

Fast Recovery Diodes (Hockey PUK Version), 845 A


B-43

PRIMARY CHARACTERISTICS

| | |
|-----------------------|--------|
| $I_{F(AV)}$ | 845 A |
| Package | B-43 |
| Circuit configuration | Single |

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
- Hockey PUK version case style B-43
- Maximum junction temperature 125 °C
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

TYPICAL APPLICATIONS

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

MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER | TEST CONDITIONS | VS-SD803C..C | | UNITS |
|--------------|-----------------|--------------|--------------|---------|
| | | S10 | S15 | |
| $I_{F(AV)}$ | | 845 | 845 | A |
| | T_{hs} | 55 | 55 | °C |
| $I_{F(RMS)}$ | | 1326 | 1326 | A |
| | T_{hs} | 25 | 25 | °C |
| I_{FSM} | 50 Hz | 11 295 | 11 295 | A |
| | 60 Hz | 11 830 | 11 830 | |
| I^2t | 50 Hz | 640 | 640 | A |
| | 60 Hz | 583 | 583 | |
| V_{RRM} | Range | 400 to 1000 | 1200 to 1600 | V |
| t_{rr} | | 1.0 | 1.5 | μ s |
| | T_J | 25 | 25 | °C |
| T_J | | -40 to +125 | -40 to +125 | |

ELECTRICAL SPECIFICATIONS

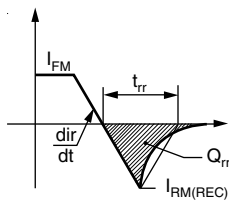
VOLTAGE RATINGS

| 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 $T_J = 125$ °C mA |
|-----------------|--------------|--|--|---|
| VS-SD803C..S10C | 04 | 400 | 500 | 45 |
| | 08 | 800 | 900 | |
| | 10 | 1000 | 1100 | |
| VS-SD803C..S15C | 12 | 1200 | 1300 | |
| | 14 | 1400 | 1500 | |
| | 16 | 1600 | 1700 | |

**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 | | 845 (420) | A |
| Maximum RMS forward current | $I_{F(RMS)}$ | 25 °C heatsink temperature double side cooled | | 1326 | °C |
| Maximum peak, one-cycle forward, non-repetitive current | I_{FSM} | $t = 10\text{ ms}$ | No voltage reapplied | 11 295 | A |
| | | $t = 8.3\text{ ms}$ | No voltage reapplied | 11 830 | |
| | | $t = 10\text{ ms}$ | 100 % V_{RRM} reapplied | 9500 | |
| | | $t = 8.3\text{ ms}$ | 100 % V_{RRM} reapplied | 9945 | |
| Maximum I^2t for fusing | I^2t | $t = 10\text{ ms}$ | No voltage reapplied | 640 | kA ² s |
| | | $t = 8.3\text{ ms}$ | No voltage reapplied | 583 | |
| | | $t = 10\text{ ms}$ | 100 % V_{RRM} reapplied | 451 | |
| | | $t = 8.3\text{ ms}$ | 100 % V_{RRM} reapplied | 412 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | $t = 0.1$ to 10 ms , no voltage reapplied | | 6400 | kA ² √s |
| Low level 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 | | 1.02 | V |
| High level of threshold voltage | $V_{F(TO)2}$ | $(I > \pi \times I_{F(AV)})$, $T_J = T_J$ maximum | | 1.32 | |
| 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 | | 0.38 | mW |
| High level of forward slope resistance | r_{f2} | $(I > \pi \times I_{F(AV)})$, $T_J = T_J$ maximum | | 0.28 | |
| Maximum forward voltage drop | V_{FM} | $I_{pk} = 2655\text{ A}$, $T_J = T_J$ maximum $t_p = 10\text{ ms}$ sinusoidal wave | | 1.89 | V |

RECOVERY CHARACTERISTICS

| CODE | MAXIMUM VALUE AT $T_J = 25\text{ °C}$ | TEST CONDITIONS | | | TYPICAL VALUES AT $T_J = 125\text{ °C}$ | | |  |
|------|---------------------------------------|---------------------------|----------------|-----------|---|---------------|--------------|--|
| | t_{rr} AT 25 % I_{RRM} (μs) | I_{pk} SQUARE PULSE (A) | di/dt (A/μs) | V_r (V) | t_{rr} AT 25 % I_{RRM} (μs) | Q_{rr} (μC) | I_{rr} (A) | |
| S10 | 1.0 | 1000 | 50 | -30 | 2.0 | 45 | 34 | |
| S15 | 1.5 | | | | 3.2 | 87 | 51 | |

