



# FFSP1665A

## Silicon Carbide Schottky Diode

### 650 V, 16 A

#### Features

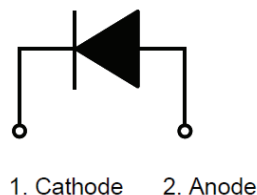
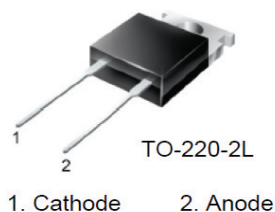
- Max Junction Temperature 175 °C
- Avalanche Rated 81 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery / No Forward Recovery

#### Applications

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

#### 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.



#### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted.

| Symbol         | Parameter                                                        | FFSP1665A                                 | Unit             |
|----------------|------------------------------------------------------------------|-------------------------------------------|------------------|
| $V_{RRM}$      | Peak Repetitive Reverse Voltage                                  | 650                                       | V                |
| $E_{AS}$       | Single Pulse Avalanche Energy (Note 1)                           | 81                                        | mJ               |
| $I_F$          | Continuous Rectified Forward Current @ $T_C < 135^\circ\text{C}$ | 16                                        | A                |
| $I_{F, Max}$   | Non-Repetitive Peak Forward Surge Current                        | $T_C = 25^\circ\text{C}, 10 \mu\text{s}$  | 1130             |
|                |                                                                  | $T_C = 150^\circ\text{C}, 10 \mu\text{s}$ | 980              |
| $I_{F, SM}$    | Non-Repetitive Forward Surge Current                             | Half-Sine Pulse, $t_p = 8.3 \text{ ms}$   | 90               |
| $I_{F, RM}$    | Repetitive Forward Surge Current                                 | Half-Sine Pulse, $t_p = 8.3 \text{ ms}$   | 50               |
| $P_{tot}$      | Power Dissipation                                                | $T_C = 25^\circ\text{C}$                  | 150              |
|                |                                                                  | $T_C = 150^\circ\text{C}$                 | 25               |
| $T_J, T_{STG}$ | Operating and Storage Temperature Range                          | -55 to +175                               | $^\circ\text{C}$ |

#### Thermal Characteristics

| Symbol          | Parameter                                  | Rating | Unit               |
|-----------------|--------------------------------------------|--------|--------------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case, Max. | 1.0    | $^\circ\text{C/W}$ |

## Package Marking and Ordering Information

| Part Number | Top Mark  | Package   | Packing Method | Reel Size | Tape Width | Quantity |
|-------------|-----------|-----------|----------------|-----------|------------|----------|
| FFSP1665A   | FFSP1665A | TO-220-2L | Tube           | N/A       | N/A        | 50 units |

## Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted.

| Symbol | Parameter               | Test Conditions                               | Min. | Typ. | Max. | Unit          |
|--------|-------------------------|-----------------------------------------------|------|------|------|---------------|
| $V_F$  | Forward Voltage         | $I_F = 16\text{ A}, T_C = 25^\circ\text{C}$   | -    | 1.50 | 1.75 | V             |
|        |                         | $I_F = 16\text{ A}, T_C = 125^\circ\text{C}$  | -    | 1.6  | 2.0  |               |
|        |                         | $I_F = 16\text{ A}, T_C = 175^\circ\text{C}$  | -    | 1.72 | 2.4  |               |
| $I_R$  | Reverse Current         | $V_R = 650\text{ V}, T_C = 25^\circ\text{C}$  | -    | -    | 200  | $\mu\text{A}$ |
|        |                         | $V_R = 650\text{ V}, T_C = 125^\circ\text{C}$ | -    | -    | 400  |               |
|        |                         | $V_R = 650\text{ V}, T_C = 175^\circ\text{C}$ | -    | -    | 600  |               |
| $Q_C$  | Total Capacitive Charge | $V = 400\text{ V}$                            | -    | 52   | -    | nC            |
| C      | Total Capacitance       | $V_R = 1\text{ V}, f = 100\text{ kHz}$        | -    | 887  | -    | pF            |
|        |                         | $V_R = 200\text{ V}, f = 100\text{ kHz}$      | -    | 95   | -    |               |
|        |                         | $V_R = 400\text{ V}, f = 100\text{ kHz}$      | -    | 72   | -    |               |

### Notes:

1: Pulse: Test Pulse width = 300 $\mu\text{s}$ , Duty Cycle = 2%

2:  $E_{AS}$  of 81 mJ is based on starting  $T_J = 25^\circ\text{C}$ ,  $L = 0.5\text{ mH}$ ,  $I_{AS} = 18\text{ A}$ ,  $V = 50\text{ V}$ .

## Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted.

Figure 1. Forward Characteristics

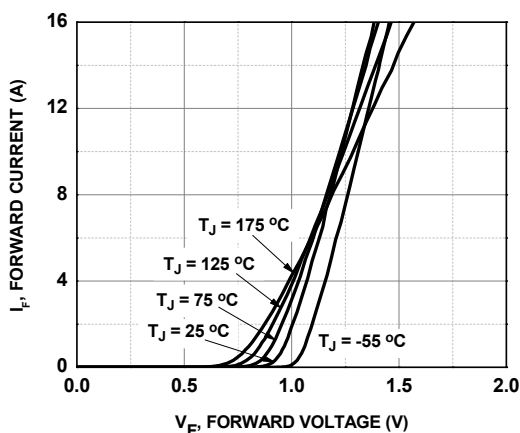


Figure 2. Reverse Characteristics

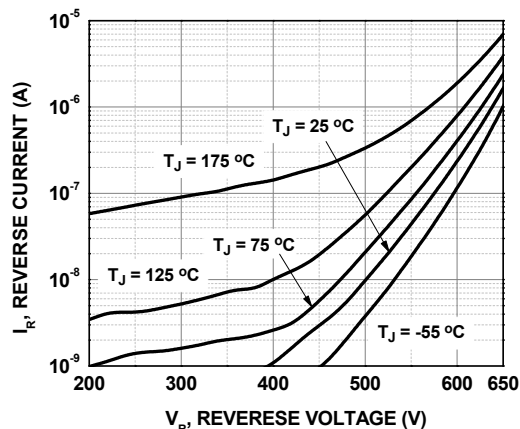


Figure 3. Current Derating

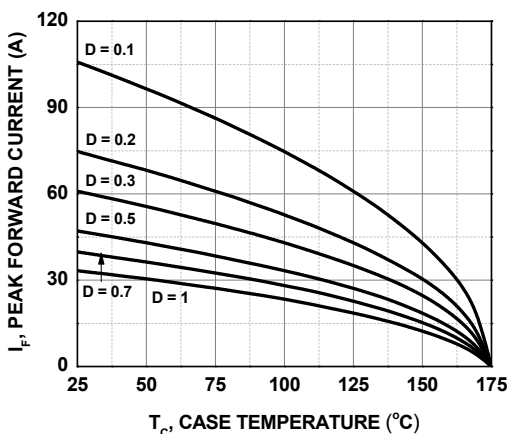
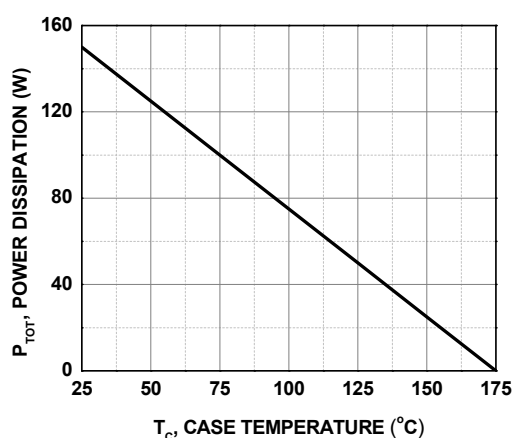


Figure 4. Power Derating



# Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted.

