



# Standard Recovery Diodes, (Stud Version), 40 A



DO-5 (DO-203AB)

### FEATURES

- High surge current capability
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600 V  $V_{RRM}$
- 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)



RoHS  
COMPLIANT

### TYPICAL APPLICATIONS

- Battery charges
- Converters
- Power supplies
- Machine tool controls
- Welding

| PRIMARY CHARACTERISTICS |                 |
|-------------------------|-----------------|
| $I_{F(AV)}$             | 40 A            |
| Package                 | DO-5 (DO-203AB) |
| Circuit configuration   | Single          |

| MAJOR RATINGS AND CHARACTERISTICS |                 |             |              |                  |
|-----------------------------------|-----------------|-------------|--------------|------------------|
| PARAMETER                         | TEST CONDITIONS | 40HF(R)     |              | UNITS            |
|                                   |                 | 10 TO 120   | 140/160      |                  |
| $I_{F(AV)}$                       |                 | 40          | 40           | A                |
|                                   | $T_C$           | 140         | 110          | °C               |
| $I_{F(RMS)}$                      |                 | 62          | 62           | A                |
| $I_{FSM}$                         | 50 Hz           | 570         | 570          | A                |
|                                   | 60 Hz           | 595         | 595          |                  |
| $I^2t$                            | 50 Hz           | 1600        | 1600         | A <sup>2</sup> s |
|                                   | 60 Hz           | 1450        | 1450         |                  |
| $V_{RRM}$                         | Range           | 100 to 1200 | 1400 to 1600 | V                |
| $T_J$                             |                 | -65 to 190  | -65 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 $T_J = T_J$ MAXIMUM<br>mA |
| VS-40HF(R)      | 10           | 100  | 200  | 9  |
|                 | 20           | 200  | 300  |  |
|                 | 40           | 400  | 500  |  |
|                 | 60           | 600  | 700  |  |
|                 | 80           | 800  | 900  |  |
|                 | 100          | 1000   | 1100   |  |
|                 | 120          | 1200   | 1300   |  |
|                 | 140          | 1400   | 1500   | 4.5  |
| 160             | 1600         | 1700   |  |  |



| FORWARD CONDUCTION  |               |  |                           |           |         |                   |
|---|---------------|--|---------------------------|-----------|---------|-------------------|
| PARAMETER   | SYMBOL        | TEST CONDITIONS  |                           | 40HF(R)   |         | UNITS             |
|   |               |  |                           | 10 TO 120 | 140/160 |                   |
| Maximum average forward current at case temperature           | $I_{F(AV)}$   | 180° conduction, half sine wave                                  |                           | 40        | 40      | A                 |
| Maximum RMS forward current                                   | $I_{F(RMS)}$  |  |                           | 140       | 110     | °C                |
| Maximum peak, one-cycle forward, non-repetitive surge current | $I_{FSM}$     | t = 10 ms<br>t = 8.3 ms  | No voltage reapplied      | 62        |         | A                 |
|   |               | t = 10 ms<br>t = 8.3 ms  | 100 % $V_{RRM}$ reapplied | 570       |         | A                 |
|   |               |  |                           | 595       |         |                   |
|   |               |  |                           | 480       |         |                   |
|   |               |  |                           | 500       |         |                   |
| Maximum $I^2t$ for fusing                                     | $I^2t$        | t = 10 ms<br>t = 8.3 ms  | No voltage reapplied      | 1600      |         | A <sup>2</sup> s  |
|   |               | t = 10 ms<br>t = 8.3 ms  | 100 % $V_{RRM}$ reapplied | 1450      |         |                   |
|   |               |  |                           | 1150      |         |                   |
|   |               |  |                           | 1050      |         |                   |
| Maximum $I^2\sqrt{t}$ for fusing                              | $I^2\sqrt{t}$ | t = 0.1 ms to 10 ms, no voltage reapplied                        |                           | 16 000    |         | A <sup>2</sup> √s |
| Value of threshold voltage (up to 1200 V)                     | $V_{F(TO)}$   | $T_J = T_J$ maximum  |                           | 0.65      |         | V                 |
| Value of threshold voltage (for 1400 V/1600 V)                | $V_{F(TO)}$   |  |                           | 0.76      |         |                   |
| Value of forward slope resistance (up to 1200 V)              | $r_f$         | $T_J = T_J$ maximum  |                           | 4.29      |         | mΩ                |
| Value of forward slope resistance (for 1400 V/1600 V)         | $r_f$         |  |                           | 3.8       |         |                   |
| Maximum forward voltage drop                                  | $V_{FM}$      | $I_{pk} = 125$ A, $T_J = 25$ °C, $t_p = 400$ μs rectangular wave |                           | 1.30      | 1.50    | V                 |

