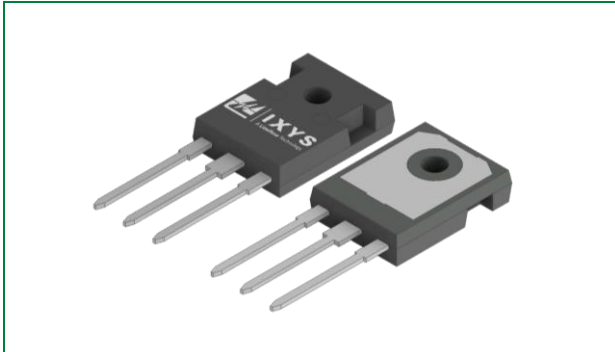


LSIC2SD120E40CCA  
1200 V, 2 x 20 A SiC Schottky Barrier Diode

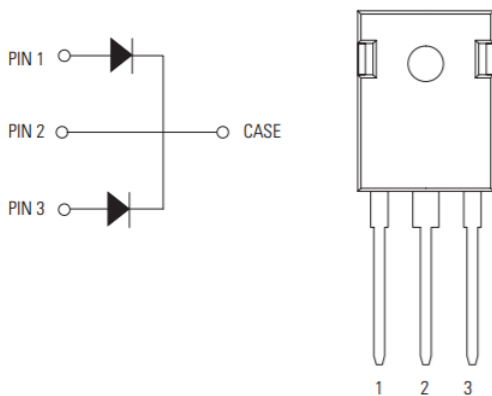


Agency Approvals and Environmental

Environmental Approvals



Pinout Diagram TO-247-3L



Product Summary

| Characteristic                             | Value | Unit |
|--|-------|------|
| $V_{RRM}$                                  | 1200  | V    |
| $I_F (T_c \leq 135\text{ }^\circ\text{C})$ | 26    | A    |
| $Q_c (V_R: 0 - 800\text{ V})$              | 125   | nC   |

Note:  $I_F$  and  $Q_c$  shown is the per leg rating

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
- RoHS compliant, lead-free, and halogen-free

Applications

- Boost diodes in PFC or DC/DC stages
- Switch-mode power supplies
- Solar inverters
- Uninterruptable power supplies
- Industrial motor drives
- Battery chargers
- High speed rectifier

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## 1. Maximum Ratings

| Characteristic  | Symbol        | Conditions  | Value      | Unit             |
|---|---------------|---|------------|------------------|
| Repetitive Peak Reverse Voltage                       | $V_{RRM}$     | -   | 1200       | V                |
| DC Blocking Voltage                                   | $V_R$         | -   | 1200       | V                |
| Continuous Forward Current<br>(Per Leg/Per Component) | $I_F$         | $T_C = 25\text{ °C}$  | 55 / 110   | A                |
|   |               | $T_C = 135\text{ °C}$   | 26 / 52    |                  |
|   |               | $T_C = 149\text{ °C}$   | 20 / 40    |                  |
| Non-repetitive Forward Surge Current (Per Leg)        | $I_{FSM}$     | $T_C = 25\text{ °C}$ , $t_p = 10\text{ ms}$ , Half sine pulse | 145        | A                |
| $I^2t$ (Per Leg)                                      | $\int I^2 dt$ | $T_C = 25\text{ °C}$ , $t_p = 10\text{ ms}$ , Half sine pulse | 105        | A <sup>2</sup> s |
| Power Dissipation (Per Leg/Per Component)             | $P_{Tot}$     | $T_C = 25\text{ °C}$  | 250 / 500  | W                |
|   |               | $T_C = 110\text{ °C}$   | 108 / 216  |                  |
| Operating Junction Temperature                        | $T_J$         | -   | -55 to 175 | °C               |
| Storage Temperature                                   | $T_{STG}$     | -   | -55 to 150 | °C               |
| Lead Temperature for Soldering                        | $T_{SOLD}$    | -   | 260        | °C               |
| Mounting Torque                                       | $M_D$         | M3 or 6-32 screw  | 1.0        | Nm               |
|   |               |   | 8.8        | In-lb            |

## 2. Thermal Characteristics

| Characteristic   | Symbol          | Value     | Unit |
|--|-----------------|-----------|------|
| Maximum Thermal Resistance, junction-to-case (Per Leg/Per Component) | $R_{thJC, max}$ | 0.6 / 0.3 | °C/W |

