



Standard Recovery Diodes, (Stud Version), 85 A



DO-5 (DO-203AB)

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 industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

TYPICAL APPLICATIONS

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

PRIMARY CHARACTERISTICS

| | |
|-----------------------|-----------------|
| $I_{F(AV)}$ | 85 A |
| Package | DO-5 (DO-203AB) |
| Circuit configuration | Single |

MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER | TEST CONDITIONS | 85HF(R) | | UNITS |
|--------------|-----------------|-------------|--------------|------------------|
| | | 10 to 120 | 140 to 160 | |
| $I_{F(AV)}$ | | 85 | 85 | A |
| | T_C | 140 | 110 | °C |
| $I_{F(RMS)}$ | | 133 | 133 | A |
| I_{FSM} | 50 Hz | 1700 | 1700 | A |
| | 60 Hz | 1800 | 1800 | |
| I^2t | 50 Hz | 14 500 | 14 500 | A ² s |
| | 60 Hz | 13 500 | 13 500 | |
| V_{RRM} | Range | 100 to 1200 | 1400 to 1600 | V |
| T_J | | -65 to +180 | -65 to +150 | °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-85HF(R) VS-86HF(R) VS-87HF(R) VS-88HF(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 | | | 85HF(R) | | UNITS |
| | | | | | 10 to 120 | 140/160 | |
| Maximum average forward current at case temperature | I _{F(AV)} | 180° conduction, half sine wave | | | 85 | | A |
| | | | | | 140 | 110 | °C |
| Maximum RMS forward current | I _{F(RMS)} | | | | 133 | | 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 | 1700 | | A |
| | | t = 8.3 ms | | | 1800 | | |
| | | t = 10 ms | 100 % V _{R_{RM}} reapplied | | 1450 | | |
| | | t = 8.3 ms | | | 1500 | | |
| Maximum I ² t for fusing | I ² t | t = 10 ms | No voltage reapplied | | 14 500 | | A ² s |
| | | t = 8.3 ms | | | 13 500 | | |
| | | t = 10 ms | 100 % V _{R_{RM}} reapplied | | 10 500 | | |
| | | t = 8.3 ms | | | 9400 | | |
| Maximum I ² √t for fusing | I ² √t | t = 0.1 ms to 10 ms, no voltage reapplied | | | 145 000 | | A ² √s |
| Value of threshold voltage (up to 1200 V) | V _{F(TO)} | T _J = T _J maximum | | | 0.68 | | V |
| Value of threshold voltage (for 1400 V, 1600 V) | | | | | 0.69 | | |
| Value of forward slope resistance (up to 1200 V) | r _f | T _J = T _J maximum | | | 1.62 | | mW |
| Value of forward slope resistance (for 1400 V, 1600 V) | | | | | 1.75 | | |
| Maximum forward voltage drop | V _{FM} | I _{pk} = 267 A, T _J = 25 °C, t _p = 400 μs rectangular wave | | | 1.2 | 1.4 | V |

| THERMAL AND MECHANICAL SPECIFICATIONS | | | | | |
|--|-----------------------------------|---|-----------------|-------------|---------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | 85HF(R) | | UNITS |
| | | | 10 to 20 | 140 to 160 | |
| Maximum junction operating and storage temperature range | T _J , T _{Stg} | | -65 to +180 | -65 to +150 | °C |
| Maximum thermal resistance, junction to case | R _{thJC} | DC operation | 0.35 | | K/W |
| Maximum thermal resistance, case to heatsink | R _{thCS} | Mounting surface, smooth, flat and greased | 0.25 | | |
| Maximum shock ⁽¹⁾ | | | 1500 | | g |
| Maximum constant vibration ⁽¹⁾ | | 50 Hz | 20 | | |
| Maximum constant acceleration ⁽¹⁾ | | Stud outwards | 5000 | | |
| Maximum allowable mounting torque + 0 %, - 10 % | | Not lubricated thread, tightening on nut | 3.4 (30) | | N · m (lbf · in) |
| | | Lubricated thread, tightening on nut | 2.3 (20) | | |
| | | Not lubricated thread, tightening on hexagon | 4.2 (37) | | |
| | | Lubricated thread, tightening on hexagon | 3.2 (28) | | |
| Approximate weight | | Unleaded device | 17 | | g |
| | | | 0.6 | | oz. |
| Case style | | See dimensions - link at the end of datasheet | DO-5 (DO-203AB) | | |