| THERMAL AND MECHANICAL SPECIFICATIONS                    |                |   |  |                 |            |                     |
|--|----------------|---|--|-----------------|------------|---------------------|
| PARAMETER  | SYMBOL         | TEST CONDITIONS   |  | 40HF(R)         |            | UNITS               |
|  |                |   |  | 10 to 120       | 140 to 160 |                     |
| Maximum junction operating and storage temperature range | $T_J, T_{Stg}$ |   |  | -65 to 190      | -65 to 160 | °C                  |
| Maximum thermal resistance, junction to case             | $R_{thJC}$     | DC operation  |  | 0.95            |            | K/W                 |
| Maximum 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 (30)        |            | N · m<br>(lbf · in) |
|  |                | Lubricated thread, tightening on nut <sup>(1)</sup>         |  | 2.3 (20)        |            |                     |
|  |                | Not lubricated thread, tightening on hexagon <sup>(2)</sup> |  | 4.2 (37)        |            |                     |
|  |                | Lubricated thread, tightening on hexagon <sup>(2)</sup>     |  | 3.2 (28)        |            |                     |
| Approximate weight                                       |                |   |  | 17              |            | g                   |
|  |                |   |  | 0.6             |            | oz.                 |
| Case style   |                | See dimensions - link at the end of datasheet               |  | DO-5 (DO-203AB) |            |                     |

**Notes**

- (1) Recommended for pass-through holes
- (2) Recommended for holed threaded heatsinks

| $\Delta R_{thJC}$ CONDUCTION |                       |                        |                     |       |
|------------------------------|-----------------------|------------------------|---------------------|-------|
| CONDUCTION ANGLE             | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS     | UNITS |
| 180°                         | 0.14                  | 0.10                   | $T_J = T_J$ maximum | K/W   |
| 120°                         | 0.16                  | 0.17                   |                     |       |
| 90°                          | 0.21                  | 0.22                   |                     |       |
| 60°                          | 0.30                  | 0.31                   |                     |       |
| 30°                          | 0.50                  | 0.50                   |                     |       |

