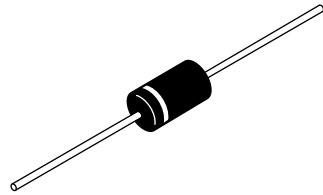
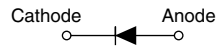


Schottky Rectifier, 3.3 A


C-16


FEATURES

- Low profile, axial leaded outline
- High frequency operation
- Very low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free plating
- Designed and qualified for industrial level


RoHS
COMPLIANT

PRODUCT SUMMARY

| | |
|-------------|----------|
| $I_{F(AV)}$ | 3.3 A |
| V_R | 90/100 V |

DESCRIPTION

The 31DQ.. axial leaded Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection

MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|-------------|---------------------------|-------------|------------|
| $I_{F(AV)}$ | Rectangular waveform | 3.3 | A |
| V_{RRM} | | 90/100 | V |
| I_{FSM} | $t_p = 5 \mu s$ sine | 210 | A |
| V_F | 3 Apk, $T_J = 25^\circ C$ | 0.85 | V |
| T_J | | - 40 to 150 | $^\circ C$ |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | 31DQ09 | 31DQ10 | UNITS |
|--------------------------------------|-----------|--------|--------|-------|
| Maximum DC reverse voltage | V_R | 90 | 100 | V |
| Maximum working peak reverse voltage | V_{RWM} | | | |

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|--|-------------|---|--------|-------|
| Maximum average forward current See fig. 4 | $I_{F(AV)}$ | 50 % duty cycle at $T_L = 108^\circ C$, rectangular waveform | 3.3 | A |
| Maximum peak one cycle non-repetitive surge current See fig. 6 | I_{FSM} | 5 μs sine or 3 μs rect. pulse | 210 | |
| | | 10 ms sine or 6 ms rect. pulse | 34 | |
| Non-repetitive avalanche energy | E_{AS} | $T_J = 25^\circ C$, $I_{AS} = 1 A$, $L = 6 mH$ | 3.0 | mJ |
| Repetitive avalanche current | I_{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical | 0.5 | A |

| ELECTRICAL SPECIFICATIONS | | | | | |
|---|----------------|---|-----------------------------------|--------|------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum forward voltage drop See fig. 1 | $V_{FM}^{(1)}$ | 3 A | $T_J = 25\text{ }^\circ\text{C}$ | 0.85 | V |
| | | 6 A | | 0.97 | |
| | | 3 A | $T_J = 125\text{ }^\circ\text{C}$ | 0.69 | |
| | | 6 A | | 0.80 | |
| Maximum reverse leakage current See fig. 4 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | 1 | mA |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 3 | |
| Typical junction capacitance | C_T | $V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ | | 110 | pF |
| Typical series inductance | L_S | Measured lead to lead 5 mm from package body | | 9.0 | nH |
| Maximum voltage rate of charge | 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 | TEST CONDITIONS | | VALUES | UNITS |
| Maximum junction and storage temperature range | $T_J^{(1)}, T_{Stg}$ | | | - 40 to 150 | $^\circ\text{C}$ |
| Maximum thermal resistance, junction to ambient | R_{thJA} | DC operation Without cooling fin | | 80 | $^\circ\text{C/W}$ |
| Typical thermal resistance, junction to lead | R_{thJL} | DC operation | | 15 | |
| Approximate weight | | | | 1.2 | g |
| | | | | 0.042 | oz. |
| Marking device | | Case style C-16 | | 31DQ09 | |
| | | | | 31DQ10 | |

Note(1) $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$ thermal runaway condition for a diode on its own heatsink

