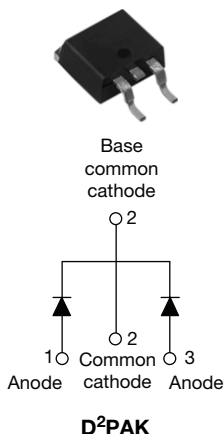
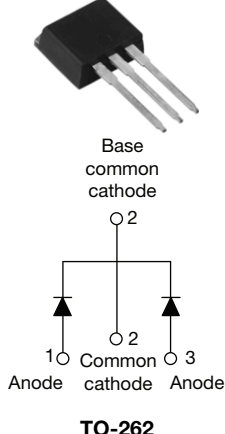


## Schottky Rectifier, 2 x 15 A

VS-30CTQ...SPbF



VS-30CTQ...-1PbF



### FEATURES

- 175 °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
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Halogen-free according to IEC 61249-2-21 definition
- Compliant to RoHS directive 2002/95/EC
- AEC-Q101 qualified



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

### DESCRIPTION

This center tap Schottky rectifier series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

### PRODUCT SUMMARY

|             |            |
|-------------|------------|
| $I_{F(AV)}$ | 2 x 15 A   |
| $V_R$       | 80 V/100 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS                       | VALUES      | UNITS |
|-------------|---------------------------------------|-------------|-------|
| $I_{F(AV)}$ | Rectangular waveform                  | 30          | A     |
| $V_{RRM}$   |                                       | 80/100      | V     |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine                  | 850         | A     |
| $V_F$       | 15 Apk, $T_J = 125^\circ C$ (per leg) | 0.67        | V     |
| $T_J$       | Range                                 | - 55 to 175 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | VS-30CTQ080SPbF<br>VS-30CTQ080-1PbF | VS-30CTQ100SPbF<br>VS-30CTQ100-1PbF | UNITS |
|--------------------------------------|-----------|-------------------------------------|-------------------------------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 80                                  | 100                                 | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |                                     |                                     |       |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER   | SYMBOL      | TEST CONDITIONS   | VALUES | UNITS |
|---|-------------|---|--------|-------|
| Maximum average forward current<br>per device<br>See fig. 5               | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 129^\circ C$ , rectangular waveform   | 30     | A     |
|   |             |   | 15     |       |
| 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   | 850    |       |
|   |             | 10 ms sine or 6 ms rect. pulse  | 275    |       |
| Non-repetitive avalanche energy per leg                                   | $E_{AS}$    | $T_J = 25^\circ C$ , $I_{AS} = 0.50$ A, $L = 60$ mH   | 7.50   | 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 | 0.50   | A     |

# VS-30CTQ...SPbF, VS-30CTQ...-1PbF Series

Vishay High Power Products Schottky Rectifier, 2 x 15 A



| ELECTRICAL SPECIFICATIONS                             |                                |  |                                       |        |       |      |
|---|--------------------------------|--|---------------------------------------|--------|-------|------|
| PARAMETER   | SYMBOL                         | TEST CONDITIONS  |                                       | VALUES | UNITS |      |
| Maximum forward voltage drop per leg<br>See fig. 1    | V <sub>FM</sub> <sup>(1)</sup> | 15 A   | T <sub>J</sub> = 25 °C                | 0.86   | V     |      |
|   |                                | 30 A   |                                       | 1.05   |       |      |
|   |                                | 15 A   | T <sub>J</sub> = 125 °C               | 0.67   |       | 0.82 |
|   |                                | 30 A   |                                       |        |       |      |
| Maximum reverse leakage current per leg<br>See fig. 2 | I <sub>RM</sub> <sup>(1)</sup> | T <sub>J</sub> = 25 °C   | V <sub>R</sub> = Rated V <sub>R</sub> | 0.55   | mA    |      |
|   |                                | T <sub>J</sub> = 125 °C  |                                       | 7.0    |       |      |
| Maximum junction capacitance per leg                  | C <sub>T</sub>                 | V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz), 25 °C |                                       | 500    | pF    |      |
| Typical series inductance per leg                     | L <sub>S</sub>                 | Measured lead to lead 5 mm from package body                                   |                                       | 8.0    | nH    |      |
| Maximum voltage rate of change                        | dV/dt                          | Rated V <sub>R</sub>   |                                       | 10 000 | V/μs  |      |

## Note

<sup>(1)</sup> Pulse width < 300  $\mu$ s, duty cycle < 2 %

| THERMAL - MECHANICAL SPECIFICATIONS                      |                                   |                                      |             |                        |
|--|-----------------------------------|--------------------------------------|-------------|------------------------|
| PARAMETER  | SYMBOL                            | TEST CONDITIONS                      | VALUES      | UNITS                  |
| Maximum junction and storage temperature range           | T <sub>J</sub> , T <sub>Stg</sub> |                                      | - 55 to 175 | °C                     |
| Maximum thermal resistance, junction to case per leg     | R <sub>thJC</sub>                 | DC operation                         | 3.25        | °C/W                   |
| Maximum thermal resistance, junction to case per package |                                   |                                      | 1.63        |                        |
| Typical thermal resistance, case to heatsink             | R <sub>thCS</sub>                 | Mounting surface, smooth and greased | 0.50        |                        |
| Approximate weight                                       |                                   |                                      | 2           | g                      |
|  |                                   |                                      | 0.07        | oz.                    |
| Mounting torque  | minimum                           |                                      | 6 (5)       | kgf · cm<br>(lbf · in) |
|  | maximum                           |                                      | 12 (10)     |                        |
| Marking device   |                                   | Case style D <sup>2</sup> PAK        | 30CTQ100S   |                        |
|  |                                   | Case style TO-262                    | 30CTQ100-1  |                        |



