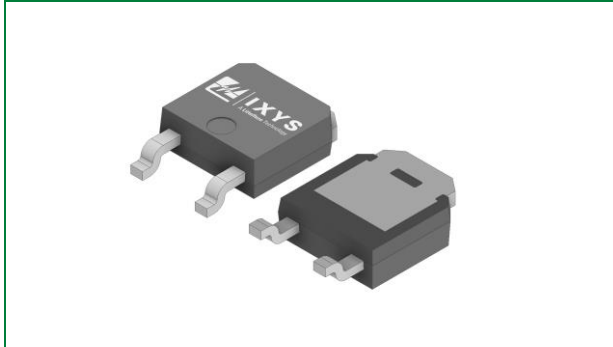


LSIC2SD120C05A 1200 V, 5 A SiC Schottky Barrier Diode

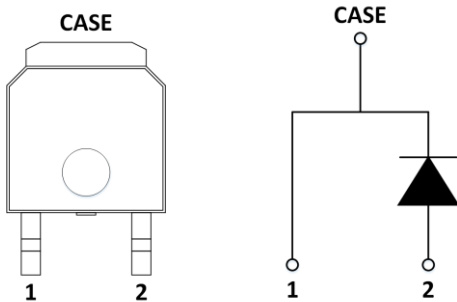


Agency Approvals and Environmental

Environmental Approvals



Pinout Diagram



Product Summary

| Characteristic | Value | Unit |
|------------------------------------|-------|------|
| V_{RRM} | 1200 | V |
| $I_F (T_C \leq 135^\circ\text{C})$ | 8.7 | A |
| $Q_C (V_R: 0-800\text{ V})$ | 31 | nC |

Features

- AEC-Q101 Qualified
- MSL 1 Rated
- 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 | I_F | $T_C = 25\text{ °C}$ | 18.0 | A |
| | | $T_C = 135\text{ °C}$ | 8.7 | |
| | | $T_C = 159\text{ °C}$ | 5 | |
| Non-repetitive Forward Surge Current | I_{FSM} | $T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$, Half sine pulse | 40 | A |
| I^2t | $\int I^2 dt$ | $T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$, Half sine pulse | 8 | A ² s |
| Power Dissipation | P_{Tot} | $T_C = 25\text{ °C}$ | 100 | W |
| | | $T_C = 110\text{ °C}$ | 43 | |
| Operating Junction Temperature | T_J | - | -55 to 175 | °C |
| Storage Temperature | T_{STG} | - | -55 to 150 | °C |
| Lead Temperature for Soldering (MSL 1 Rated) | T_{SOLD} | - | 260 | °C |

2. Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|----------------|-------|------|
| Maximum Thermal Resistance, junction-to-case | $R_{thJC,MAX}$ | 1.5 | °C/W |

3. Electrical Characteristics

| Characteristic | Symbol | Conditions | Value | | | Unit |
|--------------------------|--------|---|-------|-----|-----|------|
| | | | Min | Typ | Max | |
| Forward Voltage | V_F | $I_F = 5\text{ A}$, $T_J = 25\text{ °C}$ | - | 1.5 | 1.8 | V |
| | | $I_F = 5\text{ A}$, $T_J = 175\text{ °C}$ | - | 2.1 | - | |
| Reverse Current | I_R | $V_R = 1200\text{ V}$, $T_J = 25\text{ °C}$ | - | <1 | 100 | μA |
| | | $V_R = 1200\text{ V}$, $T_J = 175\text{ °C}$ | - | 2 | - | |
| Total Capacitance | C | $V_R = 1\text{ V}$, $f = 1\text{ MHz}$ | - | 310 | - | pF |
| | | $V_R = 400\text{ V}$, $f = 1\text{ MHz}$ | - | 29 | - | |
| | | $V_R = 800\text{ V}$, $f = 1\text{ MHz}$ | - | 22 | - | |
| Total Capacitive Charge | Q_C | $V_R = 800\text{ V}$, $Q_C = \int Q(V) dV$ | - | 31 | - | nC |
| Capacitive Stored Energy | E_C | $V_R = 800\text{ V}$ | - | 6.9 | - | μJ |

