

Bulletin I2020 rev. A 07/94

International  
**IR** Rectifier

**200HF(R) SERIES**

**STANDARD RECOVERY DIODES**

**Stud Version**

**Features**

- High current carrying capability
- High surge current capability
- Types up to 1200V  $V_{RRM}$
- Stud cathode and stud anode version
- Standard JEDEC types
- Diffused junction

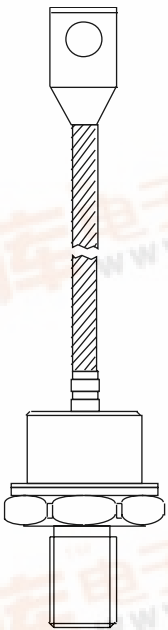
**Typical Applications**

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

**Major Ratings and Characteristics**

| Parameters       | 200HF(R)    | Units             |
|------------------|-------------|-------------------|
| $I_{F(AV)}$      | 200         | A                 |
| @ $T_C$          | 125         | °C                |
| $I_{F(RMS)}$     | 314         | A                 |
| $I_{FSM}$ @ 50Hz | 4400        | A                 |
| @ 60Hz           | 4610        | A                 |
| $I^2t$ @ 50Hz    | 97          | KA <sup>2</sup> s |
| @ 60Hz           | 88          | KA <sup>2</sup> s |
| $V_{RRM}$ range  | 400 to 1200 | V                 |
| $T_J$            | -40 to 180  | °C                |

200 A



case style  
DO-205AC (DO-30)



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### ELECTRICAL SPECIFICATIONS

#### Voltage Ratings

| Type number | Voltage Code | $V_{RRM}$ , maximum repetitive peak reverse voltage<br>V | $V_{RSM}$ , maximum non-repetitive peak rev. voltage<br>V | $I_{RRM}$ max.<br>@ 180°C<br>mA |
|-------------|--------------|----------------------------------------------------------|-----------------------------------------------------------|---------------------------------|
| 200HF(R)    | 40           | 400                                                      | 500                                                       | 15                              |
|             | 80           | 800                                                      | 900                                                       |                                 |
|             | 120          | 1200                                                     | 1300                                                      |                                 |

#### Forward Conduction

| Parameter                                                            | 200HF(R)   | Units              | Conditions                                                                                   |
|----------------------------------------------------------------------|------------|--------------------|----------------------------------------------------------------------------------------------|
| $I_{F(AV)}$ Max. average forward current @ Case temperature          | 200<br>125 | A<br>°C            | 180° conduction, half sine wave                                                              |
| $I_{F(RMS)}$ Max. RMS forward current                                | 314        | A                  | DC @ 120°C case temperature                                                                  |
| $I_{FSM}$ Max. peak, one-cycle forward, non-repetitive surge current | 4400       | A                  | t = 10ms No voltage                                                                          |
|                                                                      | 4610       |                    | t = 8.3ms reapplied                                                                          |
|                                                                      | 3700       |                    | t = 10ms 100% $V_{RRM}$                                                                      |
|                                                                      | 3870       |                    | t = 8.3ms reapplied                                                                          |
| $I^2t$ Maximum $I^2t$ for fusing                                     | 97         | KA <sup>2</sup> s  | t = 10ms No voltage                                                                          |
|                                                                      | 88         |                    | t = 8.3ms reapplied                                                                          |
|                                                                      | 68         |                    | t = 10ms 100% $V_{RRM}$                                                                      |
|                                                                      | 62         |                    | t = 8.3ms reapplied                                                                          |
| $I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing                       | 968        | KA <sup>2</sup> /s | t = 0.1 to 10ms, no voltage reapplied                                                        |
| $V_{F(TO)1}$ Low level value of threshold voltage                    | 0.85       | V                  | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J \text{ max.}$ |
| $V_{F(TO)2}$ High level value of threshold voltage                   | 1.04       |                    | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J \text{ max.}$                                      |
| $r_{f1}$ Low level value of forward slope resistance                 | 0.85       | mΩ                 | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J \text{ max.}$ |
| $r_{f2}$ High level value of forward slope resistance                | 0.59       |                    | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J \text{ max.}$                                      |
| $V_{FM}$ Max. forward voltage drop                                   | 1.45       | V                  | $I_{pk} = 628A$ , $T_J = 25^\circ C$                                                         |