**Note**

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

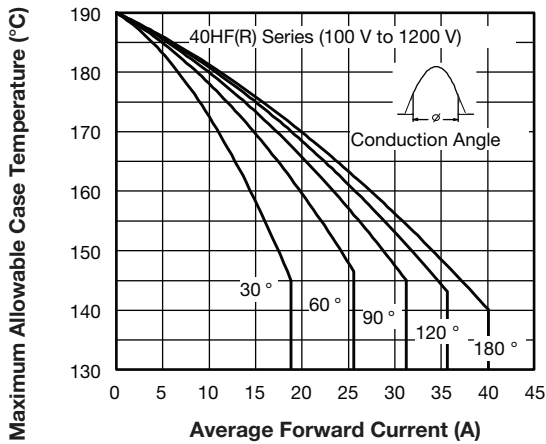


Fig. 1 - Current Ratings Characteristics

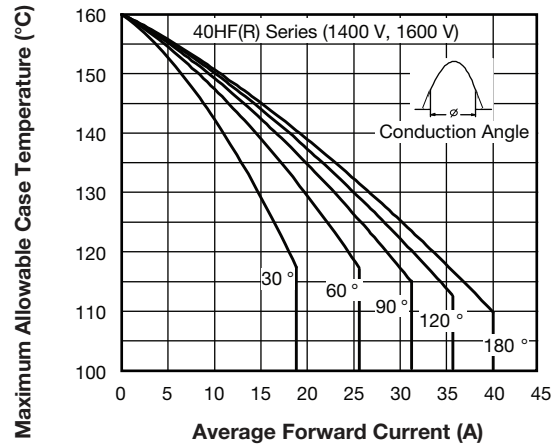


Fig. 3 - Current Ratings Characteristics

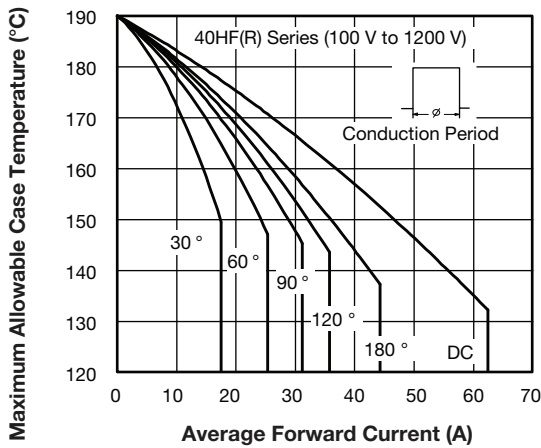


Fig. 2 - Current Ratings Characteristics

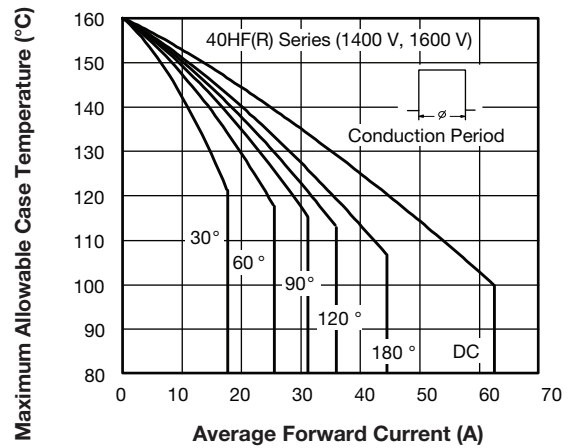


Fig. 4 - Current Ratings Characteristics

