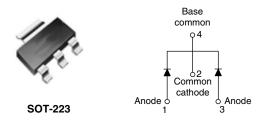


### Vishay High Power Products

### Schottky Rectifier, 2 x 1 A



| PRODUCT SUMMARY     |         |  |  |  |
|---------------------|---------|--|--|--|
| I <sub>F(AV)</sub>  | 2 x 1 A |  |  |  |
| V <sub>R</sub> 30 V |         |  |  |  |

### **FEATURES**

- Small foot print, surface mountable
- · Low profile
- · Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- · Common cathode
- Designed and qualified for industrial level

### **DESCRIPTION**

The 20CJQ030 surface mount Schottky rectifier series has been designed for applications requiring very low forward drop and very small foot prints. Typical applications are in portables, switching power supplies, converters, automotive system, freewheeling diodes, battery charging, and reverse battery protection.

| MAJOR RATINGS AND CHARACTERISTICS |  |             |       |  |
|-----------------------------------|--|-------------|-------|--|
| SYMBOL                            | CHARACTERISTICS                          | VALUES      | UNITS |  |
| I <sub>F(AV)</sub>                | Rectangular waveform                     | 2           | Α     |  |
| V <sub>RRM</sub>                  |  | 30          | V     |  |
| I <sub>FSM</sub>                  | t <sub>p</sub> = 5 μs sine               | 400         | Α     |  |
| V <sub>F</sub>                    | 1 Apk, T <sub>J</sub> = 125 °C (per leg) | 0.42        | V     |  |
| T <sub>J</sub>                    | Range                                    | - 55 to 150 | °C    |  |

| VOLTAGE RATINGS              |           |          |       |  |
|------------------------------|-----------|----------|-------|--|
| PARAMETER                    | SYMBOL    | 20CJQ030 | UNITS |  |
| DC reverse voltage           | $V_{R}$   | 30       | V     |  |
| Working peak reverse voltage | $V_{RWM}$ | 30       | V     |  |

| ABSOLUTE MAXIMUM RATINGS   |            |   |  |   |        |       |
|--|------------|---|--|---|--------|-------|
| PARAMETER  |            | SYMBOL  | TEST CONDITIONS  |   | VALUES | UNITS |
| Maximum average forward current  | per leg    |   | 50 % duty cycle at T <sub>C</sub> = 132 °C, rectangular waveform |   | 1      |       |
| See fig. 5   | per device | I <sub>F(AV)</sub>  | 50 % duty cycle at T <sub>C</sub> = 117 °C, rectangular waveform |   | 2      | А     |
| Maximum peak one cycle non-repetitive surge current per leg See fig. 7 |            |   | 5 μs sine or 3 μs rect. pulse                                    | Following any rated load condition and with | 400    | Α .   |
|  |            | I <sub>FSM</sub>  | 10 ms sine or 6 ms rect. pulse                                   | rated V <sub>RRM</sub> applied              | 24     |       |
| Non-repetitive avalanche energy per leg E,                             |            | E <sub>AS</sub>   | T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 1 A, L = 4 mH          |   | 2      | mJ    |
| Repetitive avalanche current per leg I <sub>AR</sub>                   |            | Current decaying linearly to zero in 1 $\mu$ s<br>Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical |  | 1   | Α      |       |

# Vishay High Power Products Schottky Rectifier, 2 x 1 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> | 1 A   | T <sub>J</sub> = 25 °C                  | 0.50   | V     |
|  |                                | 2 A   |   | 0.59   |       |
|  |                                | 1 A   | T <sub>J</sub> = 125 °C                 | 0.42   |       |
|  |                                | 2 A   |   | 0.52   |       |
| Maximum reverse leakage current per leg            | I <sub>RM</sub> <sup>(1)</sup> | T <sub>J</sub> = 25 °C  | - V <sub>R</sub> = Rated V <sub>R</sub> | 0.1    | - mA  |
| See fig. 2   | 'RM\'                          | T <sub>J</sub> = 125 °C   |   | 15     |       |
| Typical 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 |   | 120    | pF    |
| Typical series inductance per leg                  | L <sub>S</sub>                 | Measured lead to lead 5 mm from package body 6                                |   | nH     |       |
| Maximum voltage rate of change                     | dV/dt                          | Rated V <sub>R</sub> 4600 V/ <sub>L</sub>                                     |   | 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> <sup>(1)</sup> , T <sub>Stg</sub> |                    | - 55 to 150 | °C    |
| Maximum thermal resistance, junction to ambient | R <sub>thJA</sub>                                | DC eneration       | 65          | °C/W  |
| Maximum thermal resistance, junction to lead    | R <sub>thJL</sub>                                | DC operation       | 25          |       |
| Approximate weight                              |  |                    | 0.13        | g     |
| Approximate weight                              |  |                    | 0.0045      | OZ.   |
| Marking device                                  |  | Case style SOT-223 | 2C.         | JQE   |

