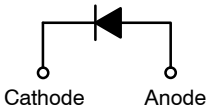
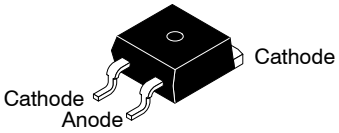
# Silicon Carbide (SiC) Schottky Diode – EliteSiC, 10 A, 1200 V, D1, D2PAK-2L

# FFSB10120A-F085

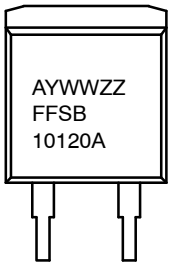



**Schottky Diode**




**D²PAK2 (TO−263−2L)**
**CASE 418BK**

## MARKING DIAGRAM




| | |
|---|---|
| A | = Assembly Plant Code |
| YWW | = Date Code (Year & Week) |
| ZZ | = Lot Code |
| FFSB10120A | = Specific Device Code |

## ORDERING INFORMATION

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

## 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 100 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery/No Forward Recovery
- AEC−Q101 qualified

## Applications

- Automotive HEV−EV Onboard Chargers
- Automotive HEV−EV DC−DC Converters

## ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25°C unless otherwise noted)

| Symbol | Parameter | | Ratings | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Peak Repetitive Reverse Voltage | | 1200 | V |
| $E_{AS}$ | Single Pulse Avalanche Energy (Note 1) | | 100 | mJ |
| $I_F$ | Continuous Rectified Forward Current @ $T_C$ < 164°C | | 10 | A |
| | Continuous Rectified Forward Current @ $T_C$ < 135°C | | 21 | |
| $I_{F, Max}$ | Non−Repetitive Peak Forward Surge Current | $T_C$ = 25°C, 10 μs | 850 | A |
| | | $T_C$ = 150°C, 10 μs | 800 | |
| $I_{F, SM}$ | Non−Repetitive Forward Surge Current | Half−Sine Pulse, tp = 8.3 ms | 90 | A |
| $I_{F, RM}$ | Repetitive Forward Surge Current | Half−Sine Pulse, tp = 8.3 ms | 35 | A |
| Ptot | Power Dissipation | $T_C$ = 25°C | 283 | W |
| | | $T_C$ = 150°C | 47 | W |
| $T_J$, $T_{STG}$ | Operating and Storage Temperature Range | | −55 to +175 | °C |
| | TO247 Mounting Torque, M3 Screw | | 60 | Ncm |

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 100 mJ is based on starting $T_J$ = 25°C, L = 0.5 mH, $I_{AS}$ = 20 A, V = 50 V.

## THERMAL CHARACTERISTICS

| Symbol | Parameter | Ratings | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case, Max | 0.53 | °C/W |

## ELECTRICAL CHARACTERISTICS ($T_C$ = 25°C unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | $I_F$ = 10 A, $T_C$ = 25°C | − | 1.45 | 1.75 | V |
| | | $I_F$ = 10 A, $T_C$ = 125°C | − | 1.7 | 2 | |
| | | $I_F$ = 10 A, $T_C$ = 175°C | − | 2 | 2.4 | |
| $I_R$ | Reverse Current | $V_R$ = 1200 V, $T_C$ = 25°C | − | − | 200 | μA |
| | | $V_R$ = 1200 V, $T_C$ = 125°C | − | − | 300 | |
| | | $V_R$ = 1200 V, $T_C$ = 175°C | − | − | 400 | |
| $Q_C$ | Total Capacitive Charge | V = 800 V | − | 62 | − | nC |
| C | Total Capacitance | $V_R$ = 1 V, f = 100 kHz | − | 612 | − | pF |
| | | $V_R$ = 400 V, f = 100 kHz | − | 58 | − | |
| | | $V_R$ = 800 V, f = 100 kHz | − | 47 | − | |

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.

