

### 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 1600 V  $V_{RRM}$
- RoHS compliant
- Designed and qualified for industrial level



**RoHS**  
COMPLIANT

#### TYPICAL APPLICATIONS

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

#### PRODUCT SUMMARY

$I_{F(AV)}$

85 A

#### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER                   | TEST CONDITIONS | 85HF(R)     |             | UNITS            |
|-----------------------------|-----------------|-------------|-------------|------------------|
|                             |                 | 10 TO 120   | 140/160     |                  |
| I <sub>F(AV)</sub>          |                 | 85          |             | A                |
|                             | T <sub>C</sub>  | 140         | 110         | °C               |
| I <sub>F(RMS)</sub>         |                 | 133         |             | A                |
| I <sub>FSM</sub>            | 50 Hz           | 1700        |             | A                |
|                             | 60 Hz           | 1800        |             |                  |
| I <sup>2</sup> <sub>t</sub> | 50 Hz           | 14 500      |             | A <sup>2</sup> s |
|                             | 60 Hz           | 13 500      |             |                  |
| V <sub>RRM</sub>            | Range           | 100 to 1200 | 1400/1600   | V                |
| T <sub>J</sub>              |                 | - 65 to 180 | - 65 to 150 | °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 |
|-------------|--------------|-------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------|
| 85HF(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                                                                           |                                  |                                                                       | 85HF(R)   |         | UNITS             |
|                                                               |                     |                                                                                           |                                  |                                                                       | 10 to 120 | 140/160 |                   |
| Maximum average forward current at case temperature           | I <sub>F(AV)</sub>  | 180° conduction, half sine wave                                                           |                                  |                                                                       | 85        |         | A                 |
|                                                               |                     |                                                                                           |                                  |                                                                       | 140       | 110     | °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 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      |         | mΩ                |
| 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       | 1.4     | V                 |

| THERMAL AND MECHANICAL SPECIFICATIONS                    |                                   |                                               |                        |             |                     |
|----------------------------------------------------------|-----------------------------------|-----------------------------------------------|------------------------|-------------|---------------------|
| PARAMETER                                                | SYMBOL                            | TEST CONDITIONS                               | 85HF(R)                |             | UNITS               |
|                                                          |                                   |                                               | 10 to 120              | 140/160     |                     |
| Maximum junction operating and storage temperature range | T <sub>J</sub> , T <sub>Stg</sub> |                                               | - 65 to 180            | - 65 to 150 | °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 shock <sup>(1)</sup>                             |                                   |                                               | 1500                   |             | g                   |
| Maximum constant vibration <sup>(1)</sup>                |                                   | 50 Hz                                         | 20                     |             |                     |
| Maximum constant acceleration <sup>(1)</sup>             |                                   | Stud outwards                                 | 5000                   |             |                     |
| Allowable mounting torque                                |                                   | Not lubricated threads                        | 3.4 + 0 - 10 %<br>(30) |             | N · m<br>(lbf · in) |
|                                                          |                                   | Lubricated threads                            | 2.3 + 0 - 10 %<br>(20) |             |                     |
| Approximate weight                                       |                                   | Unleaded device                               | 17                     |             | g                   |
|                                                          |                                   |                                               | 0.6                    |             | oz.                 |
| Case style                                               |                                   | See dimensions - link at the end of datasheet | DO-203AB (DO-5)        |             |                     |

### Notes

<sup>(1)</sup> Available only for 88HF



| $\Delta R_{thJC}$ CONDUCTION |                       |                        |                             |       |
|------------------------------|-----------------------|------------------------|-----------------------------|-------|
| CONDUCTION ANGLE             | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS             | UNITS |
| 180°                         | 0.10                  | 0.08                   | $T_J = T_J \text{ maximum}$ | 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

