

### STANDARD RECOVERY DIODES

### Stud Version

#### Features

- High surge current capability
- Designed for a wide range of applications
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600V  $V_{RRM}$

70 A

#### Typical Applications

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

#### Major Ratings and Characteristics

| Parameters       | 70HF(R)     |              | Units            |
|------------------|-------------|--------------|------------------|
|                  | 10 to 120   | 140 to 160   |                  |
| $I_{F(AV)}$      | 70          | 70           | A                |
| @ $T_C$          | 140         | 110          | °C               |
| $I_{F(RMS)}$     | 110         |              | A                |
| $I_{FSM}$ @ 50Hz | 1200        |              | A                |
| @ 60Hz           | 1250        |              | A                |
| $I^2t$ @ 50Hz    | 7100        |              | A <sup>2</sup> s |
| @ 60Hz           | 6450        |              | A <sup>2</sup> s |
| $V_{RRM}$ range  | 100 to 1200 | 1400 to 1600 | V                |
| $T_J$ range      | - 65 to 180 | - 65 to 150  | °C               |



## 70HF(R) Series

Bulletin I20202 rev. E 03/04

International  
IOR 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 | $I_{RRM}$ max.<br>@ $T_J = T_J$ max.<br>mA |
|-------------|--------------|----------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------|--------------------------------------------|
| 70HF(R)     | 10           | 100                                                      | 200                                                          | 200                                          | 15                                         |
|             | 20           | 200                                                      | 300                                                          | 300                                          |                                            |
|             | 40           | 400                                                      | 500                                                          | 500                                          |                                            |
|             | 60           | 600                                                      | 720                                                          | 725                                          | 9                                          |
|             | 80           | 800                                                      | 960                                                          | 950                                          |                                            |
|             | 100          | 1000                                                     | 1200                                                         | 1150                                         |                                            |
|             | 120          | 1200                                                     | 1440                                                         | 1350                                         |                                            |
|             | 140          | 1400                                                     | 1650                                                         | 1550                                         | 4.5                                        |
|             | 160          | 1600                                                     | 1900                                                         | 1750                                         |                                            |

#### Forward Conduction

| Parameter           |                                                               | 70HF(R)   |            | Units             | Conditions                                                                                            |                       |                                                                           |  |
|---------------------|---------------------------------------------------------------|-----------|------------|-------------------|-------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------|--|
|                     |                                                               | 10 to 120 | 140 to 160 |                   |                                                                                                       |                       |                                                                           |  |
| I <sub>F(AV)</sub>  | Max. average forward current<br>@ Case temperature            | 70        | 70         | A                 | 180° conduction, half sine wave                                                                       |                       |                                                                           |  |
|                     |                                                               | 140       | 110        | °C                |                                                                                                       |                       |                                                                           |  |
| I <sub>F(RMS)</sub> | Max. RMS forward current                                      | 110       |            | A                 |                                                                                                       |                       |                                                                           |  |
| I <sub>FSM</sub>    | Max. peak, one-cycle forward,<br>non-repetitive surge current | 1200      |            | A                 | t = 10ms                                                                                              | No voltage            | Sinusoidal half wave,<br><br>Initial T <sub>J</sub> = T <sub>J</sub> max. |  |
|                     |                                                               | 1250      |            |                   | t = 8.3ms                                                                                             | reapplied             |                                                                           |  |
|                     |                                                               | 1000      |            |                   | t = 10ms                                                                                              | 100% V <sub>RRM</sub> |                                                                           |  |
|                     |                                                               | 1050      |            |                   | t = 8.3ms                                                                                             | reapplied             |                                                                           |  |
| I <sup>2</sup> t    | Maximum I <sup>2</sup> t for fusing                           | 7100      |            | A <sup>2</sup> s  | t = 10ms                                                                                              | No voltage            |                                                                           |  |
|                     |                                                               | 6450      |            |                   | t = 8.3ms                                                                                             | reapplied             |                                                                           |  |
|                     |                                                               | 5000      |            |                   | t = 10ms                                                                                              | 100% V <sub>RRM</sub> |                                                                           |  |
|                     |                                                               | 4550      |            |                   | t = 8.3ms                                                                                             | reapplied             |                                                                           |  |
| I <sup>2</sup> /t   | Maximum I <sup>2</sup> /t for fusing                          | 71000     |            | A <sup>2</sup> /s | t = 0.1 to 10ms, no voltage reapplied                                                                 |                       |                                                                           |  |
| V <sub>F(TO)1</sub> | Low level value of threshold<br>voltage                       | 0.79      |            | V                 | (16.7% × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> max. |                       |                                                                           |  |
| V <sub>F(TO)2</sub> | High level value of threshold<br>voltage                      | 1.00      |            |                   | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max.                                   |                       |                                                                           |  |
| r <sub>f1</sub>     | Low level value of forward<br>slope resistance                | 2.33      |            | mΩ                | (16.7% × π × I <sub>F(AV)</sub> ) < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> max. |                       |                                                                           |  |
| r <sub>f2</sub>     | High level value of forward<br>slope resistance               | 1.53      |            |                   | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max.                                   |                       |                                                                           |  |
| V <sub>FM</sub>     | Max. forward voltage drop                                     | 1.35      | 1.46       | V                 | I <sub>pk</sub> = 220A, T <sub>J</sub> = 25°C, t <sub>p</sub> = 400μs rectangular wave                |                       |                                                                           |  |