## 3. Electrical Characteristics (Per Leg, $T_J = 25\text{ °C}$ unless otherwise specified)

| Characteristic            | Symbol | Conditions                                    | Value |      |     | Unit |
|---------------------------|--------|---|-------|------|-----|------|
|                           |        |   | Min   | Typ  | Max |      |
| Forward Voltage           | $V_F$  | $I_F = 20\text{ A}$ , $T_J = 25\text{ °C}$    | -     | 1.5  | 1.8 | V    |
|                           |        | $I_F = 20\text{ A}$ , $T_J = 175\text{ °C}$   | -     | 2.1  | -   |      |
| Reverse Current           | $I_R$  | $V_R = 1200\text{ V}$ , $T_J = 25\text{ °C}$  | -     | <1.0 | 100 | μA   |
|                           |        | $V_R = 1200\text{ V}$ , $T_J = 175\text{ °C}$ | -     | 8    | -   |      |
| Total Capacitance         | C      | $V_R = 1\text{ V}$ , $f = 1\text{ MHz}$       | -     | 1310 | -   | pF   |
|                           |        | $V_R = 400\text{ V}$ , $f = 1\text{ MHz}$     | -     | 120  | -   |      |
|                           |        | $V_R = 800\text{ V}$ , $f = 1\text{ MHz}$     | -     | 86   | -   |      |
| Total Capacitive Charge   | $Q_C$  | $V_R = 800\text{ V}$ , $Q_C = \int C(V) dV$   | -     | 125  | -   | nC   |
| Capacitance Stored Energy | $E_C$  | $V_R = 800\text{ V}$                          | -     | 28   | -   | μJ   |

4. Performance Curves

Figure 1. Typical Forward Characteristics (Per Leg)

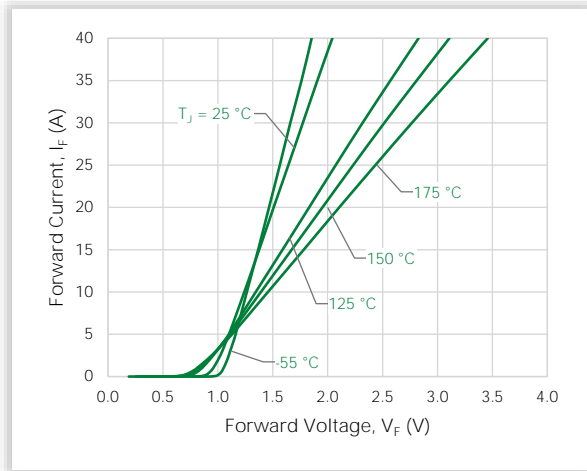


Figure 2. Typical Reverse Characteristics (Per Leg)

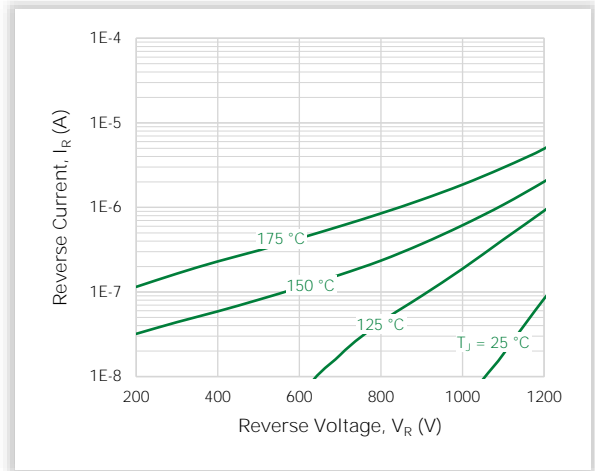


Figure 3. Power Derating (Per Leg)

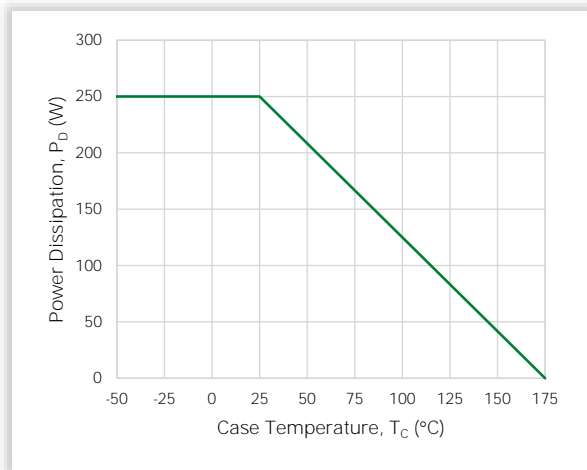


Figure 4. Current Derating (Per Leg)

