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FFSP15120A

Silicon Carbide Schottky Diode

1200 V, 15 A

Features

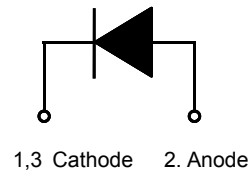
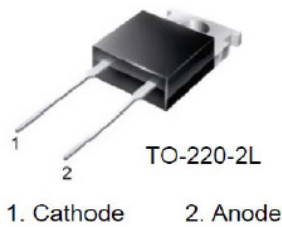
- Max Junction Temperature 175 °C
- Avalanche Rated 145 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery / No Forward Recovery

Applications

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

Description

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



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

Symbol	Parameter	FFSP15120A	Unit	
V_{RRM}	Peak Repetitive Reverse Voltage	1200	V	
E_{AS}	Single Pulse Avalanche Energy (Note 1)	145	mJ	
I_F	Continuous Rectified Forward Current @ $T_C < 148\text{ }^\circ\text{C}$	15	A	
$I_{F, Max}$	Non-Repetitive Peak Forward Surge Current	$T_C = 25\text{ }^\circ\text{C}, 10\text{ }\mu\text{s}$	920	A
		$T_C = 150\text{ }^\circ\text{C}, 10\text{ }\mu\text{s}$	870	A
$I_{F, SM}$	Non-Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3\text{ ms}$	115	A
$I_{F, RM}$	Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3\text{ ms}$	50	A
P_{tot}	Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	300	W
		$T_C = 150\text{ }^\circ\text{C}$	50	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$	

Thermal Characteristic

Symbol	Parameter	FFSP15120A	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	0.5	$^\circ\text{C/W}$

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFSP15120A	FFSP15120A	TO-220-2L	Tube	N/A	N/A	50 units

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F = 15\text{ A}, T_C = 25\text{ }^\circ\text{C}$	-	1.45	1.75	V
		$I_F = 15\text{ A}, T_C = 125\text{ }^\circ\text{C}$	-	1.7	2	
		$I_F = 15\text{ A}, T_C = 175\text{ }^\circ\text{C}$	-	2	2.4	
I_R	Reverse Current	$V_R = 1200\text{ V}, T_C = 25\text{ }^\circ\text{C}$	-	-	200	μA
		$V_R = 1200\text{ V}, T_C = 125\text{ }^\circ\text{C}$	-	-	300	
		$V_R = 1200\text{ V}, T_C = 175\text{ }^\circ\text{C}$	-	-	400	
Q_C	Total Capacitive Charge	$V = 800\text{ V}$	-	95	-	nC
C	Total Capacitance	$V_R = 1\text{ V}, f = 100\text{ kHz}$	-	936	-	pF
		$V_R = 400\text{ V}, f = 100\text{ kHz}$	-	86	-	
		$V_R = 800\text{ V}, f = 100\text{ kHz}$	-	68	-	

Notes:

1: EAS of 145 mJ is based on starting $T_J = 25\text{ }^\circ\text{C}$, $L = 0.5\text{ mH}$, $I_{AS} = 24\text{ A}$, $V = 150\text{ V}$.

