

## 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  $V_{RRM}$
- RoHS compliant



### 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 <sub>F(AV)</sub>            | 180° conduction, half sine wave                                                                           |                                  |                                                                       | 25     | A                 |                  |
|                                                               |                               |                                                                                                           |                                  |                                                                       | 120    | °C                |                  |
| Maximum RMS forward current                                   | I <sub>F(RMS)</sub>           |                                                                                                           |                                  |                                                                       | 40     | A                 |                  |
| Maximum on-repetitive peak reverse power                      | P <sub>R</sub> <sup>(1)</sup> | 10 μs square pulse, T <sub>J</sub> = T <sub>J</sub> maximum                                               |                                  |                                                                       | 10     | K/W               |                  |
| 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 | 356    | A                 |                  |
|                                                               |                               | t = 8.3 ms                                                                                                |                                  |                                                                       | 373    |                   |                  |
|                                                               |                               | t = 10 ms                                                                                                 | 100 % V <sub>RRM</sub> reapplied |                                                                       | 300    |                   |                  |
|                                                               |                               | t = 8.3 ms                                                                                                |                                  |                                                                       | 314    |                   |                  |
| Maximum I <sup>2</sup> t for fusing                           | I <sup>2</sup> t              | t = 10 ms                                                                                                 | No voltage reapplied             |                                                                       |        | 636               | A <sup>2</sup> s |
|                                                               |                               | t = 8.3 ms                                                                                                |                                  |                                                                       |        | 580               |                  |
|                                                               |                               | t = 10 ms                                                                                                 | 100 % V <sub>RRM</sub> reapplied |                                                                       |        | 450               |                  |
|                                                               |                               | t = 8.3 ms                                                                                                |                                  |                                                                       |        | 410               |                  |
| Maximum I <sup>2</sup> √t for fusing                          | I <sup>2</sup> √t             | t = 0.1 to 10 ms, no voltage reapplied                                                                    |                                  |                                                                       | 6360   | A <sup>2</sup> √s |                  |
| Low level value of threshold voltage                          | V <sub>F(TO)1</sub>           | (16.7 % × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum |                                  |                                                                       | 0.80   | V                 |                  |
| High level value of threshold voltage                         | V <sub>F(TO)2</sub>           | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum                                    |                                  |                                                                       | 0.90   |                   |                  |
| Low level value of forward slope resistance                   | r <sub>f1</sub>               | (16.7 % × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum |                                  |                                                                       | 6.80   | mΩ                |                  |
| High level value of forward slope resistance                  | r <sub>f2</sub>               | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum                                    |                                  |                                                                       | 5.70   |                   |                  |
| Maximum forward voltage drop                                  | V <sub>FM</sub>               | I <sub>pk</sub> = 78 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 400 μs rectangular wave                  |                                  |                                                                       | 1.30   | V                 |                  |

