

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}
- Designed and qualified for multiple level
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

TYPICAL APPLICATIONS

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

PRODUCT SUMMARY

| | |
|-----------------------|-----------------|
| $I_{F(AV)}$ | 40 A |
| Package | DO-203AB (DO-5) |
| Circuit configuration | Single diode |

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 | 62 | A |
| I_{FSM} | 50 Hz | 570 | 570 | A |
| | 60 Hz | 595 | 595 | |
| I^2t | 50 Hz | 1600 | 1600 | A ² s |
| | 60 Hz | 1450 | 1450 | |
| V_{RRM} | Range | 100 to 1200 | 1400 to 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 |
|-------------|--------------|--|--|--|
| VS-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) | | UNITS |
| | | | | 10 TO 120 | 140/160 | |
| Maximum average forward current at case temperature | $I_{F(AV)}$ | 180° conduction, half sine wave | | 40 | 40 | A |
| Maximum RMS forward current | $I_{F(RMS)}$ | | | 140 | 110 | °C |
| Maximum peak, one-cycle forward, non-repetitive surge current | I_{FSM} | t = 10 ms t = 8.3 ms | No voltage reappplied | 62 | | A |
| | | t = 10 ms t = 8.3 ms | 100 % V_{RRM} reappplied | 570 | | A |
| | | | | 595 | | |
| | | | | 480 | | |
| | | | | 500 | | |
| Maximum I^2t for fusing | I^2t | t = 10 ms t = 8.3 ms | No voltage reappplied | 1600 | | A ² s |
| | | t = 10 ms t = 8.3 ms | 100 % V_{RRM} reappplied | 1450 | | |
| | | | | 1150 | | |
| | | | | 1050 | | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 ms to 10 ms, no voltage reappplied | | 16 000 | | A ² √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) | | UNITS |
| | | | | 10 to 120 | 140 to 160 | |
| 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, tightening on nut ⁽¹⁾ | | 3.4 (30) | | N · m (lbf · in) |
| | | Lubricated thread, tightening on nut ⁽¹⁾ | | 2.3 (20) | | |
| | | Not lubricated thread, tightening on hexagon ⁽²⁾ | | 4.2 (37) | | |
| | | Lubricated thread, tightening 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