4. Performance Curves

Figure 1. Typical Forward Characteristics

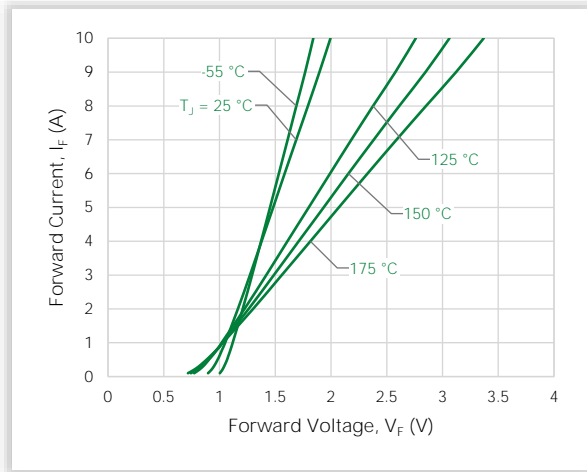


Figure 2. Typical Reverse Characteristics

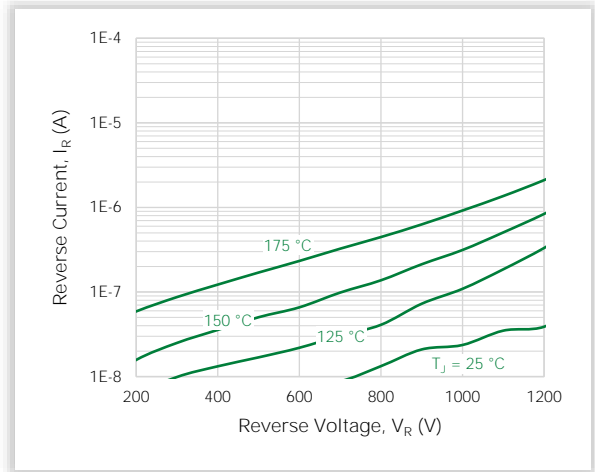


Figure 3. Power Derating

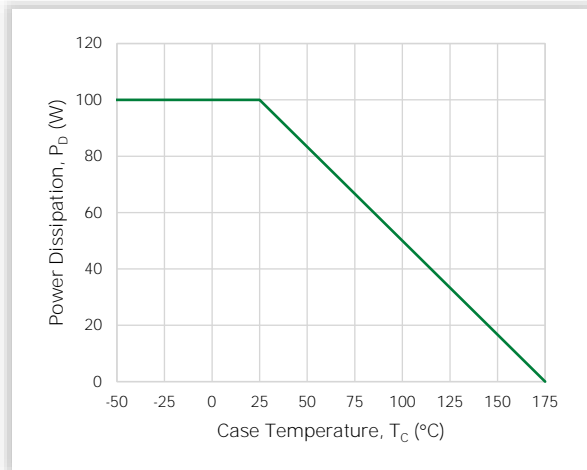


Figure 4. Current Derating

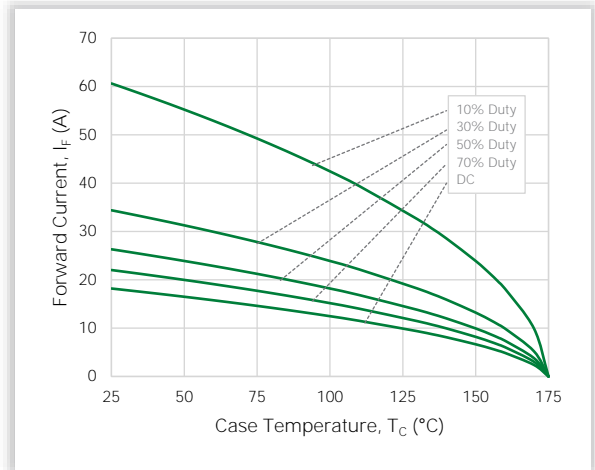


Figure 5. Capacitance vs. Reverse Voltage

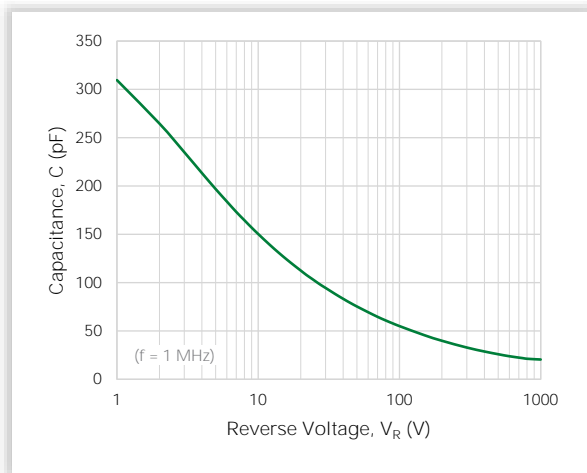


Figure 6. Capacitive Charge vs. Reverse Voltage

