



Fast Recovery Diodes (Hockey PUK Version), 1650 A, 1825 A



K-PUK (DO-200AC)

| PRIMARY CHARACTERISTICS | |
|-------------------------|------------------|
| $I_{F(AV)}$ | 1650 A, 1825 A |
| Package | K-PUK (DO-200AC) |
| Circuit configuration | Single |

FEATURES

- High power fast recovery diode series
- 2.0 μ s to 3.0 μ s recovery time
- High voltage ratings up to 3000 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® K-PUK (DO-200AC)
- Maximum junction temperature 150 °C
- 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 | SD1553C..K | | UNITS |
| | | S20 | S30 | |
| $I_{F(AV)}$ | | 1825 | 1650 | A |
| | T_{hs} | 55 | 55 | °C |
| $I_{F(RMS)}$ | | 3100 | 2800 | A |
| I_{FSM} | 50 Hz | 25 000 | 22 000 | |
| | 60 Hz | 26 180 | 23 000 | |
| V_{RRM} | Range | 1800 to 2500 | 1800 to 3000 | V |
| t_{rr} | | 2.0 | 3.0 | μ s |
| | 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 |
| VS-SD1553C..S20K | 18 | 1800 | 1900 | 75 |
| | 22 | 2200 | 2300 | |
| | 25 | 2500 | 2600 | |
| VS-SD1553C..S30K | 18 | 1800 | 1900 | |
| | 22 | 2200 | 2300 | |
| | 25 | 2500 | 2600 | |
| | 28 | 2800 | 2900 | |
| | 30 | 3000 | 3100 | |



| FORWARD CONDUCTION | | | | | | | |
|---|---------------|--|----------------------------|---|------------|--------------------|-------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | SD1553C..K | | UNITS | |
| | | | | S20 | S30 | | |
| Maximum average forward current at heatsink temperature | $I_{F(AV)}$ | 180° conduction, half sine wave Double side (single side) cooled | | 1825 (865) | 1650 (790) | A | |
| Maximum RMS forward current | $I_{F(RMS)}$ | 25 °C heatsink temperature double side cooled | | 3100 | 2800 | °C | |
| Maximum peak, one-cycle forward, non-repetitive surge current | I_{FSM} | t = 10 ms | No voltage reappplied | Sinusoidal half wave, initial $T_J = T_J$ maximum | 25 000 | 22 000 | A |
| | | t = 8.3 ms | | | 26 180 | 23 000 | |
| | | t = 10 ms | 100 % V_{RRM} reappplied | | 21 030 | 18 500 | |
| | | t = 8.3 ms | | | 22 010 | 19 370 | |
| Maximum I^2t for fusing | I^2t | t = 10 ms | No voltage reappplied | | 3126 | 2421 | kA ² s |
| | | t = 8.3 ms | | | 2854 | 2210 | |
| | | t = 10 ms | 100 % V_{RRM} reappplied | | 2210 | 1712 | |
| | | t = 8.3 ms | | | 2018 | 1563 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reappplied | | 31 260 | 24 210 | 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 | | 1.15 | 1.31 | V | |
| High level value of threshold voltage | $V_{F(TO)2}$ | $(I > \pi \times I_{F(AV)})$, $T_J = T_J$ maximum | | 1.29 | 1.45 | | |
| 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 | | 0.27 | 0.32 | mW | |
| High level value of forward slope resistance | r_{f2} | $(I > \pi \times I_{F(AV)})$, $T_J = T_J$ maximum | | 0.25 | 0.30 | | |
| Maximum forward voltage drop | V_{FM} | $I_{pk} = 4000$ A, $T_J = T_J$ maximum, $t_p = 10$ ms sinusoidal wave | | 2.23 | 2.60 | V | |

| RECOVERY CHARACTERISTICS | | | | | | | | |
|--------------------------|---------------------------------|---------------------------|-----------------|-----------|---------------------------------|----------------------------------|--------------|--|
| CODE | MAXIMUM VALUE AT $T_J = 25$ °C | | TEST CONDITIONS | | | TYPICAL VALUES AT $T_J = 150$ °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 | 100 | - 50 | 4.5 | 650 | 240 | |
| S30 | 3.0 | | | | 5.0 | 780 | 260 | |

| 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 | 0.04 | K/W |
| | | DC operation double side cooled | 0.02 | |
| Mounting force, ± 10 % | | | 22 250 (2250) | N (kg) |
| Approximate weight | | | 425 | g |
| Case style | | See dimensions - link at the end of datasheet | K-PUK (DO-200AC) | |

