

## Standard Recovery Diodes (Stud Version), 12 A



DO-203AA (DO-4)

### FEATURES

- High surge current capability
- Stud cathode and stud anode version
- Wide current range
- Types up to 1200 V  $V_{RRM}$
- RoHS compliant
- Designed and qualified for industrial and consumer level


**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

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

### PRODUCT SUMMARY

|             |      |
|-------------|------|
| $I_{F(AV)}$ | 12 A |
|-------------|------|

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER    | TEST CONDITIONS | VALUES      | UNITS            |
|--------------|-----------------|-------------|------------------|
| $I_{F(AV)}$  |                 | 12          | A                |
|              | $T_C$           | 144         | °C               |
| $I_{F(RMS)}$ |                 | 19          | A                |
| $I_{FSM}$    | 50 Hz           | 265         | A                |
|              | 60 Hz           | 280         |                  |
| $I^2t$       | 50 Hz           | 351         | A <sup>2</sup> s |
|              | 60 Hz           | 320         |                  |
| $V_{RRM}$    | Range           | 100 to 1200 | V                |
| $T_J$        |                 | - 65 to 175 | °C               |

### ELECTRICAL SPECIFICATIONS

#### VOLTAGE RATINGS

| TYPE NUMBER | VOLTAGE CODE | $V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK VOLTAGE<br>V | $V_{R(BR)}$ , MINIMUM AVALANCHE VOLTAGE<br>V <sup>(1)</sup> | $I_{RRM}$ MAXIMUM AT $T_J = 175$ °C<br>mA |
|-------------|--------------|--|--|---|---|
| 12F(R)      | 10           | 100  | 150  | -   | 12  |
|             | 20           | 200  | 275  | -   |   |
|             | 40           | 400  | 500  | 500   |   |
|             | 60           | 600  | 725  | 750   |   |
|             | 80           | 800  | 950  | 950   |   |
|             | 100          | 1000   | 1200   | 1150  |   |
|             | 120          | 1200   | 1400   | 1350  |   |

#### Note

<sup>(1)</sup> Avalanche version only available from  $V_{RRM}$  400 V to 1200 V



| FORWARD CONDUCTION  |               |   |                            |   |                           |
|---|---------------|---|----------------------------|---|---------------------------|
| PARAMETER   | SYMBOL        | TEST CONDITIONS   |                            | VALUES  | UNITS                     |
| Maximum average forward current at case temperature           | $I_{F(AV)}$   | 180° conduction, half sine wave   |                            | 12  | A                         |
|   |               |   |                            | 144   | °C                        |
| Maximum RMS forward current                                   | $I_{F(RMS)}$  |   |                            | 19  | A                         |
| Maximum on-repetitive peak reverse power                      | $P_R^{(1)}$   | 10 $\mu$ s square pulse, $T_J = T_J$ maximum  |                            | 7   | K/W                       |
| Maximum peak, one-cycle forward, non-repetitive surge current | $I_{FSM}$     | t = 10 ms   | No voltage reappplied      | Sinusoidal half wave, initial $T_J = T_J$ maximum | A                         |
|   |               | t = 8.3 ms  |                            |   |                           |
|   |               | t = 10 ms   | 100 % $V_{RRM}$ reappplied |   |                           |
|   |               | t = 8.3 ms  |                            |   |                           |
| Maximum $I^2t$ for fusing                                     | $I^2t$        | t = 10 ms   | No voltage reappplied      | A <sup>2</sup> s                                  |                           |
|   |               | t = 8.3 ms  |                            |   |                           |
|   |               | t = 10 ms   | 100 % $V_{RRM}$ reappplied |   |                           |
|   |               | t = 8.3 ms  |                            |   |                           |
| Maximum $I^2\sqrt{t}$ for fusing                              | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reappplied   |                            | 3510  | A <sup>2</sup> $\sqrt{s}$ |
| Low level value of threshold voltage                          | $V_{F(TO)1}$  | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum |                            | 0.77  | V                         |
| High level value of threshold voltage                         | $V_{F(TO)2}$  | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum                                      |                            | 0.97  |                           |
| Low level value of forward slope resistance                   | $r_{f1}$      | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum |                            | 10.70   | m $\Omega$                |
| High level value of forward slope resistance                  | $r_{f2}$      | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum                                      |                            | 6.20  |                           |
| Maximum forward voltage drop                                  | $V_{FM}$      | $I_{pk} = 38$ A, $T_J = 25$ °C, $t_p = 400$ $\mu$ s rectangular wave                    |                            | 1.26  | V                         |

