

Fast Recovery Diodes (Hockey PUK Version), 920/1050 A



DO-200AB (B-PUK)

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® DO-200AB (B-PUK)
- Maximum junction temperature 150 °C
- Designed and qualified for industrial level
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

PRODUCT SUMMARY

| | |
|-----------------------|------------------|
| $I_{F(AV)}$ | 920 A to 1050 A |
| Package | DO-200AB (B-PUK) |
| 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 | SD1053C..L | | UNITS |
|--------------|-----------------|--------------|--------------|---------|
| | | S20 | S30 | |
| $I_{F(AV)}$ | | 1050 | 920 | A |
| | T_{hs} | 55 | 55 | °C |
| $I_{F(RMS)}$ | | 1940 | 1700 | A |
| I_{FSM} | 50 Hz | 15 000 | 13 000 | |
| | 60 Hz | 15 700 | 13 610 | |
| 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-SD1053C..S20L | 18 | 1800 | 1900 | 50 |
| | 22 | 2200 | 2300 | |
| | 25 | 2500 | 2600 | |
| VS-SD1053C..S30L | 18 | 1800 | 1900 | |
| | 22 | 2200 | 2300 | |
| | 25 | 2500 | 2600 | |
| | 28 | 2800 | 2900 | |
| | 30 | 3000 | 3100 | |



| FORWARD CONDUCTION | | | | | | |
|---|---------------|---|--|------------|-----------|--------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | SD1053C..L | | UNITS |
| | | | | S20 | S30 | |
| Maximum average forward current at heatsink temperature | $I_{F(AV)}$ | 180° conduction, half sine wave Double side (single side) cooled | | 1050 (450) | 920 (390) | A |
| | | | | 55 (85) | 55 (85) | °C |
| Maximum RMS forward current | $I_{F(RMS)}$ | 25 °C heatsink temperature double side cooled | | 1940 | 1700 | |
| Maximum peak, one-cycle forward, non-repetitive surge current | I_{FSM} | t = 10 ms t = 8.3 ms t = 10 ms t = 8.3 ms | No voltage reappplied 100 % V_{RRM} reappplied Sinusoidal half wave, initial $T_J = T_J$ maximum | 15 000 | 13 000 | A |
| | | | | 15 700 | 13 610 | |
| | | | | 12 620 | 10 930 | |
| | | | | 13 210 | 11 450 | |
| Maximum I^2t for fusing | I^2t | t = 10 ms t = 8.3 ms t = 10 ms t = 8.3 ms | No voltage reappplied 100 % V_{RRM} reappplied | 1125 | 845 | kA ² s |
| | | | | 1027 | 772 | |
| | | | | 796 | 598 | |
| | | | | 727 | 546 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reappplied | | 11 250 | 8450 | 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) | | 1.34 | 1.51 | V |
| High level value of threshold voltage | $V_{F(TO)2}$ | (I > $\pi \times I_{F(AV)}$, $T_J = T_J$ maximum) | | 1.48 | 1.67 | |
| 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) | | 0.37 | 0.50 | mΩ |
| High level value of forward slope resistance | r_{f2} | (I > $\pi \times I_{F(AV)}$, $T_J = T_J$ maximum) | | 0.33 | 0.45 | |
| Maximum forward voltage drop | V_{FM} | $I_{pk} = 1500$ A, $T_J = T_J$ maximum, $t_p = 10$ ms sinusoidal wave | | 1.90 | 2.26 | 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 | 4.0 | 400 | 180 | |
| S30 | 3.0 | | | | 4.5 | 550 | 230 | |

| 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 | 0.073 | K/W |
| | | DC operation double side cooled | 0.031 | |
| Mounting force, ± 10 % | | | 14 700 (1500) | N (kg) |
| Approximate weight | | | 255 | g |
| Case style | | See dimensions - link at the end of datasheet | DO-200AB (B-PUK) | |

| ΔR_{thJ-hs} CONDUCTION | | | | | | |
|--------------------------------|-----------------------|-------------|------------------------|-------------|---------------------|-------|
| CONDUCTION ANGLE | SINUSOIDAL CONDUCTION | | RECTANGULAR CONDUCTION | | TEST CONDITIONS | UNITS |
| | SINGLE SIDE | DOUBLE SIDE | SINGLE SIDE | DOUBLE SIDE | | |
| 180° | 0.009 | 0.008 | 0.006 | 0.006 | $T_J = T_J$ maximum | K/W |
| 120° | 0.011 | 0.011 | 0.011 | 0.011 | | |
| 90° | 0.014 | 0.014 | 0.015 | 0.015 | | |
| 60° | 0.020 | 0.021 | 0.021 | 0.022 | | |
| 30° | 0.036 | 0.036 | 0.036 | 0.036 | | |