## PACKAGE MARKING AND ORDERING INFORMATION

| Part Number | Top Mark | Package | Shipping† |
|---|---|---|---|
| FFSB10120A−F085 | FFSB10120A | $D^2$PAK2 (TO−263−2L) | 800 Units/ Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

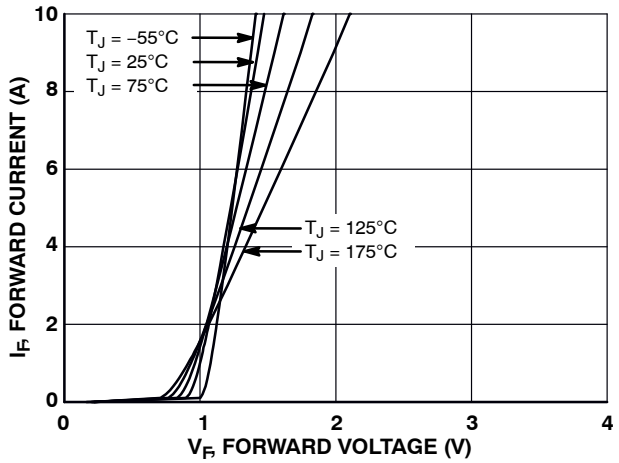



Figure 1. Forward Characteristics

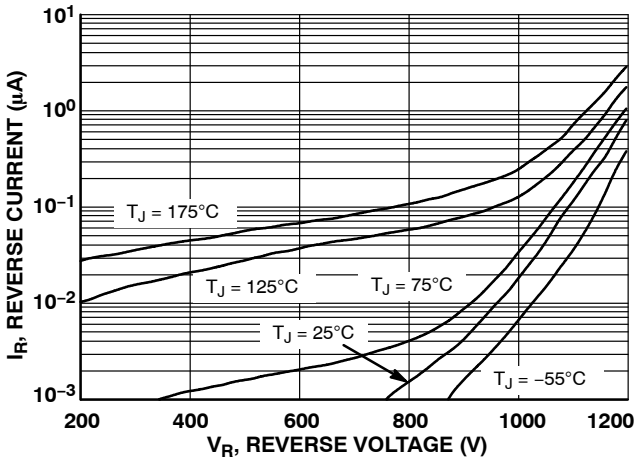



Figure 2. Reverse Characteristics