**Note**

(1) Available only for avalanche version, all other parameters the same as 12F

| THERMAL AND MECHANICAL SPECIFICATIONS        |            |   |  |                 |          |
|--|------------|---|--|-----------------|----------|
| PARAMETER                                    | SYMBOL     | TEST CONDITIONS                               |  | VALUES          | UNITS    |
| Maximum junction operating temperature range | $T_J$      |   |  | - 65 to 175     | °C       |
| Maximum storage temperature range            | $T_{Stg}$  |   |  | - 65 to 200     |          |
| Maximum thermal resistance, junction to case | $R_{thJC}$ | DC operation                                  |  | 2               | K/W      |
| Maximum thermal resistance, case to heatsink | $R_{thCS}$ | Mounting surface, smooth, flat and greased    |  | 0.5             |          |
| Allowable mounting torque                    |            | Not lubricated threads                        |  | 1.5 + 0 - 10 %  | N · m    |
|  |            |   |  | 13              | lbf · in |
|  |            | Lubricated threads                            |  | 1.2 + 0 - 10 %  | N · m    |
|  |            |   |  | 10              | lbf · in |
| Approximate weight                           |            |   |  | 7               | g        |
|  |            |   |  | 0.25            | oz.      |
| Case style                                   |            | See dimensions - link at the end of datasheet |  | DO-203AA (DO-4) |          |



| $\Delta R_{thJC}$ CONDUCTION |                       |                        |   |       |
|------------------------------|-----------------------|------------------------|---|-------|
| CONDUCTION ANGLE             | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS                         | UNITS |
| 180°                         | 0.33                  | 0.26                   | T <sub>J</sub> = T <sub>J</sub> maximum | K/W   |
| 120°                         | 0.41                  | 0.44                   |   |       |
| 90°                          | 0.53                  | 0.58                   |   |       |
| 60°                          | 0.78                  | 0.81                   |   |       |
| 30°                          | 1.28                  | 1.29                   |   |       |