Note

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

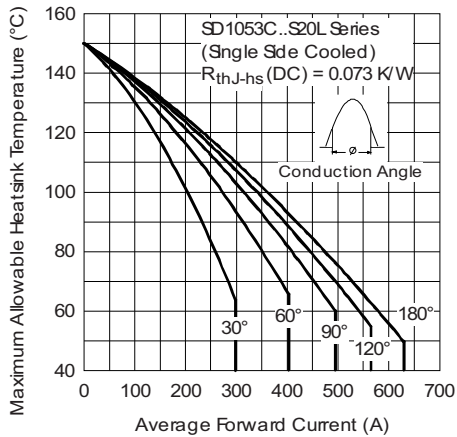


Fig. 1 - Current Ratings Characteristics

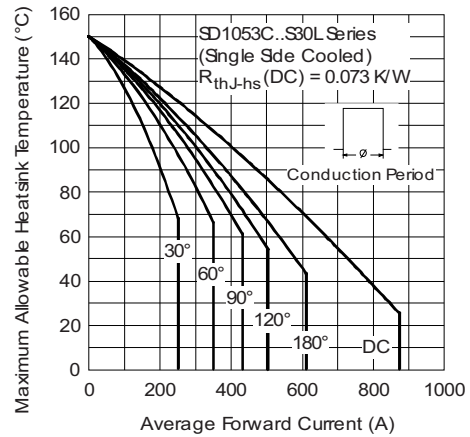


Fig. 4 - Current Ratings Characteristics

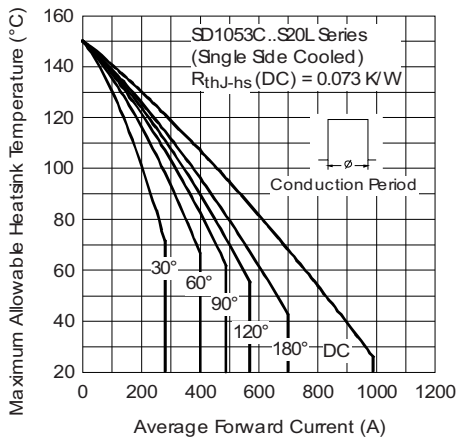


Fig. 2 - Current Ratings Characteristics

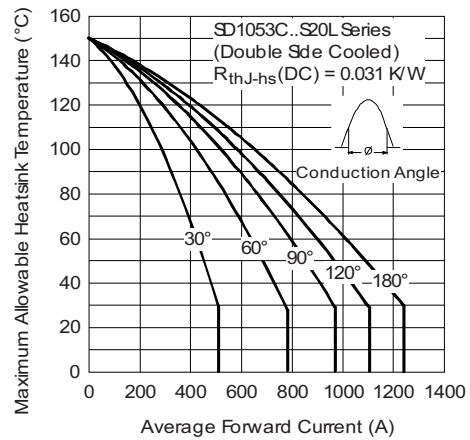


Fig. 5 - Current Ratings Characteristics

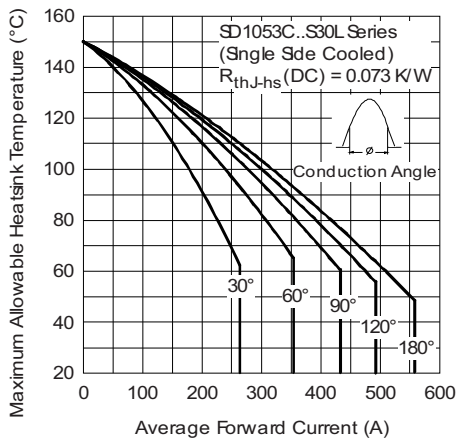


Fig. 3 - Current Ratings Characteristics

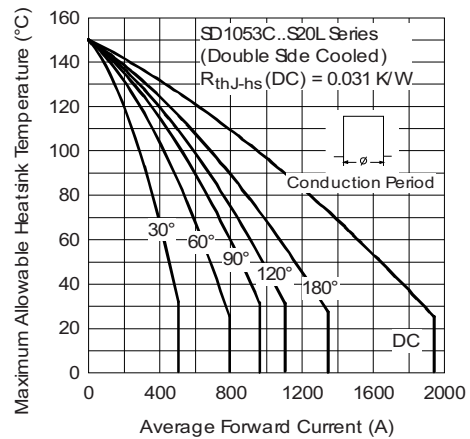