Figure 5. Capacitive Charge vs. Reverse Voltage

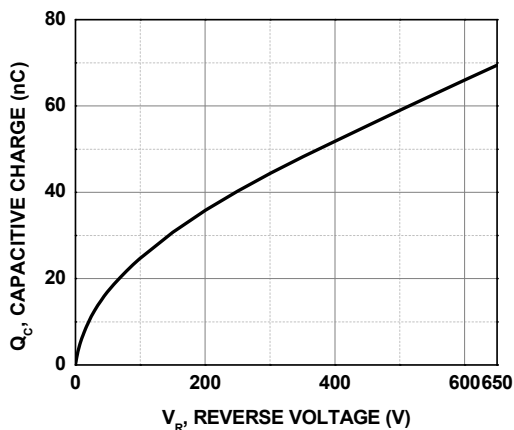


Figure 6. Capacitance vs. Reverse Voltage

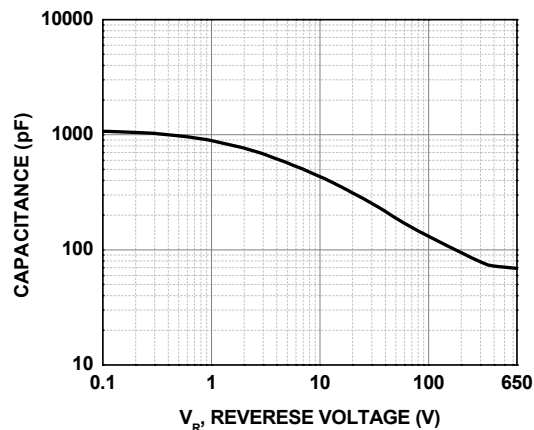


Figure 7. Capacitance Stored Energy

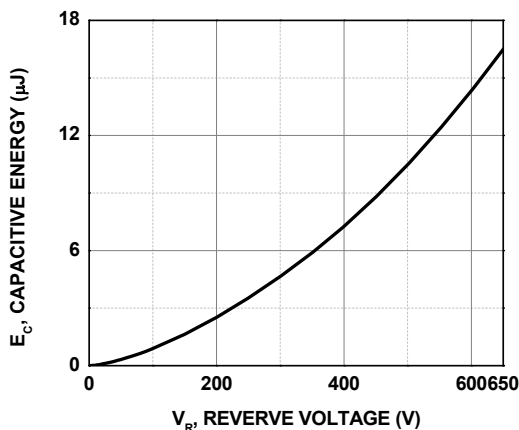
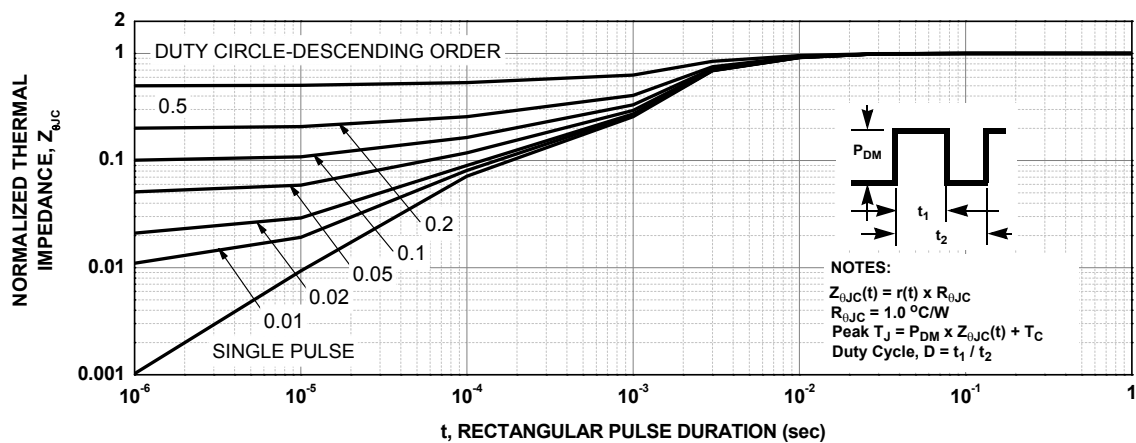


Figure 8. Junction-to-Case Transient Thermal Response Curve



## Test Circuit and Waveforms

Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

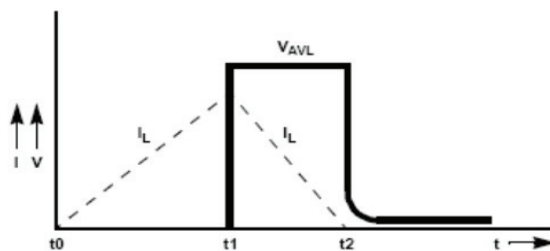
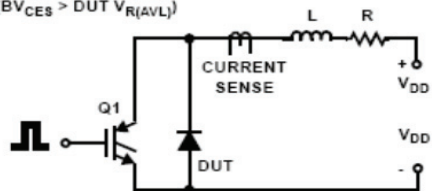
$L = 0.5\text{mH}$

$R < 0.1\Omega$

$V_{DD} = 50\text{V}$

$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$

$Q1 = \text{IGBT (}BV_{CES} > DUT V_{R(AVL)}\text{)}$



## Mechanical Dimensions

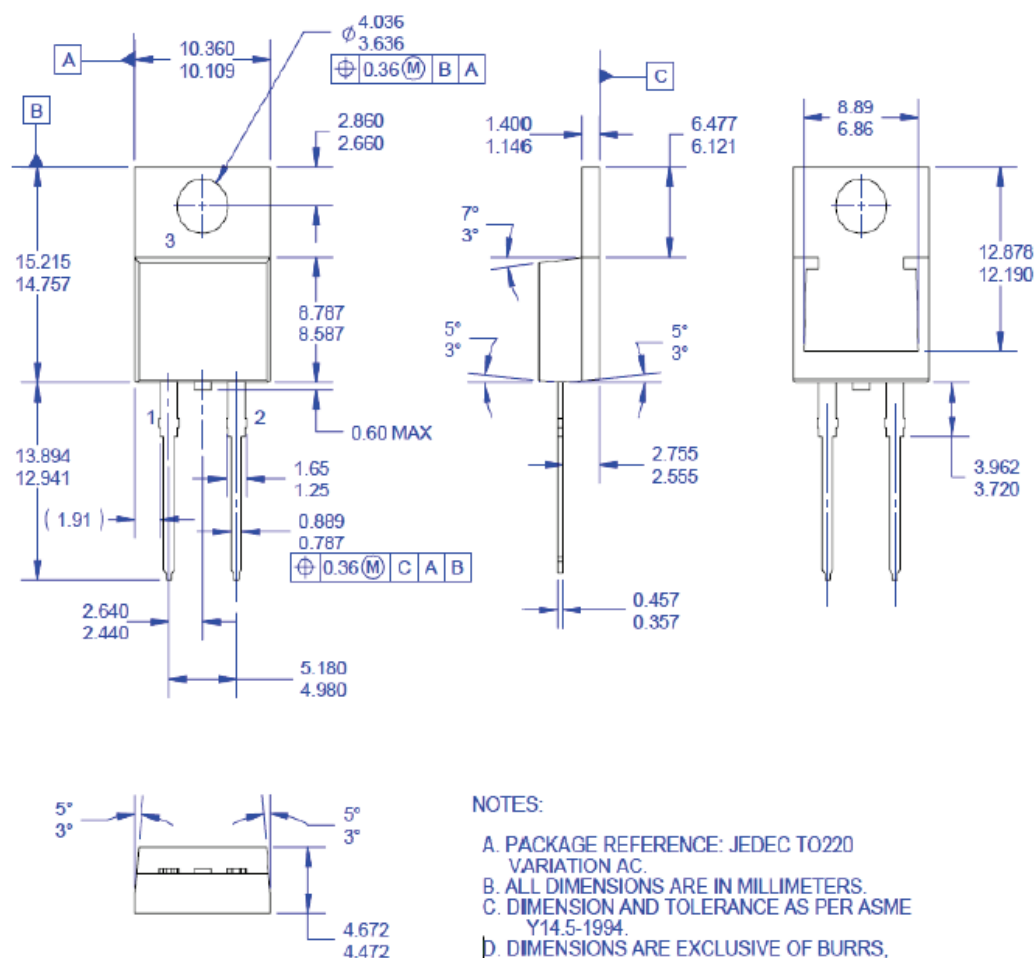


Figure 10. TO-220 2L - TO-220, MOLDED, 2LD

ON Semiconductor and the ON Logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries.

ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor.

"Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.