

### STANDARD RECOVERY DIODES

### Stud Version

#### Features

- High surge current capability
- Designed for a wide range of applications
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600V  $V_{RRM}$

85 A

#### Typical Applications

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

#### Major Ratings and Characteristics

| Parameters      | 85HF(R)     |              | Units            |
|-----------------|-------------|--------------|------------------|
|                 | 10 to 120   | 140 to 160   |                  |
| $I_{F(AV)}$     | 85          | 85           | A                |
| @ $T_C$         | 140         | 110          | °C               |
| $I_{F(RMS)}$    | 133         |              | A                |
| $I_{FSM}$       | @ 50Hz      | 1700         | A                |
|                 | @ 60Hz      | 1800         | A                |
| $I^2t$          | @ 50Hz      | 14500        | A <sup>2</sup> s |
|                 | @ 60Hz      | 13500        | A <sup>2</sup> s |
| $V_{RRM}$ range | 100 to 1200 | 1400 to 1600 | V                |
| $T_J$ range     | - 65 to 180 | - 65 to 150  | °C               |



## 85HF(R) Series

Bulletin I20203 rev. A 09/98

International  
**IR** Rectifier

### 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 | $I_{RRM}$ max.<br>@ $T_J = T_J$ max.<br>mA |
|-------------|--------------|--|--|--|
| 85HF(R)     | 10           | 100  | 200  | 15   |
|             | 20           | 200  | 300  |  |
|             | 40           | 400  | 500  |  |
|             | 60           | 600  | 720  |  |
|             | 80           | 800  | 960  | 9  |
|             | 100          | 1000   | 1200   |  |
|             | 120          | 1200   | 1440   |  |
|             | 140          | 1400   | 1650   | 4.5  |
| 160         | 1600         | 1900   |  |  |

#### Forward Conduction

| Parameter  | 85HF(R)   |            | Units             | Conditions  |                |   |
|--|-----------|------------|-------------------|---|----------------|---|
|  | 10 to 120 | 140 to 160 |                   |   |                |   |
| $I_{F(AV)}$ Max. average forward current @ Case temperature          | 85        | 85         | A                 | 180° conduction, half sine wave   |                |   |
|  | 140       | 110        | °C                |   |                |   |
| $I_{F(RMS)}$ Max. RMS forward current                                | 133       |            | A                 |   |                |   |
| $I_{FSM}$ Max. peak, one-cycle forward, non-repetitive surge current | 1700      |            | A                 | t = 10ms  | No voltage     | Sinusoidal half wave,<br>Initial $T_J = T_J$ max. |
|  | 1800      |            |                   | t = 8.3ms   | reapplied      |   |
|  | 1450      |            |                   | t = 10ms  | 100% $V_{RRM}$ |   |
|  | 1500      |            |                   | t = 8.3ms   | reapplied      |   |
| $I^2t$ Maximum $I^2t$ for fusing                                     | 14500     |            | A <sup>2</sup> s  | t = 10ms  | No voltage     |   |
|  | 13500     |            |                   | t = 8.3ms   | reapplied      |   |
|  | 10500     |            |                   | t = 10ms  | 100% $V_{RRM}$ |   |
|  | 9400      |            |                   | t = 8.3ms   | reapplied      |   |
| $I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing                       | 16000     |            | A <sup>2</sup> √s | t = 0.1 to 10ms, no voltage reapplied                                       |                |   |
| $V_{F(TO)1}$ Low level value of threshold voltage                    | 0.68      |            | V                 | (16.7% x $\pi$ x $I_{F(AV)}$ ) < I < $\pi$ x $I_{F(AV)}$ , $T_J = T_J$ max. |                |   |
| $V_{F(TO)2}$ High level value of threshold voltage                   | 0.80      |            |                   | (I > $\pi$ x $I_{F(AV)}$ ), $T_J = T_J$ max.                                |                |   |
| $r_{f1}$ Low level value of forward slope resistance                 | 1.62      |            | mΩ                | (16.7% x $\pi$ x $I_{F(AV)}$ ) < I < $\pi$ x $I_{F(AV)}$ , $T_J = T_J$ max. |                |   |
| $r_{f2}$ High level value of forward slope resistance                | 1.25      |            |                   | (I > $\pi$ x $I_{F(AV)}$ ), $T_J = T_J$ max.                                |                |   |
| $V_{FM}$ Max. forward voltage drop                                   | 1.20      |            | V                 | $I_{pk} = 267A$ , $T_J = 25^\circ C$ , $t_p = 400\mu s$ rectangular wave    |                |   |

