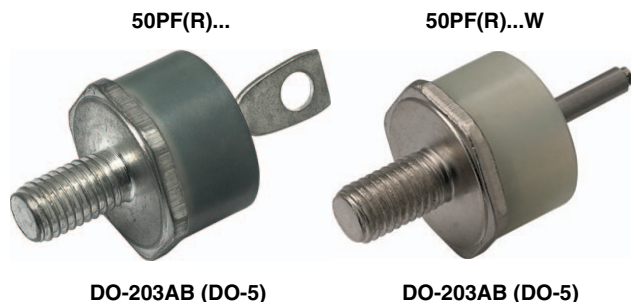


## Standard Recovery Diodes, Generation 2 DO-5 (Stud Version), 50 A



### FEATURES

- High surge current capability
- Designed for a wide range of applications
- Stud cathode and stud anode version
- Wire version available
- Low thermal resistance
- Designed and qualified for multiple level
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- Welding
- Any high voltage input rectification bridge

| PRODUCT SUMMARY       |                 |
|-----------------------|-----------------|
| $I_{F(AV)}$           | 50 A            |
| Package               | DO-203AB (DO-5) |
| Circuit configuration | Single diode    |

| MAJOR RATINGS AND CHARACTERISTICS |                 |              |                  |
|-----------------------------------|-----------------|--------------|------------------|
| PARAMETER                         | TEST CONDITIONS | VALUES       | UNITS            |
| $I_{F(AV)}$                       |                 | 50           | A                |
|                                   | $T_C$           | 128          | °C               |
| $I_{F(RMS)}$                      |                 | 78           | A                |
| $I_{FSM}$                         | 50 Hz           | 570          | A                |
|                                   | 60 Hz           | 595          |                  |
| $I^2t$                            | 50 Hz           | 1600         | A <sup>2</sup> s |
|                                   | 60 Hz           | 1450         |                  |
| $V_{RRM}$                         | Range           | 1400 to 1600 | V                |
| $T_J$                             |                 | -55 to 160   | °C               |

### ELECTRICAL SPECIFICATIONS

| VOLTAGE RATINGS  |              |                                                          |                                                              |                                           |
|------------------|--------------|----------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------|
| TYPE NUMBER      | VOLTAGE CODE | $V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE<br>V | $I_{RRM}$ MAXIMUM AT $T_J = 150$ °C<br>mA |
| VS-50PF(R)...(W) | 140          | 1400                                                     | 1650                                                         | 4.5                                       |
|                  | 160          | 1600                                                     | 1900                                                         |                                           |



| FORWARD CONDUCTION                                            |                     |                                                                                                           |                                  |                                                       |        |                   |
|---------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------|--------|-------------------|
| PARAMETER                                                     | SYMBOL              | TEST CONDITIONS                                                                                           |                                  |                                                       | VALUES | UNITS             |
| Maximum average forward current at case temperature           | I <sub>F(AV)</sub>  | 180° conduction, half sine wave                                                                           |                                  |                                                       | 50     | A                 |
|                                                               |                     |                                                                                                           |                                  |                                                       | 128    | °C                |
| Maximum RMS forward current                                   | I <sub>F(RMS)</sub> |                                                                                                           |                                  |                                                       | 78     | A                 |
| Maximum peak, one cycle forward, non-repetitive surge current | I <sub>FSM</sub>    | t = 10 ms                                                                                                 | No voltage reapplied             | Sinusoidal half wave, initial T <sub>J</sub> = 150 °C | 570    | A                 |
|                                                               |                     | t = 8.3 ms                                                                                                |                                  |                                                       | 595    |                   |
|                                                               |                     | t = 10 ms                                                                                                 | 100 % V <sub>RRM</sub> reapplied |                                                       | 480    |                   |
|                                                               |                     | t = 8.3 ms                                                                                                |                                  |                                                       | 500    |                   |
| Maximum I <sup>2</sup> t for fusing                           | I <sup>2</sup> t    | t = 10 ms                                                                                                 | No voltage reapplied             |                                                       | 1600   | A <sup>2</sup> s  |
|                                                               |                     | t = 8.3 ms                                                                                                |                                  |                                                       | 1450   |                   |
|                                                               |                     | t = 10 ms                                                                                                 | 100 % V <sub>RRM</sub> reapplied |                                                       | 1150   |                   |
|                                                               |                     | t = 8.3 ms                                                                                                |                                  |                                                       | 1050   |                   |
| Maximum I <sup>2</sup> √t for fusing                          | I <sup>2</sup> √t   | t = 0.1 ms to 10 ms, no voltage reapplied                                                                 |                                  |                                                       | 16 000 | A <sup>2</sup> √s |
| Low level value of threshold voltage                          | V <sub>F(TO)</sub>  | (16.7 % × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum |                                  |                                                       | 0.77   | V                 |
| Low level value of forward slope resistance                   | r <sub>f</sub>      | (16.7 % × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum |                                  |                                                       | 4.30   | mΩ                |
| Maximum forward voltage drop                                  | V <sub>FM</sub>     | I <sub>pk</sub> = 125 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 400 μs rectangular wave                 |                                  |                                                       | 1.50   | V                 |

