

## LFUSCD15120A



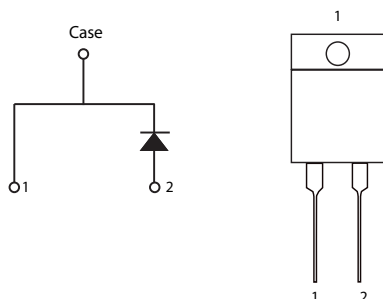
## Description

The LFUSCD series of silicon carbide (SiC) Schottky diodes has near-zero recovery current, high surge capability, and a maximum operating junction temperature of 175 °C. The diode series is ideal for applications where improvements in efficiency, reliability, and thermal management are desired.

## Features

- Positive temperature coefficient for safe operation and ease of paralleling
- 175 °C maximum operating junction temperature
- Enhanced surge capability
- Extremely fast, temperature-independent switching behavior
- Dramatically reduced switching losses compared to Si bipolar diodes

## Circuit Diagram



## Applications

- Boost diodes in power factor correction
- Switch-mode power supplies
- Uninterruptible power supplies
- Solar inverters
- Industrial motor drives

## Maximum Ratings

| Characteristics                                             | Symbol      | Conditions                                                                                  | Max.       | Unit |
|-------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------|------------|------|
| DC Blocking Voltage                                         | $V_R$       | -                                                                                           | 1200       | V    |
| Repetitive Peak Reverse Voltage, $T_J = 25\text{ °C}$       | $V_{RRM}$   |                                                                                             | 1200       | V    |
| Maximum DC Forward Current                                  | $I_F$       | $T_C = 138\text{ °C}$                                                                       | 15         | A    |
| Non-Repetitive Forward Surge Current                        | $I_{FSM}$   | $T_C = 25\text{ °C}$ , 8.3 ms, half sine pulse                                              | 120        | A    |
| Non-Repetitive Avalanche Energy                             | $E_{AS}$    | $T_J = 25\text{ °C}$ , $L = 10\text{ mH}$ , $I_{pk} = 5\text{ A}$ , $V_{DD} = 100\text{ V}$ | 132        | mJ   |
| Power Dissipation                                           | $P_{Tot}$   | $T_C = 25\text{ °C}$                                                                        | 187        | W    |
|                                                             |             | $T_C = 138\text{ °C}$                                                                       | 46         |      |
| Maximum Operating Junction Temperature                      | $T_{J,MAX}$ |                                                                                             | 175        | °C   |
| Storage Temperature                                         | $T_{STG}$   |                                                                                             | -55 to 175 | °C   |
| Soldering Temperatures, Wavesoldering Only Allowed at Leads | $T_{sld}$   | 1.6 mm from case for 10s                                                                    | 260        | °C   |