Thermal and Mechanical Specifications

| Parameter   | 85HF(R)        |            | Units  | Conditions                                 |
|---|----------------|------------|--------|--|
|   | 10 to 120      | 140 to 160 |        |  |
| T <sub>J</sub> Max. junction operating temperature range    | -65 to 180     | -65 to 150 | °C     |  |
| T <sub>stg</sub> Max. storage temperature range             | -65 to 180     | -65 to 150 |        |  |
| R <sub>thJC</sub> Max. thermal resistance, junction to case | 0.35           |            | K/W    | DC operation                               |
| R <sub>thCS</sub> Max. thermal resistance, case to heatsink | 0.25           |            |        | Mounting surface, smooth, flat and greased |
| Maximum shock   | 1500g          |            |        | <b>see note (1)</b>                        |
| Maximum constant vibration                                  | 20g            |            |        | 50Hz <b>see note (1)</b>                   |
| Maximum constant acceleration                               | 5000g          |            |        | Stud outwards <b>see note (1)</b>          |
| T Max. allowed mounting torque ±10%                         | 2.3 - 3.4      |            | Nm     | Not lubricated threads                     |
|   | 20 - 30        |            | lbf·in |  |
| wt Approximate weight                                       | 17 (0.6)       |            | g (oz) |  |
| Case style  | DO-203AB (DO5) |            |        | See Outline Table                          |

(1) Available only for 88HF

$\Delta R_{thJC}$  Conduction

(The following table shows the increment of thermal resistance R<sub>thJC</sub> when devices operate at different conduction angles than DC)

| Conduction angle | Sinusoidal conduction | Rectangular conduction | Units | Conditions                           |
|------------------|-----------------------|------------------------|-------|--------------------------------------|
| 180°             | 0.10                  | 0.08                   | K/W   | T <sub>J</sub> = T <sub>J</sub> max. |
| 120°             | 0.11                  | 0.11                   |       |                                      |
| 90°              | 0.13                  | 0.13                   |       |                                      |
| 60°              | 0.17                  | 0.17                   |       |                                      |
| 30°              | 0.26                  | 0.26                   |       |                                      |

