# FFSB0865B

# Silicon Carbide Schottky Diode

## 650 V, 8 A

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 33 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery / No Forward Recovery
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

### Applications

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

**MAXIMUM RATINGS** ($T_J$ = 25°C unless otherwise noted)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Peak Repetitive Reverse Voltage | | $V_{RRM}$ | 650 | V |
| Single Pulse Avalanche Energy ($T_J$ = 25°C, $I_{L(pk)}$ = 11.5 A, L = 0.5 mH, V = 50 V) | | $E_{AS}$ | 33 | mJ |
| Continuous Rectified Forward Current | @ $T_C$ < 147 | $I_F$ | 8.0 | A |
| | @ $T_C$ < 135 | | 10.1 | |
| Non−Repetitive Peak Forward Surge Current | $T_C$ = 25°C, $t_P$ = 10 µs | $I_{FM}$ | 577 | A |
| | $T_C$ = 150°C, $t_P$ = 10 µs | | 533 | |
| Non−Repetitive Forward Surge Current (Half−Sine Pulse) | $T_C$ = 25°C, $t_P$ = 8.3 ms | $I_{FSM}$ | 56 | A |
| Power Dissipation | $T_C$ = 25°C | $P_{tot}$ | 73 | W |
| | $T_C$ = 150°C | | 12 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | −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**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction−to−Case, Max. | $R_{\theta JC}$ | 2.05 | °C/W |

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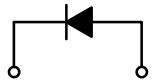
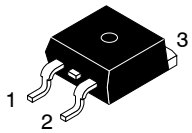
| $V_{RRM}$ | $I_F$ |
|---|---|
| 650 V | 8.0 A |



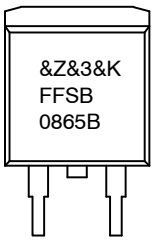
1., 3. Cathode 2. Anode

**Schottky Diode**




**D²PAK−3**
**TO−263**
**CASE 418BK**

**MARKING DIAGRAM**




| | |
|---|---|
| &Z | = Assembly Plant Code |
| &3 | = Numeric Date Code |
| &K | = Lot Code |
| FFSB0865B | = Specific Device Code |

**ORDERING INFORMATION**

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

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**ELECTRICAL CHARACTERISTICS** ($T_J$ = 25°C unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **ON CHARACTERISTICS** | | | | | | |
| Forward Voltage | $V_F$ | $I_F$ = 8.0 A, $T_J$ = 25°C | | 1.39 | 1.7 | V |
| | | $I_F$ = 8.0 A, $T_J$ = 125°C | | 1.55 | 2.0 | |
| | | $I_F$ = 8.0 A, $T_J$ = 175°C | | 1.71 | 2.4 | |
| Reverse Current | $I_R$ | $V_R$ = 650 V, $T_J$ = 25°C | | 0.5 | 40 | μA |
| | | $V_R$ = 650 V, $T_J$ = 125°C | | 1.0 | 80 | |
| | | $V_R$ = 650 V, $T_J$ = 175°C | | 2.0 | 160 | |
| **CHARGES, CAPACITANCES & GATE RESISTANCE** | | | | | | |
| Total Capacitive Charge | $Q_C$ | $V_C$ = 400 V | | 22 | | nC |
| | $C_{tot}$ | $V_R$ = 1 V, f = 100 kHz | | 336 | | pF |
| | | $V_R$ = 200 V, f = 100 kHz | | 39 | | |
| | | $V_R$ = 400 V, f = 100 kHz | | 30 | | |

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 Marking | Package | Packing Method | Reel Size | Tape Width | Quantity |
|---|---|---|---|---|---|---|
| FFSB0865B | FFSB0865B | $D^2PAK$ | Tape & Reel† | 330 mm | 24 mm | 800 Units |

