

Standard Recovery Diodes, (Stud Version), 12 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}
- Designed and qualified for industrial and consumer level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

| PRIMARY CHARACTERISTICS | |
|-------------------------|-----------------|
| $I_{F(AV)}$ | 12 A |
| Package | DO-4 (DO-203AA) |
| Circuit configuration | Single |

TYPICAL APPLICATIONS

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

| 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 ² 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 V | V_{RSM} , MAXIMUM NON-REPETITIVE PEAK VOLTAGE V | I_{RRM} MAXIMUM AT $T_J = 175$ °C mA |
| VS-12F(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 | | 12 | A |
| | | | | 144 | °C |
| Maximum RMS forward current | $I_{F(RMS)}$ | | | 19 | A |
| Maximum peak, one-cycle forward, non-repetitive surge current | I_{FSM} | t = 10 ms | No voltage reapplied | 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 ² s |
| | | 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 √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 | mΩ |
| 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, $t_p = 400$ μs rectangular wave | | 1.26 | 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 | 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-4 (DO-203AA) | |

| ΔR_{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

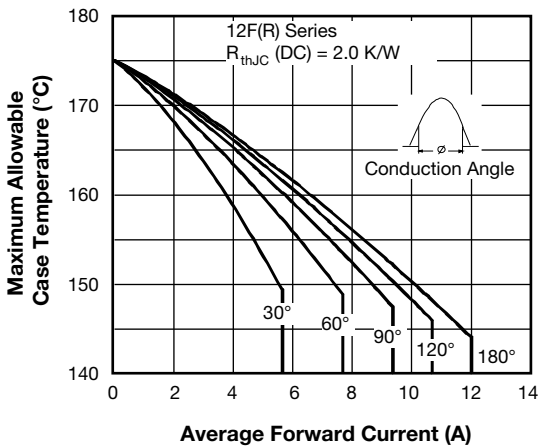


Fig. 1 - Current Ratings Characteristics

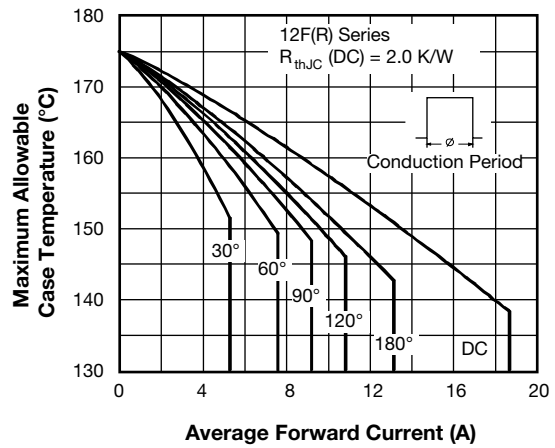


Fig. 2 - Current Ratings Characteristics

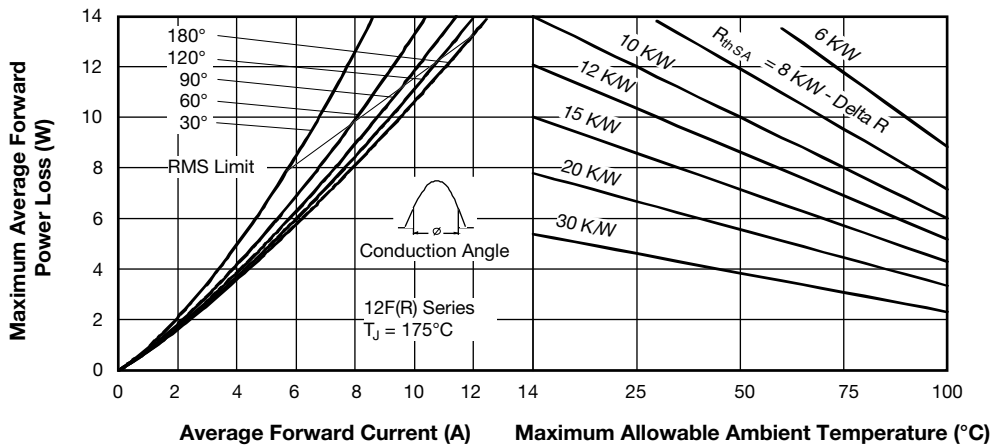


Fig. 3 - Forward Power Loss Characteristics

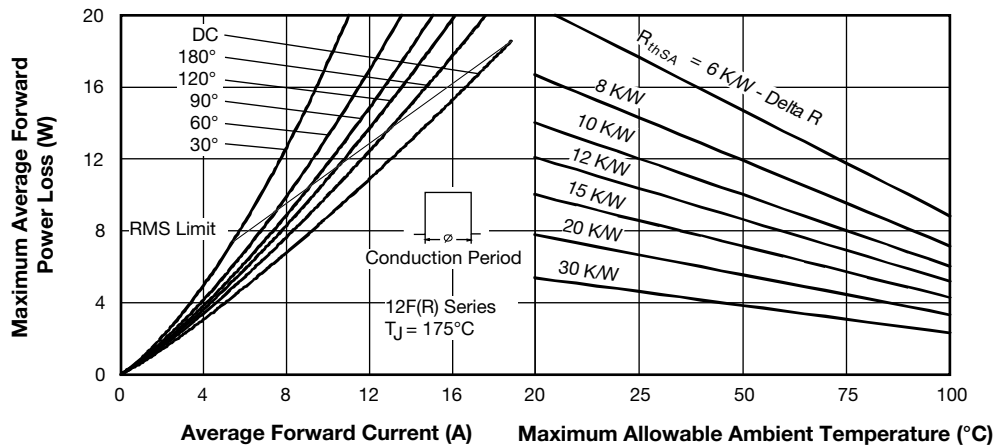


Fig. 4 - Forward Power Loss Characteristics

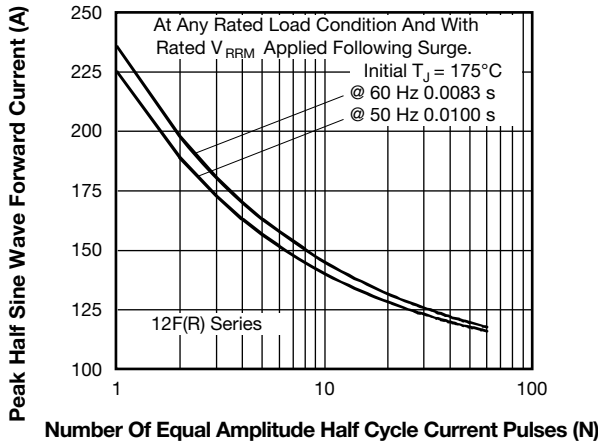


Fig. 5 - Maximum Non-Repetitive Surge Current

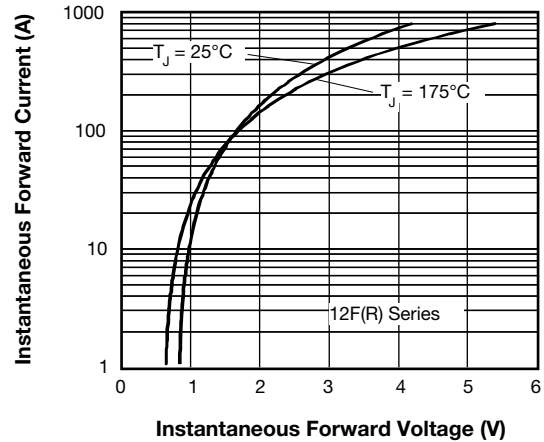


Fig. 7 - Forward Voltage Drop Characteristics

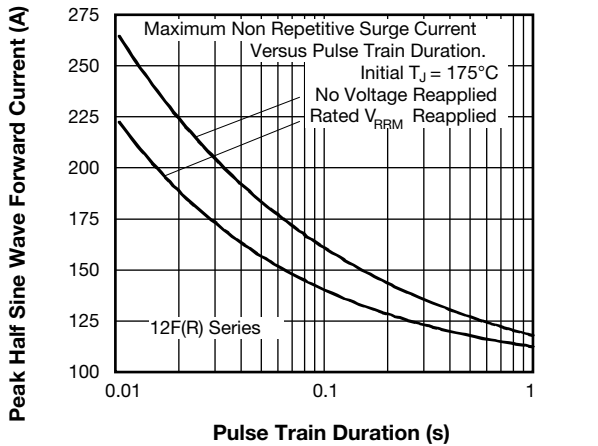


Fig. 6 - Maximum Non-Repetitive Surge Current

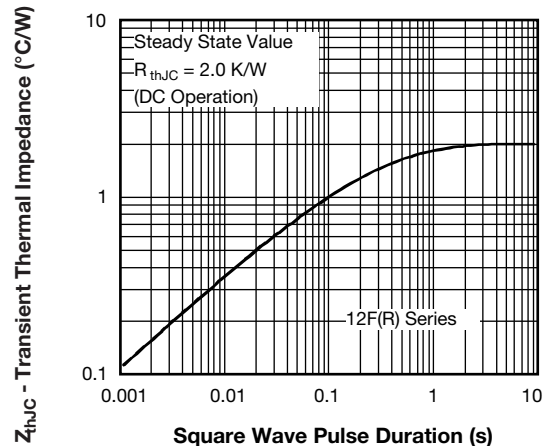


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

| | | | | | | |
|-------------|---------------------------------|--------------------------------------|-----------------------|--|---|--|
| Device code | VS- | 12 | F | R | 120 | M |
| | ① | ② | ③ | ④ | ⑤ | ⑥ |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | - Vishay Semiconductors product | - Current rating: code = $I_{F(AV)}$ | - F = standard device | - None = stud normal polarity (cathode to stud) R = stud reverse polarity (anode to stud) | - Voltage code x 10 = V_{RRM} (see Voltage Ratings table) | - 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 | www.vishay.com/doc?95311 |

DO-203AA (DO-4)

DIMENSIONS in millimeters (inches)





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