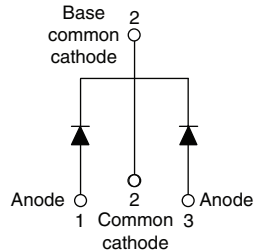


Schottky Rectifier, 2 x 20 A


TO-220AB


FEATURES

- 150 °C T_J operation
- Center tap configuration
- Low forward voltage drop
- High frequency operation
- 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 ("PbF" suffix)
- Designed and qualified for industrial level


RoHS*
COMPLIANT

PRODUCT SUMMARY

| | |
|-------------|----------|
| $I_{F(AV)}$ | 2 x 20 A |
| V_R | 60 V |

DESCRIPTION

This center tap Schottky rectifier has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. 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 | 40 | A |
| V_{RRM} | | 60 | V |
| I_{FSM} | $t_p = 5 \mu s$ sine | 1000 | A |
| V_F | 20 Apk, $T_J = 125 \text{ }^\circ\text{C}$ (per leg) | 0.58 | V |
| T_J | Range | - 55 to 150 | $^\circ\text{C}$ |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | 48CTQ060PbF | UNITS |
|--------------------------------------|-----------|-------------|-------|
| Maximum DC reverse voltage | V_R | 60 | V |
| Maximum working peak reverse voltage | V_{RWM} | | |

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------|--------|-------|
| Maximum average forward current per leg See fig. 5 per device | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 111 \text{ }^\circ\text{C}$, rectangular waveform | 20 | A |
| | | | 40 | |
| Maximum peak one cycle non-repetitive surge current per leg See fig. 7 | I_{FSM} | 5 μs sine or 3 μs rect. pulse | 1000 | |
| | | 10 ms sine or 6 ms rect. pulse | 260 | |
| Non-repetitive avalanche energy per leg | E_{AS} | $T_J = 25 \text{ }^\circ\text{C}$, $I_{AS} = 1.50 \text{ A}$, $L = 11.5 \text{ mH}$ | 13 | 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 | 1.50 | 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 | $V_{FM}^{(1)}$ | 20 A | $T_J = 25\text{ }^\circ\text{C}$ | 0.61 | V |
| | | 40 A | | 0.83 | |
| | | 20 A | $T_J = 125\text{ }^\circ\text{C}$ | 0.58 | |
| | | 40 A | | 0.75 | |
| Maximum reverse leakage current per leg See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | 2 | mA |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 89 | |
| Threshold voltage | $V_{F(TO)}$ | $T_J = T_J \text{ maximum}$ | | 0.37 | V |
| Forward slope resistance | r_t | | | 8.26 | m Ω |
| Maximum junction capacitance per leg | C_T | $V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 $^\circ\text{C}$ | | 1220 | pF |
| Typical series inductance per leg | L_S | Measured lead to lead 5 mm from package body | | 8.0 | nH |
| Maximum voltage rate of change | dV/dt | Rated V_R | | 10 000 | V/ μs |

Note(1) Pulse width < 300 μs , 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 case per leg | R_{thJC} | DC operation | | 2.0 | $^\circ\text{C/W}$ |
| Maximum thermal resistance, junction to case per package | | | | 1.0 | |
| Typical thermal resistance, case to heatsink | R_{thCS} | Mounting surface, smooth and greased | | 0.50 | |
| Approximate weight | | | | 2 | g |
| | | | | 0.07 | oz. |
| Mounting torque | minimum | | | 6 (5) | kgf · cm |
| | maximum | | | 12 (10) | (lbf · in) |
| Marking device | | Case style TO-220AB | | 48CTQ060 | |

