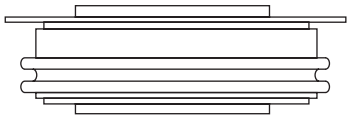
# Fast Recovery Diodes (Hockey PUK Version), 810/910 A



B-43

## FEATURES

- High power FAST recovery diode series
- 2.0 to 3.0 µs recovery time
- High voltage ratings up to 2500 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 150 °C
- Lead (Pb)-free
- Designed and qualified for industrial level

Pb-free
RoHS COMPLIANT

| PRODUCT SUMMARY | |
|---|---|
| $I_{F(AV)}$ | 810/910 A |

## TYPICAL APPLICATIONS

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

| MAJOR RATINGS AND CHARACTERISTICS | | | | |
|---|---|---|---|---|
| PARAMETER | TEST CONDITIONS | SD823C..C | | UNITS |
| | | S20 | S30 | |
| $I_{F(AV)}$ | | 810 | 910 | A |
| | $T_{hs}$ | 55 | 55 | °C |
| $I_{F(RMS)}$ | | 1500 | 1690 | A |
| $I_{FSM}$ | 50 Hz | 9300 | 9600 | |
| | 60 Hz | 9730 | 10 050 | |
| $V_{RRM}$ | Range | 1200 to 2500 | 1200 to 2500 | V |
| $t_{rr}$ | | 2.0 | 3.0 | µs |
| | $T_J$ | 25 | | °C |
| $T_J$ | | - 40 to 150 | | |

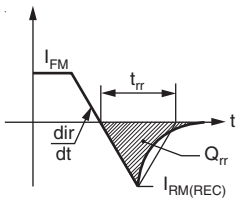
## ELECTRICAL SPECIFICATIONS

| 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 |
| SD823C..C | 12 | 1200 | 1300 | 50 |
| | 16 | 1600 | 1700 | |
| | 20 | 2000 | 2100 | |
| | 25 | 2500 | 2600 | |

## FORWARD CONDUCTION

| PARAMETER | SYMBOL | TEST CONDITIONS | | | SD823C..C | | UNITS |
|---|---|---|---|---|---|---|---|
| | | | | | S20 | S30 | |
| Maximum average forward current at heatsink temperature | $I_{F(AV)}$ | 180° conduction, half sine wave Double side (single side) cooled | | | 810 (425) | 910 (470) | A |
| | | | | | 55 (85) | 55 (85) | °C |
| Maximum RMS forward current | $I_{F(RMS)}$ | 25 °C heatsink temperature double side cooled | | | 1500 | 1690 | A |
| Maximum peak, one-cycle forward, non-repetitive current | $I_{FSM}$ | t = 10 ms | No voltage reapplied | Sinusoidal half wave, initial $T_J = T_J$ maximum | 9300 | 9600 | |
| | | t = 8.3 ms | | | 9730 | 10 050 | |
| | | t = 10 ms | 100 % $V_{RRM}$ reapplied | | 7820 | 8070 | |
| | | t = 8.3 ms | | | 8190 | 8450 | |
| Maximum $I^2t$ for fusing | $I^2t$ | t = 10 ms | No voltage reapplied | | 432 | 460 | $kA^2s$ |
| | | t = 8.3 ms | | | 395 | 420 | |
| | | t = 10 ms | 100 % $V_{RRM}$ reapplied | | 306 | 326 | |
| | | t = 8.3 ms | | | 279 | 297 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reapplied | | | 4320 | 4600 | $kA^2\sqrt{s}$ |
| Low level value of threshold voltage | $V_{F(TO)1}$ | (16.7 % x $\pi$ x $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum | | | 1.00 | 0.95 | V |
| High level value of threshold voltage | $V_{F(TO)2}$ | ($I > \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum | | | 1.11 | 1.06 | |
| Low level value of forward slope resistance | $r_{f1}$ | (16.7 % x $\pi$ x $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum | | | 0.80 | 0.60 | mΩ |
| High level value of forward slope resistance | $r_{f2}$ | ($I > \pi$ x $I_{F(AV)}$), $T_J = T_J$ maximum | | | 0.76 | 0.57 | |
| Maximum forward voltage drop | $V_{FM}$ | $I_{pk}$ = 1500 A, $T_J = T_J$ maximum $t_p$ = 10 ms sinusoidal wave | | | 2.20 | 1.85 | V |

## RECOVERY CHARACTERISTICS

| CODE | MAXIMUM VALUE AT $T_J$ = 25 °C | TEST CONDITIONS | | | TYPICAL VALUES AT $T_J$ = 125 °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) | |
| S20 | 2.0 | 1000 | 50 | - 50 | 3.5 | 240 | 110 | |
| S30 | 3.0 | | | | 5.0 | 380 | 130 | |