| ΔR_{thJ-hs} CONDUCTION | | | | | | |
|--------------------------------|-----------------------|-------------|------------------------|-------------|---------------------|-------|
| CONDUCTION ANGLE | SINUSOIDAL CONDUCTION | | RECTANGULAR CONDUCTION | | TEST CONDITIONS | UNITS |
| | SINGLE SIDE | DOUBLE SIDE | SINGLE SIDE | DOUBLE SIDE | | |
| 180° | 0.0018 | 0.0019 | 0.0012 | 0.0012 | $T_J = T_J$ maximum | K/W |
| 120° | 0.0021 | 0.0021 | 0.0021 | 0.0021 | | |
| 90° | 0.0027 | 0.0027 | 0.0029 | 0.0029 | | |
| 60° | 0.0039 | 0.0039 | 0.0041 | 0.0041 | | |
| 30° | 0.0067 | 0.0067 | 0.0068 | 0.0068 | | |

Note

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

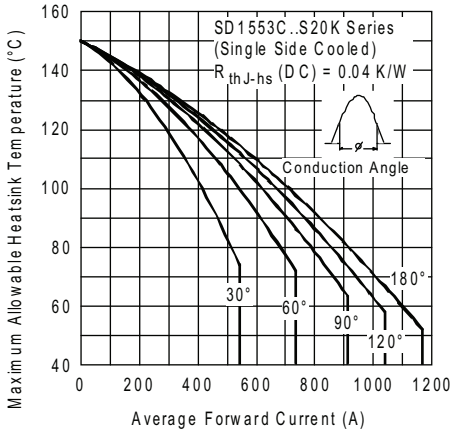


