

### 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  $V_{RRM}$

16 A

#### Typical Applications

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

#### Major Ratings and Characteristics

| Parameters       | 16F(R)      | Units            |
|------------------|-------------|------------------|
| $I_{F(AV)}$      | 16          | A                |
| @ $T_C$          | 140         | °C               |
| $I_{F(RMS)}$     | 25          | A                |
| $I_{FSM}$ @ 50Hz | 350         | A                |
| @ 60Hz           | 370         | A                |
| $I^2t$ @ 50Hz    | 612         | A <sup>2</sup> s |
| @ 60Hz           | 560         | A <sup>2</sup> s |
| $V_{RRM}$ range  | 100 to 1200 | V                |
| $T_J$ range      | - 65 to 175 | °C               |



## 16F(R) Series

Bulletin I20204 rev. A 09/98

International  
**IR** Rectifier

### ELECTRICAL SPECIFICATIONS

#### Voltage Ratings

| Type number | Voltage Code | $V_{RRM}$ : maximum repetitive peak reverse voltage<br>V | $V_{RSM}$ : maximum non-repetitive peak reverse voltage<br>V | $V_{R(BR)}$ : minimum avalanche voltage<br>V (1) | $I_{RRM}$ max.<br>@ $T_J = 175^\circ\text{C}$<br>mA |
|-------------|--------------|--|--|--|---|
| 16F(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  | 16F(R) | Units             | Conditions   |
|--|--------|-------------------|--|
| $I_{F(AV)}$ Max. average forward current @ Case temperature          | 16     | A                 | 180° conduction, half sine wave  |
|  | 140    | °C                |  |
| $I_{F(RMS)}$ Max. RMS forward current                                | 25     | A                 |  |
| $P_R$ Maximum non-repetitive peak reverse power                      | 15     | K/W               | 10µs square pulse, $T_J = T_J$ max.<br><b>see note (2)</b>                           |
| $I_{FSM}$ Max. peak, one-cycle forward, non-repetitive surge current | 350    | A                 | t = 10ms No voltage reappplied   |
|  | 370    |                   | t = 8.3ms  |
|  | 295    |                   | t = 10ms 100% $V_{RRM}$ reappplied   |
|  | 310    |                   | t = 8.3ms  |
| $I^2t$ Maximum $I^2t$ for fusing                                     | 612    | A <sup>2</sup> s  | t = 10ms No voltage reappplied   |
|  | 560    |                   | t = 8.3ms  |
|  | 435    |                   | t = 10ms 100% $V_{RRM}$ reappplied   |
|  | 395    |                   | t = 8.3ms  |
| $I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing                       | 6120   | A <sup>2</sup> √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                   | 0.90   |                   | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ max.                                      |
| $r_{f1}$ Low level value of forward slope resistance                 | 7.80   | 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                | 5.70   |                   | $(I > \pi \times I_{F(AV)})$ , $T_J = T_J$ max.                                      |
| $V_{FM}$ Max. forward voltage drop                                   | 1.23   | V                 | $I_{pk} = 50A$ , $T_J = 25^\circ\text{C}$ , $t_p = 400\mu\text{s}$ rectangular wave  |

(2) Available only for Avalanche version, all other parameters the same as 16F.

**Thermal and Mechanical Specifications**

| Parameter   | 16F(R)          | Units  | Conditions                                     |
|---|-----------------|--------|--|
| T <sub>J</sub> Max. junction operating temperature range    | -65 to 175      | °C     |  |
| T <sub>stg</sub> Max. storage temperature range             | -65 to 200      |        |  |
| R <sub>thJC</sub> Max. thermal resistance, junction to case | 1.6             | K/W    | DC operation                                   |
| R <sub>thCS</sub> Max. thermal resistance, case to heatsink | 0.5             |        | Mounting surface, smooth, flat and greased     |
| T Mounting torque, ± 10%                                    | 1.2<br>(1.5)    | Nm     | Lubricated threads<br>(Not lubricated threads) |
| wt Approximate weight                                       | 7 (0.25)        | g (oz) |  |
| Case style  | DO-203AA (DO-4) |        | See Outline Table                              |

**ΔR<sub>thJC</sub> Conduction**

(The following table shows the increment of thermal resistance R<sub>thJC</sub> when devices operate at different conduction angles than DC)

| Conduction angle | Sinusoidal conduction | Rectangular conduction | Units | Conditions                           |
|------------------|-----------------------|------------------------|-------|--------------------------------------|
| 180°             | 0.31                  | 0.23                   | K/W   | T <sub>J</sub> = T <sub>J</sub> max. |
| 120°             | 0.38                  | 0.40                   |       |                                      |
| 90°              | 0.49                  | 0.54                   |       |                                      |
| 60°              | 0.72                  | 0.75                   |       |                                      |
| 30°              | 1.20                  | 1.21                   |       |                                      |