## THERMAL AND MECHANICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|---|---|---|---|
| Maximum junction operating and storage temperature range | $T_J$, $T_{Stg}$ | | - 40 to 150 | °C |
| 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, ± 10 % | | | 9800 (1000) | N (kg) |
| Approximate weight | | | 83 | g |
| Case style | | See dimensions - link at the end of datasheet | B-43 | |

| $\Delta R_{thJ\text{-}hs}$ CONDUCTION | | | | | | |
|---|---|---|---|---|---|---|
| CONDUCTION ANGLE | SINUSOIDAL CONDUCTION | | RECTANGULAR CONDUCTION | | TEST CONDITIONS | UNITS |
| | SINGLE SIDE | DOUBLE SIDE | SINGLE SIDE | DOUBLE SIDE | | |
| 180° | 0.007 | 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 $R_{thJ\text{-}hs}$ when devices operate at different conduction angles than DC

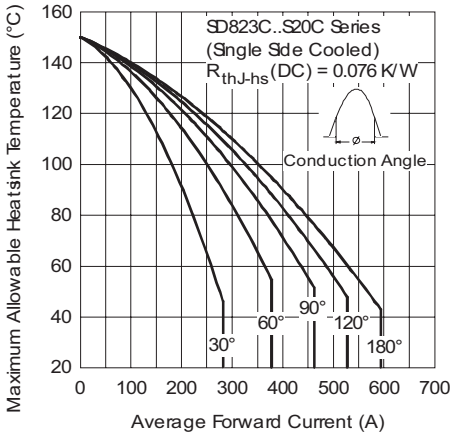



Fig. 1 - Current Ratings Characteristics

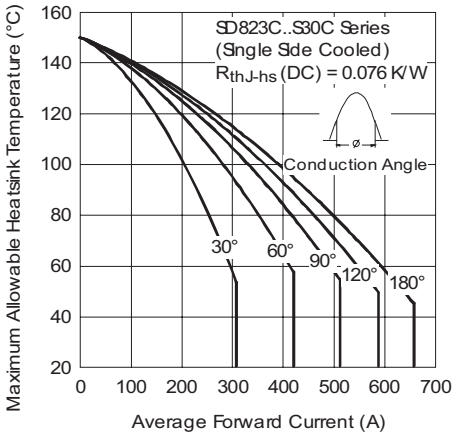



Fig. 3 - Current Ratings Characteristics

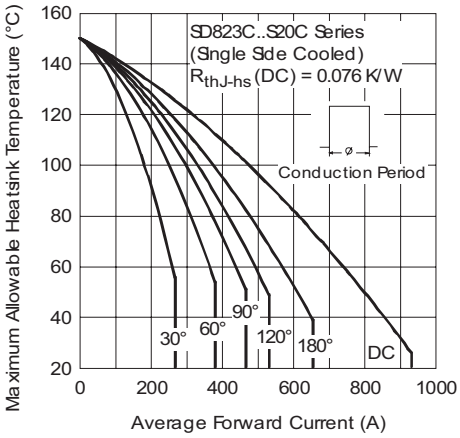



Fig. 2 - Current Ratings Characteristics

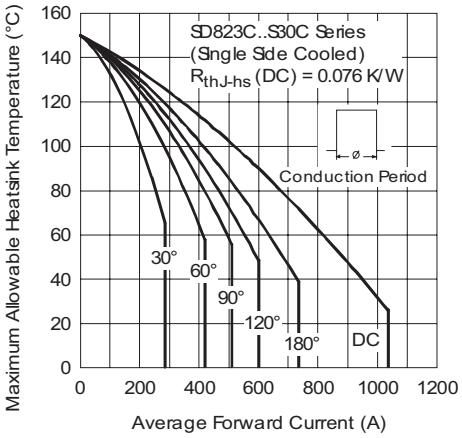



Fig. 4 - Current Ratings Characteristics

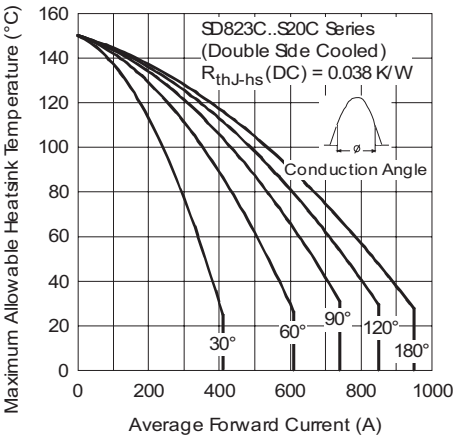



Fig. 5 - Current Ratings Characteristics

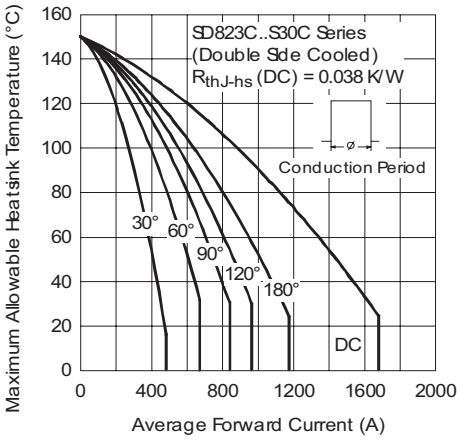



Fig. 8 - Current Ratings Characteristics

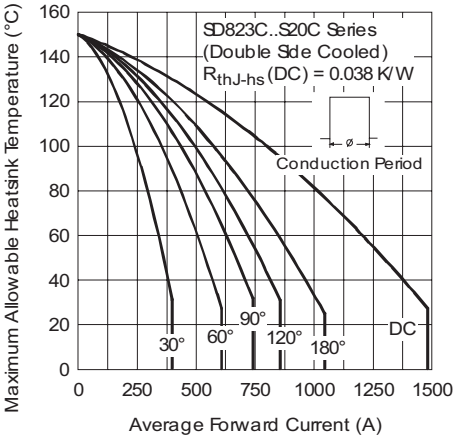



