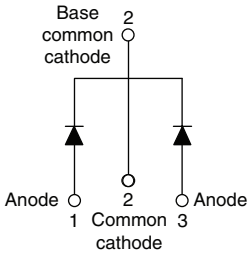
# Schottky Rectifier, 2 x 30 A

TO-220AB




## FEATURES

- 150 °C $T_J$ operation
- Center tap TO-220 package
- 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

Pb-free Available

RoHS* COMPLIANT

| PRODUCT SUMMARY | |
|---|---|
| $I_{F(AV)}$ | 2 x 30 A |
| $V_R$ | 35 to 45 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 (per device) | 60 | A |
| $V_{RRM}$ | | 35 to 45 | V |
| $I_{FRM}$ | $T_C$ = 113 °C (per leg) | 60 | A |
| $I_{FSM}$ | $t_p$ = 5 µs sine | 1500 | |
| $V_F$ | 30 Apk, $T_J$ = 125 °C | 0.53 | V |
| $T_J$ | Range | - 65 to 150 | °C |

| VOLTAGE RATINGS | | | | | |
|---|---|---|---|---|---|
| PARAMETER | SYMBOL | 60CTQ035PbF | 60CTQ040PbF | 60CTQ045PbF | UNITS |
| Maximum DC reverse voltage | $V_R$ | 35 | 40 | 45 | V |
| Maximum working peak reverse voltage | $V_{RWM}$ | | | | |

| ABSOLUTE MAXIMUM RATINGS | | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average forward current | per leg | $I_{F(AV)}$ | 50 % duty cycle at $T_C$ = 113 °C, rectangular waveform | | 30 | A |
| | per device | | | | 60 | |
| Peak repetitive forward current per leg | | $I_{FRM}$ | Rated $V_R$, square wave, 20 kHz, $T_C$ = 113 °C | | 60 | |
| Maximum peak one cycle non-repetitive surge current per leg | | $I_{FSM}$ | 5 µs sine or 3 µs rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied | 1500 | |
| | | | 10 ms sine or 6 ms rect. pulse | | 300 | |
| Non-repetitive avalanche energy per leg | | $E_{AS}$ | $T_J$ = 25 °C, $I_{AS}$ = 3 A, L = 4.40 mH | | 20 | mJ |
| Repetitive avalanche current per leg | | $I_{AR}$ | Current decaying linearly to zero in 1 µs<br>Frequency limited by $T_J$ maximum $V_A$ = 1.5 x $V_R$ typical | | 3 | A |

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

## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| Maximum forward voltage drop | $V_{FM}$ (1) | 30 A | $T_J$ = 25 °C | 0.51 | 0.56 | V |
| | | 60 A | | 0.66 | 0.72 | |
| | | 30 A | $T_J$ = 125 °C | 0.48 | 0.53 | |
| | | 60 A | | 0.68 | 0.75 | |
| Maximum instantaneous reverse current | $I_{RM}$ | $T_J$ = 25 °C | Rated DC voltage | 0.33 | 2 | mA |
| | | $T_J$ = 125 °C | | 145 | 250 | |
| Maximum junction capacitance | $C_T$ | $V_R$ = 5 $V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C | | 2000 | | pF |
| Typical series inductance | $L_S$ | Measured from top of terminal to mounting plane | | 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 temperature range | | $T_J$ | | - 65 to 150 | °C |
| Maximum storage temperature range | | $T_{Stg}$ | | - 65 to 175 | |
| Maximum thermal resistance, junction to case per leg | | $R_{thJC}$ | DC operation | 1.2 | °C/W |
| 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 | | Non-lubricated threads | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | | 12 (10) | |
| Marking device | | | Case style TO-220AB | 60CTQ035 | |
| | | | | 60CTQ040 | |
| | | | | 60CTQ045 | |