### Electrical Characteristics

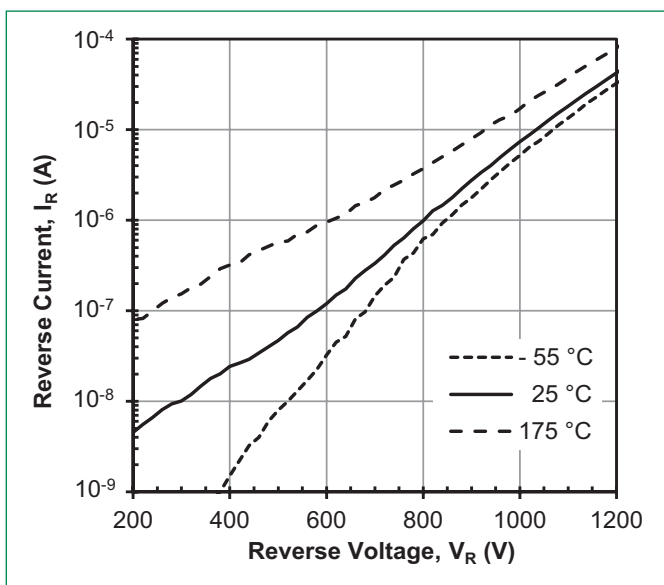
| Characteristics         | Symbol | Conditions                                                                   | Value |      |      | Unit          |
|-------------------------|--------|------------------------------------------------------------------------------|-------|------|------|---------------|
|                         |        |                                                                              | Min.  | Typ. | Max. |               |
| Forward Voltage         | $V_F$  | $I_F = 15 \text{ A}, T_J = 25^\circ \text{C}$                                | -     | 1.5  | 1.7  | V             |
|                         |        | $I_F = 15 \text{ A}, T_J = 175^\circ \text{C}$                               | -     | 2.5  | 3    |               |
| Reverse Current         | $I_R$  | $V_R = 1200 \text{ V}, T_J = 25^\circ \text{C}$                              | -     | 45   | 375  | $\mu\text{A}$ |
|                         |        | $V_R = 1200 \text{ V}, T_J = 175^\circ \text{C}$                             | -     | 90   | 1000 |               |
| Total Capacitive Charge | $Q_C$  | $V_R = 600 \text{ V}, I_F = 15 \text{ A}, di/dt = 250 \text{ A}/\mu\text{s}$ | -     | 60   | -    | nC            |
| Total Capacitance       | C      | $V_R = 1 \text{ V}, f = 1 \text{ MHz}$                                       | -     | 750  | -    | pF            |
|                         |        | $V_R = 300 \text{ V}, f = 1 \text{ MHz}$                                     | -     | 75   | -    |               |
|                         |        | $V_R = 600 \text{ V}, f = 1 \text{ MHz}$                                     | -     | 54   | -    |               |

Footnote:  $T_J = +25^\circ \text{C}$  unless otherwise specified

### Thermal Characteristics

| Characteristics    | Symbol          | Conditions | Value |      |      | Unit                      |
|--------------------|-----------------|------------|-------|------|------|---------------------------|
|                    |                 |            | Min.  | Typ. | Max. |                           |
| Thermal Resistance | $R_{\theta JC}$ | -          | -     | -    | 0.8  | $^\circ\text{C}/\text{W}$ |