Fig. 6 - Current Ratings Characteristics

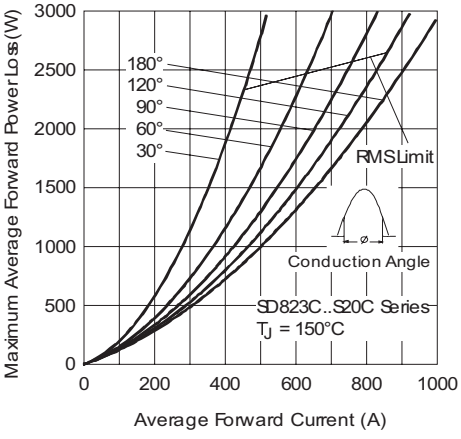



Fig. 9 - Forward Power Loss Characteristics

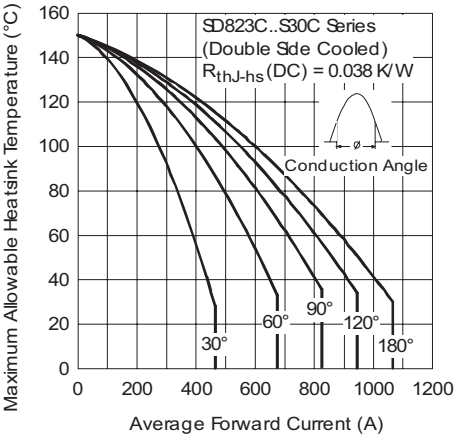



Fig. 7 - Current Ratings Characteristics

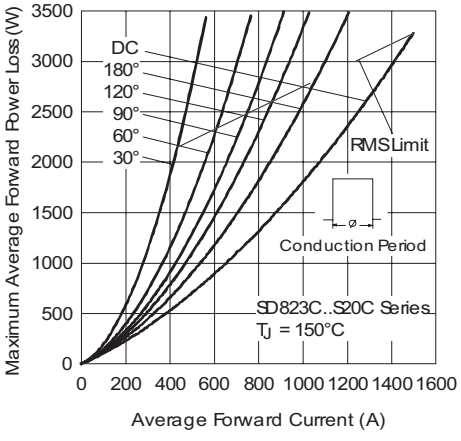



Fig. 10 - Forward Power Loss Characteristics

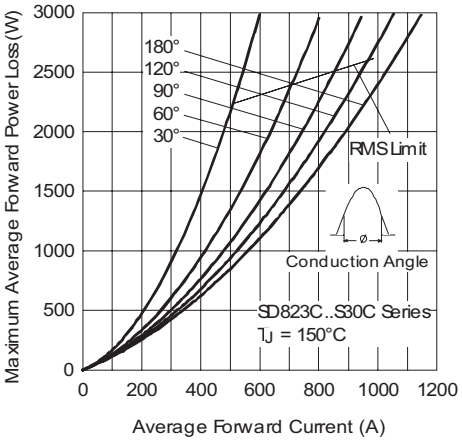



Fig. 11 - Forward Power Loss Characteristics

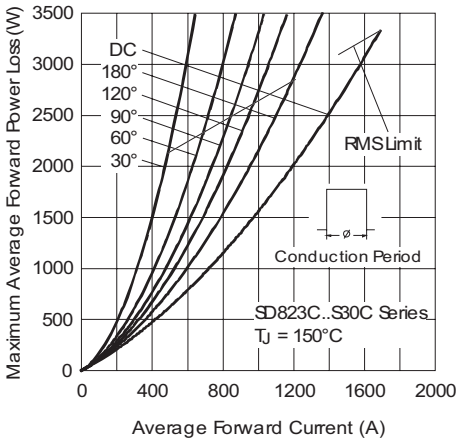



Fig. 12 - Forward Power Loss Characteristics

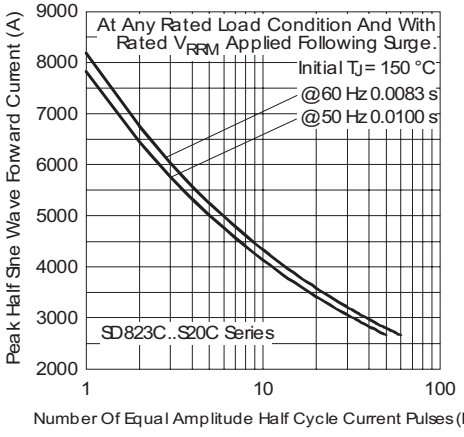



Fig. 13 - Maximum Non-Repetitive Surge Current

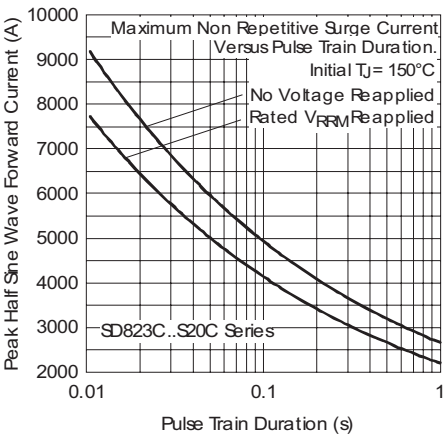



Fig. 14 - Maximum Non-Repetitive Surge Current