Fig. 6 - Current Ratings Characteristics

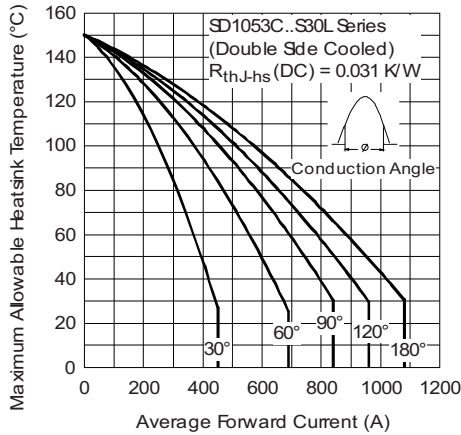


Fig. 7 - Current Ratings Characteristics

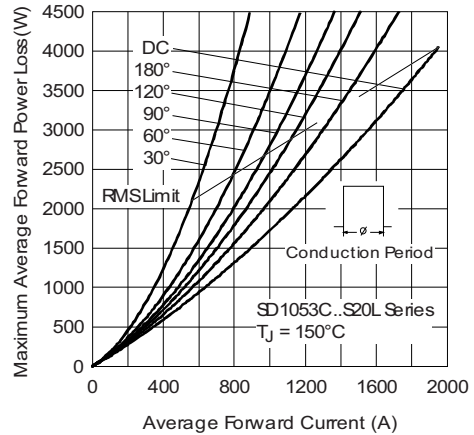


Fig. 10 - Forward Power Loss Characteristics

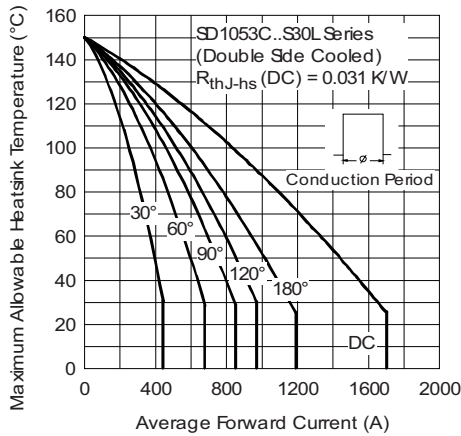


Fig. 8 - Current Ratings Characteristics

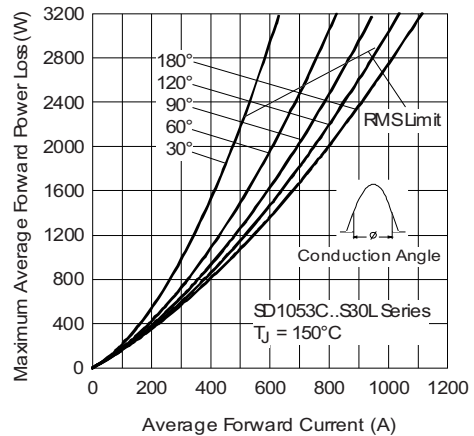


Fig. 11 - Forward Power Loss Characteristics

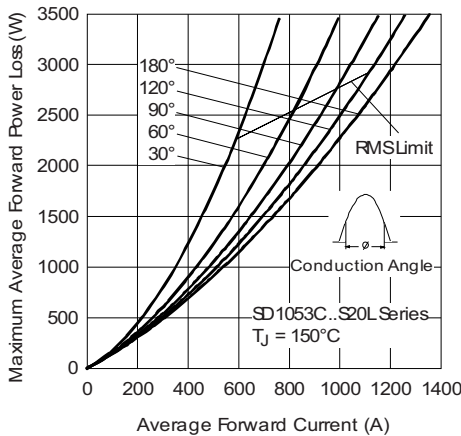


Fig. 9 - Forward Power Loss Characteristics

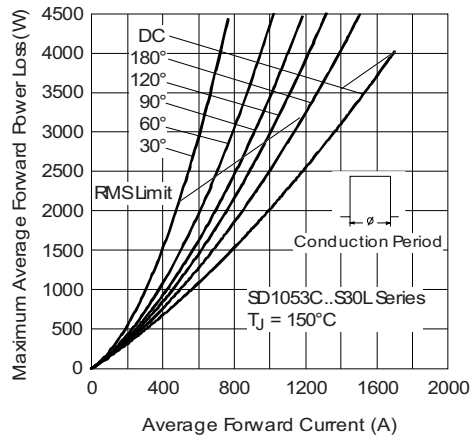


