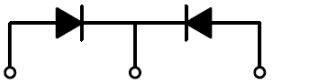
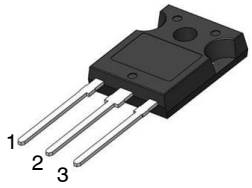
Silicon Carbide (SiC) Schottky Diode – EliteSiC, 20 A, 1200 V, D3, TO-247-3L

NDSH20120CDN



Schottky Diode



TO−247−3LD
CASE 340CX

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 49 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)

Applications

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

MARKING DIAGRAM

DSH20120CDN	= 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.

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)		49	mJ
I_F	Continuous Rectified Forward Current @ T_C < 145°C		10*/20**	A
	Continuous Rectified Forward Current @ T_C < 135°C		12*/24**	
$I_{F, Max}$	Non-Repetitive Peak Forward Surge Current	T_C = 25°C, 10 μs	546	A
		T_C = 150°C, 10 μs	459	A
$I_{F,SM}$	Non-Repetitive Forward Surge Current	Half-Sine Pulse, t_p = 8.3 ms	59	A
$I_{F,RM}$	Repetitive Forward Surge Current	Half-Sine Pulse, t_p = 8.3 ms	31	A
Ptot	Power Dissipation	T_C = 25°C	94	W
		T_C = 150°C	16	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.
*Per leg.
** Per device.
1. E_{AS} of 49 mJ is based on starting T_J = 25°C, L = 0.5 mH, I_{AS} = 14 A, V = 50 V.

THERMAL CHARACTERISTICS (per leg)

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	1.6*/0.65**	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max	40	°C/W

*Per leg.
** Per device.

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

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_F	Forward Voltage	I_F = 10 A, T_J = 25°C	–	1.39	1.75	V
		I_F = 10 A, T_J = 125°C	–	1.68	–	
		I_F = 10 A, T_J = 175°C	–	1.94	–	
I_R	Reverse Current	V_R = 1200 V, T_J = 25°C	–	1	200	μA
		V_R = 1200 V, T_J = 125°C	–	3	200	
		V_R = 1200 V, T_J = 175°C	–	8	200	
Q_C	Total Capacitive Charge	V = 800 V	–	46	–	nC
C	Total Capacitance	V_R = 1 V, f = 100 kHz	–	680	–	pF
		V_R = 400 V, f = 100 kHz	–	41	–	
		V_R = 800 V, f = 100 kHz	–	32	–	

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
NDSH20120CDN	DSH20120CDN	TO−247−3LD (Pb-Free / Halogen Free)	30 Units / Tube

