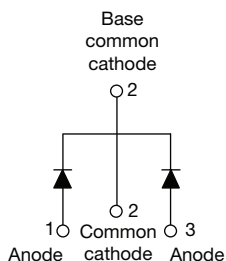


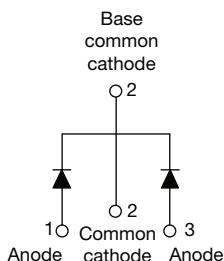
## Schottky Rectifier, 2 x 15 A

VS-32CTQ...SPbF



D<sup>2</sup>PAK

VS-32CTQ...-1PbF



TO-262

### FEATURES

- 150 °C T<sub>J</sub> 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
- 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

The VS-32CTQ... Schottky rectifier series 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.

### PRODUCT SUMMARY

|                    |           |
|--------------------|-----------|
| I <sub>F(AV)</sub> | 2 x 15 A  |
| V <sub>R</sub>     | 25 V/30 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL             | CHARACTERISTICS                 | VALUES      | UNITS |
|--------------------|---------------------------------|-------------|-------|
| I <sub>F(AV)</sub> | Rectangular waveform            | 30          | A     |
| V <sub>RRM</sub>   |                                 | 25/30       | V     |
| I <sub>FSM</sub>   | t <sub>p</sub> = 5 μs sine      | 900         | A     |
| V <sub>F</sub>     | 15 Apk, T <sub>J</sub> = 125 °C | 0.40        | V     |
| T <sub>J</sub>     | Range                           | - 55 to 150 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL           | VS-32CTQ025SPbF<br>VS-32CTQ025-1PbF | VS-32CTQ030SPbF<br>VS-32CTQ030-1PbF | UNITS |
|--------------------------------------|------------------|-------------------------------------|-------------------------------------|-------|
| Maximum DC reverse voltage           | V <sub>R</sub>   | 25                                  | 30                                  | V     |
| Maximum working peak reverse voltage | V <sub>RWM</sub> |                                     |                                     |       |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                                            | SYMBOL             | TEST CONDITIONS                                                                                                                        | VALUES | UNITS |
|----------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------|-------|
| Maximum average forward current<br>See fig. 5                        | I <sub>F(AV)</sub> | 50 % duty cycle at T <sub>C</sub> = 115 °C, rectangular waveform                                                                       | 30     | A     |
| Maximum peak one cycle non-repetitive<br>surge current<br>See fig. 7 | I <sub>FSM</sub>   | 5 μs sine or 3 μs rect. pulse                                                                                                          | 900    |       |
|                                                                      |                    | 10 ms sine or 6 ms rect. pulse                                                                                                         | 250    |       |
| Non-repetitive avalanche energy                                      | E <sub>AS</sub>    | T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 1.20 A, L = 11.10 mH                                                                         | 13     | mJ    |
| Repetitive avalanche current                                         | I <sub>AR</sub>    | Current decaying linearly to zero in 1 μs<br>Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical | 3      | A     |

# VS-32CTQ...SPbF, VS-32CTQ...-1PbF Series

Vishay High Power Products Schottky Rectifier, 2 x 15 A



| ELECTRICAL SPECIFICATIONS                     |                                |                                                                                |                                       |        |       |  |
|-----------------------------------------------|--------------------------------|--------------------------------------------------------------------------------|---------------------------------------|--------|-------|--|
| PARAMETER                                     | SYMBOL                         | TEST CONDITIONS                                                                |                                       | VALUES | UNITS |  |
| Maximum forward voltage drop<br>See fig. 1    | V <sub>FM</sub> <sup>(1)</sup> | 15 A                                                                           | T <sub>J</sub> = 25 °C                | 0.49   | V     |  |
|                                               |                                | 30 A                                                                           |                                       | 0.58   |       |  |
|                                               |                                | 15 A                                                                           | T <sub>J</sub> = 125 °C               | 0.40   |       |  |
|                                               |                                | 30 A                                                                           |                                       | 0.53   |       |  |
| Maximum reverse leakage current<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> | 1.75   | mA    |  |
|                                               |                                | T <sub>J</sub> = 125 °C                                                        |                                       | 97     |       |  |
| Threshold voltage                             | V <sub>F(TO)</sub>             | T <sub>J</sub> = T <sub>J</sub> maximum                                        |                                       | 0.233  | V     |  |
| Forward slope resistance                      | r <sub>t</sub>                 |                                                                                |                                       | 9.09   | mΩ    |  |
| 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 |                                       | 1300   | 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

