

Silicon Carbide Schottky Diode

650 V, 10 A

FFSD1065B

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 & 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
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

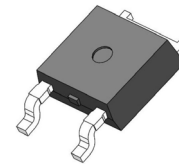
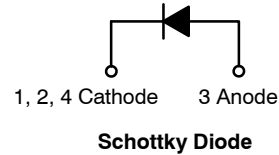
Applications

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



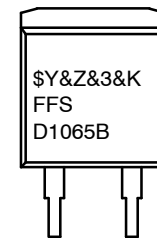
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DPAK3 (TO-252, 3 LEAD)
CASE 369AS

MARKING DIAGRAM



| | |
|-----------|-------------------------|
| \$Y | = ON Semiconductor Logo |
| &Z | = Assembly Plant Code |
| &3 | = Numeric Date Code |
| &K | = Lot Code |
| FFSD1065B | = Specific Device Code |

ORDERING INFORMATION

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

FFSD1065B

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

| Symbol | Parameter | Value | Unit | |
|-----------------------------------|---|--|------|---|
| V _{RRM} | Peak Repetitive Reverse Voltage | 650 | V | |
| E _{AS} | Single Pulse Avalanche Energy (Note 1) | 49 | mJ | |
| I _F | Continuous Rectified Forward Current @ T _C < 150°C | 10 | A | |
| | Continuous Rectified Forward Current @ T _C < 135°C | 13.5 | | |
| I _{F, Max} | Non-Repetitive Peak Forward Surge Current | T _C = 25°C, 10 μs | 650 | A |
| | | T _C = 150°C, 10 μs | 570 | A |
| I _{F, SM} | Non-Repetitive Forward Surge Current T _C = 25°C | Half-Sine Pulse, t _p = 8.3 ms | 45 | A |
| P _{tot} | Power Dissipation | T _C = 25°C | 98 | W |
| | | T _C = 150°C | 16 | W |
| T _J , T _{STG} | Operating and Storage Temperature Range | -55 to +175 | °C | |
| | TO-247 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 49 mJ is based on starting T_J = 25°C, L = 0.5 mH, I_{AS} = 14 A, V = 50 V.

THERMAL CHARACTERISTICS

| Symbol | Parameter | Value | Unit |
|------------------|---|-------|------|
| R _{θJC} | Thermal Resistance, Junction to Case, Max | 1.53 | °C/W |

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

| Symbol | Parameter | Test Condition | Min | Typ | Max | Unit |
|----------------|-------------------------|--|-----|------|-----|------|
| V _F | Forward Voltage | I _F = 10 A, T _C = 25°C | - | 1.38 | 1.7 | V |
| | | I _F = 10 A, T _C = 125°C | - | 1.6 | 2.0 | |
| | | I _F = 10 A, T _C = 175°C | - | 1.72 | 2.4 | |
| I _R | Reverse Current | V _R = 650 V, T _C = 25°C | - | 0.5 | 40 | μA |
| | | V _R = 650 V, T _C = 125°C | - | 1 | 80 | |
| | | V _R = 650 V, T _C = 175°C | - | 2 | 160 | |
| Q _C | Total Capacitive Charge | V = 400 V | - | 25 | - | nC |
| C | Total Capacitance | V _R = 1 V, f = 100 kHz | - | 424 | - | pF |
| | | V _R = 300 V, f = 100 kHz | - | 39 | - | |
| | | V _R = 600 V, f = 100 kHz | - | 35 | - | |

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* |
|-------------|-------------|-----------------------------------|--------------------|
| FFSD1065B | FFSD1065B | DPAK3 (Pb-Free / Halogen Free) | 2500 / 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

($T_J = 25^\circ\text{C}$ unless otherwise noted)

