# 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 | $A^2s$ |
| | 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 V | $V_{RSM}$, MAXIMUM NON-REPETITIVE PEAK VOLTAGE V | $V_{R(BR)}$, MINIMUM AVALANCHE VOLTAGE V (1) | $I_{RRM}$ MAXIMUM AT $T_J$ = 175 °C 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**

(1) 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 µs 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 reapplied | Sinusoidal half wave, initial $T_J = T_J$ maximum | 265 | A |
| | | t = 8.3 ms | | | 280 | |
| | | t = 10 ms | 100 % $V_{RRM}$ reapplied | | 225 | |
| | | t = 8.3 ms | | | 235 | |
| Maximum $I^2t$ for fusing | $I^2t$ | t = 10 ms | No voltage reapplied | | 351 | $A^2s$ |
| | | t = 8.3 ms | | | 320 | |
| | | t = 10 ms | 100 % $V_{RRM}$ reapplied | | 250 | |
| | | t = 8.3 ms | | | 226 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reapplied | | | 3510 | $A^2\sqrt{s}$ |
| Low level value of threshold voltage | $V_{F(TO)1}$ | (16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ maximum | | | 0.77 | V |
| High level value of threshold voltage | $V_{F(TO)2}$ | (I > π x $I_{F(AV)}$), $T_J = T_J$ maximum | | | 0.97 | |
| Low level value of forward slope resistance | $r_{f1}$ | (16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ maximum | | | 10.70 | mΩ |
| High level value of forward slope resistance | $r_{f2}$ | (I > π x $I_{F(AV)}$), $T_J = T_J$ maximum | | | 6.20 | |
| Maximum forward voltage drop | $V_{FM}$ | $I_{pk}$ = 38 A, $T_J$ = 25 °C, $t_p$ = 400 µs 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 | $T_J = T_J$ 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 $R_{thJC}$ when devices operate at different conduction angles than DC

