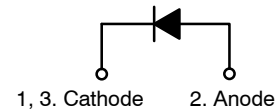


Silicon Carbide (SiC) Schottky Diode – EliteSiC, 4 A, 650 V, D1, DPAK



Schottky Diode

FFSD0465A

Description

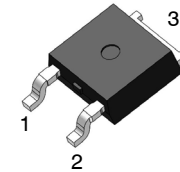
Silicon Carbide (SiC) Schottky Diodes use a completely new technology that provides superior switching performance and higher reliability compared to Silicon. No reverse recovery current, temperature independent switching characteristics, and excellent thermal performance sets Silicon Carbide as the 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 25 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery/No Forward Recovery
- This Device is Pb-Free, Halogen Free/BFR Free and RoHS Compliant

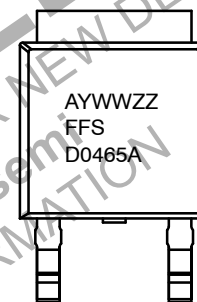
Applications

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



DPAK
CASE 369AS

MARKING DIAGRAM



- A = Assembly Plant Code
- YWW = Date Code (Year & Week)
- ZZ = Lot Code
- FFSD0465A = Specific Device Code

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) | 25 | mJ |
| I _F | Continuous Rectified Forward Current @ T _C < 160°C | 4 | A |
| | Continuous Rectified Forward Current @ T _C < 135°C | 7.6 | |
| I _{F, Max} | Non-Repetitive Peak Forward Surge Current | T _C = 25°C, 10 μs | 360 A |
| | | T _C = 150°C, 10 μs | 330 A |
| I _{F, SM} | Non-Repetitive Forward Surge Current | Half-Sine Pulse, t _p = 8.3 ms | 38 A |
| I _{F, RM} | Repetitive Forward Surge Current | Half-Sine Pulse, t _p = 8.3 ms | 18 A |
| P _{tot} | Power Dissipation | T _C = 25°C | 61 W |
| | | T _C = 150°C | 10 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.

1. E_{AS} of 25 mJ is based on starting T_J = 25°C, L = 0.5 mH, I_{AS} = 10 A, V = 50 V

ORDERING INFORMATION

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

FFSD0465A

THERMAL CHARACTERISTICS

| Symbol | Parameter | Value | Unit |
|-----------------|--|-------|---------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case, Max. | 2.46 | $^{\circ}C/W$ |

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}C$ unless otherwise noted)

| Symbol | Parameter | Test Condition | Min | Typ | Max | Unit |
|--------|-------------------------|--|-----|------|------|---------|
| V_F | Forward Voltage | $I_F = 4\text{ A}, T_C = 25^{\circ}C$ | - | 1.50 | 1.75 | V |
| | | $I_F = 4\text{ A}, T_C = 125^{\circ}C$ | - | 1.6 | 2.0 | |
| | | $I_F = 4\text{ A}, T_C = 175^{\circ}C$ | - | 1.72 | 2.4 | |
| I_R | Reverse Current | $V_R = 650\text{ V}, T_C = 25^{\circ}C$ | - | - | 200 | μA |
| | | $V_R = 650\text{ V}, T_C = 125^{\circ}C$ | - | - | 400 | |
| | | $V_R = 650\text{ V}, T_C = 175^{\circ}C$ | - | - | 600 | |
| Q_C | Total Capacitive Charge | $V = 400\text{ V}$ | - | 16 | - | nC |
| C | Total Capacitance | $V_R = 1\text{ V}, f = 100\text{ kHz}$ | - | 258 | - | pF |
| | | $V_R = 200\text{ V}, f = 100\text{ kHz}$ | - | 29 | - | |
| | | $V_R = 400\text{ V}, f = 100\text{ kHz}$ | - | 21 | - | |

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* |
|-------------|-------------|---------|--------------------|
| FFSD0465A | FFSD0465A | DPAK | 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

