

Standard Recovery Diodes, (Stud Version), 400 A



DO-9 (DO-205AB)

FEATURES

- Wide current range
- High surge current capabilities
- Stud cathode and stud anode version
- Standard JEDEC® types
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- High power drives

PRIMARY CHARACTERISTICS

| | |
|-----------------------|-----------------|
| $I_{F(AV)}$ | 400 A |
| Package | DO-9 (DO-205AB) |
| Circuit configuration | Single |

MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER | TEST CONDITIONS | VALUES | UNITS |
|--------------|-----------------|-------------|-------------------|
| $I_{F(AV)}$ | | 400 | A |
| | T_C | 120 | °C |
| $I_{F(RMS)}$ | | 630 | A |
| I_{FSM} | 50 Hz | 8250 | A |
| | 60 Hz | 8640 | |
| I^2t | 50 Hz | 340 | kA ² s |
| | 60 Hz | 311 | |
| V_{RRM} | Range | 800 to 1600 | V |
| T_J | | -40 to +200 | °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-400U(R) | 80 | 800 | 900 | 15 |
| | 120 | 1200 | 1300 | |
| | 160 | 1600 | 1700 | |



| FORWARD CONDUCTION | | | | | |
|---|---------------|---|---------------------------|---|--------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average forward current at case temperature | $I_{F(AV)}$ | 180° conduction, half sine wave | | 400 | A |
| | | | | 120 | °C |
| Maximum RMS forward current | $I_{F(RMS)}$ | DC at 110 °C case temperature | | 630 | 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 | A |
| | | t = 8.3 ms | | | |
| | | t = 10 ms | 100 % V_{RRM} reapplied | | |
| | | t = 8.3 ms | | | |
| Maximum I^2t for fusing | I^2t | t = 10 ms | No voltage reapplied | Sinusoidal half wave, initial $T_J = T_J$ maximum | kA ² s |
| | | t = 8.3 ms | | | |
| | | t = 10 ms | 100 % V_{RRM} reapplied | | |
| | | t = 8.3 ms | | | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reapplied | | 3400 | kA ² √s |
| Low level value of threshold voltage | $V_{F(TO)1}$ | (16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$), $T_J = T_J$ maximum | | 0.77 | V |
| High level value of threshold voltage | $V_{F(TO)2}$ | (I > $\pi \times I_{F(AV)}$), $T_J = T_J$ maximum | | 0.85 | |
| Low level value of forward slope resistance | r_{f1} | (16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$), $T_J = T_J$ maximum | | 0.49 | mΩ |
| High level value of forward slope resistance | r_{f2} | (I > $\pi \times I_{F(AV)}$), $T_J = T_J$ maximum | | 0.49 | |
| Maximum forward voltage drop | V_{FM} | $I_{pk} = 1500$ A, $T_J = T_J$ maximum, $t_p = 10$ ms sinusoidal wave | | 1.62 | V |

| THERMAL AND MECHANICAL SPECIFICATIONS | | | | | |
|--|----------------|---|--|-----------------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum junction operating and storage temperature range | T_J, T_{Stg} | | | -40 to 200 | °C |
| Maximum thermal resistance, junction to case | R_{thJC} | DC operation | | 0.15 | K/W |
| Maximum thermal resistance, case to heatsink | R_{thCS} | Mounting surface, smooth, flat and greased | | 0.04 | |
| Maximum allowed mounting torque ± 10 % | | Not lubricated threads | | 27 | N · m |
| Approximate weight | | | | 250 | g |
| Case style | | See dimensions - link at the end of datasheet | | DO-9 (DO-205AB) | |

| ΔR_{thJC} CONDUCTION | | | | |
|------------------------------|-----------------------|------------------------|---------------------|-------|
| CONDUCTION ANGLE | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS | UNITS |
| 180° | 0.020 | 0.013 | $T_J = T_J$ maximum | K/W |
| 120° | 0.023 | 0.023 | | |
| 90° | 0.029 | 0.031 | | |
| 60° | 0.042 | 0.044 | | |
| 30° | 0.073 | 0.074 | | |

