

**Silicon Carbide (SiC)
 Schottky Diode – EliteSiC,
 20 A, 650 V, D1,
 TO-220F-2L**

FFSPF2065A

Description

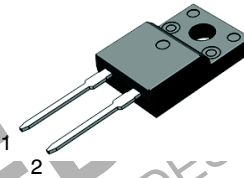
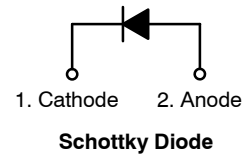
Silicon Carbide (SiC) Schottky Diodes use a completely new technology that provides superior switching performance and higher reliability compared to Silicon. No reverse recovery current, temperature independent switching characteristics, and excellent thermal performance sets Silicon Carbide as the 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 95 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery/No Forward Recovery
- These Devices are Pb-Free and are RoHS Compliant

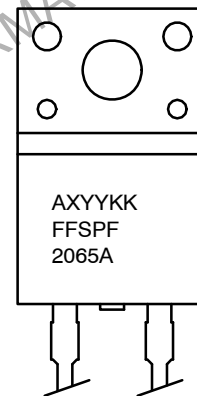
Applications

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



TO-220 FP / TO-220F-2FS
 CASE 221AS

MARKING DIAGRAM



- A = Assembly Plant Code
- XYX = Date Code (Year & Week)
- KK = Lot Traceability Code
- FFSH2065A = Specific Device Code

ORDERING INFORMATION

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

FFSPF2065A

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) | 95 | mJ | |
| I _F | Continuous Rectified Forward Current @ T _C < 67°C | 20 | A | |
| | Continuous Rectified Forward Current @ T _C < 135°C | 10 | | |
| I _{F, Max} | Non-Repetitive Peak Forward Surge Current | T _C = 25°C, 10 μs | 1100 | A |
| | | T _C = 150°C, 10 μs | 1000 | A |
| I _{F, SM} | Non-Repetitive Forward Surge Current | Half-Sine Pulse, t _p = 8.3 ms | 105 | A |
| I _{F, RM} | Repetitive Forward Surge Current | Half-Sine Pulse, t _p = 8.3 ms | 58 | A |
| P _{tot} | Power Dissipation | T _C = 25°C | 49 | W |
| | | T _C = 150°C | 8.1 | W |
| T _J , T _{STG} | Operating and Storage Temperature Range | -55 to +175 | °C | |
| | TO-220F 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 95 mJ is based on starting T_J = 25°C, L = 0.5 mH, I_{AS} = 19.5 A, V = 50 V.

THERMAL CHARACTERISTICS

| Symbol | Parameter | Value | Unit |
|------------------|---|-------|------|
| R _{θJC} | Thermal Resistance, Junction to Case, Max | 3.1 | °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 = 20 A, T _C = 25°C | - | 1.5 | 1.75 | V |
| | | I _F = 20 A, T _C = 125°C | - | 1.6 | 2.0 | |
| | | I _F = 20 A, T _C = 175°C | - | 1.72 | 2.4 | |
| I _R | Reverse Current | V _R = 650 V, T _C = 25°C | - | - | 200 | μA |
| | | V _R = 650 V, T _C = 125°C | - | - | 400 | |
| | | V _R = 650 V, T _C = 175°C | - | - | 600 | |
| Q _C | Total Capacitive Charge | V = 400 V | - | 64 | - | nC |
| C | Total Capacitance | V _R = 1 V, f = 100 kHz | - | 1085 | - | pF |
| | | V _R = 200 V, f = 100 kHz | - | 117 | - | |
| | | V _R = 400 V, f = 100 kHz | - | 88 | - | |

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 |
|-------------|-------------|--------------------------------------|-----------------|
| FFSPF2065A | FFSPF2065A | TO-220 FP / TO-220F-2FS (Pb-Free) | 50 Units / Tube |

