

Silicon Carbide (SiC) Schottky Diode – EliteSiC, 10 A, 1200 V, D1, TO-247-3L

FFSH10120ADN-F155

Description

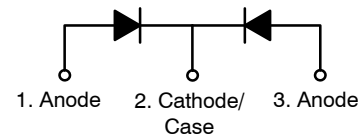
Silicon Carbide (SiC) Schottky Diodes use a completely new technology that provides superior switching performance and higher reliability compared to Silicon. No reverse recovery current, temperature independent switching characteristics, and excellent thermal performance sets Silicon Carbide as the 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

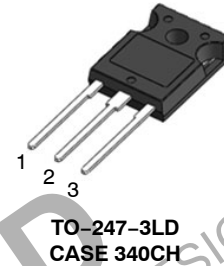
- Max Junction Temperature 175°C
- Avalanche Rated 55 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery/No Forward Recovery
- This Device is Pb-Free, Halogen Free/BFR Free and RoHS Compliant

Applications

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



Schottky Diode



MARKING DIAGRAM



A	= Assembly Plant Code
YWW	= Date Code (Year & Week)
ZZ	= Lot Traceability Code
FFSH10120ADN	= Specific Device Code

ORDERING INFORMATION

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

FFSH10120ADN-F155

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted) (per leg)

Symbol	Parameter	Value	Unit
V_{RRM}	Peak Repetitive Reverse Voltage	1200	V
E_{AS}	Single Pulse Avalanche Energy (Note 1)	55	mJ
I_F	Continuous Rectified Forward Current @ $T_C < 157^\circ\text{C}$	5* / 10**	A
	Continuous Rectified Forward Current @ $T_C < 135^\circ\text{C}$	8.1* / 16.2**	A
$I_{F, Max}$	Non-Repetitive Peak Forward Surge Current	$T_C = 25^\circ\text{C}$, 10 μs	380
		$T_C = 150^\circ\text{C}$, 10 μs	330
$I_{F, SM}$	Non-Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3 \text{ ms}$	42
$I_{F, RM}$	Repetitive Forward Surge Current	Half-Sine Pulse, $t_p = 8.3 \text{ ms}$	21
P_{tot}	Power Dissipation	$T_C = 25^\circ\text{C}$	83
		$T_C = 150^\circ\text{C}$	14
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$
	TO-247 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.

NOTE: * Per leg, ** Per Device

1. E_{AS} of 55 mJ is based on starting $T_J = 25^\circ\text{C}$, $L = 0.5 \text{ mH}$, $I_{AS} = 15 \text{ A}$, $V = 50 \text{ V}$.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	1.8* / 0.91**	$^\circ\text{C/W}$

NOTE: * Per leg, ** Per Device

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted) (per leg)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_F	Forward Voltage	$I_F = 5 \text{ A}$, $T_C = 25^\circ\text{C}$	-	1.45	1.75	V
		$I_F = 5 \text{ A}$, $T_C = 125^\circ\text{C}$	-	1.7	2.0	
		$I_F = 5 \text{ A}$, $T_C = 175^\circ\text{C}$	-	2.0	2.4	
I_R	Reverse Current	$V_R = 1200 \text{ V}$, $T_C = 25^\circ\text{C}$	-	-	200	μA
		$V_R = 1200 \text{ V}$, $T_C = 125^\circ\text{C}$	-	-	300	
		$V_R = 1200 \text{ V}$, $T_C = 175^\circ\text{C}$	-	-	400	
Q_C	Total Capacitive Charge	$V = 800 \text{ V}$	-	37	-	nC
C	Total Capacitance	$V_R = 1 \text{ V}$, $f = 100 \text{ kHz}$	-	337	-	pF
		$V_R = 400 \text{ V}$, $f = 100 \text{ kHz}$	-	33	-	
		$V_R = 800 \text{ V}$, $f = 100 \text{ kHz}$	-	26	-	

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
FFSH10120ADN-F155	FFSH10120ADN	TO-247-3LD	30 Units / Tube