Fig. 12 - Forward Power Loss Characteristics

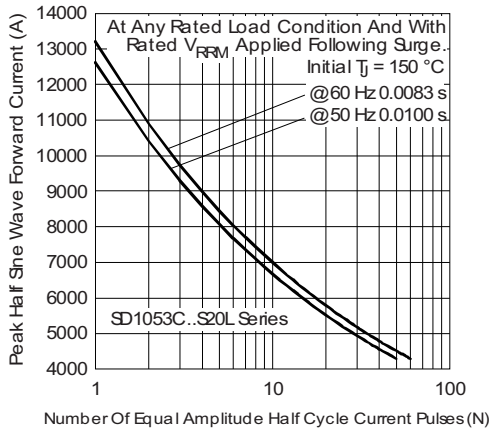


Fig. 13 - Maximum Non-Repetitive Surge Current

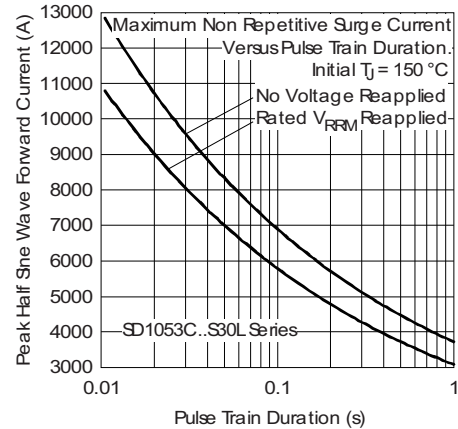


Fig. 16 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

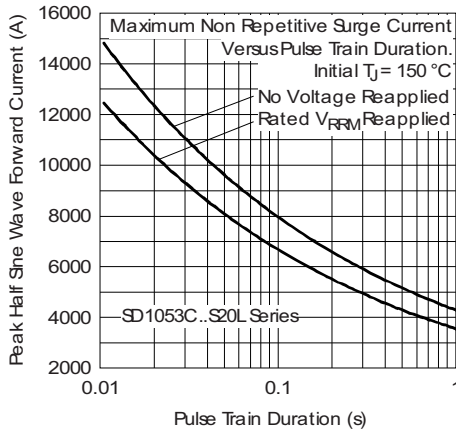


Fig. 14 - Maximum Non-Repetitive Surge Current

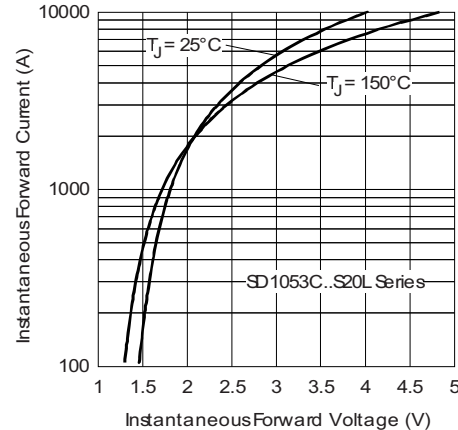


Fig. 17 - Forward Voltage Drop Characteristics

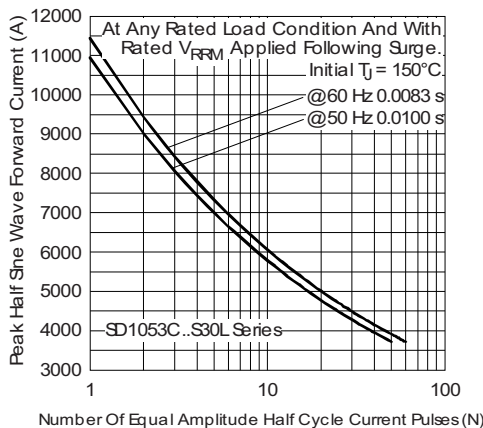


Fig. 15 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

