Silicon Carbide Schottky Diode

1200 V, 50 A

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 441 mJ
- High Surge Current Capacity
- Positive Temperature Coefficient
- Ease of Paralleling
- No Reverse Recovery/No Forward Recovery

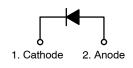
Applications

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

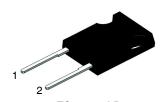


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Schottky Diode



TO-247-2LD CASE 340CL

MARKING DIAGRAM



\$Y = ON Semiconductor Logo &Z = Assembly Plant Code

&3 = Numeric Date Code

&K = Lot Code

FFSH50120A = Specific Device Code

ORDERING INFORMATION

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

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

Symbol	Parameter		Value	Unit
V_{RRM}	Peak Repetitive Reverse Voltage		1200	V
E _{AS}	Single Pulse Avalanche Energy (Note 1)		441	mJ
I _F	Continuous Rectified Forward Current @ T _C < 155°C		50	Α
	Continuous Rectified Forward Current @ T _C <	135°C	77	Α
I _{F, Max}	Non-Repetitive Peak Forward Surge Current	T _C = 25°C, 10 μs	1700	Α
		T _C = 150°C, 10 μs	1600	Α
I _{F,SM}	Non-Repetitive Forward Surge Current	Half-Sine Pulse, t _p = 8.3 ms	280	Α
I _{F,RM}	Repetitive Forward Surge Current	Half-Sine Pulse, t _p = 8.3 ms	85	Α
Ptot	Power Dissipation	T _C = 25°C	736	W
		T _C = 150°C	147	W
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +175	°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 441 mJ is based on starting T_J = 25°C, L = 0.5 mH, I_{AS} = 42 A, V = 50 V.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{ heta JC}$	Thermal Resistance, Junction to Case, Max	0.17	°C/W

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

Symbol	Parameter	Test Condition	Min	Тур	Max	Unit
V_{F}	Forward Voltage	I _F = 50 A, T _C = 25°C	-	1.45	1.75	V
		I _F = 50 A, T _C = 125°C	-	1.7	2.0	
		I _F = 50 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	
$Q_{\mathbb{C}}$	Total Capacitive Charge	V = 800 V	-	252	=	nC
С	Total Capacitance	V _R = 1 V, f = 100 kHz	-	2560	=	pF
		V _R = 400 V, f = 100 kHz	-	234	=	
		V _R = 800 V, f = 100 kHz	-	190	-	

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
FFSH50120A	FFSH50120A	TO-247-2LD	30 Units / Tube

TYPICAL CHARACTERISTICS

(T_J = 25°C unless otherwise noted)

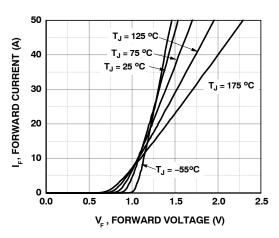


Figure 1. Forward Characteristics

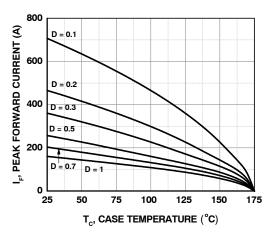


Figure 3. Current Derating

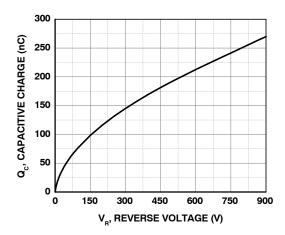


Figure 5. Capacitive Charge vs. Reverse Voltage

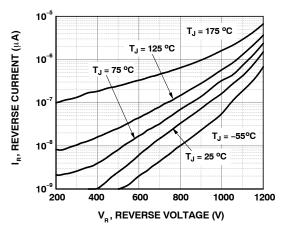


Figure 2. Reverse Characteristics

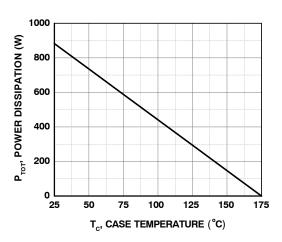


Figure 4. Power Derating

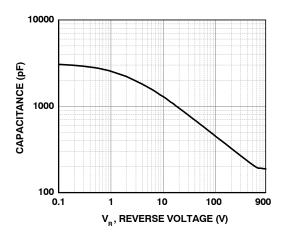


Figure 6. Capacitance vs. Reverse Voltage

TYPICAL CHARACTERISTICS

 $(T_J = 25^{\circ}C \text{ unless otherwise noted})$

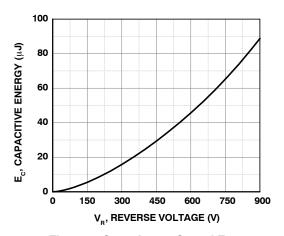


Figure 7. Capacitance Stored Energy

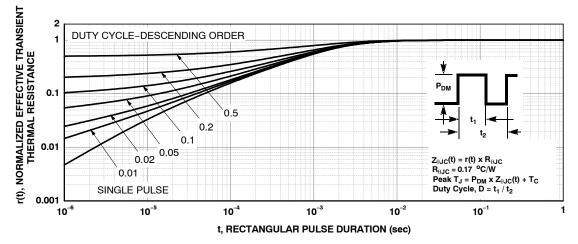
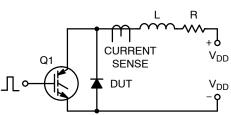


Figure 8. Junction-to-Case Transient Thermal Response Curve

TEST CIRCUIT AND WAVEFORMS

$$\begin{split} L &= 0.5 \text{ mH} \\ R &< 0.1 \ \Omega \\ V_{DD} &= 50 \ V \\ EAVL &= 1/2 Li2 \left[V_{R(AVL)} \ / \ (V_{R(AVL)} - V_{DD}) \right] \\ Q1 &= IGBT \ (BV_{CES} > DUT \ V_{R(AVL)}) \end{split}$$



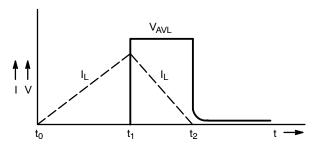
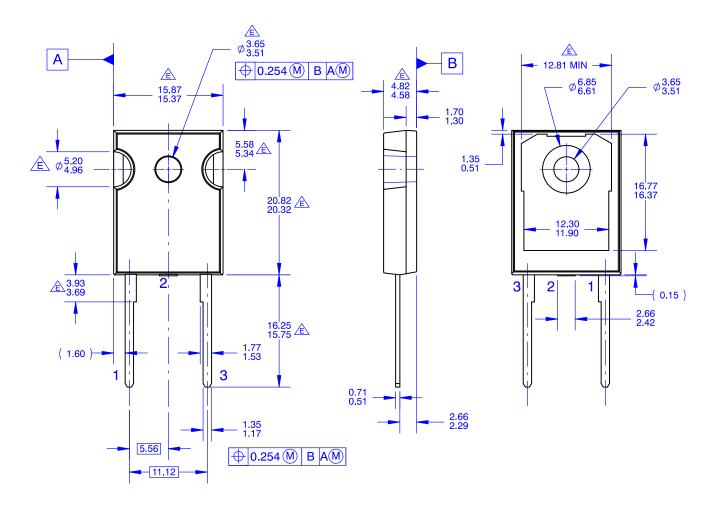


Figure 9. Unclamped Inductive Switching Test Circuit & Waveform

TO-247-2LD CASE 340CL **ISSUE O**

DATE 31 OCT 2016



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