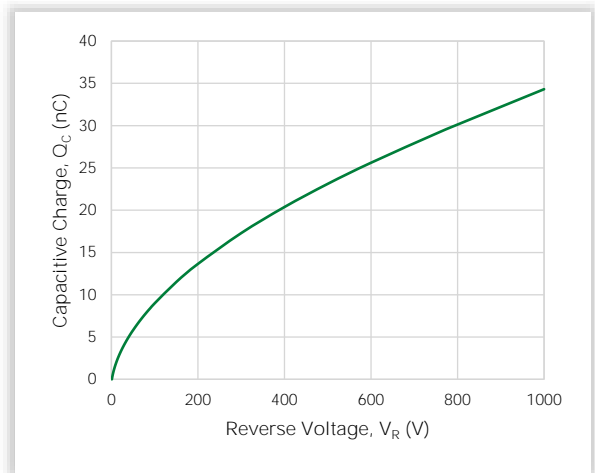


Figure 7. Stored Energy vs. Reverse Voltage

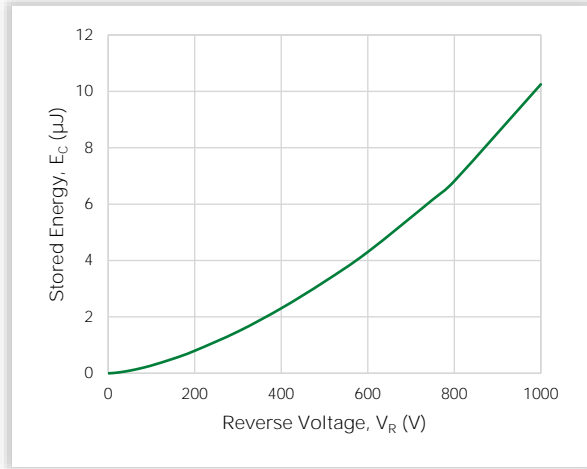
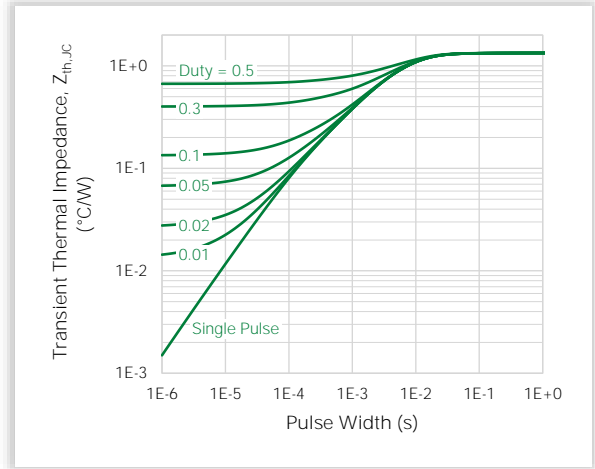
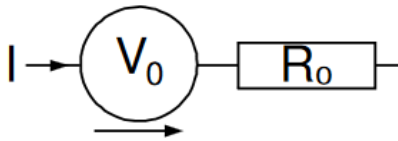


Figure 8. Transient Thermal Impedance



5. V_F Model for Simulation



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

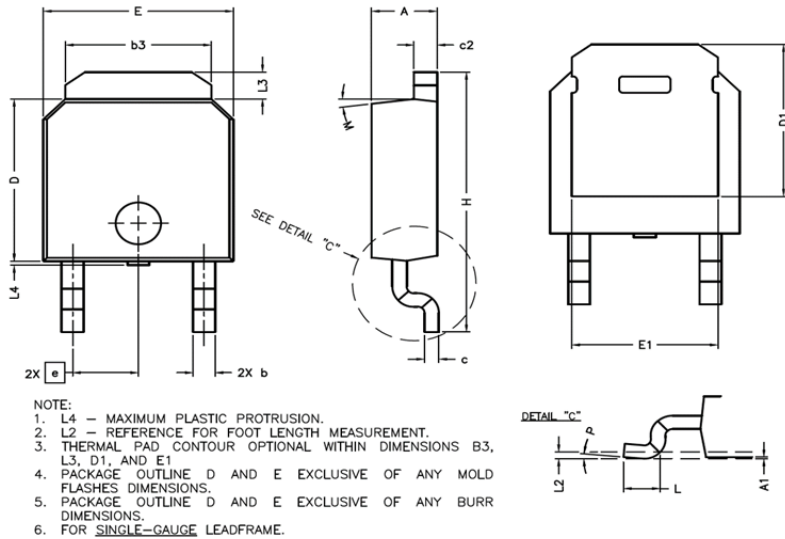
$$V_0 = -1.24 \times 10^{-3} \cdot T_J + 9.94 \times 10^{-1}$$

