

## Standard Recovery Diodes, (Stud Version), 85 A



DO-203AB (DO-5)

### FEATURES

- High surge current capability
- Stud cathode and stud anode version
- Leaded version available
- Types up to 400 V  $V_{RRM}$
- Designed and qualified for industrial 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 chargers
- Converters
- Power supplies
- Machine tool controls
- Welding

### PRODUCT SUMMARY

|                       |                 |
|-----------------------|-----------------|
| $I_{F(AV)}$           | 85 A            |
| Package               | DO-203AB (DO-5) |
| Circuit configuration | Single diode    |

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER    | TEST CONDITIONS | 85HF(R)    | UNITS            |
|--------------|-----------------|------------|------------------|
|              |                 | 400        |                  |
| $I_{F(AV)}$  |                 | 85         | A                |
|              | $T_C$           | 140        | °C               |
| $I_{F(RMS)}$ |                 | 133        | A                |
| $I_{FSM}$    | 50 Hz           | 1700       | A                |
|              | 60 Hz           | 1800       |                  |
| $I^2t$       | 50 Hz           | 14 500     | A <sup>2</sup> s |
|              | 60 Hz           | 13 500     |                  |
| $V_{RRM}$    | Range           | 400        | V                |
| $T_J$        |                 | -65 to 180 | °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-85HF(R)  | 40           | 400  | 500  | 9  |



| FORWARD CONDUCTION  |               |  |                           |         |                   |
|---|---------------|--|---------------------------|---------|-------------------|
| PARAMETER   | SYMBOL        | TEST CONDITIONS  |                           | 85HF(R) | UNITS             |
| Maximum average forward current at case temperature           | $I_{F(AV)}$   | 180° conduction, half sine wave                                  |                           | 85      | A                 |
|   |               |  |                           | 140     | °C                |
| Maximum RMS forward current                                   | $I_{F(RMS)}$  |  |                           | 133     | A                 |
| Maximum peak, one-cycle forward, non-repetitive surge current | $I_{FSM}$     | t = 10 ms  | No voltage reapplied      | 1700    | A                 |
|   |               | t = 8.3 ms   | No voltage reapplied      | 1800    |                   |
|   |               | t = 10 ms  | 100 % $V_{RRM}$ reapplied | 1450    |                   |
|   |               | t = 8.3 ms   | 100 % $V_{RRM}$ reapplied | 1500    |                   |
| Maximum $I^2t$ for fusing                                     | $I^2t$        | t = 10 ms  | No voltage reapplied      | 14 500  | A <sup>2</sup> s  |
|   |               | t = 8.3 ms   | No voltage reapplied      | 13 500  |                   |
|   |               | t = 10 ms  | 100 % $V_{RRM}$ reapplied | 10 500  |                   |
|   |               | t = 8.3 ms   | 100 % $V_{RRM}$ reapplied | 9400    |                   |
| 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  |                           | 0.68    | V                 |
| Value of threshold voltage (for 1400 V, 1600 V)               |               |  |                           | 0.69    |                   |
| Value of forward slope resistance (up to 1200 V)              | $r_f$         | $T_J = T_J$ maximum  |                           | 1.62    | mW                |
| Value of forward slope resistance (for 1400 V, 1600 V)        |               |  |                           | 1.75    |                   |
| Maximum forward voltage drop                                  | $V_{FM}$      | $I_{pk} = 267$ A, $T_J = 25$ °C, $t_p = 400$ μs rectangular wave |                           | 1.2     | V                 |

| THERMAL AND MECHANICAL SPECIFICATIONS                    |                |   |  |                 |                     |
|--|----------------|---|--|-----------------|---------------------|
| PARAMETER  | SYMBOL         | TEST CONDITIONS                               |  | 85HF(R)         | UNITS               |
| Maximum junction operating and storage temperature range | $T_J, T_{Stg}$ |   |  | -65 to 180      | °C                  |
| Maximum thermal resistance, junction to case             | $R_{thJC}$     | DC operation                                  |  | 0.35            | 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      |  | 3.4 (30)        | N · m<br>(lbf · in) |
|  |                | Lubricated thread, tightening on nut          |  | 2.3 (20)        |                     |
|  |                | Not lubricated thread, tightening on hexagon  |  | 4.2 (37)        |                     |
|  |                | Lubricated thread, tightening on hexagon      |  | 3.2 (28)        |                     |
| Approximate weight                                       |                | Unleaded device                               |  | 17              | g                   |
|  |                |   |  | 0.6             | oz.                 |
| Case style   |                | See dimensions - link at the end of datasheet |  | DO-203AB (DO-5) |                     |

