# Standard Recovery Diodes, (Stud Version), 40 A



DO-203AB (DO-5)

## FEATURES

- High surge current capability
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600 V $V_{RRM}$
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for multiple level

RoHS COMPLIANT

## TYPICAL APPLICATIONS

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

| PRODUCT SUMMARY | |
|---|---|
| $I_{F(AV)}$ | 40 A |

| MAJOR RATINGS AND CHARACTERISTICS | | | | |
|---|---|---|---|---|
| PARAMETER | TEST CONDITIONS | 40HF(R) | | UNITS |
| | | 10 TO 120 | 140/160 | |
| $I_{F(AV)}$ | | 40 | 40 | A |
| | $T_C$ | 140 | 110 | °C |
| $I_{F(RMS)}$ | | 62 | | A |
| $I_{FSM}$ | 50 Hz | 570 | | A |
| | 60 Hz | 595 | | |
| $I^2t$ | 50 Hz | 1600 | | $A^2s$ |
| | 60 Hz | 1450 | | |
| $V_{RRM}$ | Range | 100 to 1200 | 1400/1600 | V |
| $T_J$ | | - 65 to 190 | - 65 to 160 | °C |

## 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 | $I_{RRM}$ MAXIMUM AT $T_J = T_J$ MAXIMUM 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 | SYMBOL | TEST CONDITIONS | | | 40HF(R) 10 TO 120 | 40HF(R) 140/160 | UNITS |
|---|---|---|---|---|---|---|---|
| Maximum average forward current at case temperature | $I_{F(AV)}$ | 180° conduction, half sine wave | | | 40 | 40 | A |
| | | | | | 140 | 110 | °C |
| Maximum RMS forward current | $I_{F(RMS)}$ | | | | 62 | | A |
| Maximum peak, one-cycle forward, non-repetitive surge current | $I_{FSM}$ | t = 10 ms | No voltage reapplied | Sinusoidal half wave, initial $T_J = T_J$ maximum | 570 | | A |
| | | t = 8.3 ms | | | 595 | | |
| | | t = 10 ms | 100 % $V_{RRM}$ reapplied | | 480 | | |
| | | t = 8.3 ms | | | 500 | | |
| Maximum $I^2t$ for fusing | $I^2t$ | t = 10 ms | No voltage reapplied | | 1600 | | $A^2s$ |
| | | t = 8.3 ms | | | 1450 | | |
| | | t = 10 ms | 100 % $V_{RRM}$ reapplied | | 1150 | | |
| | | t = 8.3 ms | | | 1050 | | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 ms to 10 ms, no voltage reapplied | | | 16 000 | | $A^2\sqrt{s}$ |
| Value of threshold voltage (up to 1200 V) | $V_{F(TO)}$ | $T_J = T_J$ maximum | | | 0.65 | | V |
| Value of threshold voltage (for 1400 V/1600 V) | $V_{F(TO)}$ | | | | 0.76 | | |
| Value of forward slope resistance (up to 1200 V) | $r_f$ | $T_J = T_J$ maximum | | | 4.29 | | mΩ |
| Value of forward slope resistance (for 1400 V/1600 V) | $r_f$ | | | | 3.8 | | |
| Maximum forward voltage drop | $V_{FM}$ | $I_{pk}$ = 125 A, $T_J$ = 25 °C, $t_p$ = 400 µs rectangular wave | | | 1.30 | 1.50 | V |

## THERMAL AND MECHANICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | 40HF(R) 10 TO 120 | 40HF(R) 140/160 | UNITS |
|---|---|---|---|---|---|
| Maximum junction operating and storage temperature range | $T_J$, $T_{Stg}$ | | - 65 to 190 | - 65 to 160 | °C |
| Maximum thermal resistance, junction to case | $R_{thJC}$ | DC operation | 0.95 | | K/W |
| Maximum thermal resistance, case to heatsink | $R_{thCS}$ | Mounting surface, smooth, flat and greased | 0.25 | | |
| Maximum allowable mounting torque (+ 0 %, - 10 %) | | Not lubricated thread, tighting on nut (1) | 3.4 (30) | | N · m (lbf · in) |
| | | Lubricated thread, tighting on nut (1) | 2.3 (20) | | |
| | | Not lubricated thread, tighting on hexagon (2) | 4.2 (37) | | |
| | | Lubricated thread, tighting on hexagon (2) | 3.2 (28) | | |
| Approximate weight | | | 17 | | g |
| | | | 0.6 | | oz. |
| Case style | | See dimensions - link at the end of datasheet | DO-203AB (DO-5) | | |

