

LFUSCD04065A



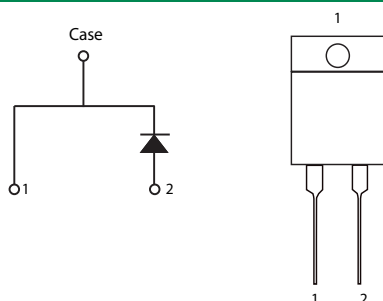

Description

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 | - | 650 | V |
| Repetitive Peak Reverse Voltage, $T_J = 25\text{ °C}$ | V_{RRM} | | 650 | V |
| Surge Peak Reverse Voltage | V_{RSM} | | 650 | V |
| Maximum DC Forward Current | I_F | $T_C = 156\text{ °C}$ | 4 | A |
| Non-Repetitive Forward Surge Current | I_{FSM} | $T_C = 25\text{ °C}$, 8.3 ms, half sine pulse | 32 | A |
| Non-Repetitive Peak Forward Current | I_{FMAX} | $T_C = 25\text{ °C}$, 10 μ S | 235 | A |
| Non-Repetitive Avalanche Energy | E_{AS} | $T_J = 25\text{ °C}$, $L = 5\text{ mH}$, $I_{pk} = 3.55\text{ A}$, $V_{DD} = 100\text{ V}$ | 33 | mJ |
| Power Dissipation | P_{Tot} | $T_C = 25\text{ °C}$ | 71 | W |
| | | $T_C = 156\text{ °C}$ | 9 | |
| Maximum Operating Junction Temperature | $T_{J,MAX}$ | | 175 | °C |
| Storage Temperature | T_{STG} | | -55 to 175 | °C |

Electrical Characteristics

| Characteristics | Symbol | Conditions | Value | | | Unit |
|-------------------------|--------|---|-------|------|------|---------------|
| | | | Min. | Typ. | Max. | |
| Forward Voltage | V_F | $I_F = 4 \text{ A}, T_J = 25 \text{ }^\circ\text{C}$ | - | 1.5 | 1.7 | V |
| | | $I_F = 4 \text{ A}, T_J = 150 \text{ }^\circ\text{C}$ | - | 1.8 | 2.1 | |
| | | $I_F = 4 \text{ A}, T_J = 175 \text{ }^\circ\text{C}$ | - | 2.0 | 2.25 | |
| Reverse Current | I_R | $V_R = 650 \text{ V}, T_J = 25 \text{ }^\circ\text{C}$ | - | 10 | 170 | μA |
| | | $V_R = 650 \text{ V}, T_J = 175 \text{ }^\circ\text{C}$ | - | 20 | 550 | |
| Total Capacitive Charge | Q_C | $V_R = 400 \text{ V}, I_F = 4 \text{ A}, di/dt = 110 \text{ A}/\mu\text{s}$ | - | 6 | - | nC |
| Total Capacitance | C | $V_R = 1 \text{ V}, f = 1 \text{ MHz}$ | - | 125 | - | pF |
| | | $V_R = 300 \text{ V}, f = 1 \text{ MHz}$ | - | 16 | - | |
| | | $V_R = 600 \text{ V}, f = 1 \text{ MHz}$ | - | 13 | - | |

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

Thermal Characteristics

| Characteristics | Symbol | Conditions | Value | | | Unit |
|--------------------|-----------------|------------|-------|------|------|---------------------------|
| | | | Min. | Typ. | Max. | |
| Thermal Resistance | $R_{\theta JC}$ | - | - | - | 2.1 | $^\circ\text{C}/\text{W}$ |