**Ordering Information Table**

**Device Code**

|   |    |   |   |     |   |
|---|----|---|---|-----|---|
| A | 16 | F | R | 120 | M |
| ① | ②  | ③ | ④ | ⑤   | ⑥ |

- 1** - A = Avalanche diode  
None = Standard diode
- 2** - Current rating: Code = I<sub>F(AV)</sub>
- 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<sub>RRM</sub> (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)

# 16F(R) Series

Bulletin I20204 rev. A 09/98

## Outlines Table

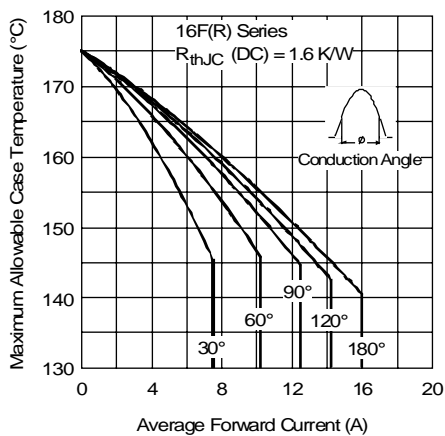
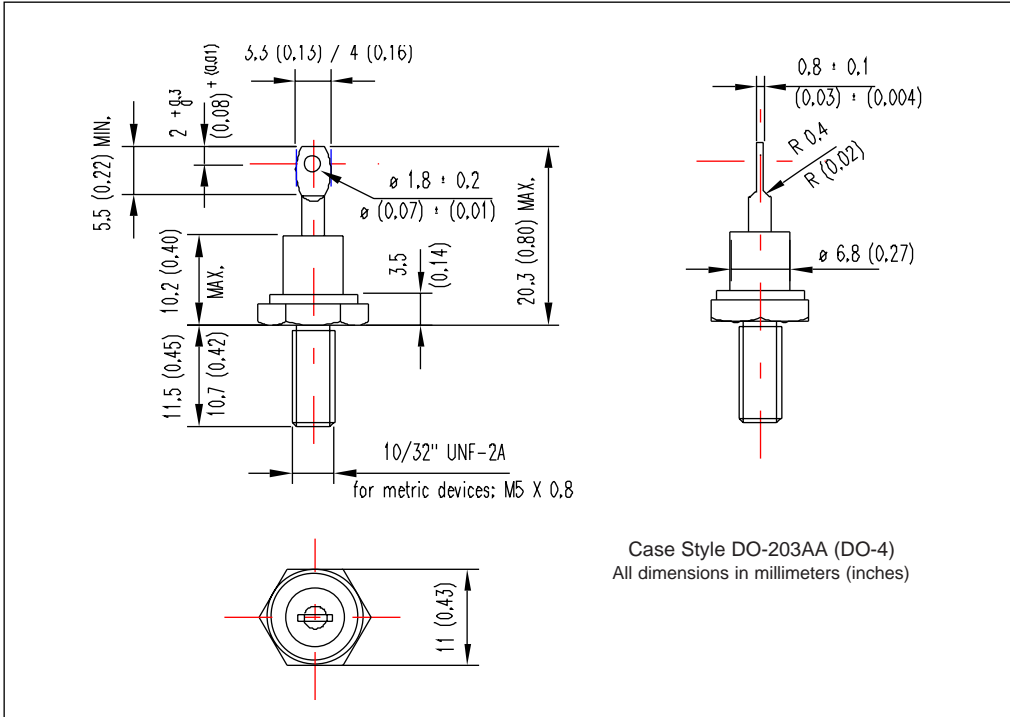


