

## 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<br>PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE<br>PEAK REVERSE VOLTAGE<br>V | $I_{RRM}$ MAXIMUM<br>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 <sub>F(AV)</sub>  | 180° conduction, half sine wave                                                           |                                  |                                                                       | 85      | A                 |
|                                                               |                     |                                                                                           |                                  |                                                                       | 140     | °C                |
| Maximum RMS forward current                                   | I <sub>F(RMS)</sub> |                                                                                           |                                  |                                                                       | 133     | 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> = T <sub>J</sub> maximum | 1700    | A                 |
|                                                               |                     | t = 8.3 ms                                                                                |                                  |                                                                       | 1800    |                   |
|                                                               |                     | t = 10 ms                                                                                 | 100 % V <sub>RRM</sub> reapplied |                                                                       | 1450    |                   |
|                                                               |                     | t = 8.3 ms                                                                                |                                  |                                                                       | 1500    |                   |
| Maximum I <sup>2</sup> t for fusing                           | I <sup>2</sup> t    | t = 10 ms                                                                                 | No voltage reapplied             |                                                                       | 14 500  | A <sup>2</sup> s  |
|                                                               |                     | t = 8.3 ms                                                                                |                                  |                                                                       | 13 500  |                   |
|                                                               |                     | t = 10 ms                                                                                 | 100 % V <sub>RRM</sub> reapplied |                                                                       | 10 500  |                   |
|                                                               |                     | t = 8.3 ms                                                                                |                                  |                                                                       | 9400    |                   |
| 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 |
| Value of threshold voltage (up to 1200 V)                     | V <sub>F(TO)</sub>  | T <sub>J</sub> = T <sub>J</sub> 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 <sub>f</sub>      | T <sub>J</sub> = T <sub>J</sub> maximum                                                   |                                  |                                                                       | 1.62    | mW                |
| Value of forward slope resistance (for 1400 V, 1600 V)        |                     |                                                                                           |                                  |                                                                       | 1.75    |                   |
| Maximum forward voltage drop                                  | V <sub>FM</sub>     | I <sub>pk</sub> = 267 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 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 <sub>J</sub> , T <sub>Stg</sub> |                                               | -65 to 180      | °C                  |
| Maximum thermal resistance, junction to case             | R <sub>thJC</sub>                 | DC operation                                  | 0.35            | K/W                 |
| Maximum thermal resistance, case to heatsink             | R <sub>thCS</sub>                 | 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