Figure 1: Typical Reverse Characteristics

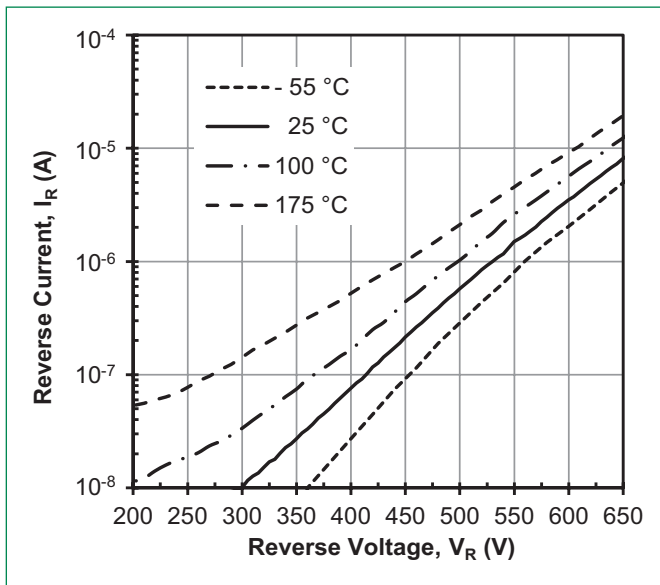


Figure 2: Typical Forward Characteristics

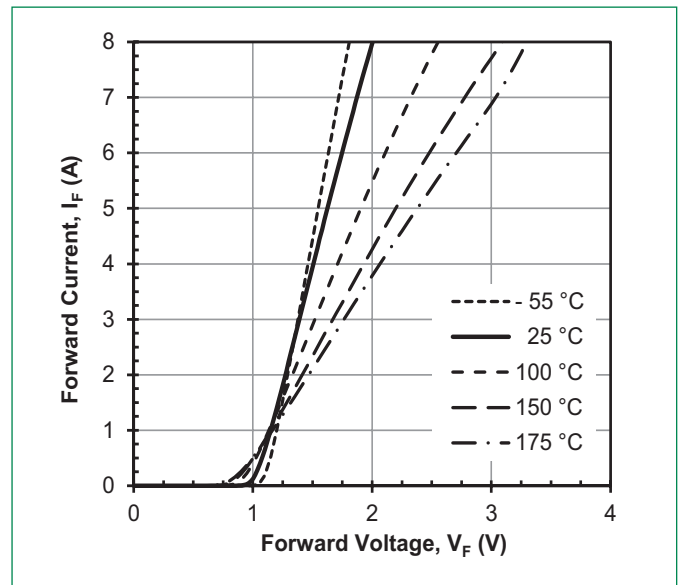


Figure 3: Power Dissipation

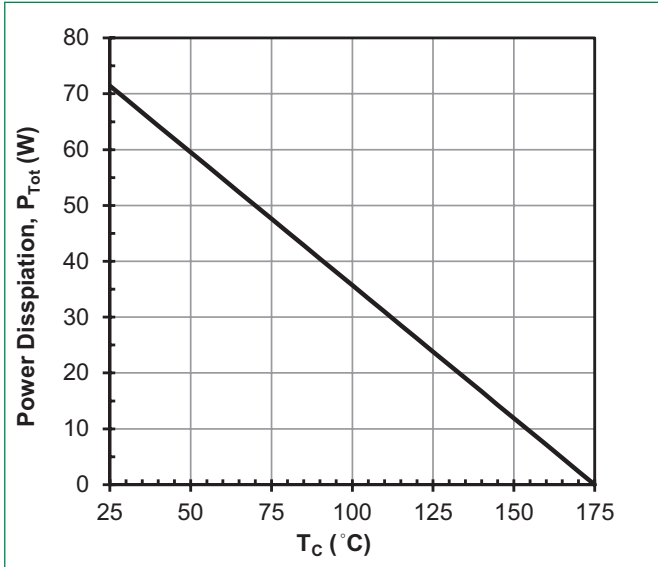


Figure 4: Diode Forward Current

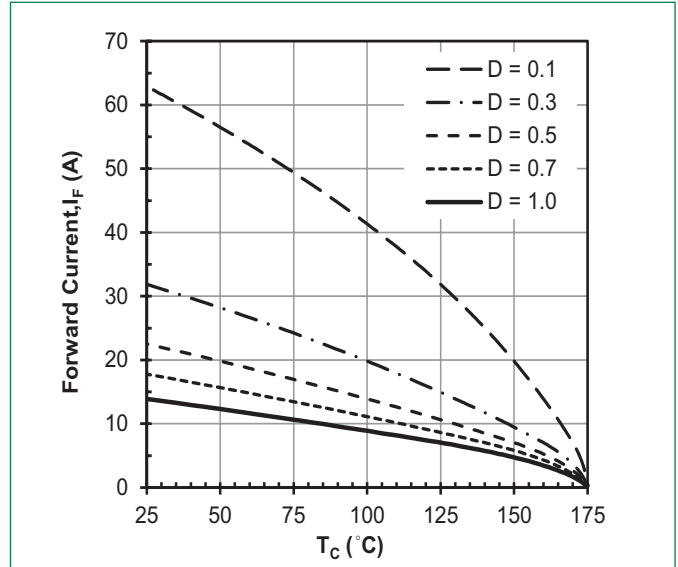


Figure 5: Capacitance vs. Reverse Voltage

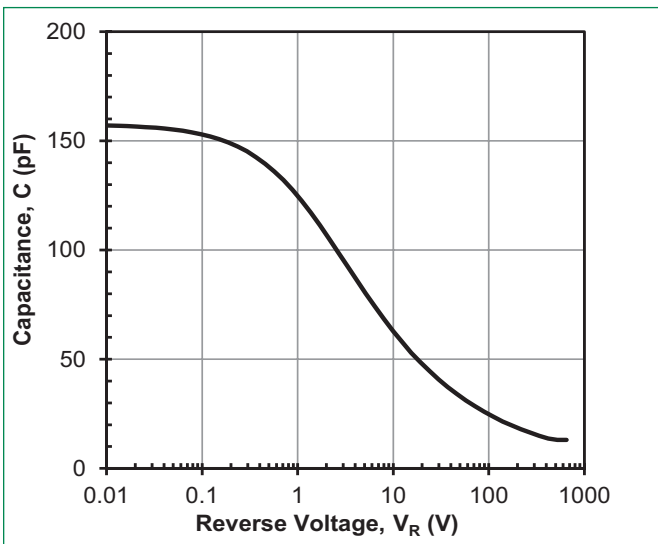
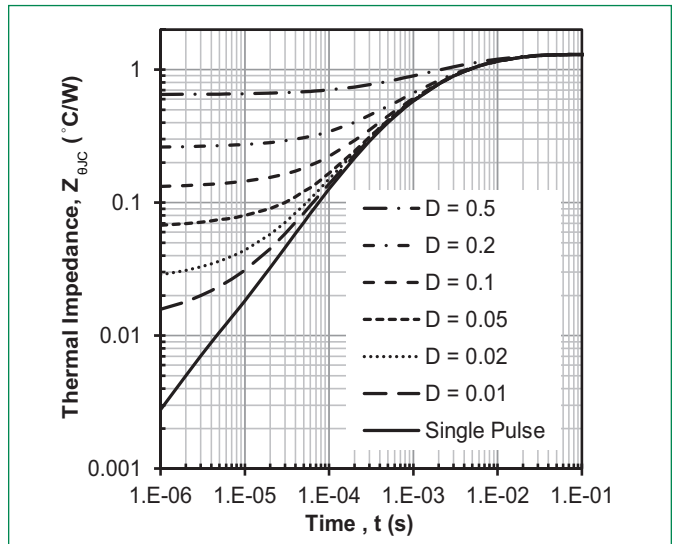
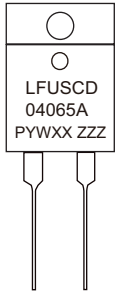


Figure 6: Maximum Transient Thermal Impedance



Part Marking System



