

Silicon Carbide (SiC) Schottky Diode – EliteSiC, 40 A, 1200 V, D1, TO-247-3L

FFSH40120ADN-F155

Description

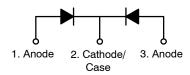
Silicon Carbide (SiC) Schottky Diodes use a completely new technology that provides superior switching performance and higher reliability compared to Silicon. No reverse recovery current, temperature independent switching characteristics, and excellent thermal performance sets Silicon Carbide as the 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 200 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

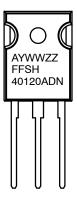


Schottky Diode



TO-247-3LD CASE 340CH

MARKING DIAGRAM



A = Assembly Plant Code
YWW = Date Code (Year & Week)
ZZ = Lot Code
FFSH40120ADN = Specific Device Code

ORDERING INFORMATION

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

1

FFSH40120ADN-F155

ABSOLUTE MAXIMUM RATINGS (T_C = 25°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)		200	mJ
I _F	Continuous Rectified Forward Current @ T _C < 148°C		20* / 40**	А
I _{F,Max}	Non-Repetitive Peak Forward Surge Current	T _C = 25°C, 10 μs	1190	А
		T _C = 150°C, 10 μs	990	А
I _{F,SM}	Non-Repetitive Forward Surge Current	Half-Sine Pulse, t _p = 8.3 ms	135	Α
I _{F,RM}	Repetitive Forward Surge Current	Half-Sine Pulse, t _p = 8.3 ms	74	А
P _{TOT}	Power Dissipation	T _C = 25°C	220	W
		T _C = 150°C	37	W
T _J , T _{STG}	Operating and Storage Temperature Range	Operating and Storage Temperature Range		°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.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{ hetaJC}$	Thermal Resistance, Junction to Case, Max	0.68* / 0.34**	°C/W

NOTE: * Per leg, ** Per Device.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted) (per leg)

Symbol	Parameter	Test Condition	Min	Тур	Max	Unit
V _F	Forward Voltage	I _F = 20 A, T _C = 25°C	-	1.45	1.75	V
		I _F = 20 A, T _C = 125°C	_	1.7	2.0	
		I _F = 20 A, T _C = 175°C	_	2.0	2.4	
I _R	Reverse Current	V _R = 1200 V, T _C = 25°C	_	-	200	μΑ
		V _R = 1200 V, T _C = 125°C	_	-	300	
		V _R = 1200 V, T _C = 175°C	-	-	400	
Q_{C}	Total Capacitive Charge	V = 800 V	_	120	-	nC
С	Total Capacitance	V _R = 1 V, f = 100 kHz	-	1220	-	pF
		V _R = 400 V, f = 100 kHz	_	111	_	
		V _R = 800 V, f = 100 kHz	_	88	_	

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	Packing Method	Quantity
FFSH40120ADN-F155	FFSH40120ADN	TO-247-3LD	Tube	30 Units

^{1.} E_{AS} of 200 mJ is based on starting $T_J = 25$ °C, L = 0.5 mH, $I_{AS} = 29$ A, V = 150 V.