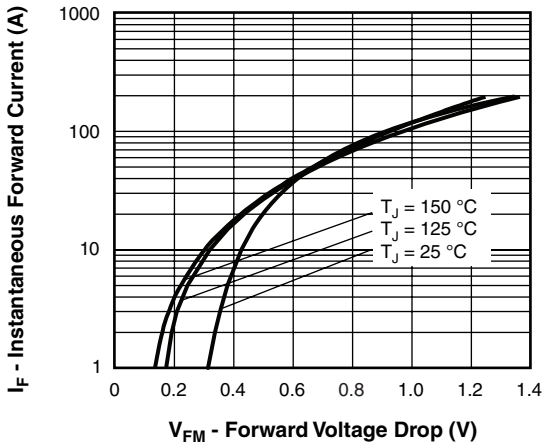



Fig. 1 - Maximum Forward Voltage Drop Characteristics

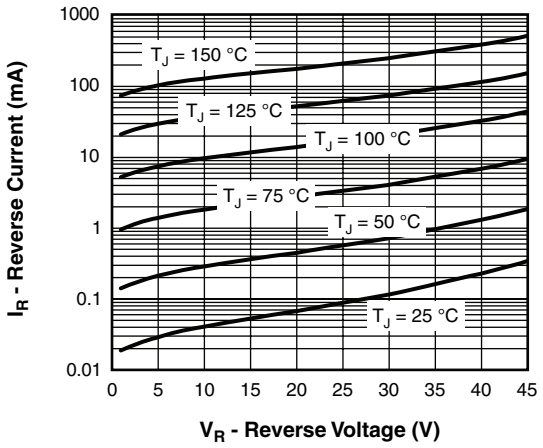



Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

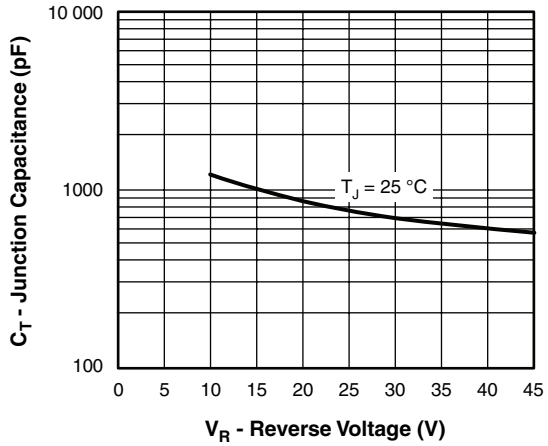



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

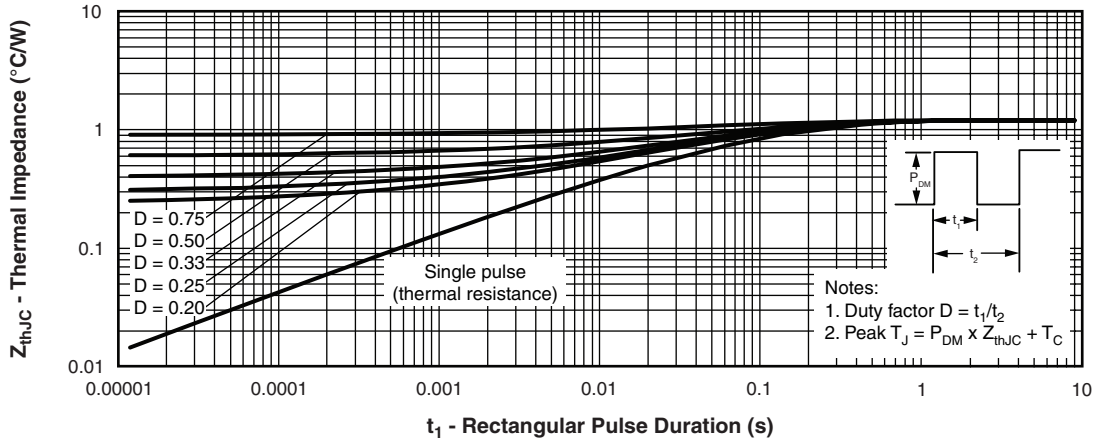



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics

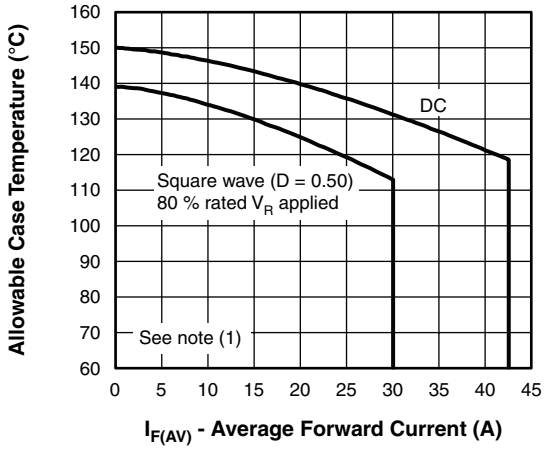



Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

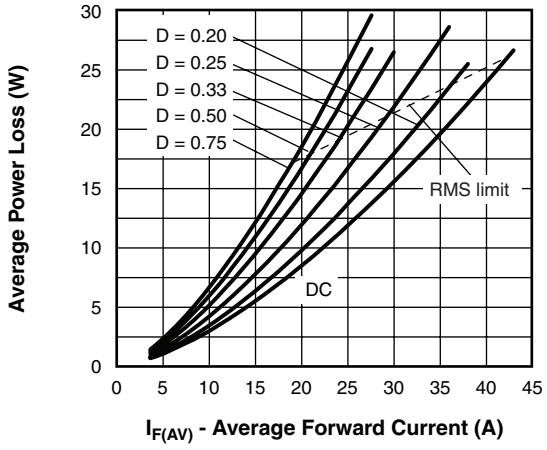



Fig. 6 - Forward Power Loss Characteristics

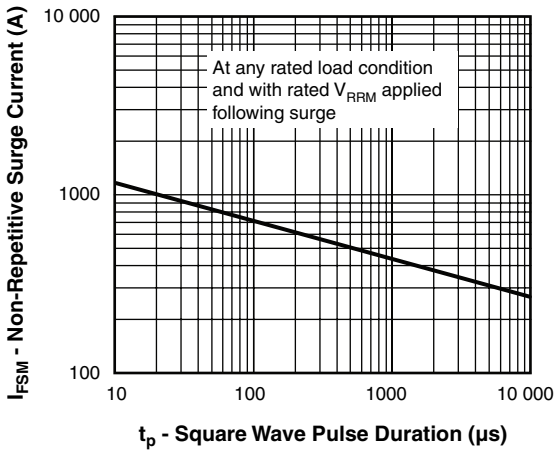


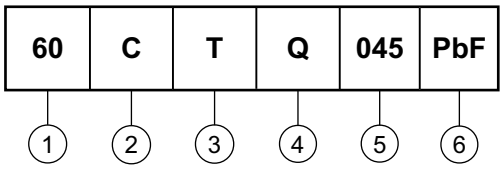

Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

**Note**

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

## ORDERING INFORMATION TABLE

**Device code**




1 - Current rating (60 = 60 A)

2 - Circuit configuration:
C = Common cathode

3 - Package:
T = TO-220

4 - Schottky "Q" series

5 - Voltage ratings
- 035 = 35 V
- 040 = 40 V
- 045 = 45 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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