Notes

- ⁽¹⁾ Available only for 88HF
- ⁽²⁾ Recommended for pass-through holes
- ⁽³⁾ Recommended for holed threaded heatsinks



| ΔR_{thJC} CONDUCTION | | | | |
|------------------------------|-----------------------|------------------------|-----------------------------|-------|
| CONDUCTION ANGLE | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS | UNITS |
| 180° | 0.10 | 0.08 | $T_J = T_J \text{ maximum}$ | K/W |
| 120° | 0.11 | 0.11 | | |
| 90° | 0.13 | 0.13 | | |
| 60° | 0.17 | 0.17 | | |
| 30° | 0.26 | 0.26 | | |

Note

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

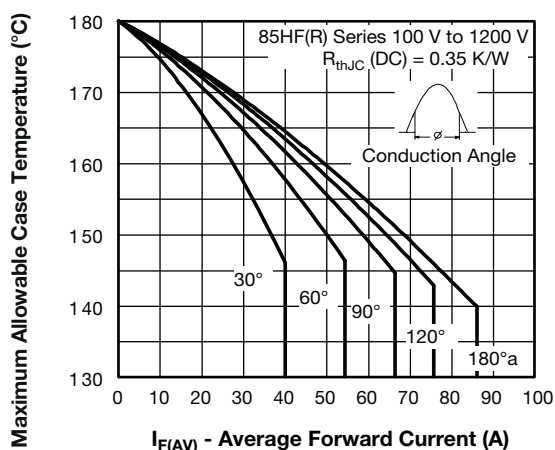


Fig. 1 - Current Ratings Characteristics

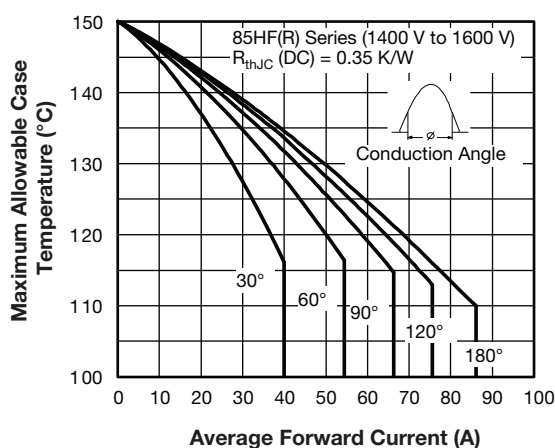


Fig. 3 - Current Ratings Characteristics

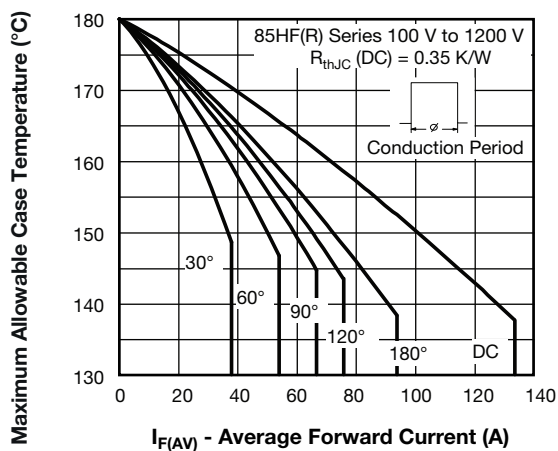


Fig. 2 - Current Ratings Characteristics

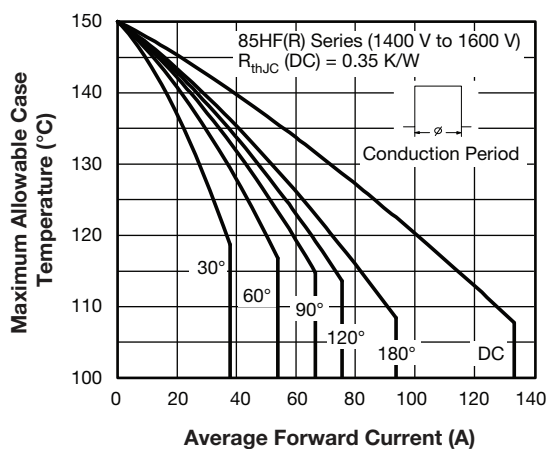


Fig. 4 - Current Ratings Characteristics



VS-85HF(R), VS-86HF(R), VS-87HF(R), VS-88HF(R) Series

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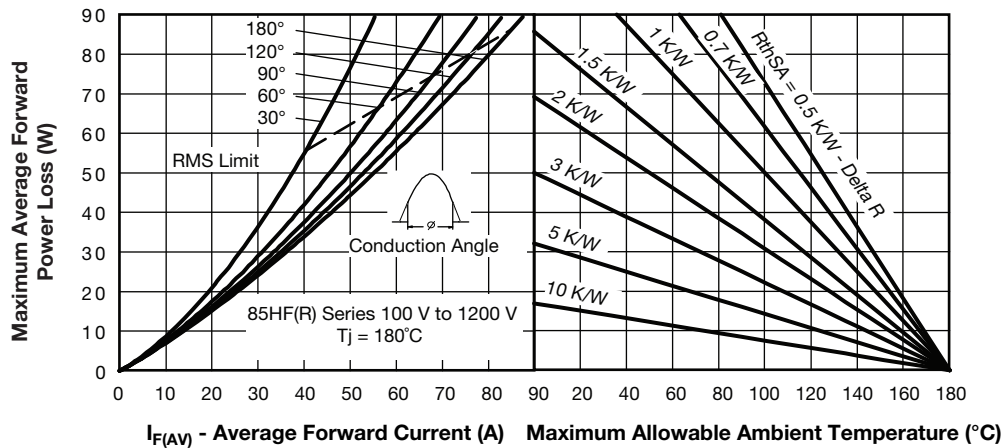


