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[VS-SD403C04S10C](#)

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www.vishay.com

VS-SD403C..C Series

Vishay Semiconductors

Fast Recovery Diodes (Hockey PUK Version), 430 A



DO-200AA

FEATURES

- High power FAST recovery diode series
- 1.0 μ s to 1.5 μ s recovery time
- High voltage ratings up to 1600 V
- High current capability
- Optimized turn-on and turn-off characteristics
- Low forward recovery
- Fast and soft reverse recovery
- Press PUK encapsulation
- Case style conform to JEDEC® DO-200AA
- Maximum junction temperature 125 °C
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

PRODUCT SUMMARY

| | |
|-----------------------|--------------|
| $I_{F(AV)}$ | 430 A |
| Package | DO-200AA |
| Circuit configuration | Single diode |

TYPICAL APPLICATIONS

- Snubber diode for GTO
- High voltage freewheeling diode
- Fast recovery rectifier applications

MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER | TEST CONDITIONS | VALUES | UNITS |
|--------------|-----------------|-------------|-------------------|
| $I_{F(AV)}$ | | 430 | A |
| | T_{hs} | 55 | °C |
| $I_{F(RMS)}$ | | 675 | A |
| | T_{hs} | 25 | °C |
| I_{FSM} | 50 Hz | 6180 | A |
| | 60 Hz | 6470 | |
| I^2t | 50 Hz | 191 | kA ² s |
| | 60 Hz | 175 | |
| V_{RRM} | Range | 400 to 1600 | V |
| t_{rr} | | 1.0 to 1.5 | μ s |
| | T_J | 25 | °C |
| T_J | | - 40 to 125 | |

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS

| TYPE NUMBER | VOLTAGE CODE | V_{RRM} , MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V | V_{RSM} , MAXIMUM NON-REPETITIVE PEAK VOLTAGE V | I_{RRM} MAXIMUM AT $T_J = 125$ °C mA |
|-----------------|--------------|--|--|---|
| VS-SD403C..S10C | 04 | 400 | 500 | 35 |
| | 08 | 800 | 900 | |
| | 10 | 1000 | 1100 | |
| VS-SD403C..S15C | 12 | 1200 | 1300 | |
| | 14 | 1400 | 1500 | |
| | 16 | 1600 | 1700 | |



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| FORWARD CONDUCTION | | | | | |
|---|---------------|---|----------------------------|-----------|--------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average forward current at heatsink temperature | $I_{F(AV)}$ | 180° conduction, half sine wave Double side (single side) cooled | | 430 (210) | A |
| | | | | 55 (75) | °C |
| Maximum RMS current | $I_{F(RMS)}$ | 25 °C heatsink temperature double side cooled | | 675 | A |
| Maximum peak, one-cycle, non-repetitive forward current | I_{FSM} | t = 10 ms | No voltage reappplied | 6180 | |
| | | t = 8.3 ms | | 6470 | |
| | | t = 10 ms | 100 % V_{RRM} reappplied | 5200 | |
| | | t = 8.3 ms | | 5445 | |
| Maximum I^2t for fusing | I^2t | t = 10 ms | No voltage reappplied | 191 | kA ² s |
| | | t = 8.3 ms | | 175 | |
| | | t = 10 ms | 100 % V_{RRM} reappplied | 135 | |
| | | t = 8.3 ms | | 123 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reappplied | | 1910 | 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) | | 1.00 | V |
| High level value of threshold voltage | $V_{F(TO)2}$ | (I > $\pi \times I_{F(AV)}$, $T_J = T_J$ maximum) | | 1.20 | |
| Low level 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) | | 0.56 | mΩ |
| High level of forward slope resistance | r_{f2} | (I > $\pi \times I_{F(AV)}$, $T_J = T_J$ maximum) | | 0.70 | |
| Maximum forward voltage drop | V_{FM} | $I_{pk} = 1350$ A, $T_J = 25$ °C; $t_p = 10$ ms sinusoidal wave | | 1.83 | V |

| RECOVERY CHARACTERISTICS | | | | | | | | |
|--------------------------|--------------------------------|---------------------------|--------------|-----------|----------------------------------|---------------|--------------|--|
| CODE | MAXIMUM VALUE AT $T_J = 25$ °C | TEST CONDITIONS | | | TYPICAL VALUES AT $T_J = 125$ °C | | | |
| | trr AT 25 % I_{RRM} (μs) | I_{pk} SQUARE PULSE (A) | di/dt (A/μs) | V_r (V) | trr AT 25 % I_{RRM} (μs) | Q_{rr} (μC) | I_{rr} (A) | |
| S10 | 1.0 | 750 | 25 | - 30 | 2.4 | 52 | 33 | |
| S15 | 1.5 | | | | 2.9 | 90 | 44 | |