FFSPF2065A

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

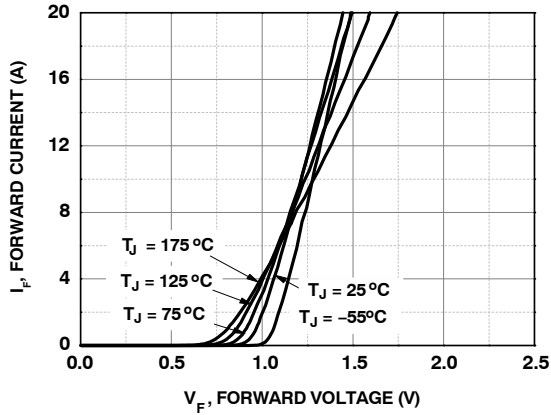


Figure 1. Forward Characteristics

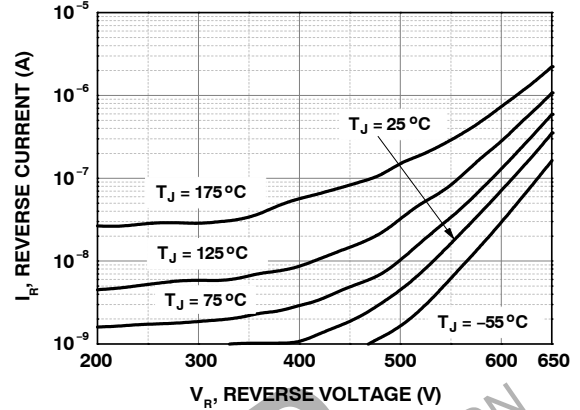


Figure 2. Reverse Characteristics

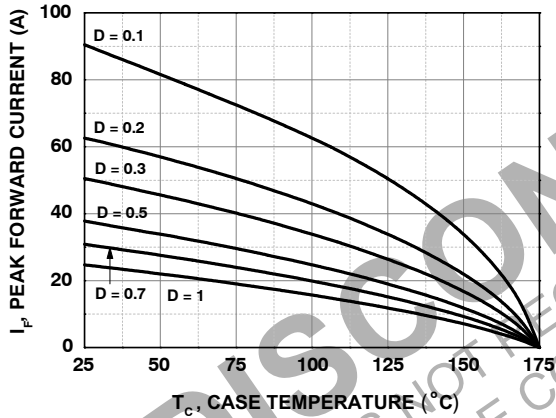


Figure 3. Current Derating

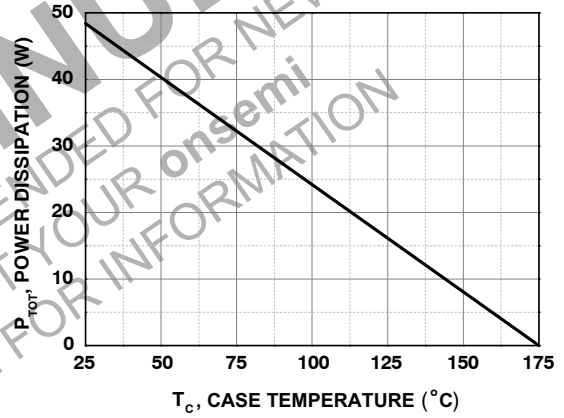


Figure 4. Power Derating

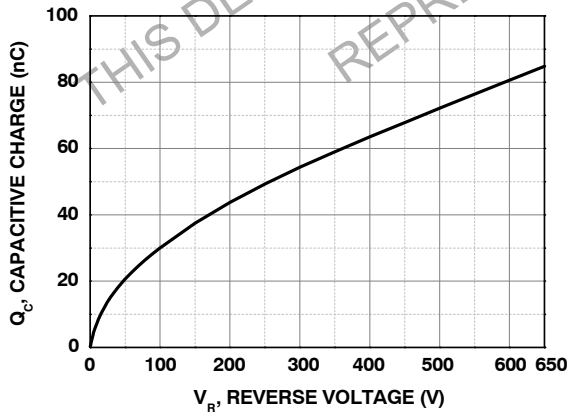


Figure 5. Capacitive Charge vs. Reverse Voltage

