

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



DO-4 (DO-203AA)

### 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)



**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

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

### PRIMARY CHARACTERISTICS

|                       |                 |
|-----------------------|-----------------|
| $I_{F(AV)}$           | 25 A            |
| Package               | DO-4 (DO-203AA) |
| Circuit configuration | Single          |

### 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 | $I_{RRM}$ MAXIMUM AT $T_J = 175$ °C<br>mA |
|-------------|--------------|--|--|---|
| VS-25F(R)   | 10           | 100  | 150  | 12  |
|             | 20           | 200  | 275  |   |
|             | 40           | 400  | 500  |   |
|             | 60           | 600  | 725  |   |
|             | 80           | 800  | 950  |   |
|             | 100          | 1000   | 1200   |   |
|             | 120          | 1200   | 1400   |   |



| 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 peak, one-cycle forward, non-repetitive surge current | $I_{FSM}$     | t = 10 ms   | No voltage reapplied      | 356    | A                 |
|   |               | t = 8.3 ms  |                           | 373    |                   |
|   |               | t = 10 ms   | 100 % $V_{RRM}$ reapplied | 300    |                   |
|   |               | t = 8.3 ms  |                           | 314    |                   |
| Maximum $I^2t$ for fusing                                     | $I^2t$        | t = 10 ms   | No voltage reapplied      | 636    | A <sup>2</sup> s  |
|   |               | t = 8.3 ms  |                           | 580    |                   |
|   |               | t = 10 ms   | 100 % $V_{RRM}$ reapplied | 450    |                   |
|   |               | t = 8.3 ms  |                           | 410    |                   |
| Maximum $I^2\sqrt{t}$ for fusing                              | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reapplied  |                           | 6360   | A <sup>2</sup> √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   | mΩ                |
| 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, $t_p = 400$ μs rectangular wave                         |                           | 1.30   | V                 |

| 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 heat sink | $R_{thCS}$ | Mounting surface, smooth, flat and greased    |  | 0.5                 |                  |
| Allowable mounting torque                     |            | Not lubricated threads                        |  | 1.5 + 0 - 10 % (13) | N · m (lbf · in) |
|   |            | Lubricated threads                            |  | 1.2 + 0 - 10 % (10) | N · m (lbf · in) |
| Approximate weight                            |            |   |  | 7                   | g                |
|   |            |   |  | 0.25                | oz.              |
| Case style                                    |            | See dimensions - link at the end of datasheet |  | DO-4 (DO-203AA)     |                  |

| $\Delta R_{thJC}$ CONDUCTION |                       |                        |                     |       |
|------------------------------|-----------------------|------------------------|---------------------|-------|
| 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