($T_J = 25^{\circ}C$ UNLESS OTHERWISE NOTED)

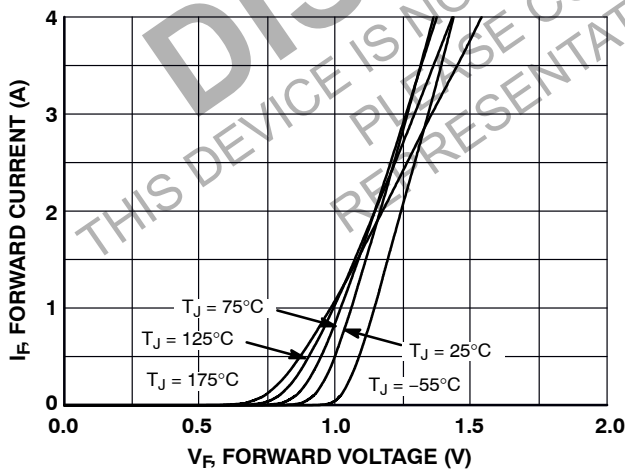


Figure 1. Forward Characteristics

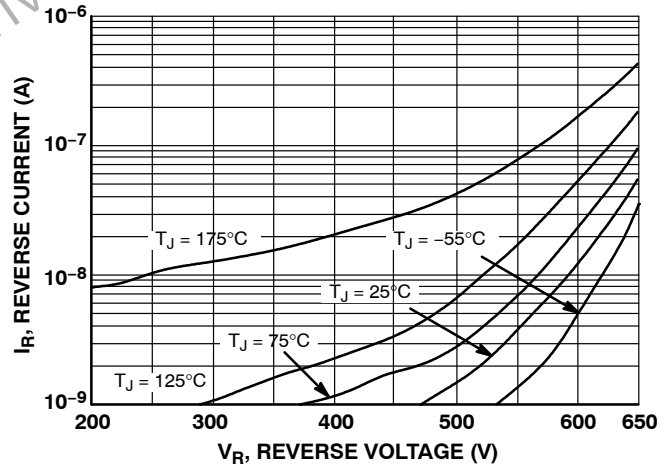


Figure 2. Reverse Characteristics

TYPICAL CHARACTERISTICS (CONTINUED)

