Bulletin I20201 rev. C 03/04

International
IOR Rectifier

# 40HF(R) SERIES

**STANDARD RECOVERY DIODES** **Stud Version**

## Features

- High surge current capability
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600V $V_{RRM}$

40 A

## Typical Applications

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

## Major Ratings and Characteristics

| Parameters | | 40HF(R) | | Units |
|---|---|---|---|---|
| | | 10 to 120 | 140, 160 | |
| $I_{F(AV)}$ | | 40 | 40 | A |
| | @ $T_C$ | 140 | 110 | °C |
| $I_{F(RMS)}$ | | 62 | | A |
| $I_{FSM}$ | @50Hz | 570 | | A |
| | @ 60Hz | 595 | | A |
| $I^2t$ | @50Hz | 1600 | | $A^2s$ |
| | @ 60Hz | 1450 | | $A^2s$ |
| $V_{RRM}$ | range | 100 to 1200 | 1400, 1600 | V |
| $T_J$ | range | - 65 to 190 | - 65 to 160 | °C |




case style
DO-203AB (DO-5)

## 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 | $I_{RRM}$ max. @ $T_J = T_J$ max. mA |
|---|---|---|---|---|
| 40HF(R) | 10 | 100 | 200 | 9 |
| | 20 | 200 | 300 | |
| | 40 | 400 | 500 | |
| | 60 | 600 | 700 | |
| | 80 | 800 | 900 | |
| | 100 | 1000 | 1100 | |
| | 120 | 1200 | 1300 | |
| | 140 | 1400 | 1500 | 4.5 |
| | 160 | 1600 | 1700 | |

### Forward Conduction

| Parameter | | 40HF(R) 10 to 120 | 40HF(R) 140, 160 | Units | Conditions | | |
|---|---|---|---|---|---|---|---|
| $I_{F(AV)}$ | Max. average forward current @ Case temperature | 40<br>140 | 40<br>110 | A<br>°C | 180° conduction, half sine wave | | |
| $I_{F(RMS)}$ | Max. RMS forward current | 62 | | A | | | |
| $I_{FSM}$ | Max. peak, one-cycle forward, non-repetitive surge current | 570 | | A | t = 10ms | No voltage reapplied | Sinusoidal half wave, Initial $T_J = T_J$ max. |
| | | 595 | | | t = 8.3ms | | |
| | | 480 | | | t = 10ms | 100% $V_{RRM}$ reapplied | |
| | | 500 | | | t = 8.3ms | | |
| $I^2t$ | Maximum $I^2t$ for fusing | 1600 | | $A^2s$ | t = 10ms | No voltage reapplied | |
| | | 1450 | | | t = 8.3ms | | |
| | | 1150 | | | t = 10ms | 100% $V_{RRM}$ reapplied | |
| | | 1050 | | | t = 8.3ms | | |
| $I^2\sqrt{t}$ | Maximum $I^2\sqrt{t}$ for fusing | 16000 | | $A^2\sqrt{s}$ | t = 0.1 to 10ms, no voltage reapplied | | |
| $V_{F(TO)}$ | Value of threshold voltage (up to 1200V) | 0.65 | | V | $T_J = T_J$ max. | | |
| $V_{F(TO)}$ | Value of threshold voltage (for 1400V, 1600V) | 0.76 | | V | $T_J = T_J$ max. | | |
| $r_f$ | Value of forward slope resistance (up to 1200V) | 4.29 | | mΩ | $T_J = T_J$ max. | | |
| $r_f$ | Value of forward slope resistance (for 1400V, 1600V) | 3.8 | | mΩ | $T_J = T_J$ max. | | |
| $V_{FM}$ | Max. forward voltage drop | 1.30 | 1.50 | V | $I_{pk}$ = 125A, $T_J$ = 25°C, $t_p$ = 400µs rectangular wave | | |

