

SOT-227 Silicon Carbide Schottky Barrier Diode, 650 V, 120 A




SOT-227



RoHS
COMPLIANT

FEATURES

- Virtually no recovery tail and no switching losses
- Majority carrier diode using Schottky technology on SiC wide band gap material
- Improved V_F and efficiency by thin wafer technology
- High speed switching, low switching losses
- Positive temperature coefficient, for easy paralleling
- Electrically isolated base plate
- Large creepage distance between terminal
- Simplified mechanical designs, rapid assembly
- Designed and qualified for industrial level
- UL approved file E78996 
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION / APPLICATIONS

Wide band gap SiC based 650 V Schottky diode, designed for high performance and ruggedness.

Optimum choice for high speed hard switching and efficient operation over a wide temperature range, it is also recommended for all applications suffering from Silicon ultrafast recovery behavior.

Typical applications include AC/DC PFC and DC/DC ultra high frequency output rectification in FBPS and LLC converters

| PRIMARY CHARACTERISTICS | |
|---|---------------------------------------|
| V_R | 650 V |
| V_F (typical) at 60 A, per diode | 1.39 V |
| Q_C (typical), per diode | 164 nC |
| $I_{F(DC)}$ per module at $T_C = 127^\circ\text{C}$ | 120 A |
| Type | Modules - diode, SiC Schottky |
| Package | SOT-227 |
| Circuit configuration | Two separate diodes, parallel pin-out |

| ABSOLUTE MAXIMUM RATINGS | | | | |
|--|----------------|--|-------------|------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MAX. | UNITS |
| Cathode to anode voltage | V_R | | 650 | V |
| Continuous forward current per diode | I_F | $T_C = 127^\circ\text{C}$ | 60 | A |
| Single pulse forward current per diode | I_{FSM} | $T_J = 25^\circ\text{C}$, 6 ms square pulse | 340 | |
| Maximum power dissipation per module | P_D | $T_C = 127^\circ\text{C}$ | 228 | W |
| RMS isolation voltage | V_{ISOL} | Any terminal to case, $t = 1$ min | 2500 | V |
| Operating junction and storage temperature range | T_J, T_{Stg} | | -55 to +175 | $^\circ\text{C}$ |

| ELECTRICAL SPECIFICATIONS ($T_J = 25^\circ\text{C}$ unless otherwise specified) | | | | | | |
|--|----------|--|------|------|------|---------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
| Cathode to anode breakdown voltage | V_{BR} | $I_R = 300\ \mu\text{A}$ | 650 | - | - | V |
| Forward voltage | V_{FM} | $I_F = 60\ \text{A}$ | - | 1.39 | 1.59 | |
| | | $I_F = 60\ \text{A}, T_J = 150^\circ\text{C}$ | - | 1.61 | - | |
| Reverse leakage current | I_{RM} | $V_R = 650\ \text{V}$ | - | 2.6 | 120 | μA |
| | | $T_J = 125^\circ\text{C}, V_R = 650\ \text{V}$ | - | 9.2 | - | |
| | | $T_J = 150^\circ\text{C}, V_R = 650\ \text{V}$ | - | 13.1 | - | |
| Junction capacitance | C_T | $V_R = 650\ \text{V}, f = 1\ \text{MHz}$ | - | 240 | - | pF |

**DYNAMIC RECOVERY CHARACTERISTICS** ($T_J = 25^\circ\text{C}$ unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|-------------------------|--------|----------------------|------|------|------|-------|
| Total capacitive charge | Q_C | $V_R = 400\text{ V}$ | - | 164 | - | nC |

THERMAL - MECHANICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|---|------------|-----------------------|---------|------|------------|--------------------|
| Thermal resistance junction to case, per diode | R_{thJC} | | - | - | 0.42 | $^\circ\text{C/W}$ |
| Thermal resistance junction to case, per module | | | - | - | 0.21 | |
| Thermal resistance case to heatsink, per module | R_{thCS} | Flat, greased surface | - | 0.05 | - | |
| Weight | | | - | 30 | - | g |
| Mounting torque | | Torque per diode | - | - | 1.1 (9.7) | Nm (lbf.in) |
| | | Torque to heatsink | - | - | 1.8 (15.9) | Nm (lbf.in) |
| Case style | | | SOT-227 | | | |