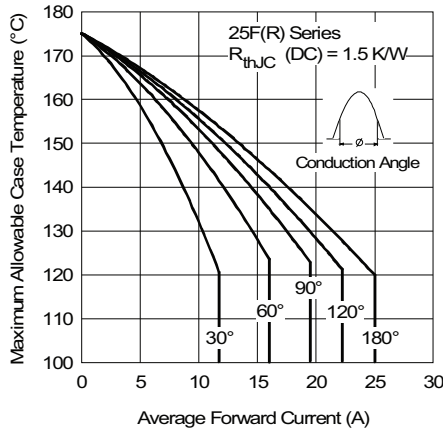


Fig. 1 - Current Ratings Characteristics

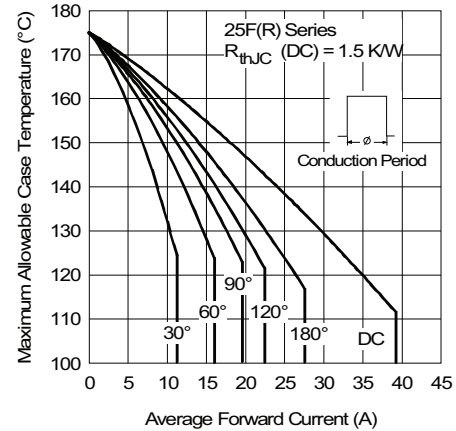


Fig. 2 - Current Ratings Characteristics

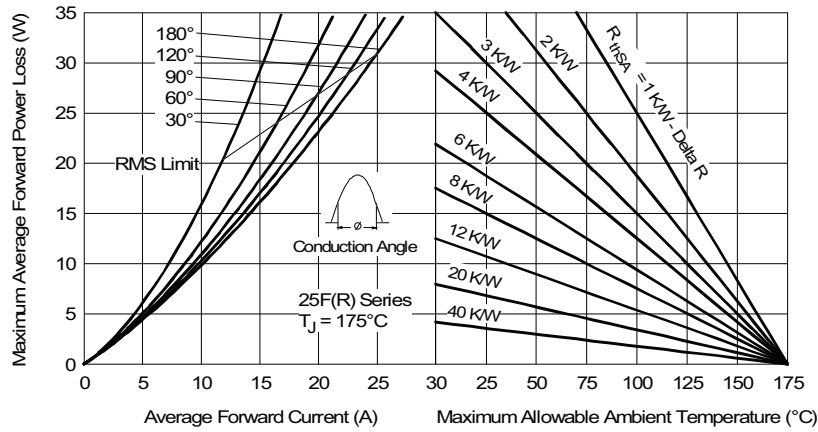


Fig. 3 - Forward Power Loss Characteristics

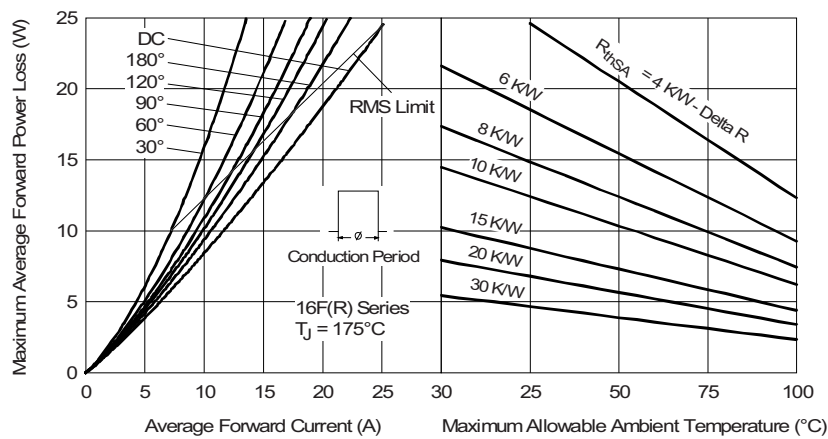


Fig. 4 - Forward Power Loss Characteristics

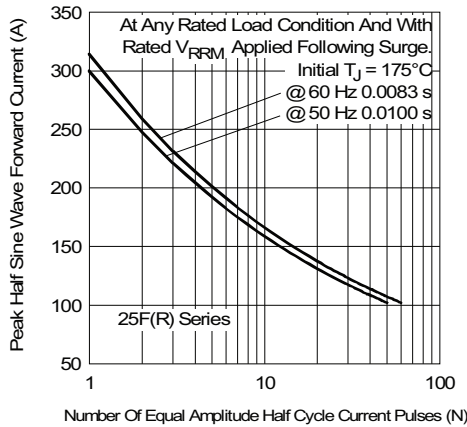


Fig. 5 - Maximum Non-Repetitive Surge Current

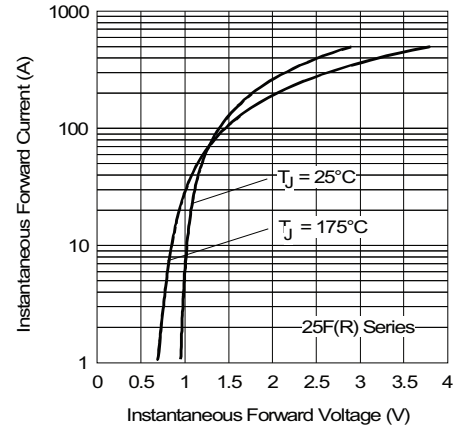


Fig. 7 - Forward Voltage Drop Characteristics

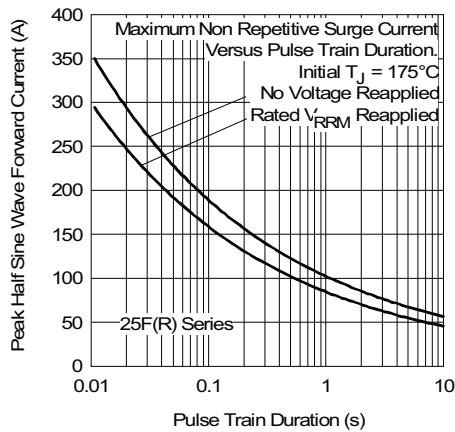


Fig. 6 - Maximum Non-Repetitive Surge Current

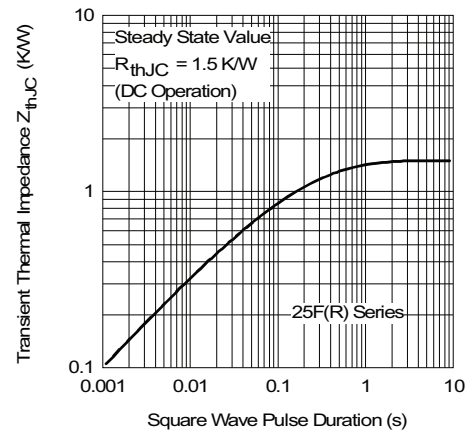


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

|             |            |           |          |          |            |          |
|-------------|------------|-----------|----------|----------|------------|----------|
| Device code | <b>VS-</b> | <b>25</b> | <b>F</b> | <b>R</b> | <b>120</b> | <b>M</b> |
|             | ①          | ②         | ③        | ④        | ⑤          | ⑥        |

- 1** - Vishay Semiconductors product
- 2** - Current rating: code =  $I_{F(AV)}$
- 3** - F = standard device
- 4** - None = stud normal polarity (cathode to stud)  
R = stud reverse polarity (anode to stud)
- 5** - Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)
- 6** - None = stud base DO-4 (DO-203AA) 10-32UNF-2A  
M = stud base DO-4 (DO-203AA) M5 X 0.8

### 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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