Fig. 5 - Forward Power Loss Characteristics

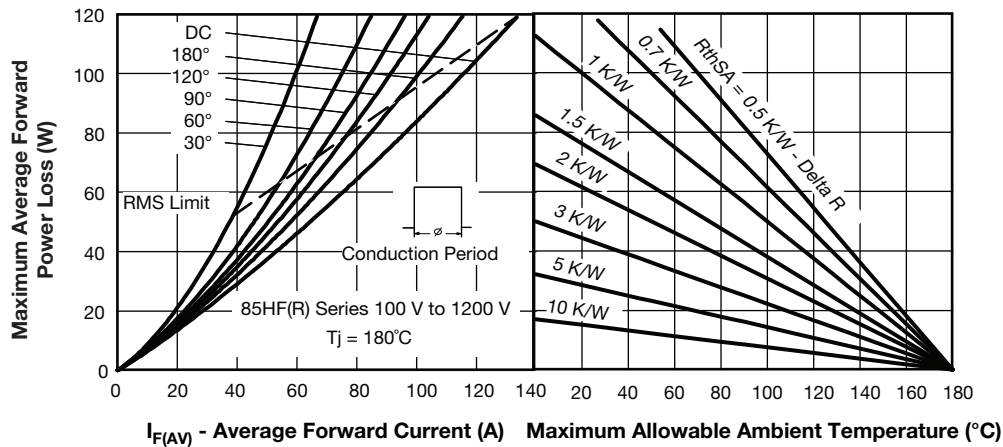


Fig. 6 - Forward Power Loss Characteristics

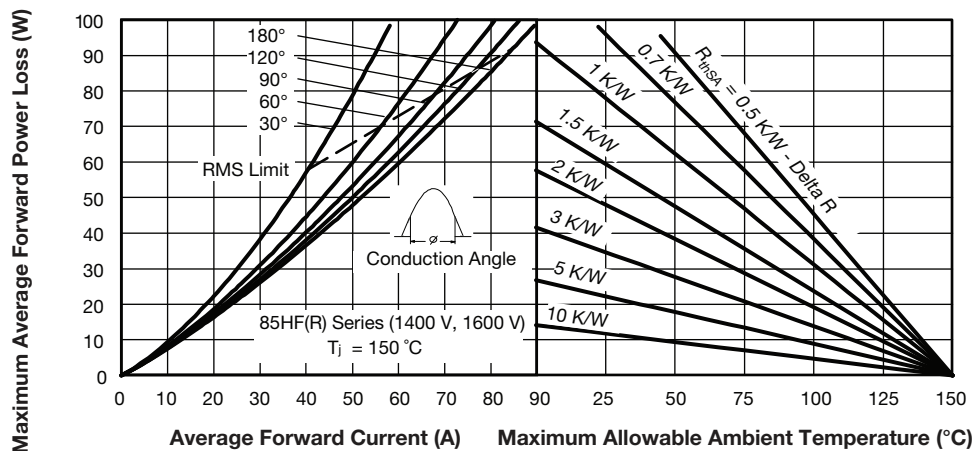


Fig. 7 - Forward Power Loss Characteristics

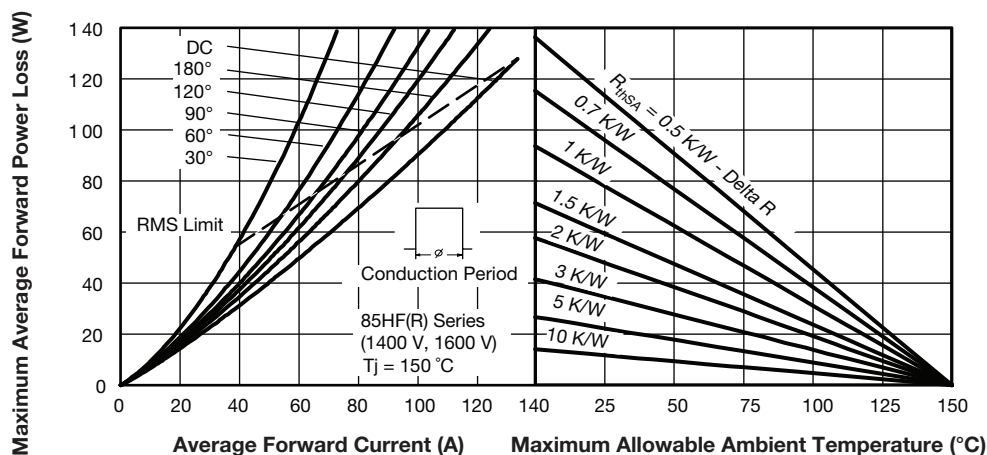


Fig. 8 - Forward Power Loss Characteristics

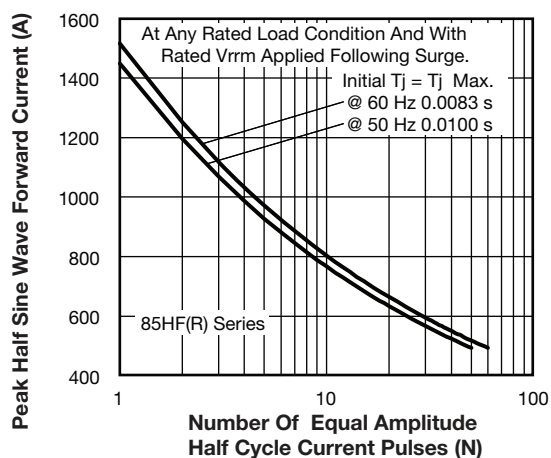


