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# FFSP1065A

## Silicon Carbide Schottky Diode

### 650 V, 10 A

#### Features

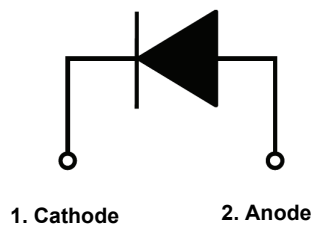
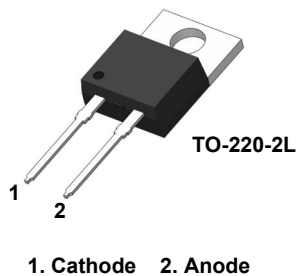
- Max Junction Temperature 175 °C
- Avalanche Rated 64 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery / No Forward Recovery

#### 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	FFSP1065A	Unit
$V_{RRM}$	Peak Repetitive Reverse Voltage	650	V
$E_{AS}$	Single Pulse Avalanche Energy (Note 1)	64	mJ
$I_F$	Continuous Rectified Forward Current @ $T_C < 152^\circ\text{C}$	10	A
	Continuous Rectified Forward Current @ $T_C < 135^\circ\text{C}$	15	
$I_{F, Max}$	Non-Repetitive Peak Forward Surge Current	$T_C = 25^\circ\text{C}, 10 \mu\text{s}$	760
		$T_C = 150^\circ\text{C}, 10 \mu\text{s}$	740
$I_{F, SM}$	Non-Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3 \text{ ms}$	56
$I_{F, RM}$	Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3 \text{ ms}$	38
$P_{tot}$	Power Dissipation	$T_C = 25^\circ\text{C}$	111
		$T_C = 150^\circ\text{C}$	19
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$

#### Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	1.35	$^\circ\text{C/W}$

## Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFSP1065A	FFSP1065A	TO-220-2L	Tube	N/A	N/A	50 units

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

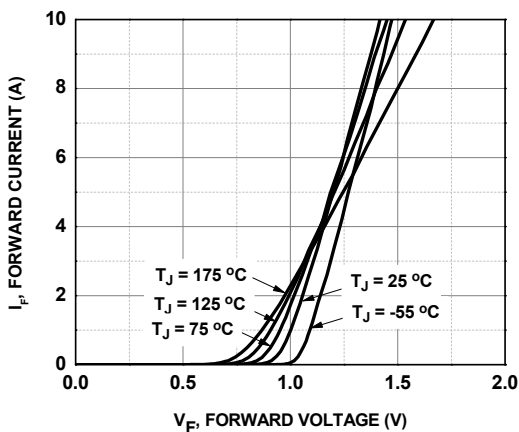
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_F$	Forward Voltage	$I_F = 10\text{ A}, T_C = 25^\circ\text{C}$	-	1.50	1.75	V
		$I_F = 10\text{ A}, T_C = 125^\circ\text{C}$	-	1.6	2.0	
		$I_F = 10\text{ A}, T_C = 175^\circ\text{C}$	-	1.72	2.4	
$I_R$	Reverse Current	$V_R = 650\text{ V}, T_C = 25^\circ\text{C}$	-	-	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	$V = 400\text{ V}$	-	34	-	nC
C	Total Capacitance	$V_R = 1\text{ V}, f = 100\text{ kHz}$	-	575	-	pF
		$V_R = 200\text{ V}, f = 100\text{ kHz}$	-	62	-	
		$V_R = 400\text{ V}, f = 100\text{ kHz}$	-	47	-	

**Notes:**

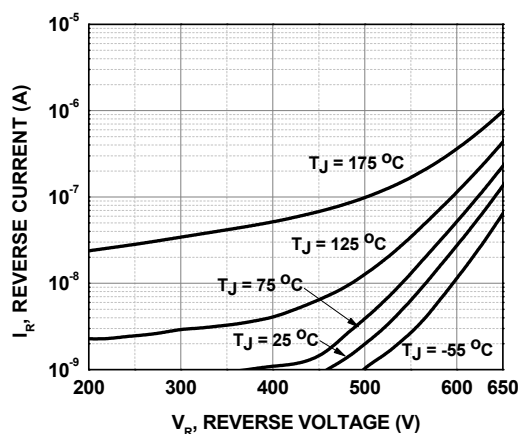
1:  $E_{AS}$  of 64 mJ is based on starting  $T_J = 25^\circ\text{C}$ ,  $L = 0.5\text{ mH}$ ,  $I_{AS} = 16\text{ A}$ ,  $V = 50\text{ V}$ .