#### Thermal and Mechanical Specification

| Parameter                                            | 200HF(R)        | Units | Conditions                                 |
|------------------------------------------------------|-----------------|-------|--------------------------------------------|
| $T_J$ Max. operating temperature range               | -40 to 180      | °C    |                                            |
| $T_{stg}$ Max. storage temperature range             | -55 to 180      |       |                                            |
| $R_{thJC}$ Max. thermal resistance, junction to case | 0.17            | K/W   | DC operation                               |
| $R_{thCS}$ Max. thermal resistance, case to heatsink | 0.08            |       | Mounting surface, smooth, flat and greased |
| $T$ Max. allowed mounting torque +0 -20%             | 11              | Nm    | Not lubricated threads                     |
|                                                      | 10              |       | Lubricated threads                         |
| wt Approximate weight                                | 120             | g     |                                            |
| Case style                                           | DO-205AC(DO-30) |       | See Outline Table                          |

#### $\Delta R_{thJC}$ Conduction

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

| Conduction angle | Sinusoidal conduction | Rectangular conduction | Units | Conditions               |
|------------------|-----------------------|------------------------|-------|--------------------------|
| 180°             | 0.045                 | 0.037                  | K/W   | $T_J = T_J \text{ max.}$ |
| 120°             | 0.056                 | 0.061                  |       |                          |
| 90°              | 0.073                 | 0.079                  |       |                          |
| 60°              | 0.102                 | 0.105                  |       |                          |
| 30°              | 0.154                 | 0.156                  |       |                          |