$$R_0 = 2.92 \times 10^{-6} \cdot T_J^2 + 4.58 \times 10^{-4} \cdot T_J + 9.01 \times 10^{-2}$$

Notes:

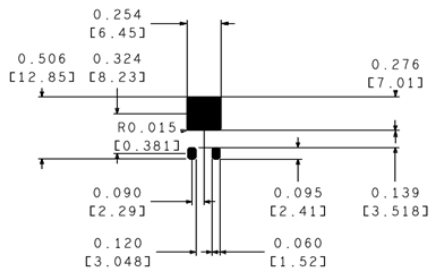
- T_J is junction temperature in °C
- Range valid from 25 °C to 175 °C
- Model represents performance of a typical part

6. Package Dimensions



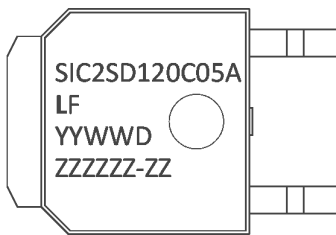
| Symbol | Millimeters | |
|--------|-------------|--------|
| | Min | Max |
| A | 2.159 | 2.413 |
| A1 | - | 0.127 |
| b | 0.635 | 1.067 |
| b3 | 4.953 | 5.461 |
| c | 0.457 | 0.610 |
| c2 | - | 0.889 |
| (c2) | 0.457 | 0.610 |
| D | 5.969 | 6.223 |
| D1 | 5.207 | 5.715 |
| E | 6.350 | 6.731 |
| E1 | 4.318 | 5.207 |
| e | 2.29 REF. | |
| H | 9.398 | 10.414 |
| L | 1.016 | 1.778 |
| L2 | 0.25 REF. | |
| L3 | 0.889 | 1.270 |
| L4 | 0.000 | 0.152 |
| M | 15° | |
| P | - | 5° |

Recommended Solder Pad Layout



UNIT: Inch [mm]

7. Part Numbering and Marking



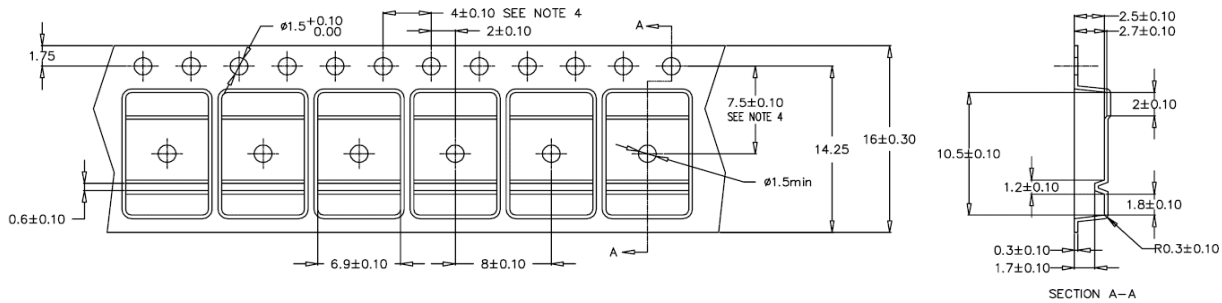
- SIC = SiC
- 2 = Gen 2
- SD = Schottky Barrier Diode
- 120 = Voltage Rating (1200 V)
- C = Package (TO-252-2L)
- 05 = Current Rating (5 A)
- A = AEC-Q101 qualified
- YY = Year
- WW = Week
- D = Special Code
- ZZZZZZ-ZZ = Lot Number

8. Packing Options

| Part Number | Marking | Packing Mode | M.O.Q. |
|----------------|---------------|--------------|--------|
| LSIC2SD120C05A | SIC2SD120C05A | Tape & Reel | 2500 |