(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 <sub>J</sub> , T <sub>Stg</sub> |                                      | - 55 to 150 | °C                     |
| Maximum thermal resistance, junction to case per leg | R <sub>thJC</sub>                 | DC operation<br>See fig. 4           | 3.25        | °C/W                   |
| 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        | 32CTQ025S   |                        |
|                                                      |                                   |                                      | 32CTQ030S   |                        |
|                                                      |                                   | Case style TO-262                    | 32CTQ025-1  |                        |
|                                                      |                                   |                                      | 32CTQ030-1  |                        |



# VS-32CTQ...SPbF, VS-32CTQ...-1PbF Series

Schottky Rectifier, 2 x 15 A Vishay High Power Products

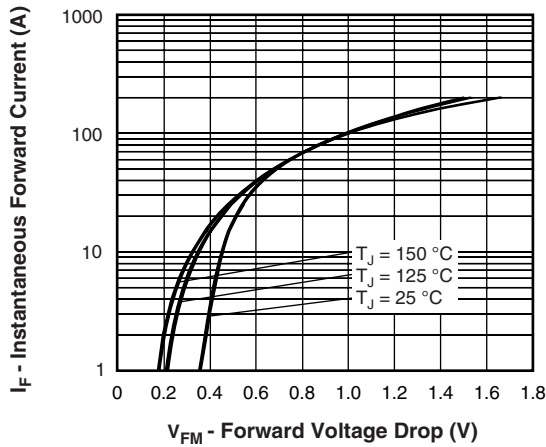


Fig. 1 - Maximum Forward Voltage Drop Characteristics

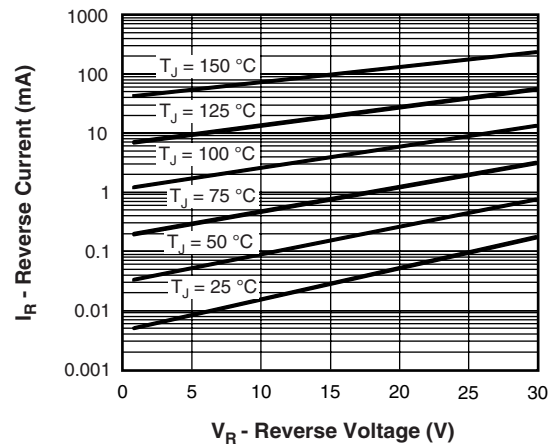


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

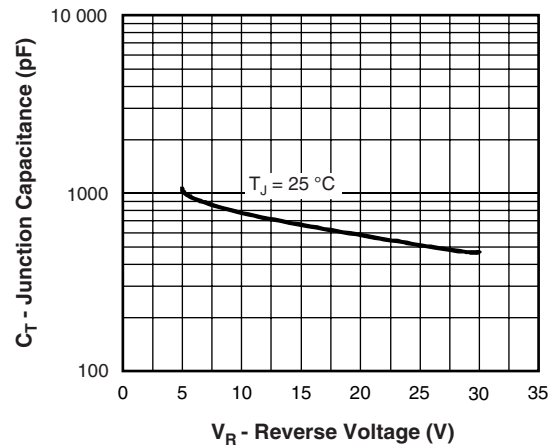


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

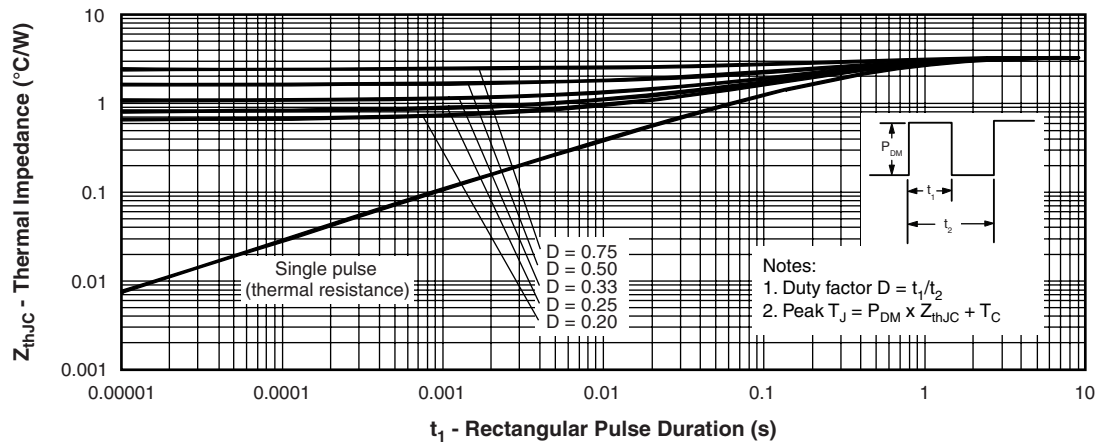


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

# VS-32CTQ...SPbF, VS-32CTQ...-1PbF Series

Vishay High Power Products Schottky Rectifier, 2 x 15 A

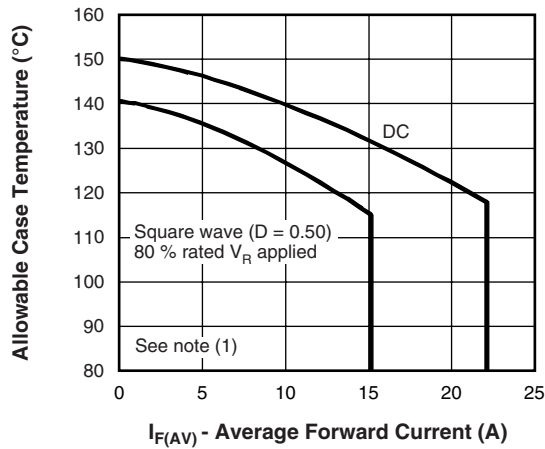


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

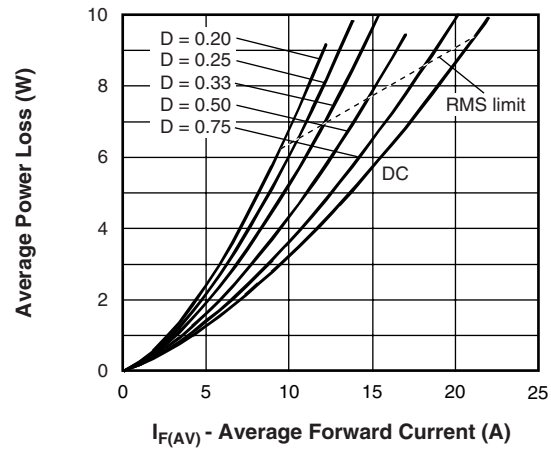


Fig. 6 - Forward Power Loss Characteristics

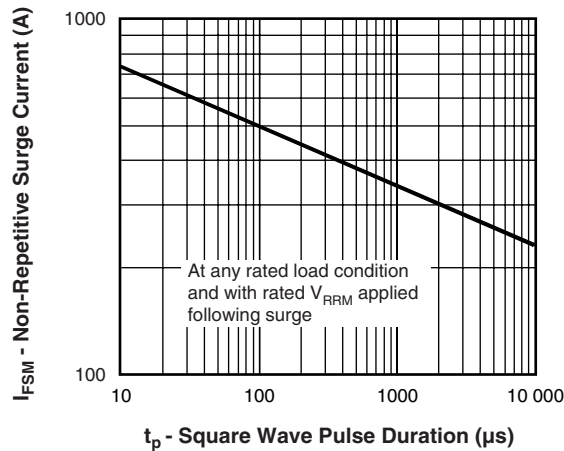


Fig. 7 - Maximum Non-Repetitive Surge Current



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  $V_{R1} = 80\%$  rated  $V_R$



## VS-32CTQ...SPbF, VS-32CTQ...-1PbF Series

Schottky Rectifier, 2 x 15 A Vishay High Power Products

### ORDERING INFORMATION TABLE

| Device code | VS-                                                                                                                                                                        | 32 | C | T | Q | 030 | S | TRL | PbF |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|---|---|-----|---|-----|-----|
|             | 1                                                                                                                                                                          | 2  | 3 | 4 | 5 | 6   | 7 | 8   | 9   |
| 1           | - HPP product suffix                                                                                                                                                       |    |   |   |   |     |   |     |     |
| 2           | - Current rating (30 A)                                                                                                                                                    |    |   |   |   |     |   |     |     |
| 3           | - Circuit configuration: C = Common cathode                                                                                                                                |    |   |   |   |     |   |     |     |
| 4           | - T = TO-220                                                                                                                                                               |    |   |   |   |     |   |     |     |
| 5           | - Schottky "Q" series                                                                                                                                                      |    |   |   |   |     |   |     |     |
| 6           | - Voltage ratings                                                                                                                                                          |    |   |   |   |     |   |     |     |
| 7           | - • S = D <sup>2</sup> PAK<br>• -1 = TO-262                                                                                                                                |    |   |   |   |     |   |     |     |
| 8           | - • 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) |    |   |   |   |     |   |     |     |
| 9           | - 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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