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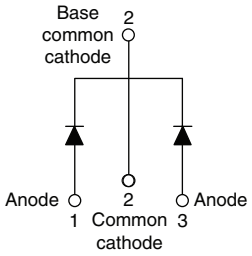
# Schottky Rectifier, 2 x 20 A

TO-220AB




## FEATURES

- 125 °C $T_J$ operation ($V_R$ < 5 V)
- Center tap configuration
- Very low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified for industrial level

## DESCRIPTION

This center tap Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

| PRODUCT SUMMARY | |
|---|---|
| $I_{F(AV)}$ | 2 x 20 A |
| $V_R$ | 15 V |
| $I_{RM}$ | 600 mA at 100 °C |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Rectangular waveform | 40 | A |
| $V_{RRM}$ | | 15 | V |
| $I_{FSM}$ | $t_p$ = 5 µs sine | 700 | A |
| $V_F$ | 19 Apk, $T_J$ = 125 °C (per leg) | 0.25 | V |
| $T_J$ | Range | - 55 to 125 | °C |

| VOLTAGE RATINGS | | | |
|---|---|---|---|
| PARAMETER | SYMBOL | 40L15CT | UNITS |
| Maximum DC reverse voltage | $V_R$ | 15 | V |
| Maximum working peak reverse voltage | $V_{RWM}$ | | |

| ABSOLUTE MAXIMUM RATINGS | | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average forward current See fig. 5 | per leg | $I_{F(AV)}$ | 50 % duty cycle at $T_C$ = 85 °C, rectangular waveform | | 20 | A |
| | per device | | | | 40 | |
| 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 | 700 | |
| | | | 10 ms sine or 6 ms rect. pulse | | 330 | |
| Non-repetitive avalanche energy per leg | | $E_{AS}$ | $T_J$ = 25 °C, $I_{AS}$ = 2 A, L = 6 mH | | 10 | 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 | | 2 | A |

## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| Forward voltage drop per leg See fig. 1 | $V_{FM}$ (1) | 19 A | $T_J$ = 25 °C | - | 0.41 | V |
| | | 40 A | | - | 0.52 | |
| | | 19 A | $T_J$ = 125 °C | 0.25 | 0.33 | |
| | | 40 A | | 0.37 | 0.50 | |
| Reverse leakage current per leg See fig. 2 | $I_{RM}$ (1) | $T_J$ = 25 °C | $V_R$ = Rated $V_R$ | - | 10 | mA |
| | | $T_J$ = 100 °C | | - | 600 | |
| Threshold voltage | $V_{F(TO)}$ | $T_J$ = $T_J$ maximum | | 0.182 | | V |
| Forward slope resistance | $r_t$ | | | 7.6 | | mΩ |
| Maximum junction capacitance per leg | $C_T$ | $V_R$ = 5 $V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C | | - | 2000 | pF |
| Typical series inductance per leg | $L_S$ | Measured lead to lead 5 mm from package body | | 8 | - | 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 125 | °C |
| Maximum thermal resistance, junction to case per leg | | $R_{thJC}$ | DC operation | 1.5 | °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 | | | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | | 12 (10) | |
| Marking device | | | Case style TO-220AB | 40L15CT | |

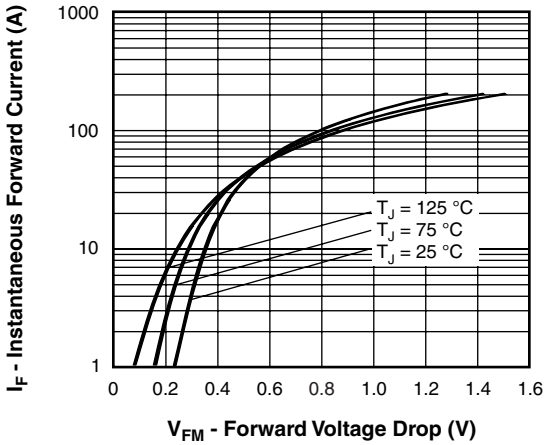



Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

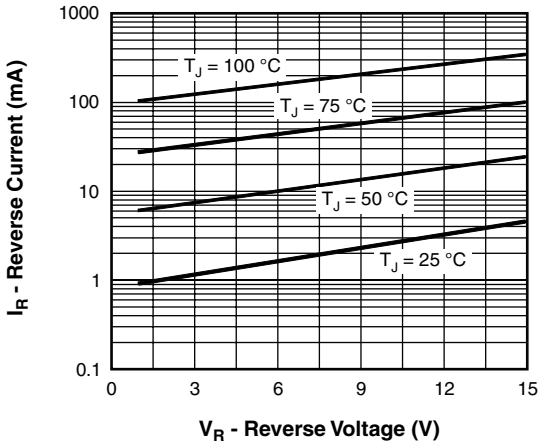



Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

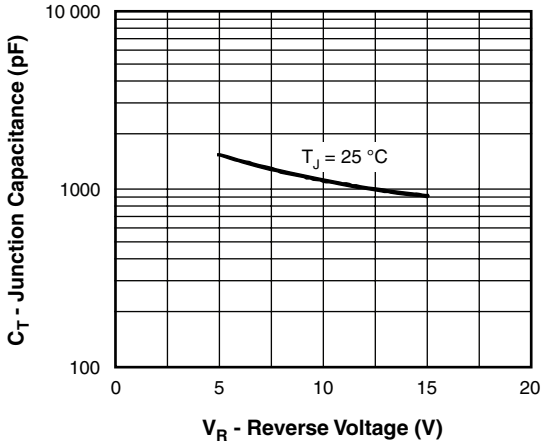



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

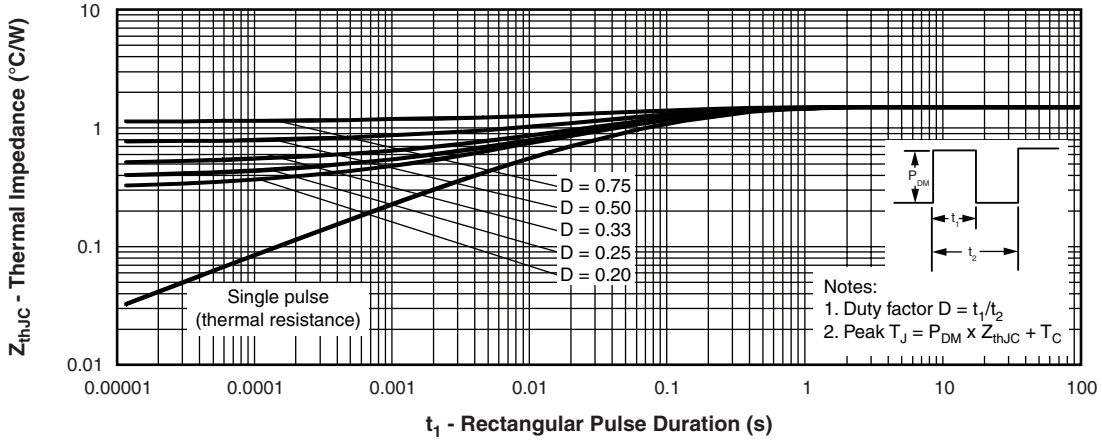



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics (Per Leg)

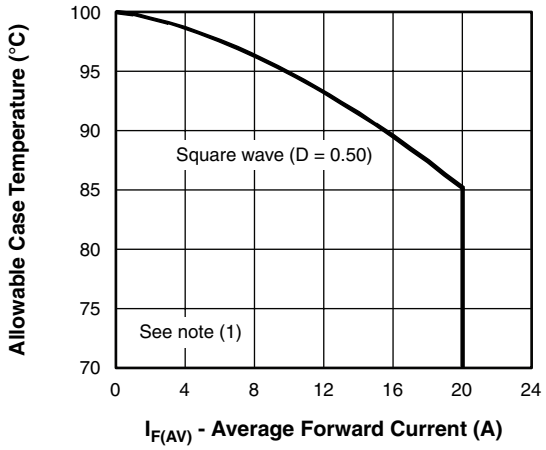



Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

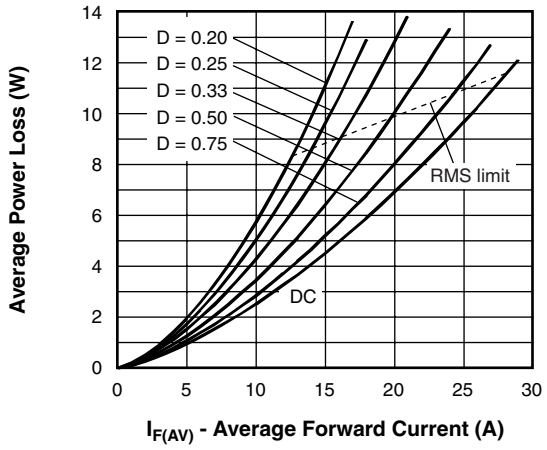



Fig. 6 - Forward Power Loss Characteristics (Per Leg)

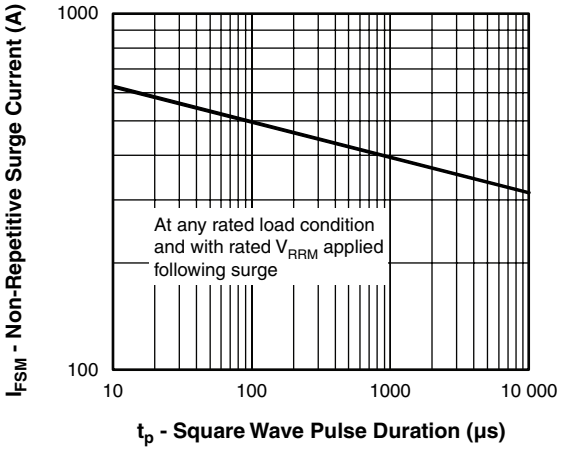



Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

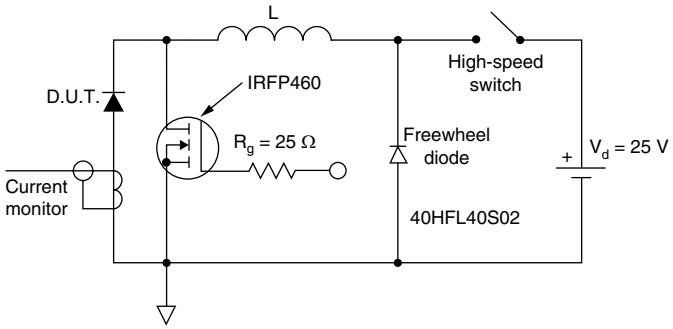



Fig. 8 - Unclamped Inductive Test Circuit

**Note**

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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 $V_{R1}$ = 10 V

## ORDERING INFORMATION TABLE

**Device code**

| 40 | L | 15 | C | T | - |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |

1 - Current rating (40 = 40 A)

2 - Schottky “L” series

3 - Voltage rating (15 = 15 V)

4 - C = Common cathode

5 - Package:
T = TO-220

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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