Fig. 1 - Current Ratings Characteristics

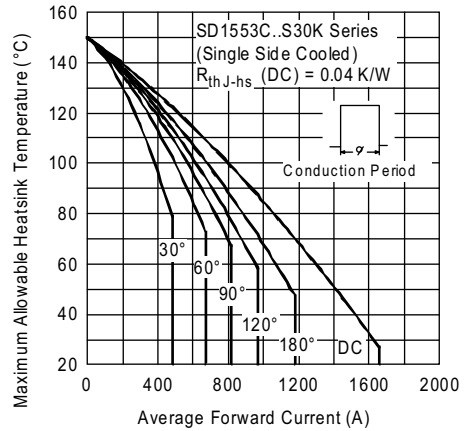


Fig. 4 - Current Ratings Characteristics

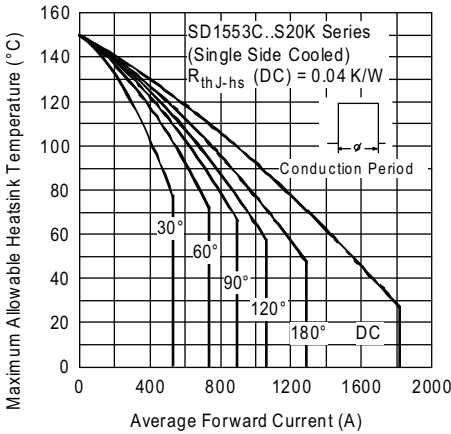


Fig. 2 - Current Ratings Characteristics

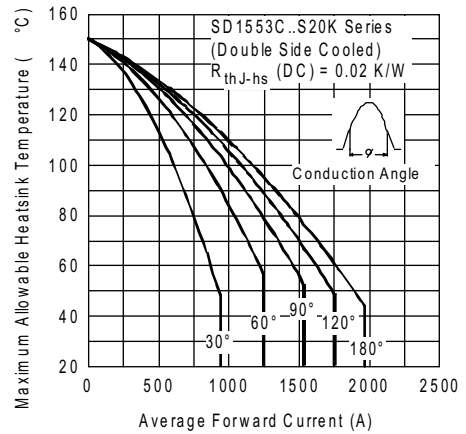


Fig. 5 - Current Ratings Characteristics

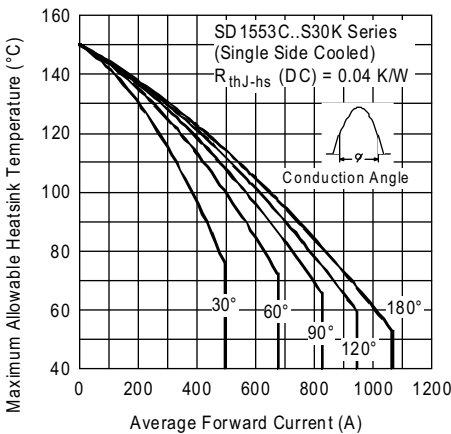


Fig. 3 - Current Ratings Characteristics

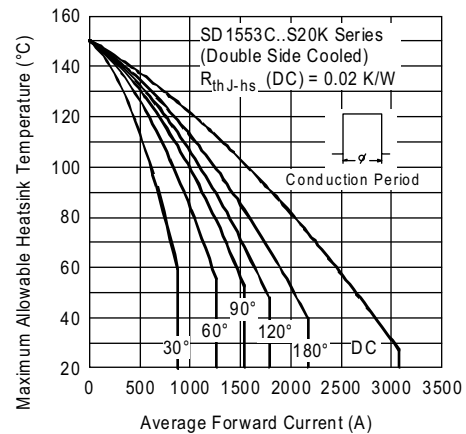


Fig. 6 - Current Ratings Characteristics

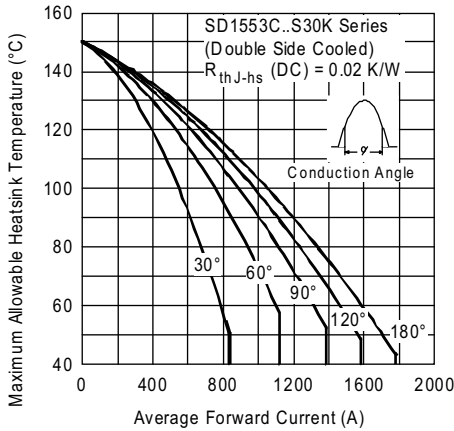


Fig. 7 - Current Ratings Characteristics

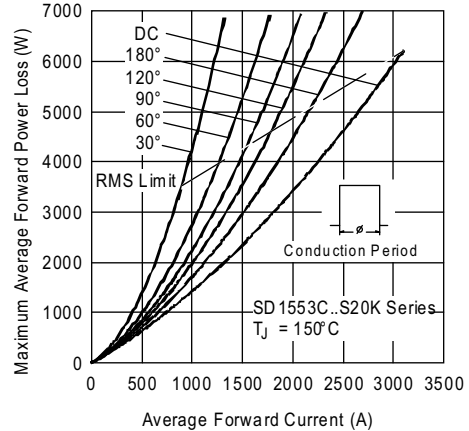


Fig. 10 - Forward Power Loss Characteristics

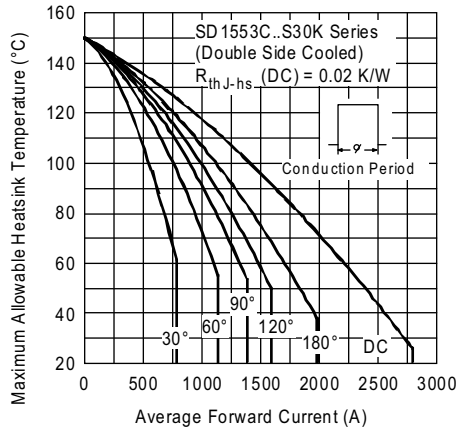


