



April 2016

# FFSH20120ADN\_F155

## Silicon Carbide Schottky Diode

### 1200 V, 20 A

#### Features

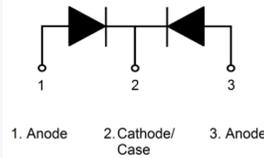
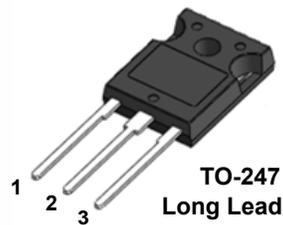
- Max Junction Temperature 175 °C
- Avalanche Rated 100 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery / No Forward Recovery

#### 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. (per leg)

Symbol	Parameter	Ratings	Unit	
$V_{RRM}$	Peak Repetitive Reverse Voltage	1200	V	
$E_{AS}$	Single Pulse Avalanche Energy (Note 1)	100	mJ	
$I_F$	Continuous Rectified Forward Current @ $T_C < 148\text{ }^\circ\text{C}$	$10^*$ / $20^{**}$	A	
$I_{F, Max}$	Non-Repetitive Peak Forward Surge Current	$T_C = 25\text{ }^\circ\text{C}$ , $10\text{ }\mu\text{s}$	630	A
		$T_C = 150\text{ }^\circ\text{C}$ , $10\text{ }\mu\text{s}$	560	A
$I_{F, SM}$	Non-Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3\text{ ms}$	96	A
$I_{F, RM}$	Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3\text{ ms}$	46	A
$P_{tot}$	Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	150	W
		$T_C = 150\text{ }^\circ\text{C}$	25	W
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$	
	TO247 Mounting Torque, M3 Screw	60	Ncm	

#### Thermal Characteristic

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	$1^*$ / $0.44^{**}$	$^\circ\text{C/W}$

\* Per leg, \*\* Per Device

FFSH20120ADN\_F155 — Silicon Carbide Schottky Diode

### Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FFSH20120ADN_F155	FFSH20120ADN	TO-247 Long Lead	Tube	N/A	N/A	30 units

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_F$	Forward Voltage	$I_F = 10\text{ A}, T_C = 25^\circ\text{C}$	-	1.45	1.75	V
		$I_F = 10\text{ A}, T_C = 125^\circ\text{C}$	-	1.7	2	
		$I_F = 10\text{ A}, T_C = 175^\circ\text{C}$	-	2	2.4	
$I_R$	Reverse Current	$V_R = 1200\text{ V}, T_C = 25^\circ\text{C}$	-	-	200	$\mu\text{A}$
		$V_R = 1200\text{ V}, T_C = 125^\circ\text{C}$	-	-	300	
		$V_R = 1200\text{ V}, T_C = 175^\circ\text{C}$	-	-	400	
$Q_C$	Total Capacitive Charge	$V = 800\text{ V}$	-	62	-	nC
C	Total Capacitance	$V_R = 1\text{ V}, f = 100\text{ kHz}$	-	612	-	pF
		$V_R = 400\text{ V}, f = 100\text{ kHz}$	-	58	-	
		$V_R = 800\text{ V}, f = 100\text{ kHz}$	-	47	-	

**Notes:**

1: EAS of 100 mJ is based on starting  $T_J = 25^\circ\text{C}$ ,  $L = 0.5\text{ mH}$ ,  $I_{AS} = 20\text{ A}$ ,  $V = 150\text{ V}$ .

