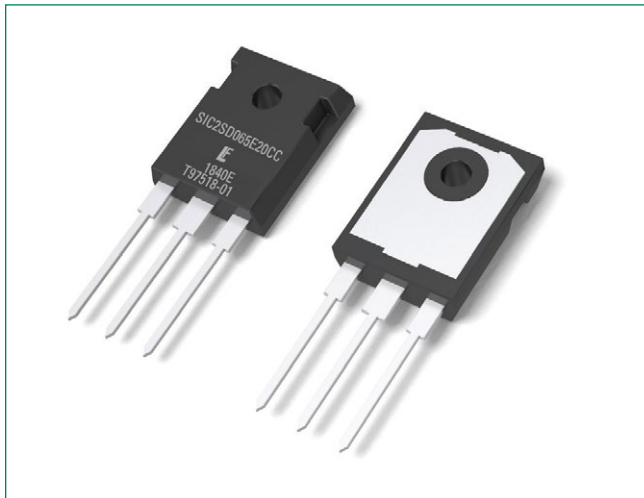


LSIC2SD065E20CCA 650 V, 20 A SiC Schottky Barrier Diode



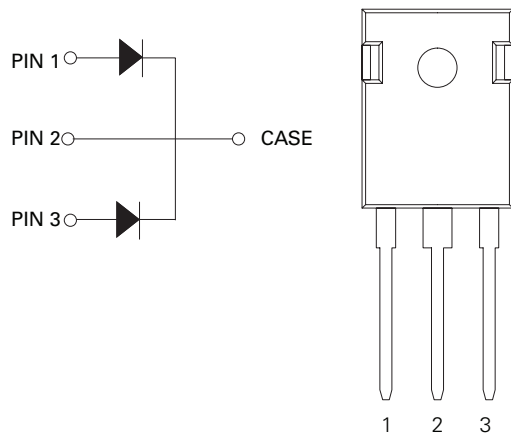
**Description**

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

**Features**

- AEC-Q101 qualified
- Positive temperature coefficient for safe operation and ease of paralleling
- 175 °C. maximum operating junction temperature
- Excellent surge capability
- Extremely fast, temperature-independent switching behavior
- Dramatically reduced switching losses compared to Si bipolar diodes

**Circuit Diagram TO-247-3L**



**Applications**

- Boost diodes in PFC or DC/DC stages
- Switch-mode power supplies
- Uninterruptible power supplies
- Solar inverters
- Industrial motor drives
- EV charging stations

**Environmental**

- Littelfuse "RoHS" logo = RoHS conform
- Littelfuse "HF" logo = **HF** Halogen Free
- Littelfuse "Pb-free" logo = Pb-free lead plating

**Maximum Ratings**

| Characteristics                                | Symbol       | Conditions                                                    | Value      | Unit |
|------------------------------------------------|--------------|---------------------------------------------------------------|------------|------|
| Repetitive Peak Reverse Voltage                | $V_{RRM}$    | -                                                             | 650        | V    |
| DC Blocking Voltage                            | $V_R$        | $T_J = 25\text{ °C}$                                          | 650        | V    |
| Continuous Forward Current (Per Leg/Component) | $I_F$        | $T_C = 25\text{ °C}$                                          | 27 / 54    | A    |
|                                                |              | $T_C = 147\text{ °C}$                                         | 10 / 20    |      |
| Non-Repetitive Forward Surge Current (Per Leg) | $I_{FSM}$    | $T_C = 25\text{ °C}$ , $t_p = 10\text{ ms}$ , Half sine pulse | 50         | A    |
| Power Dissipation (Per Leg/Component)          | $P_{Tot}$    | $T_C = 25\text{ °C}$                                          | 100 / 200  | W    |
|                                                |              | $T_C = 110\text{ °C}$                                         | 43 / 86    |      |
| Operating Junction Temperature                 | $T_J$        | -                                                             | -55 to 175 | °C   |
| Storage Temperature                            | $T_{STG}$    | -                                                             | -55 to 150 | °C   |
| Soldering Temperature                          | $T_{solder}$ | -                                                             | 260        | °C   |

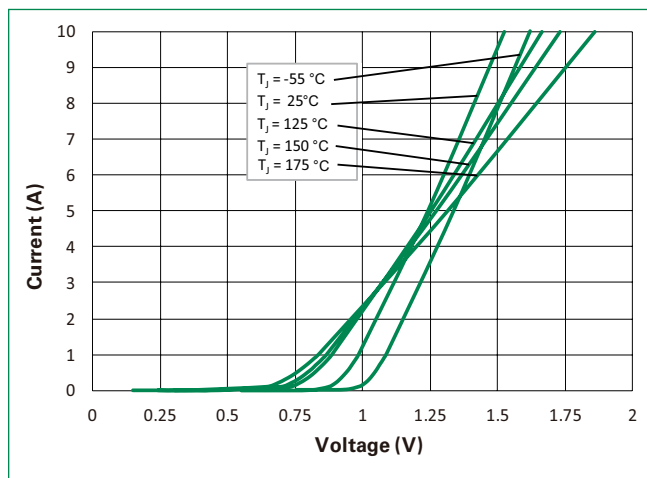
**Electrical Characteristics ( $T_J = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)**