TYPICAL CHARACTERISTICS

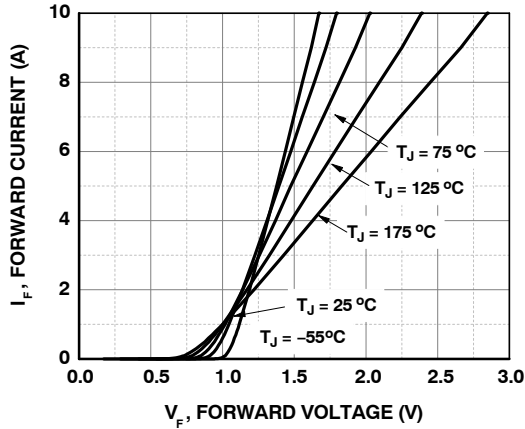
(T_J = 25°C UNLESS OTHERWISE NOTED) (PER LEG)

Figure 1. Forward Characteristics

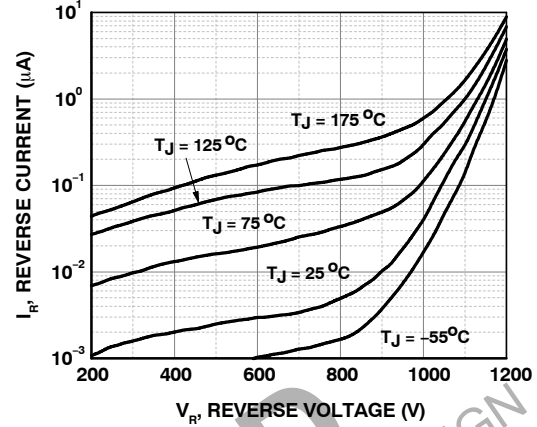


Figure 2. Reverse Characteristics

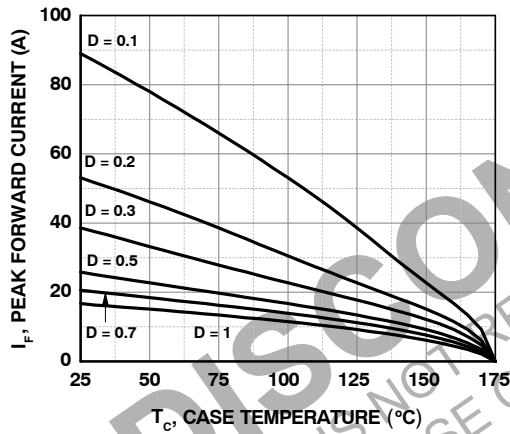


Figure 3. Current Derating

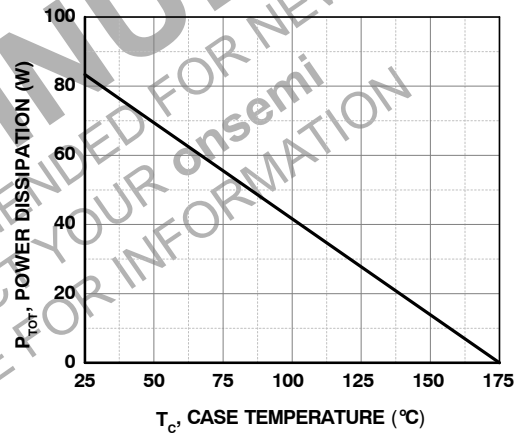


Figure 4. Power Derating

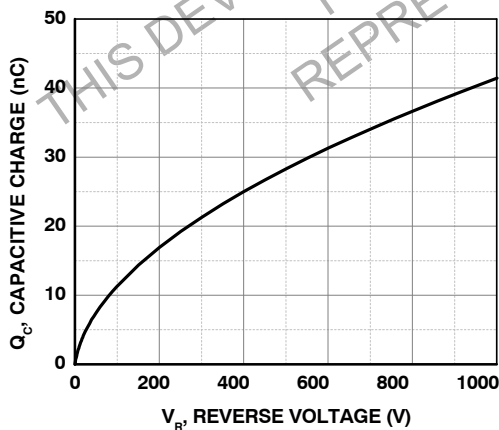


Figure 5. Capacitive Charge vs. Reverse Voltage

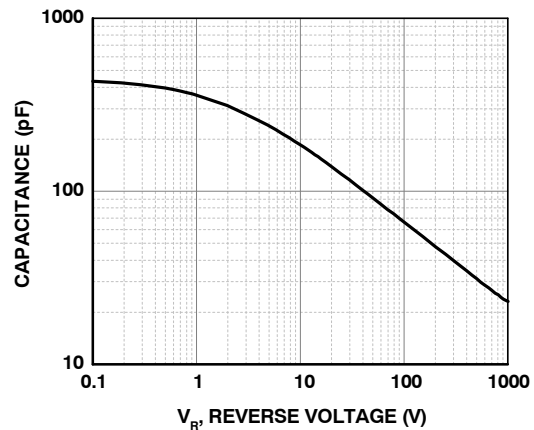


Figure 6. Capacitance vs. Reverse Voltage

TYPICAL CHARACTERISTICS

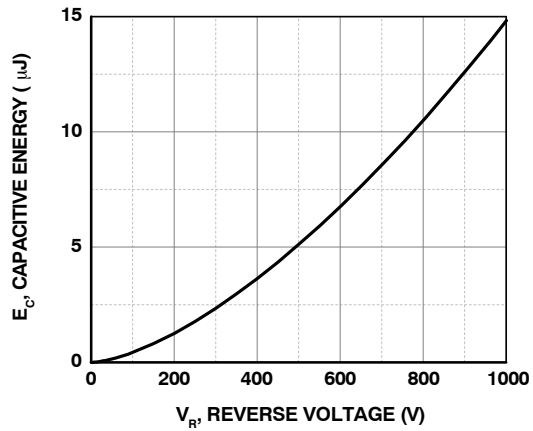
(T_J = 25°C UNLESS OTHERWISE NOTED)