| $\Delta R_{thJC}$ CONDUCTION |                       |                        |                     |       |
|------------------------------|-----------------------|------------------------|---------------------|-------|
| CONDUCTION ANGLE             | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS     | UNITS |
| 180°                         | 0.10                  | 0.08                   | $T_J = T_J$ maximum | K/W   |
| 120°                         | 0.11                  | 0.11                   |                     |       |
| 90°                          | 0.13                  | 0.13                   |                     |       |
| 60°                          | 0.17                  | 0.17                   |                     |       |
| 30°                          | 0.26                  | 0.26                   |                     |       |

**Note**

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

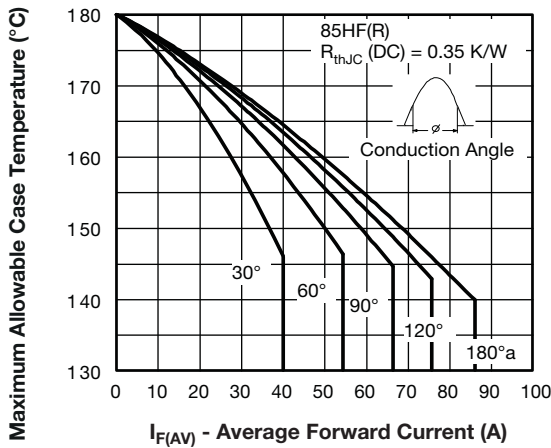


Fig. 1 - Current Ratings Characteristics

