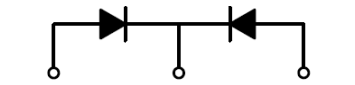
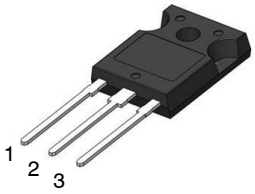
# Silicon Carbide (SiC) Schottky Diode – EliteSiC, 30 A, 1200 V, D3, TO-247-3L

# NDSH30120CDN




**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 110 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

| | |
|---|---|
| DSH30120CDN | = 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.

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**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) | | 110 | mJ |
| $I_F$ | Continuous Rectified Forward Current @ $T_C$ < 147°C | | 15*/30** | A |
| | Continuous Rectified Forward Current @ $T_C$ < 135°C | | 19*/38** | |
| $I_{F, Max}$ | Non-Repetitive Peak Forward Surge Current | $T_C$ = 25°C, 10 μs | 749 | A |
| | | $T_C$ = 150°C, 10 μs | 735 | A |
| $I_{F,SM}$ | Non-Repetitive Forward Surge Current | Half-Sine Pulse, $t_p$ = 8.3 ms | 91 | A |
| $I_{F,RM}$ | Repetitive Forward Surge Current | Half-Sine Pulse, $t_p$ = 8.3 ms | 39 | A |
| Ptot | Power Dissipation | $T_C$ = 25°C | 158 | W |
| | | $T_C$ = 150°C | 26 | 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 110 mJ is based on starting $T_J$ = 25°C, L = 0.5 mH, $I_{AS}$ = 21 A, V = 50 V.

**THERMAL CHARACTERISTICS** (per leg)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case, Max | 0.95*/0.46** | °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 | $I_F$ = 15 A, $T_J$ = 25°C | – | 1.40 | 1.75 | V |
| | | $I_F$ = 15 A, $T_J$ = 125°C | – | 1.71 | – | |
| | | $I_F$ = 15 A, $T_J$ = 175°C | – | 1.98 | – | |
| $I_R$ | Reverse Current | $V_R$ = 1200 V, $T_J$ = 25°C | – | 1.5 | 200 | μA |
| | | $V_R$ = 1200 V, $T_J$ = 125°C | – | 5 | 200 | |
| | | $V_R$ = 1200 V, $T_J$ = 175°C | – | 12 | 200 | |
| $Q_C$ | Total Capacitive Charge | V = 800 V | – | 64 | – | nC |
| C | Total Capacitance | $V_R$ = 1 V, f = 100 kHz | – | 927 | – | pF |
| | | $V_R$ = 400 V, f = 100 kHz | – | 58 | – | |
| | | $V_R$ = 800 V, f = 100 kHz | – | 44 | – | |

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 |
|---|---|---|---|
| NDSH30120CDN | DSH30120CDN | TO−247−3LD<br>(Pb-Free / Halogen Free) | 30 Units / Tube |

