

STANDARD RECOVERY DIODES

Stud Version

Features

- High surge current capability
- Avalanche types available
- Stud cathode and stud anode version
- Wide current range
- Types up to 1200V V_{RRM}

12 A

Typical Applications

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

Major Ratings and Characteristics

| Parameters | 12F(R) | Units |
|------------------|-------------|------------------|
| $I_{F(AV)}$ | 12 | A |
| @ T_C | 144 | °C |
| $I_{F(RMS)}$ | 19 | A |
| I_{FSM} @ 50Hz | 265 | A |
| @ 60Hz | 280 | A |
| I^2t @ 50Hz | 351 | A ² s |
| @ 60Hz | 320 | A ² s |
| V_{RRM} range | 100 to 1200 | V |
| T_J range | - 65 to 175 | °C |



12F(R) Series

Bulletin I20205 rev. A 09/98

International
IR Rectifier

ELECTRICAL SPECIFICATIONS

Voltage Ratings

| Type number | Voltage Code | V_{RRM} , maximum repetitive peak reverse voltage V | V_{RSM} , maximum non-repetitive peak reverse voltage V | $V_{R(BR)}$, minimum avalanche voltage V (1) | I_{RRM} max. @ $T_J = 175^\circ\text{C}$ 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 | |

(1) Avalanche version only available from V_{RRM} 400V to 1200V.

Forward Conduction

| Parameter | 12F(R) | Units | Conditions |
|--|--------|-------------------|--|
| $I_{F(AV)}$ Max. average forward current @ Case temperature | 12 | A | 180° conduction, half sine wave |
| | 144 | °C | |
| $I_{F(RMS)}$ Max. RMS forward current | 19 | A | |
| P_R Maximum non-repetitive peak reverse power | 7 | K/W | 10µs square pulse, $T_J = T_J$ max. see note (2) |
| I_{FSM} Max. peak, one-cycle forward, non-repetitive surge current | 265 | A | t = 10ms No voltage reappplied |
| | 280 | | t = 8.3ms |
| | 225 | | t = 10ms 100% V_{RRM} reappplied |
| | 235 | | t = 8.3ms |
| I^2t Maximum I^2t for fusing | 351 | A ² s | t = 10ms No voltage reappplied |
| | 320 | | t = 8.3ms |
| | 250 | | t = 10ms 100% V_{RRM} reappplied |
| | 226 | | t = 8.3ms |
| $I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing | 3510 | A ² √s | t = 0.1 to 10ms, no voltage reappplied |
| $V_{F(TO)1}$ Low level value of threshold voltage | 0.77 | V | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max. |
| $V_{F(TO)2}$ High level value of threshold voltage | 0.97 | | $(I > \pi \times I_{F(AV)})$, $T_J = T_J$ max. |
| r_{f1} Low level value of forward slope resistance | 10.70 | mΩ | $(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max. |
| r_{f2} High level value of forward slope resistance | 6.20 | | $(I > \pi \times I_{F(AV)})$, $T_J = T_J$ max. |
| V_{FM} Max. forward voltage drop | 1.26 | V | $I_{pk} = 38\text{A}$, $T_J = 25^\circ\text{C}$, $t_p = 400\mu\text{s}$ rectangular wave |

(2) Available only for Avalanche version, all other parameters the same as 12F.

Thermal and Mechanical Specifications

| Parameter | 12F(R) | Units | Conditions |
|---|-----------------|--------|--|
| T _J Max. junction operating temperature range | -65 to 175 | °C | |
| T _{stg} Max. storage temperature range | -65 to 200 | | |
| R _{thJC} Max. thermal resistance, junction to case | 2 | K/W | DC operation |
| R _{thCS} Max. thermal resistance, case to heatsink | 0.5 | | Mounting surface, smooth, flat and greased |
| T Mounting torque, ± 10% | 1.2 (1.5) | Nm | Lubricated threads (Not lubricated threads) |
| wt Approximate weight | 7 (0.25) | g (oz) | |
| Case style | DO-203AA (DO-4) | | See Outline Table |

ΔR_{thJC} Conduction

(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

| Conduction angle | Sinusoidal conduction | Rectangular conduction | Units | Conditions |
|------------------|-----------------------|------------------------|-------|--------------------------------------|
| 180° | 0.33 | 0.26 | K/W | T _J = T _J max. |
| 120° | 0.41 | 0.44 | | |
| 90° | 0.53 | 0.58 | | |
| 60° | 0.78 | 0.81 | | |
| 30° | 1.28 | 1.29 | | |

Ordering Information Table

Device Code

| | | | | | |
|----------|-----------|----------|----------|------------|----------|
| A | 12 | F | R | 120 | M |
| ① | ② | ③ | ④ | ⑤ | ⑥ |