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 125 | |
| Maximum thermal resistance, case junction to heatsink | R_{thJ-hs} | DC operation single side cooled | 0.076 | K/W |
| | | DC operation double side cooled | 0.038 | |
| Mounting force, $\pm 10\%$ | | | 9800 (1000) | N (kg) |
| Approximate weight | | | 83 | g |
| Case style | | See dimensions - link at the end of datasheet | B-43 | |

 ΔR_{thJ-hs} CONDUCTION

| CONDUCTION ANGLE | SINUSOIDAL CONDUCTION | | RECTANGULAR CONDUCTION | | TEST CONDITIONS | UNITS |
|------------------|-----------------------|-------------|------------------------|-------------|---------------------|-------|
| | SINGLE SIDE | DOUBLE SIDE | SINGLE SIDE | DOUBLE SIDE | | |
| 180° | 0.006 | 0.007 | 0.005 | 0.005 | $T_J = T_J$ maximum | K/W |
| 120° | 0.008 | 0.008 | 0.008 | 0.008 | | |
| 90° | 0.010 | 0.010 | 0.011 | 0.011 | | |
| 60° | 0.015 | 0.015 | 0.016 | 0.016 | | |
| 30° | 0.026 | 0.026 | 0.026 | 0.026 | | |

Note

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

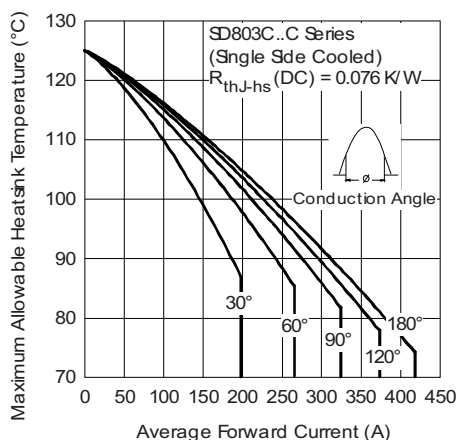


Fig. 1 - Current Ratings Characteristics

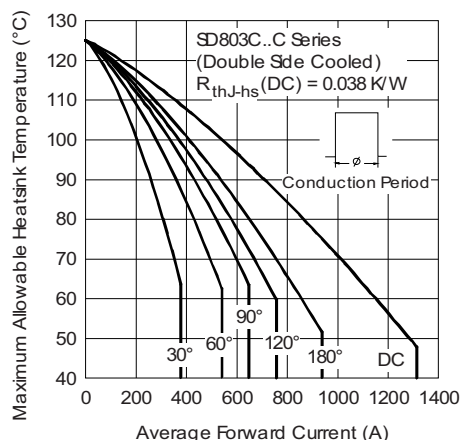


Fig. 4 - Current Ratings Characteristics

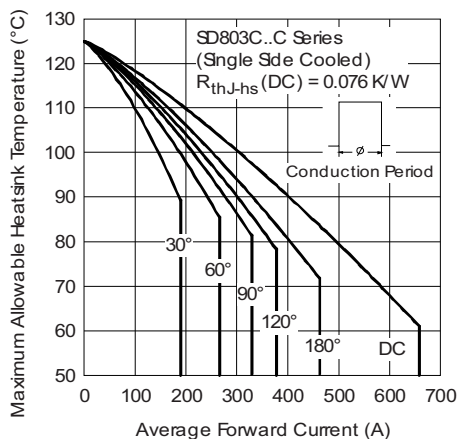


Fig. 2 - Current Ratings Characteristics

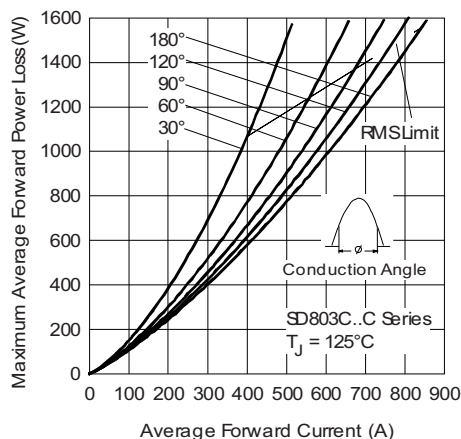


Fig. 5 - Forward Power Loss Characteristics

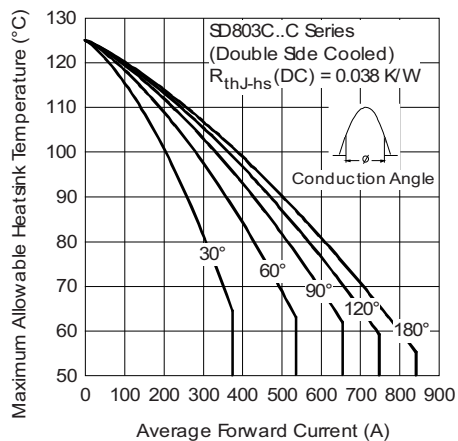


Fig. 3 - Current Ratings Characteristics

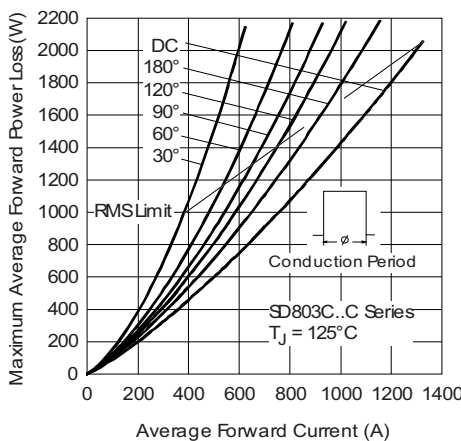


Fig. 6 - Forward Power Loss Characteristics

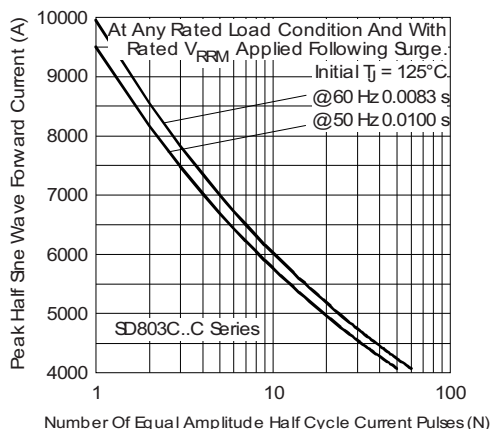


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double-Side Cooled

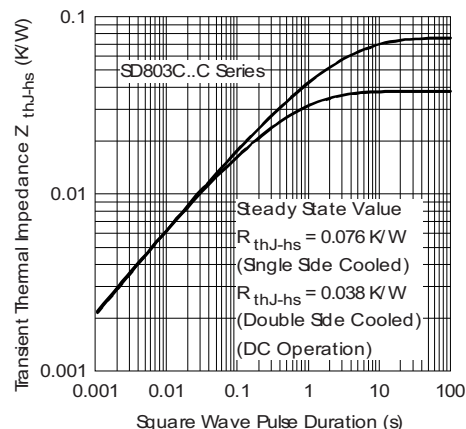