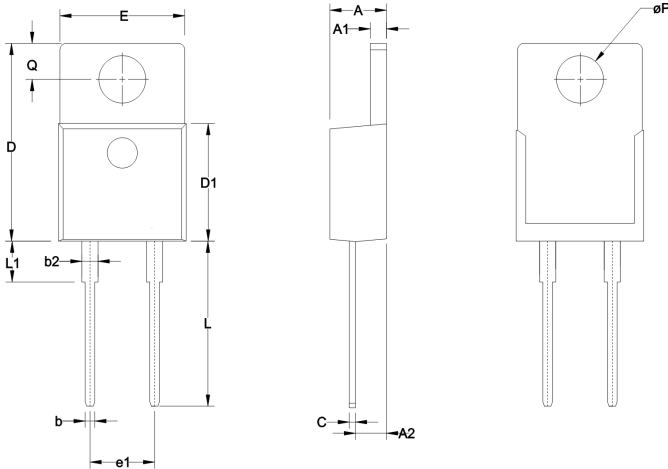
LFU = Littelfuse
 SCD = SiC diode
 04 = Current Rating(4A)
 065 = Voltage Rating (650V)
 A = TO-220-2 package
 PYWXX = Date Code
 ZZZ = Lot Number

Date code notes:
 P = assembly code
 Y = year
 W = week
 XX = sequential build number

Packing Options

| Part Number | Marking | Packing Mode | M.O.Q |
|--------------|--------------|---------------|-------|
| LFUSCD04065A | LFUSCD04065A | 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 |
| øP | 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.