- 1** - A = Avalanche diode
None = Standard diode
- 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: Code x 10 = V_{RRM} (See Voltage Ratings table)
- 6** - 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)

12F(R) Series

Bulletin I20205 rev. A 09/98

Outlines Table

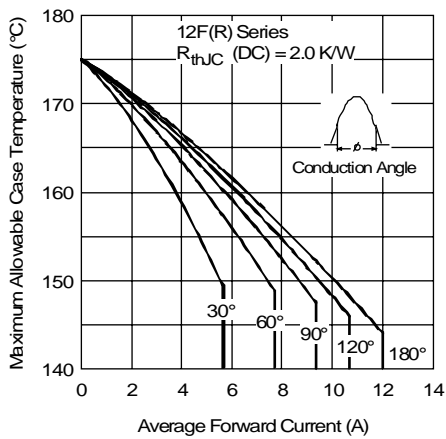
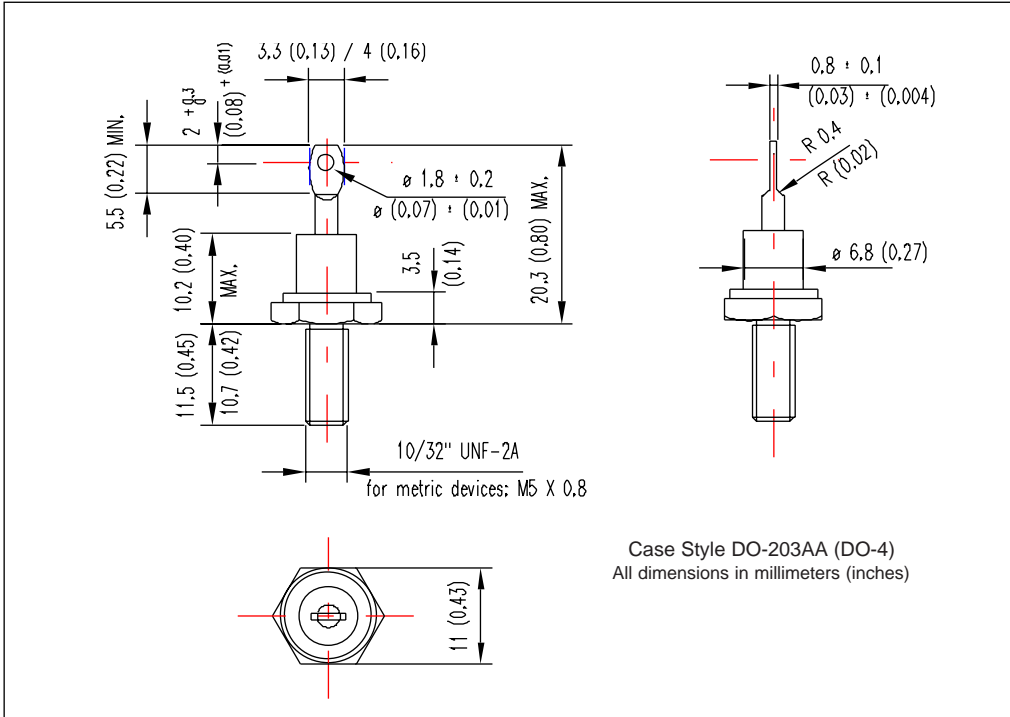