**Notes**

(1) Recommended for pass-through holes

(2) Recommended for holed threaded heatsinks

| $\Delta R_{thJC}$ CONDUCTION | | | | |
|---|---|---|---|---|
| CONDUCTION ANGLE | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS | UNITS |
| 180° | 0.14 | 0.10 | $T_J = T_J$ maximum | K/W |
| 120° | 0.16 | 0.17 | | |
| 90° | 0.21 | 0.22 | | |
| 60° | 0.30 | 0.31 | | |
| 30° | 0.50 | 0.50 | | |

**Note**

- The table above shows the increment of thermal resistance $R_{thJC}$ when devices operate at different conduction angles than DC

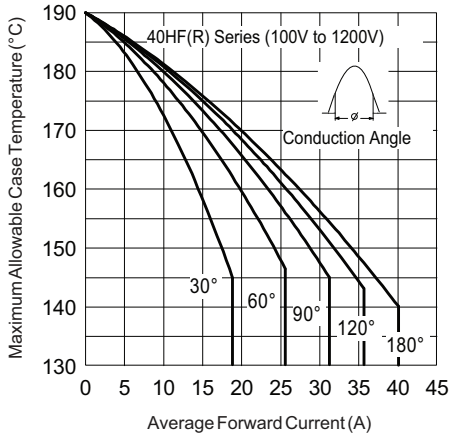



Fig. 1 - Current Ratings Characteristics

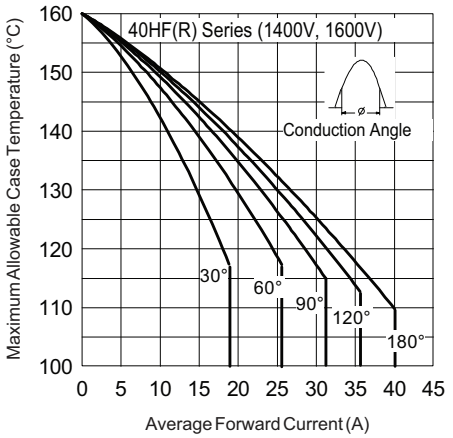



Fig. 3 - Current Ratings Characteristics

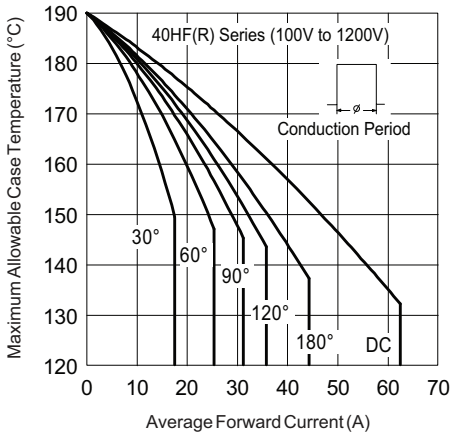



Fig. 2 - Current Ratings Characteristics

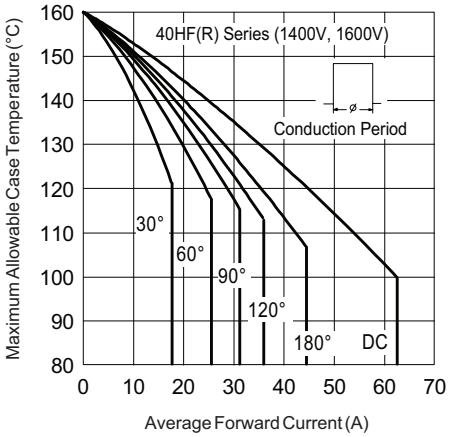



Fig. 4 - Current Ratings Characteristics

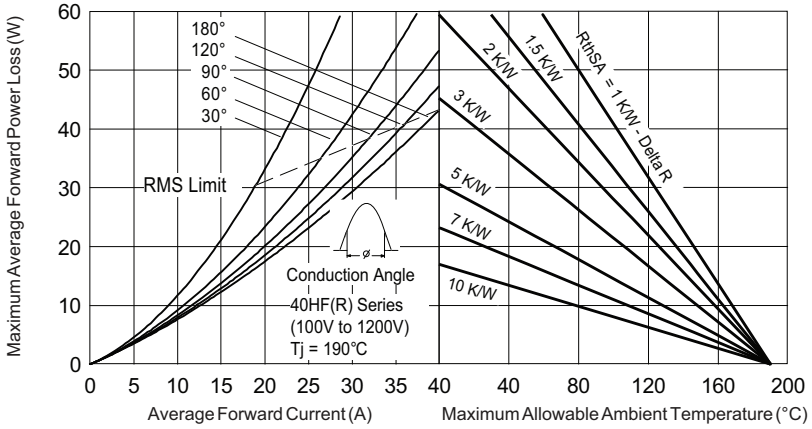



Fig. 5 - Forward Power Loss Characteristics

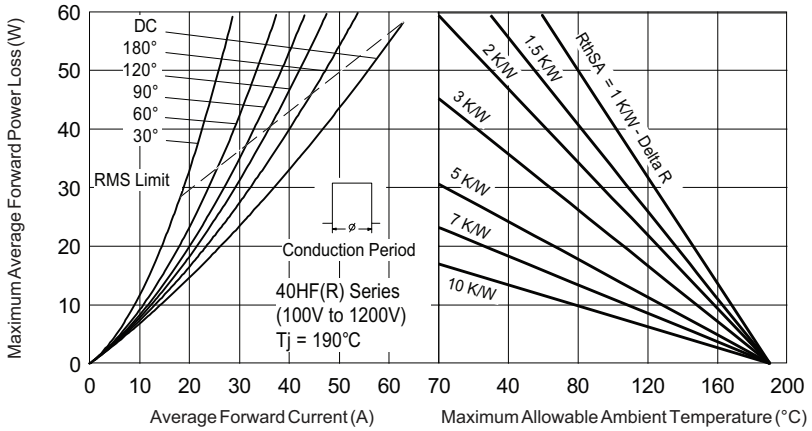



Fig. 6 - Forward Power Loss Characteristics

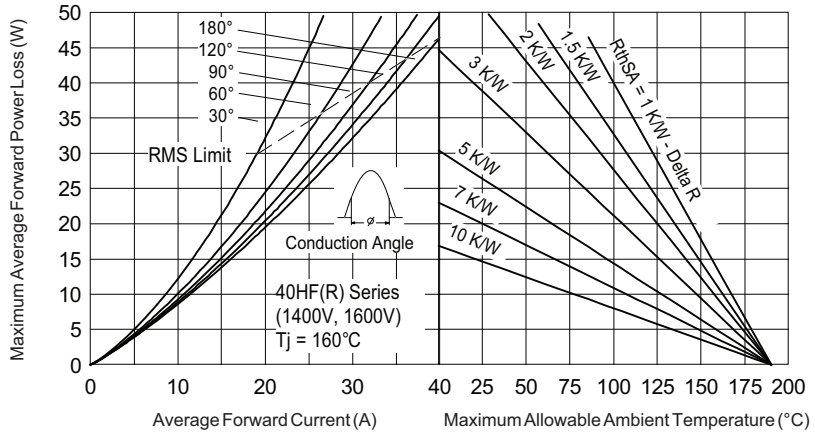



