Silicon Carbide Schottky Diode

1200 V, 15 A

FFSH15120A

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 145 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

MARKING DIAGRAM

SY&Z&3&K
FFSH
15120A

SY = ON Semiconductor Logo
&Z = Assembly Plant Code
&3 = Numeric Date Code
&K = Lot Code
FFSH15120A = Specific Device Code

ORDERING INFORMATION
See detailed ordering and shipping information on page 2 of this data sheet.
ABSOLUTE MAXIMUM RATINGS \((T_C = 25°C \text{ unless otherwise noted})\)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(V_{RRM})</td>
<td>Peak Repetitive Reverse Voltage (T_C \leq 159°C)</td>
<td>1200</td>
<td>V</td>
</tr>
<tr>
<td>(E_{AS})</td>
<td>Single Pulse Avalanche Energy (Note 1) (T_C = 25°C)</td>
<td>145</td>
<td>mJ</td>
</tr>
<tr>
<td>(I_F)</td>
<td>Continuous Rectified Forward Current (T_C &lt; 159°C)</td>
<td>15</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Continuous Rectified Forward Current (T_C &lt; 135°C)</td>
<td>26</td>
<td>A</td>
</tr>
<tr>
<td>(I_{F,\text{Max}})</td>
<td>Non-Repetitive Peak Forward Surge Current (T_C = 25°C), 10 (\mu)s</td>
<td>920</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>(T_C = 150°C), 10 (\mu)s</td>
<td>870</td>
<td>A</td>
</tr>
<tr>
<td>(I_{F,\text{SM}})</td>
<td>Non-Repetitive Forward Surge Current (I_{p} = 8.3) ms</td>
<td>115</td>
<td>A</td>
</tr>
<tr>
<td>(I_{F,\text{RM}})</td>
<td>Repetitive Forward Surge Current (I_{p} = 8.3) ms</td>
<td>50</td>
<td>A</td>
</tr>
<tr>
<td>(P_{TOT})</td>
<td>Power Dissipation (T_C = 25°C)</td>
<td>283</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td>(T_C = 150°C)</td>
<td>47</td>
<td>W</td>
</tr>
<tr>
<td>(T_{J,STG})</td>
<td>Operating and Storage Temperature Range</td>
<td>-55 to +175</td>
<td>°C</td>
</tr>
</tbody>
</table>

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 145 mJ is based on starting \(T_J = 25°C\), \(L = 0.5\) mH, \(I_{AS} = 24\) A, \(V = 50\) V.

THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(R_{\text{JUC}})</td>
<td>Thermal Resistance, Junction to Case, Max</td>
<td>0.53</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

ELECTRICAL CHARACTERISTICS \((T_C = 25°C \text{ unless otherwise noted})\)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Test Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(V_F)</td>
<td>Forward Voltage (I_F = 15) A, (T_C = 25°C)</td>
<td>-</td>
<td>1.45</td>
<td>1.75</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I_F = 15) A, (T_C = 125°C)</td>
<td>-</td>
<td>1.7</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I_F = 15) A, (T_C = 175°C)</td>
<td>-</td>
<td>2.0</td>
<td>2.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(I_R)</td>
<td>Reverse Current (V_R = 1200) V, (T_C = 25°C)</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>(\mu)A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(V_R = 1200) V, (T_C = 125°C)</td>
<td>-</td>
<td>-</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(V_R = 1200) V, (T_C = 175°C)</td>
<td>-</td>
<td>-</td>
<td>400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Q_C)</td>
<td>Total Capacitive Charge (V = 800) V</td>
<td>-</td>
<td>95</td>
<td>-</td>
<td>nC</td>
<td></td>
</tr>
<tr>
<td>(C)</td>
<td>Total Capacitance (V_R = 1) V, (f = 100) kHz</td>
<td>-</td>
<td>936</td>
<td>-</td>
<td>pF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(V_R = 400) V, (f = 100) kHz</td>
<td>-</td>
<td>86</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(V_R = 800) V, (f = 100) kHz</td>
<td>-</td>
<td>68</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Top Marking</th>
<th>Package</th>
<th>Packing Method</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>FFSH15120A</td>
<td>FFSH15120A</td>
<td>TO–247–2LD</td>
<td>Tube</td>
<td>30 Units</td>
</tr>
</tbody>
</table>
TYPICAL CHARACTERISTICS
(TJ = 25°C unless otherwise noted)

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
TYPICAL CHARACTERISTICS (Continued)

(TJ = 25°C unless otherwise noted)

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

**Figure 8. Capacitance Stored Energy**

**Figure 9. Junction–to–Case Transient Thermal Response Curve**

**TEST CIRCUIT AND WAVEFORMS**

L = 0.5 mH  
R < 0.1 Ω  
V_DD = 50 V  
EAVL = 1/2LI2 [VR(AVL) / (VR(AVL) - V_DD)]  
Q1 = IGBT (BV_CES > DUT VR(AVL))
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

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*

XXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
ZZ = Assembly Lot Code

*This information is generic. Please refer to device data sheet for actual part marking.
Pb−Free indicator, "G" or microdot "C0071", may
or may not be present. Some products may
not follow the Generic Marking.

DOCUMENT NUMBER: 98AON13850G
DESCRIPTION: TO−247−2LD

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