Note

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

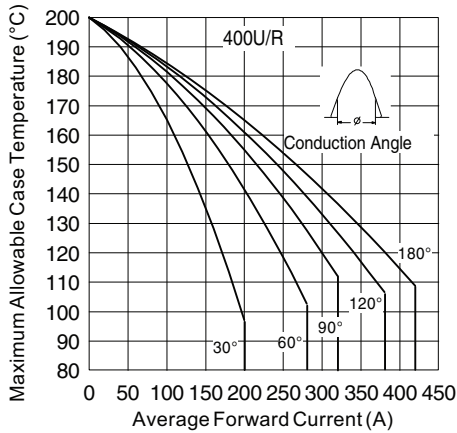


Fig. 1 - Current Ratings Characteristics

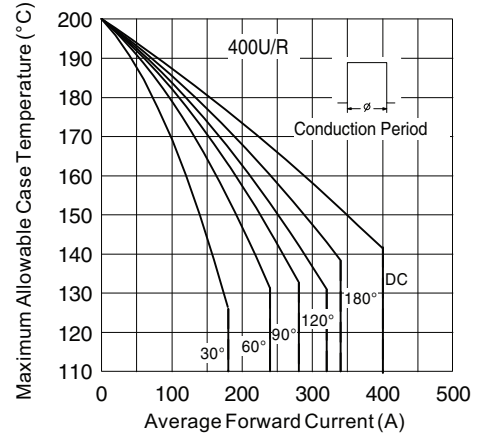


Fig. 2 - Current Ratings Characteristics

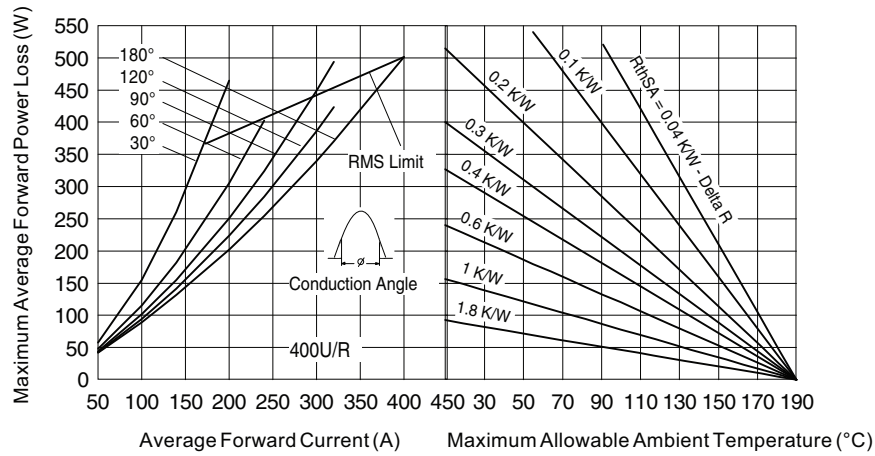


Fig. 3 - Forward Power Loss Characteristics

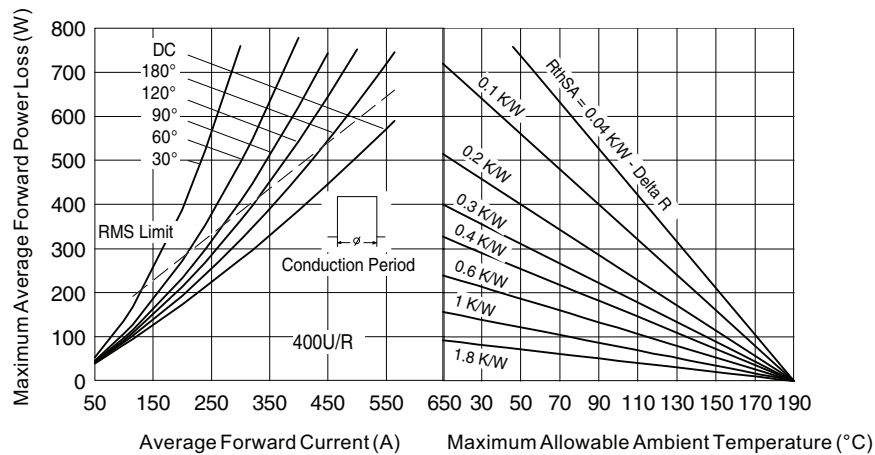


