

High Performance Schottky Rectifier, 200 A


TO-244

FEATURES

- 175 °C T_J operation
- Center tap module
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

| PRIMARY CHARACTERISTICS | |
|-------------------------|---------------------------|
| I _{F(AV)} | 200 A |
| V _R | 50 V |
| Package | TO-244 |
| Circuit configuration | Two diodes common cathode |

DESCRIPTION / APPLICATIONS

The VS-201CNQ050PbF center tap Schottky rectifier module has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature. Typical applications are in high current switching power supplies, converters, freewheeling diodes, welding, and reverse battery protection.

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|-----------------------------------|---|-------------|-------|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| I _{F(AV)} | Rectangular waveform | 200 | A |
| V _{RRM} | | 50 | V |
| I _{FSM} | t _p = 5 μs sine | 16 000 | A |
| V _F | 100 A _{pk} , T _J = 125 °C (per leg) | 0.58 | V |
| T _J | Range | -55 to +175 | °C |

| VOLTAGE RATINGS | | | |
|--------------------------------------|------------------|--------------|-------|
| PARAMETER | SYMBOL | 201CNQ050PbF | UNITS |
| Maximum DC reverse voltage | V _R | 50 | V |
| Maximum working peak reverse voltage | V _{RWM} | | |

| ABSOLUTE MAXIMUM RATINGS | | | | |
|---|--------------------|--|--|--------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum average forward current See fig. 5 | I _{F(AV)} | 50 % duty cycle at T _C = 146 °C, rectangular waveform | 200 | A |
| | | | 100 | |
| Maximum peak one cycle non-repetitive surge current per leg See fig. 7 | I _{FSM} | 5 μs sine or 3 μs rect. pulse | Following any rated load condition and with rated V _{RRM} applied | 16 000 |
| | | 10 ms sine or 6 ms rect. pulse | | 2000 |
| Non-repetitive avalanche energy per leg | E _{AS} | T _J = 25 °C, I _{AS} = 17 A, L = 1 mH | 145 | mJ |
| Repetitive avalanche current per leg | I _{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T _J maximum V _A = 1.5 x V _R typical | 20 | A |



| ELECTRICAL SPECIFICATIONS | | | | | |
|---|----------------|---|-----------------------------------|--------|------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum forward voltage drop per leg See fig. 1 | $V_{FM}^{(1)}$ | 100 A | $T_J = 25\text{ }^\circ\text{C}$ | 0.67 | V |
| | | 200 A | | 0.81 | |
| | | 100 A | $T_J = 125\text{ }^\circ\text{C}$ | 0.58 | |
| | | 200 A | | 0.71 | |
| Maximum reverse leakage current per leg See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | 10 | mA |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 90 | |
| Maximum junction capacitance per leg | C_T | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C | | 5200 | pF |
| Typical series inductance per leg | L_S | From top of terminal hole to mounting plane | | 7.0 | nH |
| Maximum voltage rate of change | dV/dt | Rated V_R | | 10 000 | V/ μ s |

Note(1) Pulse width < 300 μ s, duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS | | | | | |
|---|----------------|----------|------|----------|---------------------|
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNITS |
| Maximum junction and storage temperature range | T_J, T_{Stg} | - 55 | - | 175 | $^\circ\text{C}$ |
| Thermal resistance, junction to case per leg per module | R_{thJC} | - | - | 0.38 | $^\circ\text{C/W}$ |
| | | - | - | 0.19 | |
| Thermal resistance, case to heatsink | R_{thCS} | - | 0.10 | - | |
| Weight | | - | 68 | - | g |
| | | | 2.4 | | oz. |
| Mounting torque | | 35.4 (4) | - | 53.1 (6) | lbf · in (N · m) |
| Mounting torque center hole | | 30 (3.4) | - | 40 (4.6) | |
| Terminal torque | | 30 (3.4) | - | 44.2 (5) | |
| Vertical pull | | - | - | 80 | lbf · in |
| 2" lever pull | | - | - | 35 | |