## Thermal and Mechanical Specifications

| Parameter | | 40HF(R) | | Units | Conditions |
|---|---|---|---|---|---|
| | | 10 to 120 | 140 to 160 | | |
| $T_J$ | Max. junction operating temperature range | -65 to 190 | -65 to 160 | °C | |
| $T_{stg}$ | Max. storage temperature range | -65 to 190 | -65 to 160 | | |
| $R_{thJC}$ | Max. thermal resistance, junction to case | 0.95 | | K/W | DC operation |
| $R_{thCS}$ | 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) | unleaded device |
| | Case style | DO-203AB (DO5) | | | See Outline Table |

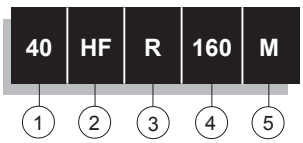
## $\Delta R_{thJC}$ Conduction

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

| Conduction angle | Sinusoidal conduction | Rectangular conduction | Units | Conditions |
|---|---|---|---|---|
| 180° | 0.14 | 0.10 | K/W | $T_J = T_J$ max. |
| 120° | 0.16 | 0.17 | | |
| 90° | 0.21 | 0.22 | | |
| 60° | 0.30 | 0.31 | | |
| 30° | 0.50 | 0.50 | | |

## Ordering Information Table

**Device Code**




**1** - 40 = Standard device
41 = Not isolated lead
42 = Isolated lead with silicone sleeve
(Red = Reverse polarity)
(Blue = Normal polarity)

**2** - Standard diode

**3** - None = Stud Normal Polarity (Cathode to Stud)
R = Stud Reverse Polarity (Anode to Stud)

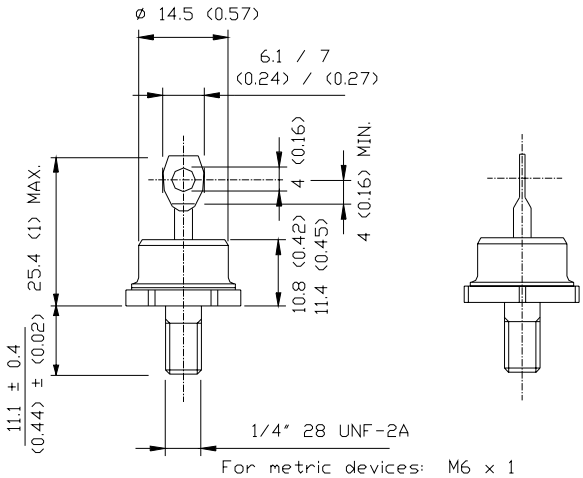
**4** - Voltage code: Code x 10 = $V_{RRM}$ (See Voltage Ratings table)

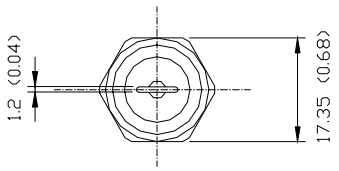
**5** - None = Stud base DO-203AB (DO-5) 1/4" 28UNF-2A
M = Stud base DO-203AB (DO-5) M6 X 1

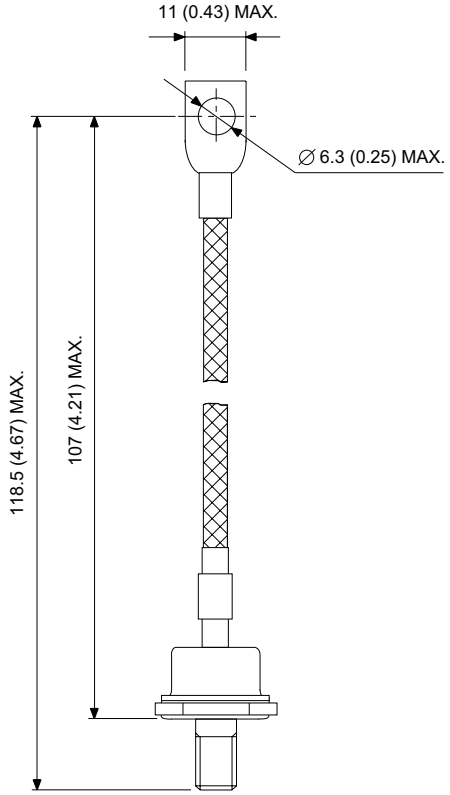
Outlines Table

**40HF(R)**

Case Style DO-203AB (DO-5)
All dimensions in millimeters (inches)