**Figure 1: Typical Reverse Characteristics**



**Figure 2: Typical Forward Characteristics**

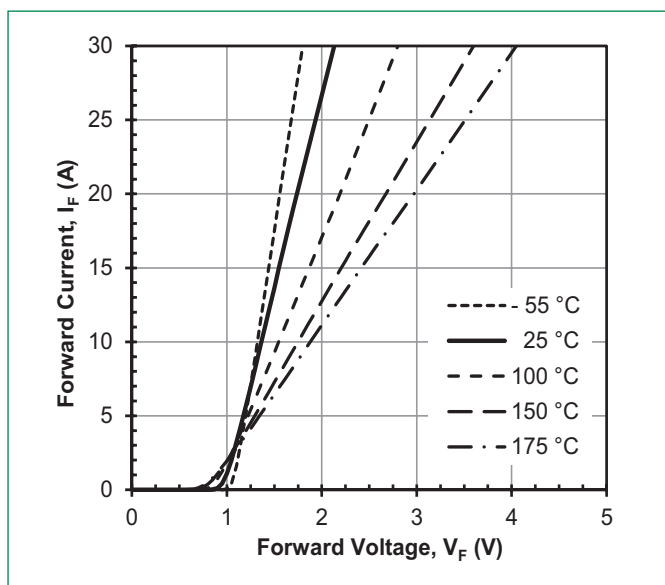


Figure 3: Power Disipation

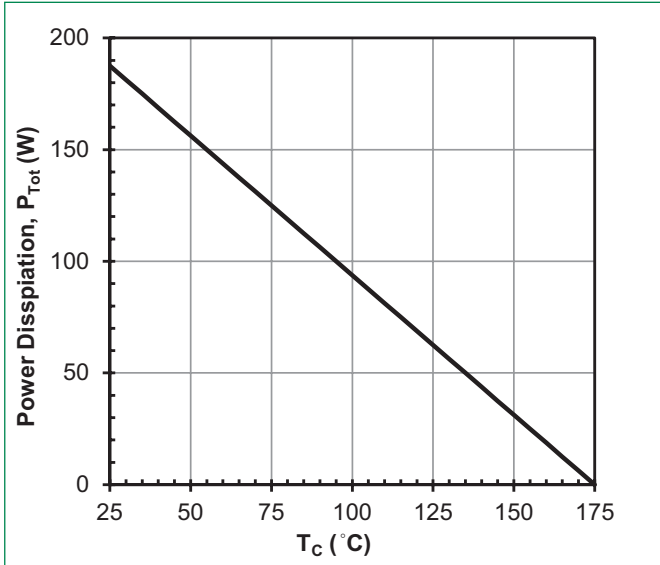


Figure 4: Diode Foward Current

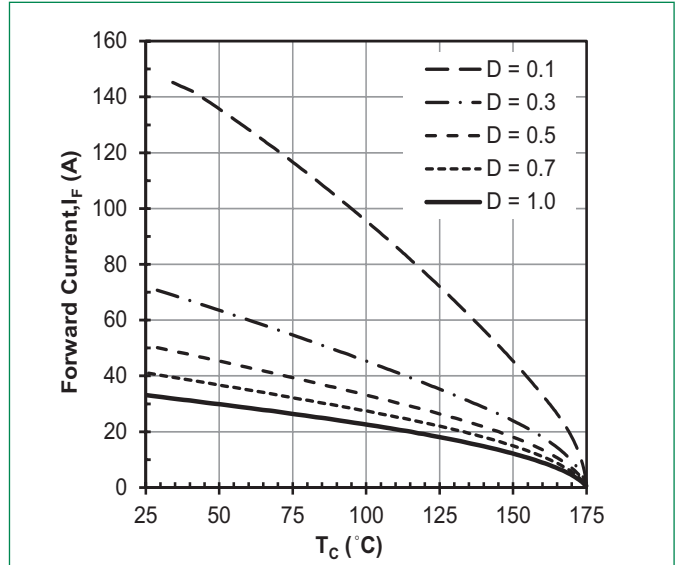


Figure 5: Capacitance vs. Reverse Voltage

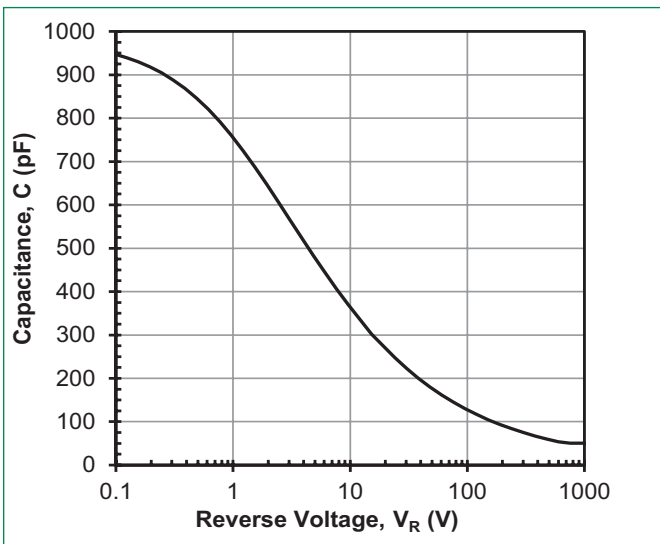
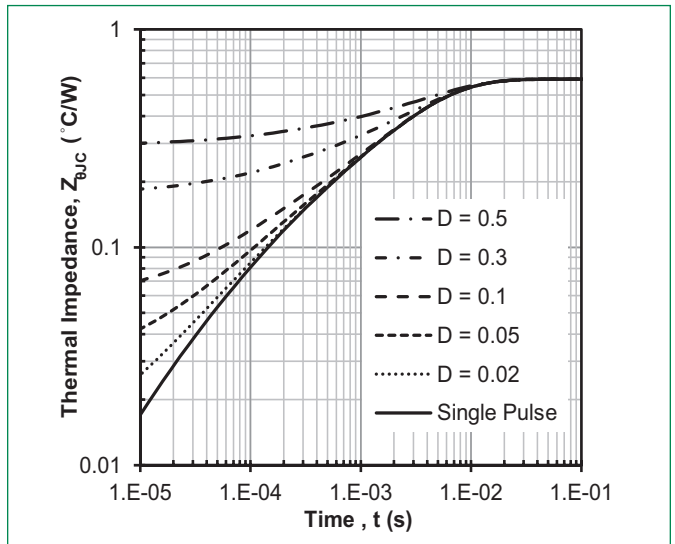
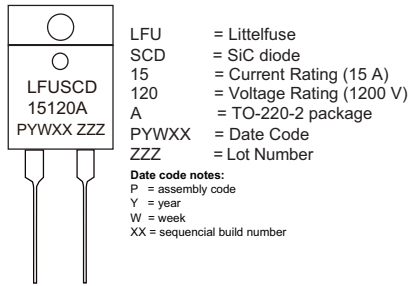


