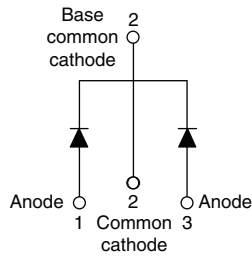


## Schottky Rectifier, 2 x 7.5 A


**TO-220AB**


### FEATURES

- 150 °C  $T_J$  operation
- 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
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified according to JEDEC-JESD47
- Halogen-free according to IEC 61249-2-21 definition (-N3 only)



### PRODUCT SUMMARY

|                 |                  |
|-----------------|------------------|
| Package         | TO-220AB         |
| $I_{F(AV)}$     | 2 x 7.5 A        |
| $V_R$           | 35 V, 40 V, 45 V |
| $V_F$ at $I_F$  | 0.51 V           |
| $I_{RM}$ max.   | 32 mA at 125 °C  |
| $T_J$ max.      | 150 °C           |
| Diode variation | Common cathode   |
| $E_{AS}$        | 10 mJ            |

### DESCRIPTION

The VS-15CTQ... center tap Schottky rectifier series has been optimized for very low forward voltage drop, with moderate leakage. 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                           | 15          | A     |
| $V_{RRM}$   | Range  | 35 to 45    | V     |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine                           | 810         | A     |
| $V_F$       | 7.5 A <sub>pk</sub> , $T_J = 125$ °C (per leg) | 0.51        | V     |
| $T_J$       | Range  | - 55 to 150 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | VS-15CTQ035PbF | VS-15CTQ035-N3 | VS-15CTQ040PbF | VS-15CTQ040-N3 | VS-15CTQ045PbF | VS-15CTQ045-N3 | UNITS |
|--------------------------------------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 35             | 35             | 40             | 40             | 45             | 45             | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |                |                |                |                |                |                |       |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER   | SYMBOL      | TEST CONDITIONS   | VALUES | UNITS |
|---|-------------|---|--------|-------|
| Maximum average forward current<br>See fig. 5                             | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 123$ °C, rectangular waveform   | 15     | A     |
| Maximum peak one cycle non-repetitive surge current per leg<br>See fig. 7 | $I_{FSM}$   | 5 $\mu s$ sine or 3 $\mu s$ rect. pulse   | 810    | A     |
|   |             | 10 ms sine or 6 ms rect. pulse  |        |       |
| Non-repetitive avalanche energy per leg                                   | $E_{AS}$    | $T_J = 25$ °C, $I_{AS} = 1.20$ A, $L = 11.10$ mH  | 10     | mJ    |
| Repetitive avalanche current per leg                                      | $I_{AR}$    | Current decaying linearly to zero in 1 $\mu s$<br>Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical | 1.5    | A     |



| ELECTRICAL SPECIFICATIONS                             |                |  |                                   |        |                  |
|---|----------------|--|-----------------------------------|--------|------------------|
| PARAMETER   | SYMBOL         | TEST CONDITIONS  |                                   | VALUES | UNITS            |
| Maximum forward voltage drop per leg<br>See fig. 1    | $V_{FM}^{(1)}$ | 7.5 A  | $T_J = 25\text{ }^\circ\text{C}$  | 0.55   | V                |
|   |                | 15 A   |                                   | 0.70   |                  |
|   |                | 7.5 A  | $T_J = 125\text{ }^\circ\text{C}$ | 0.51   |                  |
|   |                | 15 A   |                                   | 0.65   |                  |
| Maximum reverse leakage current per leg<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$   | $V_R = \text{Rated } V_R$         | 0.8    | mA               |
|   |                | $T_J = 125\text{ }^\circ\text{C}$  |                                   | 32     |                  |
| Maximum junction capacitance per leg                  | $C_T$          | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ |                                   | 400    | 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/ $\mu\text{s}$ |

**Note**

(1) Pulse width < 300  $\mu\text{s}$ , 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 case per leg     | $R_{thJC}$     | DC operation<br>See fig. 4           |  | 3.50        | $^\circ\text{C/W}$     |
| Maximum thermal resistance, junction to case per package |                | DC operation                         |  | 1.75        |                        |
| Typical thermal resistance, case to heatsink             | $R_{thCS}$     | Mounting surface, smooth and greased |  | 0.50        |                        |
| Approximate weight                                       |                |                                      |  | 2           | g                      |
|  |                |                                      |  | 0.07        | oz.                    |
| Mounting torque  |                |                                      |  | 6 (5)       | kgf · cm<br>(lbf · in) |
|  |                |                                      |  | 12 (10)     |                        |
| Marking device   |                | Case style TO-220AB                  |  | 15CTQ035    |                        |
|  |                |                                      |  | 15CTQ040    |                        |
|  |                |                                      |  | 15CTQ045    |                        |