†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

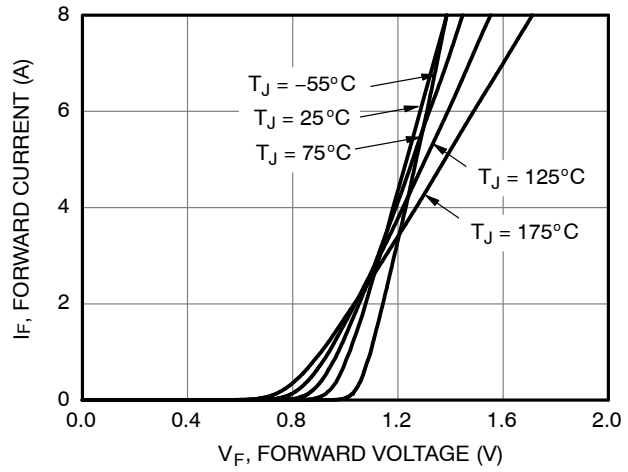



**Figure 1. Forward Characteristics**

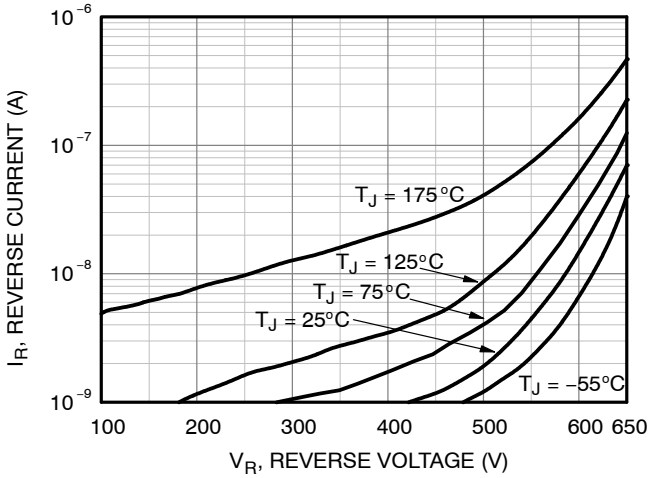



**Figure 2. Reverse Characteristics**

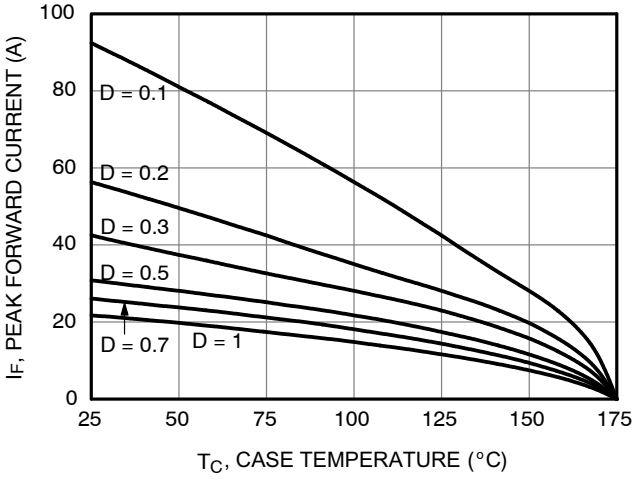



**Figure 3. Current Derating**

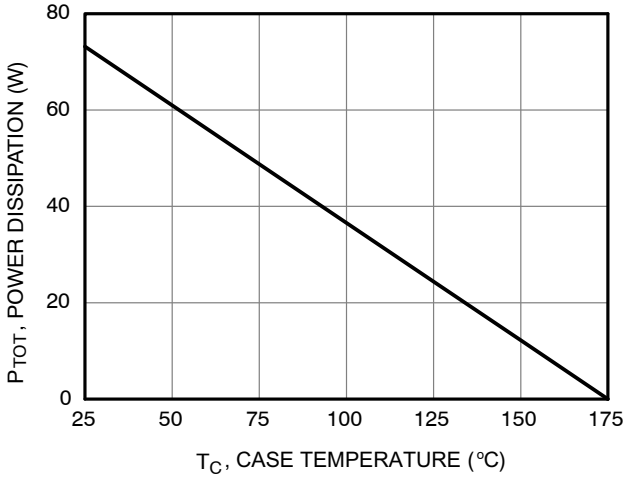