| THERMAL AND MECHANICAL SPECIFICATIONS | | | | | |
|--|--------------|---|--|-------------|--------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum operating temperature range | T_J | | | - 40 to 125 | °C |
| Maximum storage temperature range | T_{Stg} | | | - 40 to 150 | |
| Maximum thermal resistance, junction to heatsink | R_{thJ-hs} | DC operation single side cooled | | 0.16 | K/W |
| | | DC operation double side cooled | | 0.08 | |
| Mounting force, ± 10 % | | | | 4900 (500) | N (kg) |
| Approximate weight | | | | 70 | g |
| Case style | | See dimensions - link at the end of datasheet | | DO-200AA | |

| ΔR_{thJ-hs} CONDUCTION | | | | | | |
|--------------------------------|-----------------------|-------------|------------------------|-------------|---------------------|-------|
| CONDUCTION ANGLE | SINUSOIDAL CONDUCTION | | RECTANGULAR CONDUCTION | | TEST CONDITIONS | UNITS |
| | SINGLE SIDE | DOUBLE SIDE | SINGLE SIDE | DOUBLE SIDE | | |
| 180° | 0.010 | 0.011 | 0.008 | 0.008 | $T_J = T_J$ maximum | K/W |
| 120° | 0.012 | 0.013 | 0.013 | 0.013 | | |
| 90° | 0.016 | 0.016 | 0.018 | 0.018 | | |
| 60° | 0.024 | 0.024 | 0.025 | 0.025 | | |
| 30° | 0.042 | 0.042 | 0.042 | 0.042 | | |

Note

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



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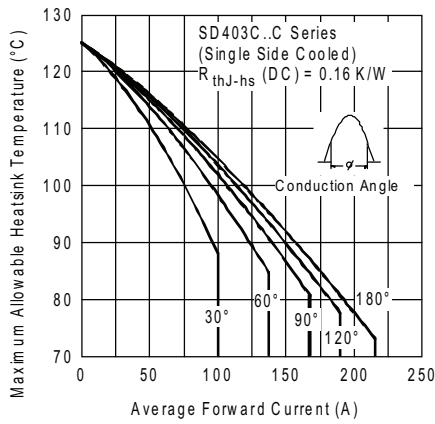