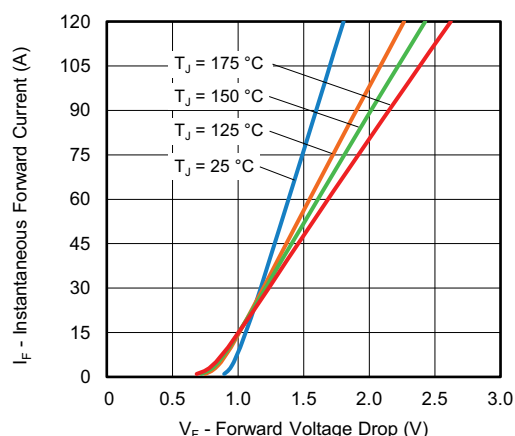


Fig. 1 - Instantaneous Forward Current vs. Forward Voltage Drop Characteristics

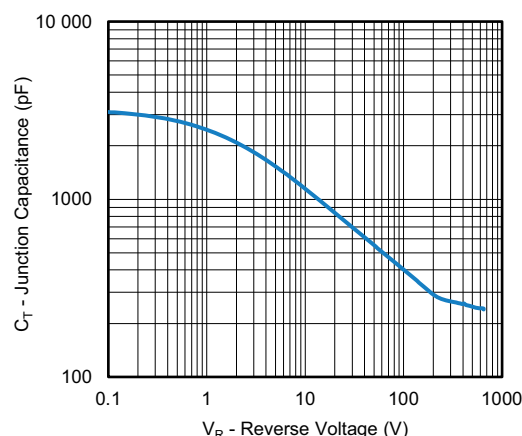


Fig. 3 - Junction Capacitance vs. Reverse Voltage

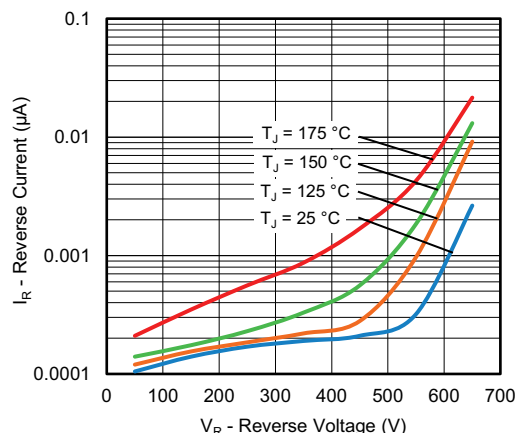


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

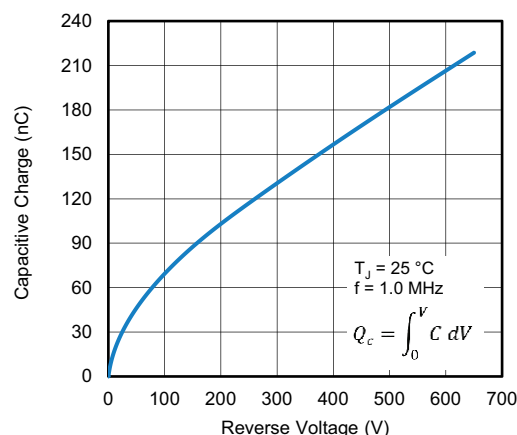


Fig. 4 - Typical Capacitive Charge vs. Reverse Voltage

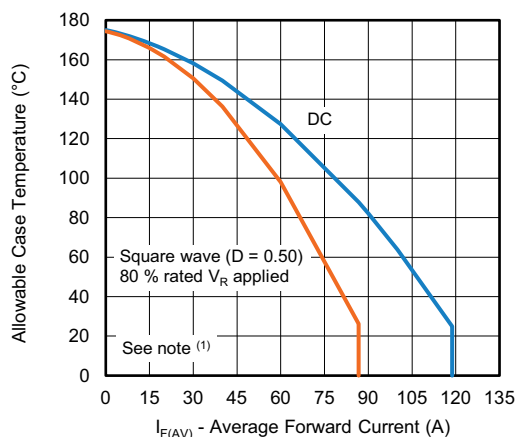


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

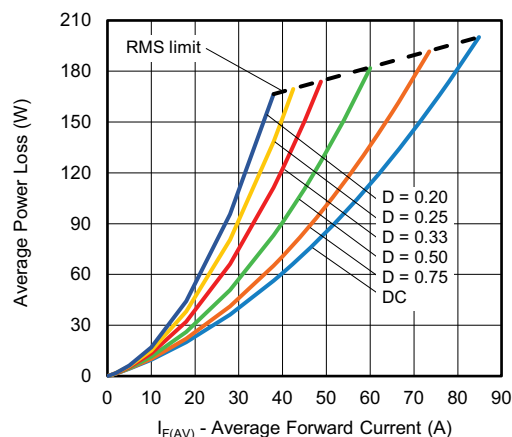


Fig. 6 - Forward Power Loss Characteristics

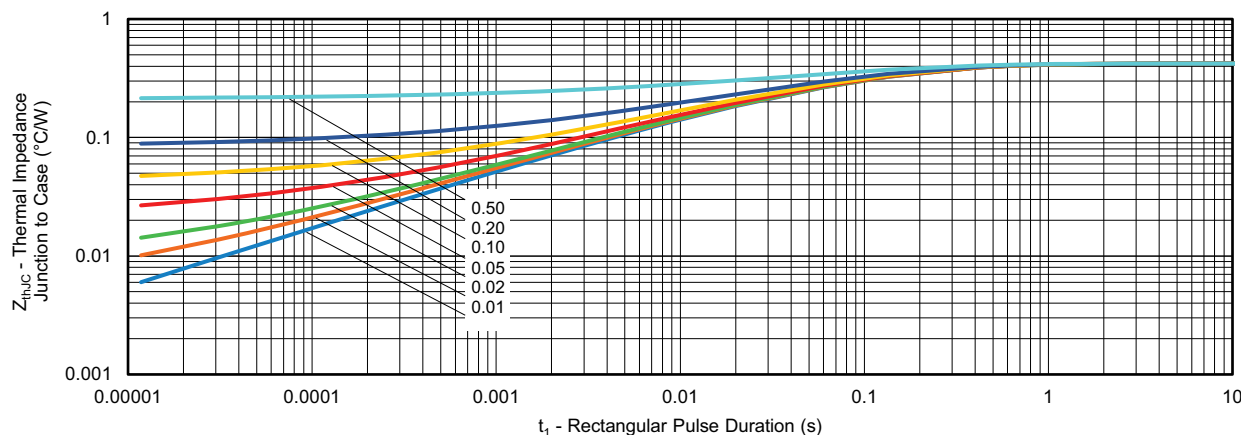


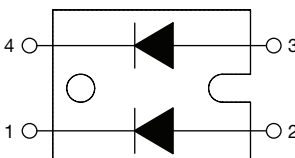
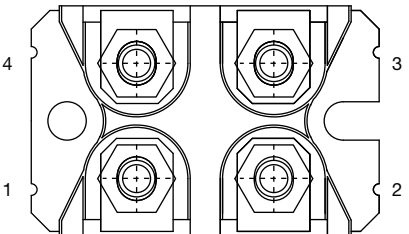
Fig. 7 - Maximum Thermal Impedance Characteristics

ORDERING INFORMATION TABLE

| Device code | VS- | SC | 120 | F | A | 65 |
|-------------|-----|----|-----|---|---|----|
| | 1 | 2 | 3 | 4 | 5 | 6 |

- 1** - Vishay Semiconductors product
- 2** - SC = SiC Schottky Barrier Diode
- 3** - Current rating per module (120 = 120 A)
- 4** - F = circuit configuration (two separate diodes, parallel pin-out)
- 5** - Package indicator (SOT-227 standard insulated base)
- 6** - Voltage rating (65 = 650 V)



| CIRCUIT CONFIGURATION | | |
|---------------------------------------|----------------------------|---|
| CIRCUIT | CIRCUIT CONFIGURATION CODE | CIRCUIT DRAWING |
| Two separate diodes, parallel pin-out | F | <div><div></div><div><p>Lead Assignment</p></div></div> |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95423 |
| Packaging information | www.vishay.com/doc?95425 |

SOT-227 Generation 2

DIMENSIONS in millimeters (inches)



Note

- Controlling dimension: millimeter



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