

## Standard Recovery Diodes (Stud Version), 25 A



DO-203AA (DO-4)

### FEATURES

- High surge current capability
- Stud cathode and stud anode version
- Wide current range
- Types up to 1200 V  $V_{RRM}$
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


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### TYPICAL APPLICATIONS

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

### PRODUCT SUMMARY

|             |      |
|-------------|------|
| $I_{F(AV)}$ | 25 A |
|-------------|------|

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER    | TEST CONDITIONS | VALUES      | UNITS            |
|--------------|-----------------|-------------|------------------|
| $I_{F(AV)}$  |                 | 25          | A                |
|              | $T_C$           | 120         | °C               |
| $I_{F(RMS)}$ |                 | 40          | A                |
| $I_{FSM}$    | 50 Hz           | 356         | A                |
|              | 60 Hz           | 373         |                  |
| $I^2t$       | 50 Hz           | 636         | A <sup>2</sup> s |
|              | 60 Hz           | 580         |                  |
| $V_{RRM}$    | 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 |
|-------------|--------------|----------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------|
| 25F(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                                                          |                           | 25     | A             |
|                                                               |               |                                                                                          |                           | 120    | °C            |
| Maximum RMS forward current                                   | $I_{F(RMS)}$  |                                                                                          |                           | 40     | A             |
| Maximum on-repetitive peak reverse power                      | $P_R^{(1)}$   | 10 $\mu$ s square pulse, $T_J = T_J$ maximum                                             |                           | 10     | K/W           |
| Maximum peak, one-cycle forward, non-repetitive surge current | $I_{FSM}$     | t = 10 ms                                                                                | No voltage reapplied      | 356    | A             |
|                                                               |               | t = 8.3 ms                                                                               | No voltage reapplied      | 373    |               |
|                                                               |               | t = 10 ms                                                                                | 100 % $V_{RRM}$ reapplied | 300    |               |
|                                                               |               | t = 8.3 ms                                                                               | 100 % $V_{RRM}$ reapplied | 314    |               |
| Maximum $I^2t$ for fusing                                     | $I^2t$        | t = 10 ms                                                                                | No voltage reapplied      | 636    | $A^2s$        |
|                                                               |               | t = 8.3 ms                                                                               | No voltage reapplied      | 580    |               |
|                                                               |               | t = 10 ms                                                                                | 100 % $V_{RRM}$ reapplied | 450    |               |
|                                                               |               | t = 8.3 ms                                                                               | 100 % $V_{RRM}$ reapplied | 410    |               |
| Maximum $I^2\sqrt{t}$ for fusing                              | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reapplied                                                   |                           | 6360   | $A^2\sqrt{s}$ |
| 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 |                           | 0.80   | V             |
| High level value of threshold voltage                         | $V_{F(TO)2}$  | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum                                       |                           | 0.90   |               |
| 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 |                           | 6.80   | m $\Omega$    |
| High level value of forward slope resistance                  | $r_{f2}$      | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ maximum                                       |                           | 5.70   |               |
| Maximum forward voltage drop                                  | $V_{FM}$      | $I_{pk} = 78$ A, $T_J = 25$ °C, $t_p = 400$ $\mu$ s rectangular wave                     |                           | 1.30   | V             |

**Note**

<sup>(2)</sup> Available only for avalanche version, all other parameters the same as 25F

| 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                                  | 1.5                    | 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 %<br>(13) | N · m<br>(lbf · in) |
|                                              |            | Lubricated threads                            | 1.2 + 0 - 10 %<br>(10) | N · m<br>(lbf · in) |
| Approximate weight                           |            |                                               | 7                      | g                   |
|                                              |            |                                               | 0.25                   | oz.                 |
| Case style                                   |            | See dimensions - link at the end of datasheet | DO-203AA (DO-4)        |                     |

| <b><math>\Delta R_{thJC}</math> CONDUCTION</b> |                       |                        |                     |       |
|------------------------------------------------|-----------------------|------------------------|---------------------|-------|
| CONDUCTION ANGLE                               | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS     | UNITS |
| 180°                                           | 0.28                  | 0.24                   | $T_J = T_J$ maximum | K/W   |
| 120°                                           | 0.39                  | 0.41                   |                     |       |
| 90°                                            | 0.50                  | 0.54                   |                     |       |
| 60°                                            | 0.73                  | 0.75                   |                     |       |
| 30°                                            | 1.20                  | 1.21                   |                     |       |