**Note**

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

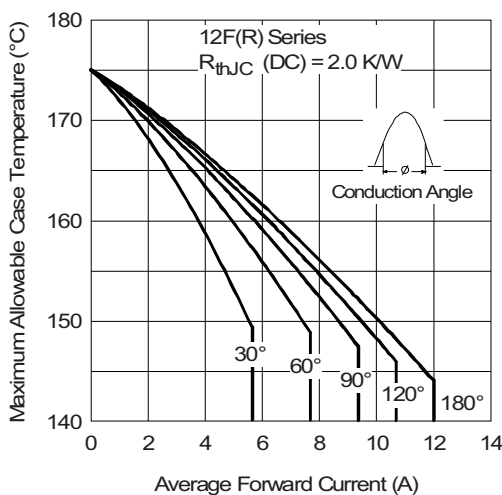


Fig. 1 - Current Ratings Characteristics

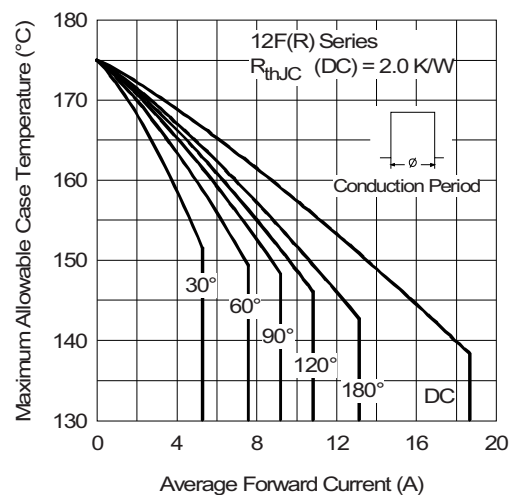


Fig. 2 - Current Ratings Characteristics

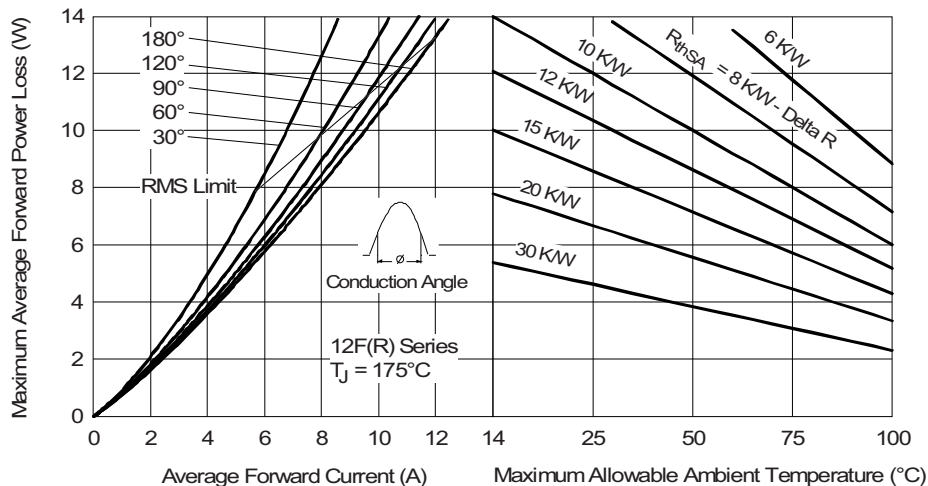


Fig. 3 - Forward Power Loss Characteristics

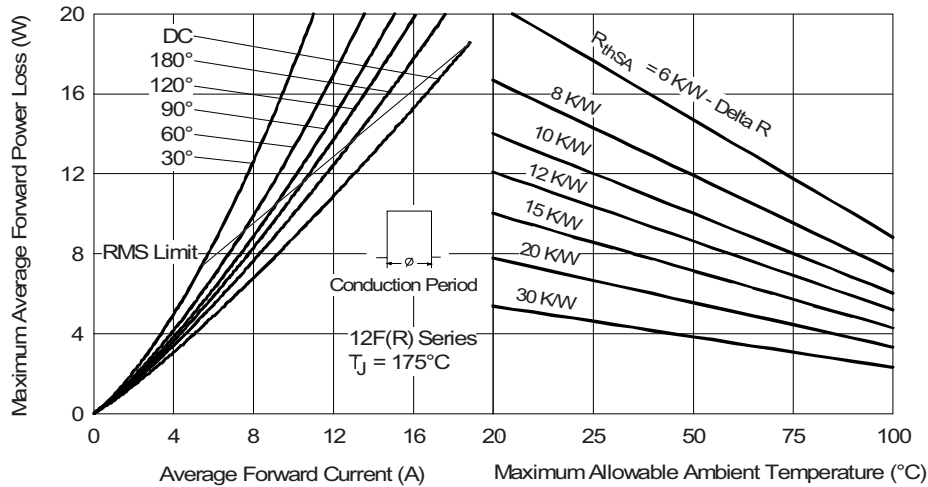