Fig. 9 - Maximum Non-Repetitive Surge Current

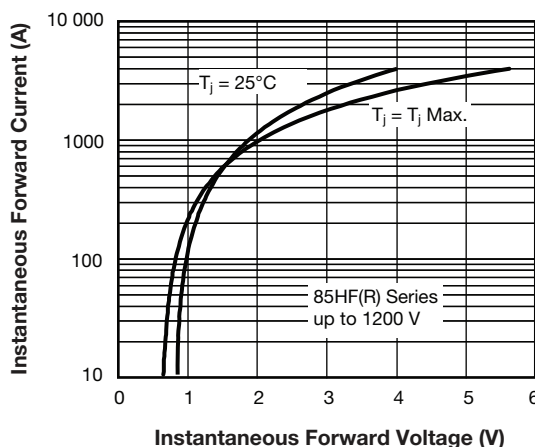


Fig. 11 - Forward Voltage Drop Characteristics

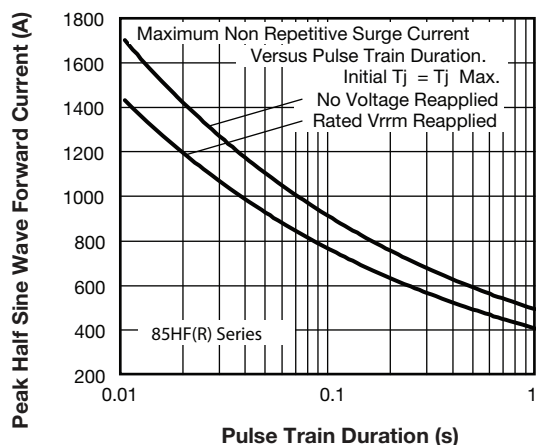


Fig. 10 - Maximum Non-Repetitive Surge Current

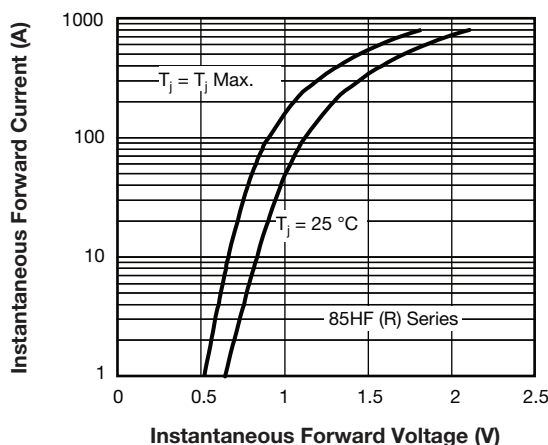


Fig. 12 - Forward Voltage Drop Characteristics (for 1400 V, 1600 V)