### Note

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

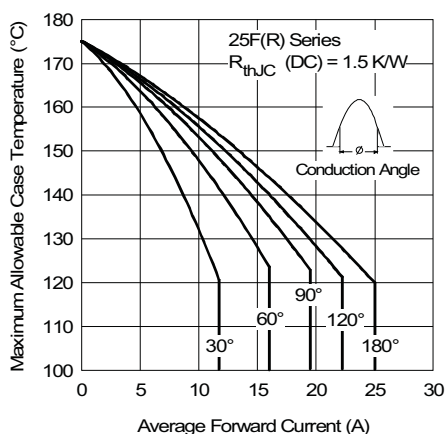


Fig. 1 - Current Ratings Characteristics

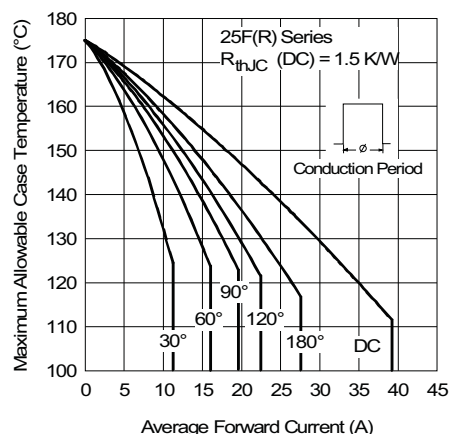


Fig. 2 - Current Ratings Characteristics

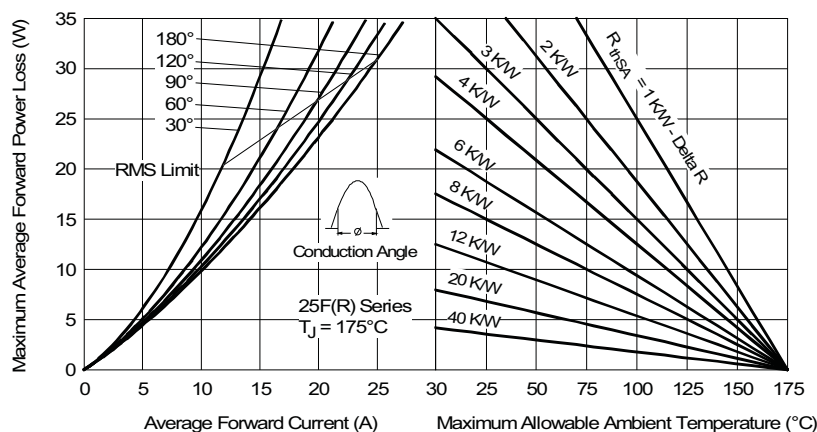


Fig. 3 - Forward Power Loss Characteristics