## TYPICAL CHARACTERISTICS ($T_J$ = 25°C UNLESS OTHERWISE NOTED)

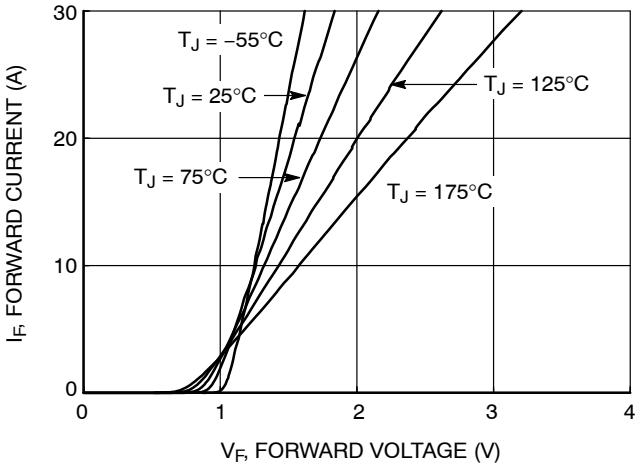



**Figure 1. Forward Characteristics**

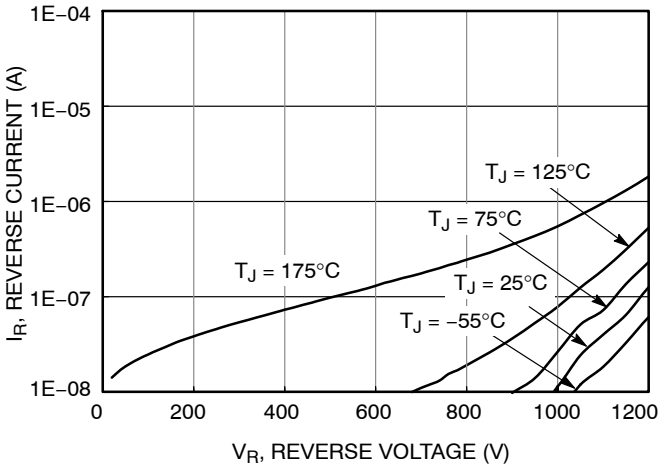



**Figure 2. Reverse Characteristics**

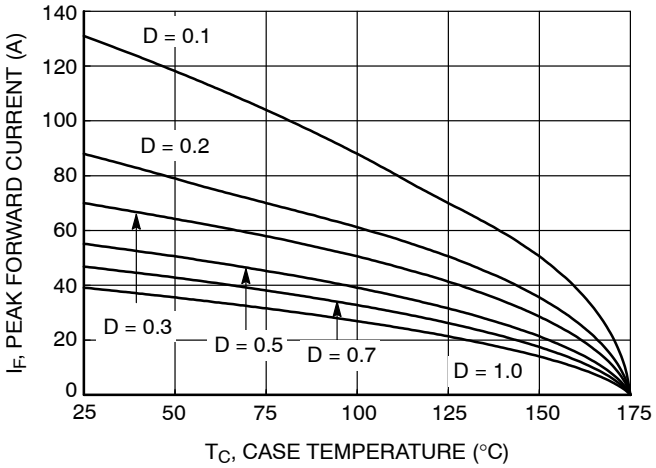



**Figure 3. Current Derating**

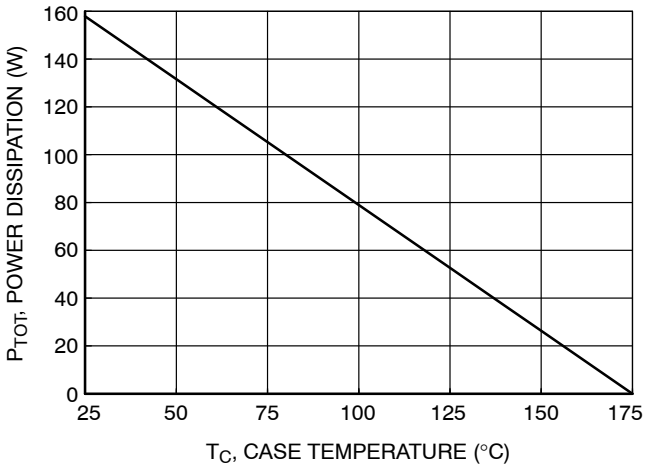