Fig. 8 - Current Ratings Characteristics

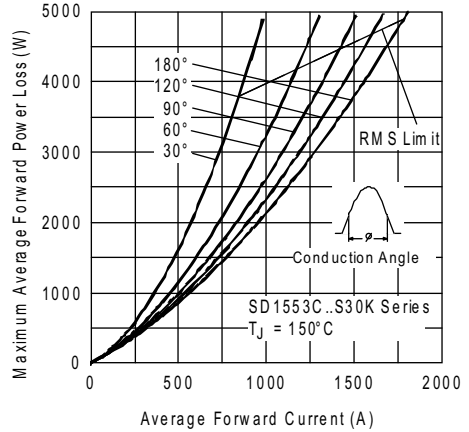


Fig. 11 - Forward Power Loss Characteristics

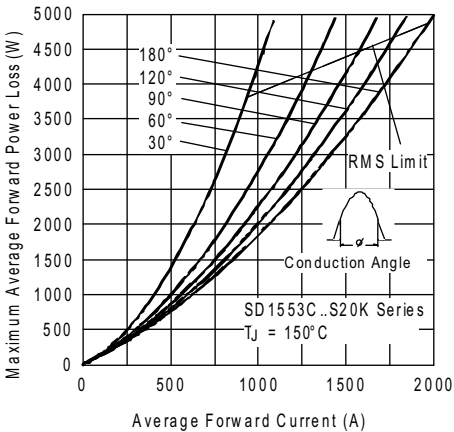


Fig. 9 - Forward Power Loss Characteristics

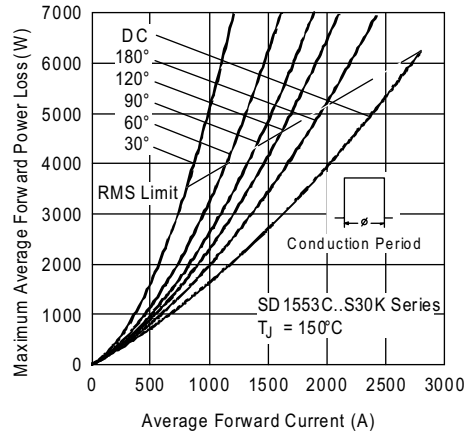


Fig. 12 - Forward Power Loss Characteristics

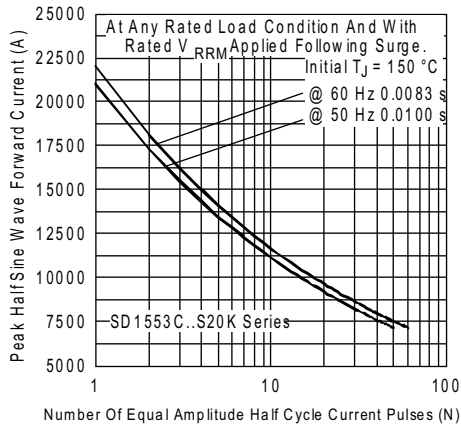


Fig. 13 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

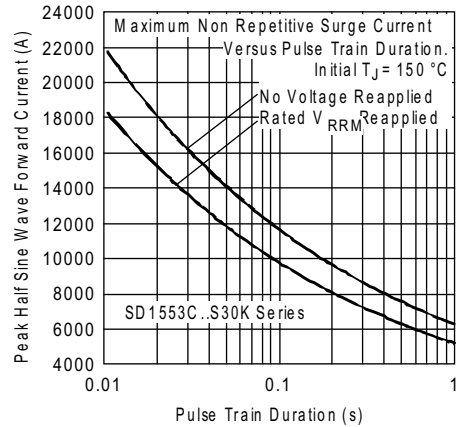


Fig. 16 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

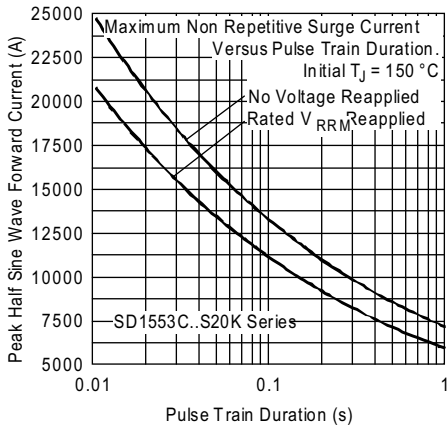


Fig. 14 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

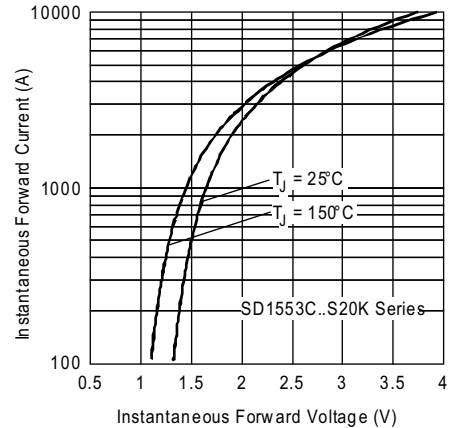


Fig. 17 - Forward Voltage Drop Characteristics