**Figure 4. Power Derating**

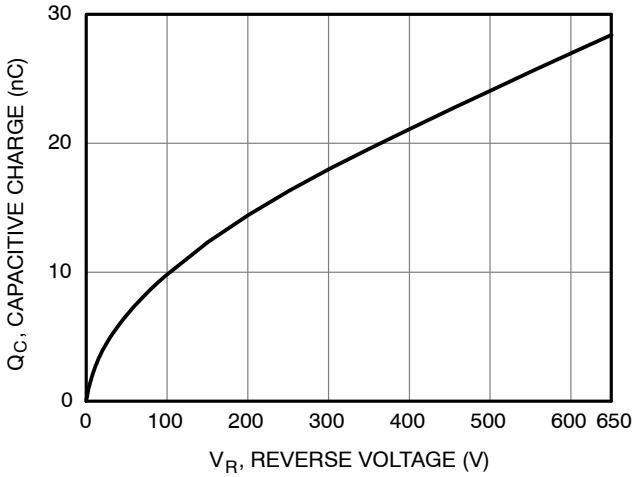



**Figure 5. Capacitive Charge vs. Reverse Voltage**

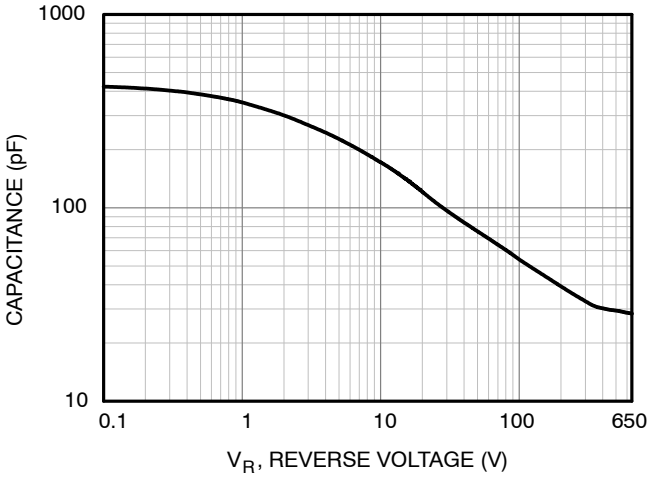



**Figure 6. Capacitance vs. Reverse Voltage**

## TYPICAL CHARACTERISTICS

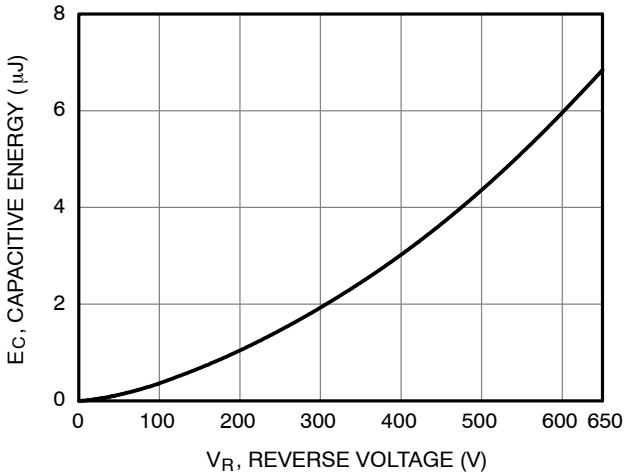



**Figure 7. Capacitance Stored Energy**

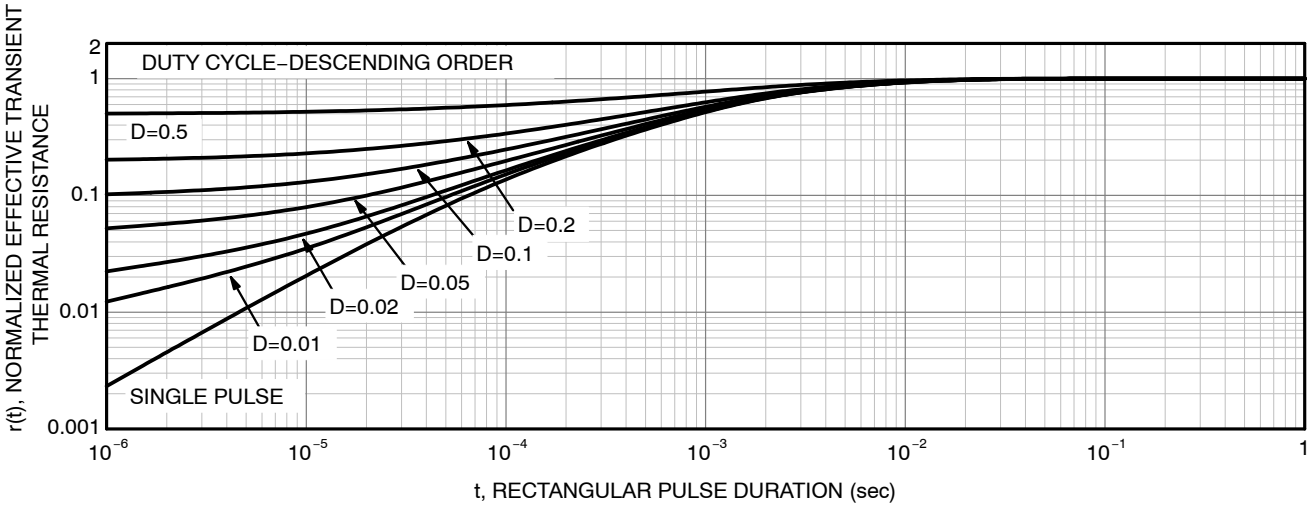
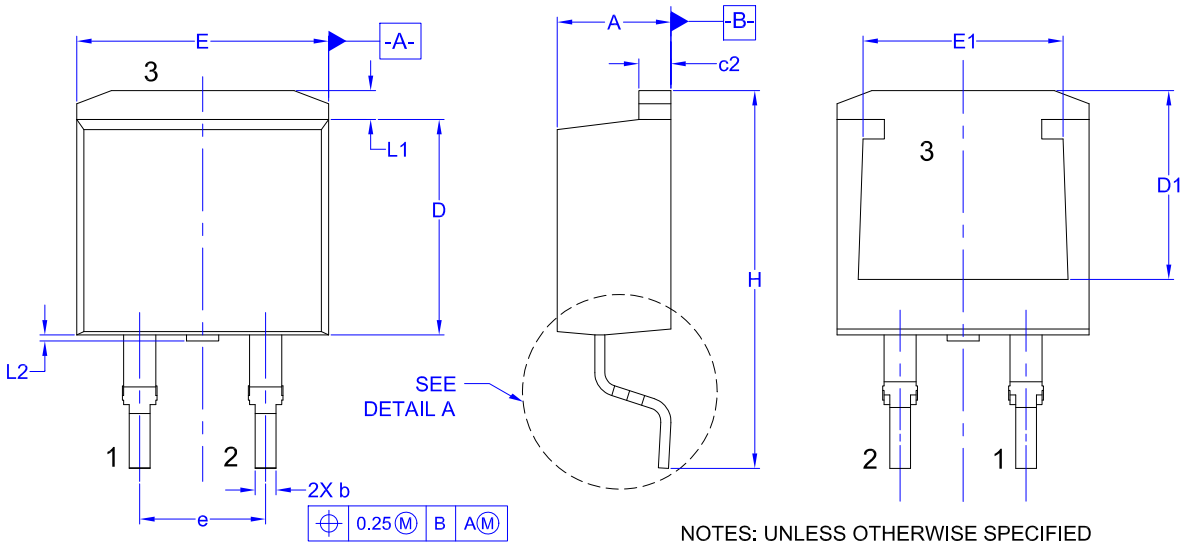