| THERMAL AND MECHANICAL SPECIFICATIONS           |                |                                                             |                 |                     |
|-------------------------------------------------|----------------|-------------------------------------------------------------|-----------------|---------------------|
| PARAMETER                                       | SYMBOL         | TEST CONDITIONS                                             | VALUES          | UNITS               |
| Maximum junction and storage temperature range  | $T_J, T_{Stg}$ |                                                             | -55 to 160      | °C                  |
| Maximum thermal resistance, junction to case    | $R_{thJC}$     | DC operation                                                | 0.51            | K/W                 |
| Thermal resistance, case to heatsink            | $R_{thCS}$     | Mounting surface, smooth, flat and greased                  | 0.25            |                     |
| Maximum allowable mounting torque (+0 %, -10 %) |                | Not lubricated thread, tightening on nut <sup>(1)</sup>     | 3.4<br>(30)     | N · m<br>(lbf · in) |
|                                                 |                | Lubricated thread, tightening on nut <sup>(1)</sup>         | 2.3<br>(20)     |                     |
|                                                 |                | Not lubricated thread, tightening on hexagon <sup>(2)</sup> | 4.2<br>(37)     |                     |
|                                                 |                | Lubricated thread, tightening on hexagon <sup>(2)</sup>     | 3.2<br>(28)     |                     |
| Approximate weight                              |                |                                                             | 15.8            | g                   |
|                                                 |                |                                                             | 0.56            | oz.                 |
| Case style                                      |                | See dimensions - link at the end of datasheet               | DO-203AB (DO-5) |                     |

**Notes**

(1) Recommended for pass-through holes

(2) Torque must be applicable only to hexagon and not to plastic structure, recommended for holed heatsink



| $\Delta R_{thJC}$ CONDUCTION |                       |                        |                             |       |
|------------------------------|-----------------------|------------------------|-----------------------------|-------|
| CONDUCTION ANGLE             | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS             | UNITS |
| 180°                         | 0.11                  | 0.10                   | $T_J = T_J \text{ maximum}$ | K/W   |
| 120°                         | 0.16                  | 0.16                   |                             |       |
| 90°                          | 0.20                  | 0.22                   |                             |       |
| 60°                          | 0.29                  | 0.31                   |                             |       |
| 30°                          | 0.49                  | 0.50                   |                             |       |

## Note

- The table above shows the increment of thermal resistance  $R_{thJC}$  when devices operate at different conduction angles than DC