### Thermal and Mechanical Specifications

| Parameter         |                                           | 70HF(R)        |            | Units    | Conditions                                 |
|-------------------|-------------------------------------------|----------------|------------|----------|--------------------------------------------|
|                   |                                           | 10 to 120      | 140 to 160 |          |                                            |
| T <sub>J</sub>    | Max. junction operating temperature range | -65 to 180     | -65 to 150 | °C       |                                            |
| T <sub>stg</sub>  | Max. storage temperature range            | -65 to 180     | -65 to 150 |          |                                            |
| R <sub>thJC</sub> | Max. thermal resistance, junction to case | 0.45           |            | K/W      | DC operation                               |
| R <sub>thCS</sub> | Max. thermal resistance, case to heatsink | 0.25           |            |          | Mounting surface, smooth, flat and greased |
| T                 | Max. allowed mounting torque ±10%         | 2.3 - 3.4      |            | Nm       | Not lubricated threads                     |
|                   |                                           | 20 - 30        |            | lbf • in |                                            |
| wt                | Approximate weight                        | 17 (0.6)       |            | g (oz)   |                                            |
| Case style        |                                           | DO-203AB (DO5) |            |          | See Outline Table                          |

### $\Delta R_{thJC}$ 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°             | 0.08                  | 0.06                   | K/W   | $T_J = T_J \text{ max.}$ |
| 120°             | 0.10                  | 0.11                   |       |                          |
| 90°              | 0.13                  | 0.14                   |       |                          |
| 60°              | 0.19                  | 0.20                   |       |                          |
| 30°              | 0.30                  | 0.30                   |       |                          |