($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

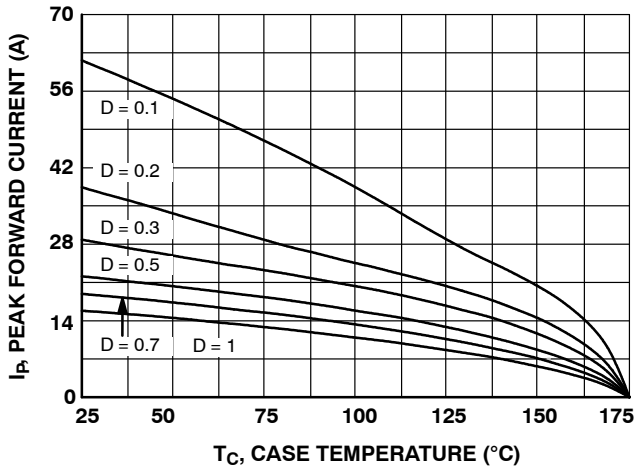


Figure 3. Current Derating

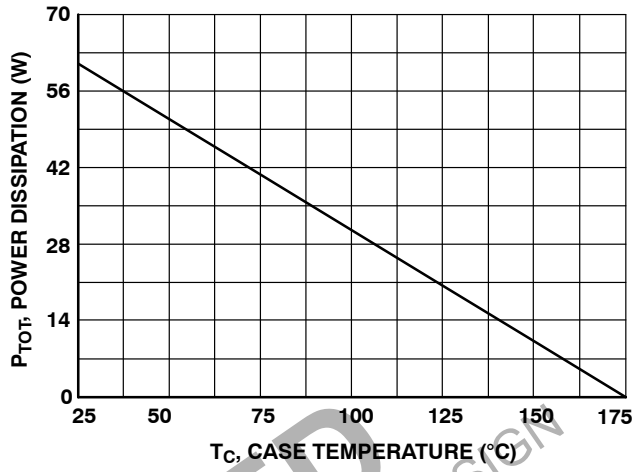


Figure 4. Power Derating

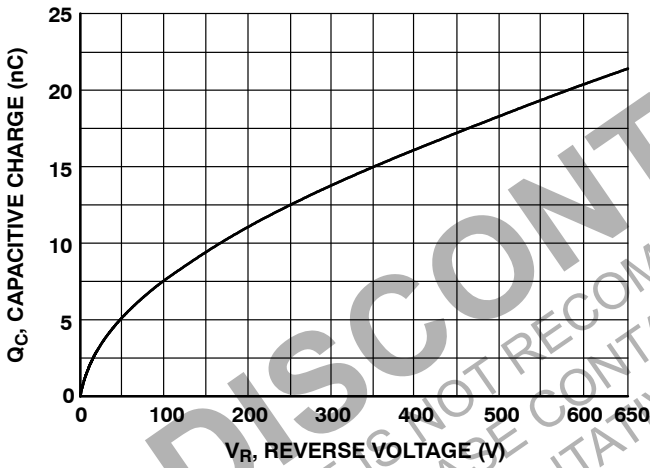


Figure 5. Capacitive Charge vs. Reverse Voltage

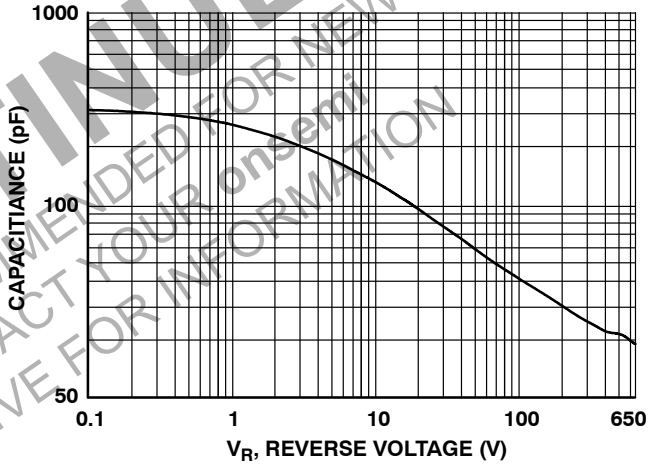


Figure 6. Capacitance vs. Reverse Voltage

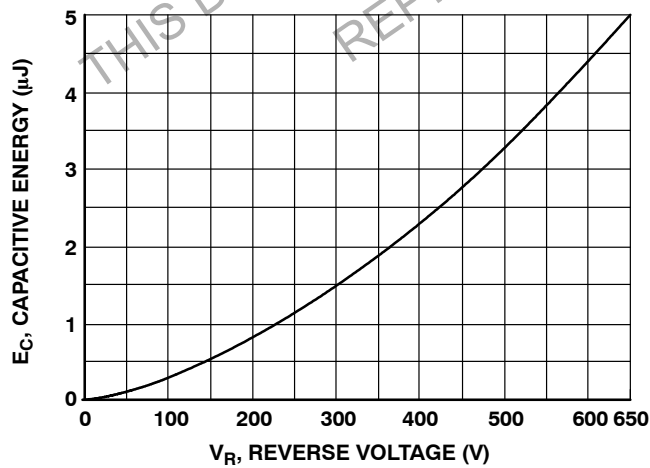


Figure 7. Capacitance Stored Energy

TYPICAL CHARACTERISTICS (CONTINUED)