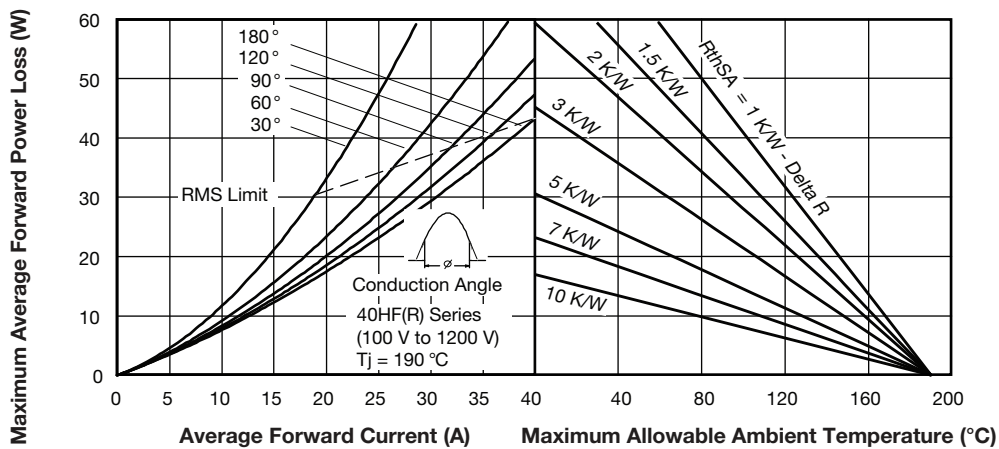


Fig. 5 - Forward Power Loss Characteristics

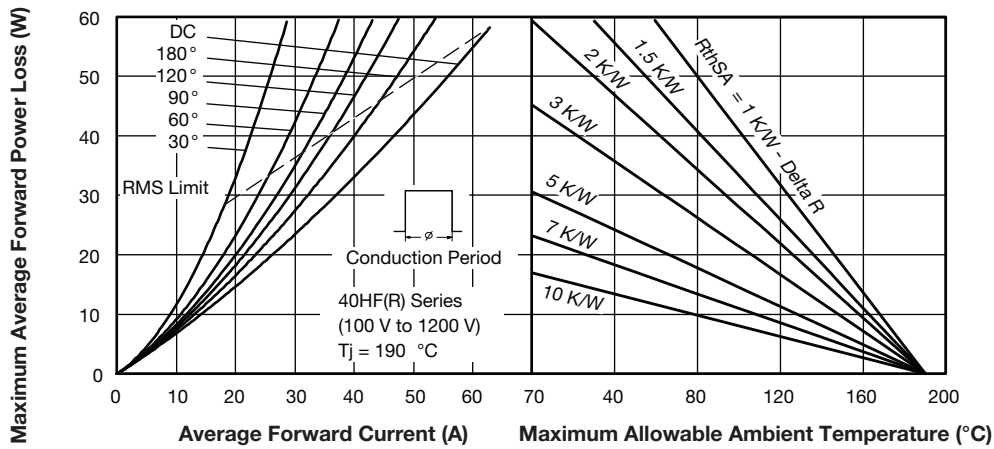


Fig. 6 - Forward Power Loss Characteristics

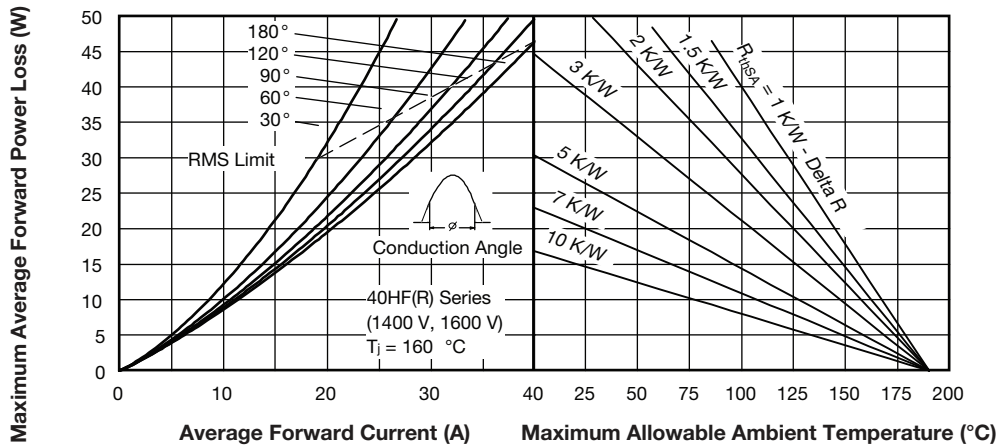


Fig. 7 - Forward Power Loss Characteristics

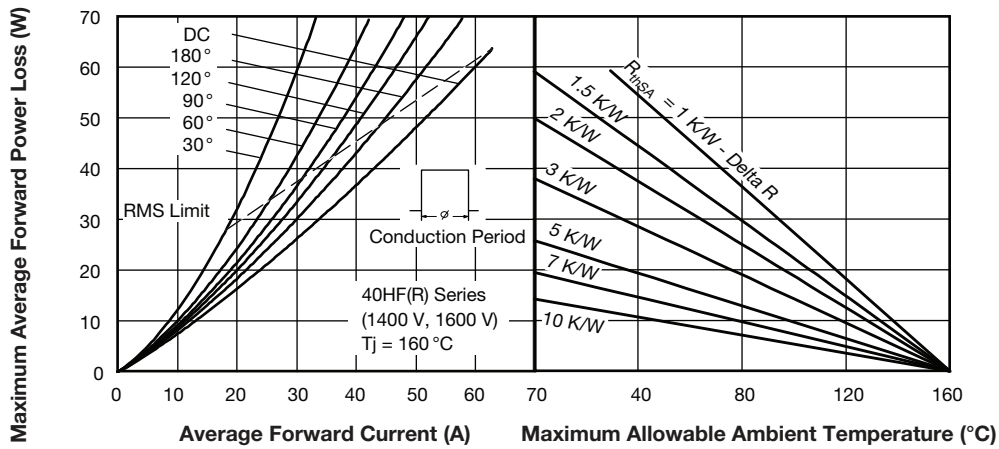


Fig. 8 - Forward Power Loss Characteristics