Fig. 4 - Forward Power Loss Characteristics

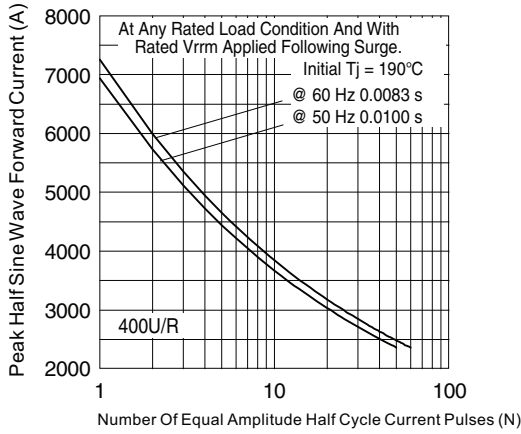


Fig. 5 - Maximum Non-Repetitive Surge Current

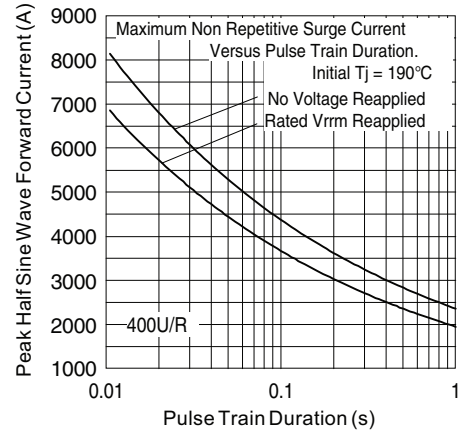


Fig. 6 - Maximum Non-Repetitive Surge Current

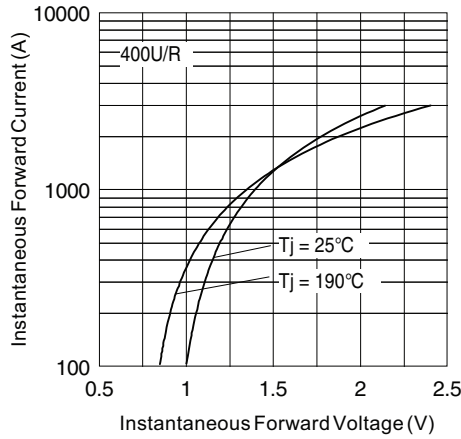


Fig. 7 - Forward Voltage Drop Characteristics

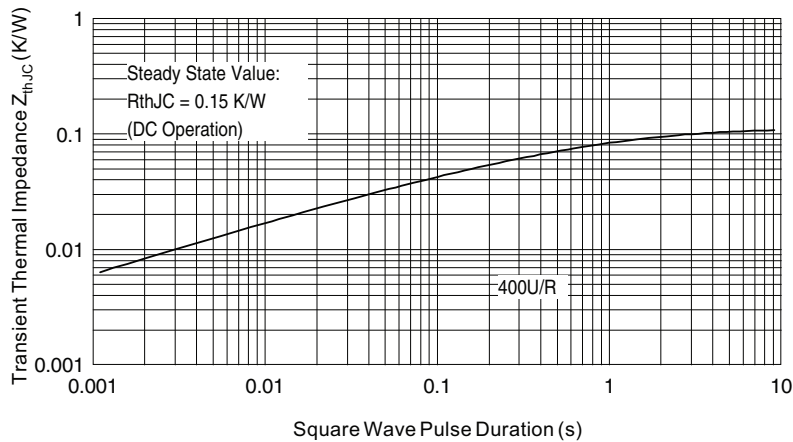
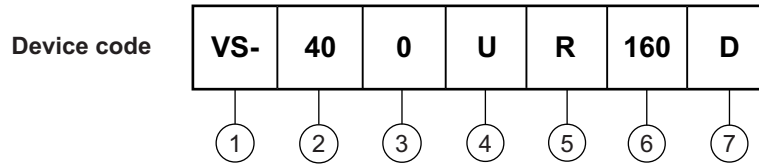