Fig. 10 - Thermal Impedance Z_{thJ-hs} Characteristics

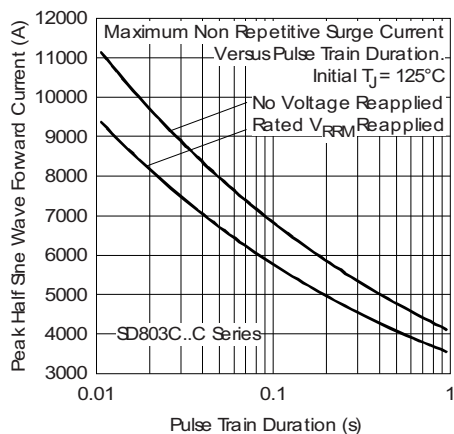


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double-Side Cooled

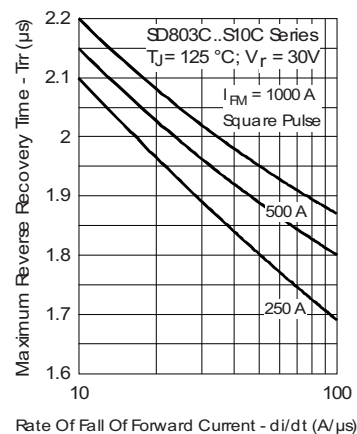


Fig. 11 - Recovery Time Characteristics

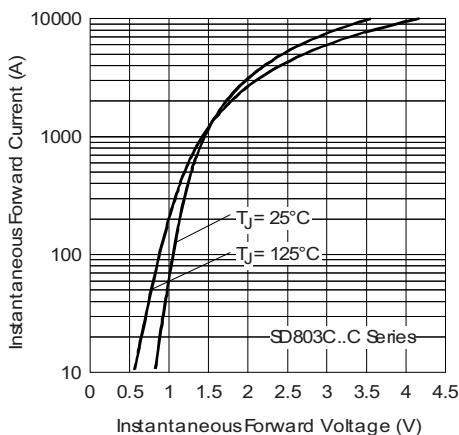


Fig. 9 - Forward Voltage Drop Characteristics

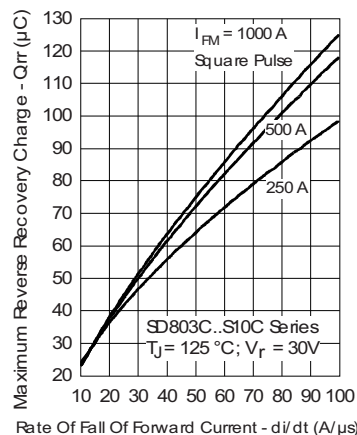


Fig. 12 - Recovery Charge Characteristics

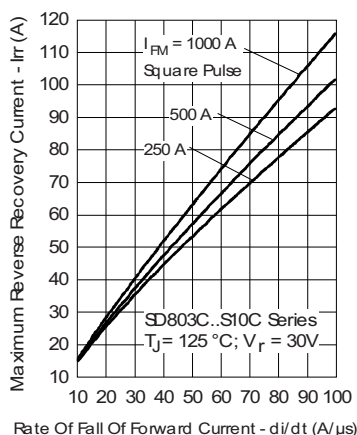


Fig. 13 - Recovery Current Characteristics

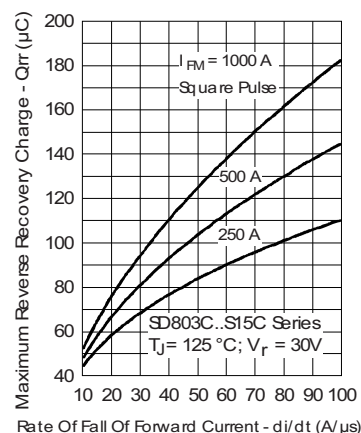


Fig. 15 - Recovery Charge Characteristics

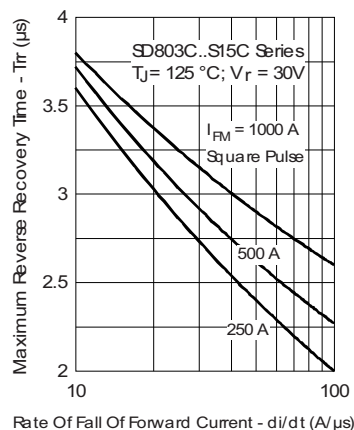


Fig. 14 - Recovery Time Characteristics

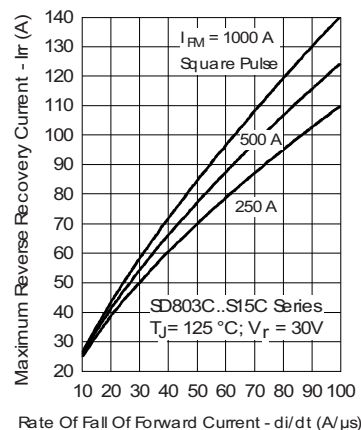


Fig. 16 - Recovery Current Characteristics

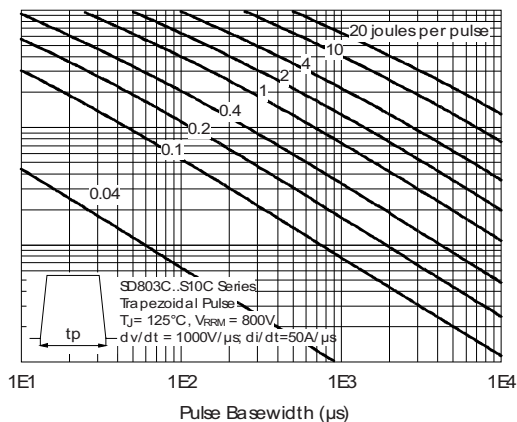
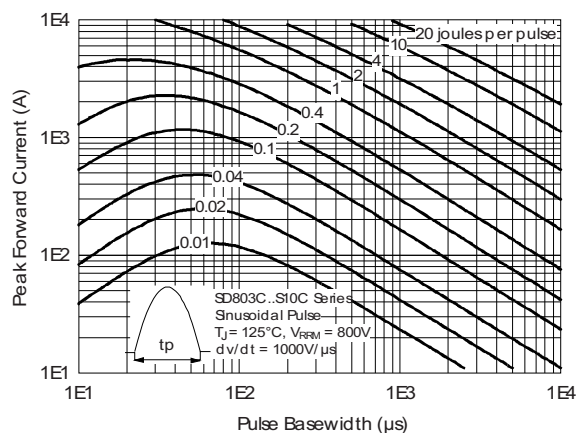


