

Silicon Carbide (SiC) **Schottky Diode** - EliteSiC, 50 A, 650 V, D1, TO-247-3L

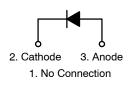
FFSH5065A-F155

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 & cost.

Features

- Max Junction Temperature 175°C
- Avalanche Rated 240 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery/No Forward Recovery
- No Reverse Recovery/No Forward Recovery
 These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant
 Applications
 General Purpose
 SMPS, Solar Inverter, UPS
 Power Switching Circuits
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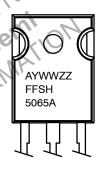


Schottky Diode



MARKING DIAGRAM

CASE 340CX



= Lot Code FFSH5065A

= Assembly Plant Code = Date Code (Year & Week)

= Specific Device Code

ORDERING INFORMATION

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

FFSH5065A-F155

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

Symbol	Parameter	Value	Unit	
V_{RRM}	Peak Repetitive Reverse Voltage	650	V	
E _{AS}	Single Pulse Avalanche Energy (Note 1)		240	mJ
I _F	Continuous Rectified Forward Current @ T _C <	50	Α	
	Continuous Rectified Forward Current @ T _C <	inuous Rectified Forward Current @ T _C < 135°C		
I _{F, Max}	Non-Repetitive Peak Forward Surge Current	titive Peak Forward Surge Current		Α
		T _C = 150°C, 10 μs	1127	Α
I _{F,SM}	Non-Repetitive Forward Surge Current	Half-Sine Pulse, t _p = 8.3 ms	200	Α
I _{F,RM}	Repetitive Forward Surge Current	Half-Sine Pulse, t _p = 8.3 ms	120	Α
Ptot	Power Dissipation	T _C = 25°C	429	W
		T _C = 150°C	72	W
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +175	M °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.

1. E_{AS} of 240 mJ is based on starting T_J = 25°C, L = 0.5 mH, I_{AS} = 31 A, V = 50 V.

THERMAL CHARACTERISTICS

Symbol	Parameter		\$0,	Rating	Unit
$R_{ hetaJC}$	Thermal Resistance, Junction-to-Case, Max. (Note 1)	-	(O)	0.35	°C/W

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

Symbol	Parameter	Test Condition	Min	Тур	Max	Unit
V _F	Forward Voltage	$I_F = 50 \text{ A}, T_C = 25^{\circ}\text{C}$	OR-III	1.51	1.75	V
		$I_F = 50 \text{ A}, T_C = 125^{\circ}\text{C}$	5	1.67	2.0	
		$I_F = 50 \text{ A}, T_C = 175^{\circ}\text{C}$	ı	1.82	2.4	
I _R	Reverse Current	V _R = 650 V, T _C = 25°C	ı	ı	200	μΑ
		$V_R = 650 \text{ V}, T_C = 125^{\circ}\text{C}$	ı	ı	400	
		V _R = 650 V, T _C = 175°C	ı	ı	600	
$Q_{\mathbb{C}}$	Total Capacitive Charge	V = 400 V	ı	147	-	nC
С	Total Capacitance	V _R = 1 V, f = 100 kHz	ı	2530	_	pF
11		V _R = 200 V, f = 100 kHz	ı	271	-	
•		V _R = 400 V, f = 100 kHz	-	211	-	

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
FFSH5065A-F155	FFSH5065A	TO-247-3LD (Pb-Free/Halogen Free)	Tube	30 Units

FFSH5065A-F155

TYPICAL CHARACTERISTICS

(T_J = 25°C UNLESS OTHERWISE NOTED)