**Figure 4. Power Derating**

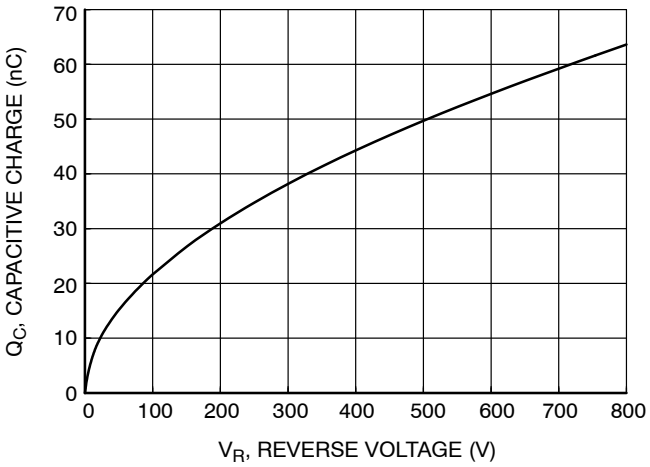



**Figure 5. Capacitive Charge vs. Reverse Voltage**

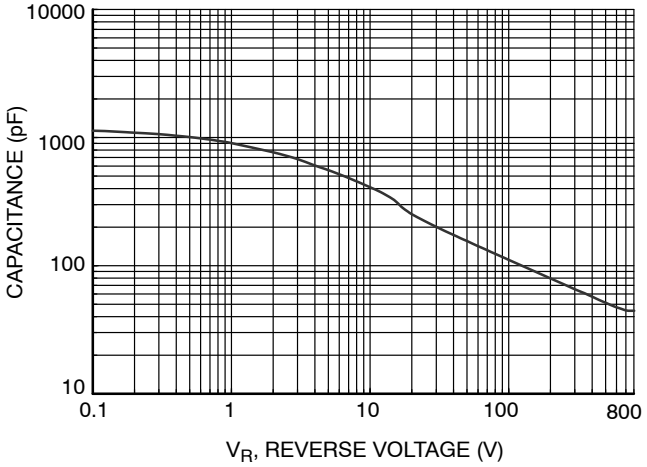



**Figure 6. Capacitive vs. Reverse Voltage**

## TYPICAL CHARACTERISTICS ($T_J$ = 25°C UNLESS OTHERWISE NOTED)

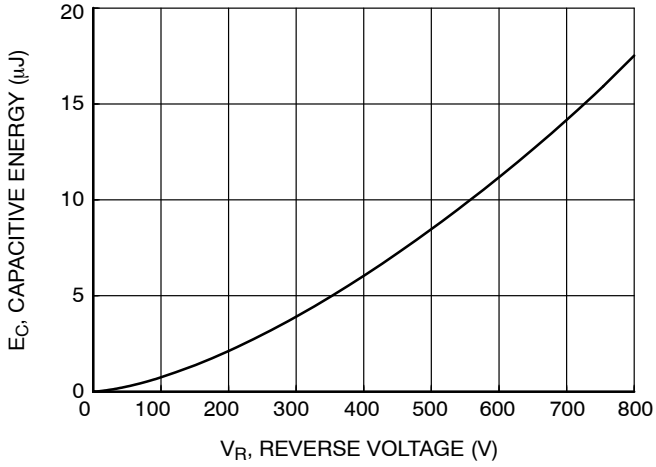