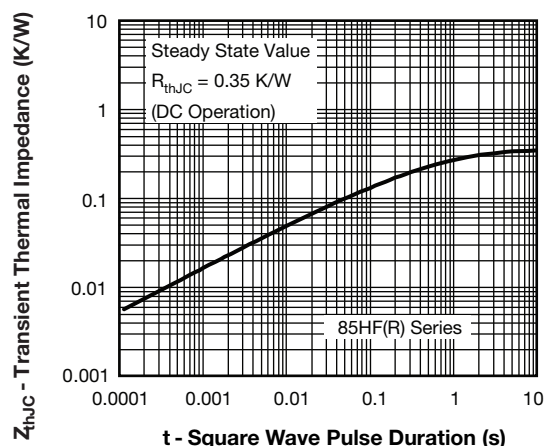


Fig. 13 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

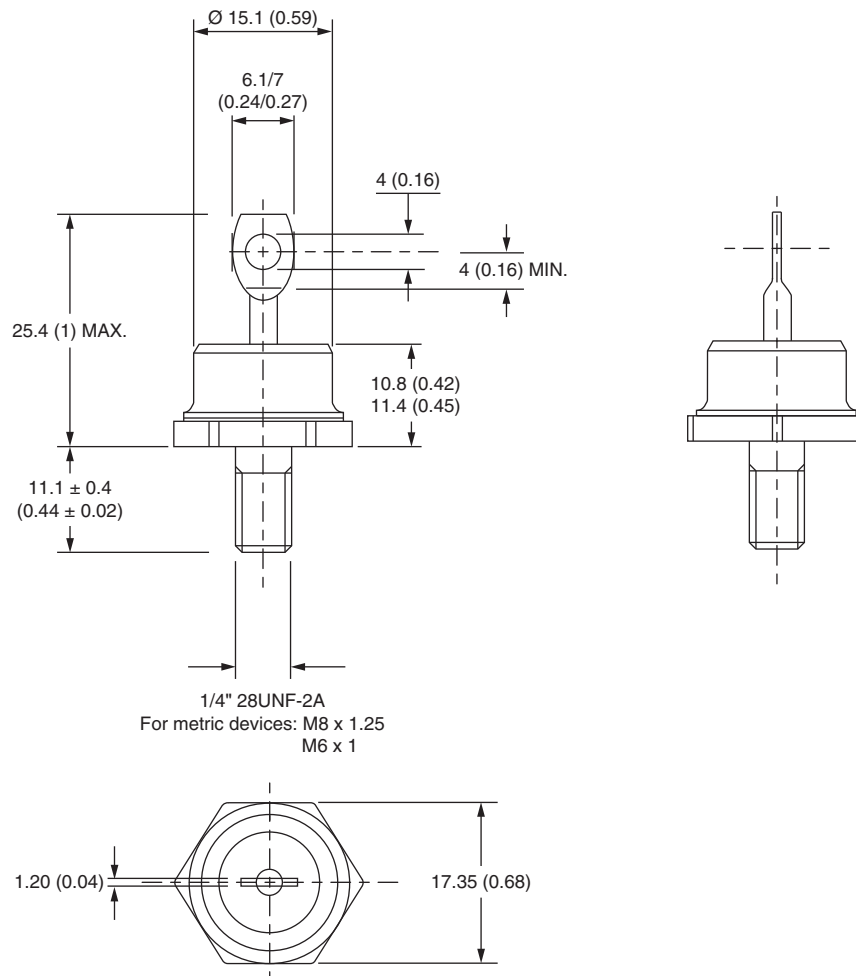
| Device code | VS- | 85 | HF | R | 160 | M |
|-------------|---|----|----|---|-----|---|
| | ① | ② | ③ | ④ | ⑤ | ⑥ |
| ① | - Vishay Semiconductors product | | | | | |
| ② | - 85 = standard device 86 = not isolated lead 87 = isolated lead with silicone sleeve (red = Reverse polarity) (blue = Normal polarity) 88 = type for rotating application | | | | | |
| 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-5 (DO-203AB) 1/4" 28UNF-2A M = stud base DO-5 (DO-203AB) M6 x 1 (not available for 88HF) M8 = stud base DO-5 (DO-203AB) M8 x 1.25 (not available for 88HF) | | | | | |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95342 |