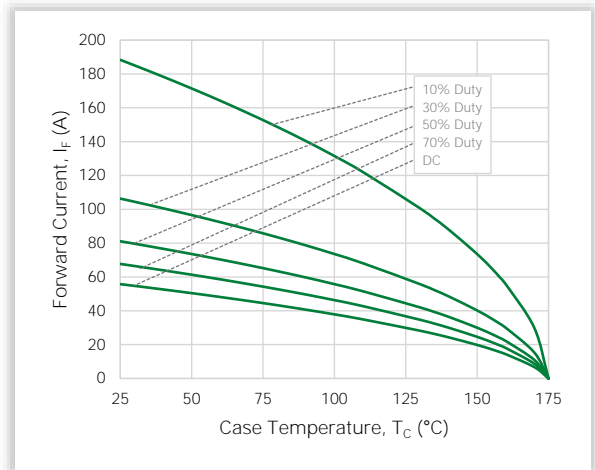


Figure 5. Capacitance vs. Reverse Voltage (Per Leg)

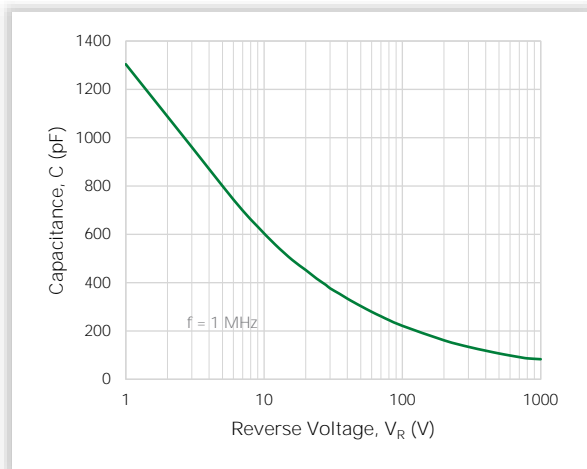


Figure 6. Capacitive Charge vs. Reverse Voltage (Per Leg)

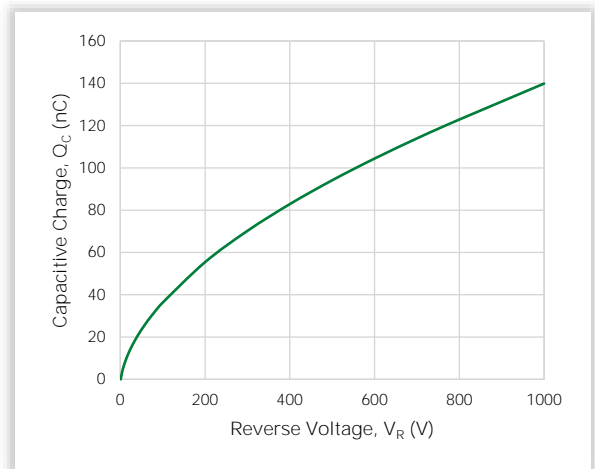


Figure 7. Stored Energy vs. Reverse Voltage (Per Leg)