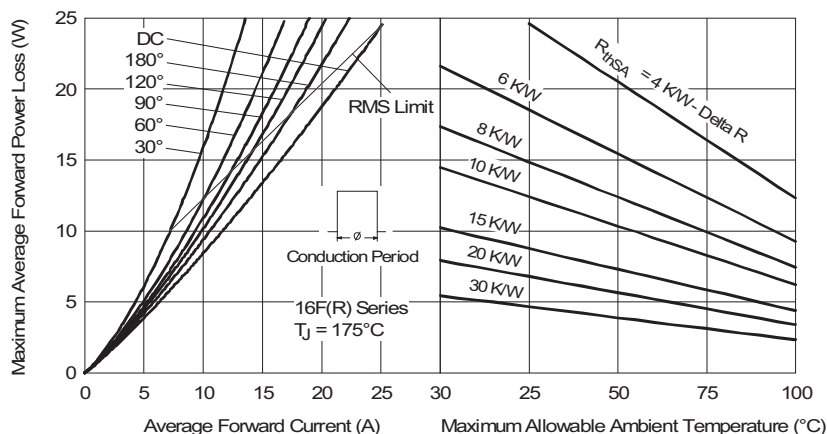


Fig. 4 - Forward Power Loss Characteristics

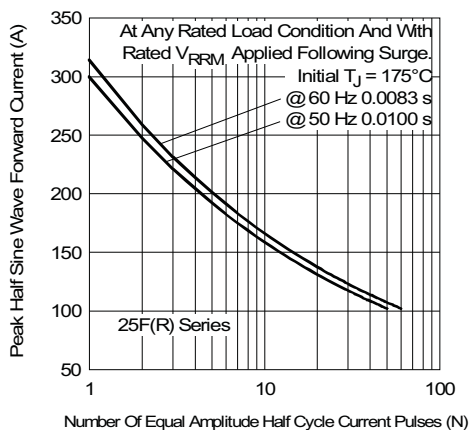


Fig. 5 - Maximum Non-Repetitive Surge Current

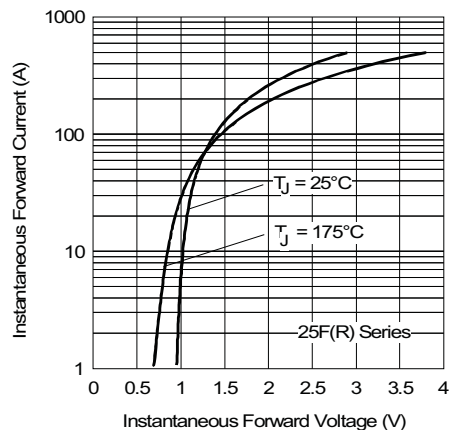


Fig. 7 - Forward Voltage Drop Characteristics

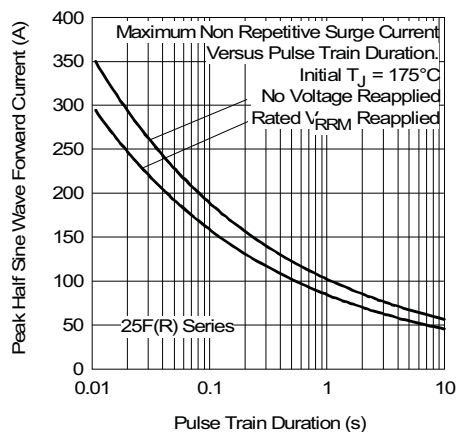
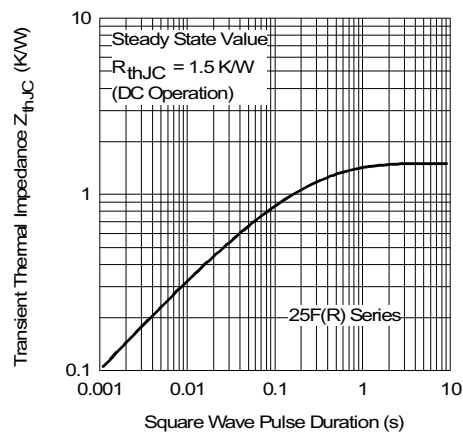