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

Figure 1. Forward Characteristics

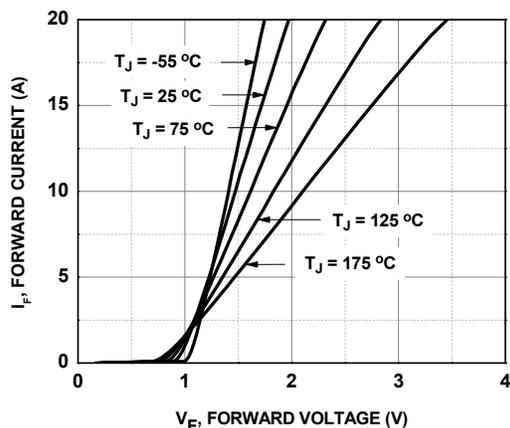


Figure 2. Reverse Characteristics

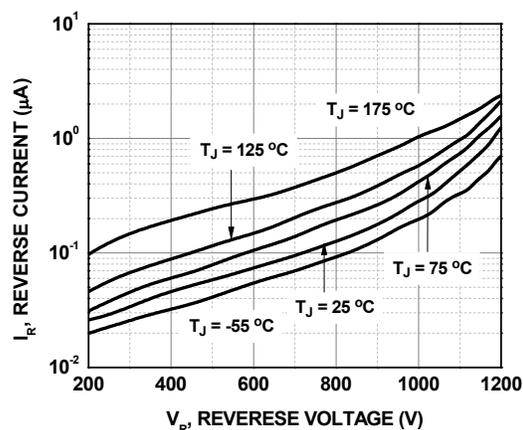


Figure 3. Reverse Characteristics

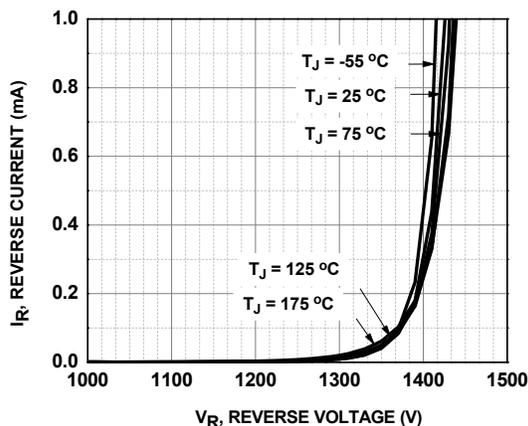
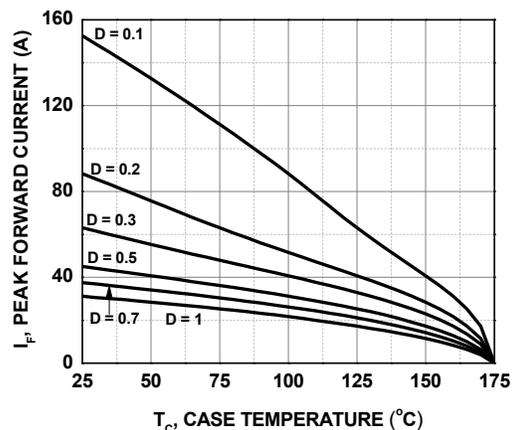
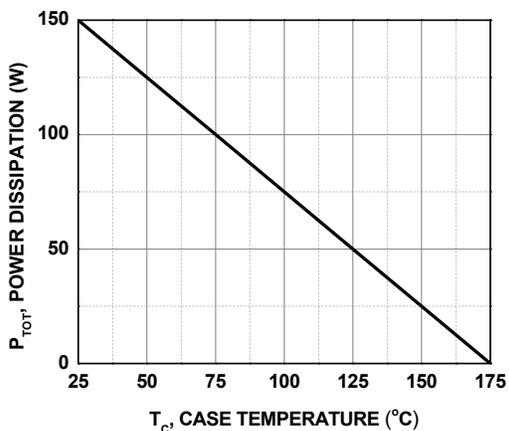