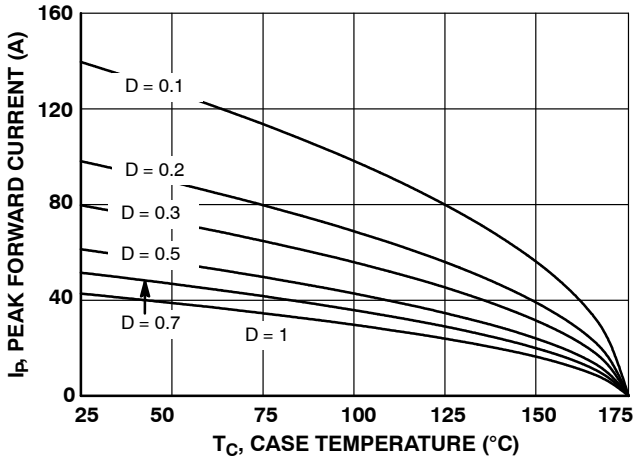



Figure 3. Current Derating

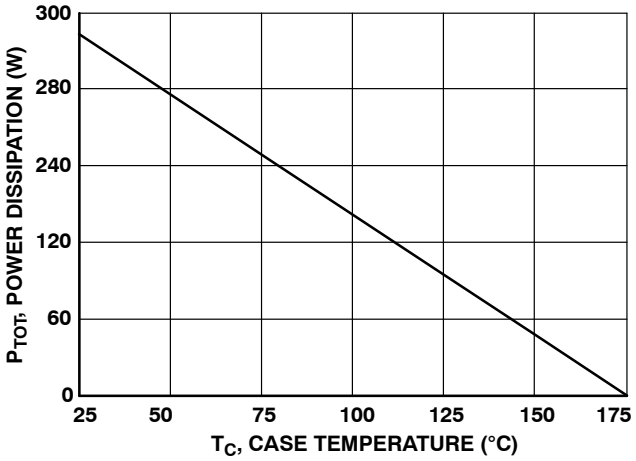



Figure 4. Power Derating

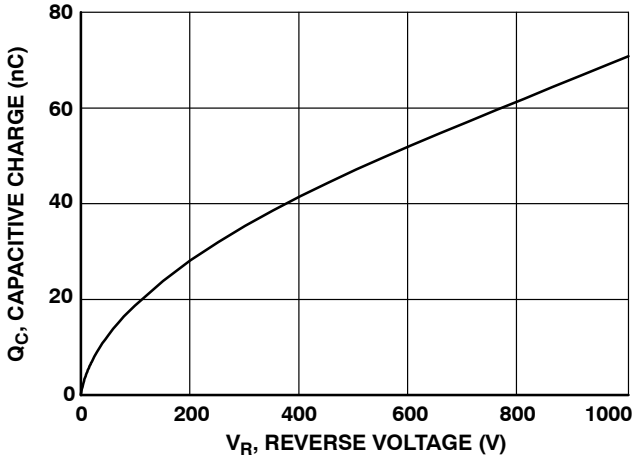



Figure 5. Capacitive Charge vs. Reverse Voltage

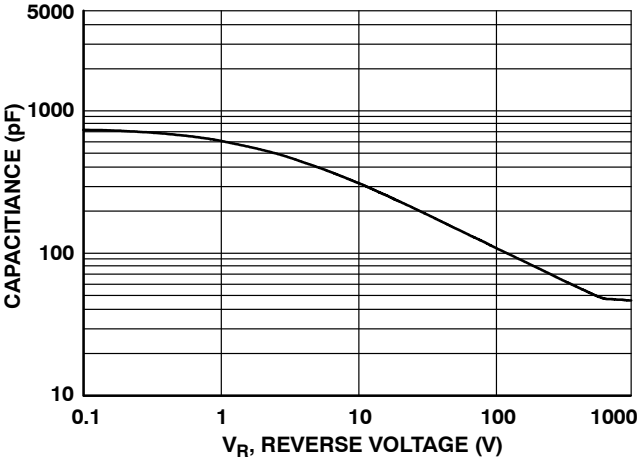



Figure 6. Capacitive Charge vs. Reverse Voltage

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

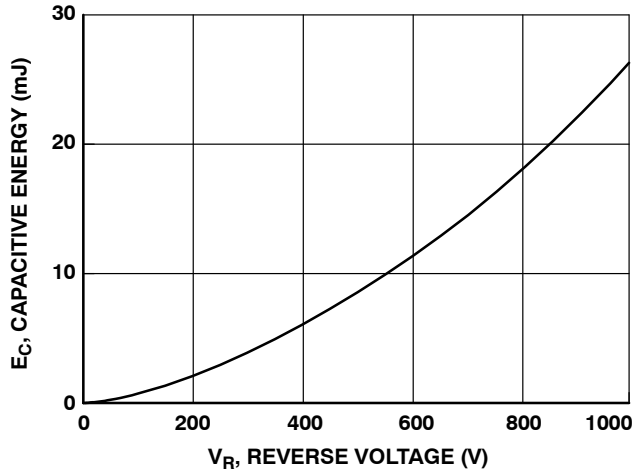