| ΔR_{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

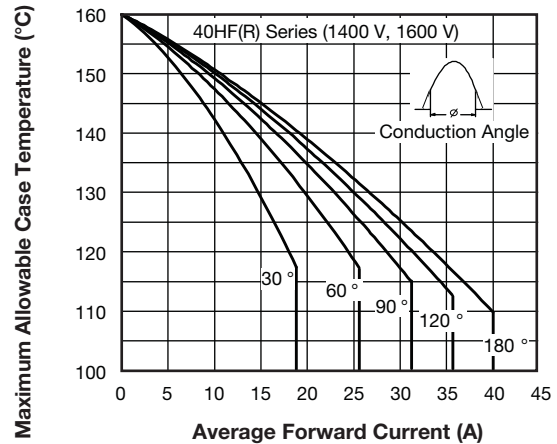


Fig. 3 - Current Ratings Characteristics

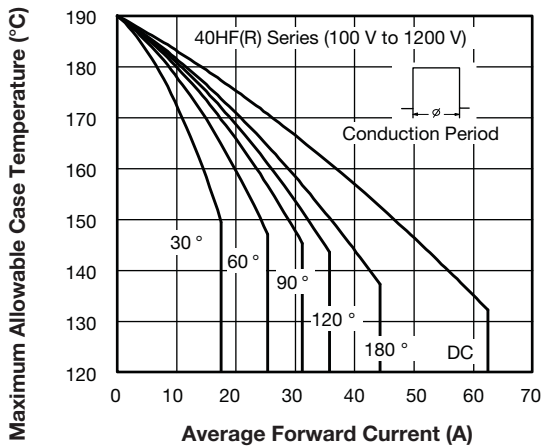


Fig. 2 - Current Ratings Characteristics

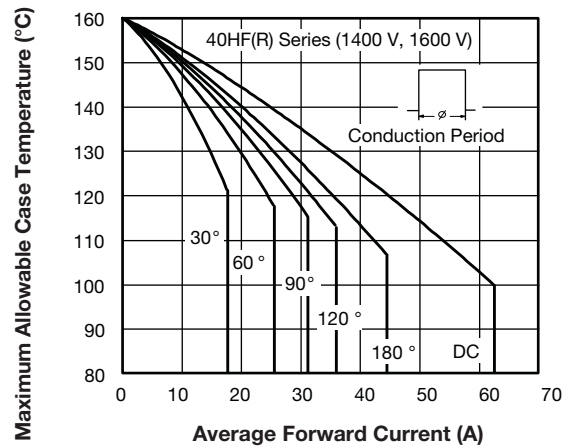


Fig. 4 - Current Ratings Characteristics

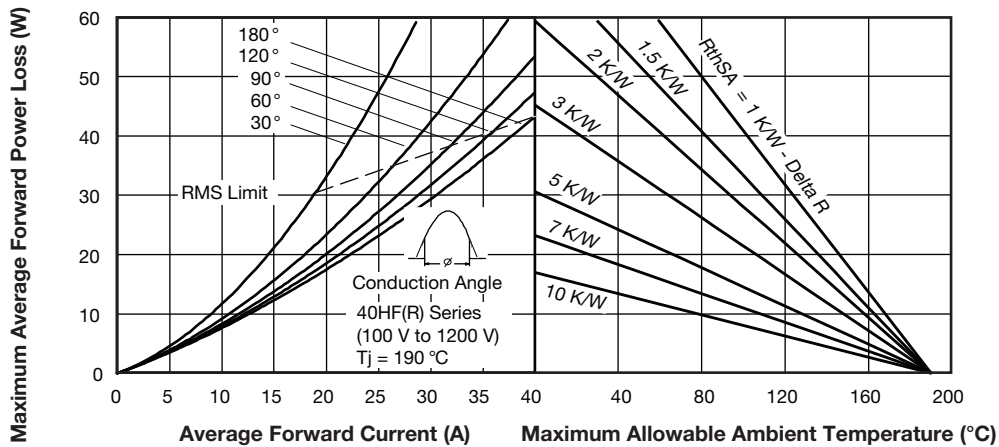


Fig. 5 - Forward Power Loss Characteristics



Fig. 6 - Forward Power Loss Characteristics

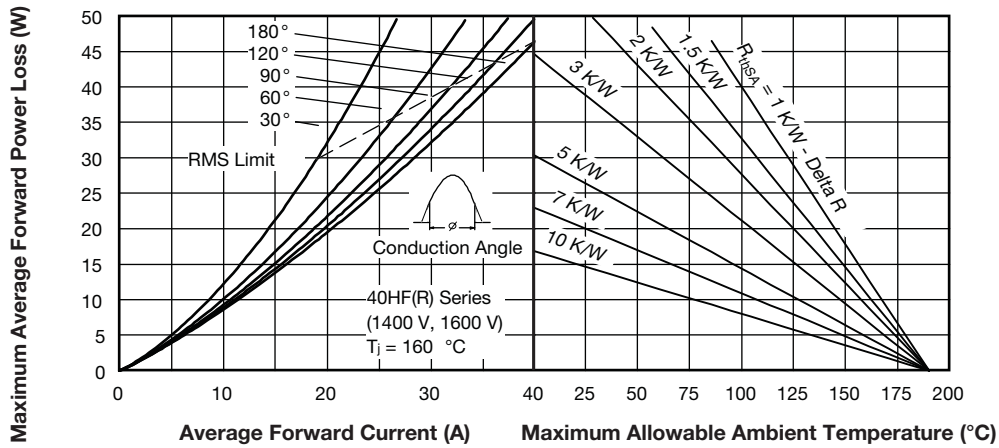


Fig. 7 - Forward Power Loss Characteristics

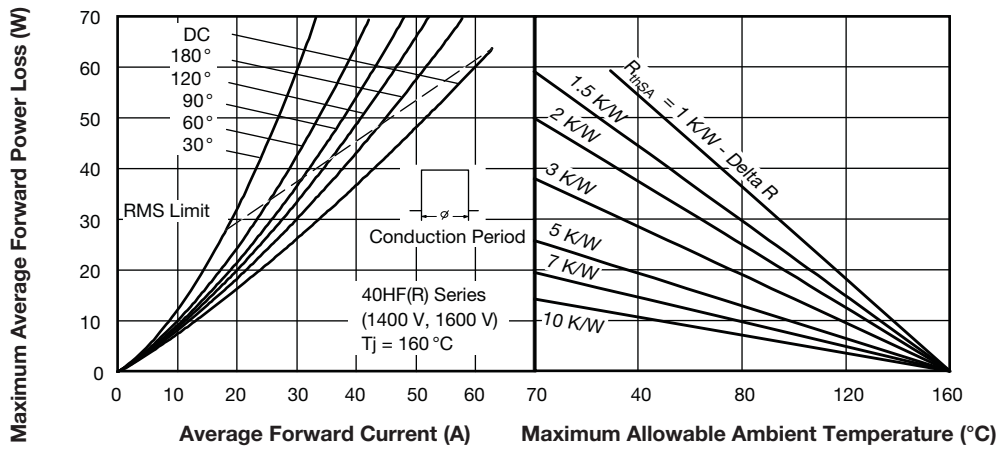


Fig. 8 - Forward Power Loss Characteristics



Fig. 9 - Maximum Non-Repetitive Surge Current

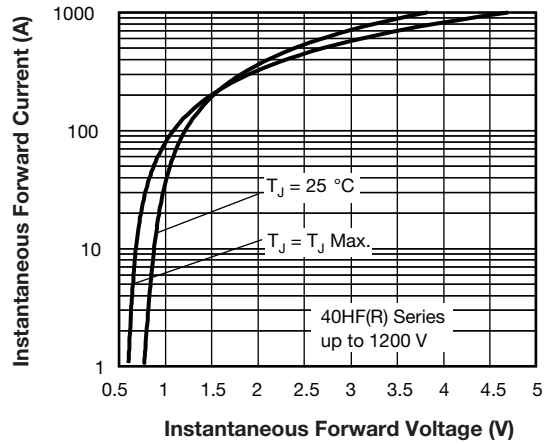


Fig. 11 - Forward Voltage Drop Characteristics (Up To 1200 V)



Fig. 10 - Maximum Non-Repetitive Surge Current

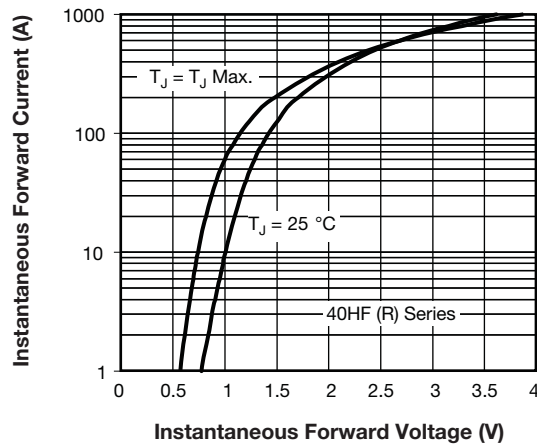


Fig. 12 - Forward Voltage Drop Characteristics (For 1400 V/1600 V)



Fig. 13 - Thermal Impedance Z_{thJC} Characteristics



ORDERING INFORMATION TABLE

| | | | | | | |
|-------------|------------|-----------|-----------|----------|------------|----------|
| Device code | VS- | 40 | HF | R | 160 | M |
| | ① | ② | ③ | ④ | ⑤ | ⑥ |

- 1** - Vishay Semiconductors product
- 2** -
 - 40 = Standard device
 - 41 = Not isolated lead
 - 42 = Isolated lead with silicone sleeve
(red = Reverse polarity)
(blue = Normal polarity)
- 3** - HF = Standard diode
- 4** -
 - None = Stud normal polarity (cathode to stud)
 - R = Stud reverse polarity (anode to stud)
- 5** - Voltage code x 10 = V_{RRM} (see Voltage Ratings table)
- 6** -
 - 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)



Outline Dimensions

Vishay Semiconductors

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



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





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