#### Note

(1) 
$$\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$$
 thermal runaway condition for a diode on its own heatsink



# Schottky Rectifier, 2 x 1 A Vishay High Power Products

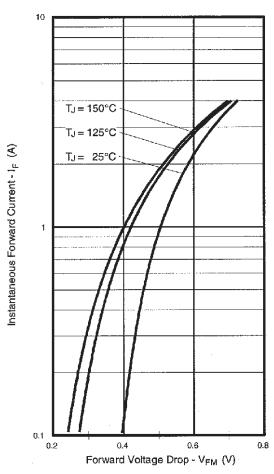


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

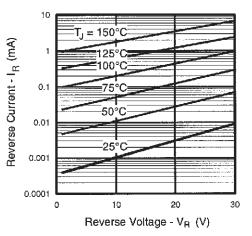


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

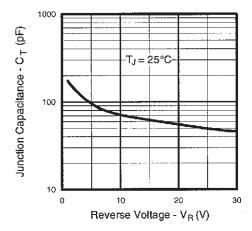


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

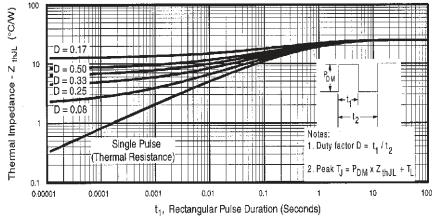


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

## Vishay High Power Products Schottky Rectifier, 2 x 1 A



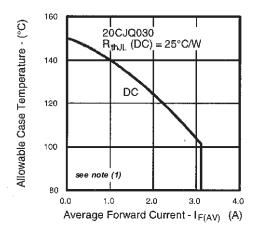


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

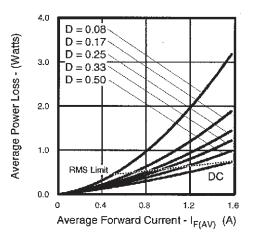


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

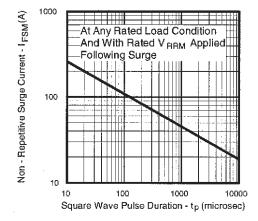


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

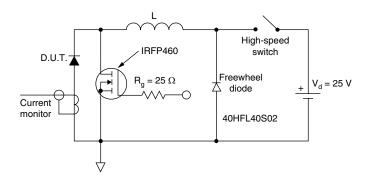


Fig. 8 - Unclamped Inductive Test Circuit

#### Note

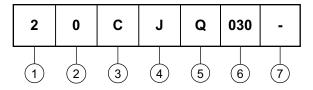
 $\begin{array}{l} \text{(1) Formula used: } T_C = T_J - (Pd + Pd_{REV}) \times R_{th,JC}; \\ Pd = Forward power loss = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D) \text{ (see fig. 6)}; \\ Pd_{REV} = Inverse power loss = V_{R1} \times I_R \text{ (1 - D); } I_R \text{ at } V_{R1} = 80 \text{ \% rated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



# Schottky Rectifier, 2 x 1 A Vishay High Power Products

### **ORDERING INFORMATION TABLE**

**Device code** 



- 1 Current rating (2 = 2 A)
- 2 Schottky rectifier series
- Circuit configuration:

C = Common cathode

4 - Package:

J = SOT-223

- 5 Schottky "Q" series
- 6 Voltage rating (030 = 30 V)
- 7 • None = Standard production
  - PbF = Lead (Pb)-free

| LINKS TO RELATED DOCUMENTS                 |                                 |  |  |  |
|--|---------------------------------|--|--|--|
| Dimensions http://www.vishay.com/doc?95022 |                                 |  |  |  |
| Part marking information                   | http://www.vishay.com/doc?95031 |  |  |  |
| Packaging information                      | http://www.vishay.com/doc?95035 |  |  |  |

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