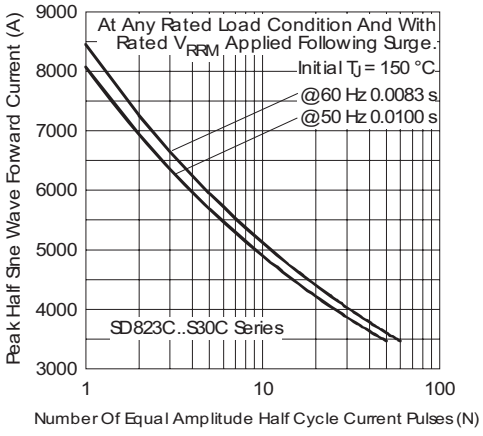



Fig. 15 - Maximum Non-Repetitive Surge Current

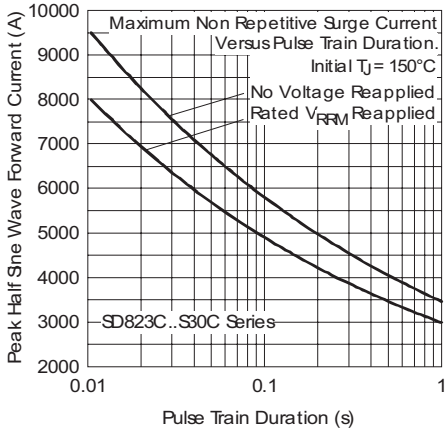



Fig. 16 - Maximum Non-Repetitive Surge Current

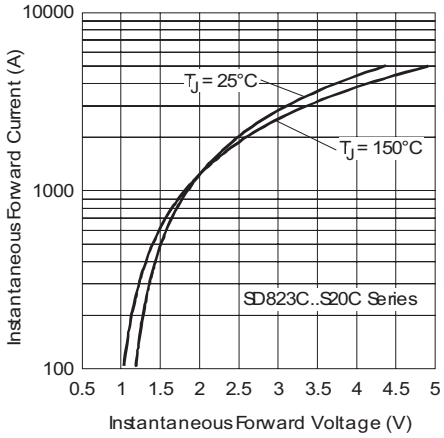



Fig. 17 - Forward Voltage Drop Characteristics

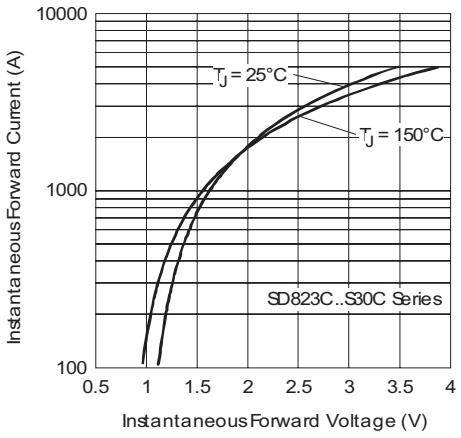



Fig. 18 - Forward Voltage Drop Characteristics

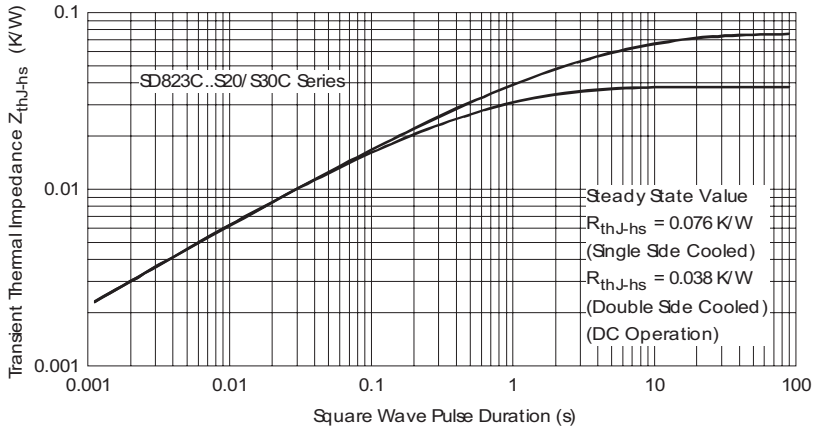



Fig. 19 - Thermal Impedance $Z_{thJ\text{-}hs}$ Characteristic

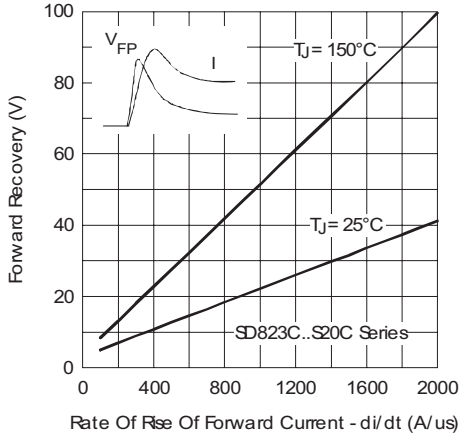



Fig. 20 - Typical Forward Recovery Characteristics

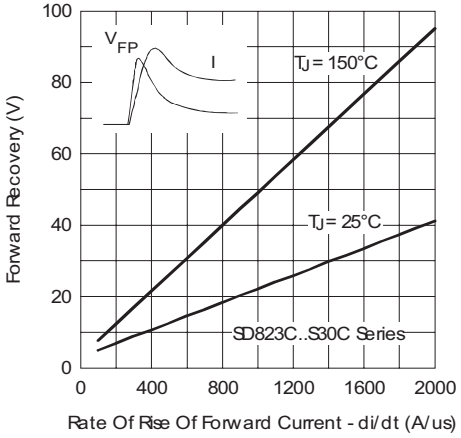



Fig. 21 - Typical Forward Recovery Characteristics

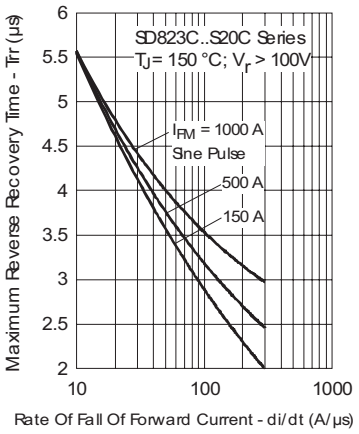