# VS-30CTQ...SPbF, VS-30CTQ...-1PbF Series

Schottky Rectifier, 2 x 15 A Vishay High Power Products

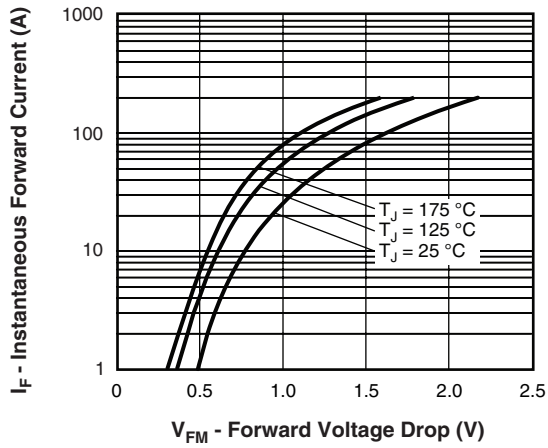


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

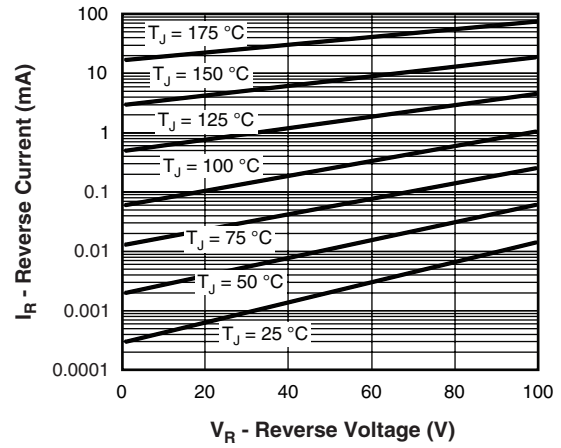


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

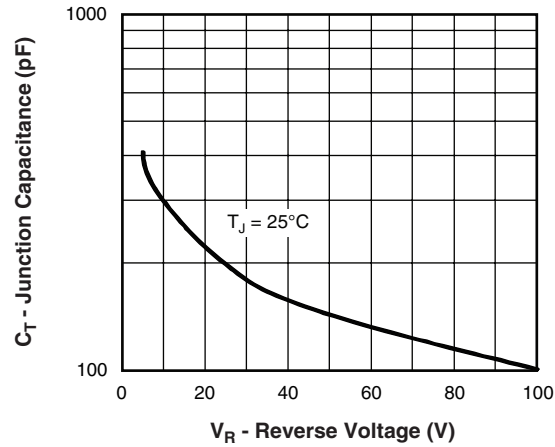


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

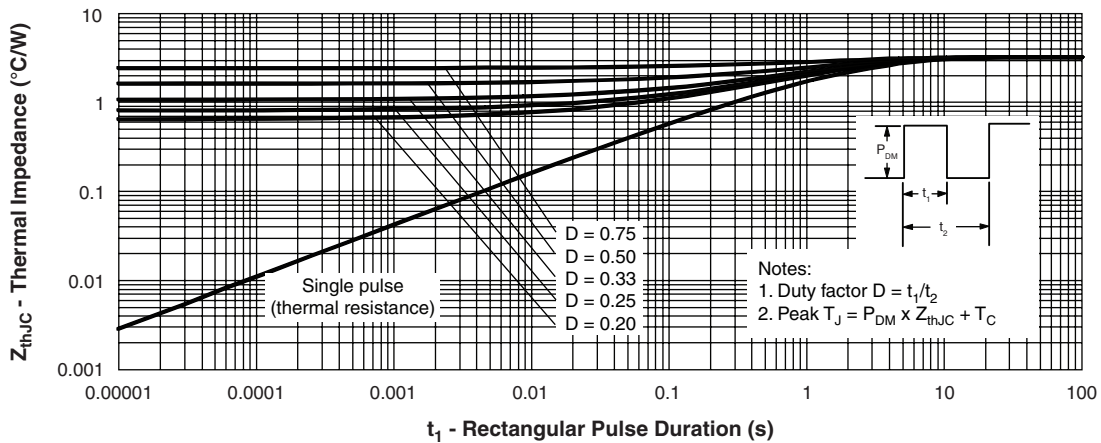


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

# VS-30CTQ...SPbF, VS-30CTQ...-1PbF Series

Vishay High Power Products Schottky Rectifier, 2 x 15 A

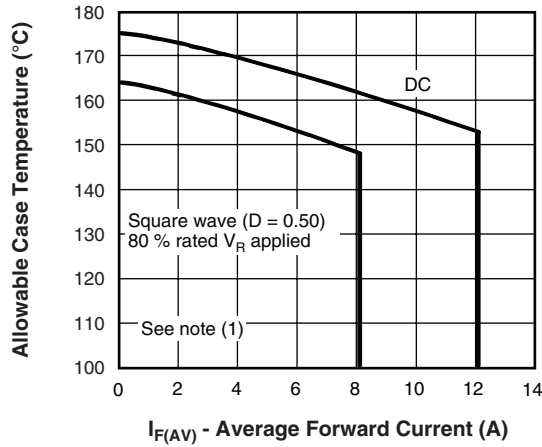


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

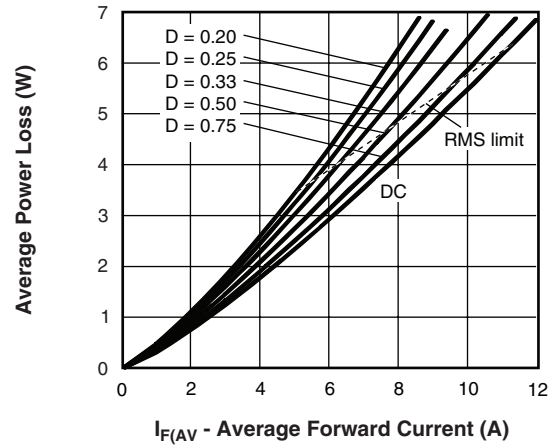


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

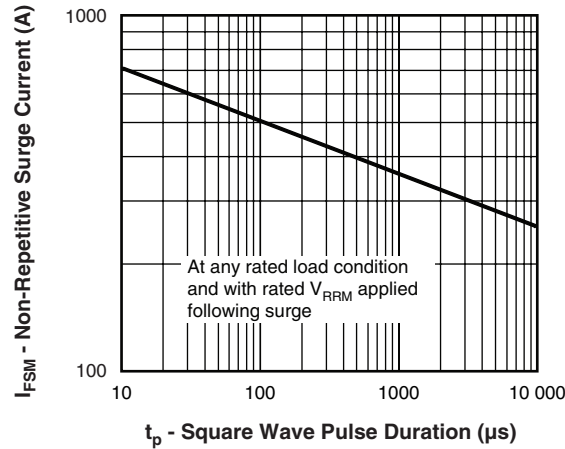


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

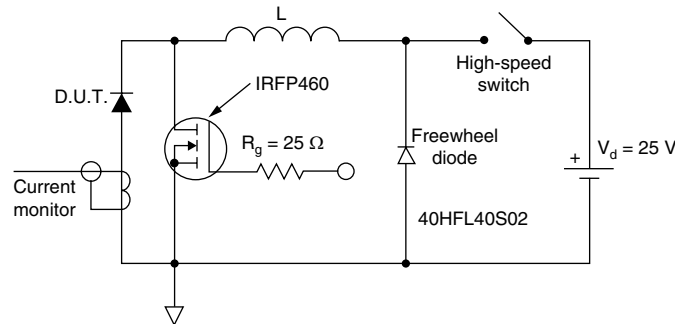


Fig. 8 - Unclamped Inductive Test Circuit

## Note

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{dREV}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 10$  V



## VS-30CTQ...SPbF, VS-30CTQ...-1PbF Series

Schottky Rectifier, 2 x 15 A Vishay High Power Products

### ORDERING INFORMATION TABLE

|             |     |    |   |   |   |     |   |     |     |
|-------------|-----|----|---|---|---|-----|---|-----|-----|