**41HF(R)**

Case Style DO-203AB (DO-5)
All dimensions in millimeters (inches)

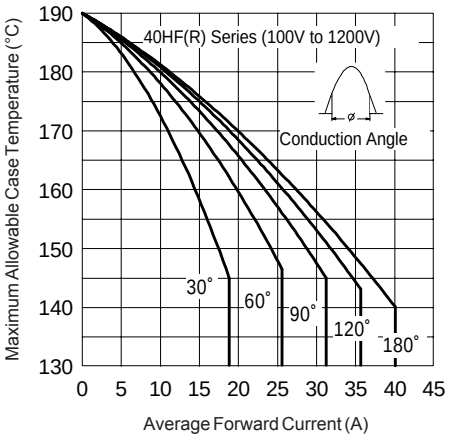



Fig. 1 - Current Ratings Characteristics

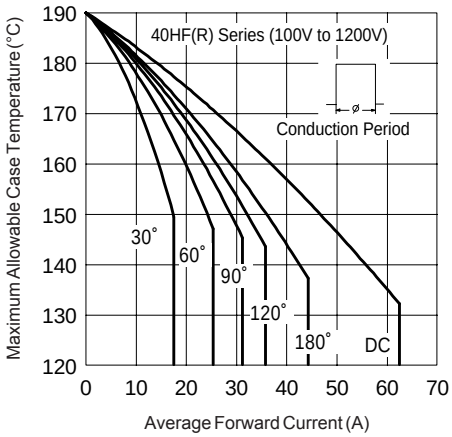



Fig. 2 - Current Ratings Characteristics

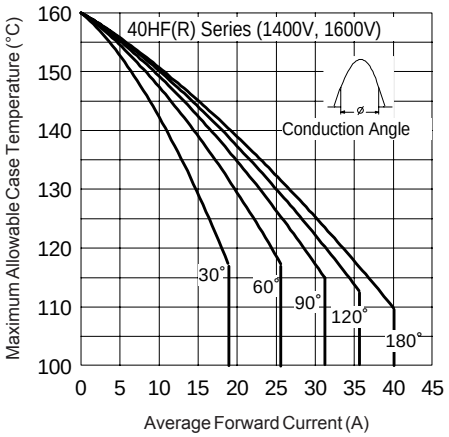



Fig. 3 - Current Ratings Characteristics

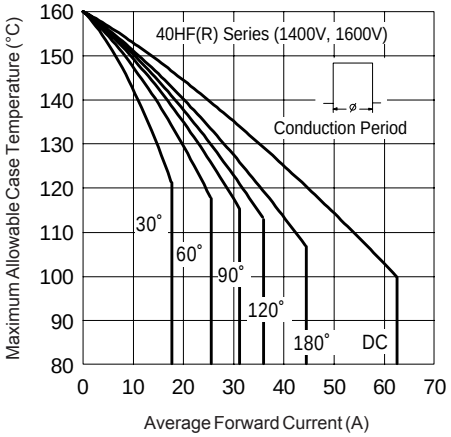



Fig. 4 - Current Ratings Characteristics

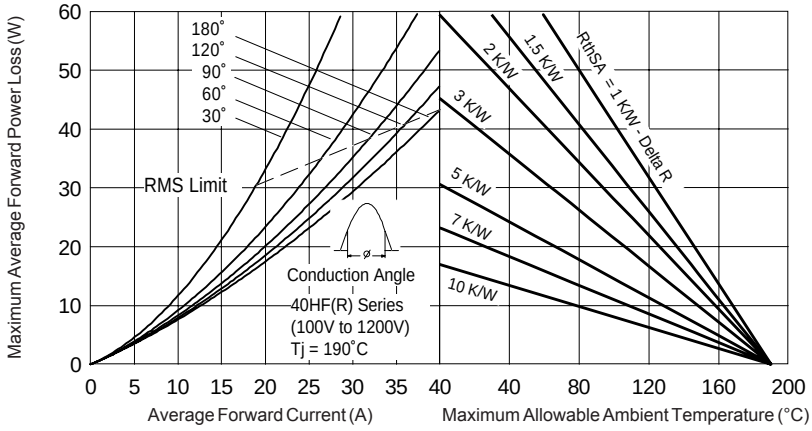