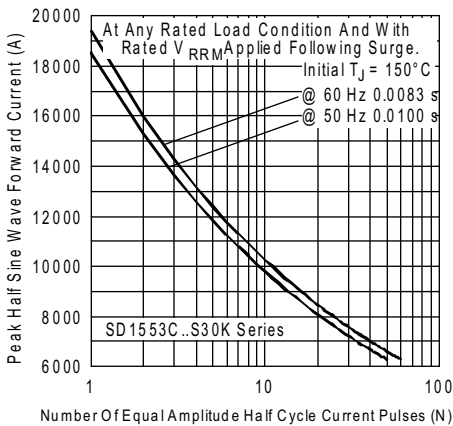


Fig. 15 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

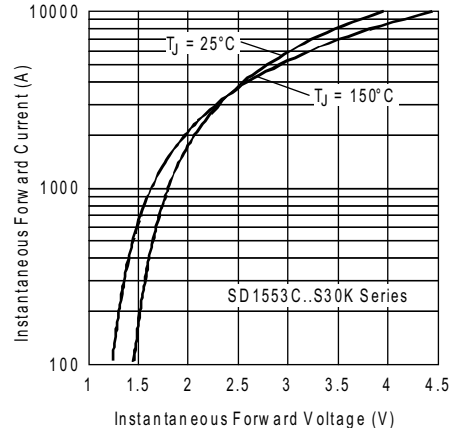


Fig. 18 - Forward Voltage Drop Characteristics

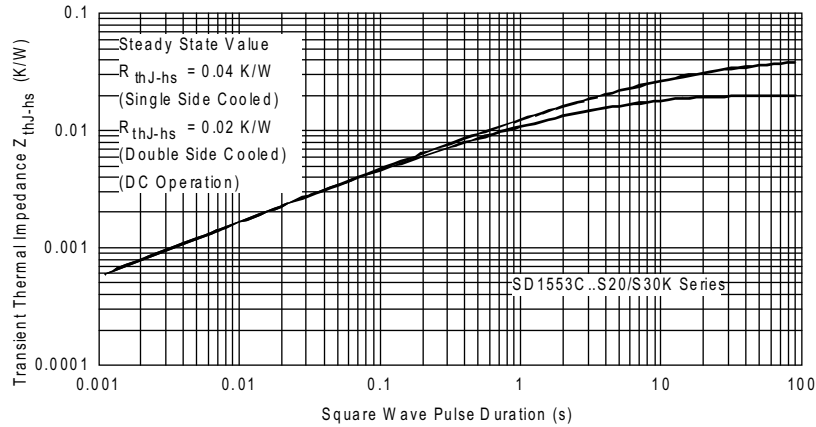


Fig. 19 - Thermal Impedance Z_{thJ-hs} Characteristic

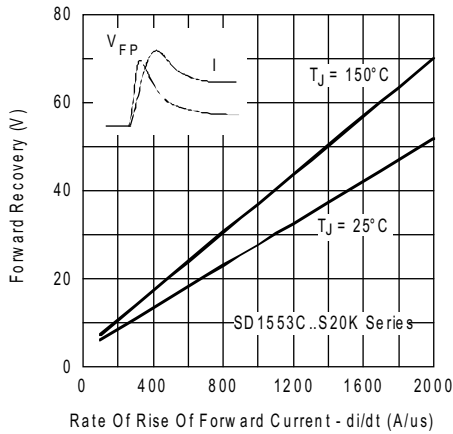


Fig. 20 - Typical Forward Recovery Characteristics

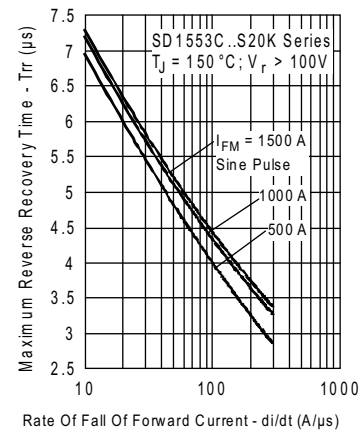


Fig. 22 - Recovery Time Characteristics

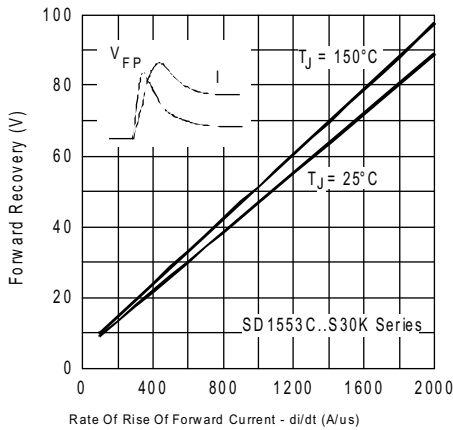


Fig. 21 - Typical Forward Recovery Characteristics

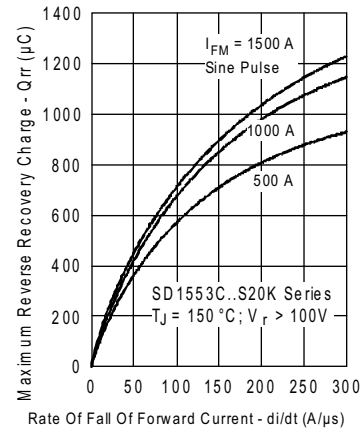


Fig. 23 - Recovery Charge Characteristics

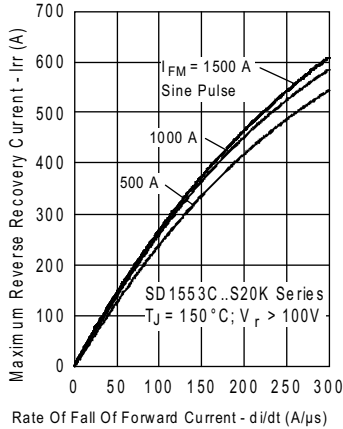