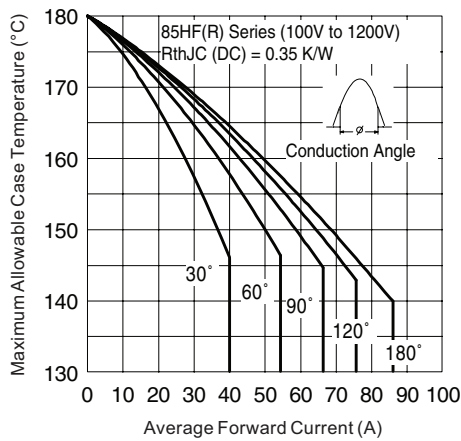


Fig. 1 - Current Ratings Characteristics

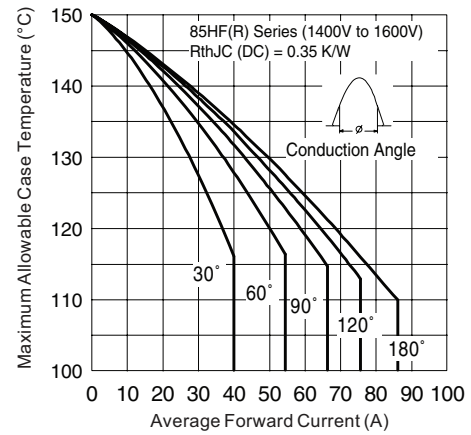


Fig. 3 - Current Ratings Characteristics

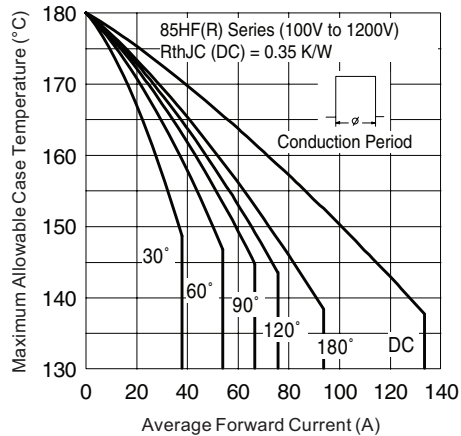


Fig. 2 - Current Ratings Characteristics

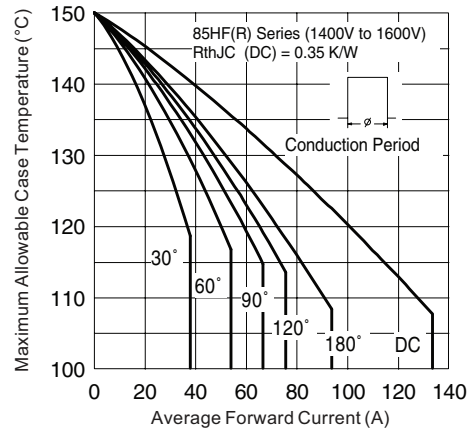


Fig. 4 - Current Ratings Characteristics

# 85HF(R) Series

Vishay High Power Products Standard Recovery Diodes,  
(Stud Version), 85 A

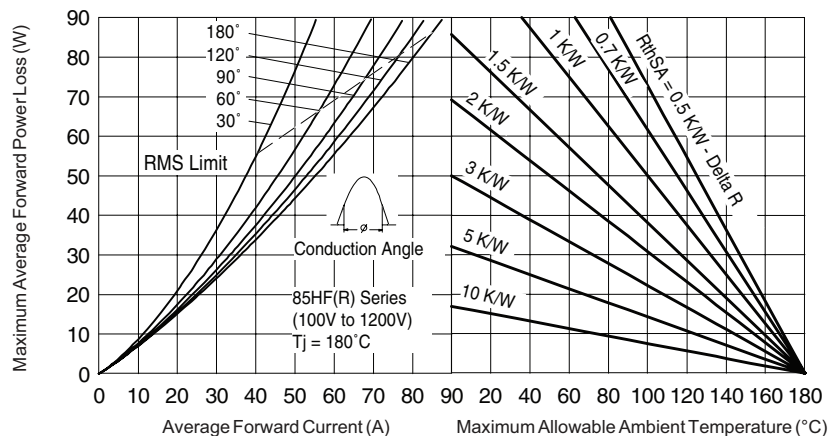


Fig. 5 - Forward Power Loss Characteristics

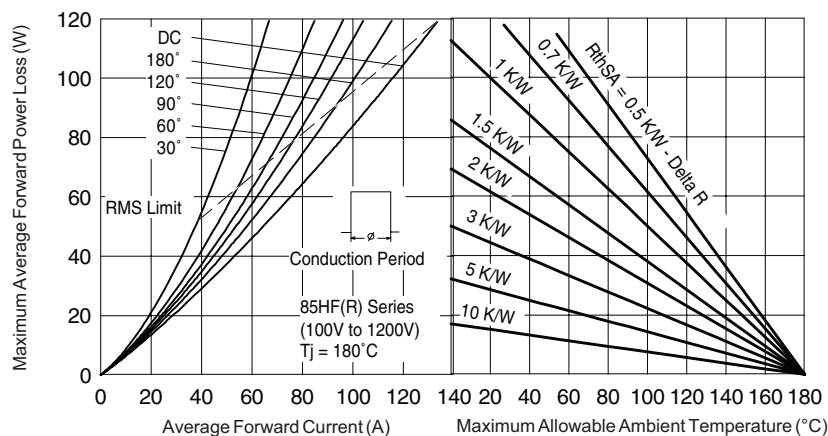


Fig. 6 - Forward Power Loss Characteristics

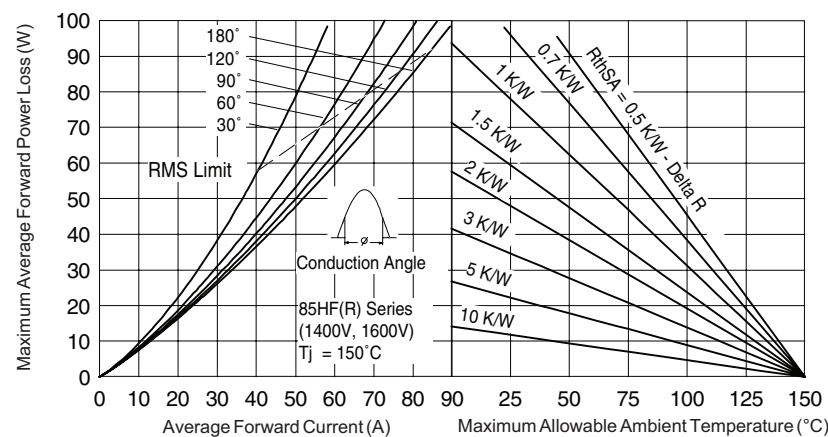


Fig. 7 - Forward Power Loss Characteristics

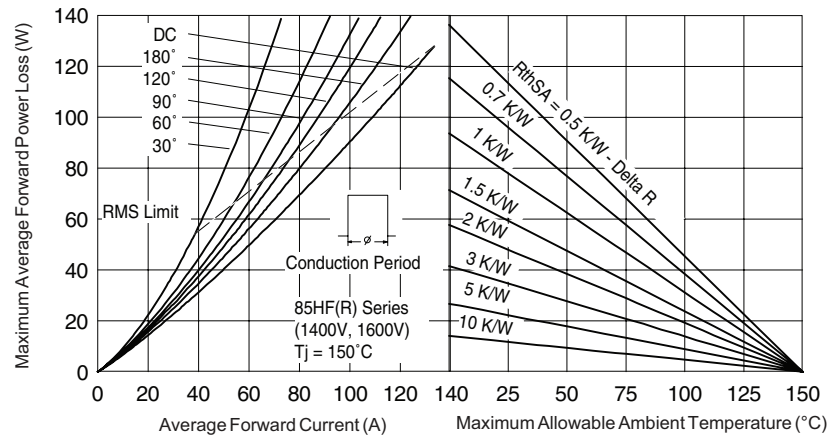


Fig. 8 - Forward Power Loss Characteristics

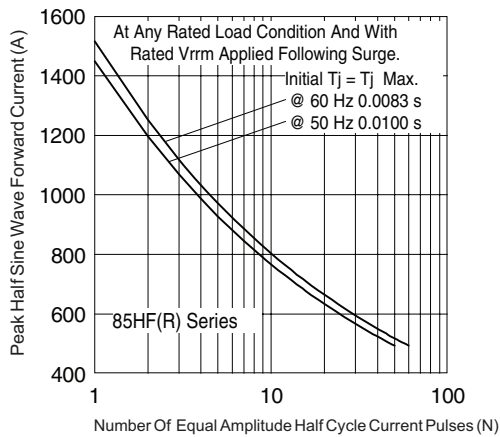


Fig. 9 - Maximum Non-Repetitive Surge Current

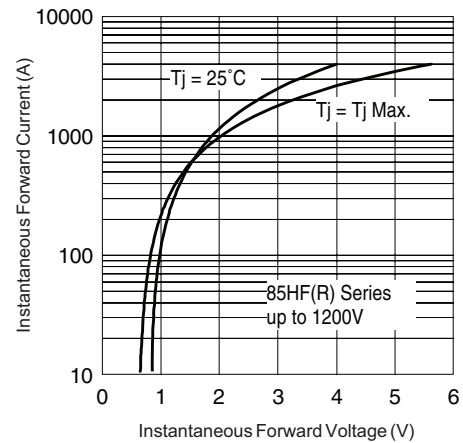


Fig. 11 - Forward Voltage Drop Characteristics  
(up to 1200 V)

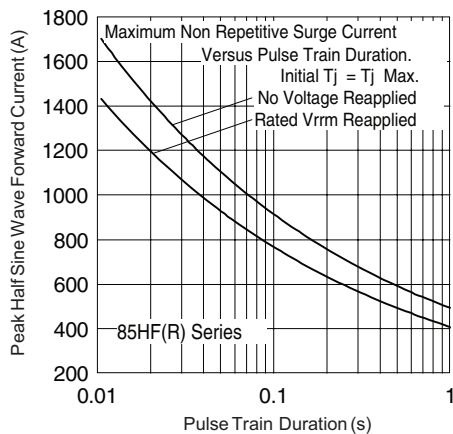