FFSH40120ADN-F155

TYPICAL CHARACTERISTICS

 $(T_J = 25^{\circ}C \text{ UNLESS OTHERWISE NOTED (PER LEG)})$

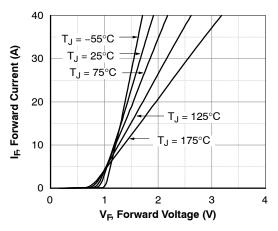


Figure 1. Forward Characteristics

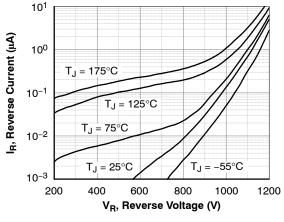


Figure 2. Reverse Characteristics

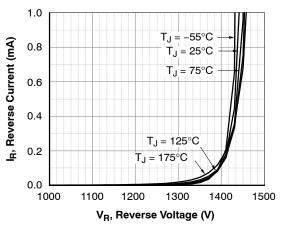


Figure 3. Reverse Characteristics

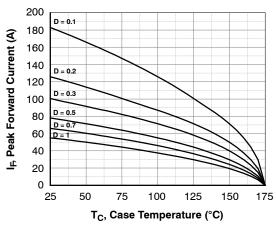


Figure 4. Current Derating

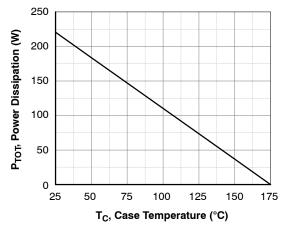


Figure 5. Power Derating

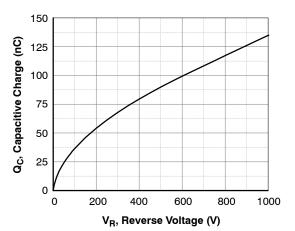


Figure 6. Capacitive Charge vs. Reverse Voltage

FFSH40120ADN-F155

TYPICAL CHARACTERISTICS (CONTINUED)

 $(T_J = 25^{\circ}C \text{ UNLESS OTHERWISE NOTED (PER LEG)})$

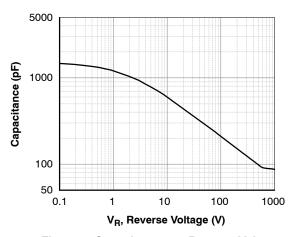


Figure 7. Capacitance vs. Reverse Voltage

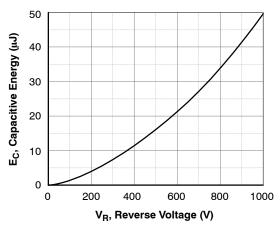


Figure 8. Capacitance Stored Energy

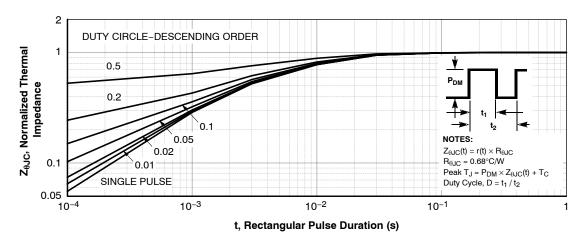


Figure 9. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

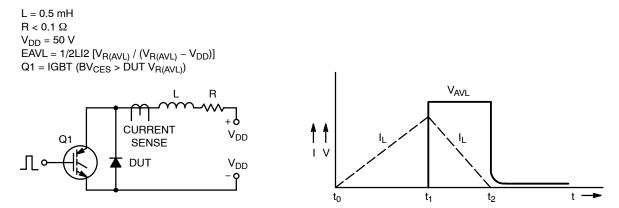
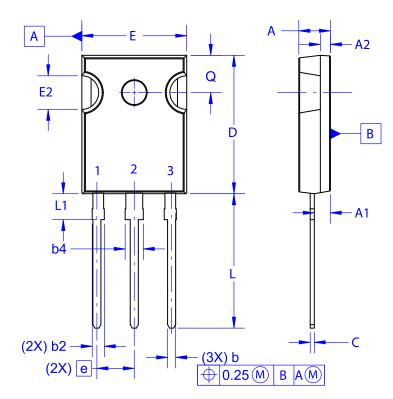


Figure 10. Unclamped Inductive Switching Test Circuit & Waveform

DATE 09 OCT 2019



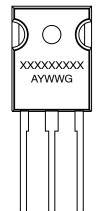
TO-247-3LD CASE 340CH **ISSUE A**





- 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

= Assembly Location

WW = Work Week

= 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.

ØP —		ØP1 D2
S E1 —		D1
21	2	
		,

DIM	MILLIMETERS			
DIM	MIN	NOM	MAX	
Α	4.58	4.70	4.82	
A 1	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	
е	~	5.56	~	
L	19.75	20.00	20.25	
L1	3.69	3.81	3.93	
ØΡ	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	
С	0.51	0.61	0.71	
D1	13.08	~	~	
D2	0.51	0.93	1.35	
E1	12.81	~	~	
ØP1	6.61	6.73	6.85	

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DESCRIPTION:	TO-247-3LD		PAGE 1 OF 1	

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