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

Figure 1. Forward Characteristics

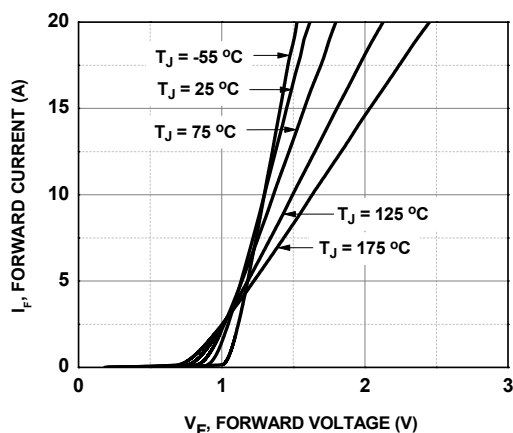


Figure 2. Reverse Characteristics

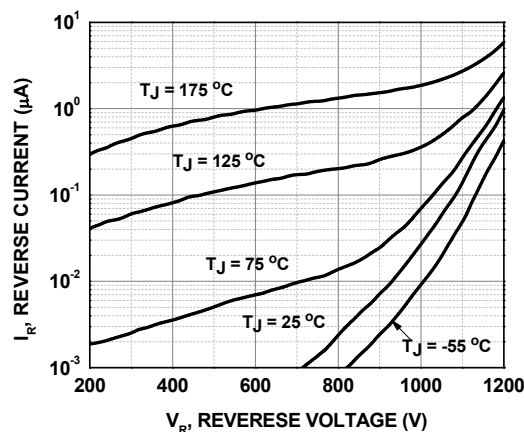


Figure 3. Reverse Characteristics

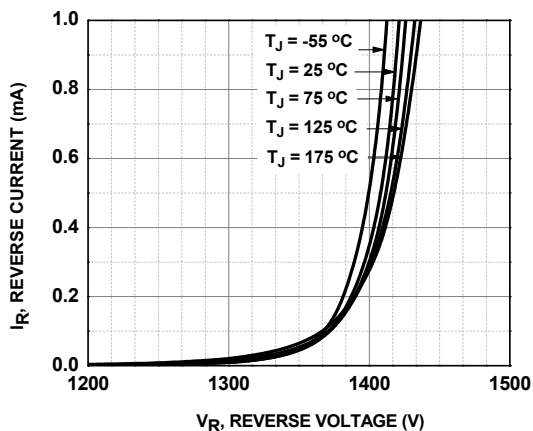
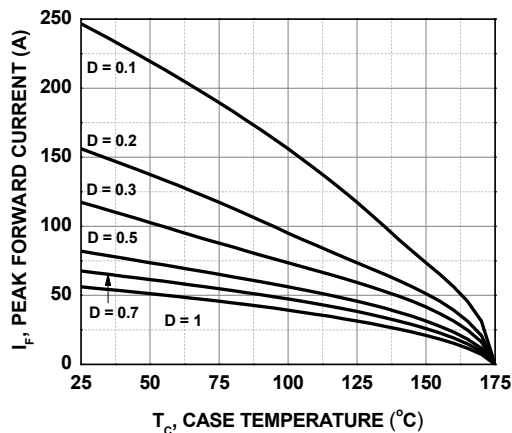