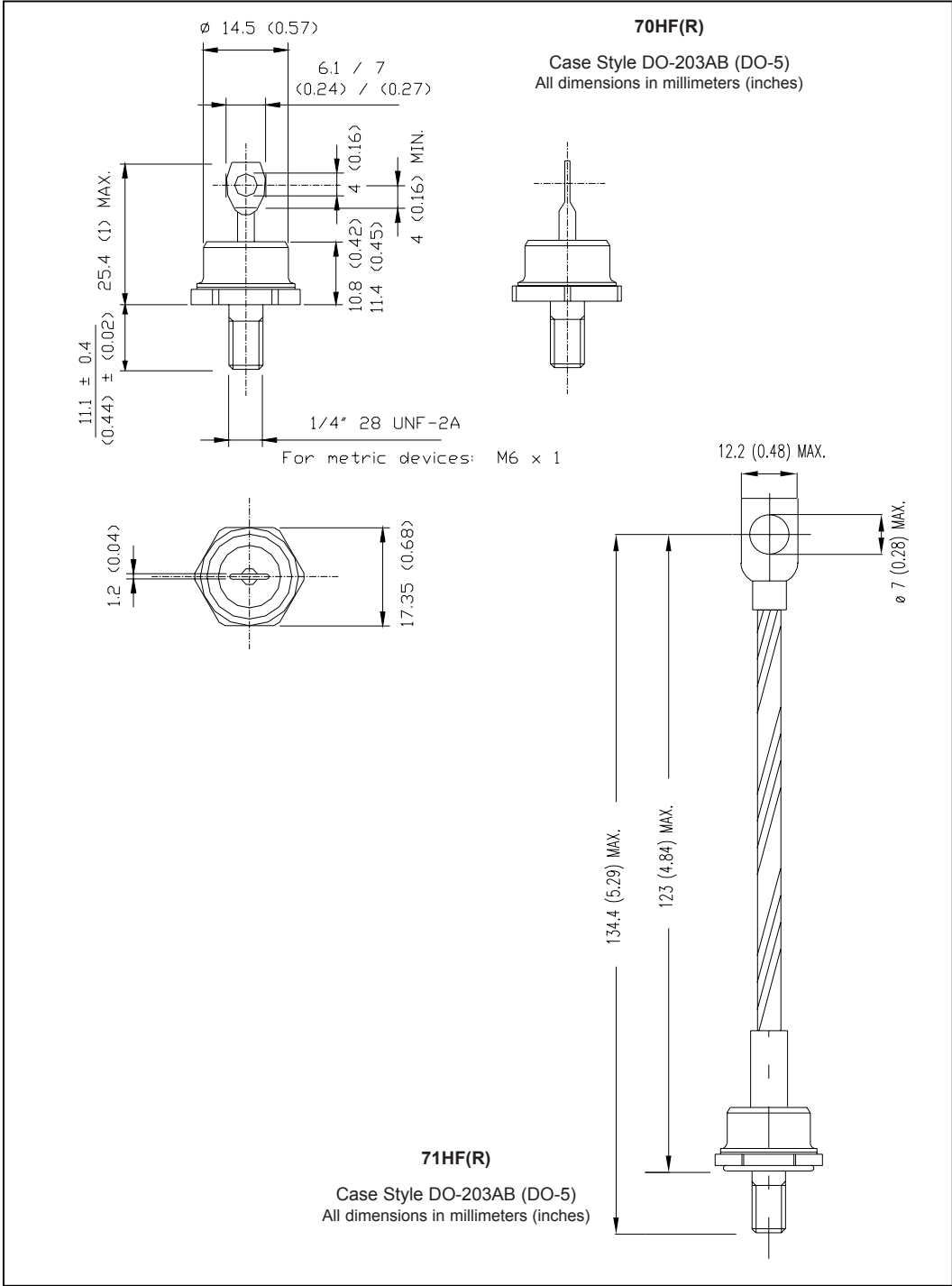
### Ordering Information Table

| Device Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |   |     |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|-----|---|
| 70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | HF | R | 160 | M |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2  | 3 | 4   | 5 |
| <p><b>1</b> - 70 = Standard device<br/> 71 = Not isolated lead<br/> 72 = Isolated lead with silicone sleeve<br/> (Red = Reverse polarity)<br/> (Blue = Normal polarity)</p> <p><b>2</b> - HF = Standard diode</p> <p><b>3</b> - None = Stud Normal Polarity (Cathode to Stud)<br/> R = Stud Reverse Polarity (Anode to Stud)</p> <p><b>4</b> - Voltage code: Code x 10 = <math>V_{RRM}</math> (See Voltage Ratings table)</p> <p><b>5</b> - None = Stud base DO-203AB (DO-5) 1/4" 28UNF-2A<br/> M = Stud base DO-203AB (DO-5) M6 X 1</p> |    |   |     |   |