Fig. 1 - Current Ratings Characteristics

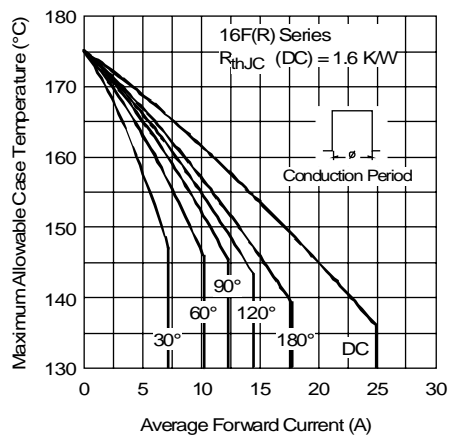


Fig. 2 - Current Ratings Characteristics

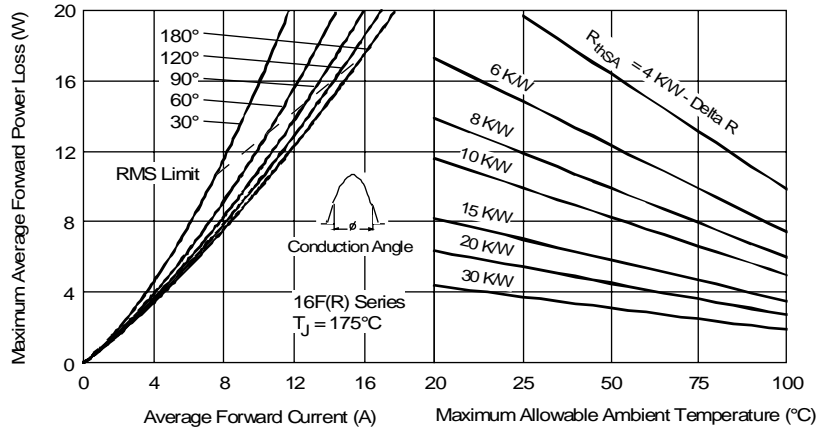


Fig. 3 - Forward Power Loss Characteristics

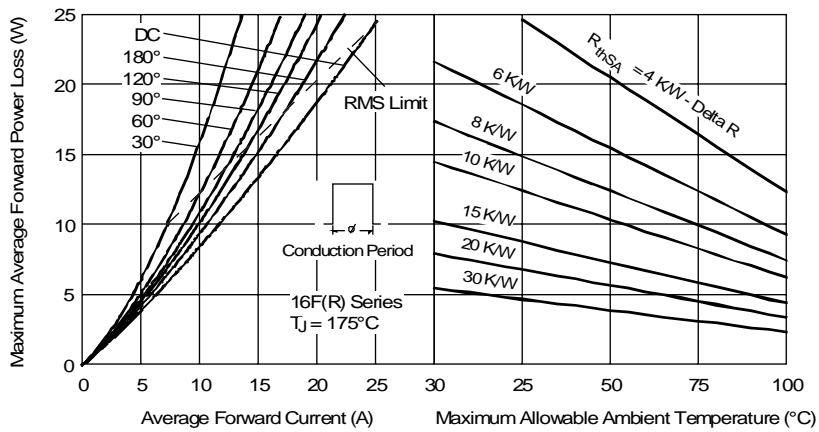


Fig. 4 - Forward Power Loss Characteristics

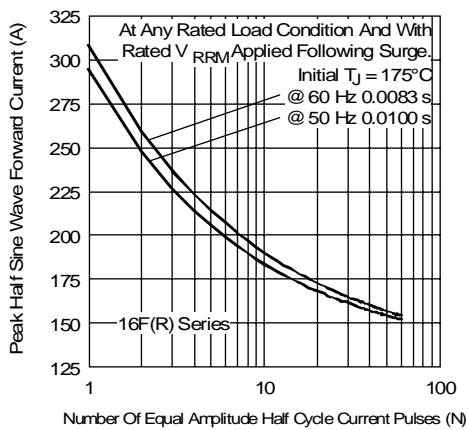


Fig. 5 - Maximum Non-Repetitive Surge Current

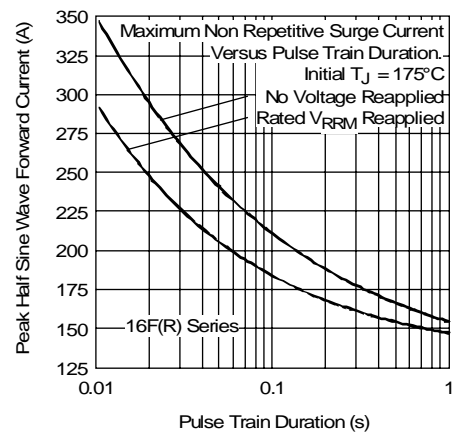


Fig. 6 - Maximum Non-Repetitive Surge Current

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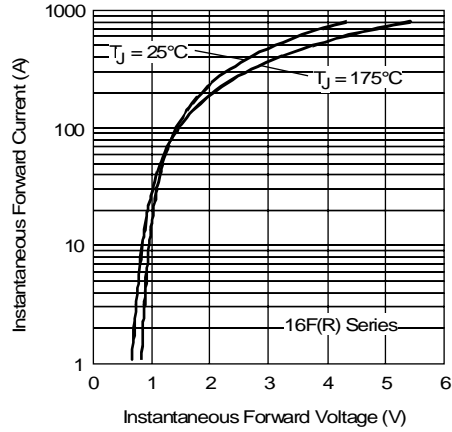


Fig. 7 - Forward Voltage Drop Characteristics

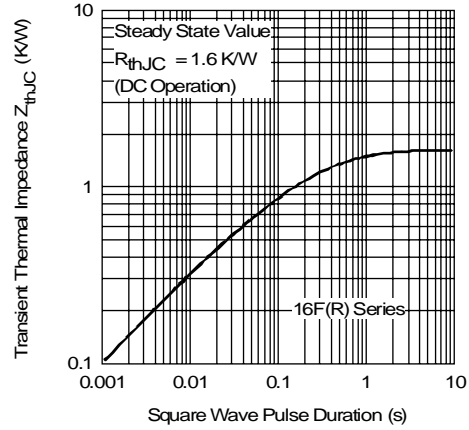


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

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Data and specifications subject to change without notice.