Figure 4. Current Derating



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

Figure 5. Power Derating

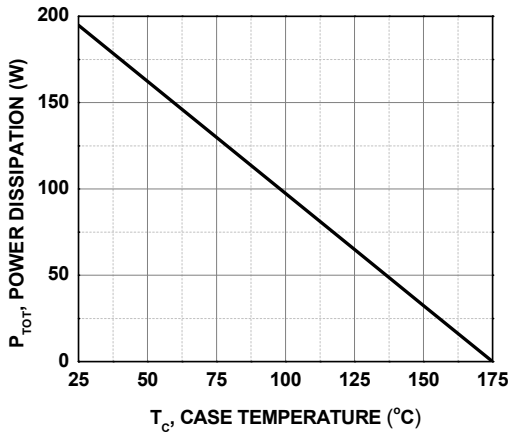


Figure 6. Capacitive Charge vs. Reverse Voltage

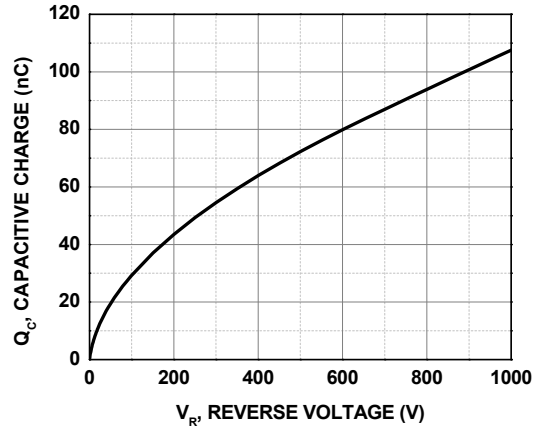


Figure 7. Capacitance vs. Reverse Voltage

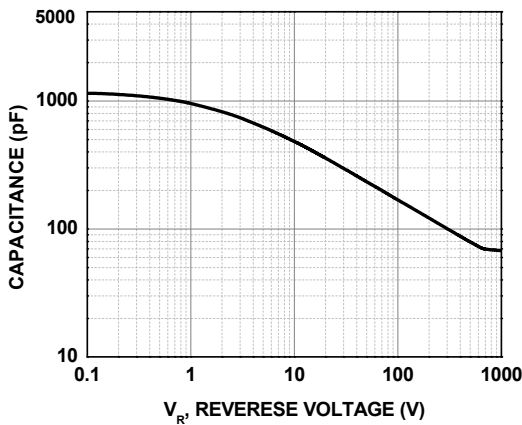


Figure 8. Capacitance Stored Energy

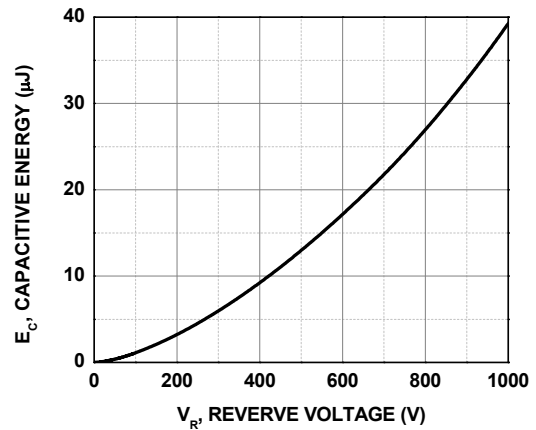
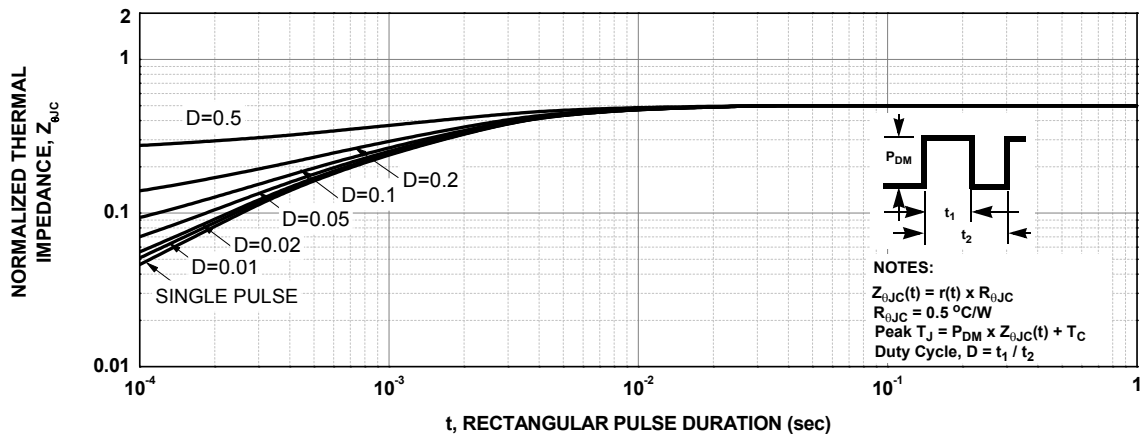


Figure 9. Junction-to-Case Transient Thermal Response Curve



Test Circuit and Waveforms

Figure 10. Unclamped Inductive Switching Test Circuit & Waveform

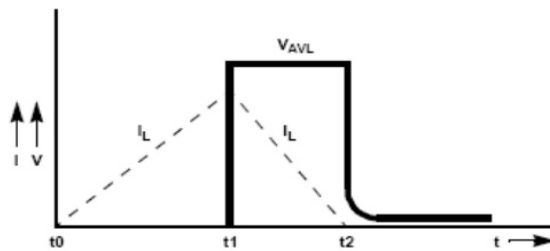
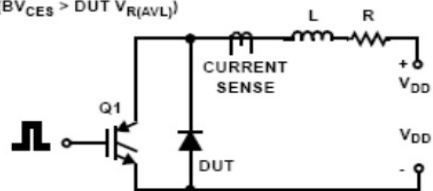
L = 0.5mH

