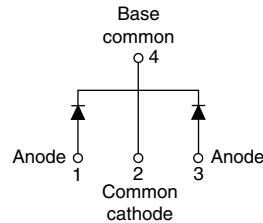


Schottky Rectifier, 2 x 1 A


SOT-223


FEATURES

- Small foot print, surface mountable
- Low profile
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Common cathode
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level


 Available
RoHS*
 COMPLIANT

PRODUCT SUMMARY

| | |
|-------------|---------|
| $I_{F(AV)}$ | 2 x 1 A |
| V_R | 45 V |

DESCRIPTION

The 20CJQ045PbF surface mount Schottky rectifier series has been designed for applications requiring very low forward drop and very small foot prints. Typical applications are in portables, switching power supplies, converters, automotive system, freewheeling diodes, battery charging, and reverse battery protection.

MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|-------------|--------------------------------------|-------------|------------|
| $I_{F(AV)}$ | Rectangular waveform | 2 | A |
| V_{RRM} | | 45 | V |
| I_{FSM} | $t_p = 5 \mu s$ sine | 390 | A |
| V_F | 1 Apk, $T_J = 125^\circ C$ (per leg) | 0.50 | V |
| T_J | Range | - 55 to 150 | $^\circ C$ |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | 20CJQ045PbF | UNITS |
|--------------------------------------|-----------|-------------|-------|
| Maximum DC reverse voltage | V_R | 45 | V |
| Maximum working peak reverse voltage | V_{RWM} | | |

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|-------------|---|--------|-------|
| Maximum average forward current See fig. 5 | $I_{F(AV)}$ | per leg 50 % duty cycle at $T_C = 126^\circ C$, rectangular waveform | 1 | A |
| | | per device 50 % duty cycle at $T_C = 102^\circ C$, rectangular waveform | 2 | |
| Maximum peak one cycle non-repetitive surge current per leg See fig. 7 | I_{FSM} | 5 μs sine or 3 μs rect. pulse | 390 | |
| | | 10 ms sine or 6 ms rect. pulse | | |
| Non-repetitive avalanche energy per leg | E_{AS} | $T_J = 25^\circ C$, $I_{AS} = 1 A$, $L = 4 mH$ | 2 | mJ |
| Repetitive avalanche current per leg | I_{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical | 1 | A |

* Pb containing terminations are not RoHS compliant, exemptions may apply

| ELECTRICAL SPECIFICATIONS | | | | | |
|---|----------------|---|-----------------------------------|--------|------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum forward voltage drop per leg See fig. 1 | $V_{FM}^{(1)}$ | 1 A | $T_J = 25\text{ }^\circ\text{C}$ | 0.54 | V |
| | | 2 A | | 0.67 | |
| | | 1 A | $T_J = 125\text{ }^\circ\text{C}$ | 0.50 | |
| | | 2 A | | 0.65 | |
| Maximum reverse leakage current per leg See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | 0.1 | mA |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 10 | |
| Threshold voltage | $V_{F(TO)}$ | $T_J = T_J \text{ maximum}$ | | 0.278 | V |
| Forward slope resistance | r_t | | | 168.4 | m Ω |
| Typical junction capacitance per leg | C_T | $V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ | | 70 | pF |
| Typical series inductance per leg | L_S | Measured lead to lead 5 mm from package body | | 6 | nH |
| Maximum voltage rate of change | dV/dt | Rated V_R | | 7700 | 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, T_{Stg} | | | - 55 to 150 | $^\circ\text{C}$ |
| Maximum thermal resistance, junction to lead | R_{thJL} | DC operation | | 25 | $^\circ\text{C/W}$ |
| Maximum thermal resistance, junction to ambient | R_{thJA} | | | 65 | |
| Approximate weight | | | | 0.13 | g |
| | | | | 0.0045 | oz. |
| Marking device | | Case style SOT-223 | | 20CJQ045 | |