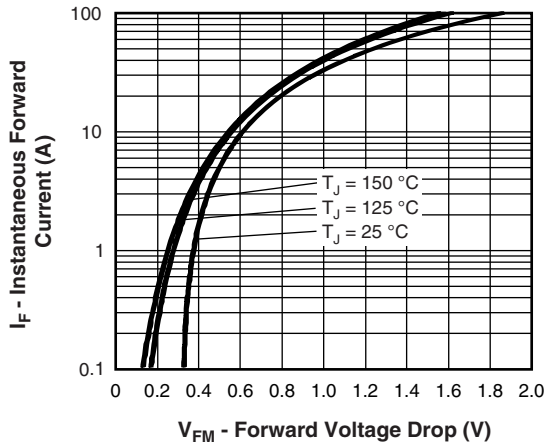


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

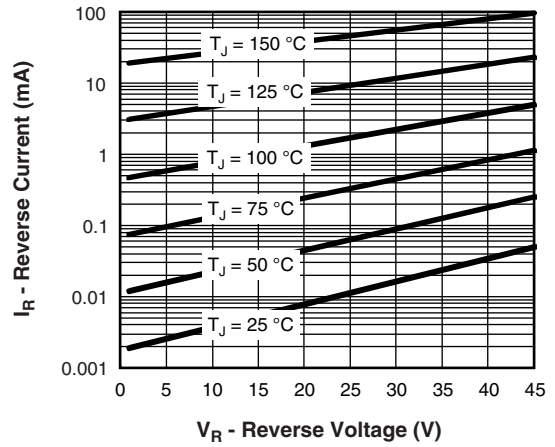


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

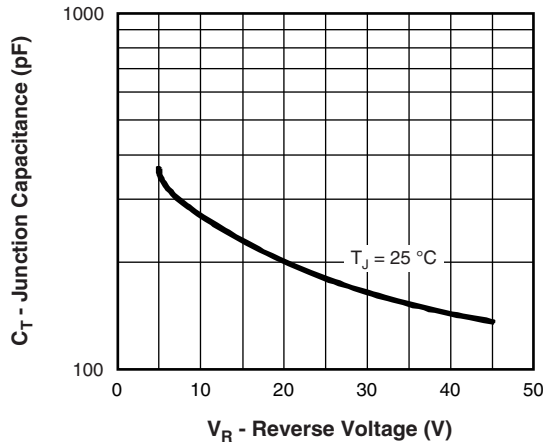


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

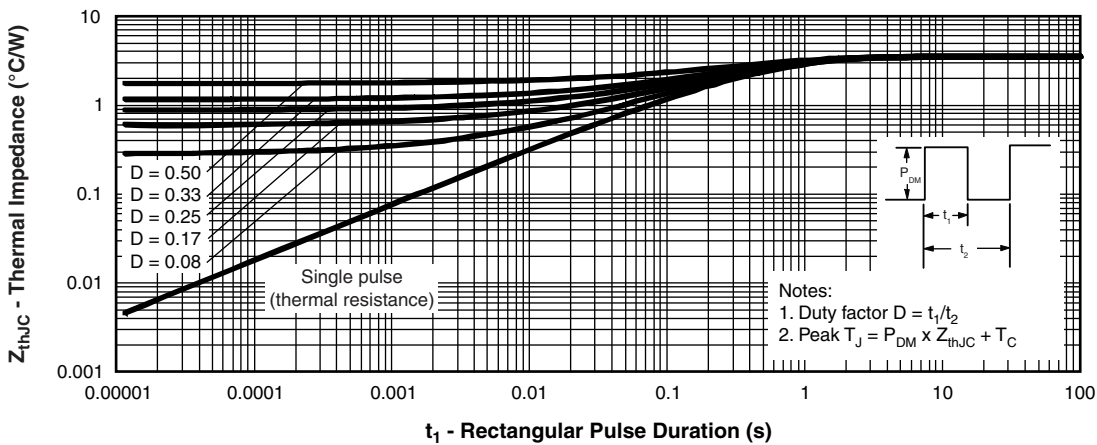


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

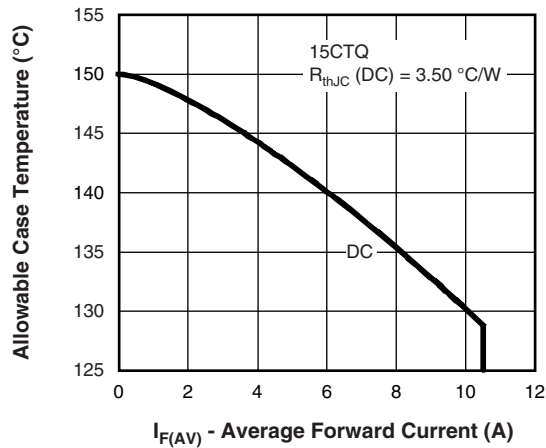


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

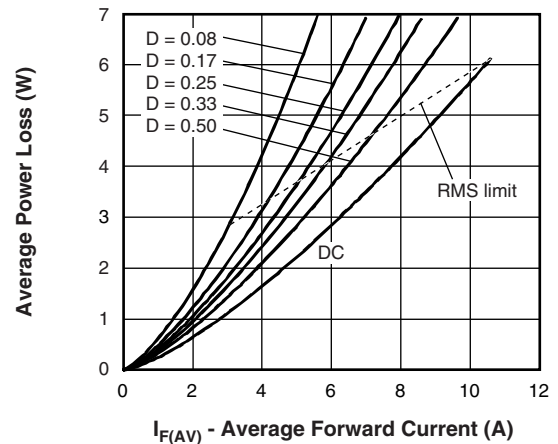


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

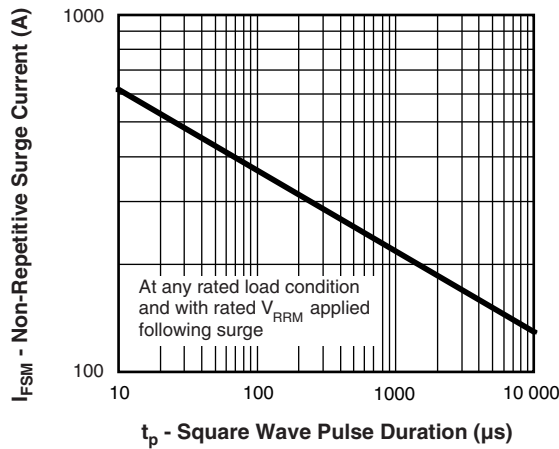


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

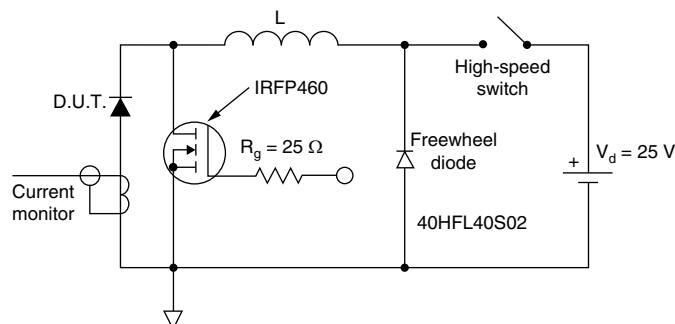
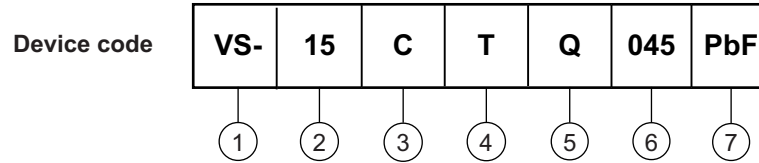


Fig. 8 - Unclamped Inductive Test Circuit



## ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (10 = 10 A)
- 3** - Circuit configuration  
C = Common cathode
- 4** - Package  
T = TO-220
- 5** - Schottky "Q" series
- 6** - Voltage rating (150 = 150 V)
- 7** - Environmental digit
  - PbF = Lead (Pb)-free and RoHS compliant
  - -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free

| <b>ORDERING INFORMATION (Example)</b> |                         |                               |                              |
|---------------------------------------|-------------------------|-------------------------------|------------------------------|