R < 0.1Ω

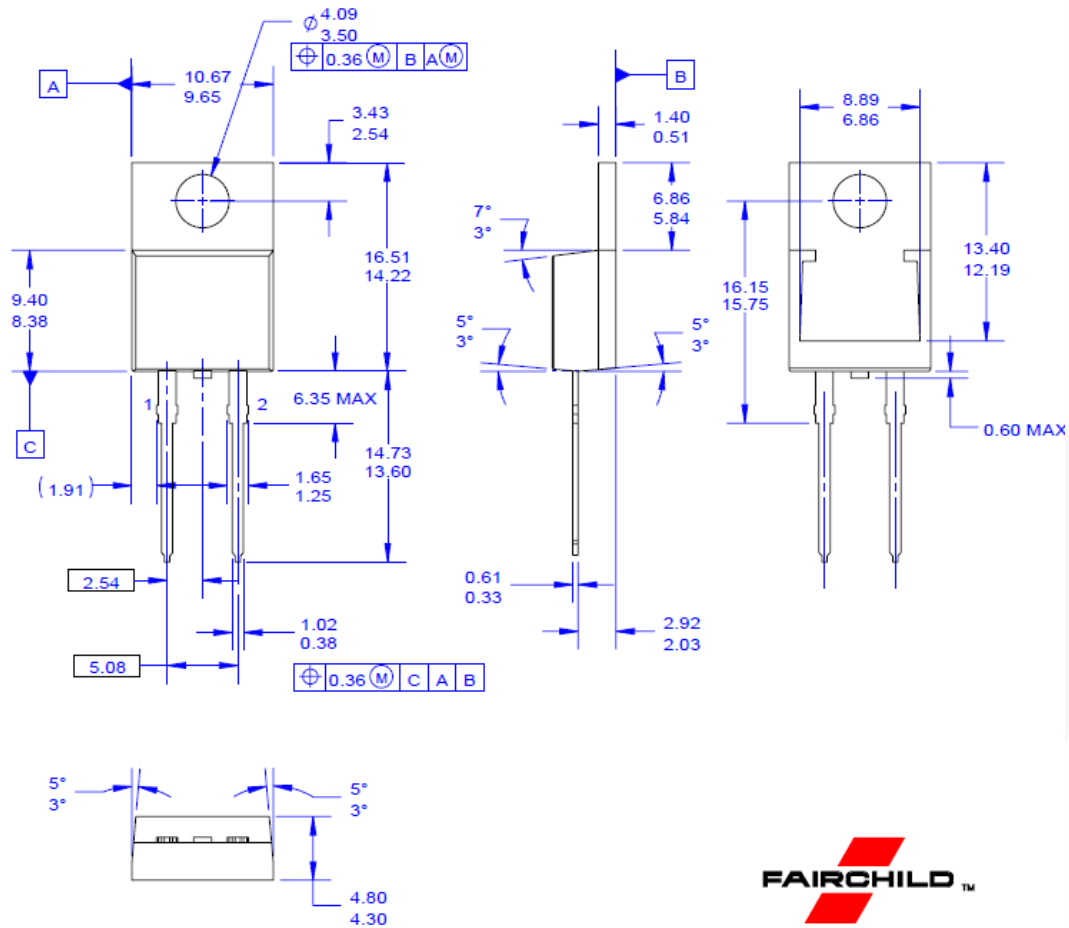
V_{DD} = 50V

EAVL = 1/2L I_L² [V_{R(AVL)} / (V_{R(AVL)} - V_{DD})]

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



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 11. TO-220 2L - TO-220, MOLDED, 2LD

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