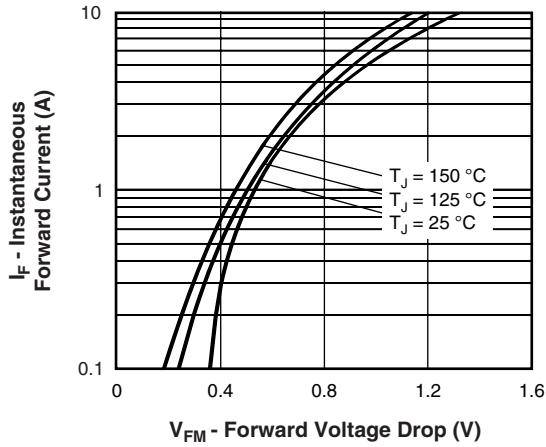


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

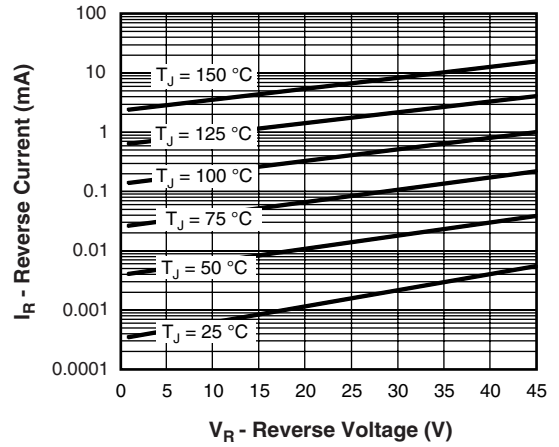


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

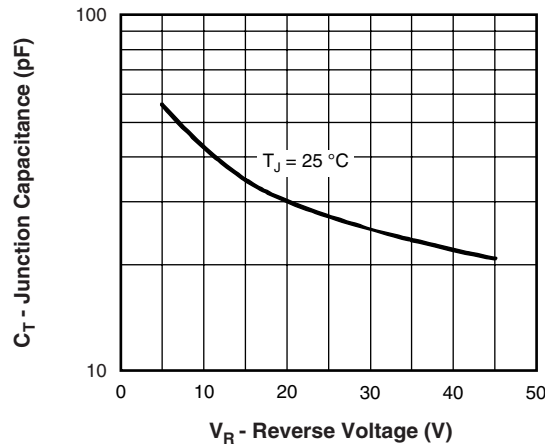
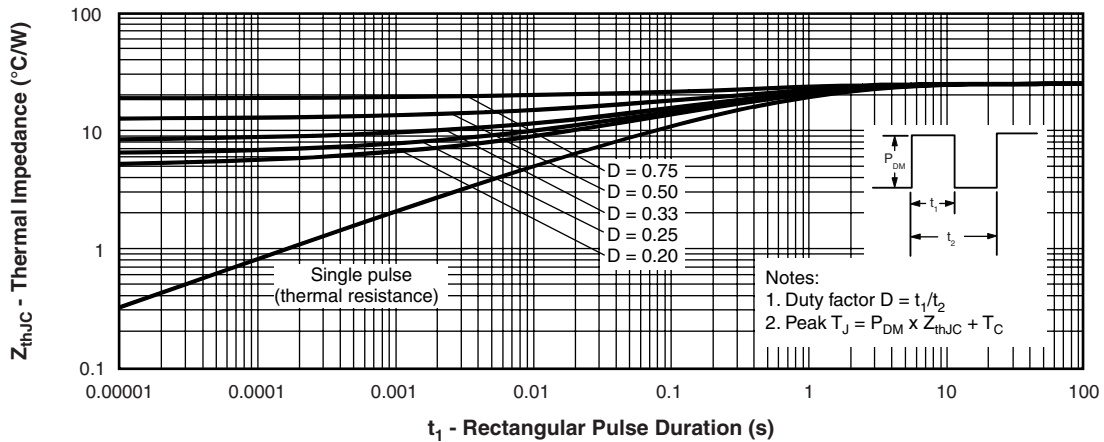


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)