| <b>PREFERRED P/N</b>                  | <b>QUANTITY PER T/R</b> | <b>MINIMUM ORDER QUANTITY</b> | <b>PACKAGING DESCRIPTION</b> |
| VS-15CTQ035PbF                        | 50                      | 1000                          | Antistatic plastic tube      |
| VS-15CTQ035-N3                        | 50                      | 1000                          | Antistatic plastic tube      |
| VS-15CTQ040PbF                        | 50                      | 1000                          | Antistatic plastic tube      |
| VS-15CTQ040-N3                        | 50                      | 1000                          | Antistatic plastic tube      |
| VS-15CTQ045PbF                        | 50                      | 1000                          | Antistatic plastic tube      |
| VS-15CTQ045-N3                        | 50                      | 1000                          | Antistatic plastic tube      |

| <b>LINKS TO RELATED DOCUMENTS</b> |   |
|-----------------------------------|---|
| Dimensions                        | <a href="http://www.vishay.com/doc?95222">www.vishay.com/doc?95222</a>              |
| Part marking information          | TO-220AB PbF <a href="http://www.vishay.com/doc?95225">www.vishay.com/doc?95225</a> |
|                                   | TO-220AB -N3 <a href="http://www.vishay.com/doc?95028">www.vishay.com/doc?95028</a> |



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