Fig. 4 - Forward Power Loss Characteristics

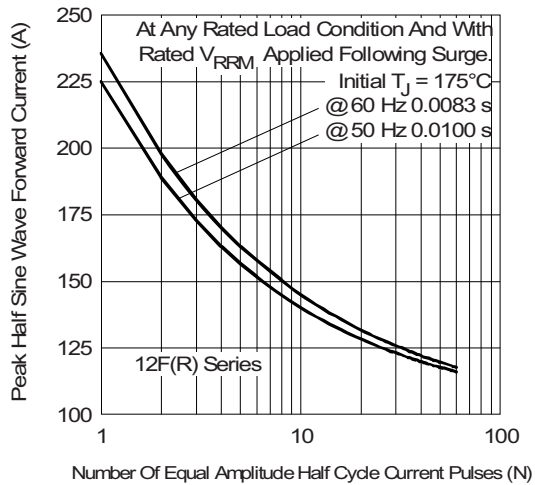


Fig. 5 - Maximum Non-Repetitive Surge Current

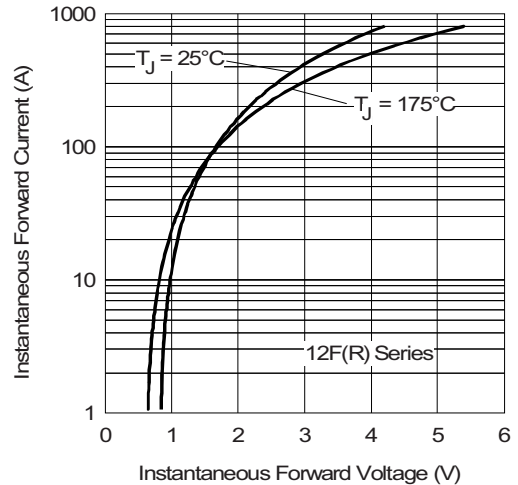


Fig. 7 - Forward Voltage Drop Characteristics

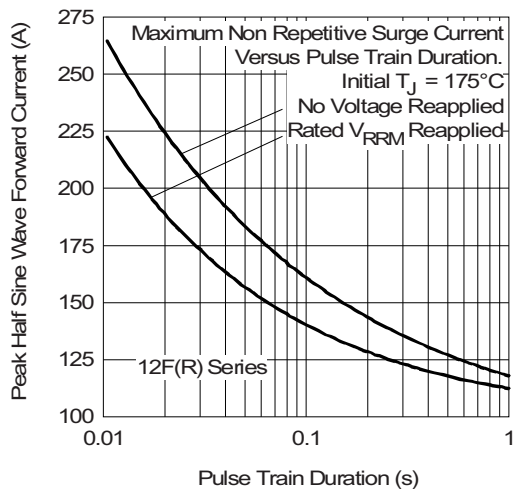


Fig. 6 - Maximum Non-Repetitive Surge Current

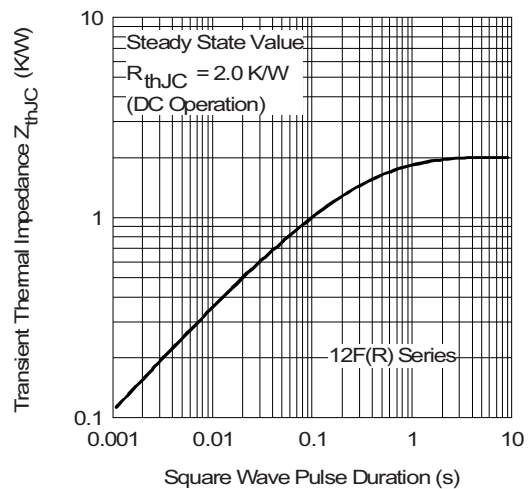
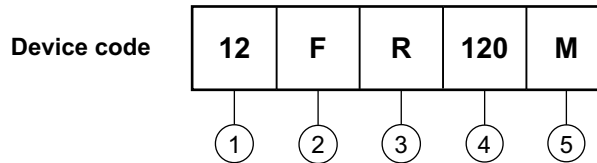