Fig. 7 - Forward Power Loss Characteristics

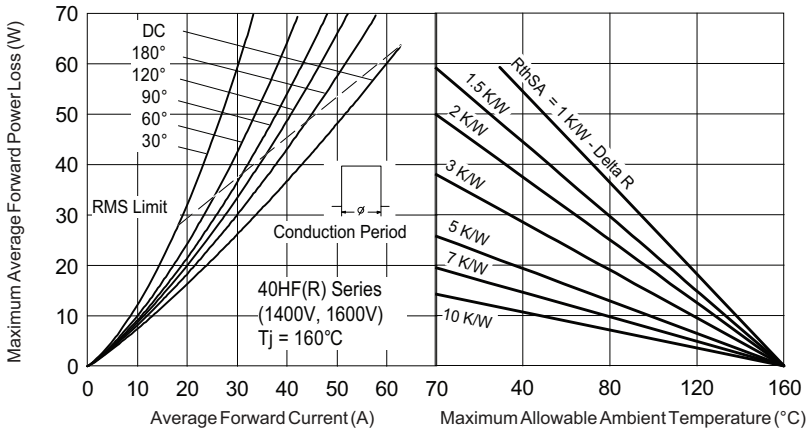



Fig. 8 - Forward Power Loss Characteristics

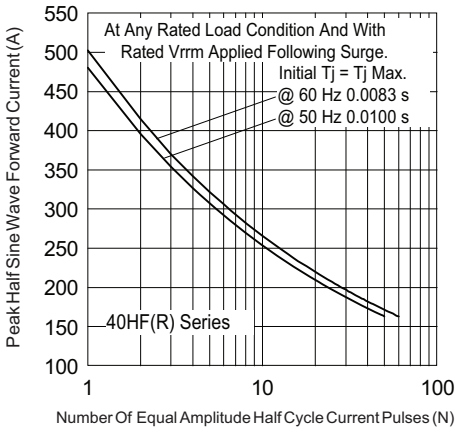



Fig. 9 - Maximum Non-Repetitive Surge Current

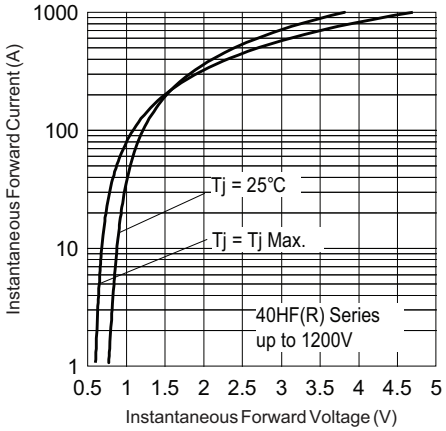



Fig. 11 - Forward Voltage Drop Characteristics
(Up To 1200 V)

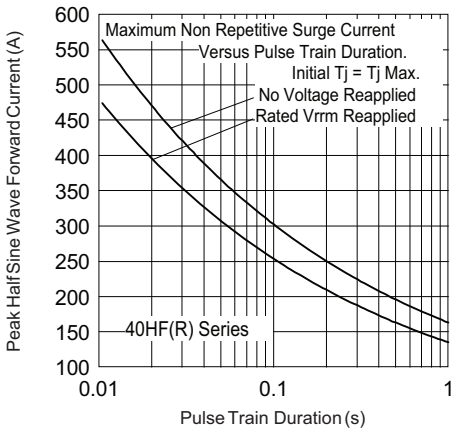



Fig. 10 - Maximum Non-Repetitive Surge Current

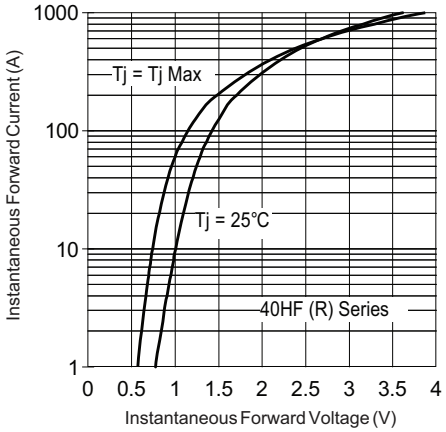



Fig. 12 - Forward Voltage Drop Characteristics
(For 1400 V/1600 V)

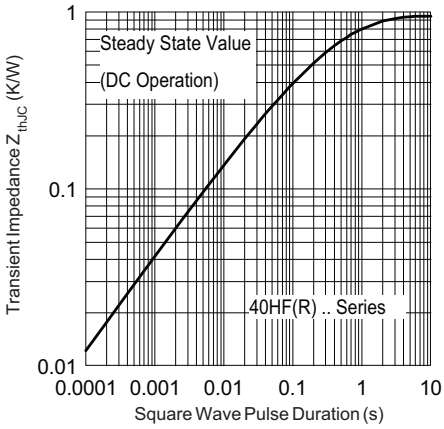



Fig. 13 - Thermal Impedance $Z_{thJC}$ Characteristics

## ORDERING INFORMATION TABLE

**Device code**

| 40 | HF | R | 160 | M |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

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

**2** - HF = Standard diode

**3** - 
- None = Stud normal polarity (cathode to stud)
- R = Stud reverse polarity (anode to stud)

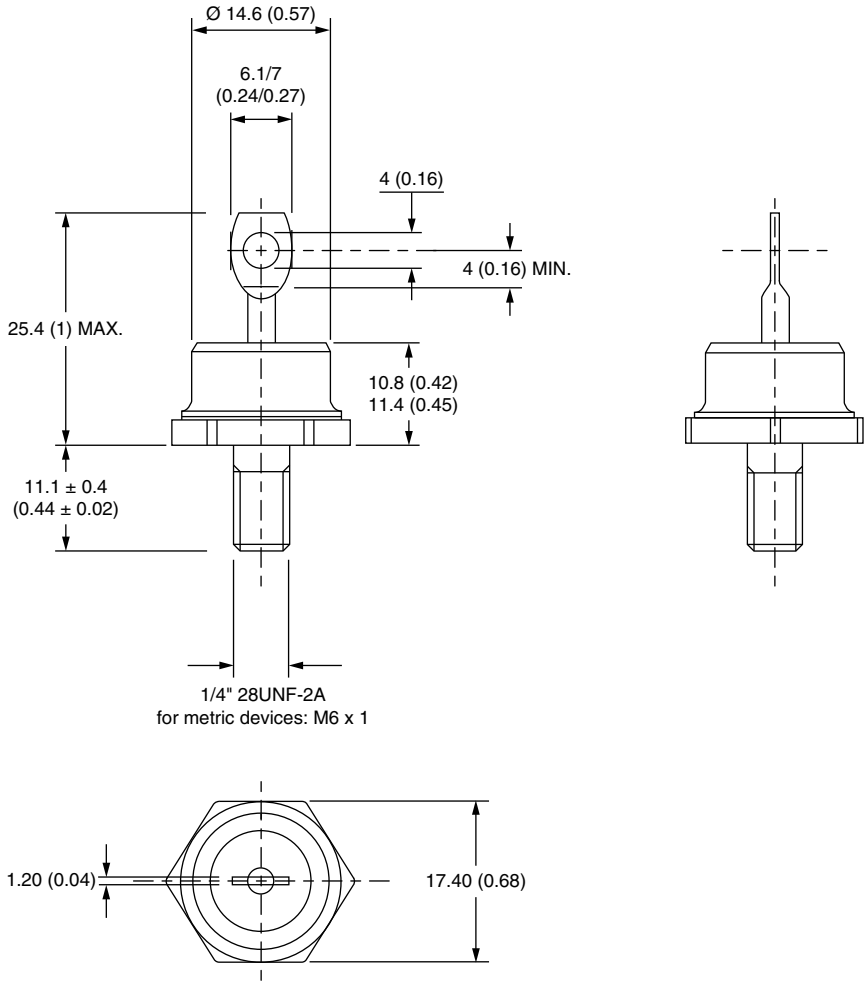
**4** - Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)

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

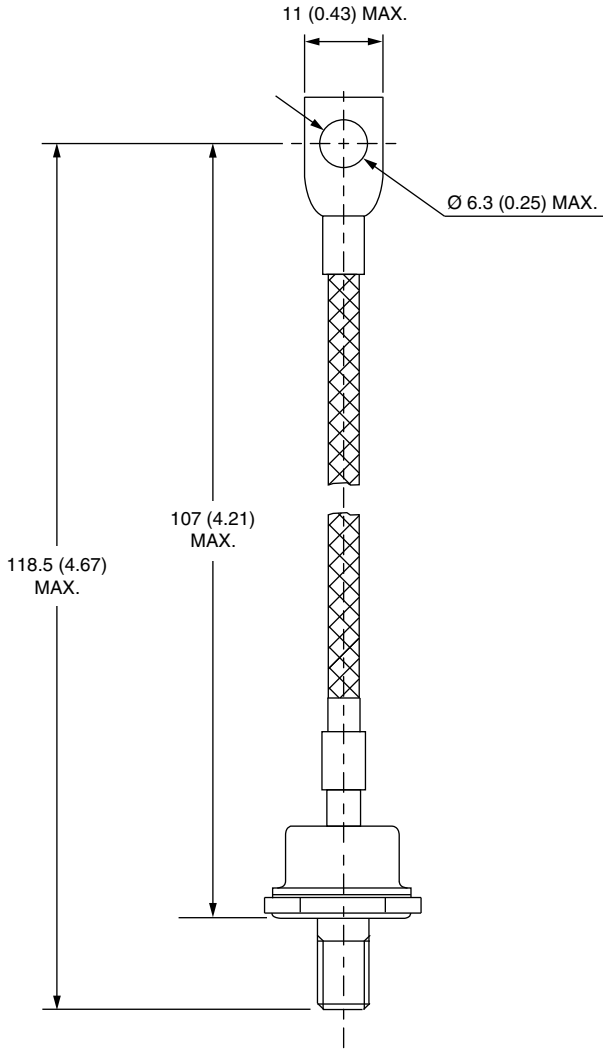
| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | www.vishay.com/doc?95344 |

# DO-203AB (DO-5) for 40HF(R) and 41HF(R) Series

**DIMENSIONS FOR 40HF(R) SERIES** in millimeters (inches)



**DIMENSIONS FOR 41HF(R) SERIES** in millimeters (inches)



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