Fig. 5 - Forward Power Loss Characteristics

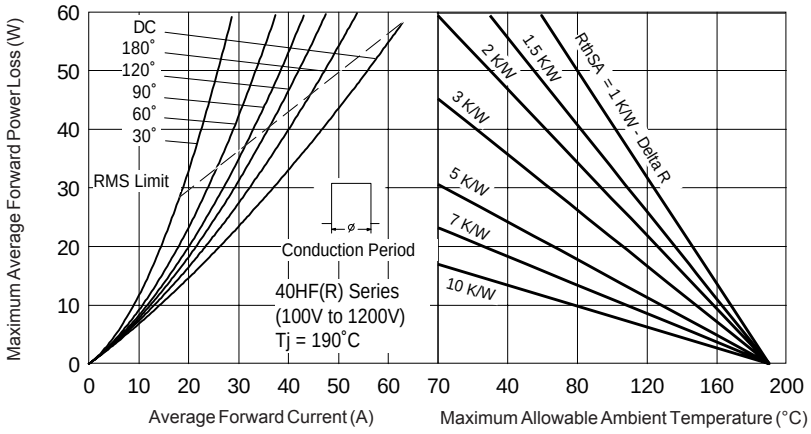



Fig. 6 - Forward Power Loss Characteristics

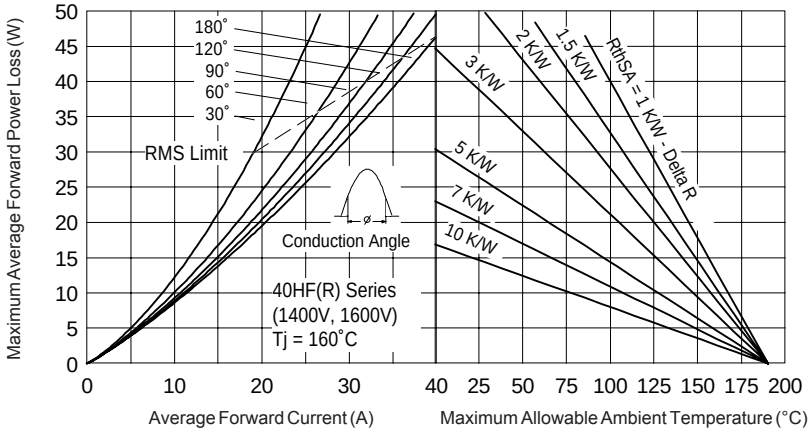



Fig. 7 - Forward Power Loss Characteristics

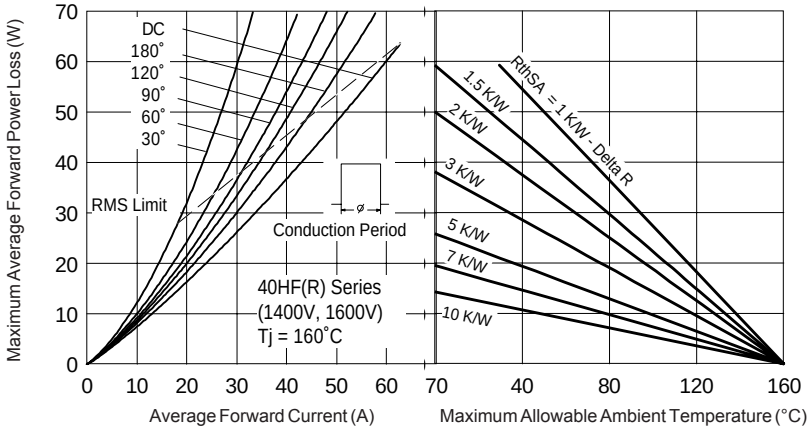



Fig. 8 - Forward Power Loss Characteristics

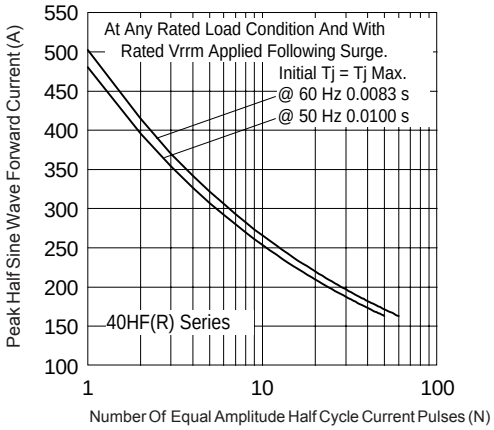



Fig. 9 - Maximum Non-Repetitive Surge Current

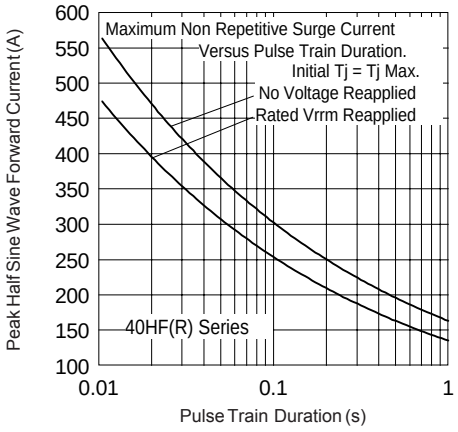



Fig. 10 - Maximum Non-Repetitive Surge Current

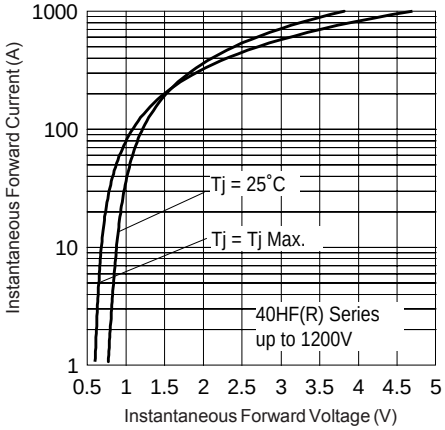



Fig. 11 - Forward Voltage Drop Characteristics
(up to 1200V)

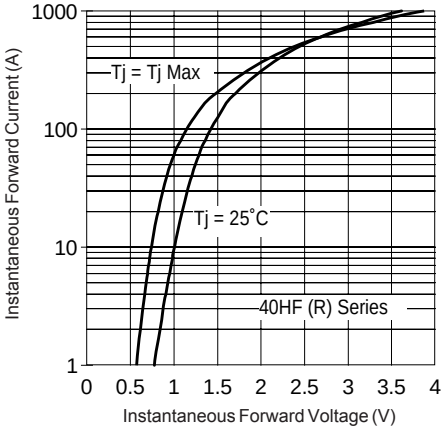



Fig. 12 - Forward Voltage Drop Characteristics
(for 1400V, 1600V)

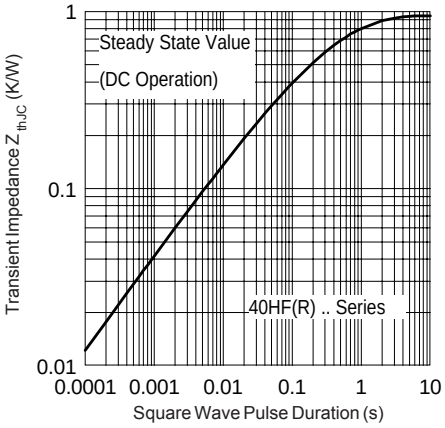



Fig. 13 - Thermal Impedance $Z_{thJC}$ Characteristics

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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