Figure 4. Current Derating

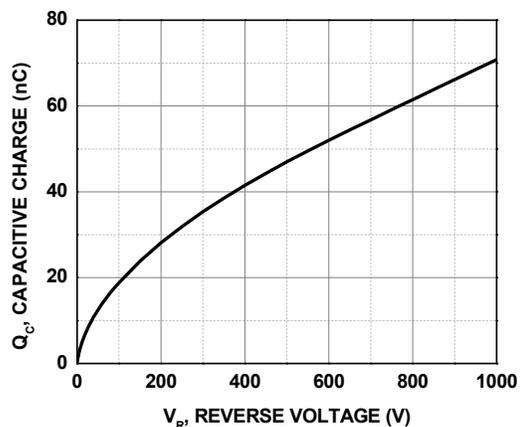


**Typical Characteristics**  $T_J = 25^\circ\text{C}$  unless otherwise noted (per leg, continue).

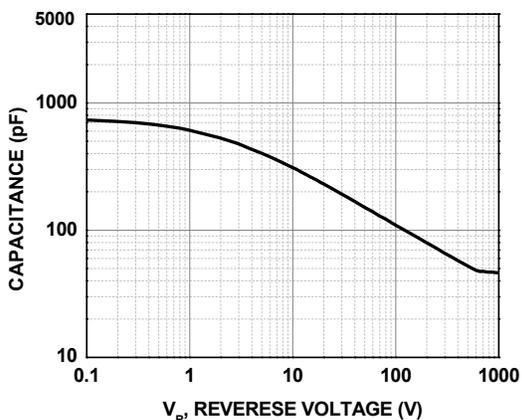
**Figure 5. Power Derating**



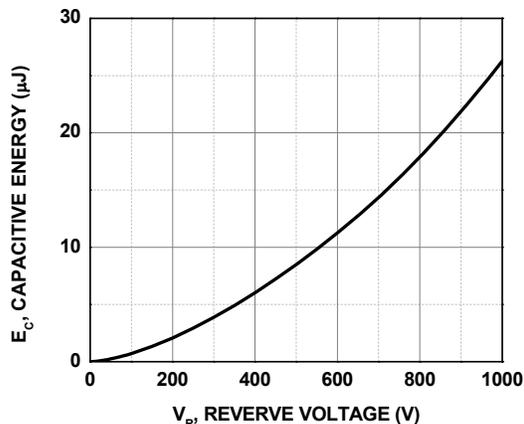
**Figure 6. Capacitive Charge vs. Reverse Voltage**



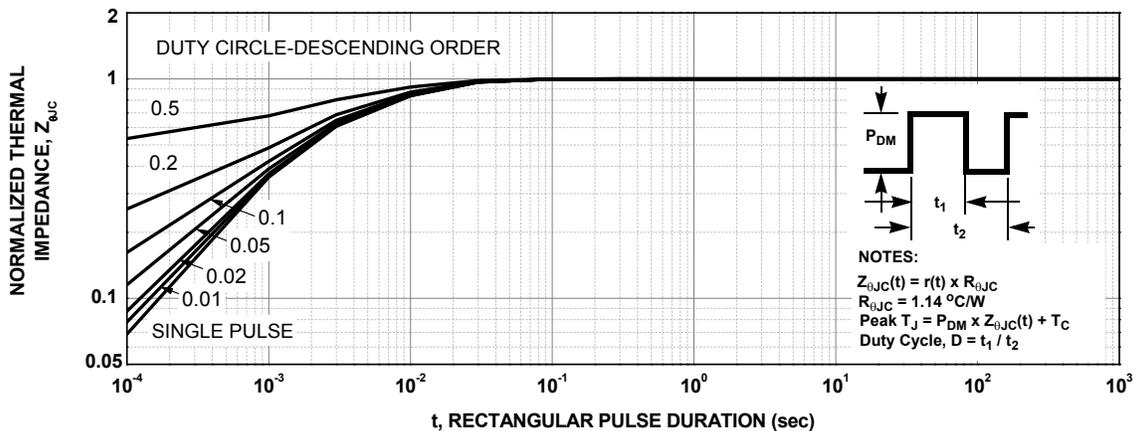
**Figure 7. Capacitance vs. Reverse Voltage**



**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

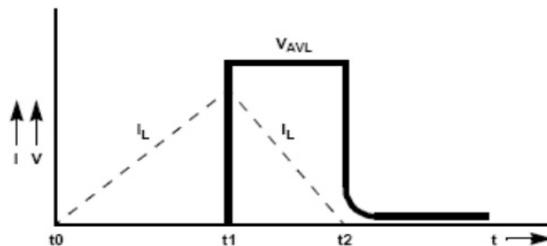
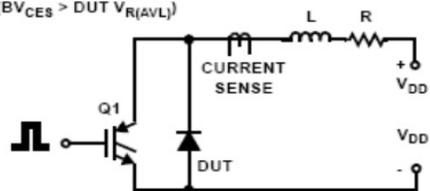
$L = 0.5\text{mH}$