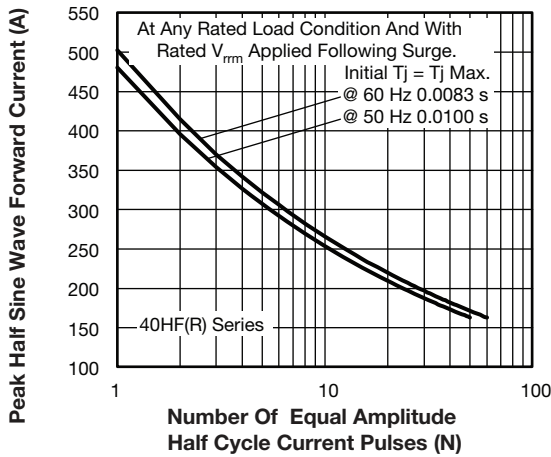


Fig. 9 - Maximum Non-Repetitive Surge Current

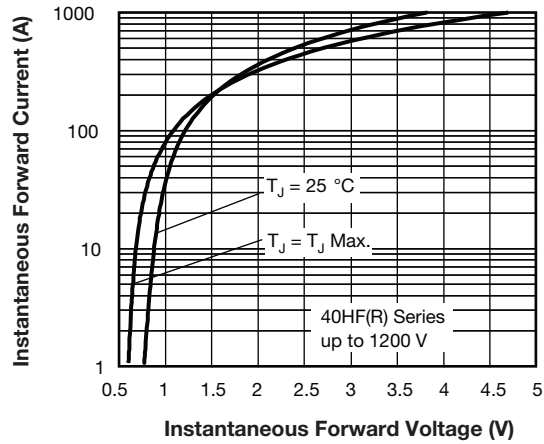


Fig. 11 - Forward Voltage Drop Characteristics (Up To 1200 V)

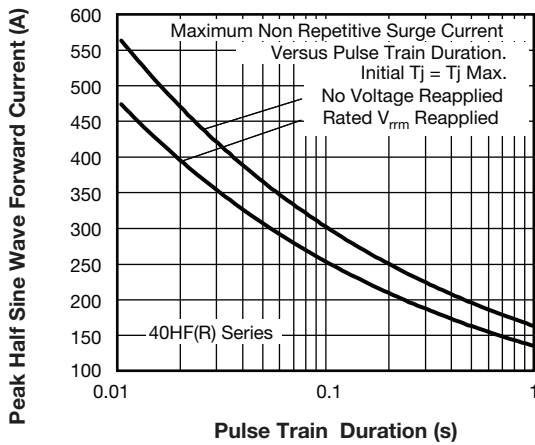


Fig. 10 - Maximum Non-Repetitive Surge Current

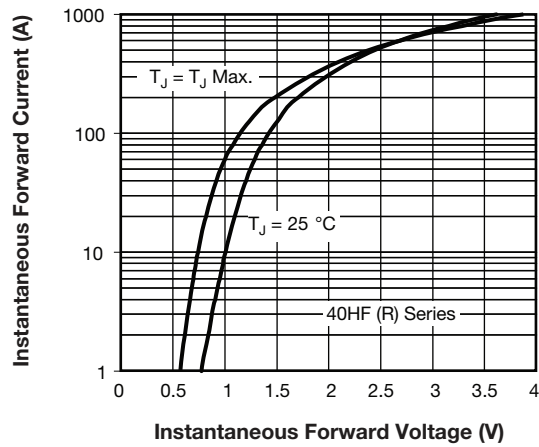


Fig. 12 - Forward Voltage Drop Characteristics (For 1400 V/1600 V)