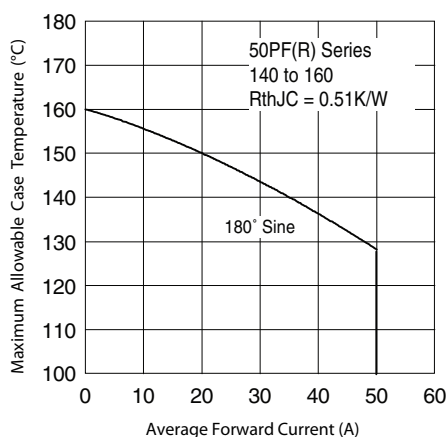


Fig. 1 - Current Ratings Characteristics

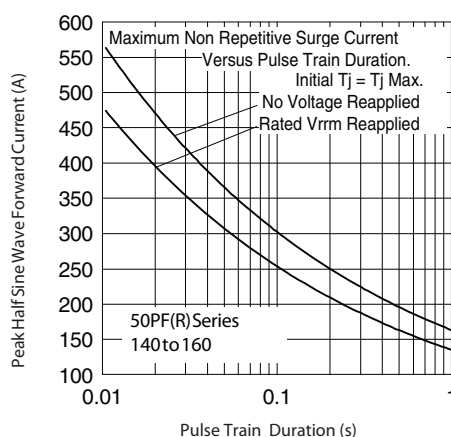


Fig. 3 - Maximum Non-Repetitive Surge Current

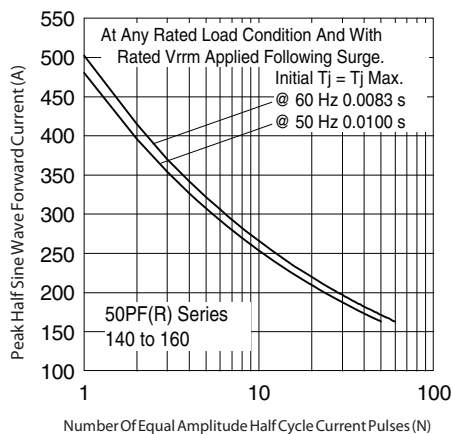


Fig. 2 - Maximum Non-Repetitive Surge Current

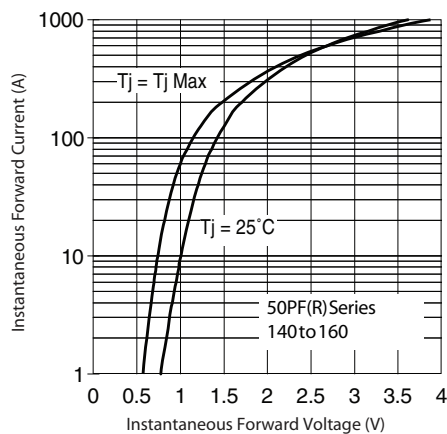


Fig. 4 - Forward Voltage Drop Characteristics

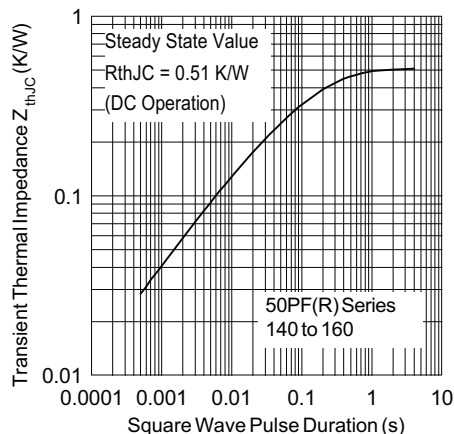


Fig. 5 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

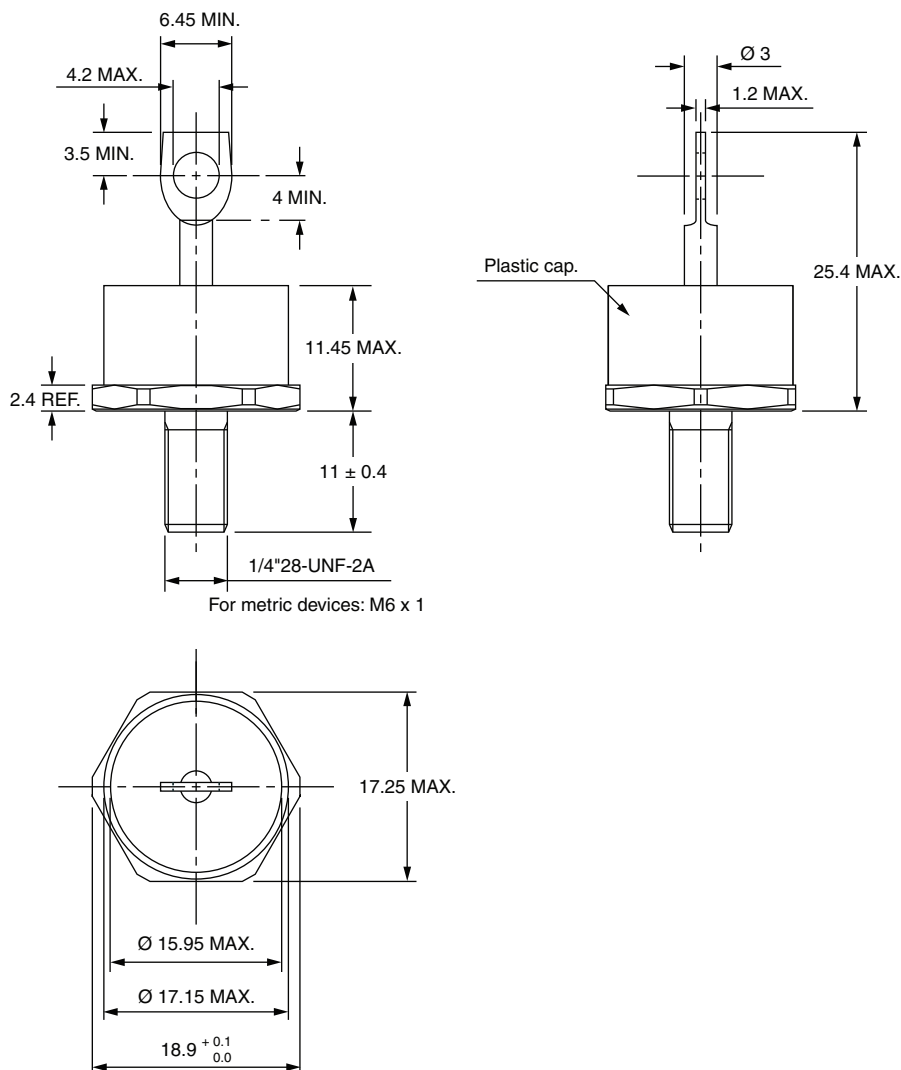
| Device code | VS-                                                                                                                                                                                                                                              | 50 | PF | R | 160 | W |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|---|-----|---|
|             | ①                                                                                                                                                                                                                                                | ②  | ③  | ④ | ⑤   | ⑥ |
| ①           | - Vishay Semiconductors product                                                                                                                                                                                                                  |    |    |   |     |   |
| ②           | - 50 = Standard device                                                                                                                                                                                                                           |    |    |   |     |   |
| ③           | - PF = Plastic package                                                                                                                                                                                                                           |    |    |   |     |   |
| ④           | <ul style="list-style-type: none"> <li>• None = Stud normal polarity (cathode to stud)</li> <li>• R = Stud reverse polarity (anode to stud)</li> </ul>                                                                                           |    |    |   |     |   |
| ⑤           | - Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)                                                                                                                                                                                      |    |    |   |     |   |
| ⑥           | <ul style="list-style-type: none"> <li>• None = Standard terminal<br/>(see dimensions for 50PF(R)... - link at the end of datasheet)</li> <li>• W = Wire terminal<br/>(see dimensions for 50PF(R)...W - link at the end of datasheet)</li> </ul> |    |    |   |     |   |

| LINKS TO RELATED DOCUMENTS |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95345">www.vishay.com/doc?95345</a> |