**Figure 7. Capacitance Stored Energy**

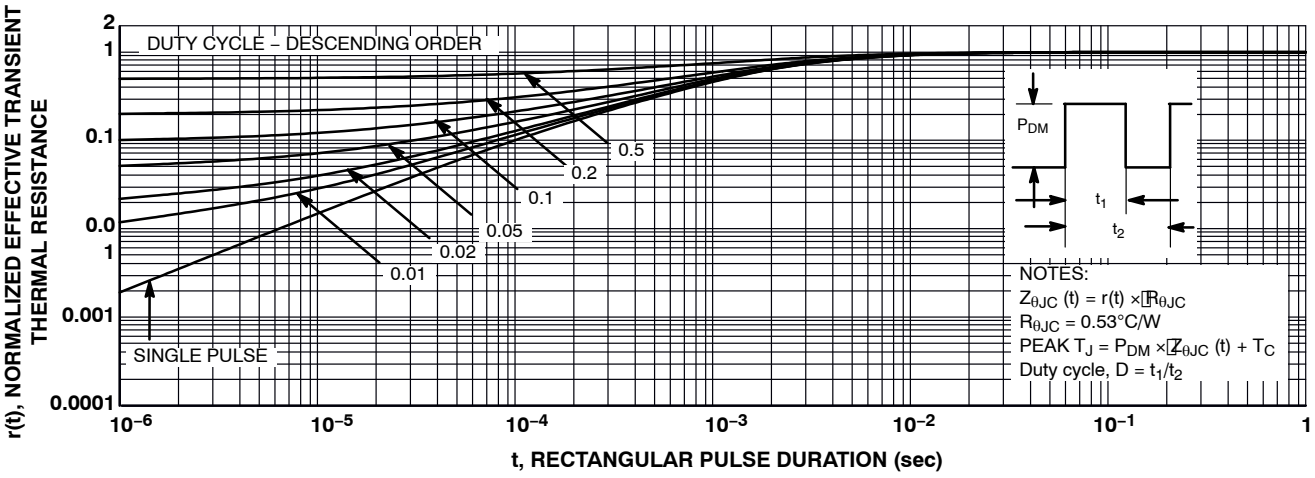



**Figure 8. Junction−to−Case Transient Thermal Response Curve**

## TEST CIRCUIT AND WAVEFORMS

L = 0.5 mH
R < 0.1 Ω
$V_{DD}$ = 50 V
EAVL = 1/2LI2 [$V_{R(AVL)}$ / ($V_{R(AVL)}$ − $V_{DD}$)]
Q1 = IGBT ($BV_{CES}$ > DUT $V_{R(AVL)}$)

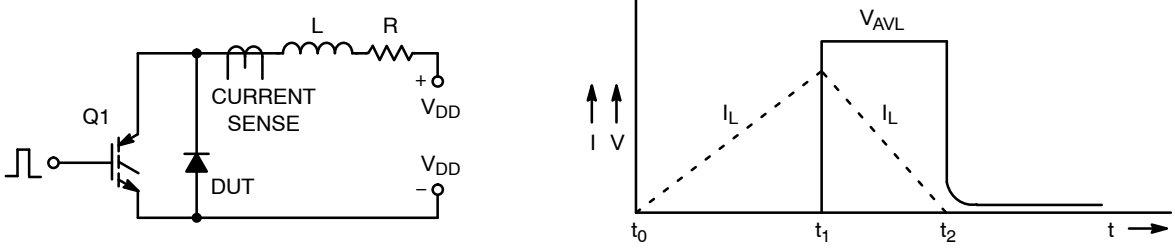
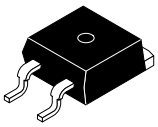