Fig. 1 - Current Ratings Characteristics

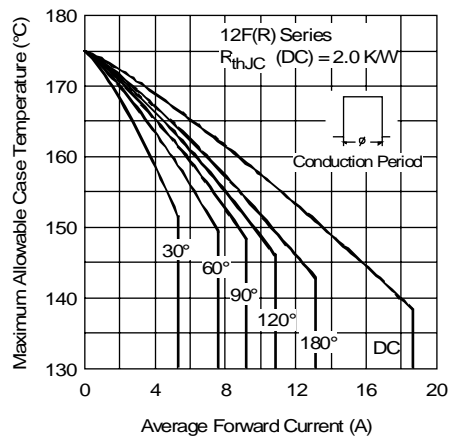


Fig. 2 - Current Ratings Characteristics

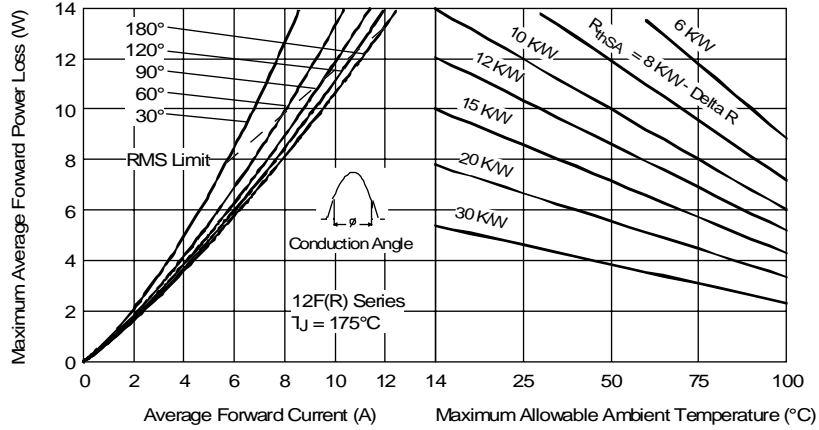


Fig. 3 - Forward Power Loss Characteristics

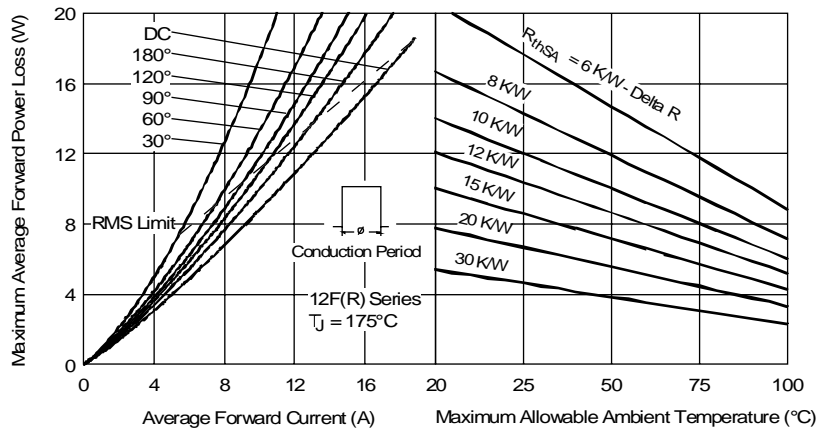


Fig. 4 - Forward Power Loss Characteristics

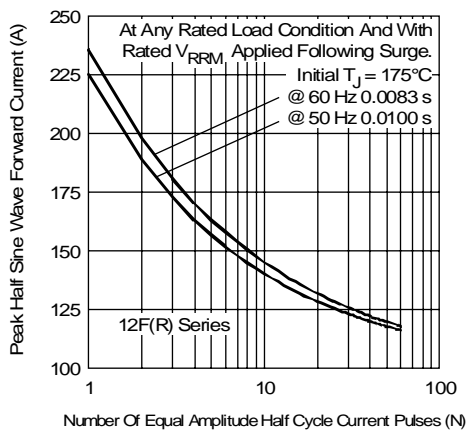


Fig. 5 - Maximum Non-Repetitive Surge Current

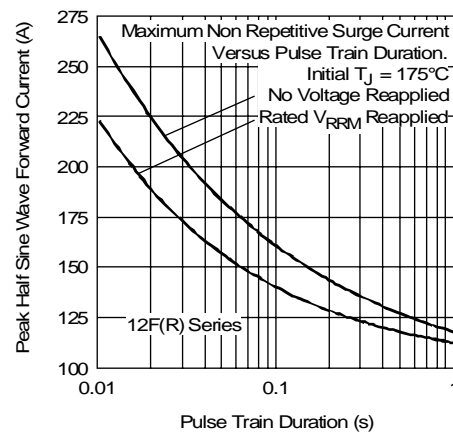


Fig. 6 - Maximum Non-Repetitive Surge Current

12F(R) Series

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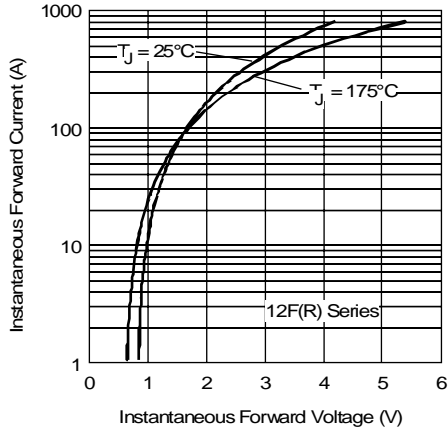


Fig. 7 - Forward Voltage Drop Characteristics

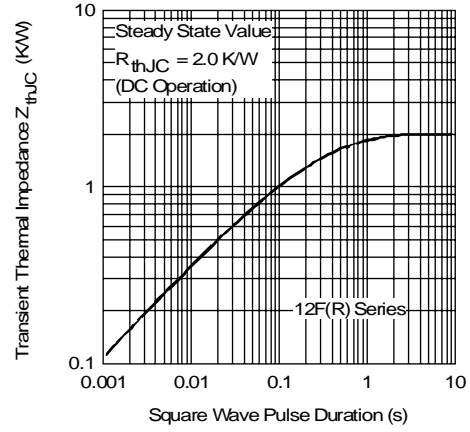


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

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