## Note

(1) Available only for avalanche version, all other parameters the same as 25F

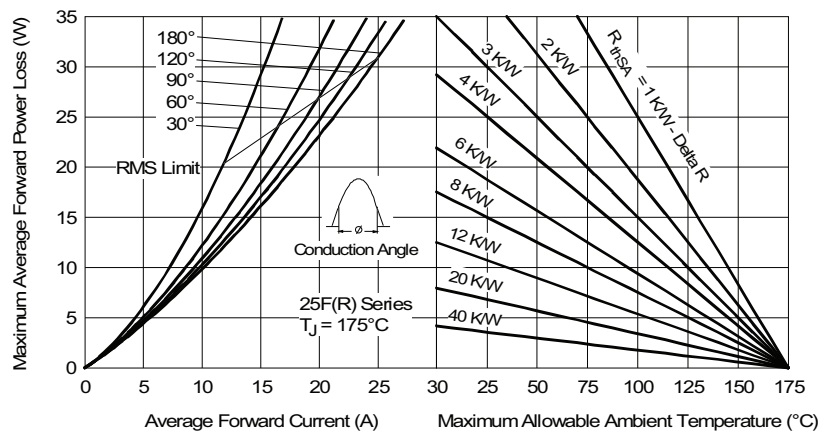
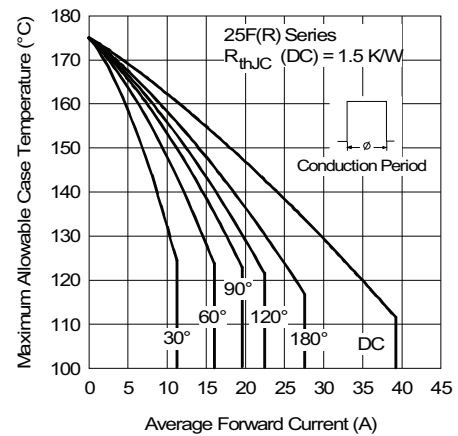
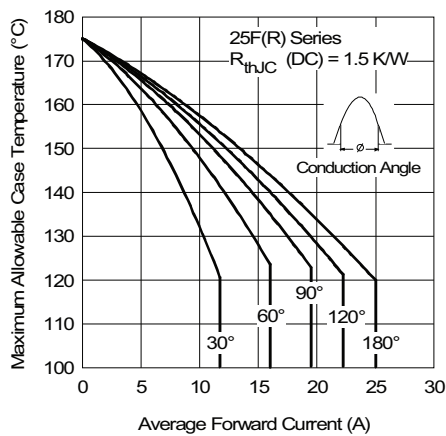
| THERMAL AND MECHANICAL SPECIFICATIONS        |                   |                                               |                        |                     |
|----------------------------------------------|-------------------|-----------------------------------------------|------------------------|---------------------|
| PARAMETER                                    | SYMBOL            | TEST CONDITIONS                               | VALUES                 | UNITS               |
| Maximum junction operating temperature range | T <sub>J</sub>    |                                               | - 65 to 175            | °C                  |
| Maximum storage temperature range            | T <sub>Stg</sub>  |                                               | - 65 to 200            |                     |
| Maximum thermal resistance, junction to case | R <sub>thJC</sub> | DC operation                                  | 1.5                    | K/W                 |
| Maximum thermal resistance, case to heatsink | R <sub>thCS</sub> | 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)        |                     |



| $\Delta R_{thJC}$ CONDUCTION |                       |                        |                             |       |
|------------------------------|-----------------------|------------------------|-----------------------------|-------|
| CONDUCTION ANGLE             | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS             | UNITS |
| 180°                         | 0.28                  | 0.24                   | $T_J = T_J \text{ maximum}$ | 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