Fig. 10 - Maximum Non-Repetitive Surge Current

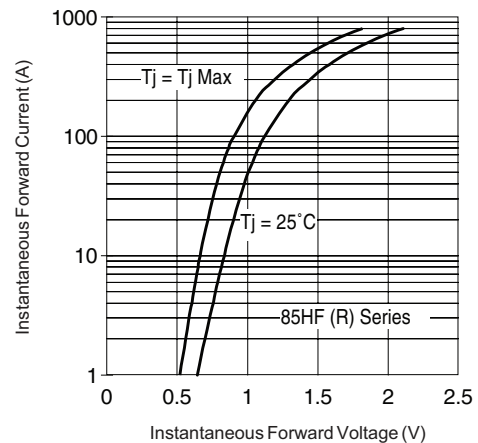


Fig. 12 - Forward Voltage Drop Characteristics  
(for 1400 V, 1600 V)

# 85HF(R) Series



Vishay High Power Products Standard Recovery Diodes,  
(Stud Version), 85 A

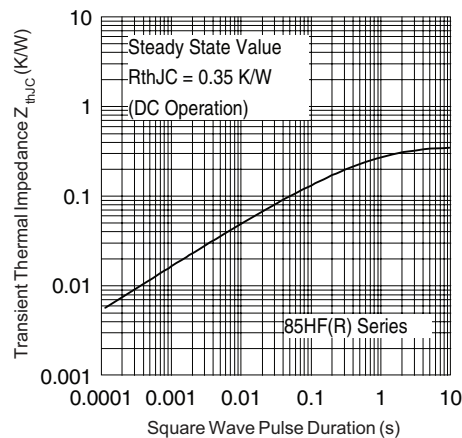


Fig. 13 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

| Device code | 85                                                                                                                                                                                        | HF | R | 160 | M |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|-----|---|
|             | ①                                                                                                                                                                                         | ②  | ③ | ④   | ⑤ |
| ①           | - 85 = Standard device<br>86 = Not isolated lead<br>87 = Isolated lead with silicone sleeve<br>(red = Reverse polarity)<br>(blue = Normal polarity)<br>88 = Type for rotating application |    |   |     |   |
| ②           | - HF = Standard diode                                                                                                                                                                     |    |   |     |   |
| ③           | - None = Stud normal polarity (cathode to stud)<br>R = Stud reverse polarity (anode to stud)                                                                                              |    |   |     |   |
| ④           | - Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)                                                                                                                               |    |   |     |   |
| ⑤           | - None = Stud base DO-203AB (DO-5) 1/4" 28UNF-2A<br>M = Stud base DO-203AB (DO-5) M6 x 1 (not available for 88HF)                                                                         |    |   |     |   |

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



### Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.