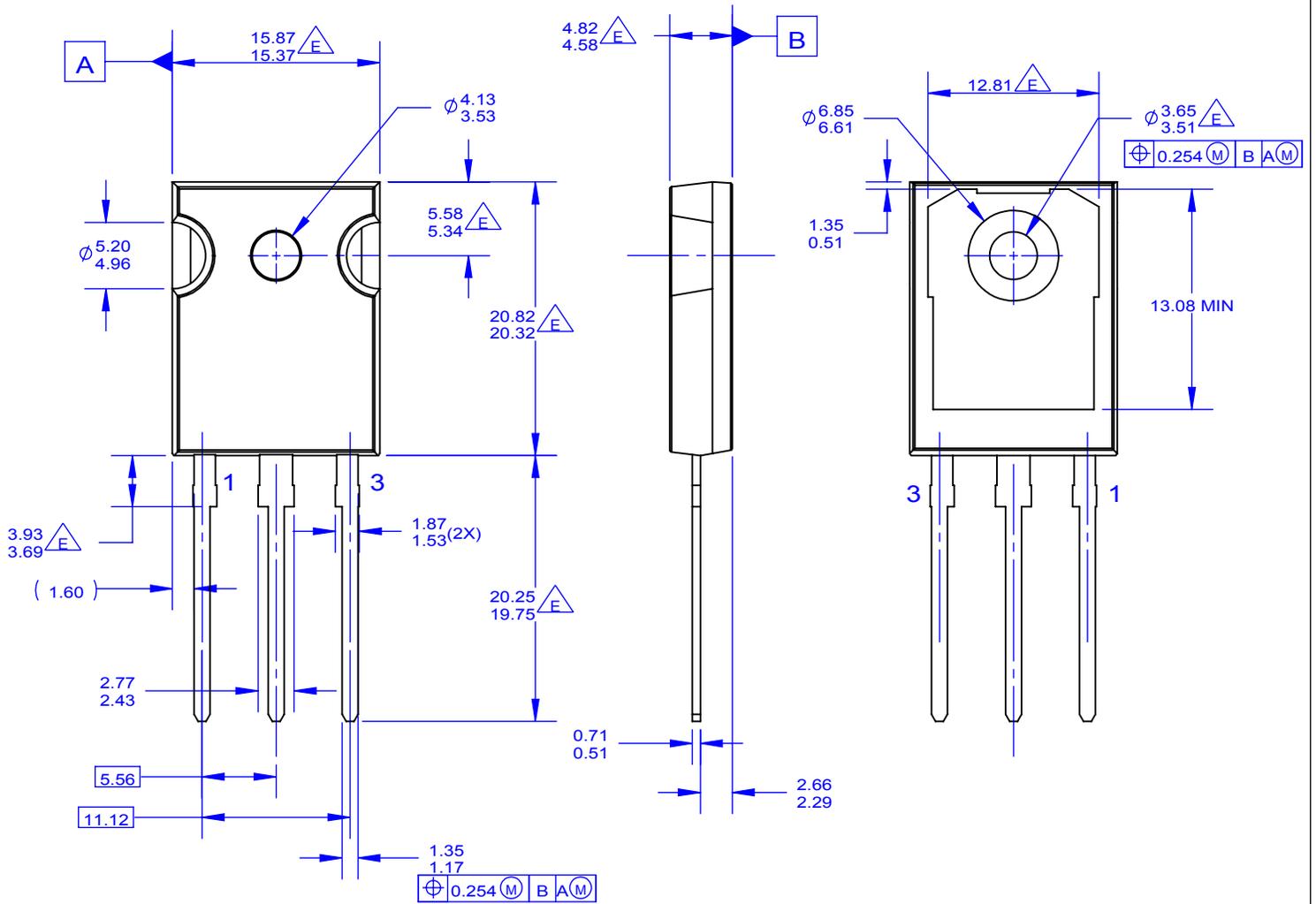
$R < 0.1\Omega$

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

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

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





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- C. ALL DIMENSIONS ARE IN MILLIMETERS.
- D. DRAWING CONFORMS TO ASME Y14.5 - 1994

$\triangle E$  DOES NOT COMPLY JEDEC STANDARD VALUE  
 F. DRAWING FILENAME: MKT-TO247G03\_REV02





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