| Device code | VS- | 30 | C | T | Q | 100 | S | TRL | PbF |
|             | 1   | 2  | 3 | 4 | 5 | 6   | 7 | 8   | 9   |

- |          |   |  |                           |
|----------|---|--|---------------------------|
| <b>1</b> | - | HPP product suffix   |                           |
| <b>2</b> | - | Current rating (30 A)  |                           |
| <b>3</b> | - | Circuit configuration: C = Common cathode  |                           |
| <b>4</b> | - | T = TO-220   |                           |
| <b>5</b> | - | Schottky "Q" series  |                           |
| <b>6</b> | - | Voltage ratings  | 080 = 80 V<br>100 = 100 V |
| <b>7</b> | - | • S = D <sup>2</sup> PAK<br>• -1 = TO-262  |                           |
| <b>8</b> | - | • None = Tube (50 pieces)<br>• TRL = Tape and reel (left oriented - for D <sup>2</sup> PAK only)<br>• TRR = Tape and reel (right oriented - for D <sup>2</sup> PAK only) |                           |
| <b>9</b> | - | PbF = Lead (Pb)-free   |                           |

| LINKS TO RELATED DOCUMENTS |  |
|----------------------------|--|
| Dimensions                 | <a href="http://www.vishay.com/doc?95014">www.vishay.com/doc?95014</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95008">www.vishay.com/doc?95008</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a> |



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