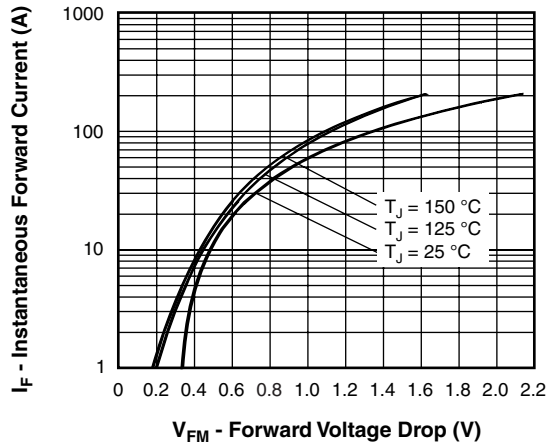


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

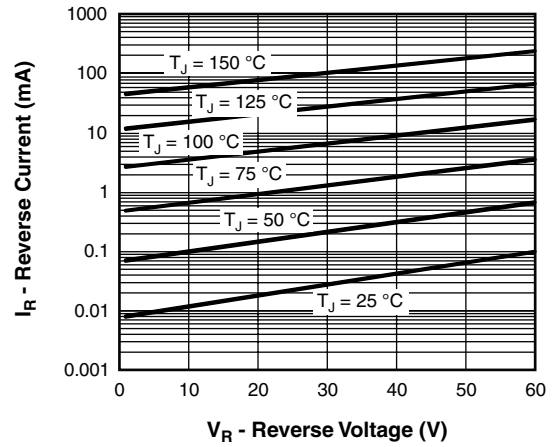


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

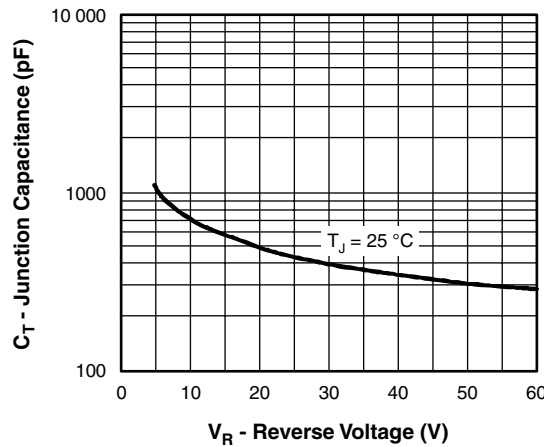


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

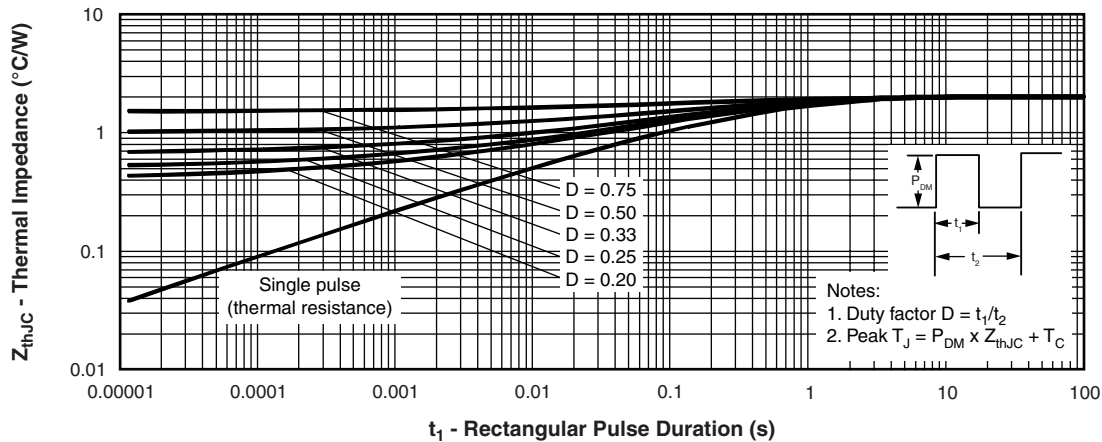


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

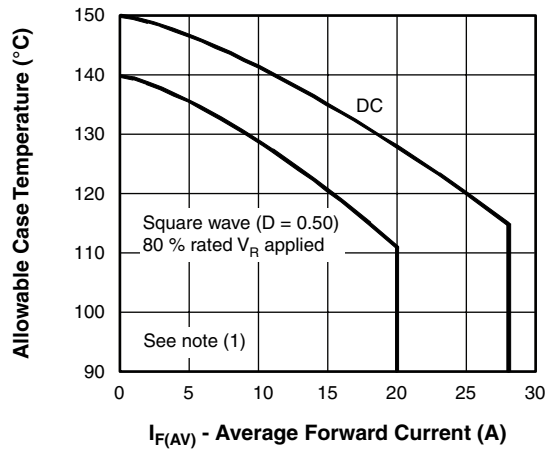


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

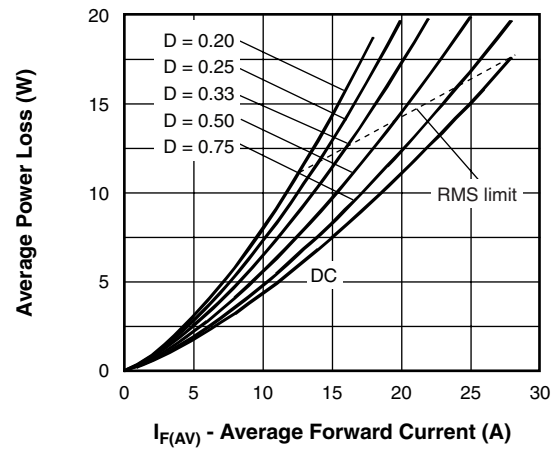


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

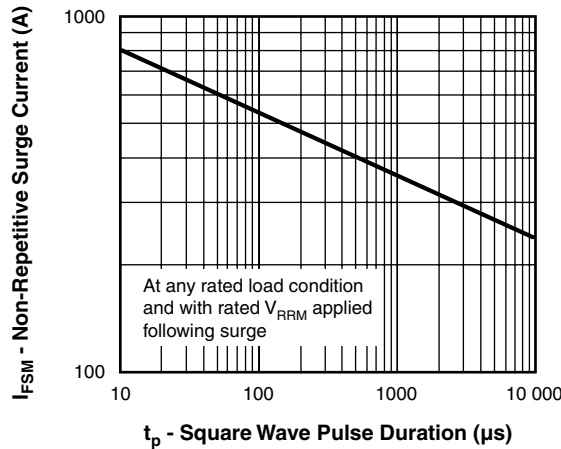


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)



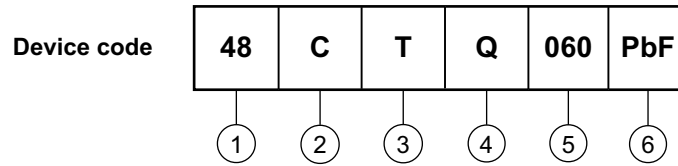
Fig. 8 - Unclamped Inductive Test Circuit

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 $V_{R1} = 10$ V



ORDERING INFORMATION TABLE



- 1** - Current rating (40 A)
- 2** - Circuit configuration:
C = Common cathode
- 3** - Package:
T = TO-220
- 4** - Schottky "Q" series
- 5** - Voltage rating (060 = 60 V)
- 6** -
 - None = Standard production
 - PbF = Lead (Pb)-free

Tube standard pack quantity: 50 pieces

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|-------------------------------------------------------------------------------|
| Dimensions | http://www.vishay.com/doc?95222 |
| Part marking information | http://www.vishay.com/doc?95225 |



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