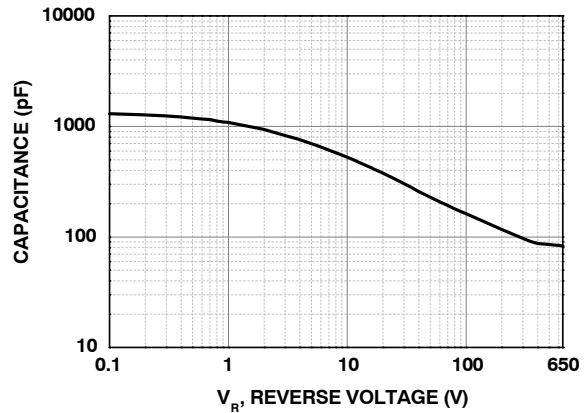


Figure 6. Capacitance vs. Reverse Voltage

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

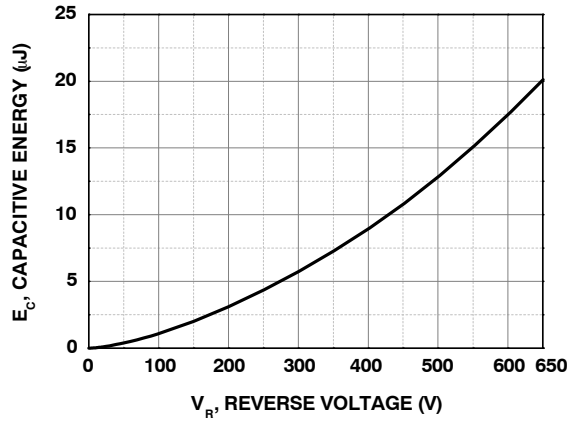


Figure 7. Capacitance Stored Energy

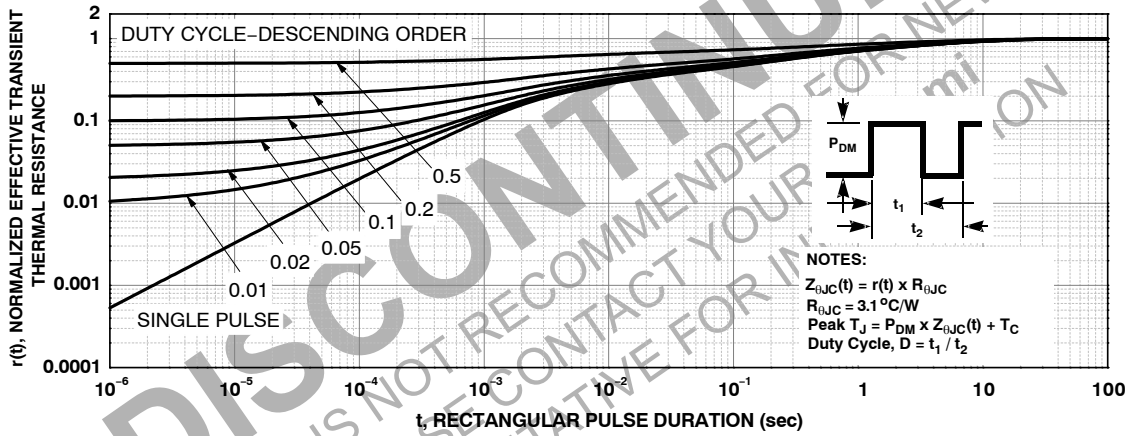


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

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

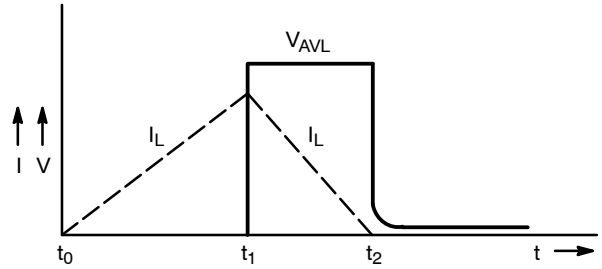
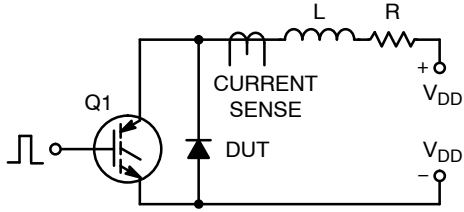