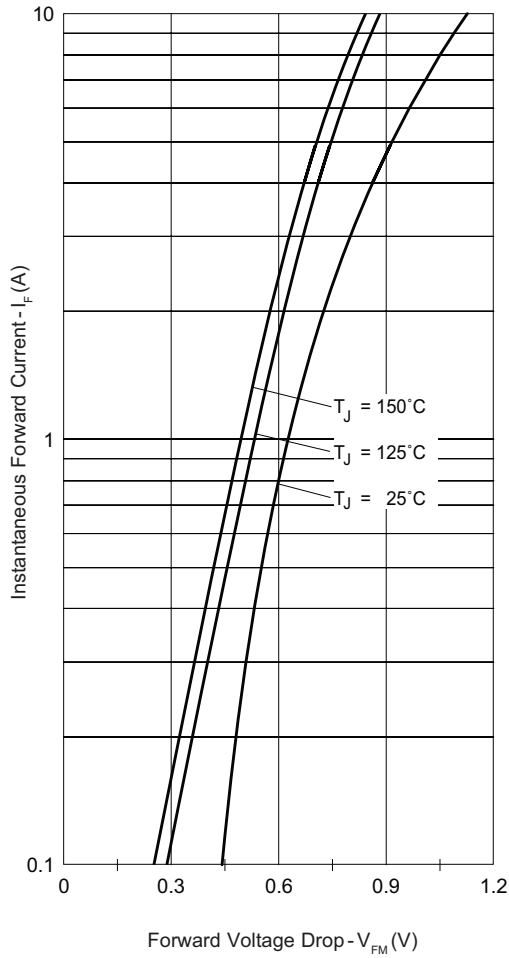


Fig. 1 - Maximum Forward Voltage Drop Characteristics

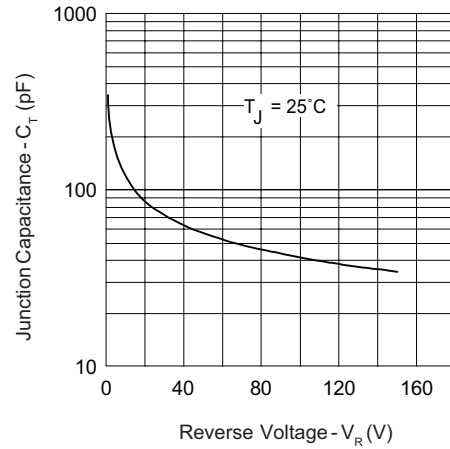


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

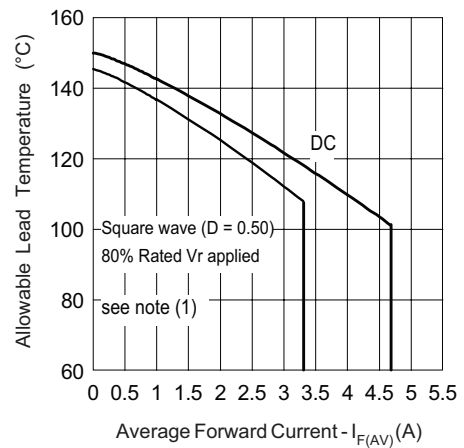


Fig. 4 - Maximum Allowable Lead Temperature vs. Average Forward Current

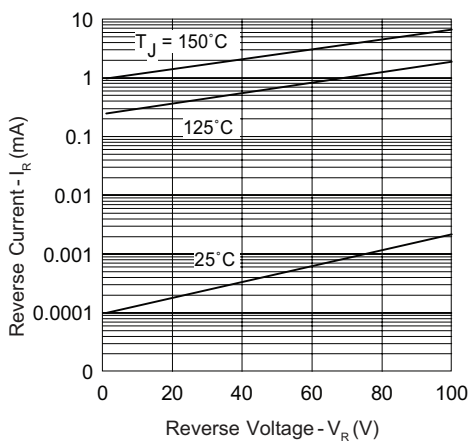


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

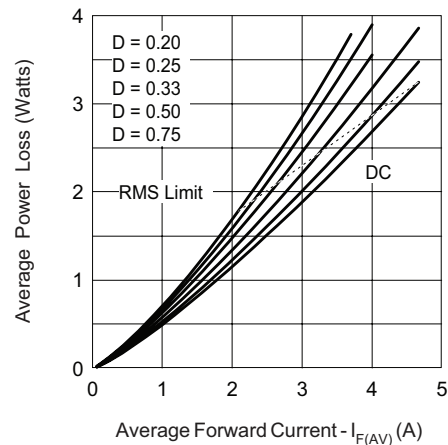


Fig. 5 - Forward Power Loss Characteristics

Note

(1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJL}$;

P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6); P_{dREV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R

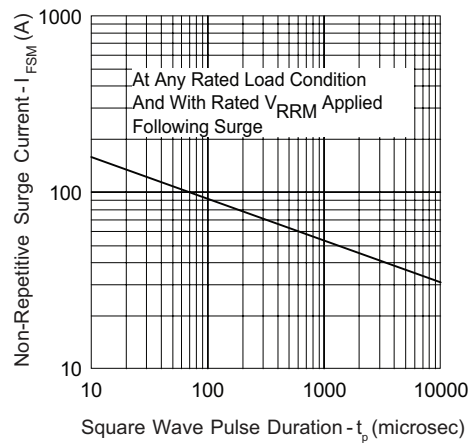


Fig. 6 - Maximum Non-Repetitive Surge Current

ORDERING INFORMATION TABLE

| | | | | | |
|-------------|-----------|----------|---|-----------|-------------------------|
| Device code | 31 | D | Q | 10 | TR |
| | ① | ② | ③ | ④ | ⑤ |
| | 1 | - | 31 = 3.1 A (axial and small packages - current is x 10) | | |
| | 2 | - | D = DO-201 package | | |
| | 3 | - | Q = Schottky Q.. series | | |
| | 4 | - | 10 = Voltage ratings | | 09 = 90 V 10 = 100 V |
| | 5 | - | • TR = Tape and reel package (1200 pcs) • None = Box package (500 pcs) | | |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|---|
| Dimensions | http://www.vishay.com/doc?95242 |
| Part marking information | http://www.vishay.com/doc?95304 |
| Packaging information | http://www.vishay.com/doc?95309 |
| SPIICE model | http://www.vishay.com/doc?95300 |



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