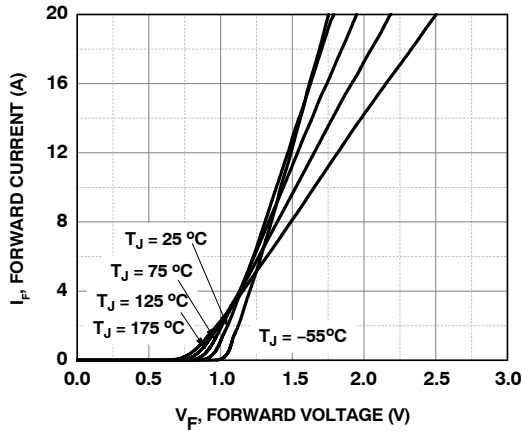


Figure 1. Forward Characteristics

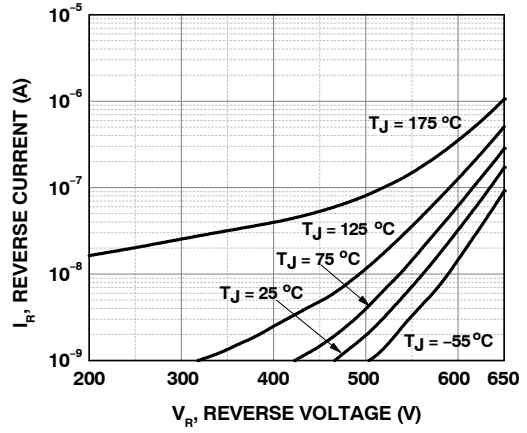


Figure 2. Reverse Characteristics

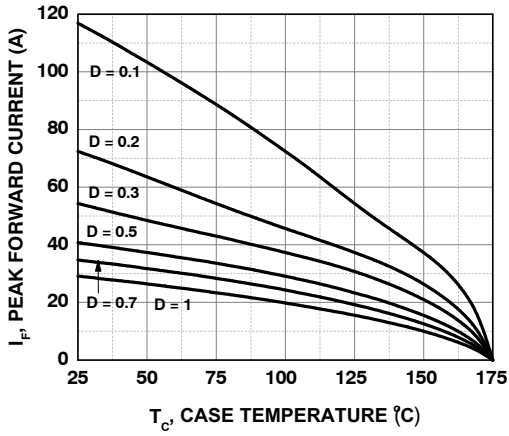


Figure 3. Current Derating

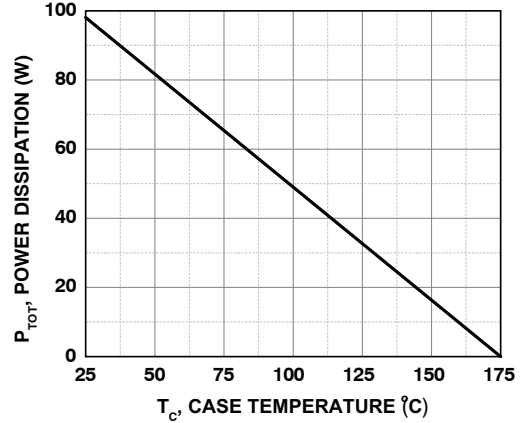


Figure 4. Power Derating

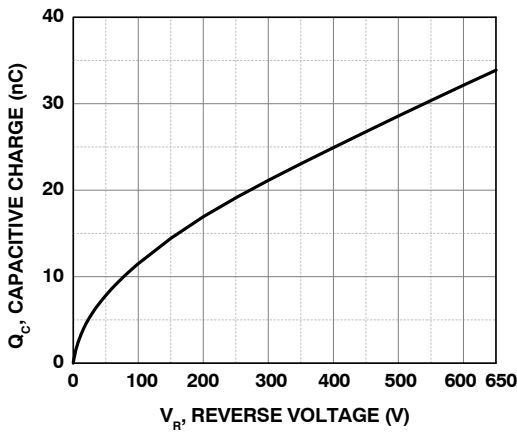


Figure 5. Capacitive Charge vs. Reverse Voltage

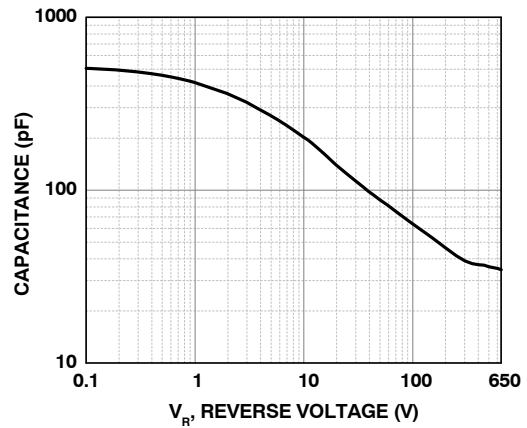


Figure 6. Capacitance vs. Reverse Voltage

FFSD1065B

TYPICAL CHARACTERISTICS (continued)

($T_J = 25^\circ\text{C}$ unless otherwise noted)