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

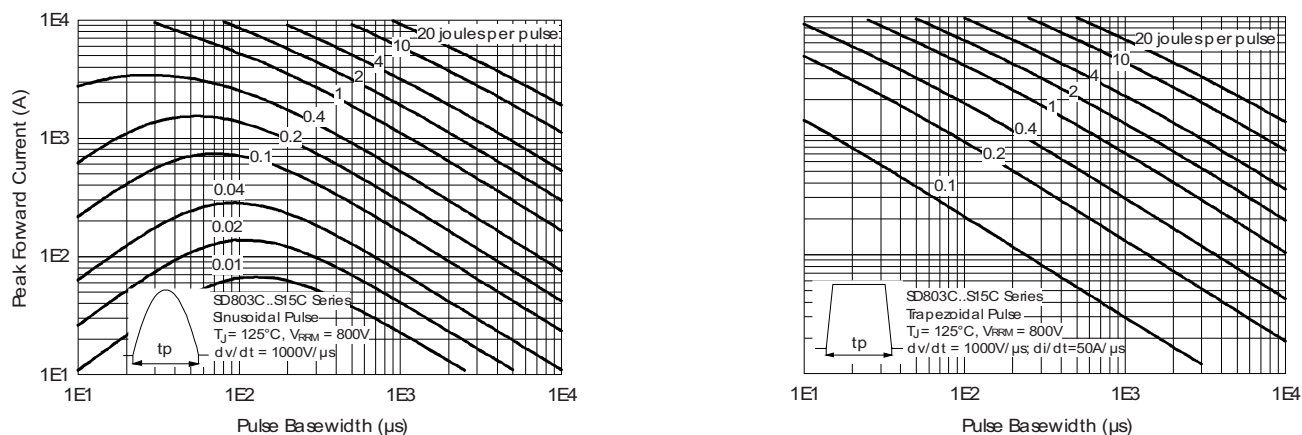


Fig. 18 - Maximum Total Energy Loss Per Pulse Characteristics

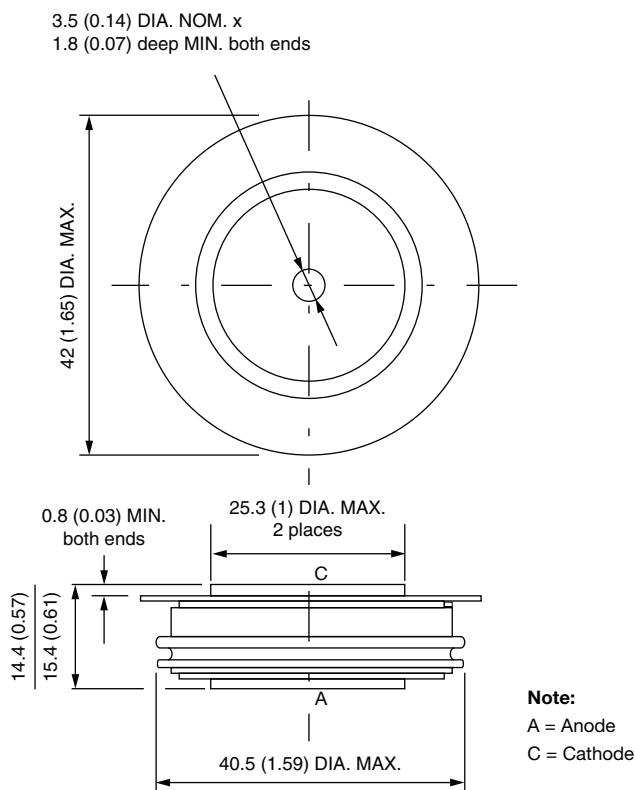
ORDERING INFORMATION TABLE

| Device code | VS- | SD | 80 | 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 B-43 | | | | | | | |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95249 |

B-43

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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