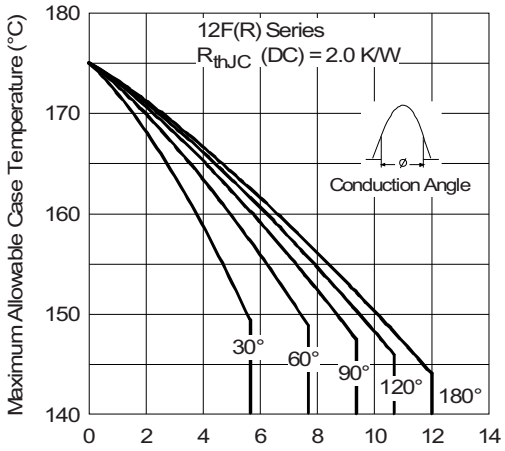



Fig. 1 - Current Ratings Characteristics

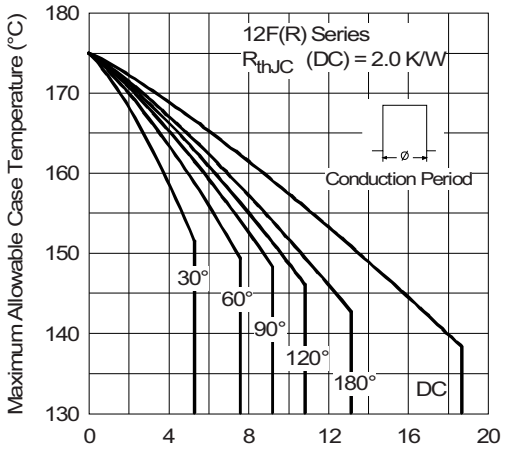



Fig. 2 - Current Ratings Characteristics

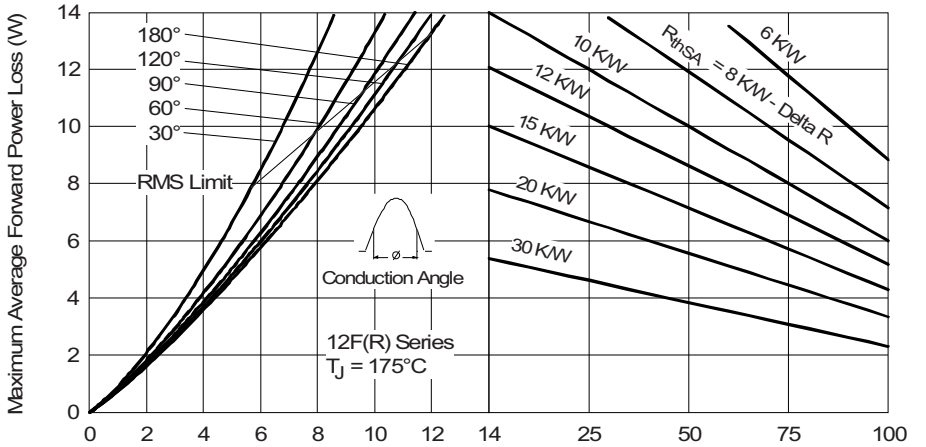



Fig. 3 - Forward Power Loss Characteristics

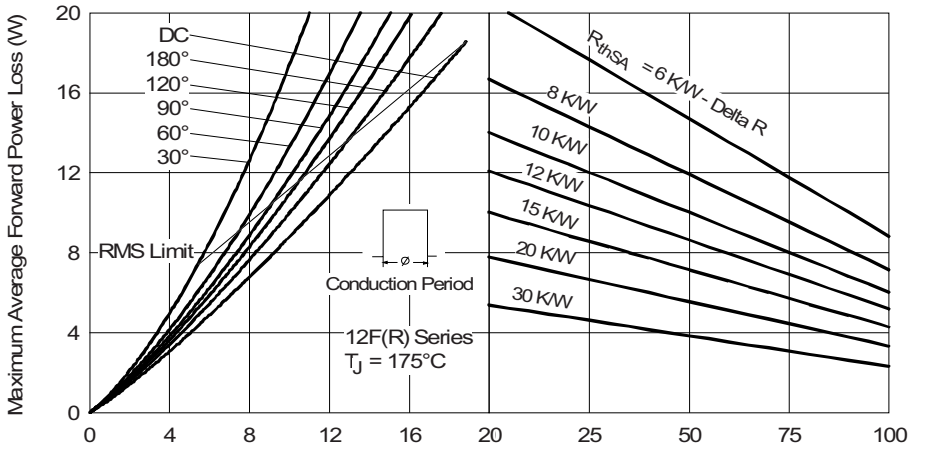



Fig. 4 - Forward Power Loss Characteristics

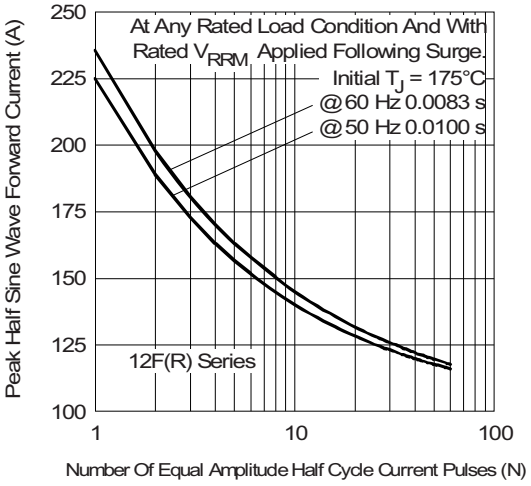



Fig. 5 - Maximum Non-Repetitive Surge Current

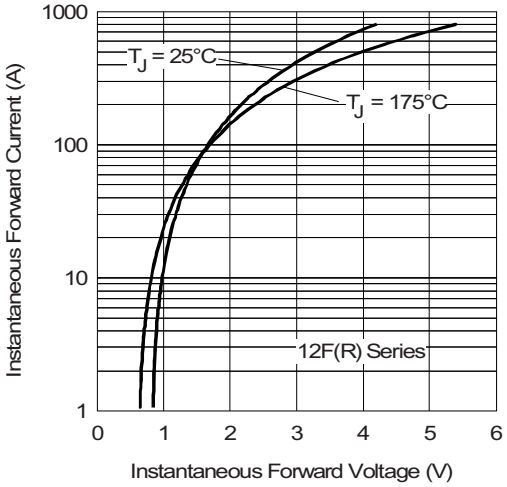



Fig. 7 - Forward Voltage Drop Characteristics

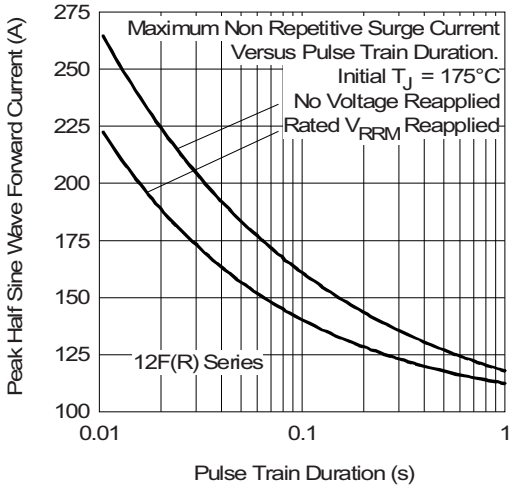