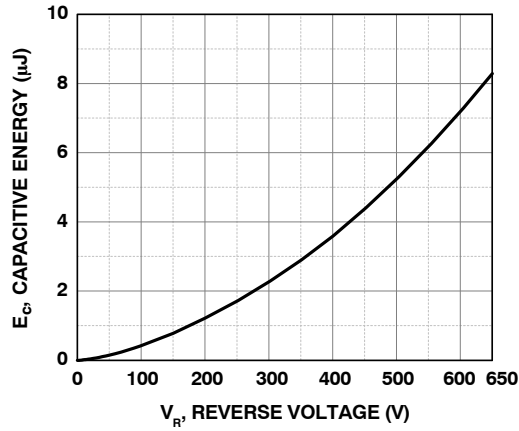


Figure 7. Capacitance Stored Energy

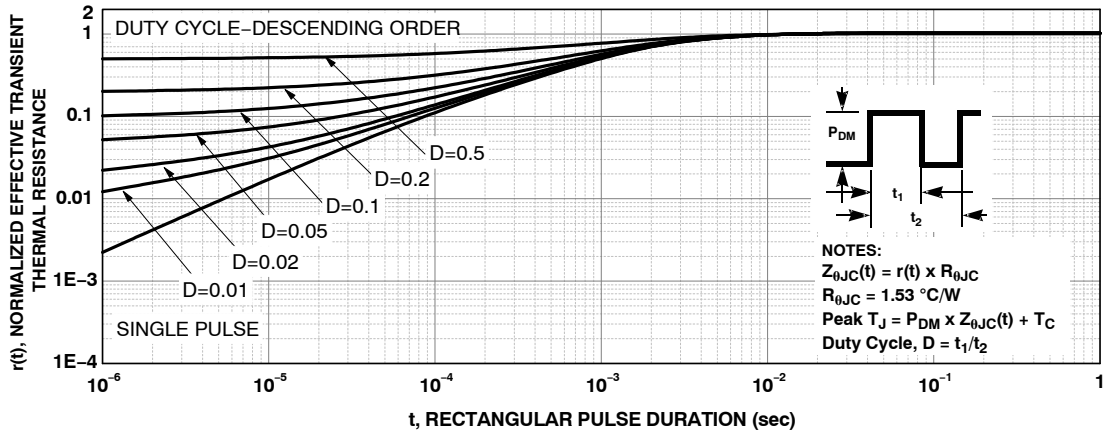


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

$L = 0.5\text{ mH}$
 $R < 0.1\ \Omega$
 $V_{DD} = 50\text{ V}$
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)} / (V_{R(AVL)} - V_{DD})]$
 $Q1 = \text{IGBT (}BV_{CES} > \text{DUT } V_{R(AVL)})$