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

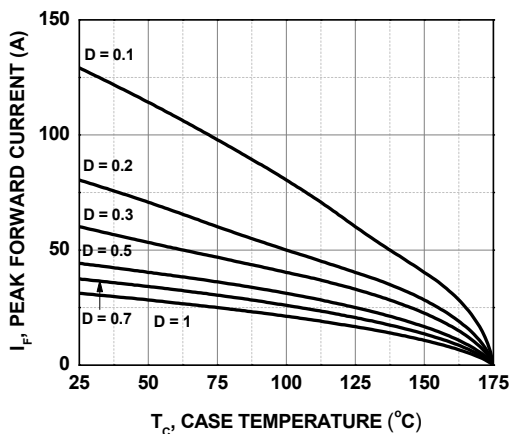
**Figure 1. Forward Characteristics**



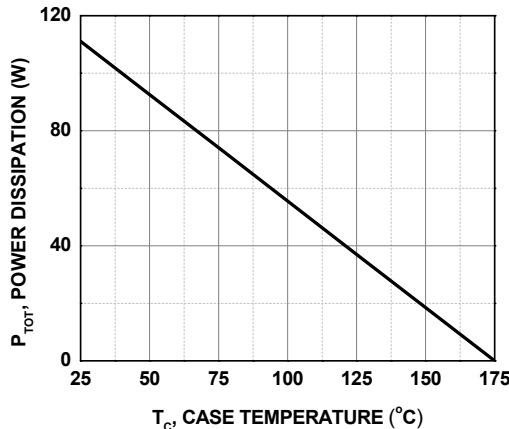
**Figure 2. Reverse Characteristics**



**Figure 3. Current Derating**

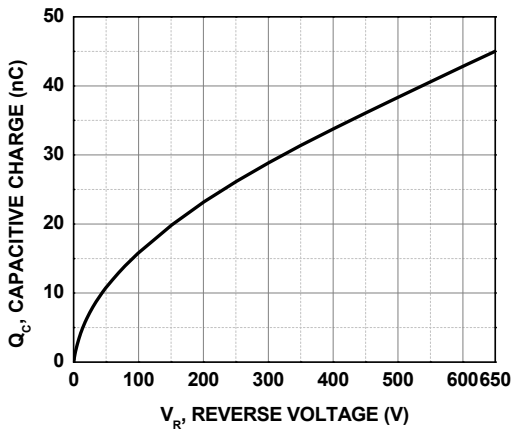


**Figure 4. Power Derating**

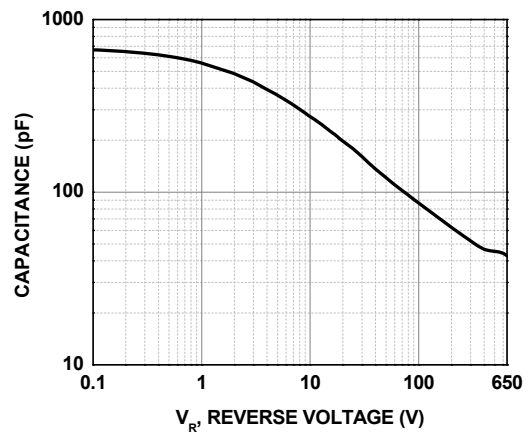


**Typical Characteristics**  $T_J = 25\text{ }^\circ\text{C}$  unless otherwise noted.

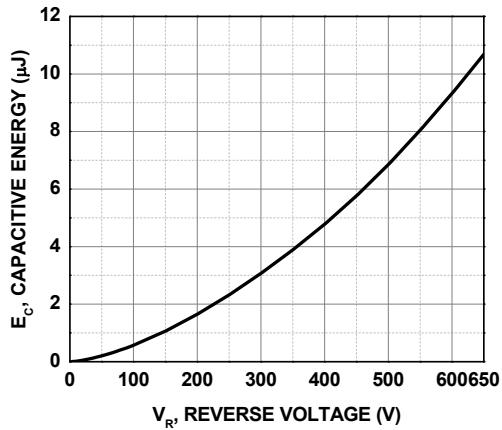
**Figure 5. Capacitive Charge vs. Reverse Voltage**



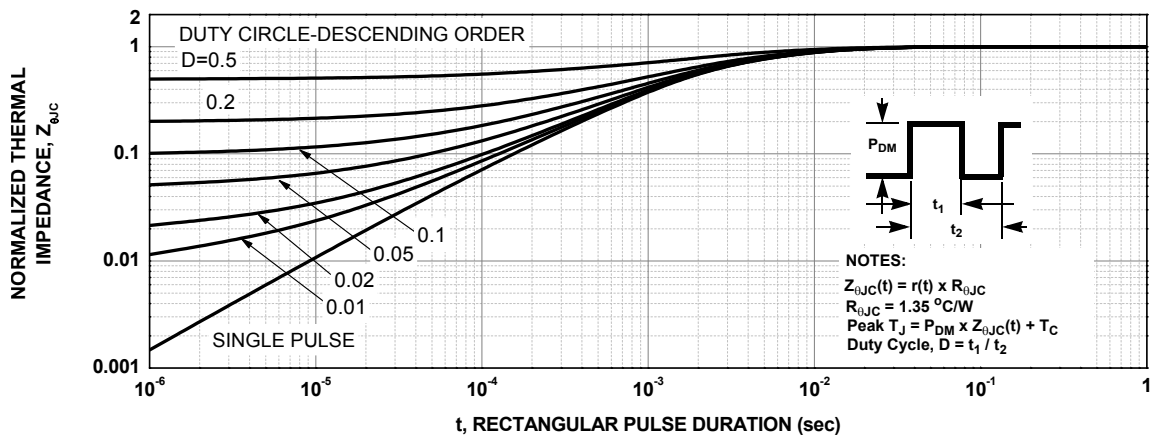
**Figure 6. Capacitance vs. Reverse Voltage**