**70HF(R) Series**

Bulletin I20202 rev. E 03/04

Outlines Table



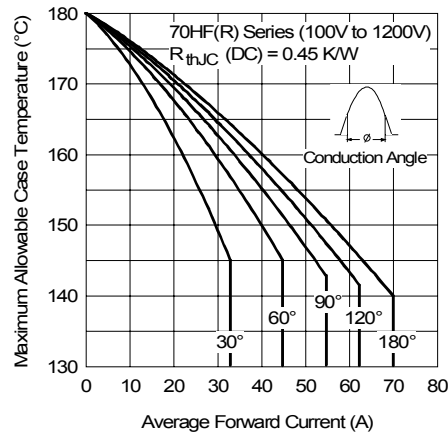


Fig. 1 - Current Ratings Characteristics

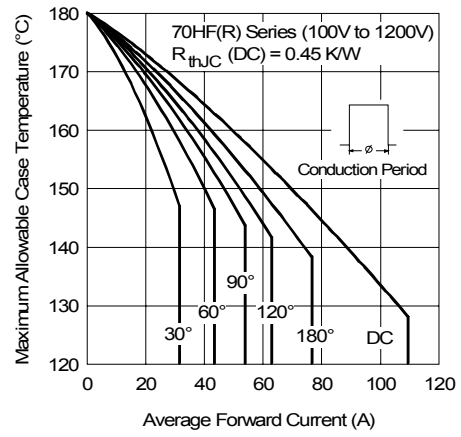


Fig. 2 - Current Ratings Characteristics

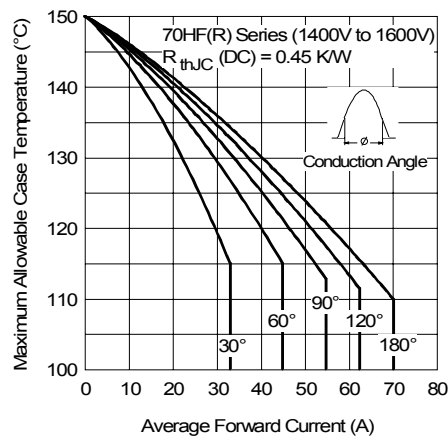


Fig. 3 - Current Ratings Characteristics

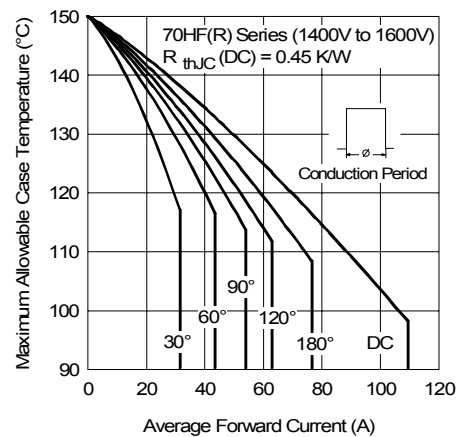


Fig. 4 - Current Ratings Characteristics

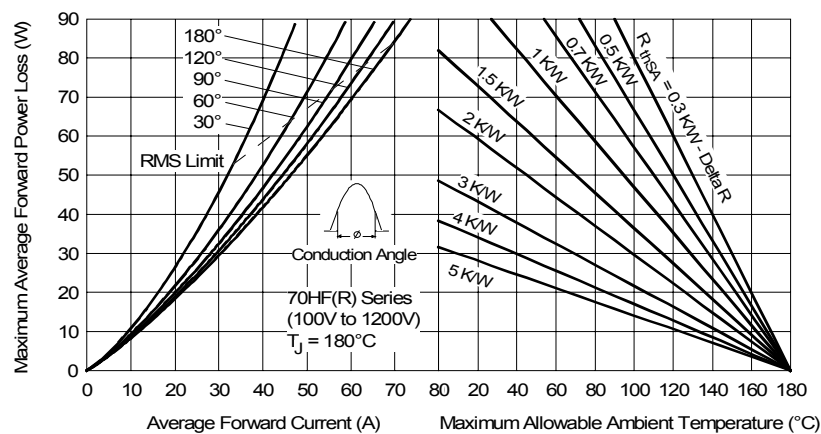


Fig. 5 - Forward Power Loss Characteristics

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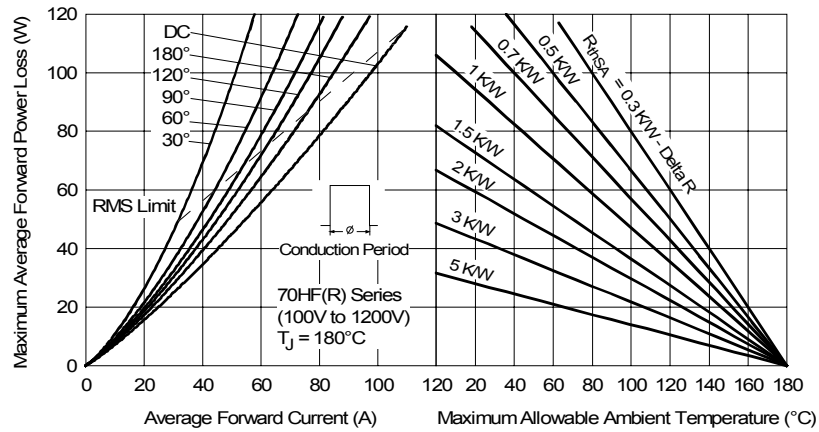