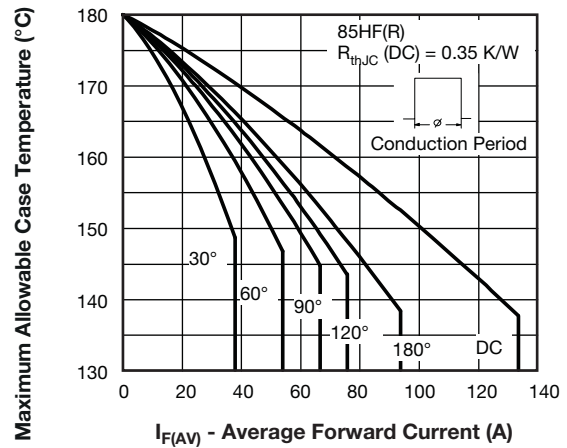


Fig. 2 - Current Ratings Characteristics

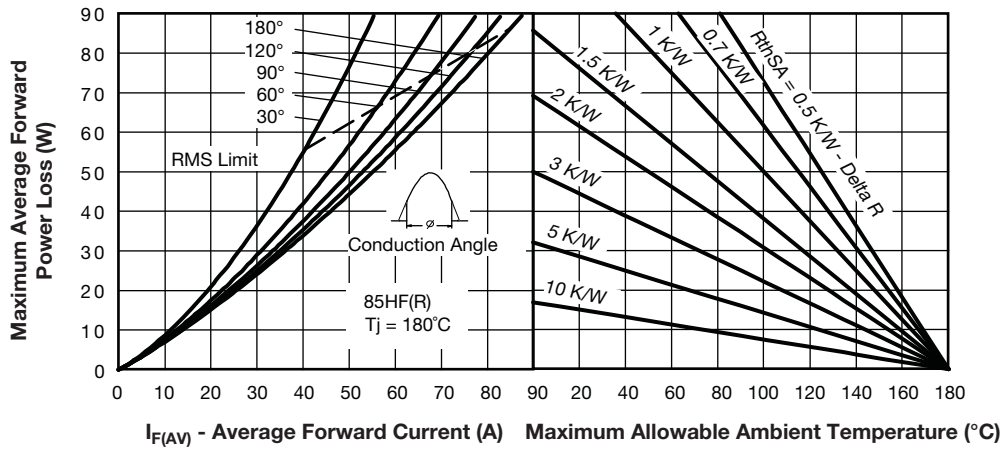


Fig. 3 - Forward Power Loss Characteristics

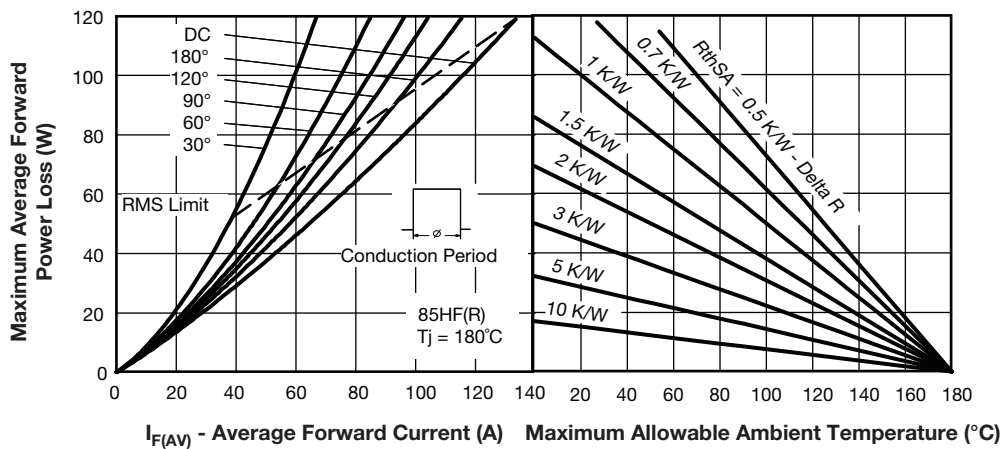


Fig. 4 - Forward Power Loss Characteristics

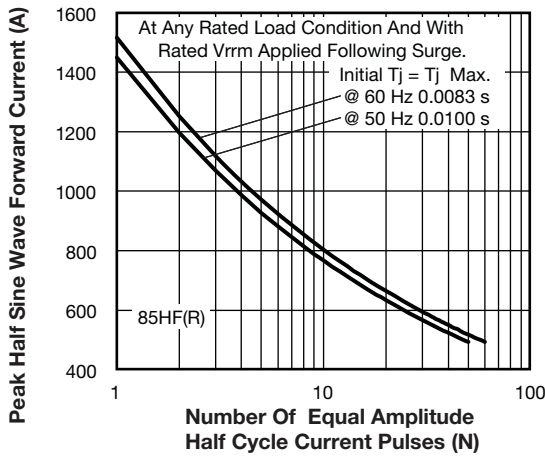


Fig. 5 - Maximum Non-Repetitive Surge Current

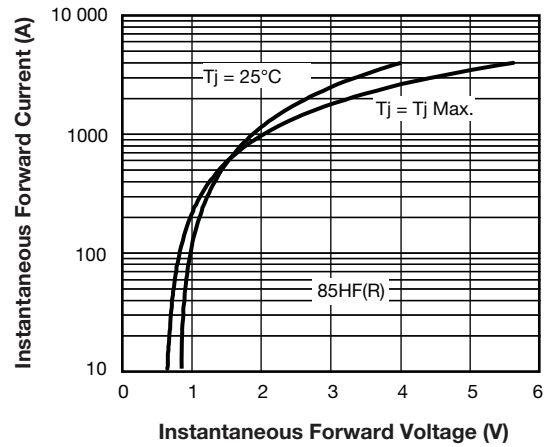


Fig. 7 - Forward Voltage Drop Characteristics

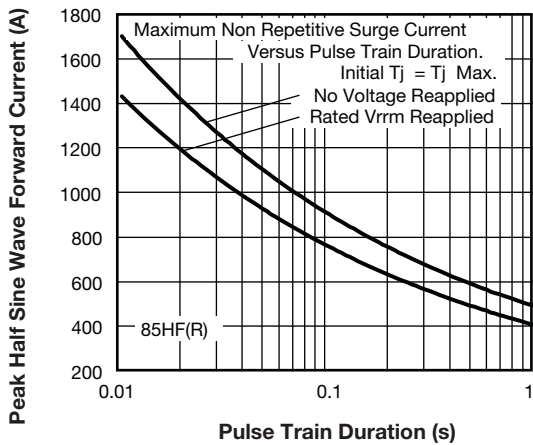


Fig. 6 - Maximum Non-Repetitive Surge Current

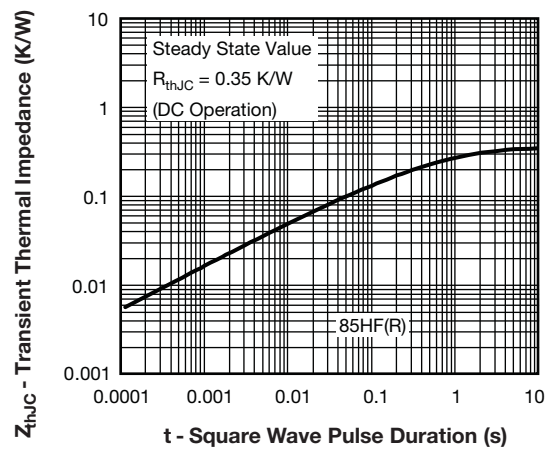


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

|             |            |           |  |          |           |           |
|-------------|------------|-----------|--|----------|-----------|-----------|
| Device code | <b>VS-</b> | <b>85</b> | <b>HF</b>  | <b>R</b> | <b>40</b> | <b>M8</b> |
|             | ①          | ②         | ③  | ④        | ⑤         | ⑥         |
|             | <b>1</b>   | -         | Vishay Semiconductors product  |          |           |           |