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

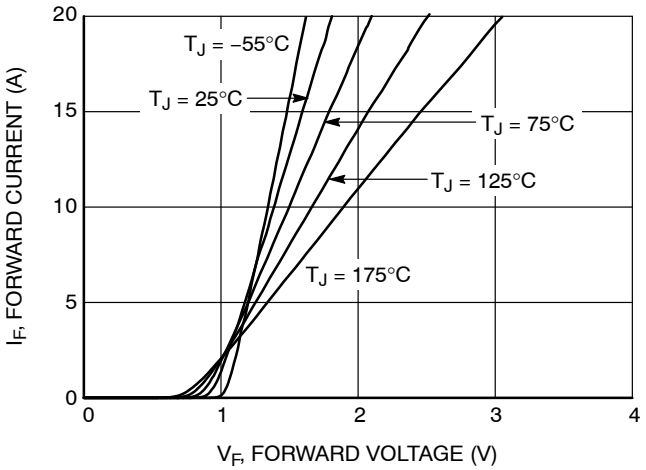


Figure 1. Forward Characteristics

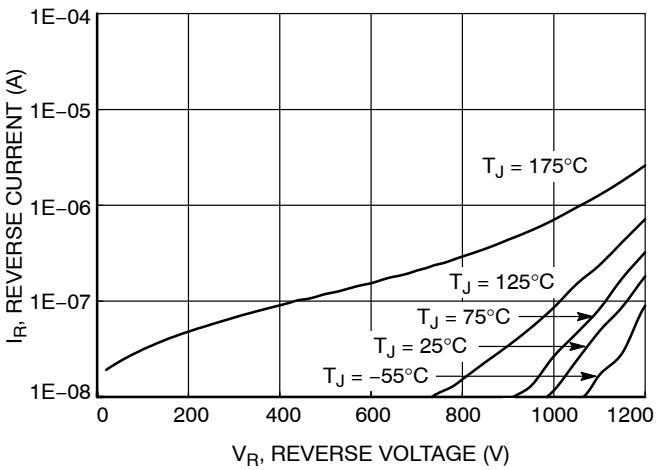


Figure 2. Reverse Characteristics

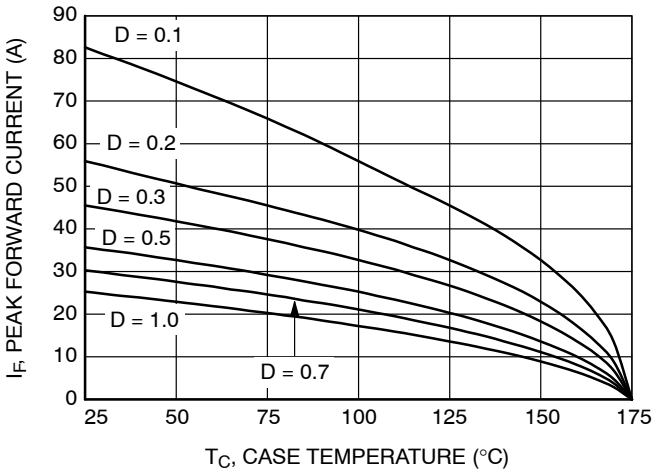


Figure 3. Current Derating

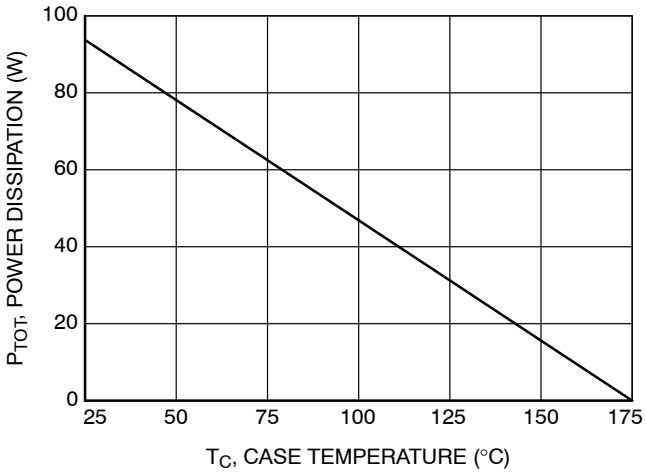


Figure 4. Power Derating

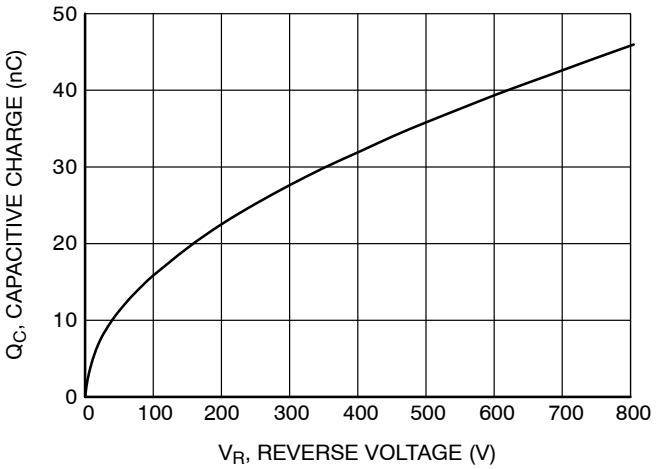


Figure 5. Capacitive Charge vs. Reverse Voltage

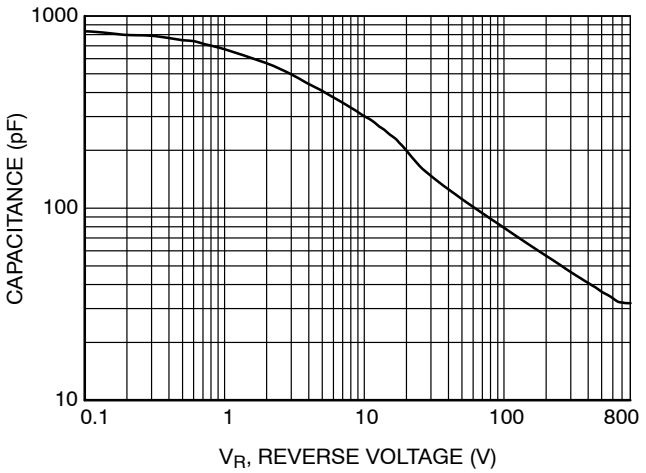


Figure 6. Capacitive vs. Reverse Voltage

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

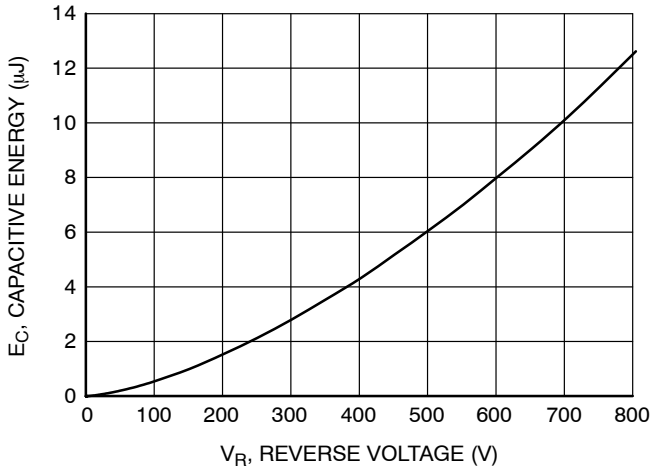


Figure 7. Capacitance Stored Energy

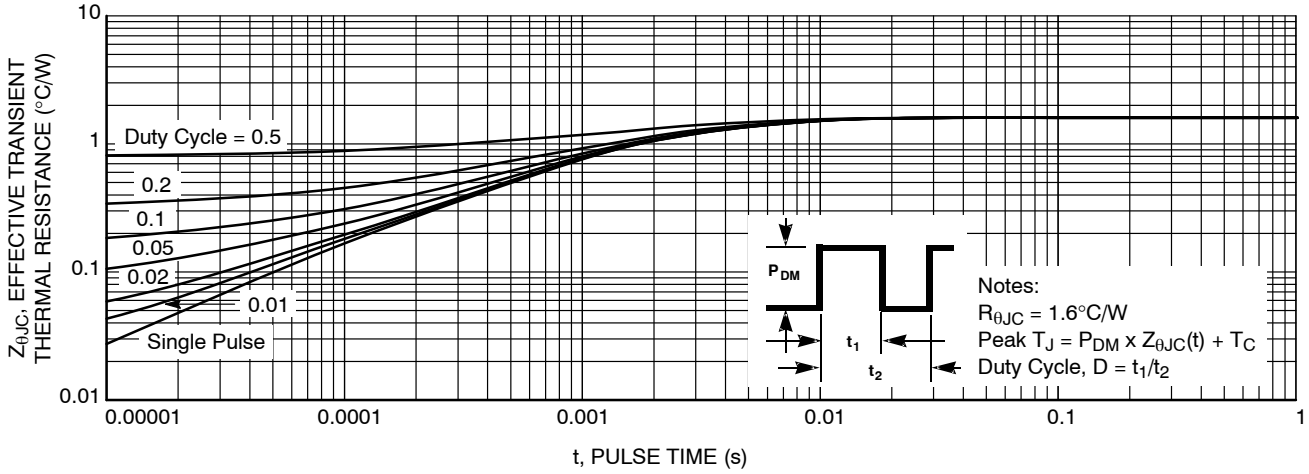


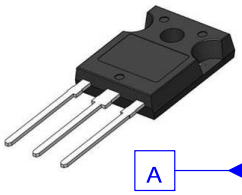
Figure 8. Junction−to−Case Transient Thermal Response Curve