Fig. 1 - Current Ratings Characteristics

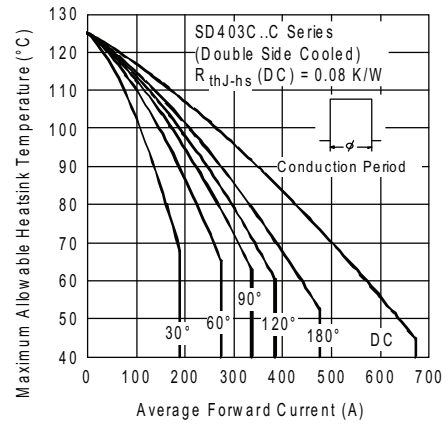


Fig. 4 - Current Ratings Characteristics

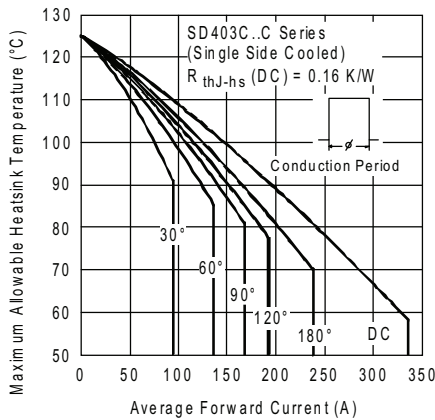


Fig. 2 - Current Ratings Characteristics

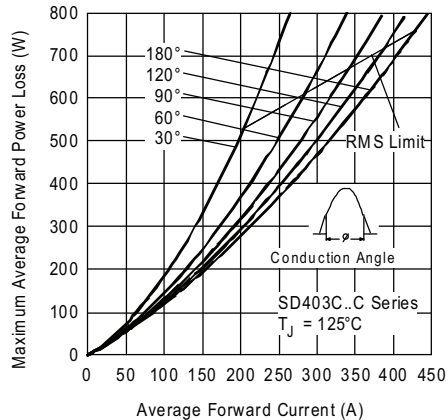


Fig. 5 - Forward Power Loss Characteristics

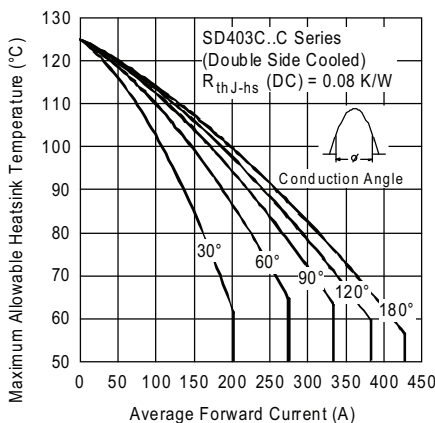


Fig. 3 - Current Ratings Characteristics

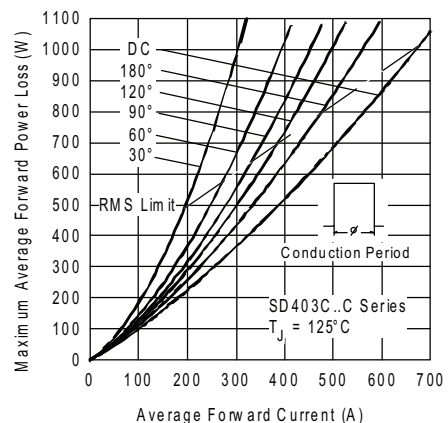


Fig. 6 - Forward Power Loss Characteristics



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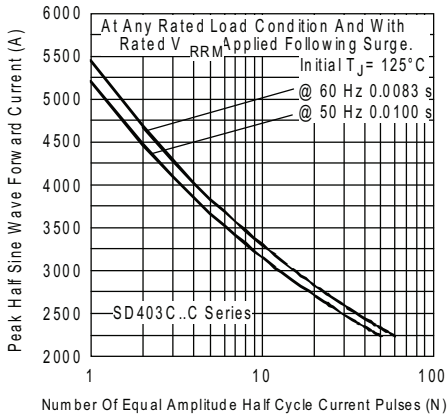