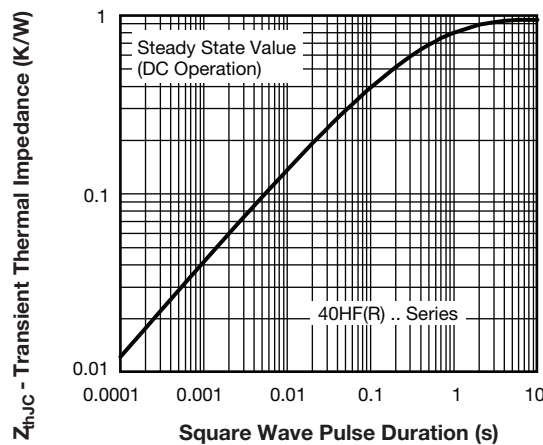
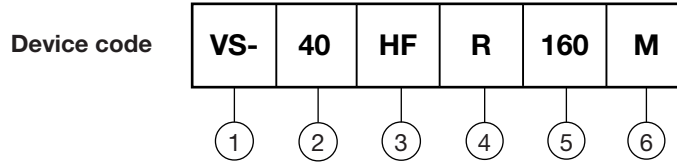


Fig. 13 - Thermal Impedance  $Z_{thJC}$  Characteristics



**ORDERING INFORMATION TABLE**

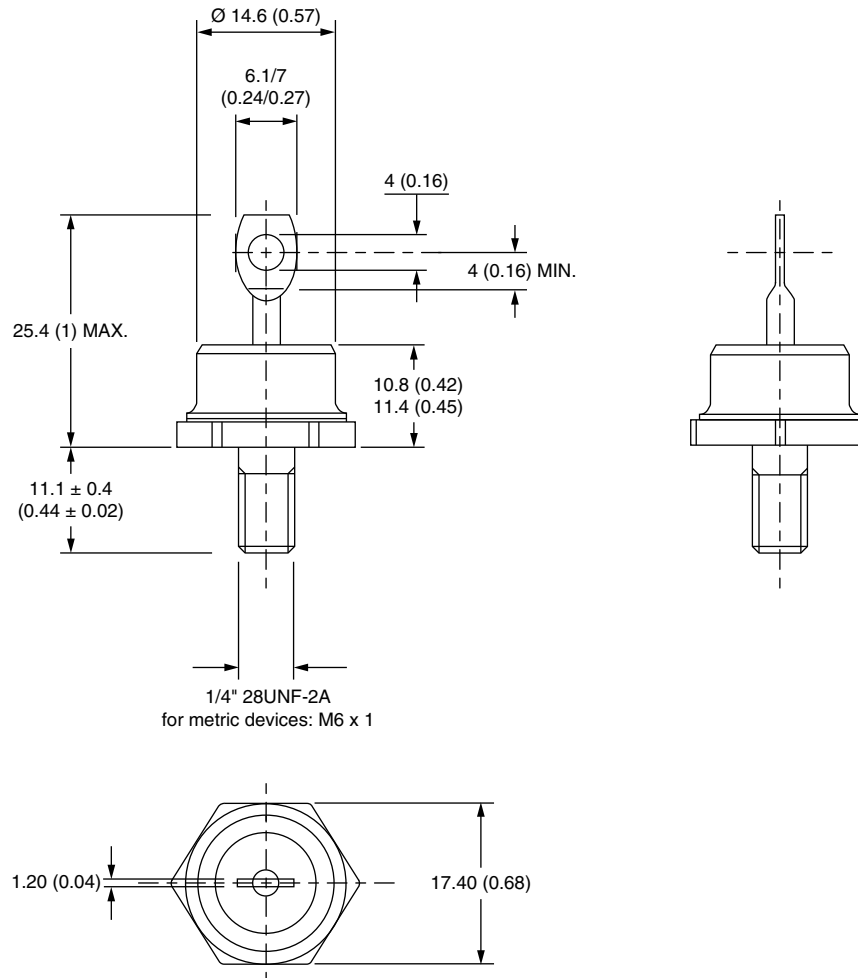


- 1** - Vishay Semiconductors product
- 2** -
  - 40 = standard device
  - 41 = not isolated lead
  - 42 = isolated lead with silicone sleeve  
(red = reverse polarity)  
(blue = normal polarity)
- 3** - HF = standard diode
- 4** -
  - None = stud normal polarity (cathode to stud)
  - R = stud reverse polarity (anode to stud)
- 5** - Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)
- 6** -