($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

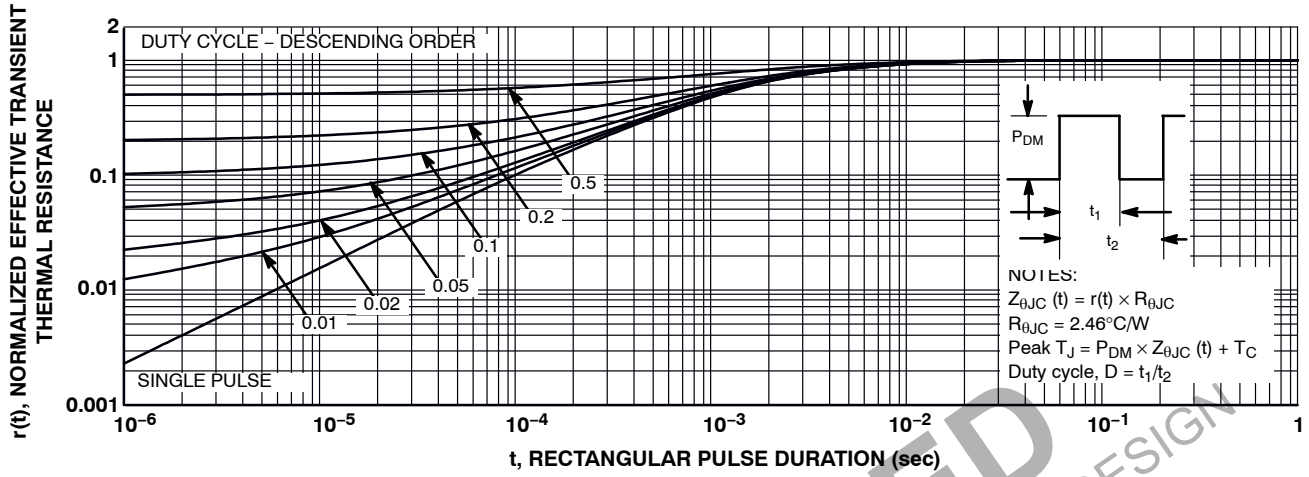


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

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

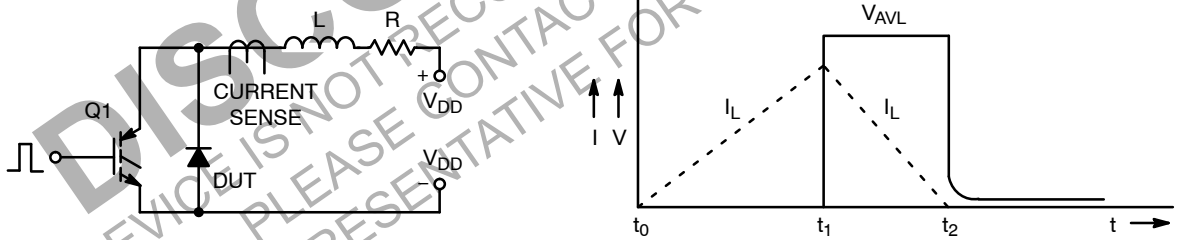
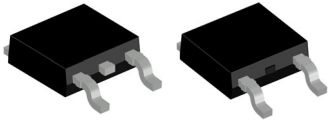
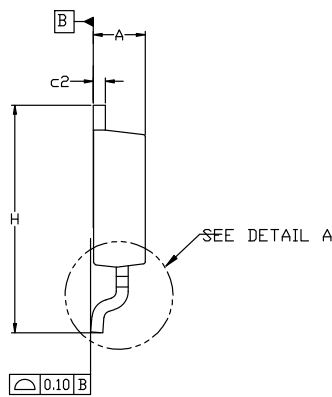
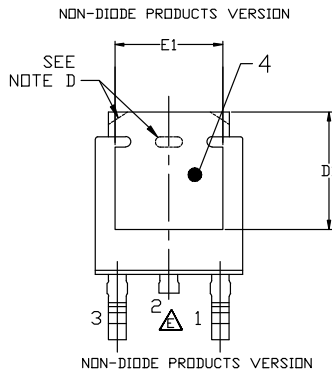
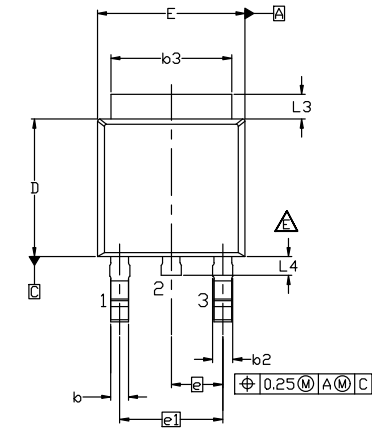


Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

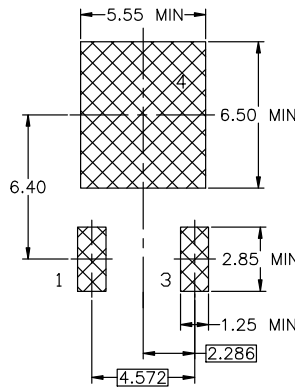
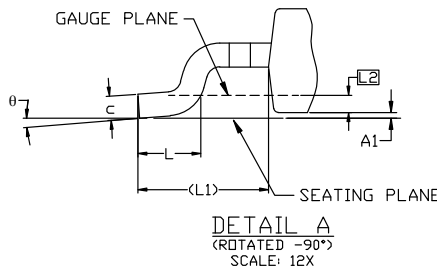


**DPAK3 6.10x6.54x2.29, 4.57P
CASE 369AS
ISSUE B**

DATE 20 DEC 2023



- NOTES: UNLESS OTHERWISE SPECIFIED
 A) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE F, VARIATION AA.
 B) ALL DIMENSIONS ARE IN MILLIMETERS.
 C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2018.
 D) SUPPLIER DEPENDENT MOLD LOCKING HOLES OR CHAMFERED CORNERS OR EDGE PROTRUSION.
 E) FOR DIODE PRODUCTS, L4 IS 0.25 MM MAX PLASTIC BODY STUB WITHOUT CENTER LEAD.
 F) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
 G) LAND PATTERN RECOMMENDATION IS BASED ON IPC7351A STD TD228P991X239-3N.

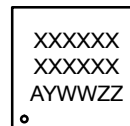


LAND PATTERN RECOMMENDATION

*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

| DIM | MILLIMETERS | | |
|-------|-------------|------|-------|
| | MIN. | NOM. | MAX. |
| A | 2.18 | 2.29 | 2.39 |
| A1 | 0.00 | - | 0.127 |
| b | 0.64 | 0.77 | 0.89 |
| b2 | 0.76 | 0.95 | 1.14 |
| b3 | 5.21 | 5.34 | 5.46 |
| c | 0.45 | 0.53 | 0.61 |
| c2 | 0.45 | 0.52 | 0.58 |
| D | 5.97 | 6.10 | 6.22 |
| D1 | 5.21 | --- | --- |
| E | 6.35 | 6.54 | 6.73 |
| E1 | 4.32 | --- | --- |
| e | 2.286 BSC | | |
| e1 | 4.572 BSC | | |
| H | 9.40 | 9.91 | 10.41 |
| L | 1.40 | 1.59 | 1.78 |
| L1 | 2.90 REF | | |
| L2 | 0.51 BSC | | |
| L3 | 0.89 | 1.08 | 1.27 |
| L4 | --- | --- | 1.02 |
| theta | 0° | --- | 10° |

GENERIC MARKING DIAGRAM*



*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.

- XXXX = Specific Device Code
- A = Assembly Location
- Y = Year
- WW = Work Week
- ZZ = Assembly Lot Code

| | | |
|-------------------------|------------------------------------|--|
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| DESCRIPTION: | DPAK3 6.10x6.54x2.29, 4.57P | PAGE 1 OF 1 |

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