Fig. 22 - Recovery Time Characteristics

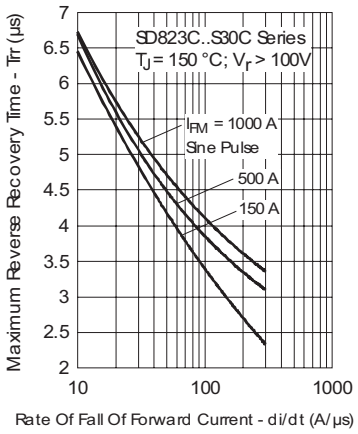



Fig. 25 - Recovery Time Characteristics

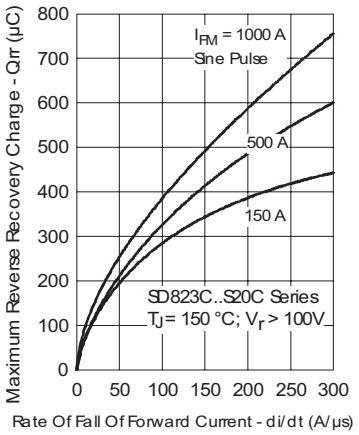



Fig. 23 - Recovery Charge Characteristics

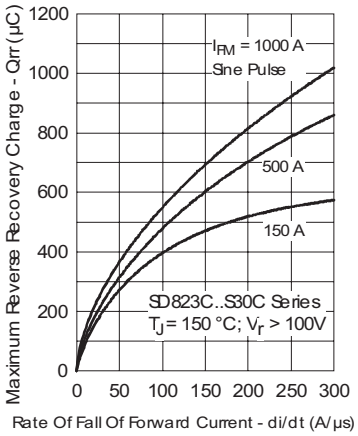



Fig. 26 - Recovery Charge Characteristics

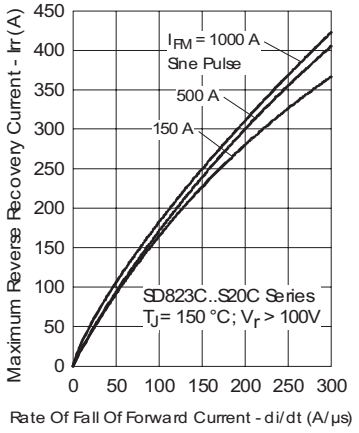



Fig. 24 - Recovery Current Characteristics

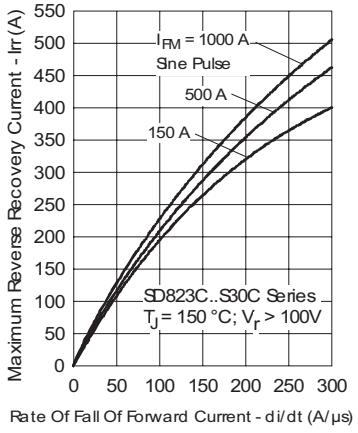



Fig. 27 - Recovery Current Characteristics

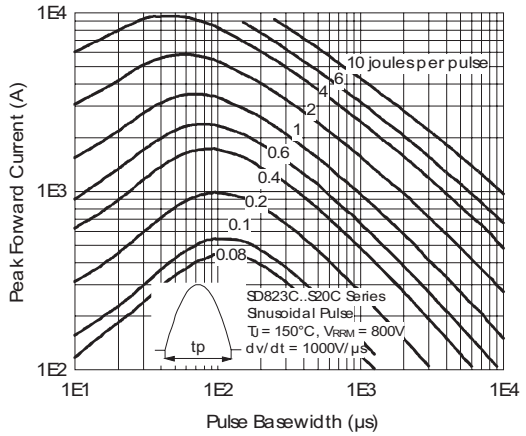



Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

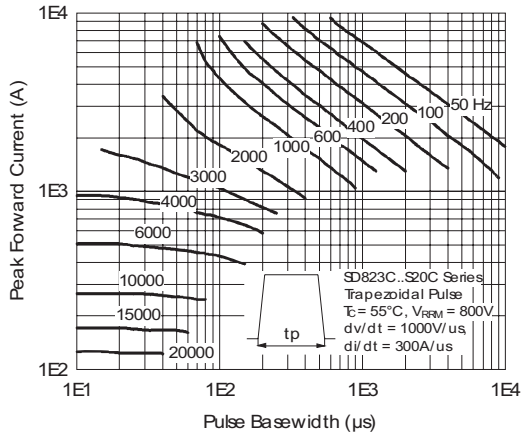



Fig. 31 - Frequency Characteristics