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

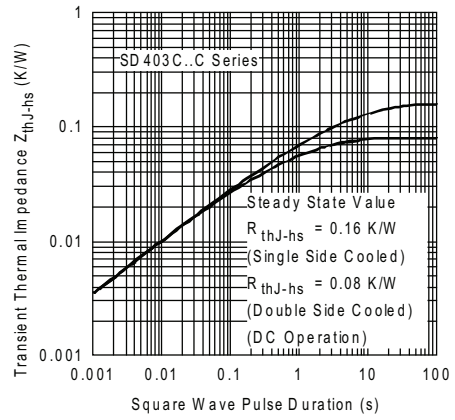


Fig. 1 - Thermal Impedance Z_{thJ-hs} Characteristics

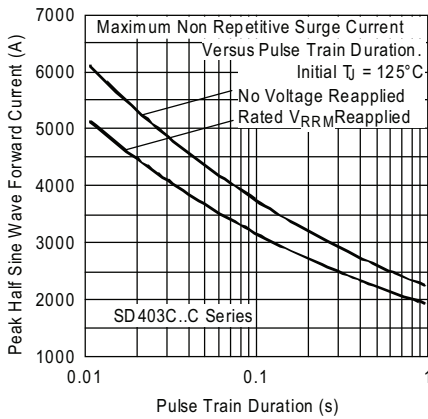


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

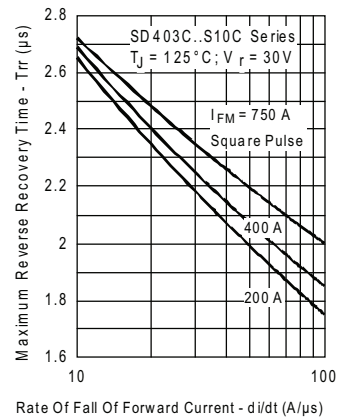


Fig. 10 - Recovery Time Characteristics

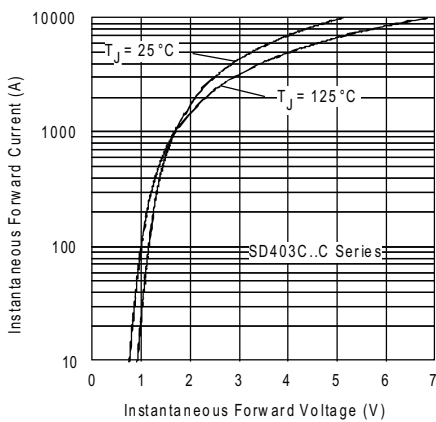


Fig. 9 - Forward Voltage Drop Characteristics

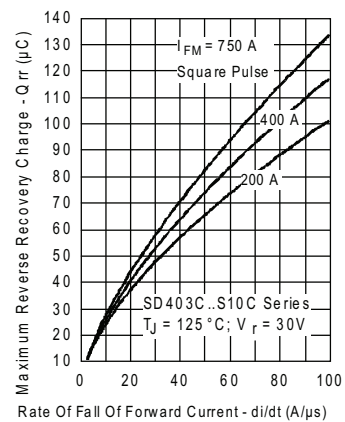


Fig. 11 - Recovery Charge Characteristics



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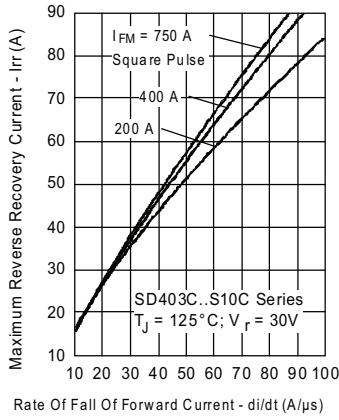


Fig. 12 - Recovery Current Characteristics

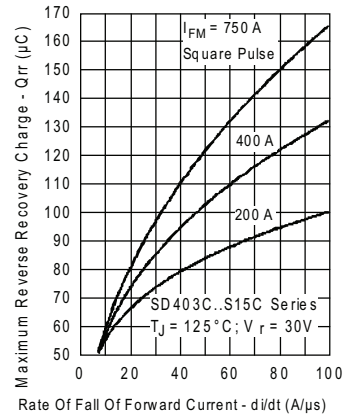


Fig. 14 - Recovery Charge Characteristics

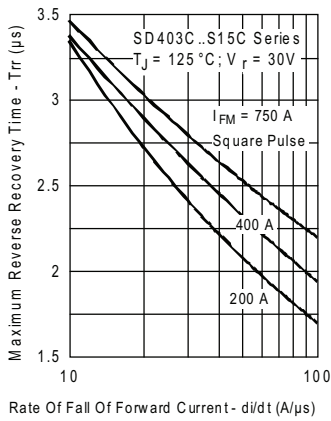


Fig. 13 - Recovery Time Characteristics

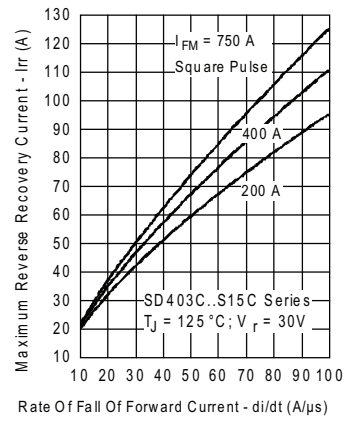


Fig. 15 - Recovery Current Characteristics

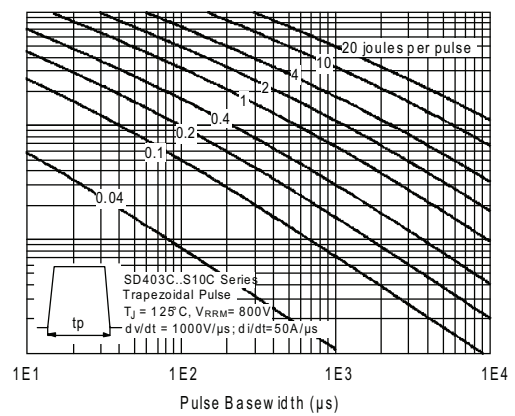
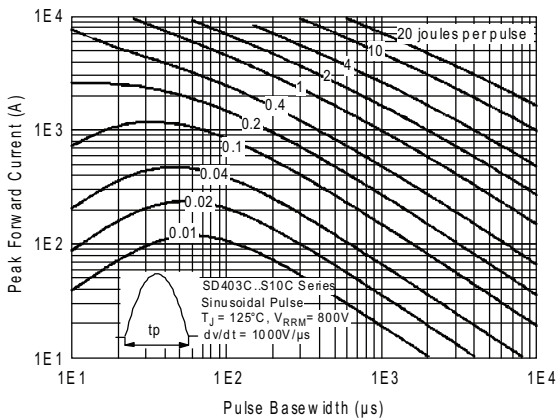