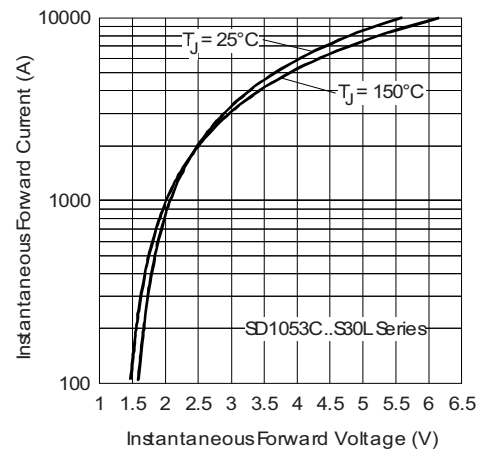


Fig. 18 - Forward Voltage Drop Characteristics

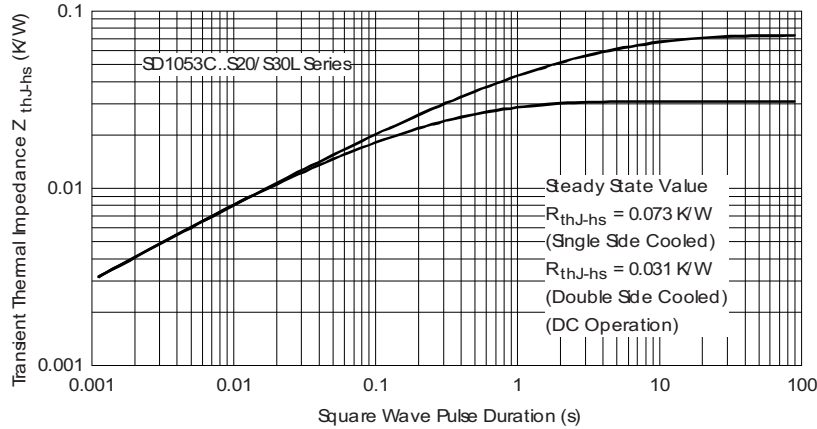


Fig. 19 - Thermal Impedance Z_{thJ-hs} Characteristic

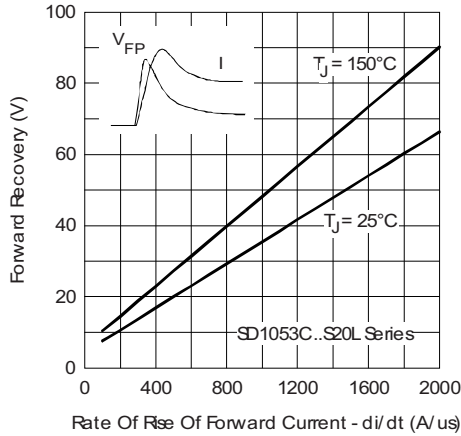


Fig. 20 - Typical Forward Recovery Characteristics

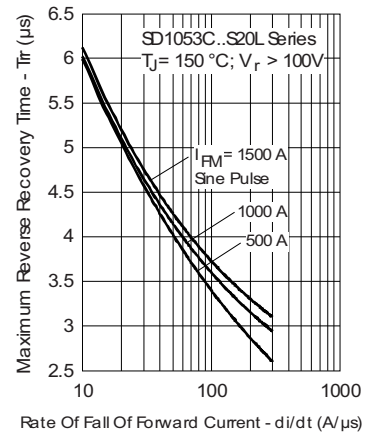


Fig. 22 - Recovery Time Characteristics



Fig. 21 - Typical Forward Recovery Characteristics

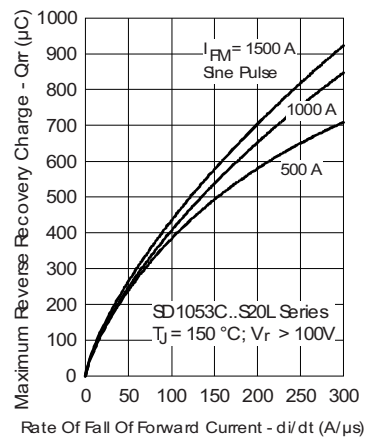


Fig. 23 - Recovery Charge Characteristics



Fig. 24 - Recovery Current Characteristics