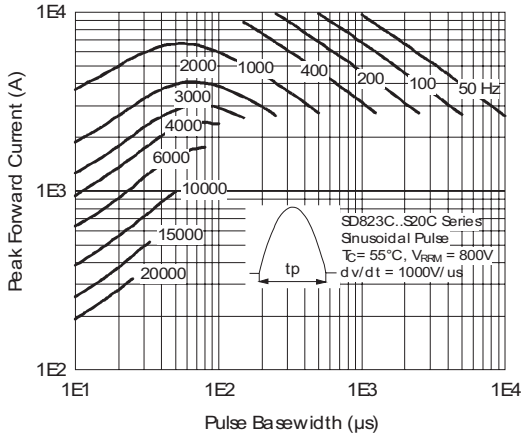



Fig. 29 - Frequency Characteristics

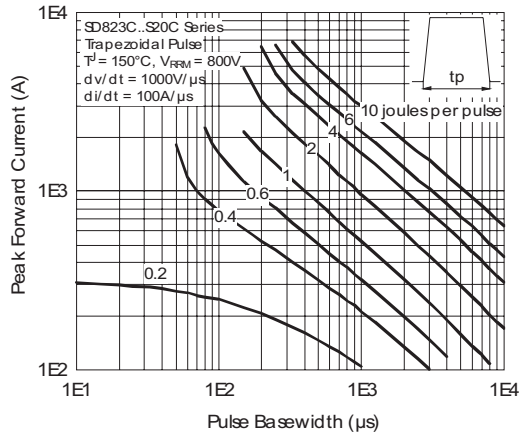



Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

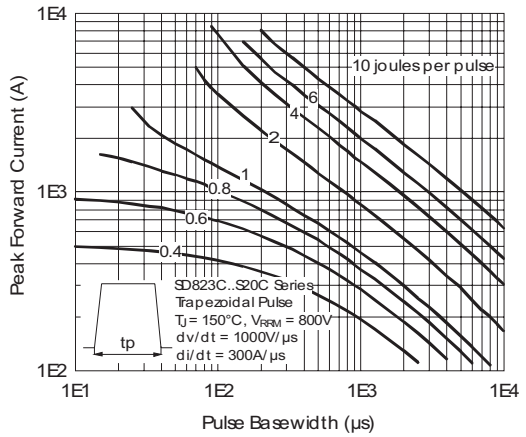



Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

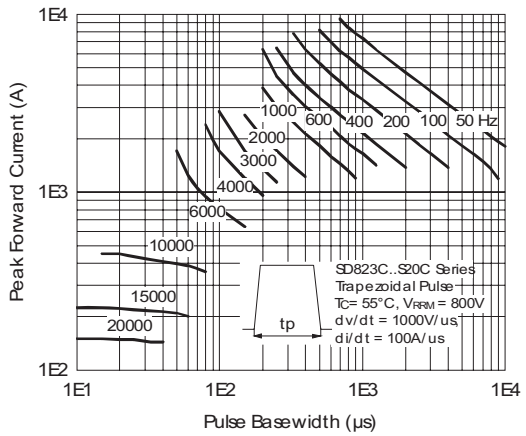



Fig. 33 - Frequency Characteristics

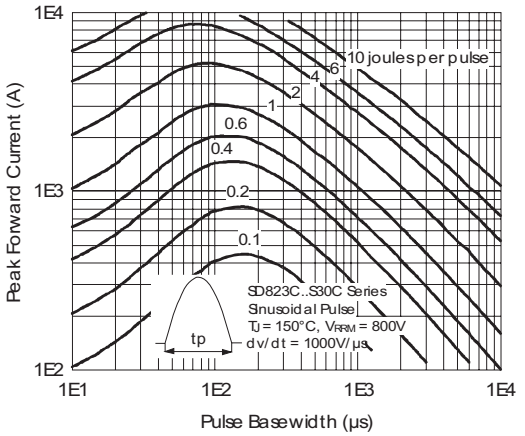



Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

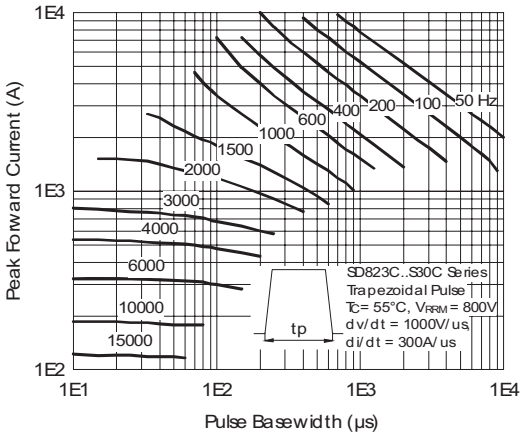



Fig. 37 - Frequency Characteristics

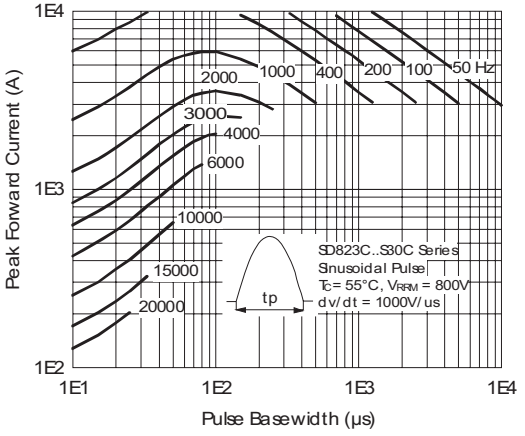



Fig. 35 - Frequency Characteristics

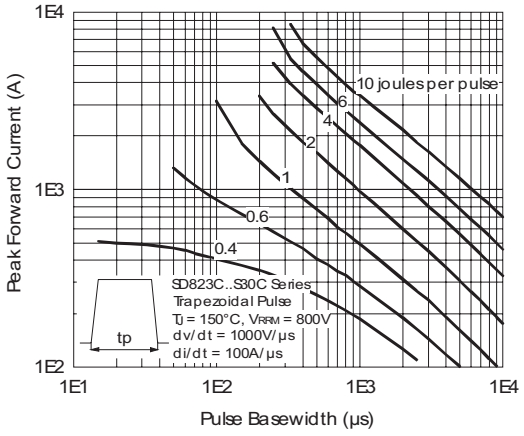



Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