| Characteristics         | Symbol | Conditions                                              | Value |      |      | Unit          |
|-------------------------|--------|---------------------------------------------------------|-------|------|------|---------------|
|                         |        |                                                         | Min.  | Typ. | Max. |               |
| Forward Voltage         | $V_F$  | $I_F = 10\text{ A}, T_J = 25\text{ }^{\circ}\text{C}$   | -     | 1.5  | 1.8  | V             |
|                         |        | $I_F = 10\text{ A}, T_J = 175\text{ }^{\circ}\text{C}$  | -     | 1.85 | -    |               |
| Reverse Current         | $I_R$  | $V_R = 650\text{ V}, T_J = 25\text{ }^{\circ}\text{C}$  | -     | <1   | 50   | $\mu\text{A}$ |
|                         |        | $V_R = 650\text{ V}, T_J = 175\text{ }^{\circ}\text{C}$ | -     | 25   | -    |               |
| Total Capacitance       | C      | $V_R = 1\text{ V}, f = 1\text{ MHz}$                    | -     | 470  | -    | pF            |
|                         |        | $V_R = 200\text{ V}, f = 1\text{ MHz}$                  | -     | 60   | -    |               |
|                         |        | $V_R = 400\text{ V}, f = 1\text{ MHz}$                  | -     | 43   | -    |               |
| Total Capacitive Charge | $Q_C$  | $V_R = 400\text{ V}, Q_C = \int_0^{V_R} C(V) dV$        | -     | 30   | -    | nC            |

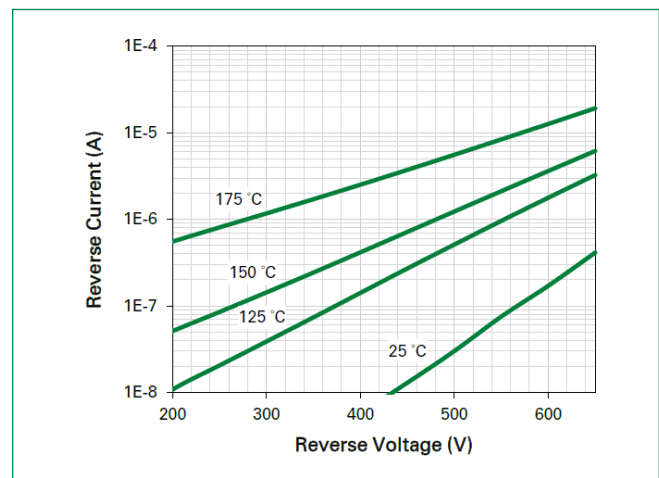
**Thermal Characteristics**

| Characteristics                        | Symbol          | Value       | Unit                 |
|----------------------------------------|-----------------|-------------|----------------------|
| Thermal Resistance (Per Leg/Component) | $R_{\theta JC}$ | 1.50 / 0.75 | $^{\circ}\text{C/W}$ |

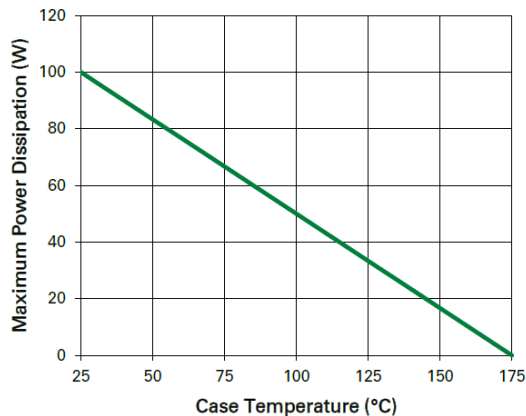
**Figure 1: Typical Forward Characteristics**



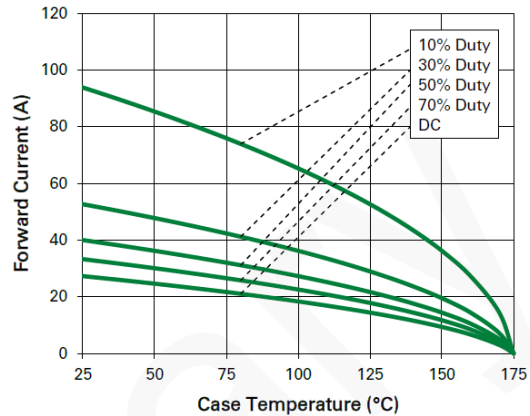
**Figure 2: Typical Reverse Characteristics**