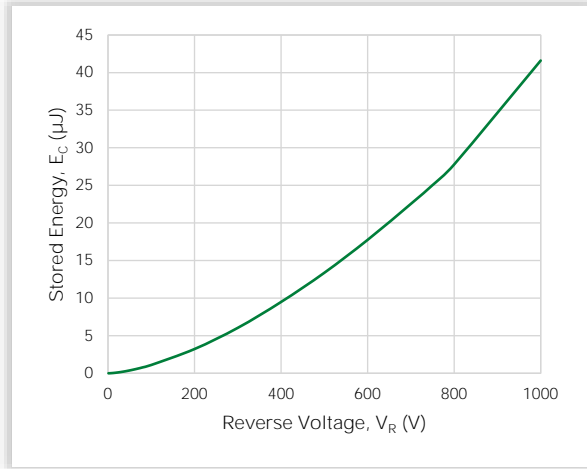
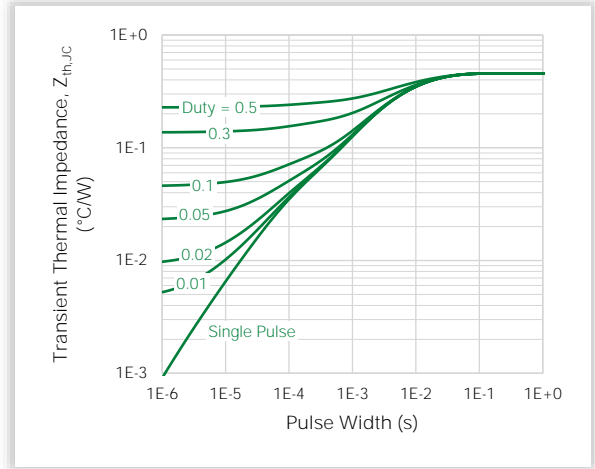
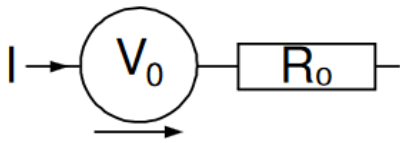


Figure 8. Transient Thermal Impedance (Per Leg)



### 5. Diode V<sub>F</sub> Model for Simulation



$$V_F(T_J) = V_0 + IR_0$$

$$V_0 = -1.30 \times 10^{-3} \cdot T_J + 1.01 \times 10^0$$

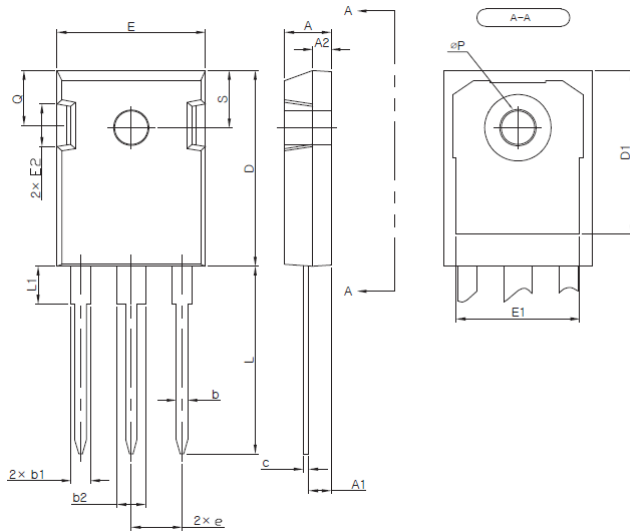
$$R_0 = 8.15 \times 10^{-7} \cdot T_J^2 + 1.03 \times 10^{-4} \cdot T_J + 2.36 \times 10^{-2}$$

Notes:

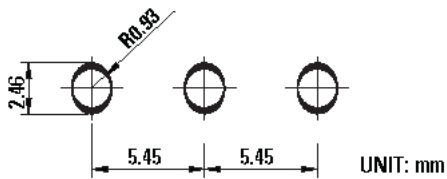
- T<sub>J</sub> is junction temperature in °C
- Range valid from 25 °C to 175 °C
- Model represents performance of a typical part per leg