|             | <b>2</b>   | -         | 85 = Standard device   |          |           |           |
|             | <b>3</b>   | -         | HF = Standard diode  |          |           |           |
|             | <b>4</b>   | -         | None = Stud normal polarity (cathode to stud)<br>R = Stud reverse polarity (anode to stud) |          |           |           |
|             | <b>5</b>   | -         | Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)                                  |          |           |           |
|             | <b>6</b>   | -         | M8 = Stud base DO-203AB (DO-5) M8 x 1.25   |          |           |           |

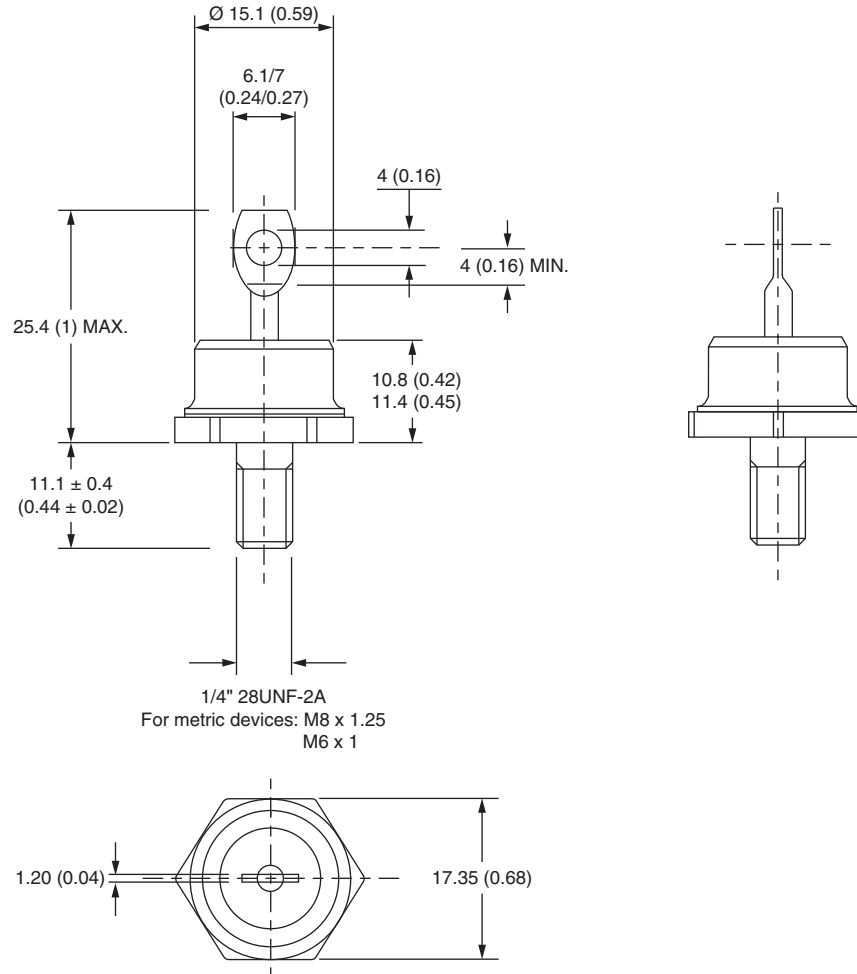
**LINKS TO RELATED DOCUMENTS**

|            |  |
|------------|--|
| Dimensions | <a href="http://www.vishay.com/doc?95342">www.vishay.com/doc?95342</a> |
|------------|--|



## DO-203AB (DO-5) for 85HF(R) Series

**DIMENSIONS** in millimeters (inches)





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