Figure 7. Capacitance Stored Energy

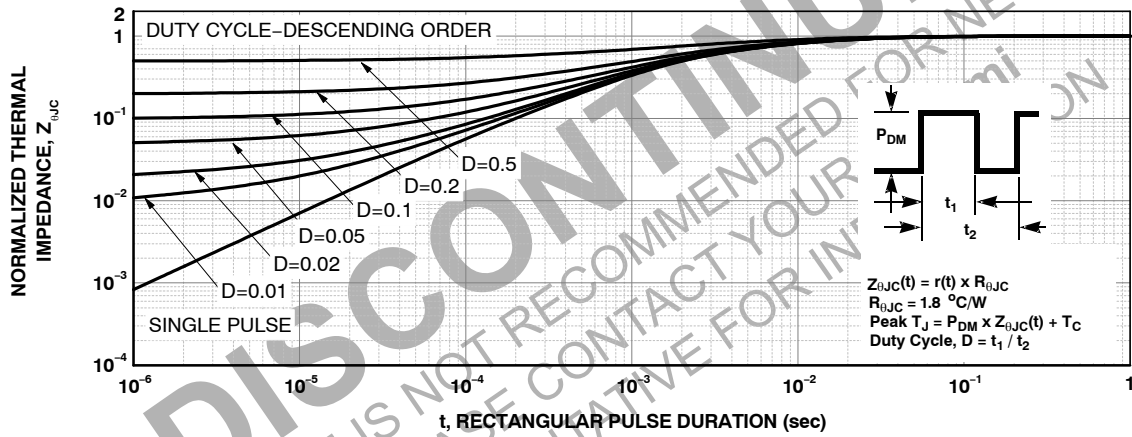


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

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

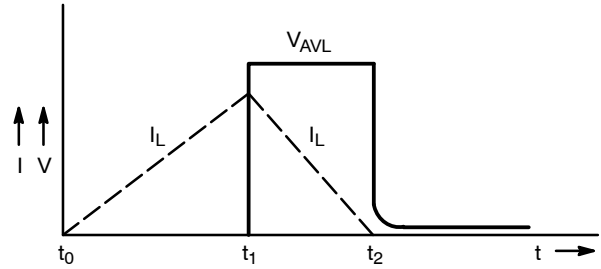
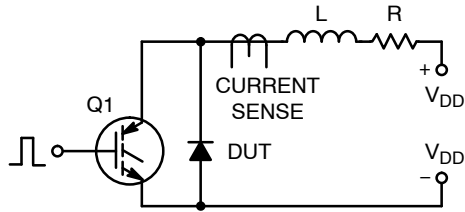
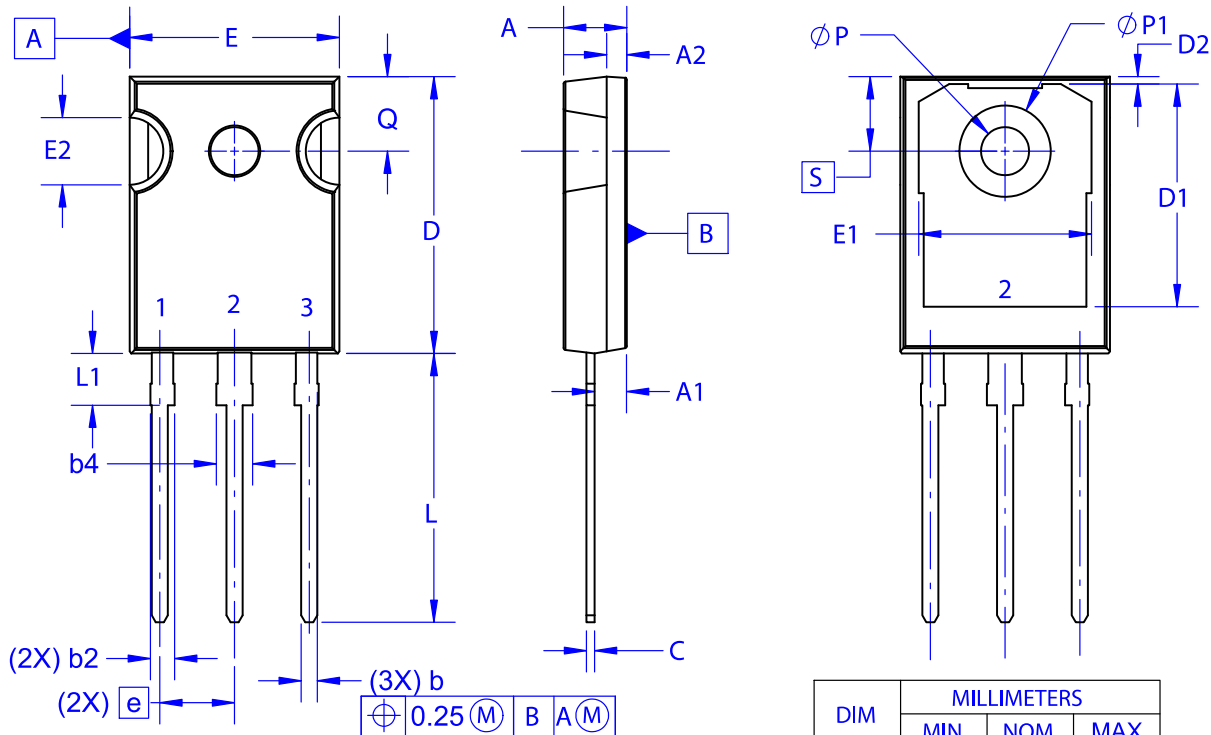


Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

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

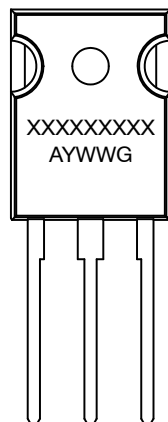
TO-247-3LD
CASE 340CH
ISSUE A

DATE 09 OCT 2019



NOTES: UNLESS OTHERWISE SPECIFIED.

- A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5 - 2009.
- D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
- E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

GENERIC
MARKING DIAGRAM*


XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.58	4.70	4.82
A1	2.29	2.475	2.66
A2	1.40	1.50	1.60
D	20.32	20.57	20.82
E	15.37	15.62	15.87
E2	4.96	5.08	5.20
e	~	5.56	~
L	19.75	20.00	20.25
L1	3.69	3.81	3.93
ϕP	3.51	3.58	3.65
Q	5.34	5.46	5.58
S	5.34	5.46	5.58
b	1.17	1.26	1.35
b2	1.53	1.65	1.77
b4	2.42	2.54	2.66
c	0.51	0.61	0.71
D1	13.08	~	~
D2	0.51	0.93	1.35
E1	12.81	~	~
$\phi P1$	6.61	6.73	6.85

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