Fig. 6 - Forward Power Loss Characteristics

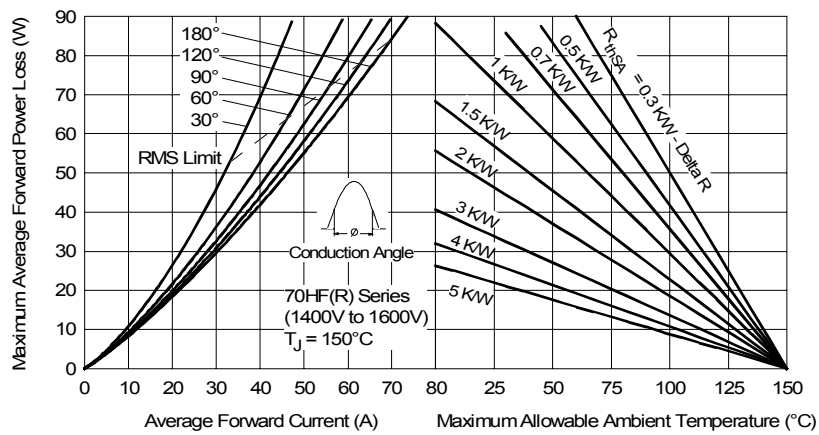


Fig. 7 - Forward Power Loss Characteristics

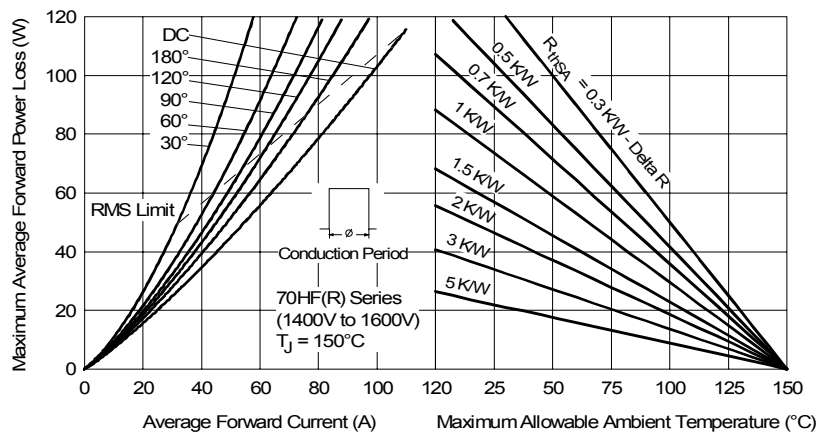


Fig. 8 - Forward Power Loss Characteristics

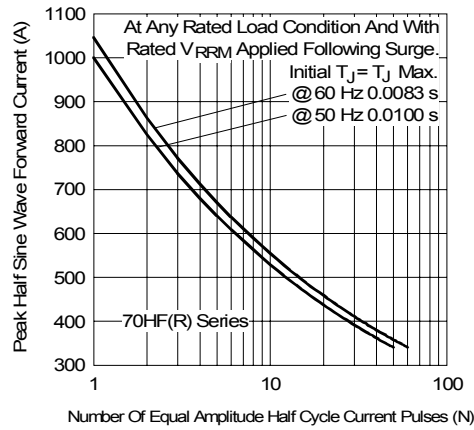


Fig. 9 - Maximum Non-Repetitive Surge Current

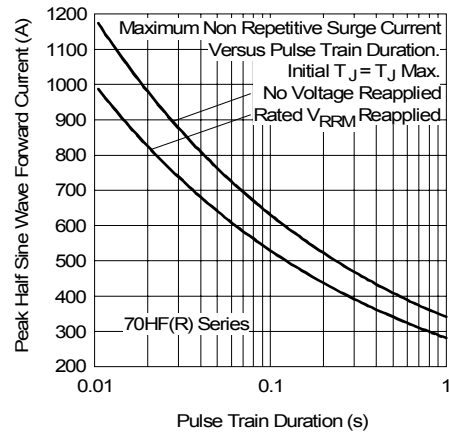


Fig. 10 - Maximum Non-Repetitive Surge Current

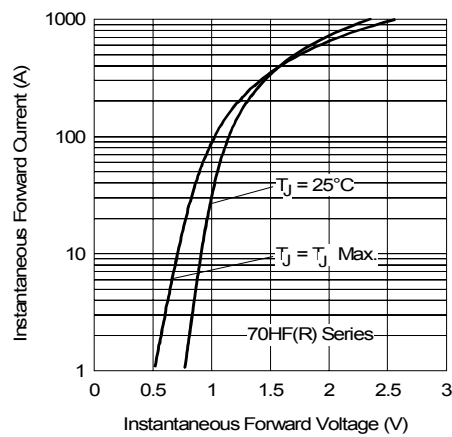


Fig. 11 - Forward Voltage Drop Characteristics