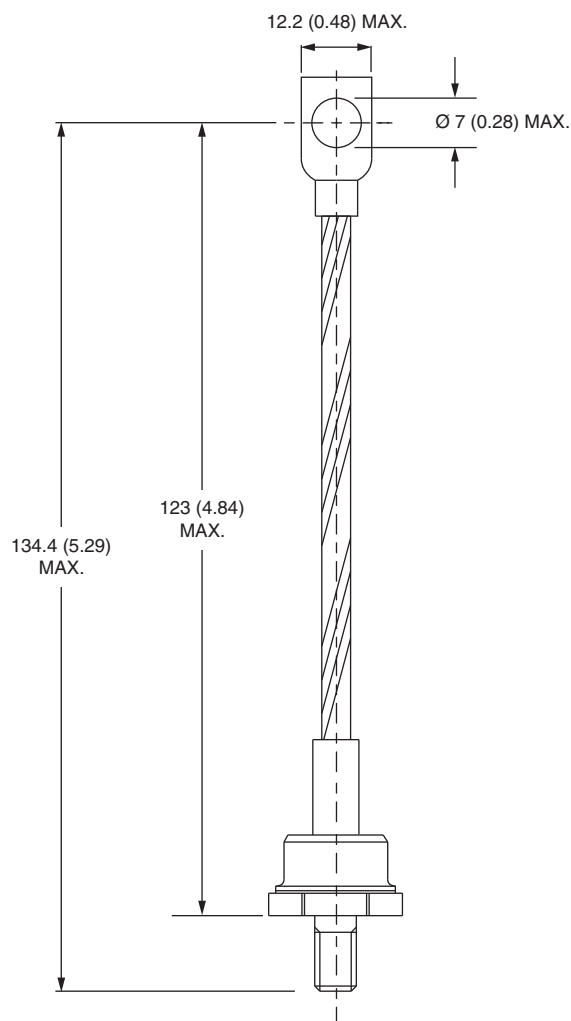
DO-5 (DO-203AB) for 85HF(R), 86HF(R) and 88HF(R) Series

DIMENSIONS FOR 85HF(R) SERIES in millimeters (inches)



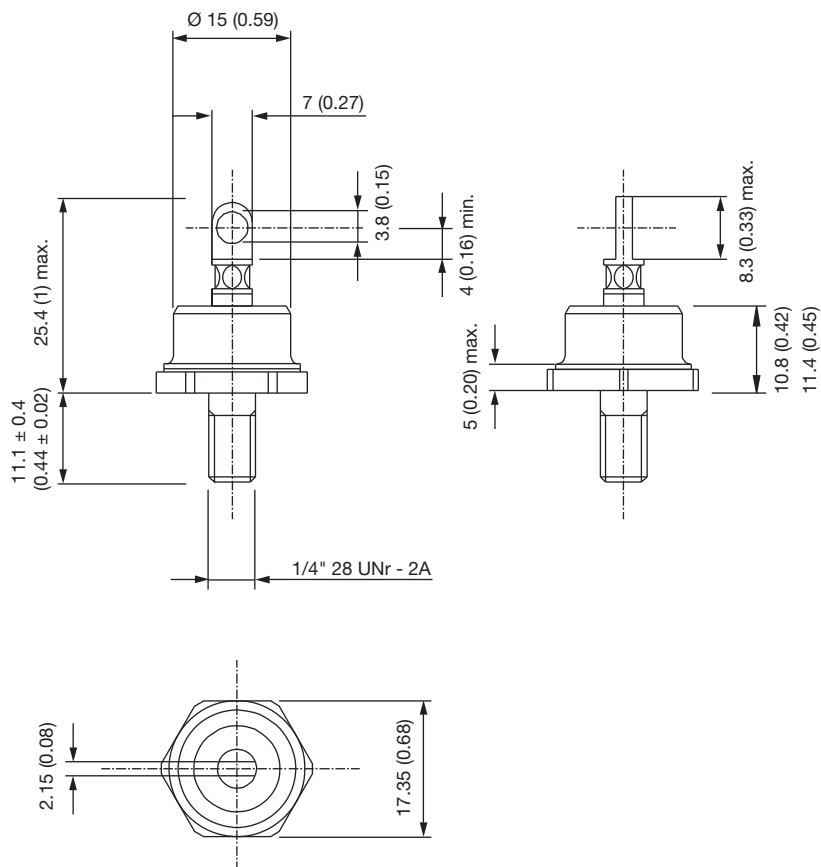


DIMENSIONS FOR 86HF(R) SERIES in millimeters (inches)





DIMENSIONS 88HF(R) SERIES in millimeters (inches)





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