Fig. 24 - Recovery Current Characteristics

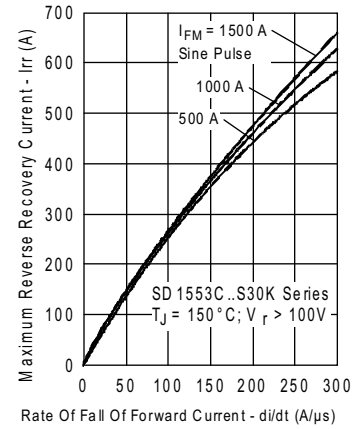


Fig. 27 - Recovery Current Characteristics

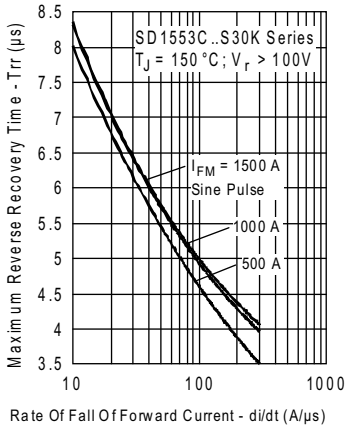


Fig. 25 - Recovery Time Characteristics

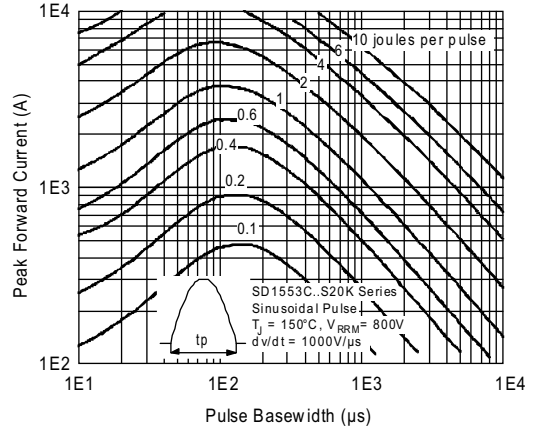


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

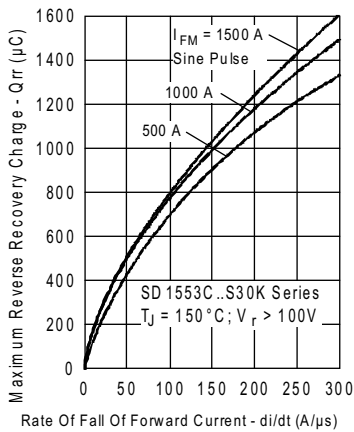


Fig. 26 - Recovery Charge Characteristics

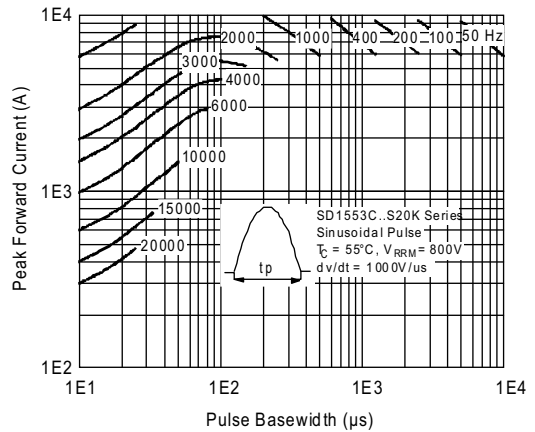


Fig. 29 - Frequency Characteristics

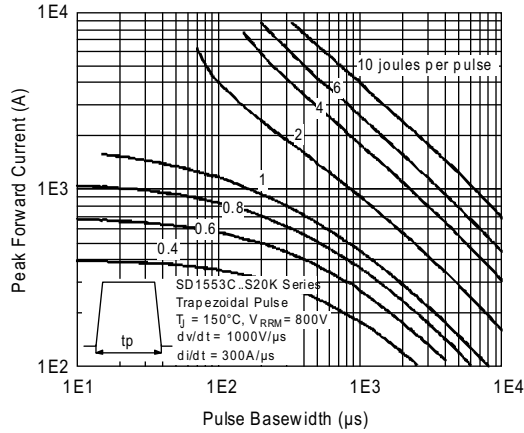


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

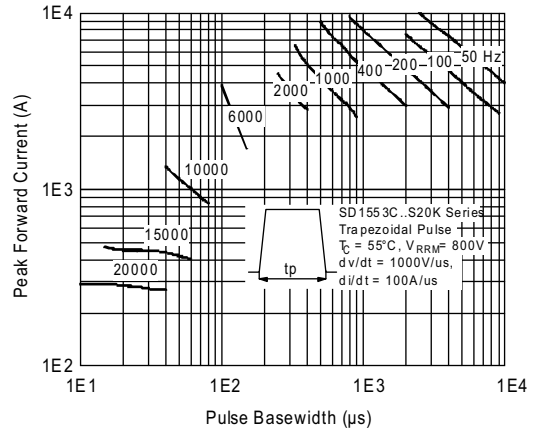


Fig. 33 - Frequency Characteristics

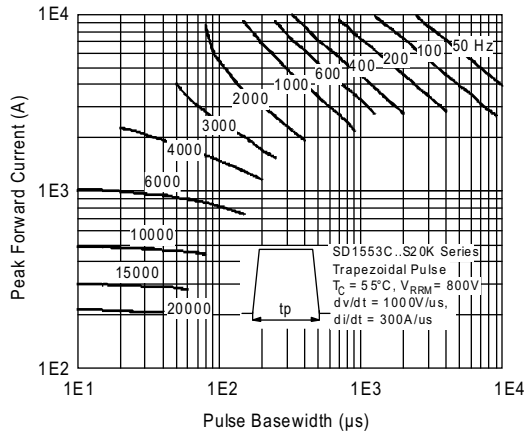


Fig. 31 - Frequency Characteristics