## DO-203AB (DO-5) for 50PF(R)...(W), 80PF(R)...(W), and 95PF(R)...(W) Series

**DIMENSIONS FOR 80PF(R), 50PF(R) AND 95PF(R) SERIES** in millimeters

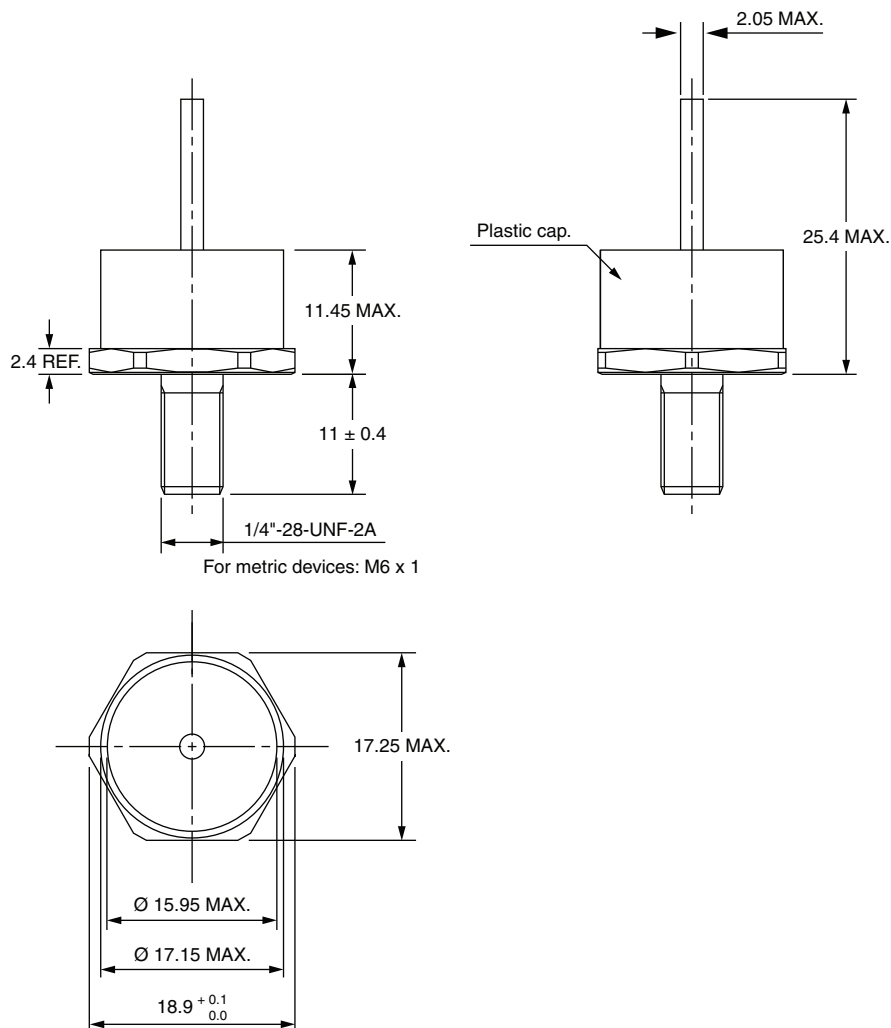


### Note

- For metric device please contact factory



## DIMENSIONS FOR 80PF(R)...(W), 50PF(R)...(W) AND 95PF(R)...(W) SERIES in millimeters

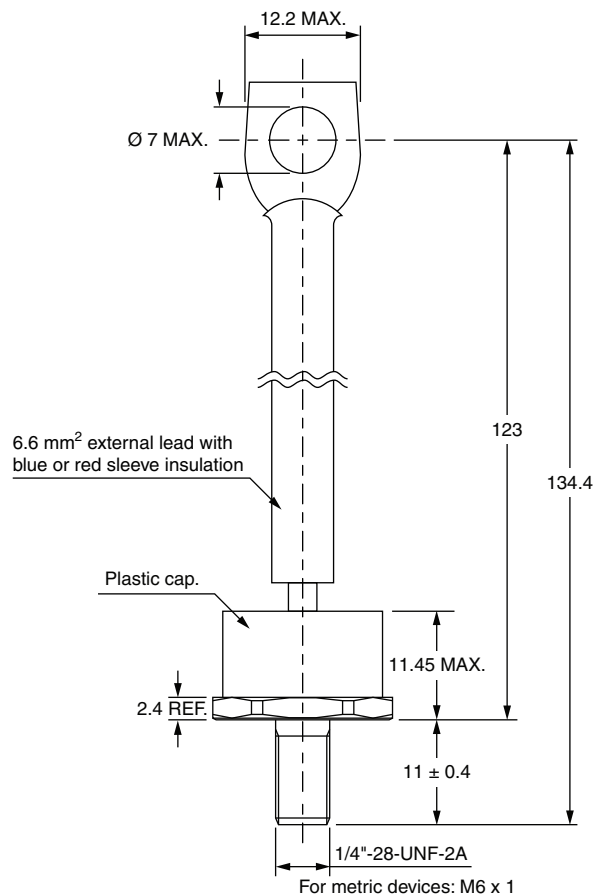


### Note

- For metric device please contact factory



## DIMENSIONS FOR 52PF(R), 82PF(R) AND 97PF(R) SERIES in millimeters



### Note

- For metric device please contact factory



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