9. Packing Specifications

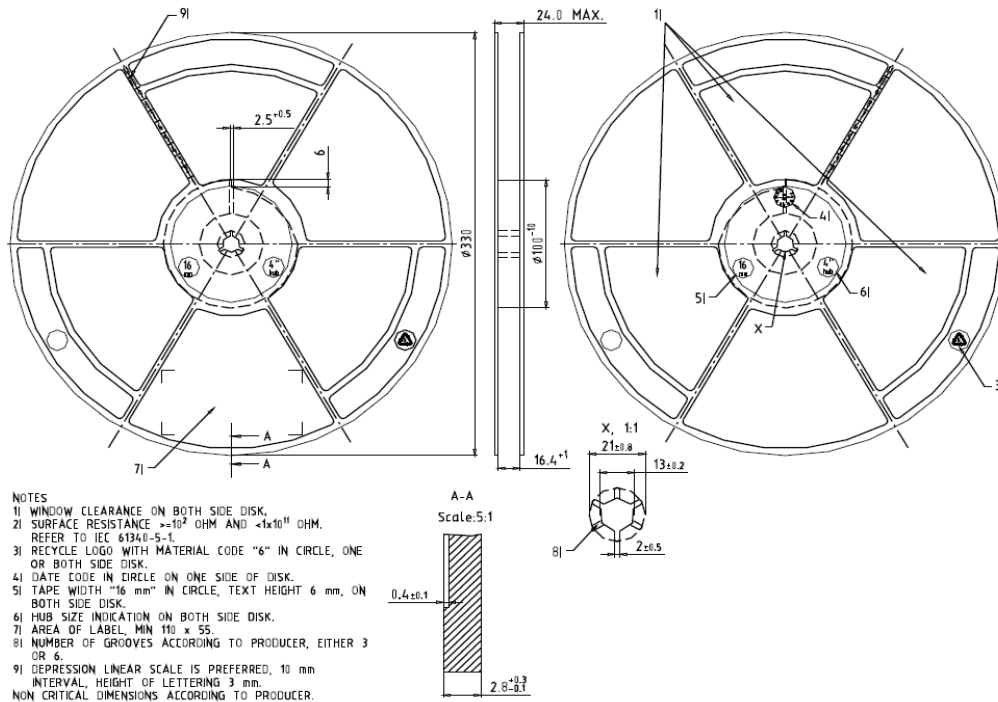
TO-252 Carrier Tape & Reel Specifications



1. Material: Black Conductive Polyesterene
2. 10 sprocket hole pitch cumulative tolerance ± 0.20
3. Camber not to exceed 1 mm in 100 mm.
4. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
5. Device orientation: TRL (leads perpendicular to the sprocket)
6. General tolerance is ± 0.10 mm unless otherwise specified.

COVER TAPE SPECS:

- Width : 13.5 mm
- Base Material : less than 1.2×10^{10} ohms/square
Transparent polyester, static dissipative
- Adhesive Layer : Polyethylene
- Total Thickness : 60 Micron
- Tensile Strength : 4-6 kg/mm²
- Elongation : 91%
- Tearing Strength : 11 kg/mm²
- Shelf life : 2 years



- NOTES**
- 1) WINDOW CLEARANCE ON BOTH SIDE DISK.
 - 2) SURFACE RESISTANCE $\leq 10^2$ OHM AND $\leq 1 \times 10^{11}$ OHM. REFER TO IEC 61340-5-1.
 - 3) RECYCLE LOGO WITH MATERIAL CODE "6" IN CIRCLE, ONE OR BOTH SIDE DISK.
 - 4) DATE CODE IN CIRCLE ON ONE SIDE OF DISK.
 - 5) TAPE WIDTH "16 mm" IN CIRCLE, TEXT HEIGHT 6 mm, ON BOTH SIDE DISK.
 - 6) HUB SIZE INDICATION ON BOTH SIDE DISK.
 - 7) AREA OF LABEL, MIN 110 x 55.
 - 8) NUMBER OF GROOVES ACCORDING TO PRODUCER, EITHER 3 OR 6.
 - 9) DEPRESSION LINEAR SCALE IS PREFERRED, 10 mm INTERVAL, HEIGHT OF LETTERING 3 mm. NON CRITICAL DIMENSIONS ACCORDING TO PRODUCER.

For additional information please visit www.Littelfuse.com/powersemi

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