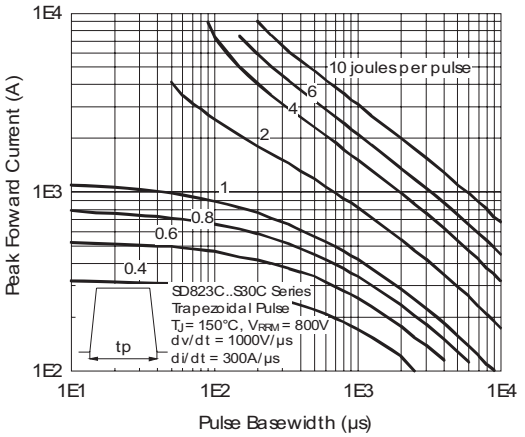



Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

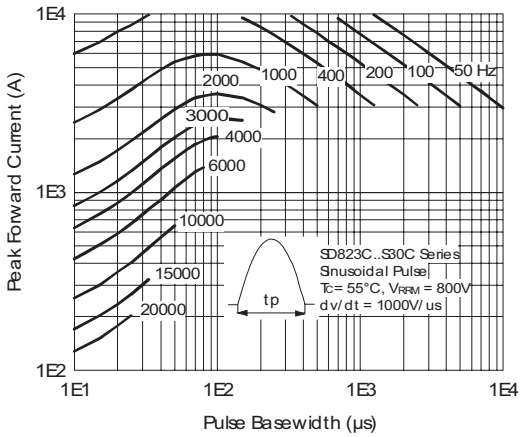
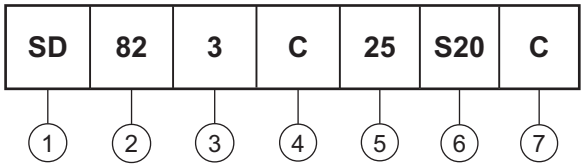



Fig. 39 - Frequency Characteristics

## ORDERING INFORMATION TABLE

**Device code**

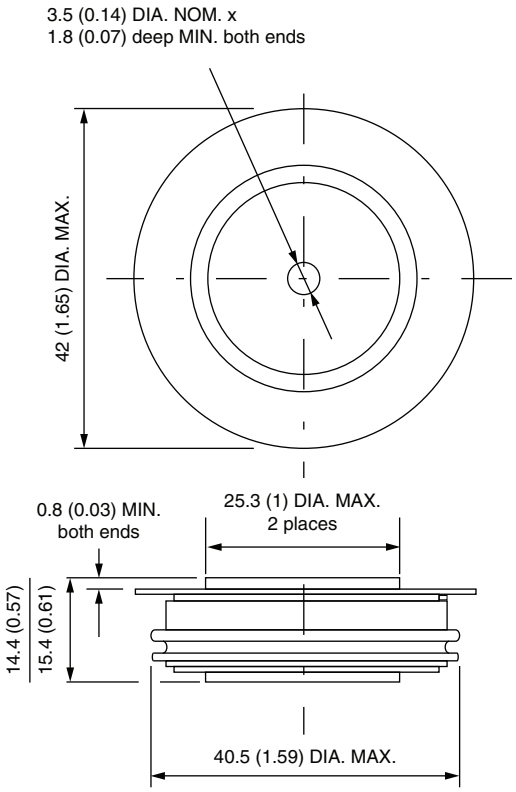



1 - Diode
2 - Essential part number
3 - 3 = Fast recovery
4 - C = Ceramic PUK
5 - Voltage code x 100 = $V_{RRM}$ (see Voltage Ratings table)
6 - $t_{rr}$ code
7 - C = PUK case B-43

| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | http://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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