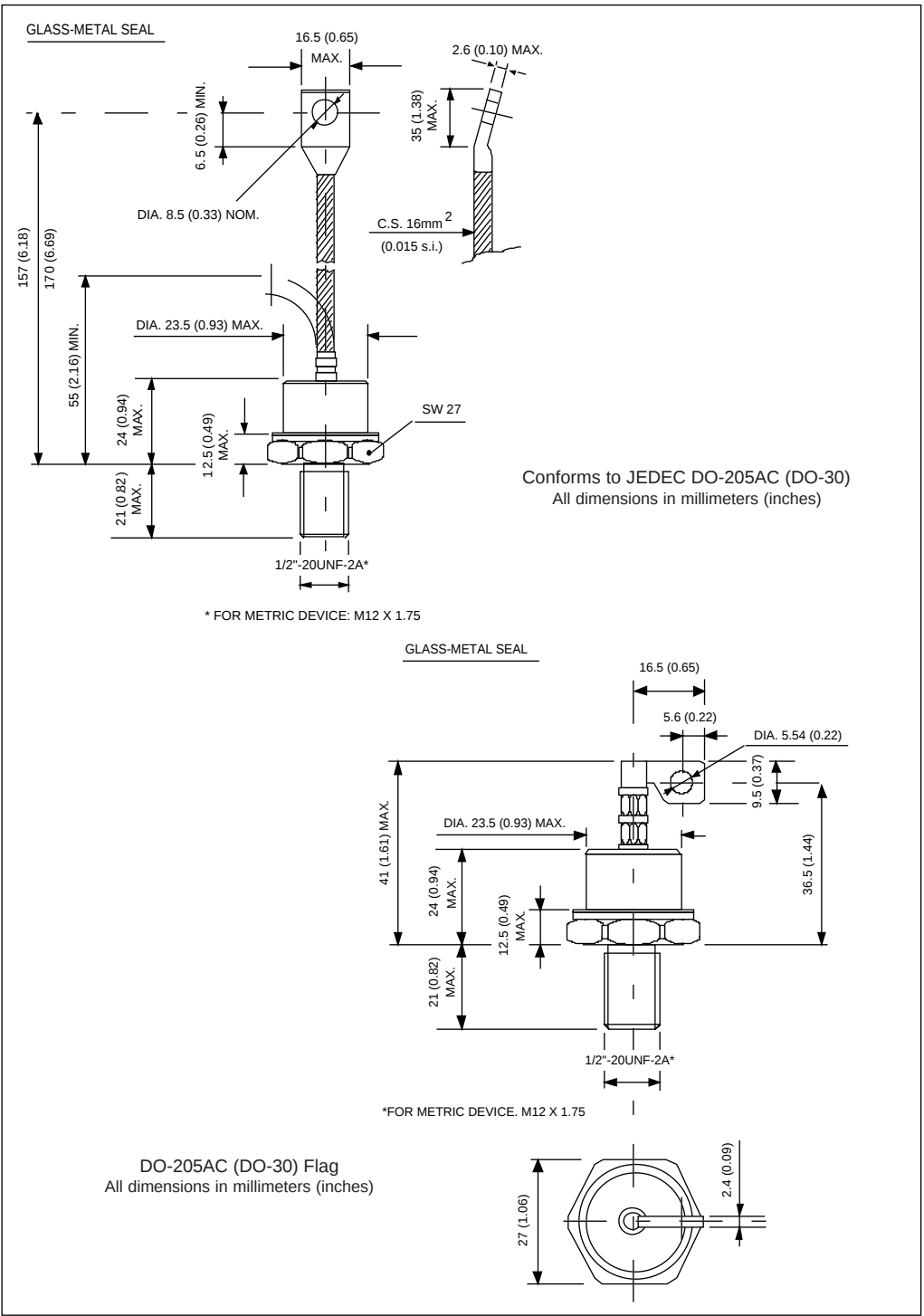
#### Ordering Information Table

| Device Code |                                                                                                                                                                               |   |     |   |   |   |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----|---|---|---|
| 200         | HF                                                                                                                                                                            | R | 120 | P | B | V |
| ①           | ②                                                                                                                                                                             | ③ | ④   | ⑤ | ⑥ | ⑦ |
| <b>1</b>    | - Essential Part Number                                                                                                                                                       |   |     |   |   |   |
| <b>2</b>    | - Diode                                                                                                                                                                       |   |     |   |   |   |
| <b>3</b>    | - None = Stud Normal Polarity (Cathode to Stud)<br>R = Stud Reverse Polarity (Anode to Stud)                                                                                  |   |     |   |   |   |
| <b>4</b>    | - Voltage code: Code x 10 = $V_{RRM}$ (See Voltage Ratings table)                                                                                                             |   |     |   |   |   |
| <b>5</b>    | - P = Stud base DO-205AC(DO-30) 1/2" 20UNF-2A<br>M = Stud base DO-205AC(DO-30) M12x1.75                                                                                       |   |     |   |   |   |
| <b>6</b>    | - B = Flag top terminals (for Cathode/ Anode Leads)<br>S = Isolated lead with silicone sleeve<br>(Red = Reverse Polarity; Blue = Normal Polarity)<br>None = Not isolated lead |   |     |   |   |   |
| <b>7</b>    | - V = Glass-metal seal                                                                                                                                                        |   |     |   |   |   |