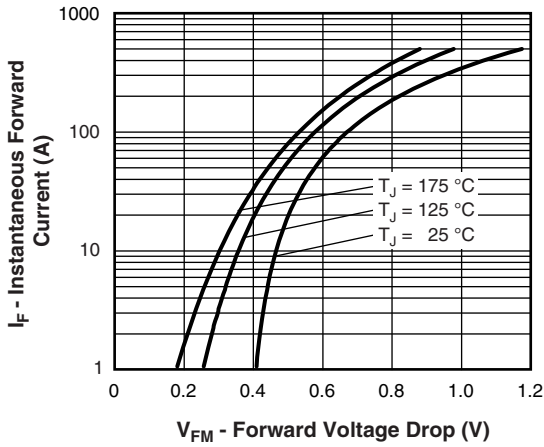


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

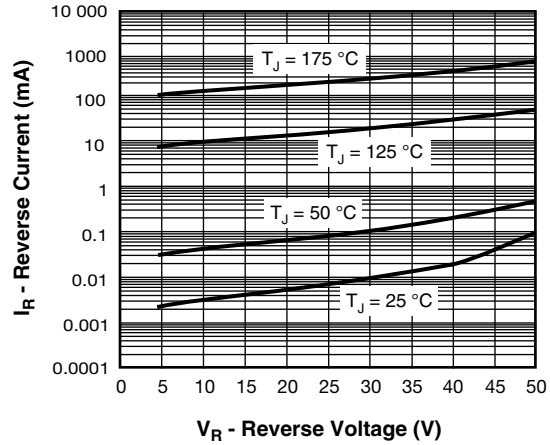


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

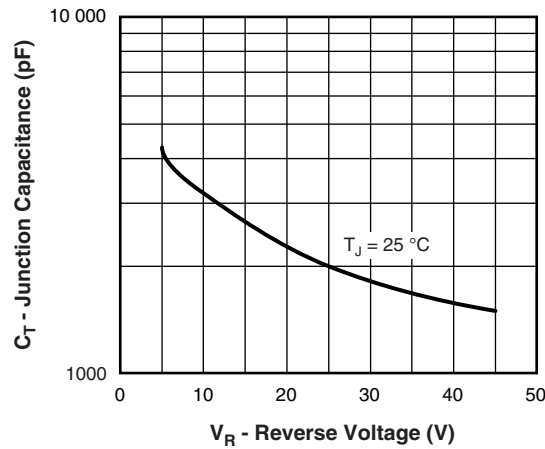


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

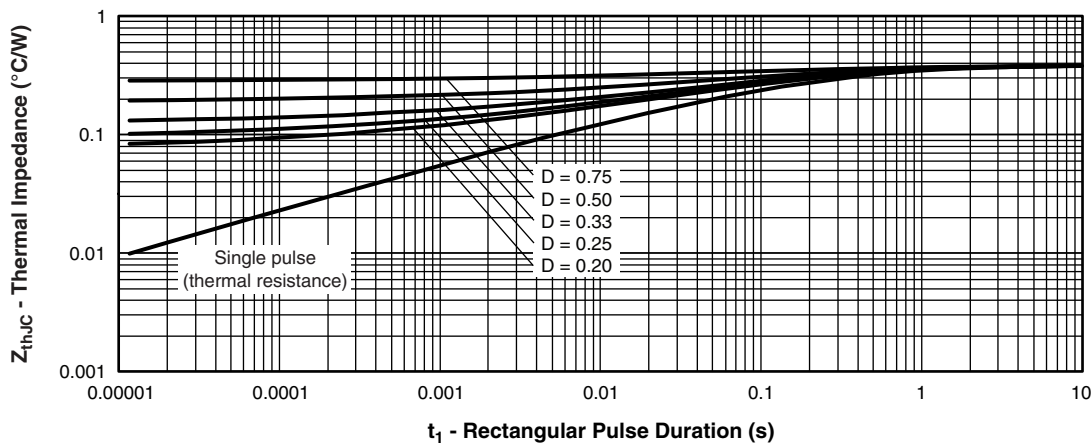


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

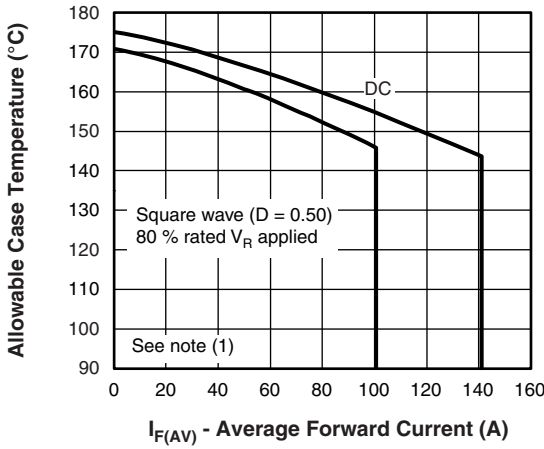


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

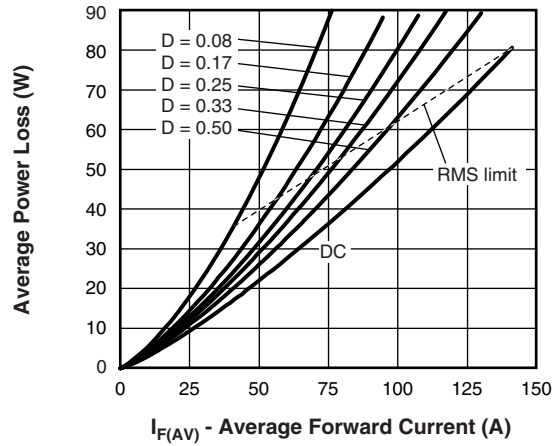


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

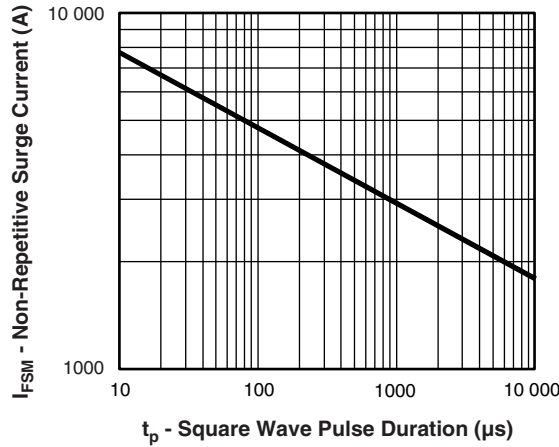


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

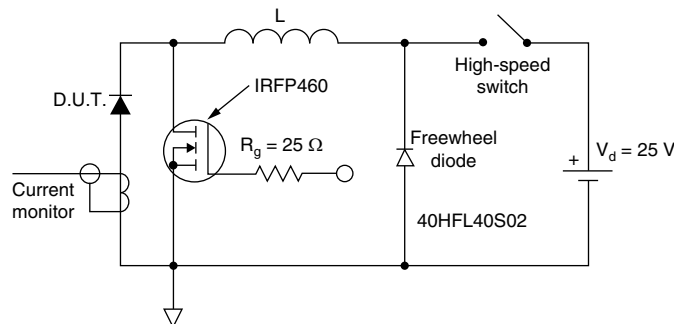


Fig. 8 - Unclamped Inductive Test Circuit

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
 P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 $P_{d_{REV}}$ = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R



ORDERING INFORMATION TABLE

| | | | | | | | | |
|-------------|------------|-----------|----------|----------|----------|----------|------------|------------|
| Device code | VS- | 20 | 1 | C | N | Q | 050 | PbF |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

- 1** - Vishay Semiconductors product
- 2** - Average current rating (x 10)
- 3** - Product silicon identification
- 4** - C = circuit configuration
- 5** - N = not isolated
- 6** - Q = Schottky rectifier diode
- 7** - Voltage rating (050 = 50 V)
- 8** - Lead (Pb)-free

LINKS TO RELATED DOCUMENTS

| | |
|------------|--|
| Dimensions | www.vishay.com/doc?95021 |
|------------|--|



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