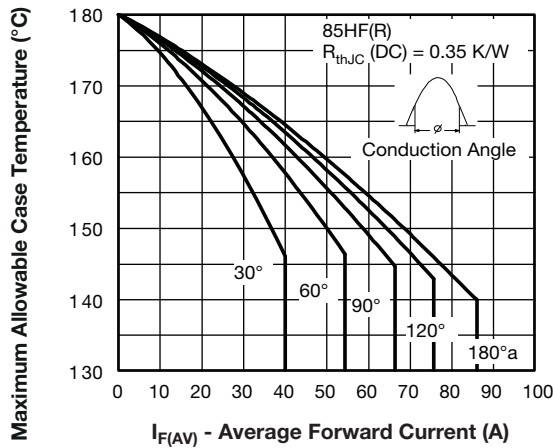


Fig. 1 - Current Ratings Characteristics

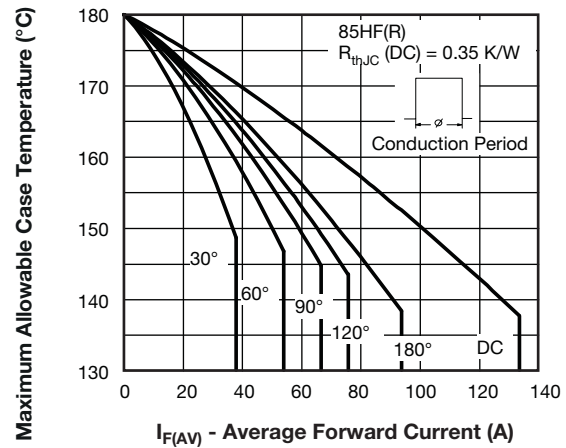


Fig. 2 - Current Ratings Characteristics

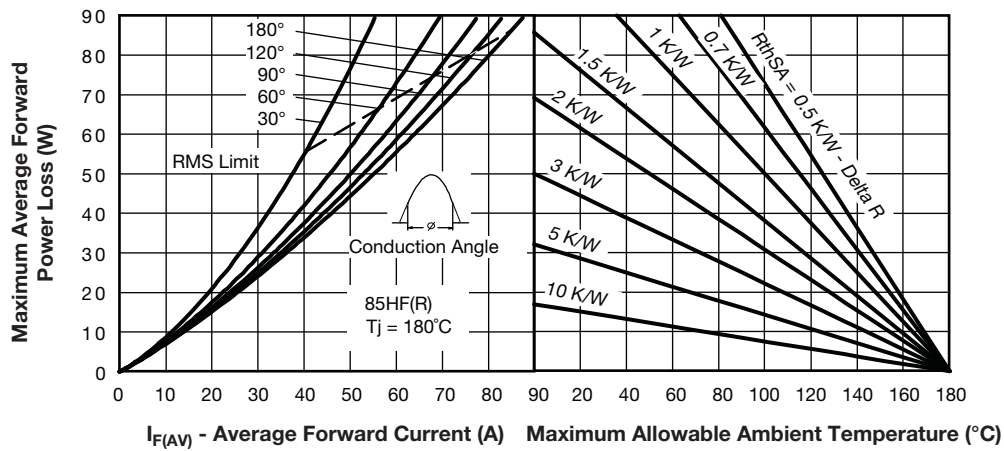


Fig. 3 - Forward Power Loss Characteristics

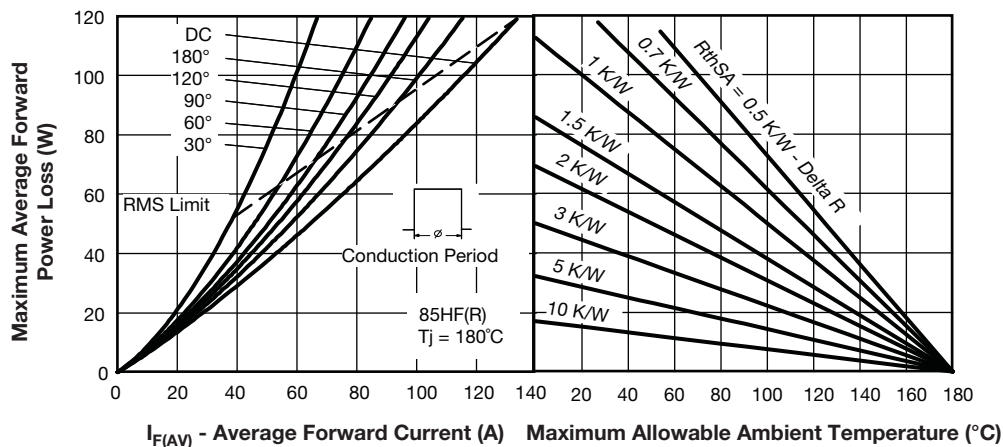


Fig. 4 - Forward Power Loss Characteristics

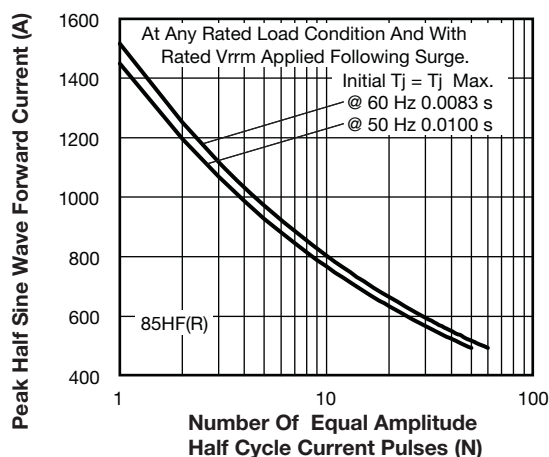


Fig. 5 - Maximum Non-Repetitive Surge Current

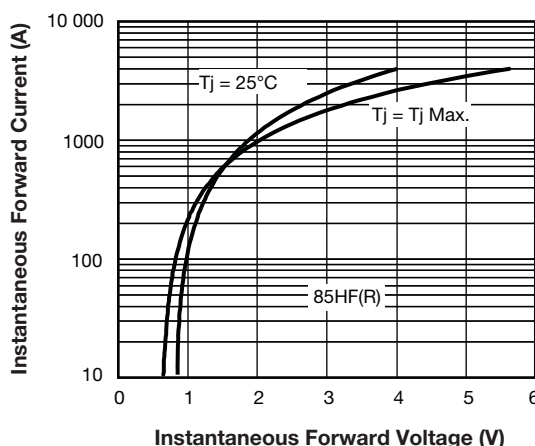


Fig. 7 - Forward Voltage Drop Characteristics

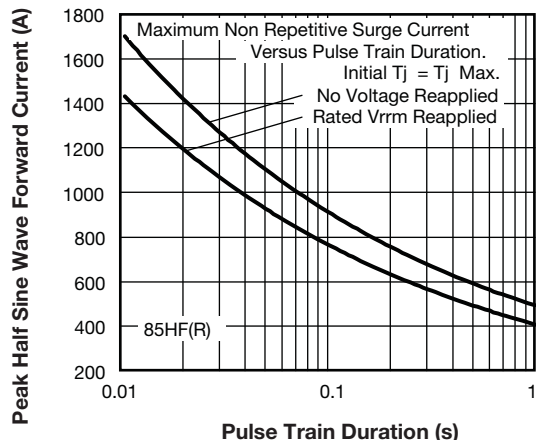
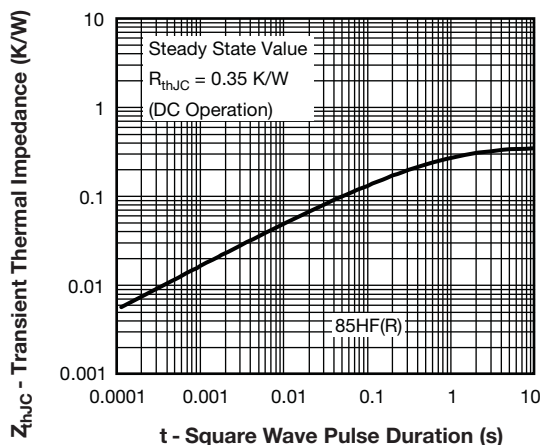


Fig. 6 - Maximum Non-Repetitive Surge Current


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

## ORDERING INFORMATION TABLE

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

## LINKS TO RELATED DOCUMENTS

Dimensions

[www.vishay.com/doc?95342](http://www.vishay.com/doc?95342)



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

**DIMENSIONS** in millimeters (inches)





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