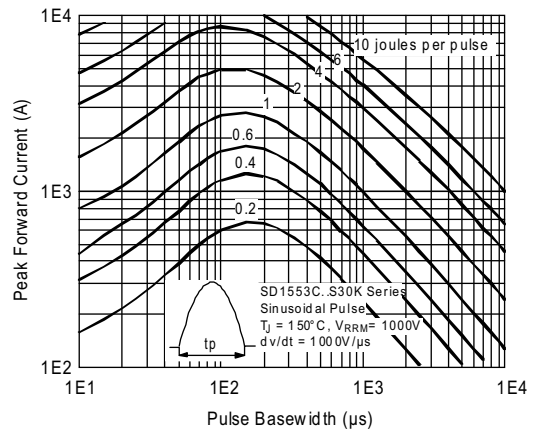


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

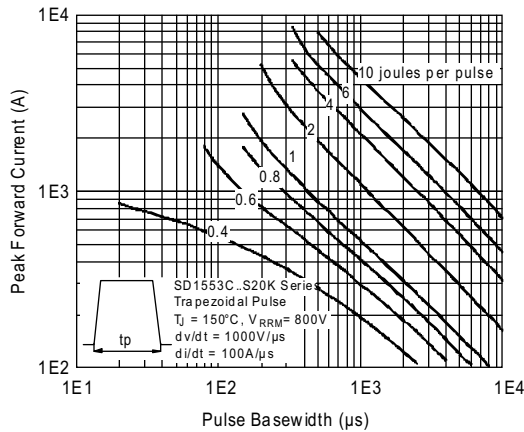


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

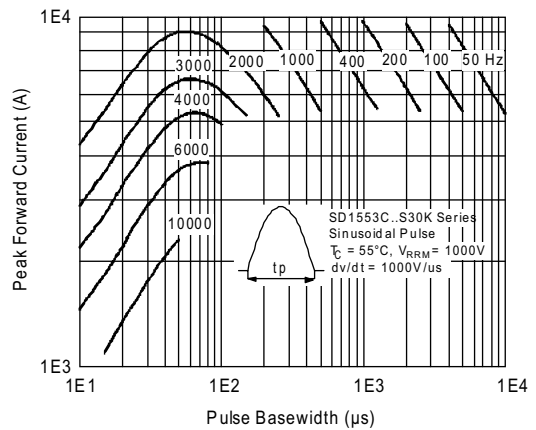


Fig. 35 - Frequency Characteristics

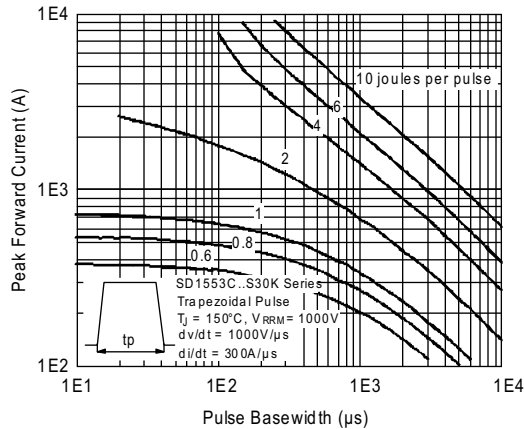


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

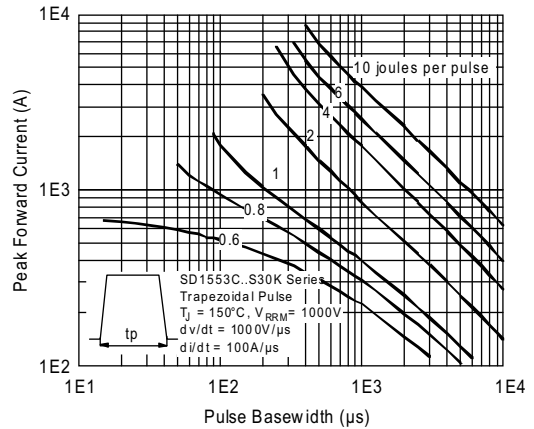


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

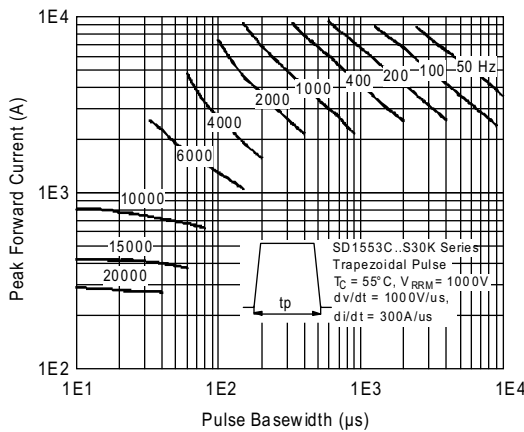


Fig. 37 - Frequency Characteristics

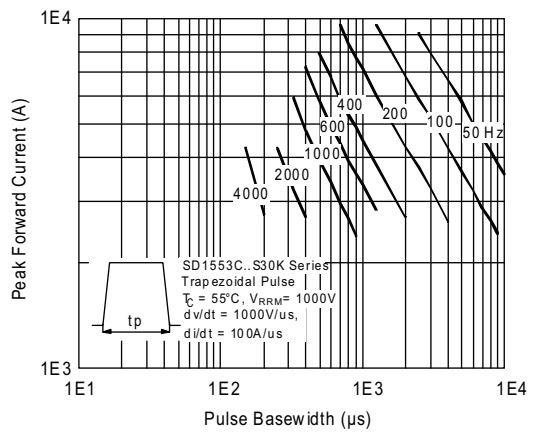


Fig. 39 - Frequency Characteristics

ORDERING INFORMATION TABLE

| | | | | | | | | | |