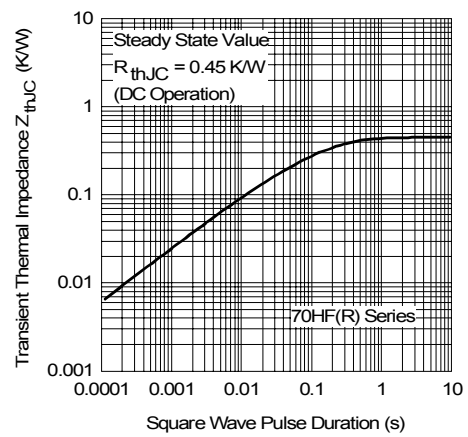


Fig. 12 - Thermal Impedance  $Z_{thJC}$  Characteristics

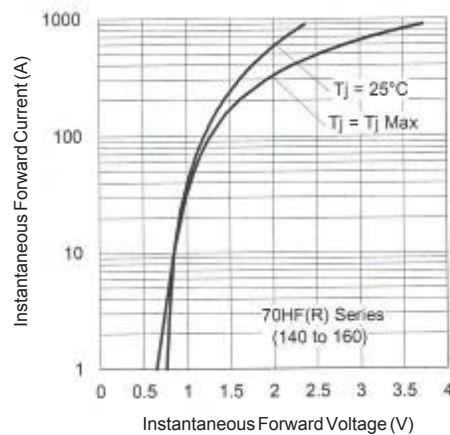


Fig. 13 - Forward Voltage Drop Characteristics

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Data and specifications subject to change without notice.  
This product has been designed and qualified for Industrial Level.  
Qualification Standards can be found on IR's Web site.

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