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Outline Table



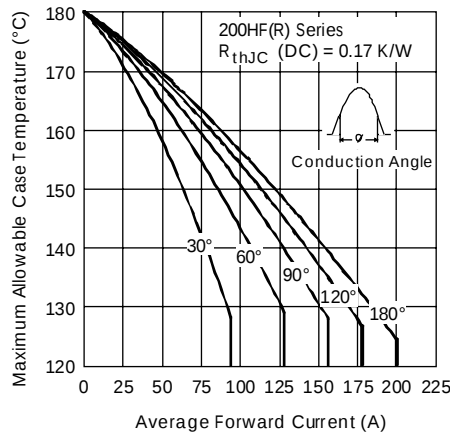


Fig. 1 - Current Ratings Characteristics

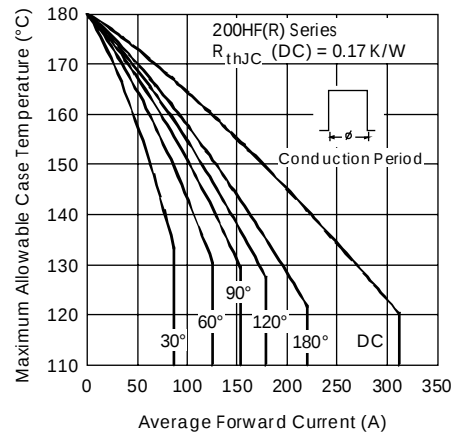


Fig. 2 - Current Ratings Characteristics

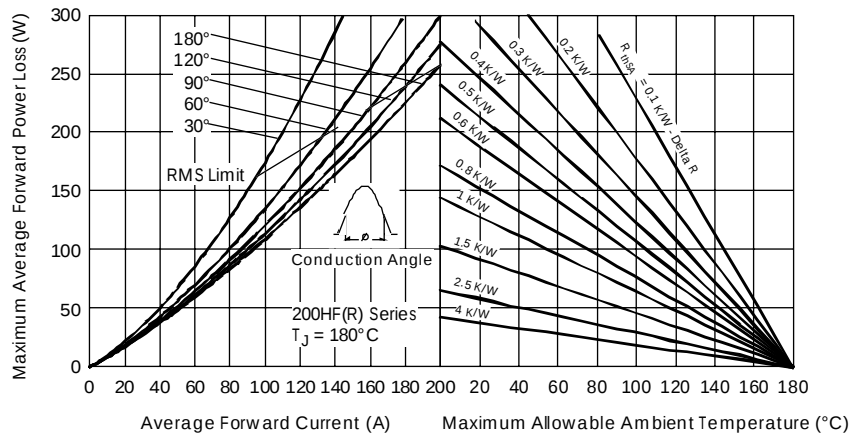


Fig. 3 - Forward Power Loss Characteristics

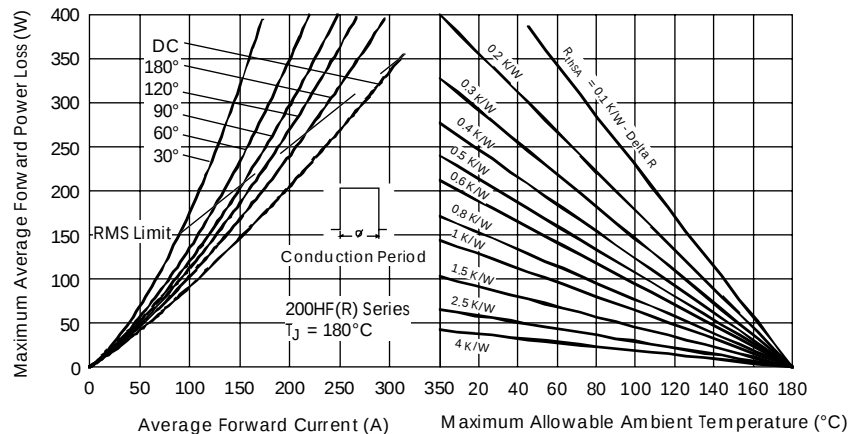


Fig. 4 - Forward Power Loss Characteristics

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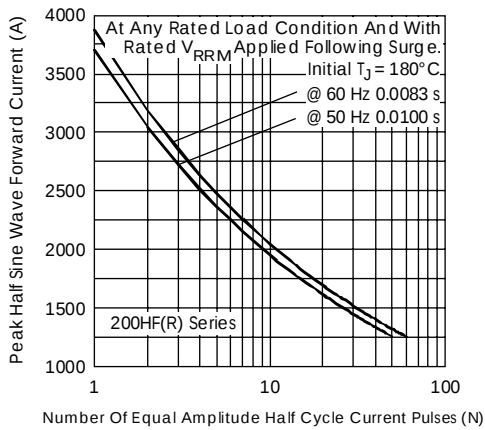


Fig. 5 - Maximum Non-Repetitive Surge Current

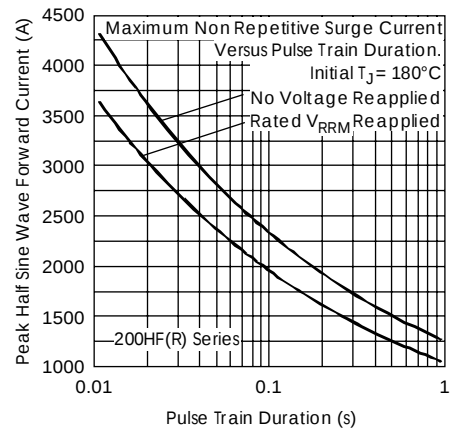


Fig. 6 - Maximum Non-Repetitive Surge Current

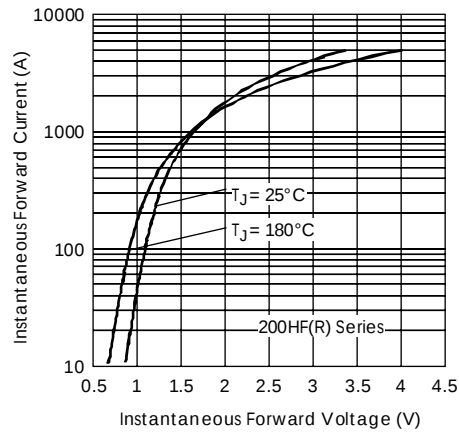


Fig. 7 - Forward Voltage Drop Characteristics

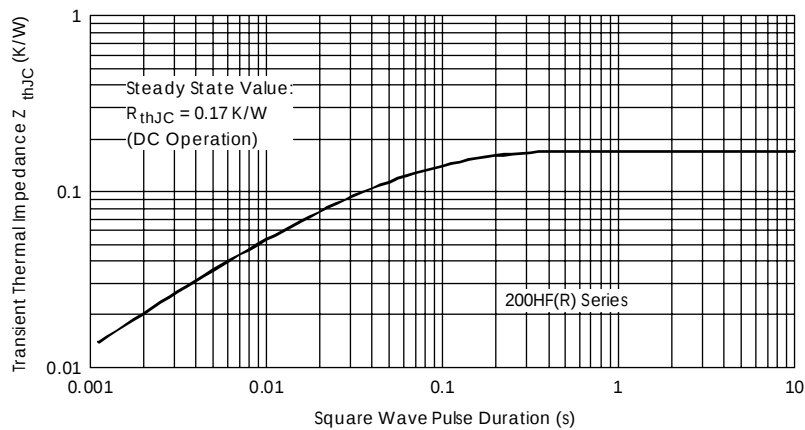


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics