



FFSP2065A

Silicon Carbide Schottky Diode 650 V, 20 A

Features

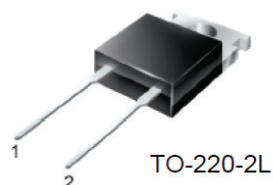
- Max Junction Temperature 175 °C
- Avalanche Rated 95 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery / No Forward Recovery

Description

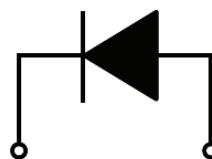
SiC Schottky Diode has no switching loss, provides improved system efficiency against Si diodes by utilizing new semiconductor material - Silicon Carbide, enables higher operating frequency, and helps increasing power density and reduction of system size/cost. Its high reliability ensures robust operation during surge or over-voltage conditions

Applications

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



1. Cathode 2. Anode



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

Symbol	Parameter		FFSP2065A	Unit
V _{RRM}	Peak Repetitive Reverse Voltage		650	V
E _{AS}	Single Pulse Avalanche Energy (Note 2)		95	mJ
I _F	Continuous Rectified Forward Current @ T _C < 147 °C		20	A
	Continuous Rectified Forward Current @ T _C < 135 °C		25	
I _{F, Max}	Non-Repetitive Peak Forward Surge Current	T _C = 25 °C, 10 μs	1225	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	187	W
		T _C = 150 °C	31	W
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +175	°C
	TO247 Mounting Torque, M3 Screw		60	Ncm

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max. (Note 1)	0.8	$^\circ\text{C/W}$

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFSP2065A	FFSP2065A	TO-220	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	$I_F = 20\text{ A}, T_C = 25^\circ\text{C}$	-	1.5	1.75	V
		$I_F = 20\text{ A}, T_C = 125^\circ\text{C}$	-	1.6	2.0	
		$I_F = 20\text{ A}, T_C = 175^\circ\text{C}$	-	1.72	2.4	
I_R	Reverse Current	$V_R = 650\text{ V}, T_C = 25^\circ\text{C}$	-	-	200	μA
		$V_R = 650\text{ V}, T_C = 125^\circ\text{C}$	-	-	400	
		$V_R = 650\text{ V}, T_C = 175^\circ\text{C}$	-	-	600	
Q_C	Total Capacitive Charge	$V = 400\text{ V}$	-	64	-	nC
C	Total Capacitance	$V_R = 1\text{ V}, f = 100\text{ kHz}$	-	1085	-	pF
		$V_R = 200\text{ V}, f = 100\text{ kHz}$	-	117	-	
		$V_R = 400\text{ V}, f = 100\text{ kHz}$	-	88	-	

Notes:

1: Pulse: Test Pulse width = 300 μs , Duty Cycle = 2%

2: EAS of 95mJ is based on starting $T_J = 25^\circ\text{C}$, $L = 0.5\text{ mH}$, $I_{AS} = 19.5\text{ A}$, $V = 50\text{ V}$.

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

Figure 1. Forward Characteristics

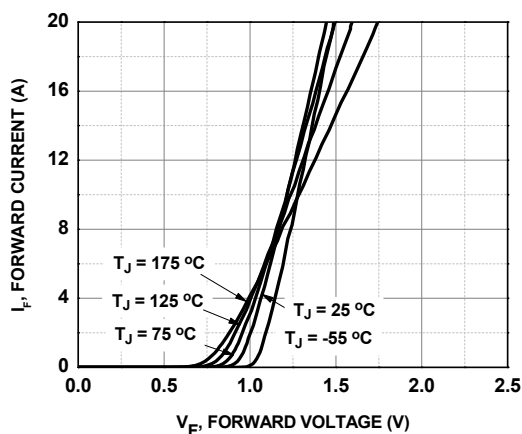


Figure 2. Reverse Characteristics

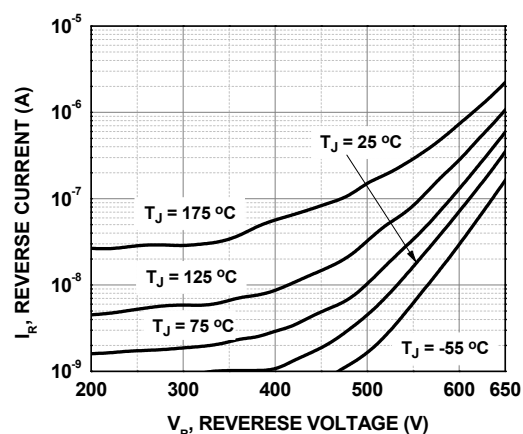


Figure 3. Current Derating

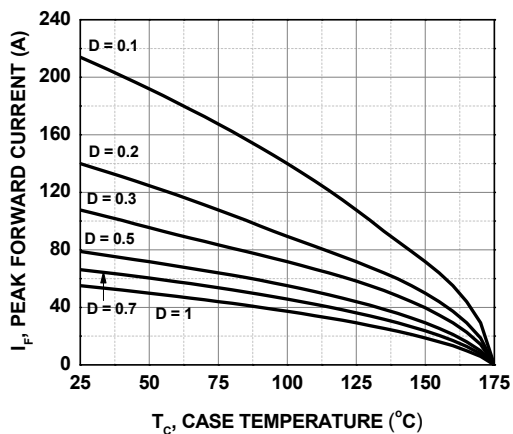
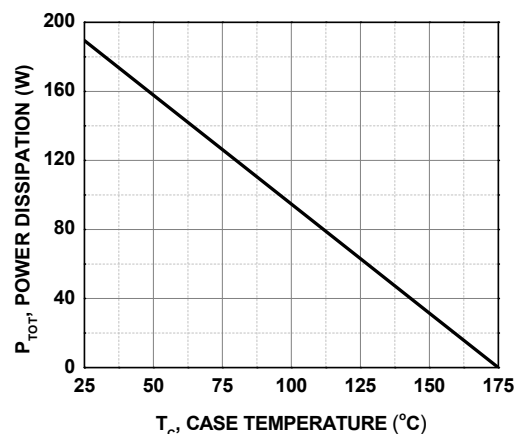


Figure 4. Power Derating



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

Figure 5. Capacitive Charge vs. Reverse Voltage

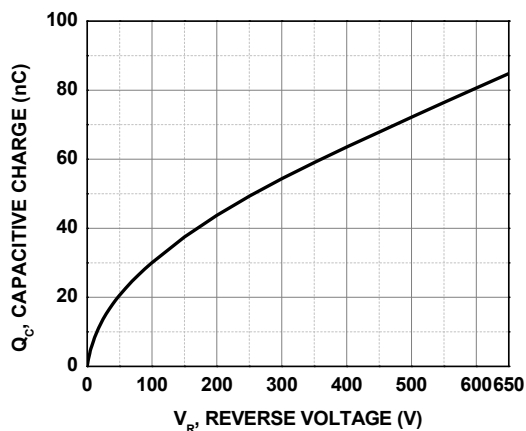


Figure 6. Capacitance vs. Reverse Voltage

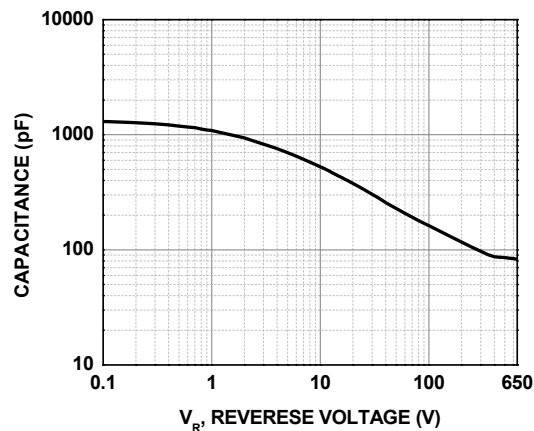


Figure 7. Capacitance Stored Energy

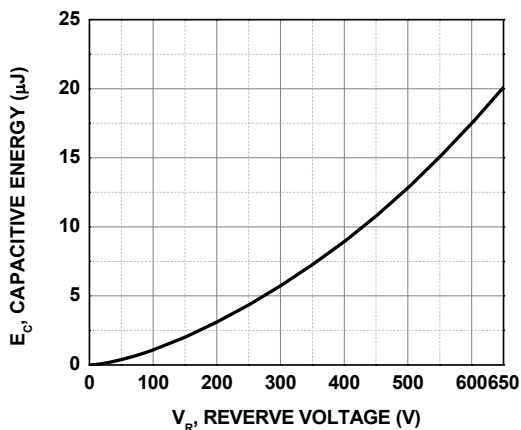
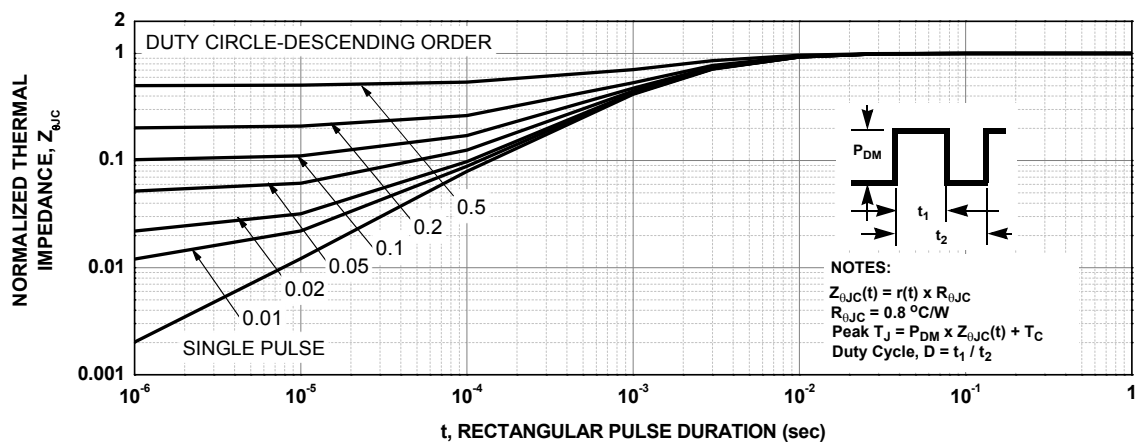


Figure 8. Junction-to-Case Transient Thermal Response Curve



Test Circuit and Waveforms

Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

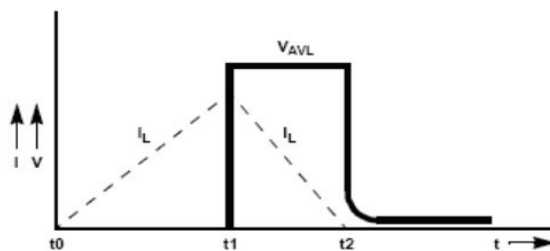
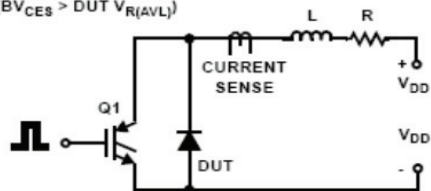
$L = 0.5\text{mH}$

$R < 0.1\Omega$

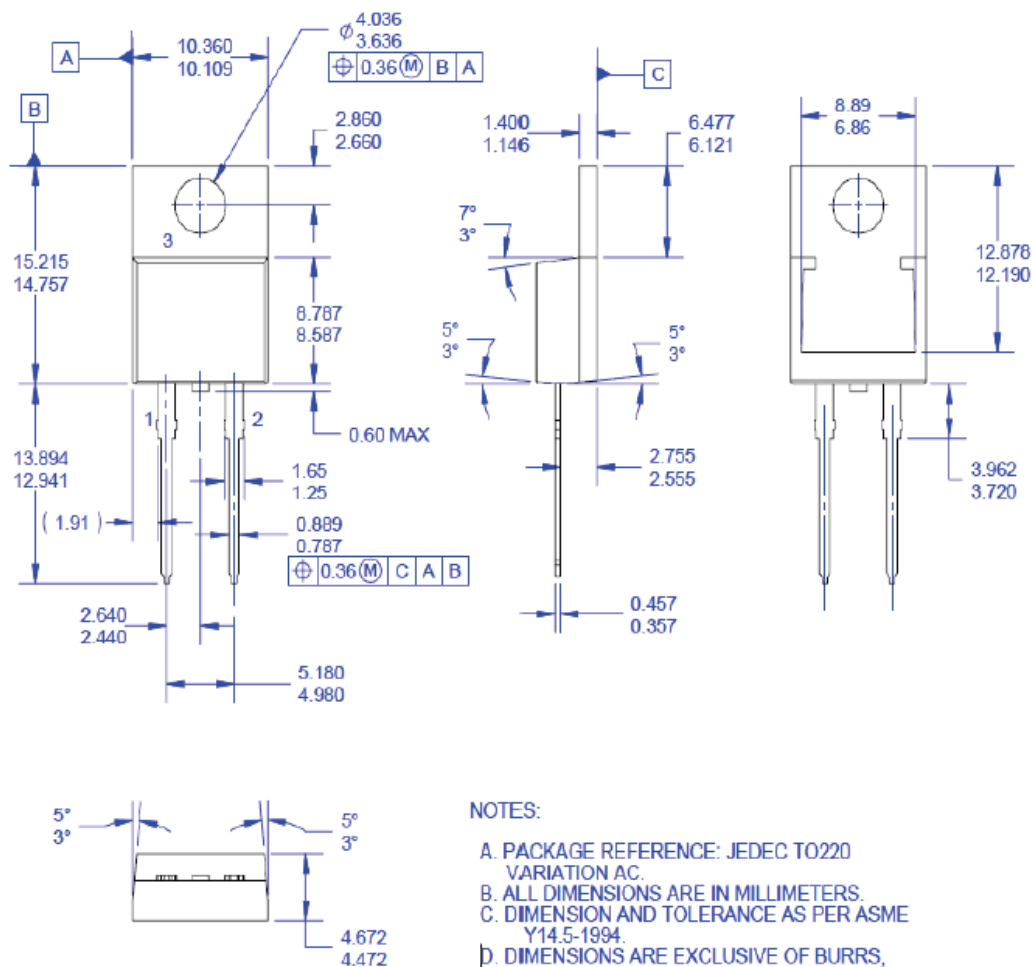
$V_{DD} = 50\text{V}$

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

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



Mechanical Dimensions



NOTES:

- A. PACKAGE REFERENCE: JEDEC TO220 VARIATION AC.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. THIS PACKAGE IS FSSZ INTERNAL PRODUCTION AND INTENDED FOR DELTA CUSTOMER ONLY.
- F. DRAWING FILE NAME: TO220B02REV4

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

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