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

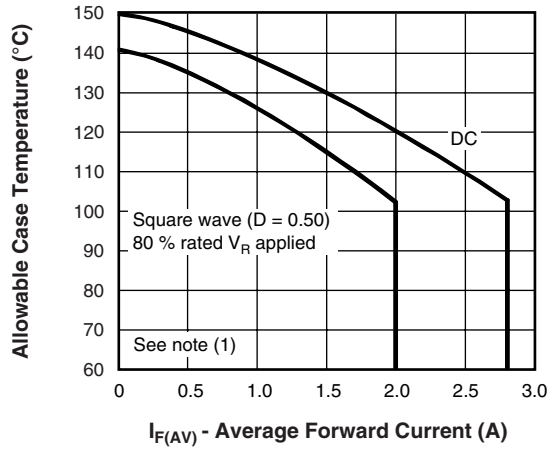


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

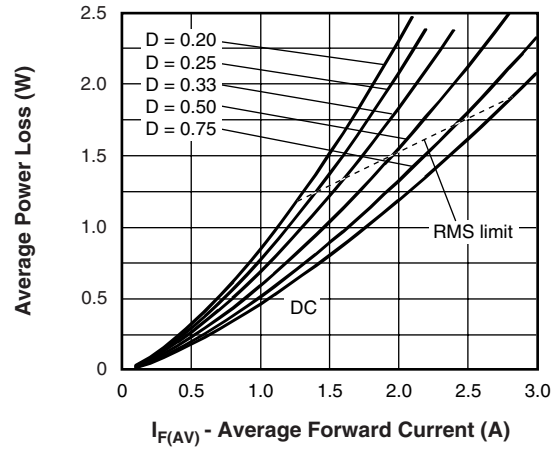


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

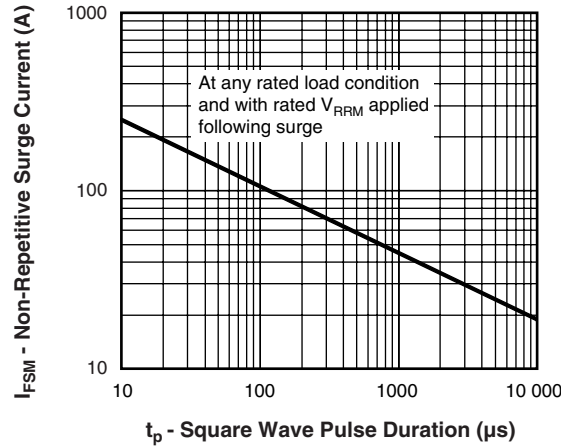


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

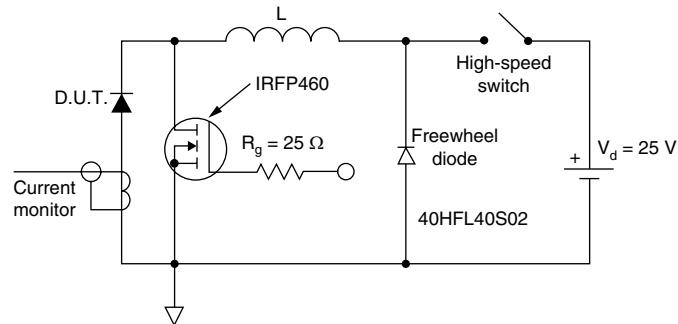


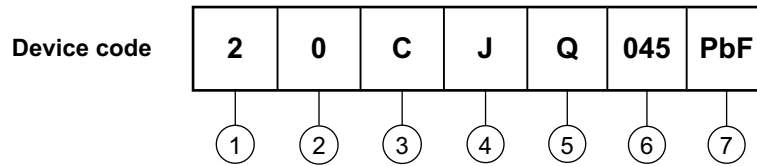
Fig. 8 - Unclamped Inductive Test Circuit

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



- 1** - Current rating (2 = 2 A)
- 2** - Schottky rectifier series
- 3** - Circuit configuration:
C = Common cathode
- 4** - Package:
J = SOT-223
- 5** - Schottky "Q" series
- 6** - Voltage rating (045 = 45 V)
- 7** -
 - None = Standard production
 - PbF = Lead (Pb)-free

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|---|
| Dimensions | http://www.vishay.com/doc?95022 |
| Part marking information | http://www.vishay.com/doc?95031 |
| Packaging information | http://www.vishay.com/doc?95035 |



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