|-------------|------------|-----------|-------------------------------|----------|----------|-------------------------------|------------|----------|---|
| Device code | VS- | SD | 155 | 3 | C | 30 | S30 | K | |
| | 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 | 8 | - | K = PUK case K-PUK (DO-200AC) | | | |

LINKS TO RELATED DOCUMENTS

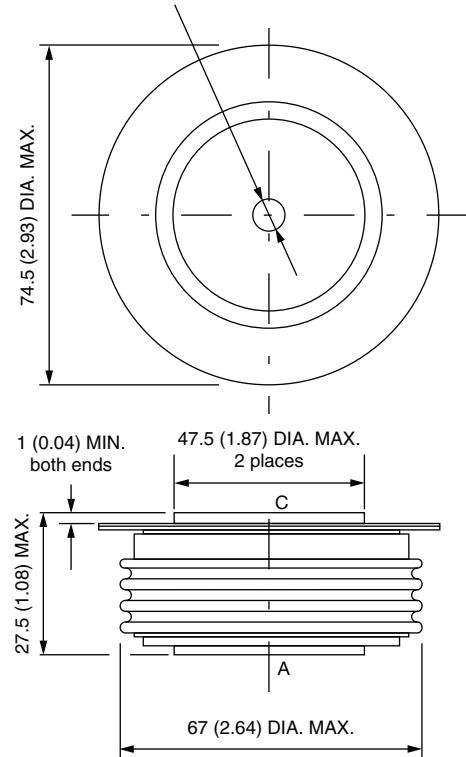
| | |
|------------|--|
| Dimensions | www.vishay.com/doc?95247 |
|------------|--|



K-PUK (DO-200AC)

DIMENSIONS in millimeters (inches)

3.5 (0.14) DIA. NOM. x
1.8 (0.07) deep MIN. both ends



Note:
A = Anode
C = Cathode

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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