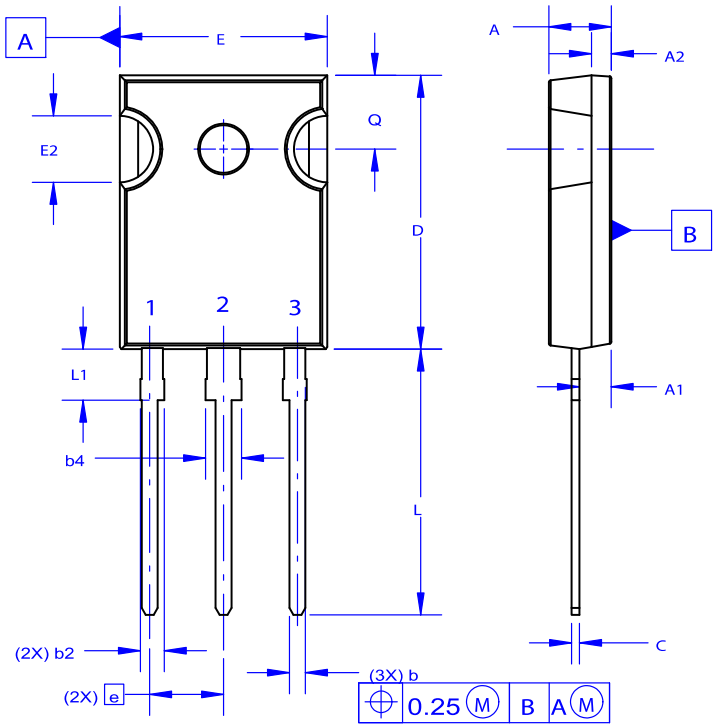
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

ON Semiconductor®

TO−247−3LD
CASE 340CX
ISSUE A

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.

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
D	20.32	20.57	20.82
E	15.37	15.62	15.87
E2	4.96	5.08	5.20
e	~	5.56	~
L	19.75	20.00	20.25
L1	3.69	3.81	3.93
ØP	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
c	0.51	0.61	0.71
D1	13.08	~	~
D2	0.51	0.93	1.35
E1	12.81	~	~
ØP1	6.60	6.80	7.00

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.

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DESCRIPTION:	**TO−247−3LD**	**PAGE 1 OF 1**

ADDITIONAL INFORMATION

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onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
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