### 6. Package Dimensions

TO-247-3L Package



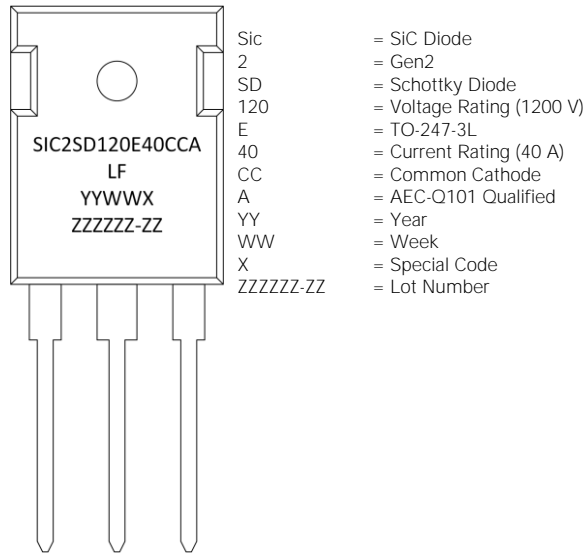
Recommended Hole Pattern Layout



| Symbol | Millimeters |       |       |
|--------|-------------|-------|-------|
|        | Min         | Nom   | Max   |
| A      | 4.80        | 5.00  | 5.20  |
| A1     | 2.29        | 2.41  | 2.54  |
| A2     | 1.90        | 2.00  | 2.10  |
| b      | 1.10        | 1.20  | 1.30  |
| b1     | 1.91        | 2.10  | 2.20  |
| b2     | 2.92        | 3.10  | 3.20  |
| c      | 0.50        | 0.60  | 0.70  |
| D      | 20.80       | 21.07 | 21.34 |
| D1     | 17.43       | 17.63 | 17.83 |
| E      | 15.75       | 15.94 | 16.13 |
| E1     | 13.06       | 13.26 | 13.46 |
| E2     | 4.32        | 4.58  | 4.83  |
| e      | 5.45 BSC    |       |       |
| L      | 19.81       | 20.19 | 20.57 |
| L1     | 3.81        | 4.07  | 4.32  |
| øP     | 3.55        | 3.60  | 3.65  |
| Q      | 5.59        | 5.90  | 6.20  |
| S      | 6.15 BSC    |       |       |

Note: These dimensions do not include mold protrusions

### 7. Part Numbering and Marking

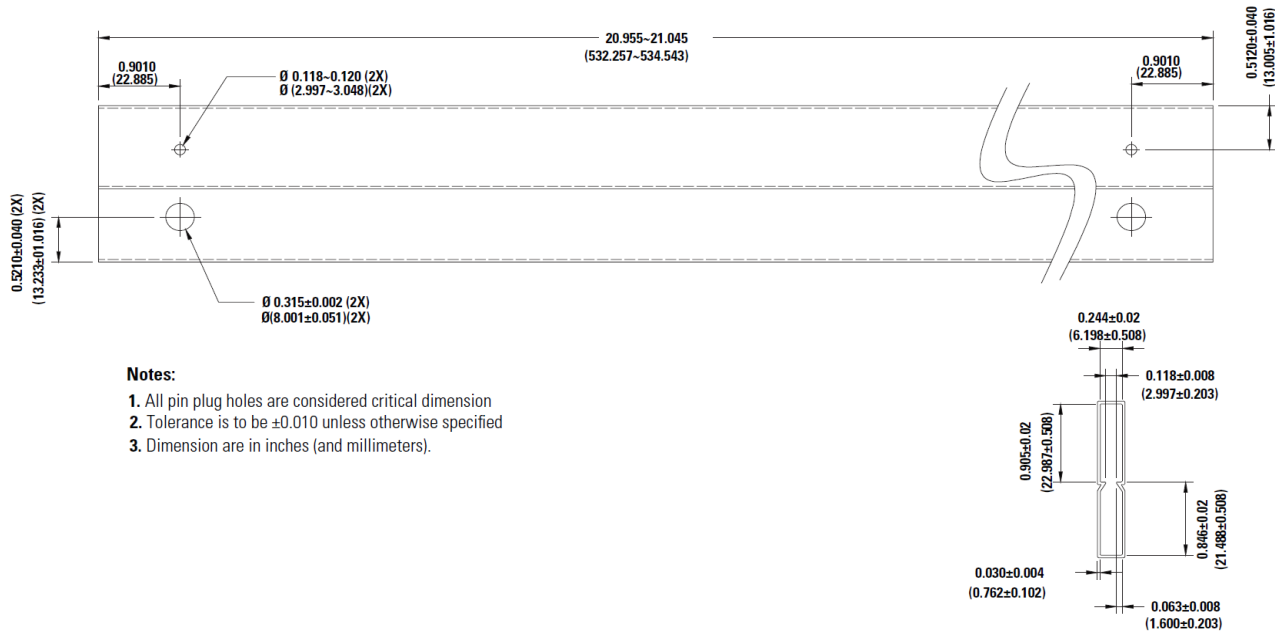


### 8. Packing Options

| Part Number      | Marking         | Packing Mode  | M.O.Q. |
|------------------|-----------------|---------------|--------|
| LSIC2SD120E40CCA | SIC2SD120E40CCA | Tube (30 pcs) | 450    |

### 9. Packing Specifications

Tube for TO-247-3L



- Notes:**
1. All pin plug holes are considered critical dimension
  2. Tolerance is to be ±0.010 unless otherwise specified
  3. Dimension are in inches (and millimeters).

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