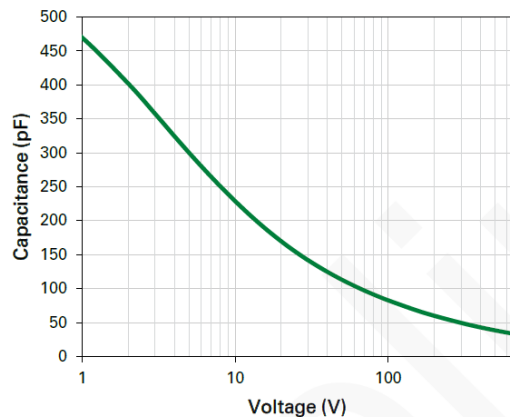
**Figure 3: Power Derating**



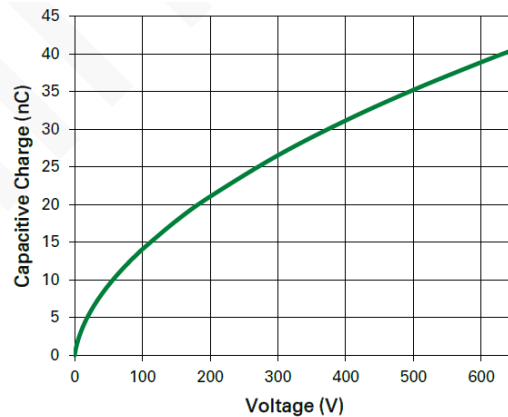
**Figure 4: Current Derating**



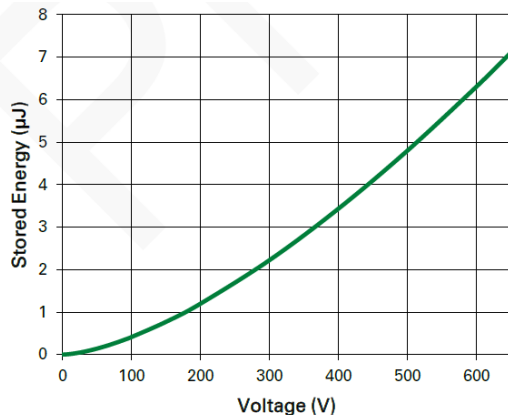
**Figure 5: Capacitance vs. Reverse Voltage**



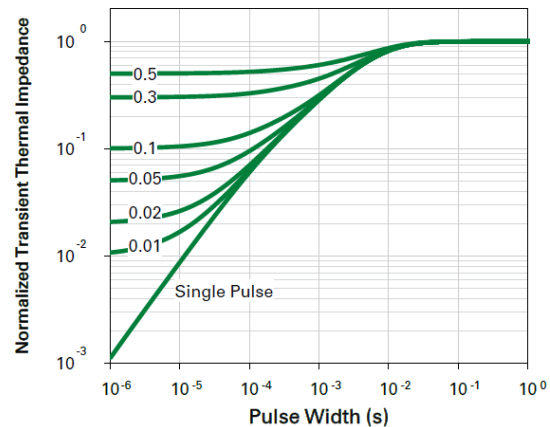
**Figure 6: Capacitive Charge vs. Reverse Voltage**



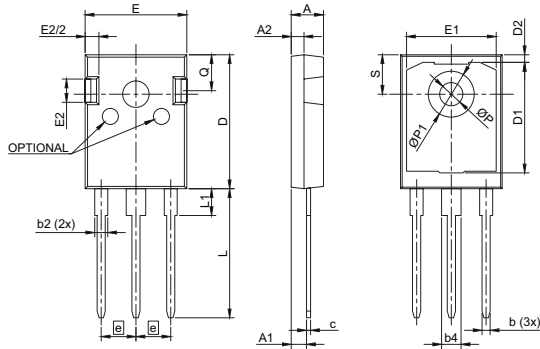
**Figure 7: Stored Energy vs. Reverse Voltage**



**Figure 8: Transient Thermal Impedance**



## Package Dimensions TO-247-3L



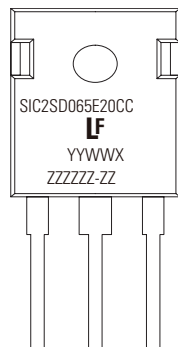
### Recommended Hole Pattern Layout



- Notes:
1. Dimensions are in millimeters
  2. Dimension D, E do not include mold flash. Mold flash shall not exceed 0.127 mm per side. These measured at the outermost extreme of plastic body.
  3.  $\phi P$  to have a maximum draft angle of 1.5° to the top of the part with a maximum hole diameter of 0.154"