**Figure 7. Capacitance Stored Energy**

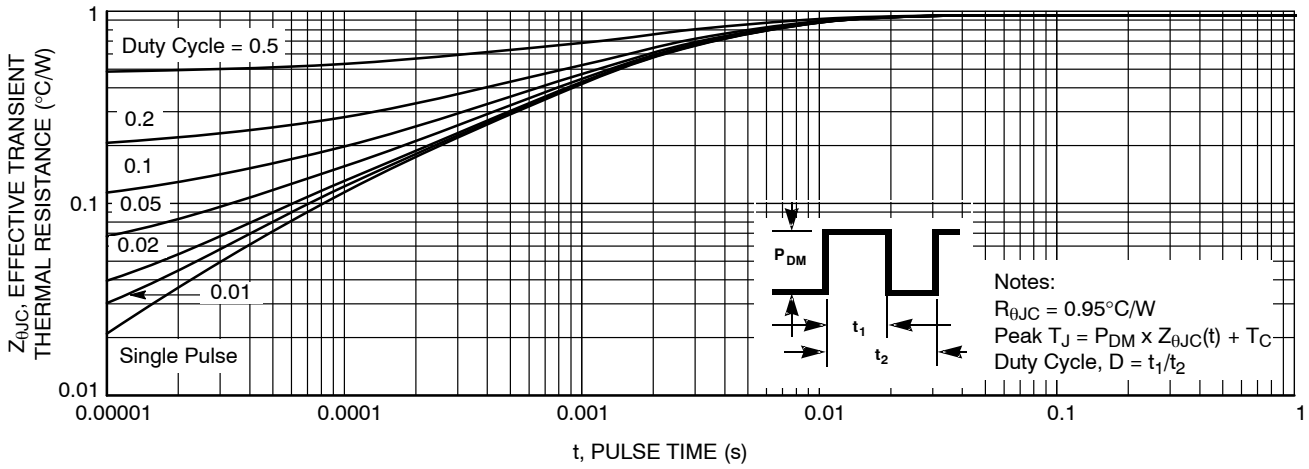
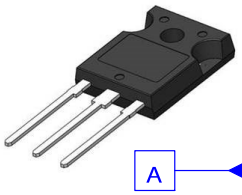
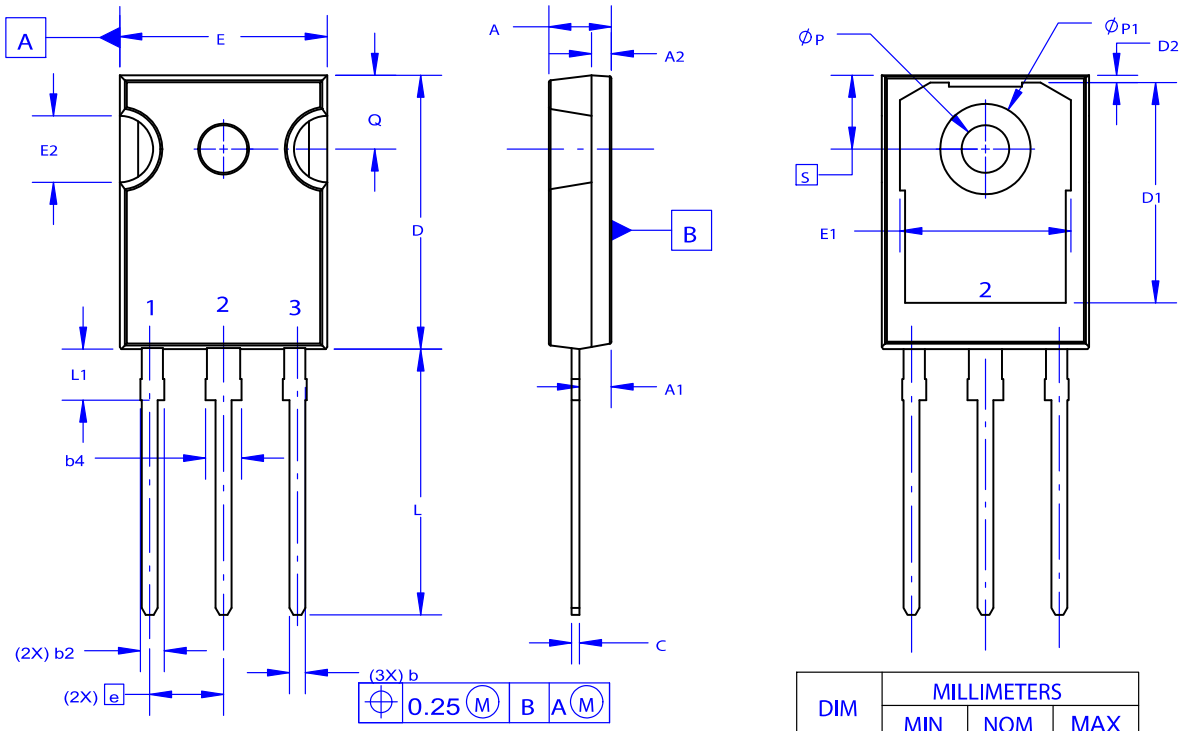



**Figure 8. Junction−to−Case Transient Thermal Response Curve**

**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 |

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