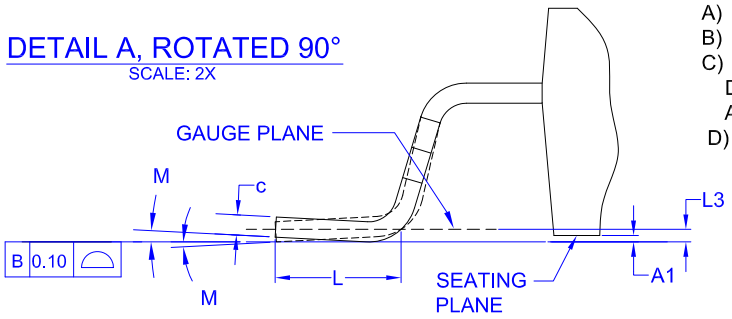



**Figure 8. Junction−to−Case Transient Thermal Response**

## PACKAGE DIMENSIONS

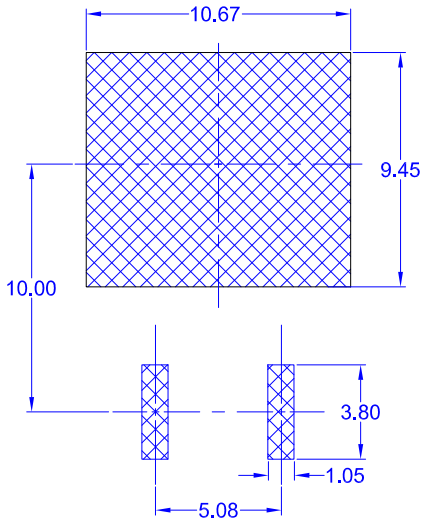
**D²PAK2 (TO−263−2L)**
CASE 418BK
ISSUE O




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° |




LAND PATTERN RECOMMENDATION
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