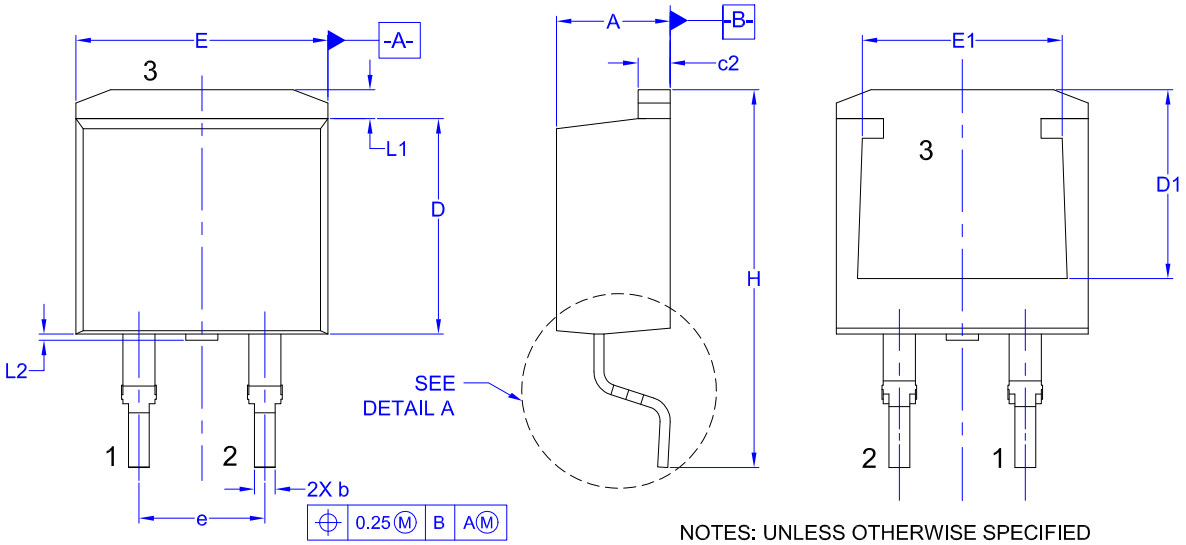

**Figure 9. Unclamped Inductive Switching Test Circuit & Waveform**

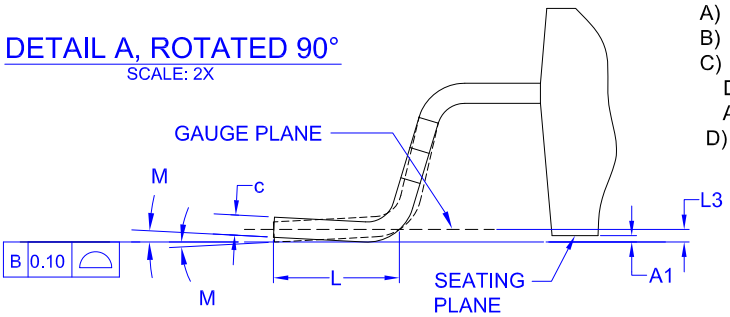
# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS



**D²PAK2 (TO−263−2L)**
CASE 418BK
ISSUE O

DATE 02 AUG 2018

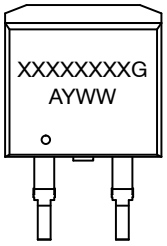



NOTES: UNLESS OTHERWISE SPECIFIED
A) ALL DIMENSIONS ARE IN MILLIMETERS.
B) REFERENCE JEDEC, TO-263, VARIATION AB.
C) DIMENSIONING AND TOLERANCING PER DIMENSIONING AND TOLERANCING PER ASME Y14.5 - 2009.
D) LANDPATTERN RECOMMENDATION PER IPC TO254P1524X482-3N

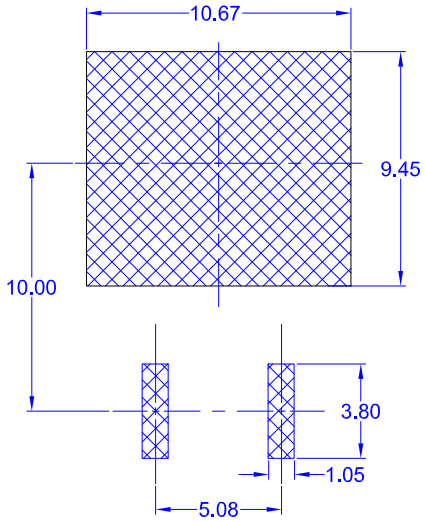
| DIM | MILLIMETERS | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 4.06 | 4.57 | 4.83 |
| A1 | 0.00 | 0.10 | 0.25 |
| b | 0.51 | 0.81 | 0.99 |
| c | 0.30 | 0.407 | 0.74 |
| c2 | 1.14 | 1.30 | 1.65 |
| D | 8.38 | 8.69 | 9.65 |
| D1 | 7.30 | 7.80 | 8.30 |
| E | 9.65 | 10.16 | 10.67 |
| E1 | 8.00 | 8.62 | 9.00 |
| e | 5.08 BSC | | |
| H | 14.60 | 15.35 | 15.88 |
| L | 1.78 | 2.54 | 2.79 |
| L1 | 0.90 | 1.29 | 1.68 |
| L2 | 0.00 | 0.15 | 0.25 |
| L3 | 0.25 BSC | | |
| M | 0° | 4° | 8° |

**GENERIC MARKING DIAGRAM***




XXX = 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.




LAND PATTERN RECOMMENDATION
UNLESS NOTED, ALL DIMS TYPICAL

| DOCUMENT NUMBER: | 98AON93788G | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red. |
|---|---|---|
| DESCRIPTION: | D²PAK2 (TO−263−2L) | PAGE 1 OF 1 |

## ADDITIONAL INFORMATION

**TECHNICAL PUBLICATIONS**:
**Technical Library:** 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