking.

Ø _P —		Φ _{P1} D2
E1 —	2	D1

DIM	MILLIMETERS				
DIM	MIN	NOM	MAX		
Α	4.58	4.70	4.82		
A 1	2.20	2.40	2.60		
A2	1.40	1.50	1.60		
D	20.32	20.57	20.82		
Е	15.37	15.62	15.87		
E2	4.96	5.08	5.20		
е	~	5.56	~		
L	19.75	20.00	20.25		
L1	3.69	3.81	3.93		
ØΡ	3.51	3.58	3.65		
Q	5.34	5.46	5.58		
S	5.34	5.46	5.58		
b	1.17	1.26	1.35		
b2	1.53	1.65	1.77		
b4	2.42	2.54	2.66		
С	0.51	0.61	0.71		
D1			~		
D2	0.51	0.93	1.35		
E1	12.81	~	~		
ØP1	6.60	6.80	7.00		

DOCUMENT NUMBER:	98AON93302G	Electronic versions are uncontrolled except when accessed directly from the Document Reposito Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.		
DESCRIPTION:	TO-247-3LD		PAGE 1 OF 1	

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

onsemi, Onsemi, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. Onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using onsemi products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by onsemi. "Typical" parameters which may be provided in onsemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. onsemi does not convey any license under any of its intellectual property rights nor the rights of others. onsemi products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA class 3 medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

 $\textbf{Technical Library:} \ \underline{www.onsemi.com/design/resources/technical-documentation}$

onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at

www.onsemi.com/support/sales