  - None = stud base DO-5 (DO-203AB) 1/4" 28UNF-2A
  - M = stud base DO-5 (DO-203AB) M6 x 1

| LINKS TO RELATED DOCUMENTS |  |
|----------------------------|--|
| Dimensions                 | <a href="http://www.vishay.com/doc?95344">www.vishay.com/doc?95344</a> |

## DO-203AB (DO-5) for 40HF(R) and 41HF(R) Series

**DIMENSIONS FOR 40HF(R) SERIES** in millimeters (inches)



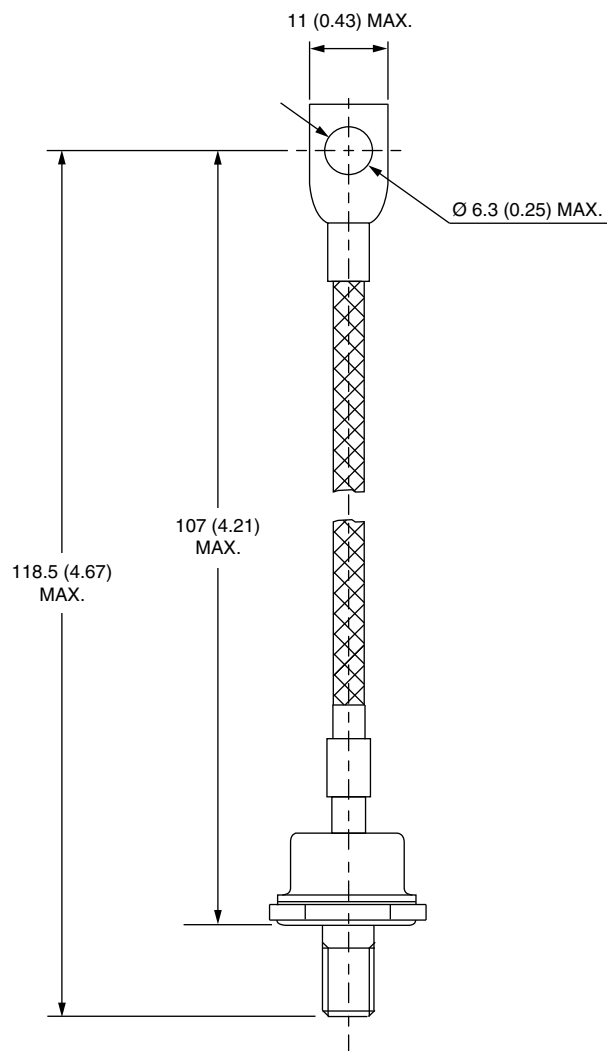
# Outline Dimensions

Vishay Semiconductors

DO-203AB (DO-5) for 40HF(R)  
and 41HF(R) Series



## DIMENSIONS FOR 41HF(R) SERIES in millimeters (inches)







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