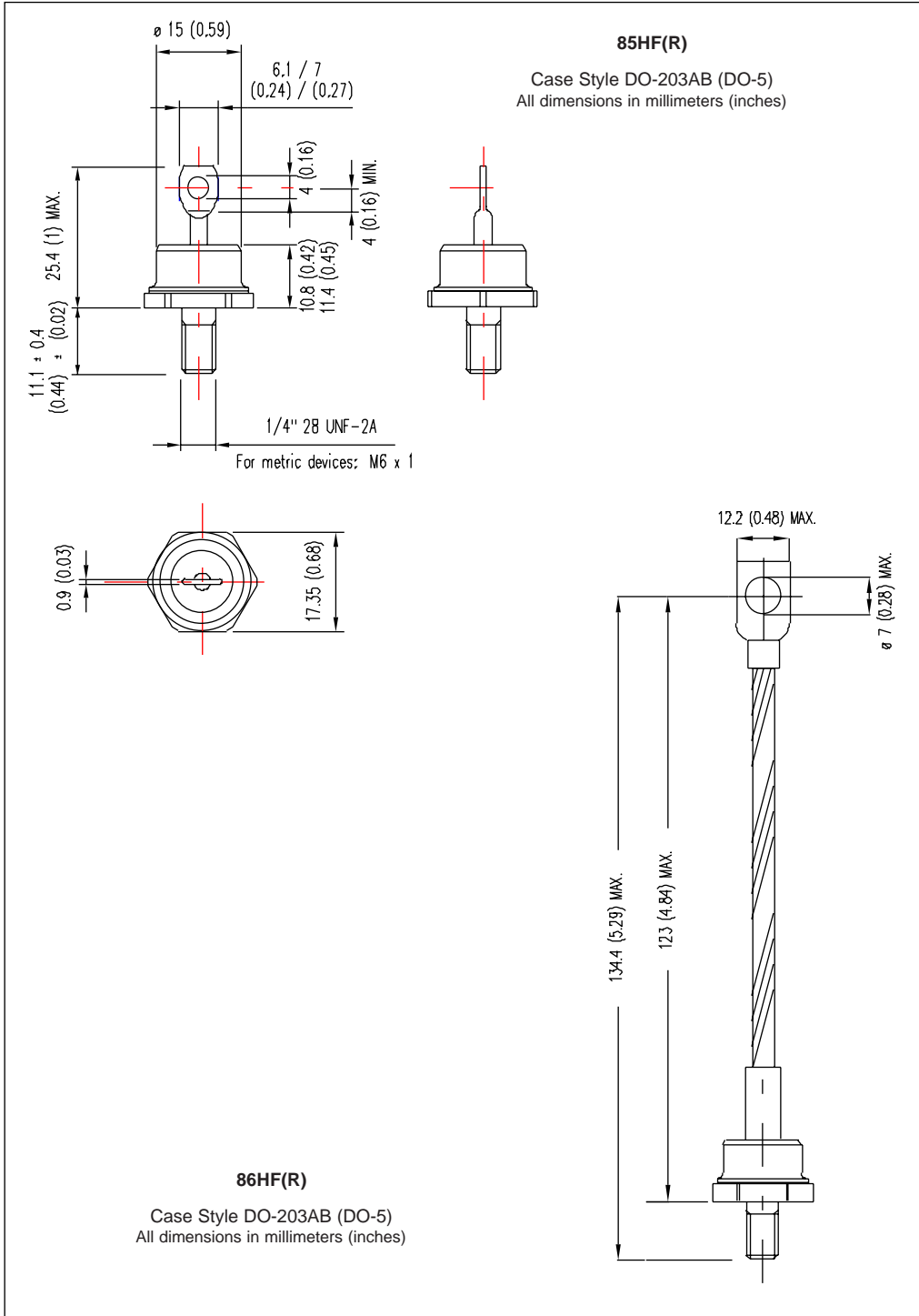
Ordering Information Table

| Device Code   |  |           |            |          |            |          |   |   |   |   |   |
|---|--|-----------|------------|----------|------------|----------|---|---|---|---|---|
|   | <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;"><b>85</b></td> <td style="padding: 5px;"><b>HF</b></td> <td style="padding: 5px;"><b>R</b></td> <td style="padding: 5px;"><b>160</b></td> <td style="padding: 5px;"><b>M</b></td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> </tr> </table> | <b>85</b> | <b>HF</b>  | <b>R</b> | <b>160</b> | <b>M</b> | ① | ② | ③ | ④ | ⑤ |
| <b>85</b>   | <b>HF</b>  | <b>R</b>  | <b>160</b> | <b>M</b> |            |          |   |   |   |   |   |
| ①   | ②  | ③         | ④          | ⑤        |            |          |   |   |   |   |   |
| <p><b>1</b> - 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</p> <p><b>2</b> - Standard diode</p> <p><b>3</b> - None = Stud Normal Polarity (Cathode to Stud)<br/> R = Stud Reverse Polarity (Anode to Stud)</p> <p><b>4</b> - Voltage code: Code x 10 = V<sub>RRM</sub> (See Voltage Ratings table)</p> <p><b>5</b> - 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)</p> |  |           |            |          |            |          |   |   |   |   |   |