**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

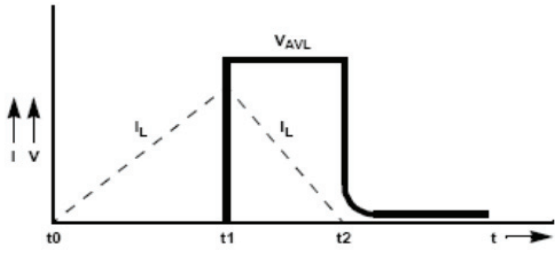
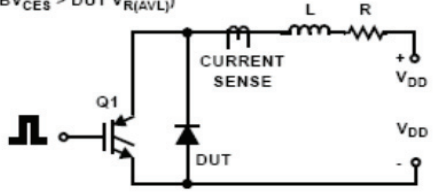
L = 0.5mH

R < 0.1Ω

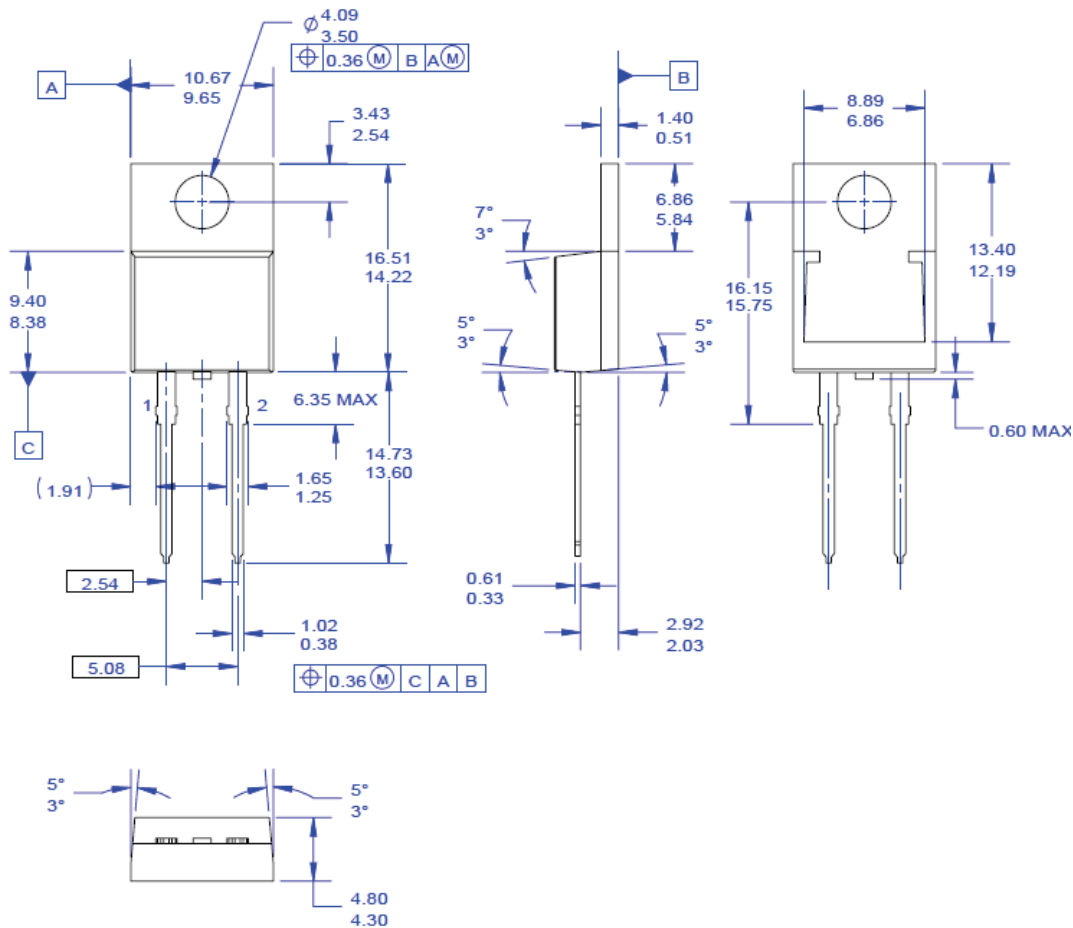
V<sub>DD</sub> = 50V

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

Q1 = IGBT (BV<sub>CES</sub> > DUT V<sub>R(AVL)</sub>)



## Mechanical Dimensions



**NOTES:**

- A. PACKAGE REFERENCE: JEDEC TO220,ISSUE K, VARIATION AC, DATED APRIL 2002.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSION AND TOLERANCE AS PER ASME Y14.5-2009.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. DRAWING FILE NAME: TO220A02REV5

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

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