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics



### ORDERING INFORMATION TABLE

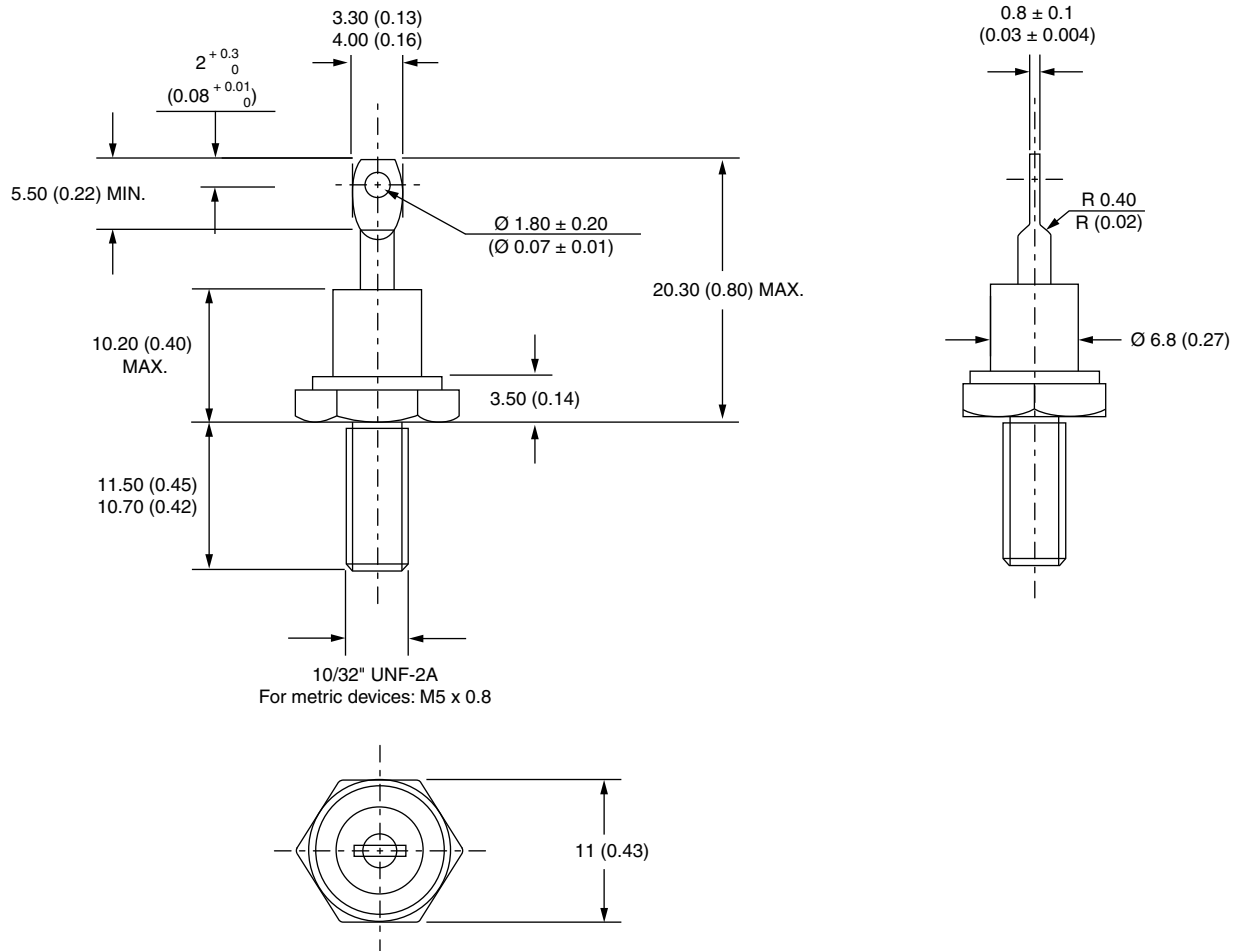


- 1** - Current rating: Code =  $I_{F(AV)}$
- 2** - F = Standard device
- 3** - None = Stud normal polarity (cathode to stud)  
R = Stud reverse polarity (anode to stud)
- 4** - Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)
- 5** - None = Stud base DO-203AA (DO-4) 10-32UNF-2A  
M = Stud base DO-203AA (DO-4) M5 x 0.8  
(not available for avalanche diodes)

| LINKS TO RELATED DOCUMENTS |   |
|----------------------------|---|
| Dimensions                 | <a href="http://www.vishay.com/doc?95311">http://www.vishay.com/doc?95311</a> |

## DO-203AA (DO-4)

**DIMENSIONS** in millimeters (inches)





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