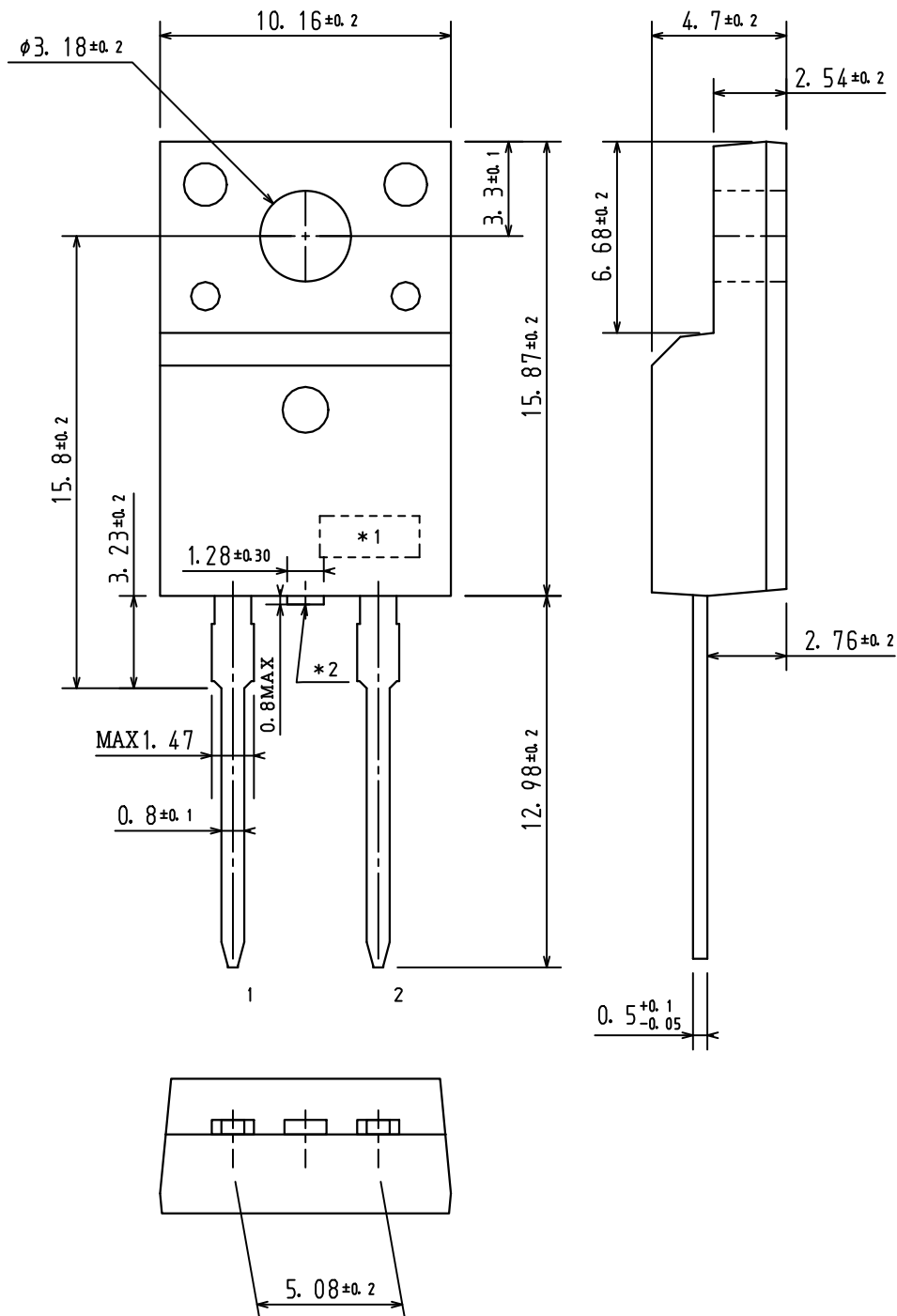
Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

DISCONTINUED

THIS DEVICE IS NOT RECOMMENDED FOR NEW DESIGN
PLEASE CONTACT YOUR onsemi
REPRESENTATIVE FOR INFORMATION

TO-220 Fullpack, 2-Lead / TO-220F-2FS
CASE 221AS
ISSUE O

DATE 29 FEB 2012



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| DESCRIPTION: | TO-220 FULLPACK, 2-LEAD / TO-220F-2FS | PAGE 1 OF 1 |

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