Figure 6: Transient Thermal Impedance



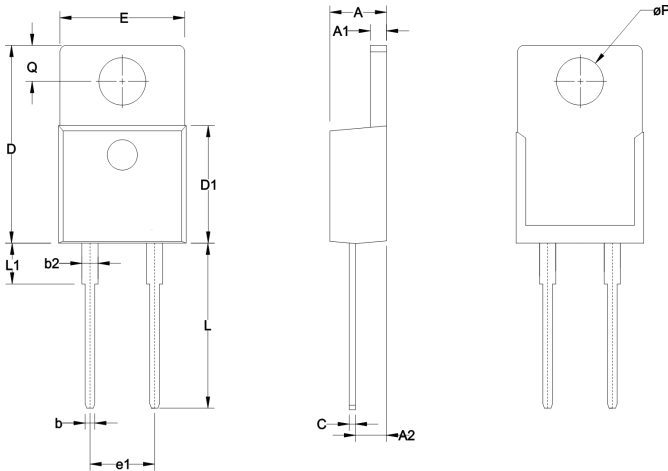
### Part Marking System



### Packing Options

| Part Number  | Marking      | Packing Mode  | M.O.Q |
|--------------|--------------|---------------|-------|
| LFUSCD15120A | LFUSCD15120A | 50 pcs / Tube | 500   |

### Dimensions-Package TO-220 2-lead



| Symbol   | Inches |       | Millimeters |       |
|----------|--------|-------|-------------|-------|
|          | Min    | Max   | Min         | Max   |
| A        | 0.165  | 0.185 | 4.19        | 4.70  |
| A1       | 0.048  | 0.052 | 1.22        | 1.32  |
| A2       | 0.094  | 0.098 | 2.39        | 2.49  |
| b        | 0.025  | 0.035 | 0.64        | 0.89  |
| b2       | 0.045  | 0.055 | 1.14        | 1.40  |
| C        | 0.018  | 0.025 | 0.46        | 0.64  |
| D        | 0.595  | 0.615 | 15.11       | 15.62 |
| D1       | 0.355  | 0.365 | 9.02        | 9.27  |
| E        | 0.381  | 0.391 | 9.68        | 9.93  |
| e1       | 0.198  | 0.202 | 5.03        | 5.13  |
| L        | 0.500  | 0.510 | 12.70       | 12.95 |
| L1       | 0.120  | 0.150 | 3.05        | 3.81  |
| $\phi P$ | 0.143  | 0.147 | 3.63        | 3.73  |
| Q        | 0.100  | 0.120 | 2.54        | 3.05  |

| Mounting | M3/M3.5 | 1Nm        |
|----------|---------|------------|
| Torque   | Screw   | 8.8 lbf-in |

### Packing Specification ( Tube for TO-220 2-lead )

Note: All units in Millimeters. Tolerances  $\pm 0.25\text{mm}$  unless otherwise specified.