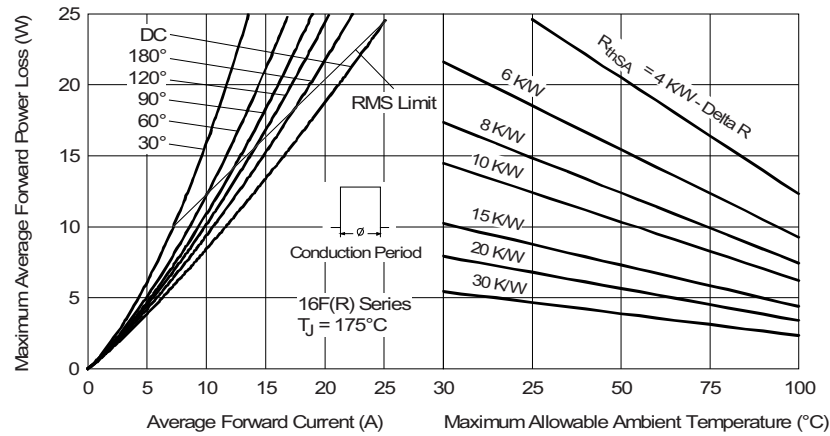


Fig. 4 - Forward Power Loss Characteristics

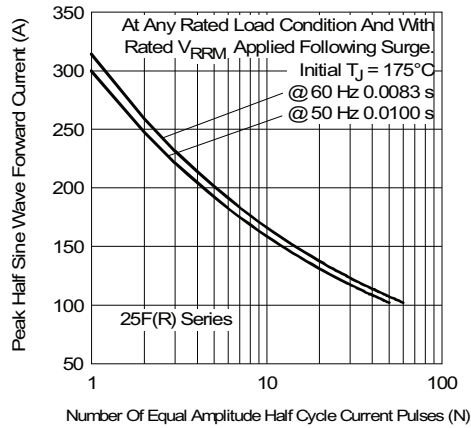


Fig. 5 - Maximum Non-Repetitive Surge Current

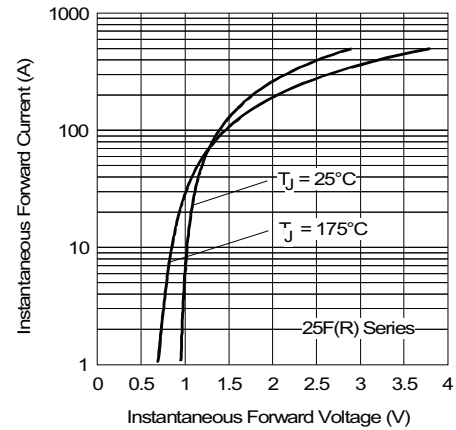


Fig. 7 - Forward Voltage Drop Characteristics

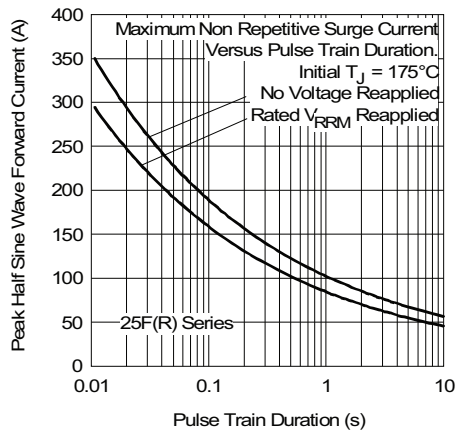


Fig. 6 - Maximum Non-Repetitive Surge Current

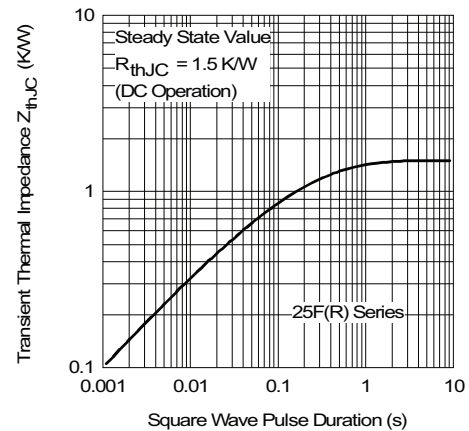


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics



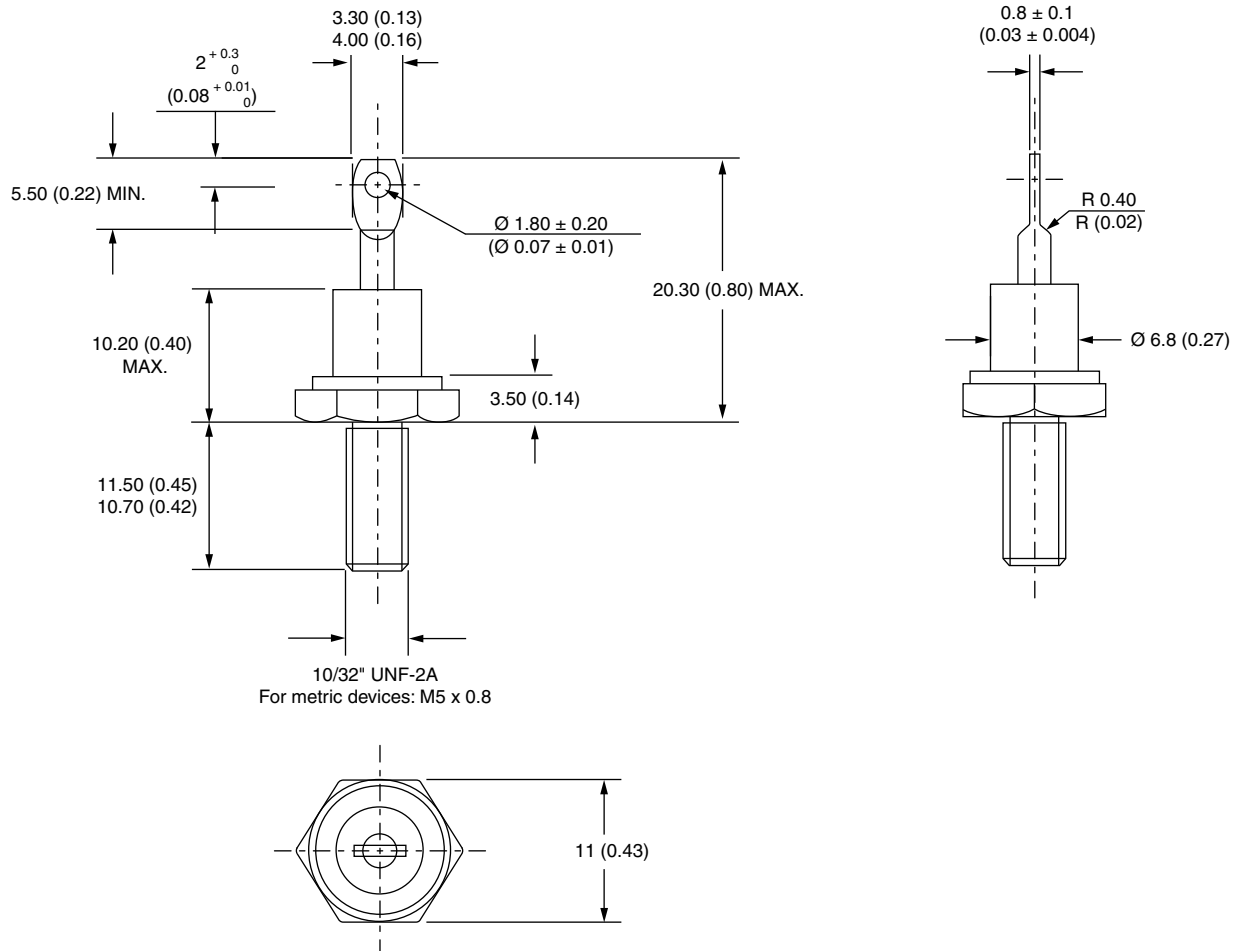
ORDERING INFORMATION TABLE

|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |   |     |   |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|-----|---|
| Device code | 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | F | R | 120 | M |
|             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2 | 3 | 4   | 5 |
|             | <div><div>1</div> - Current rating: Code = <math>I_{F(AV)}</math></div> <div><div>2</div> - F = Standard device</div> <div><div>3</div> - None = Stud normal polarity (cathode to stud)<br/>R = Stud reverse polarity (anode to stud)</div> <div><div>4</div> - Voltage code x 10 = <math>V_{RRM}</math> (see Voltage Ratings table)</div> <div><div>5</div> - None = Stud base DO-203AA (DO-4) 10-32UNF-2A<br/>M = Stud base DO-203AA (DO-4) M5 X 0.8<br/>(not available for avalanche diodes)</div> |   |   |     |   |

| 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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Менеджер отдела продаж ООО

«Трейд Электроникс»

Шишлаков Евгений

8 (495)668-30-28 доб 169

manager28@tradeelectronics.ru

<http://www.tradeelectronics.ru/>