Fig. 16 - Maximum Total Energy Loss Per Pulse Characteristics



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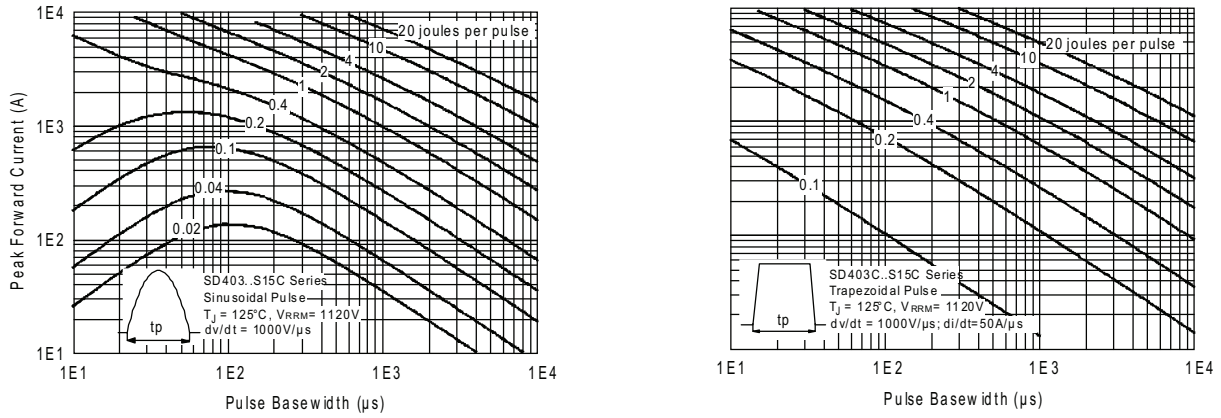


Fig. 17 - Maximum Total Energy Per Pulse Characteristics

ORDERING INFORMATION TABLE

| | | | | | | | | | |
|-------------|------------|-----------|--|----------|----------|-----------------------|------------|----------|--|
| Device code | VS- | SD | 40 | 3 | C | 16 | S15 | C | |
| | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | |
| | 1 | - | Vishay Semiconductors product | 2 | - | Diode | 3 | - | Essential part number |
| | 4 | - | 3 = Fast recovery | 5 | - | C = Ceramic PUK | 6 | - | Voltage code x 100 = V_{RRM} (see Voltage Ratings table) |
| | 7 | - | t_{rr} code (see Recovery Characteristics table) | 8 | - | C = PUK case DO-200AA | | | |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95248 |

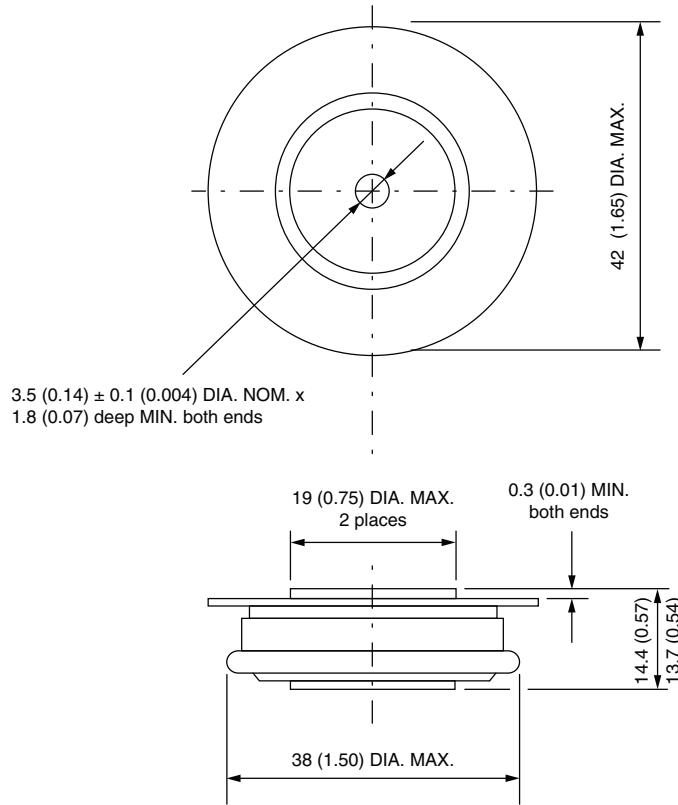


Outline Dimensions

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DO-200AA

DIMENSIONS in millimeters (inches)



Quote between upper and lower pole pieces has to be considered after application of mounting force (see Thermal and Mechanical Specifications)



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