| Symbol                      | Millimeters |       |       |
|-----------------------------|-------------|-------|-------|
|                             | Min         | Nom   | Max   |
| <b>A</b>                    | 4.80        | 5.03  | 5.20  |
| <b>A1</b>                   | 2.25        | 2.38  | 2.54  |
| <b>A2</b>                   | 1.85        | 1.98  | 2.11  |
| <b>b</b>                    | 0.99        | -     | 1.40  |
| <b>b2</b>                   | 1.65        | -     | 2.39  |
| <b>b4</b>                   | 2.59        | -     | 3.43  |
| <b>c</b>                    | 0.38        | 0.64  | 0.89  |
| <b>D</b>                    | 20.80       | 20.96 | 21.34 |
| <b>D1</b>                   | 13.50       | -     | -     |
| <b>D2</b>                   | 0.51        | 1.19  | 1.35  |
| <b>e</b>                    | 5.44 BSC    |       |       |
| <b>E</b>                    | 15.75       | 15.90 | 16.13 |
| <b>E1</b>                   | 13.06       | 14.02 | 14.15 |
| <b>E2</b>                   | 4.19        | 4.32  | 4.83  |
| <b>L</b>                    | 19.81       | 20.19 | 20.57 |
| <b>L1</b>                   | 3.81        | 4.19  | 4.45  |
| <b><math>\phi P</math></b>  | 3.55        | 3.61  | 3.66  |
| <b><math>\phi P1</math></b> | 7.06        | 7.19  | 7.32  |
| <b>Q</b>                    | 5.49        | 5.61  | 6.20  |
| <b>S</b>                    | 6.05        | 6.17  | 6.30  |

## Part Numbering and Marking System

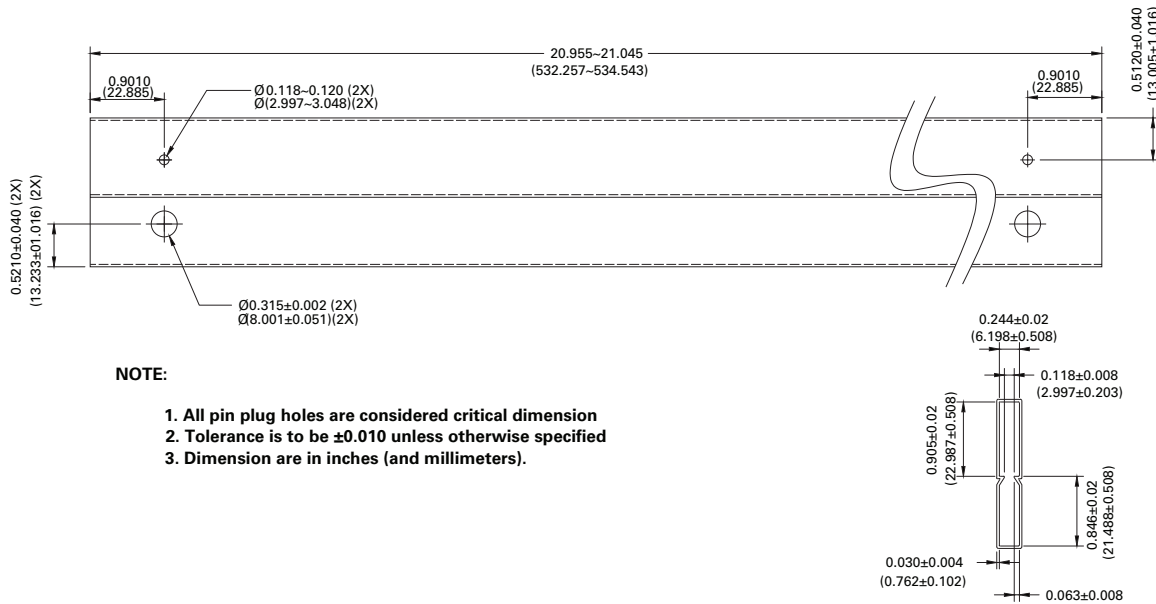


|           |                           |
|-----------|---------------------------|
| SIC       | = SiC                     |
| 2         | = Gen2                    |
| SD        | = Schottky Diode          |
| 065       | = Voltage Rating (650 V)  |
| E         | = TO-247-3L               |
| 20        | = Current Rating (20 A)   |
| CC        | = Common Cathode          |
| YY        | = Year                    |
| WW        | = Week                    |
| X         | = Trace Code (Any Letter) |
| 777777-77 | = Lot Number              |

## Packing Options

| Part Number      | Marking        | Packing Mode | M.O.Q |
|------------------|----------------|--------------|-------|
| LSIC2SD065E20CCA | SIC2SD065E20CC | Tube (30pcs) | 450   |

**Packing Specification TO-247-3L**



**NOTE:**

1. All pin plug holes are considered critical dimension
2. Tolerance is to be  $\pm 0.010$  unless otherwise specified
3. Dimension are in inches (and millimeters).

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