Fig. 6 - Maximum Non-Repetitive Surge Current


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



ORDERING INFORMATION TABLE

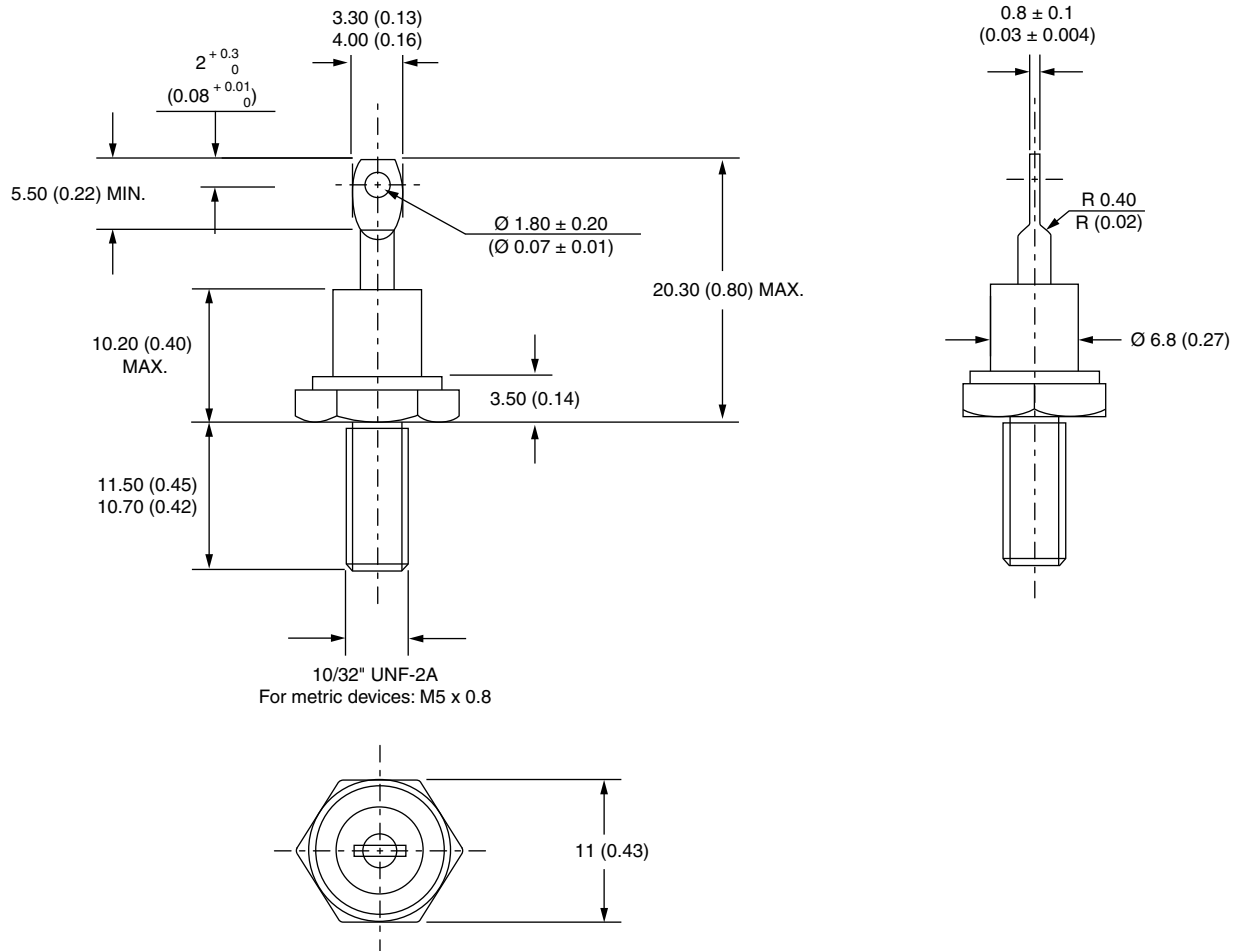
|             |    |   |   |     |   |
|-------------|----|---|---|-----|---|
| Device code | 25 | F | R | 120 | M |
|             | 1  | 2 | 3 | 4   | 5 |

- 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">www.vishay.com/doc?95311</a> |

## DO-203AA (DO-4)

**DIMENSIONS** in millimeters (inches)





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