Fig. 6 - Maximum Non-Repetitive Surge Current

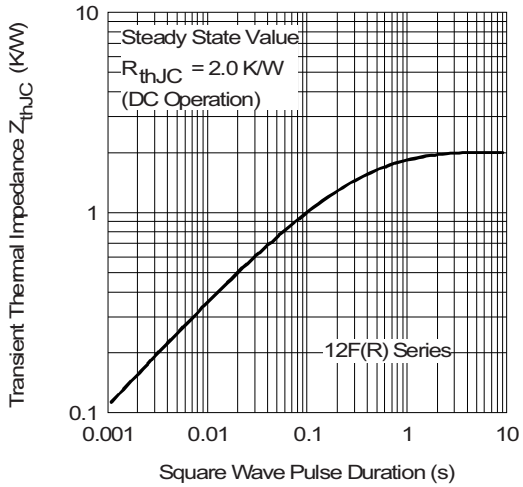



Fig. 8 - Thermal Impedance $Z_{thJC}$ Characteristics

## ORDERING INFORMATION TABLE

**Device code**

| 12 | 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

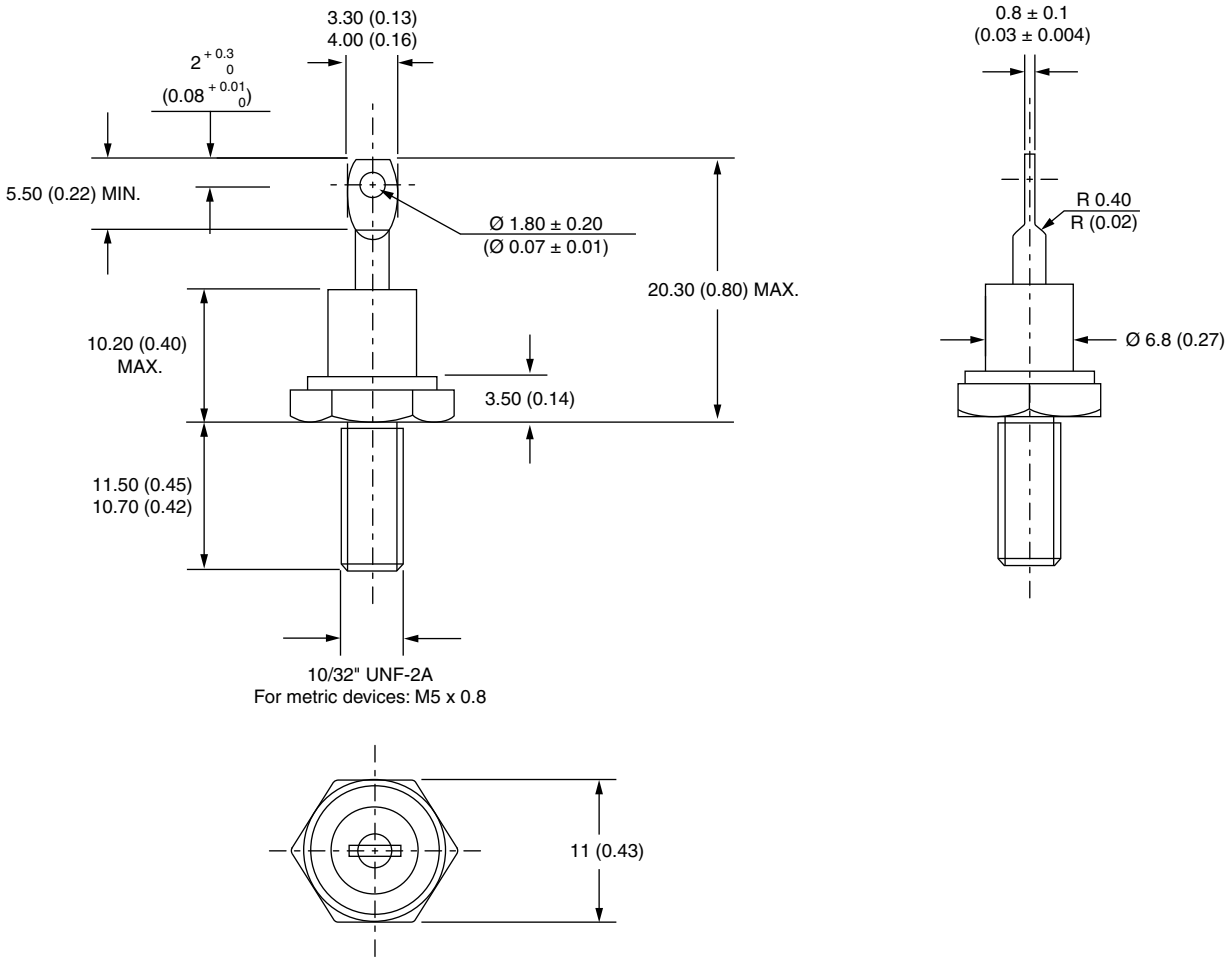
M = Stud base DO-203AA (DO-4) M5 x 0.8

(not available for avalanche diodes)

| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | http://www.vishay.com/doc?95311 |

# DO-203AA (DO-4)

**DIMENSIONS** in millimeters (inches)



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