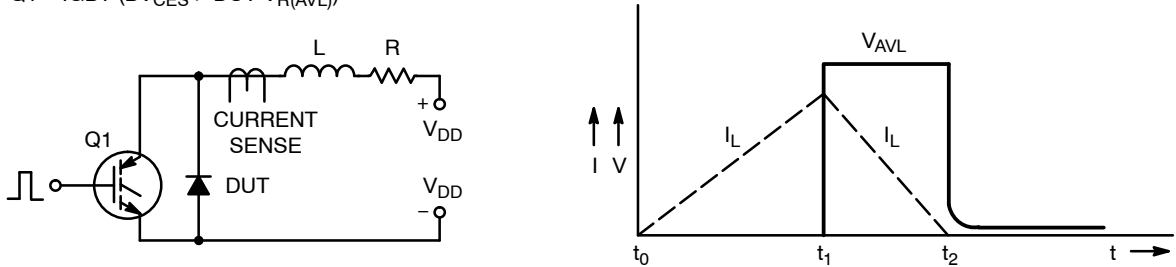


Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

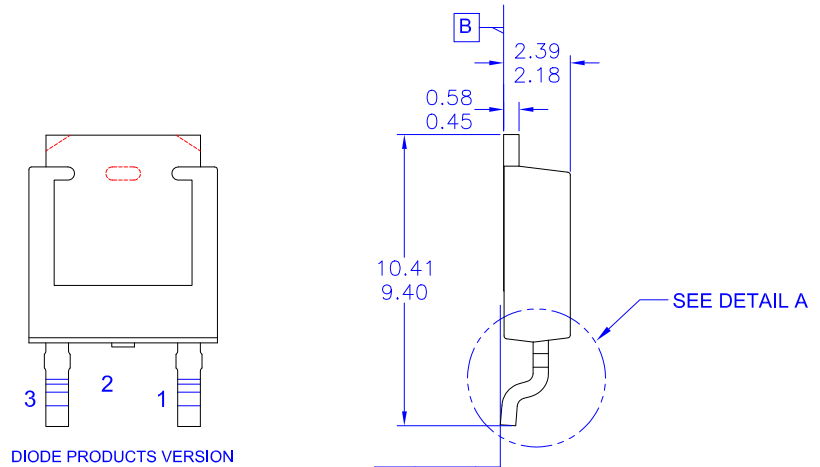
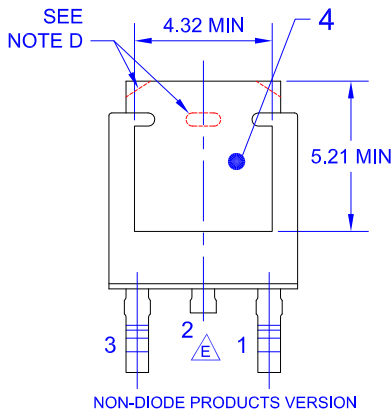
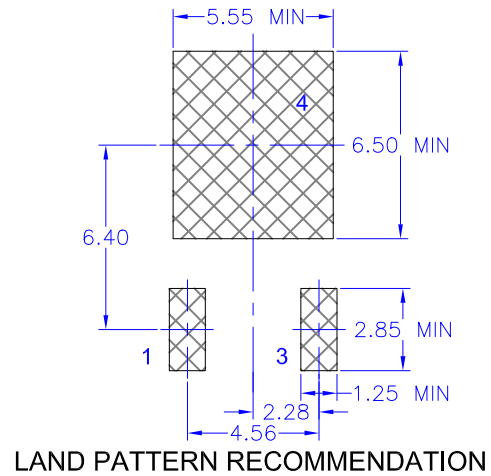
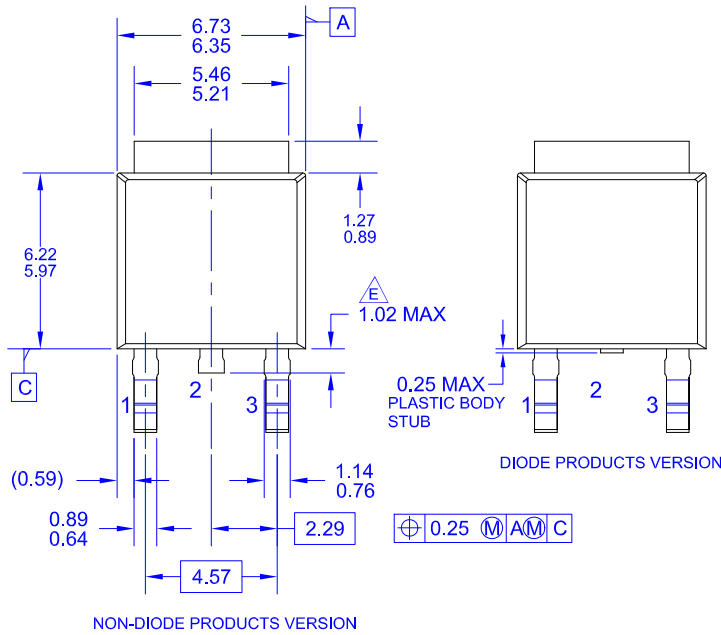
MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

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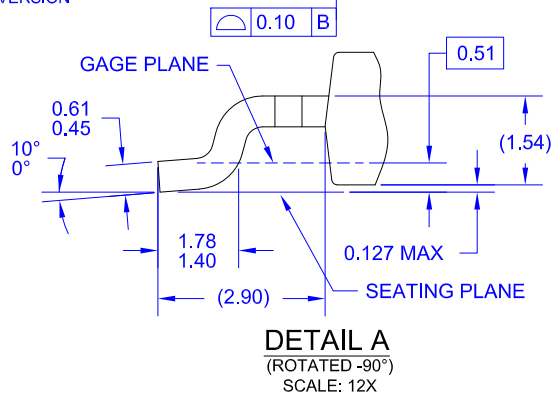


DPAK3 (TO-252 3 LD) CASE 369AS ISSUE O

DATE 30 SEP 2016



- NOTES: UNLESS OTHERWISE SPECIFIED
- A) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE C, VARIATION AA.
 - B) ALL DIMENSIONS ARE IN MILLIMETERS.
 - C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
 - D) SUPPLIER DEPENDENT MOLD LOCKING HOLES OR CHAMFERED CORNERS OR EDGE PROTRUSION.
 - E) TRIMMED CENTER LEAD IS PRESENT ONLY FOR DIODE PRODUCTS
 - F) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
 - G) LAND PATTERN RECOMMENDATION IS BASED ON IPC7351A STD TO228P991X239-3N.



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