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic



ORDERING INFORMATION TABLE

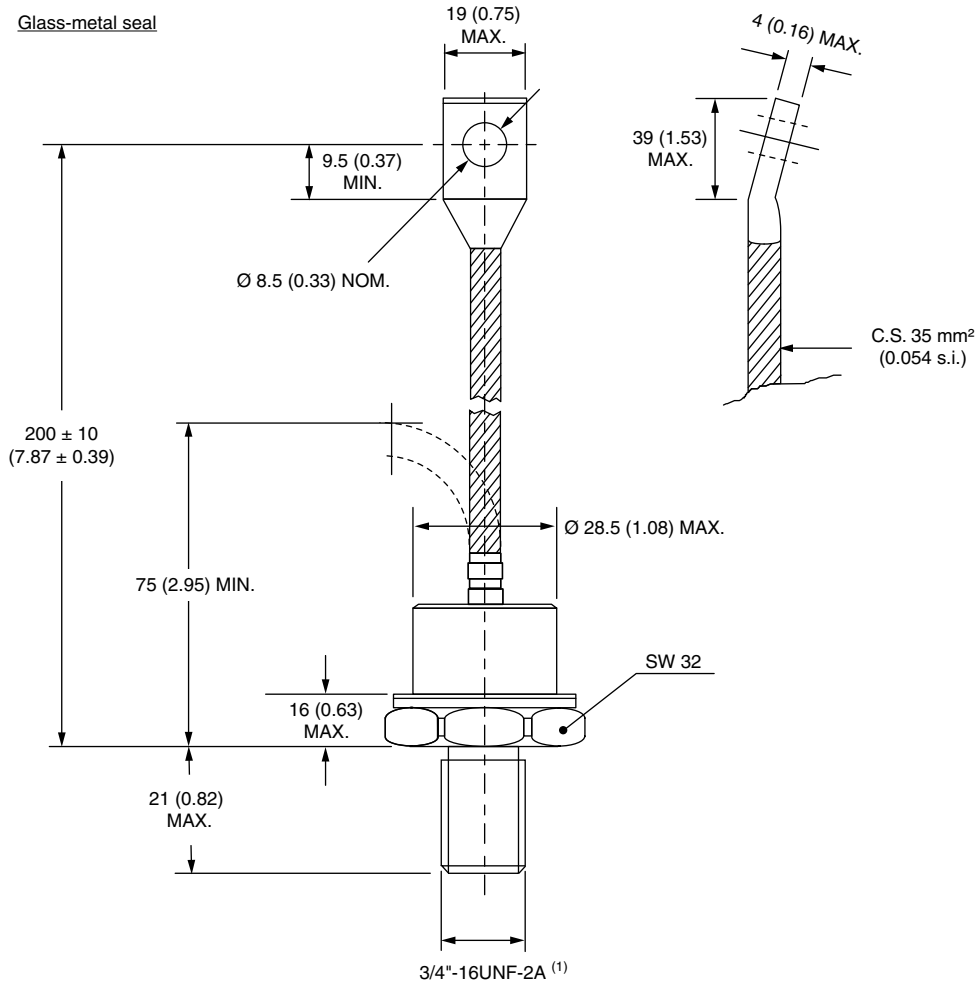


- 1** - Vishay Semiconductors product
- 2** - 40 = essential part number
- 3** - 0 = standard recovery device
- 4** - U = stud normal polarity (cathode to stud)
- 5** -
 - None = stud normal polarity (cathode to stud)
 - R = stud reverse polarity (anode to stud)
- 6** - Voltage code x 10 = V_{RRM} (see Voltage Ratings table)
- 7** - Diffused diode

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95339 |

DO-205AB (DO-9) for 400U(R) Series

DIMENSIONS in millimeters (inches)



Note

- For metric device: M16 x 1.5 contact factory



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