# 85HF(R) Series

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## Outlines Table



Outlines Table

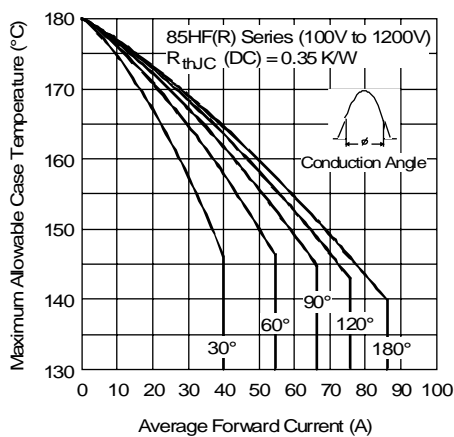
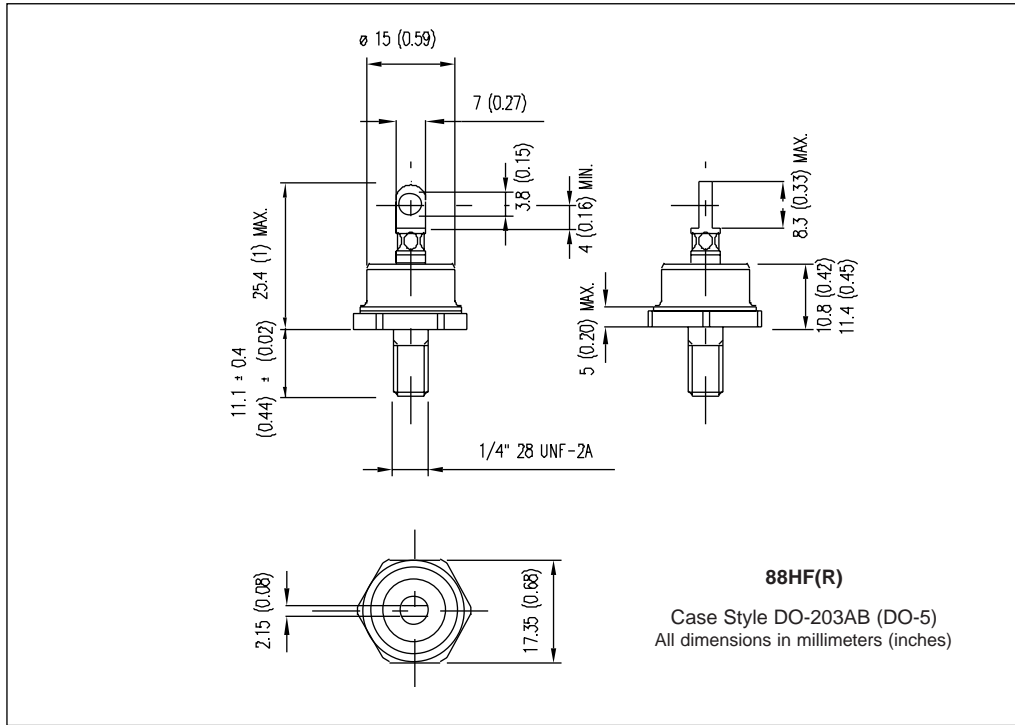


Fig. 1 - Current Ratings Characteristics

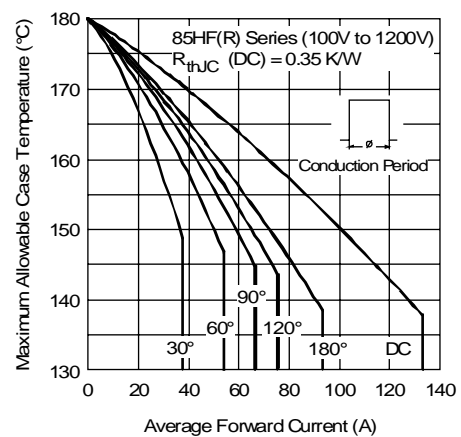


Fig. 2 - Current Ratings Characteristics