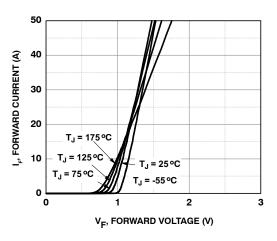


Figure 1. Forward Characteristics

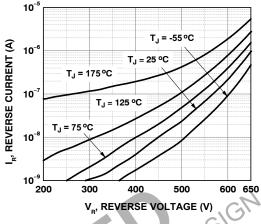


Figure 2. Reverse Characteristics

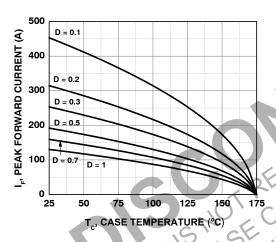


Figure 3. Current Derating

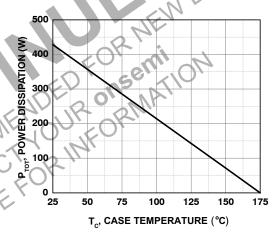


Figure 4. Power Derating

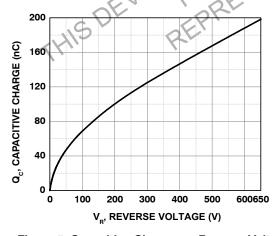


Figure 5. Capacitive Charge vs. Reverse Voltage

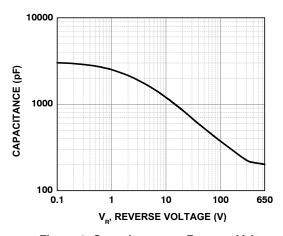


Figure 6. Capacitance vs. Reverse Voltage

FFSH5065A-F155

TYPICAL CHARACTERISTICS

(T_J = 25°C UNLESS OTHERWISE NOTED)

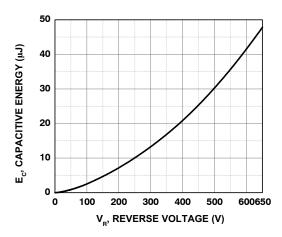


Figure 7. Capacitance Stored Energy

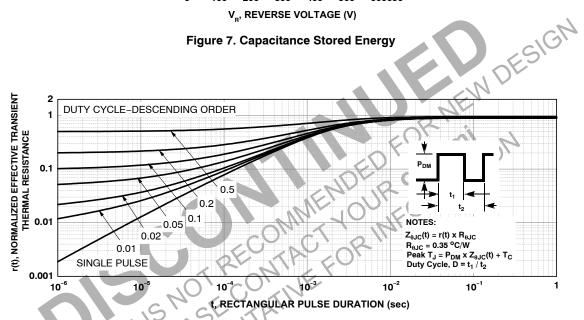
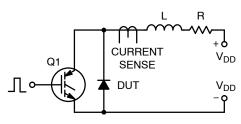


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

L = 0.5 mH $R < 0.1 \Omega$ $V_{DD} = 50 \text{ V}$
$$\begin{split} &\mathsf{EAVL} = 1/2\mathsf{L}12 \left[\mathsf{V}_{\mathsf{R}(\mathsf{AVL})} \, / \, \left(\mathsf{V}_{\mathsf{R}(\mathsf{AVL})} - \mathsf{V}_{\mathsf{DD}} \right) \right] \\ &\mathsf{Q1} = \mathsf{IGBT} \, \left(\mathsf{BV}_{\mathsf{CES}} > \mathsf{DUT} \, \mathsf{V}_{\mathsf{R}(\mathsf{AVL})} \right) \end{split}$$



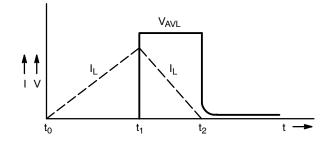
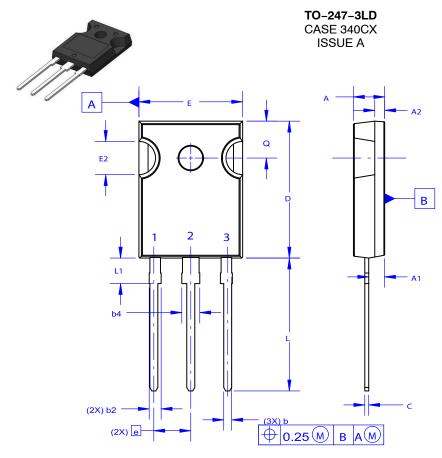


Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

DATE 06 JUL 2020





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*



XXXXX = 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.

Ø _P —		Φ _{P1} D2
E1 —	2	D1

DIM	MILLIMETERS				
DIM	MIN	NOM	MAX		
Α	4.58	4.70	4.82		
A 1	2.20	2.40	2.60		
A2	1.40	1.50	1.60		
D	20.32	20.57	20.82		
Е	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	6.60	6.80	7.00		

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

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