Fig. 27 - Recovery Current Characteristics

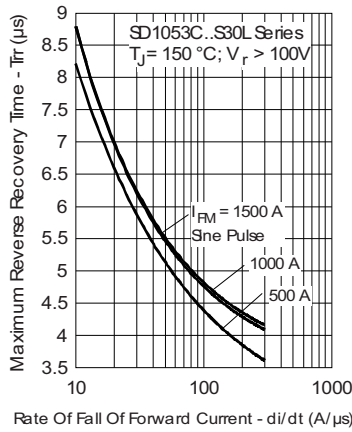


Fig. 25 - Recovery Time Characteristics

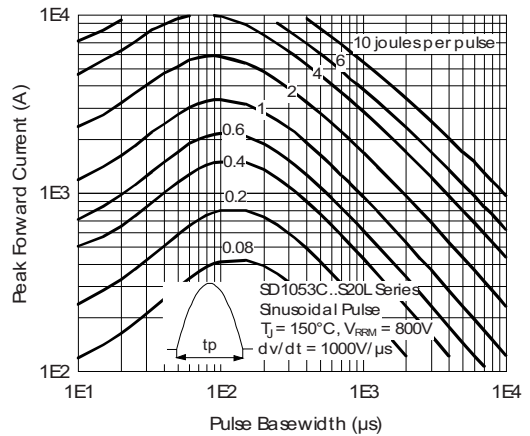


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics



Fig. 26 - Recovery Charge Characteristics

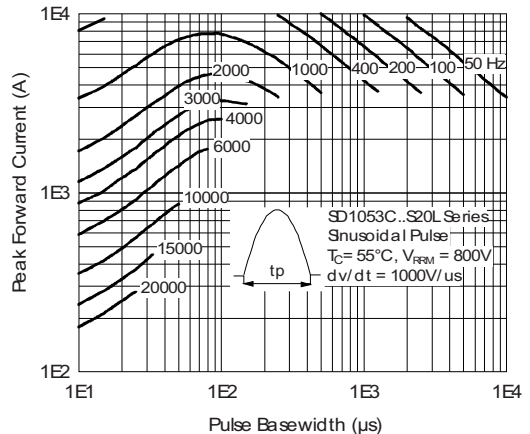


Fig. 29 - Frequency Characteristics

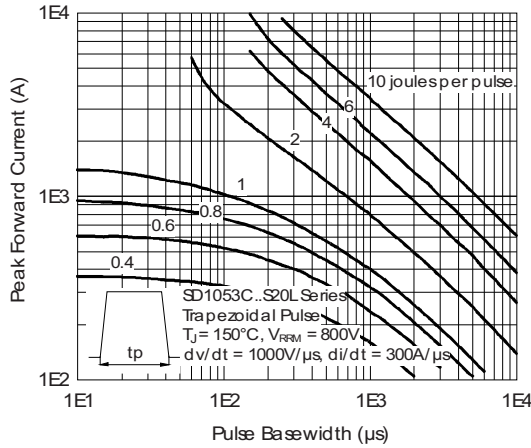


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

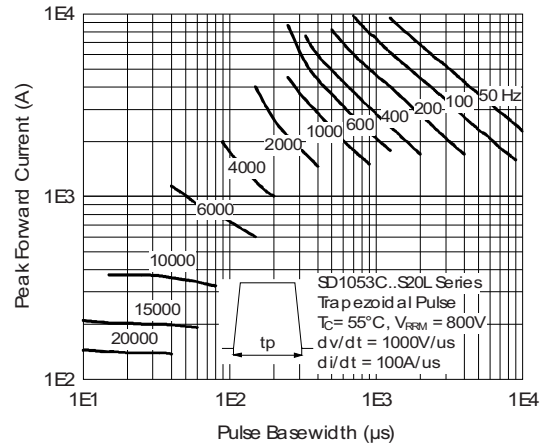


Fig. 33 - Frequency Characteristics

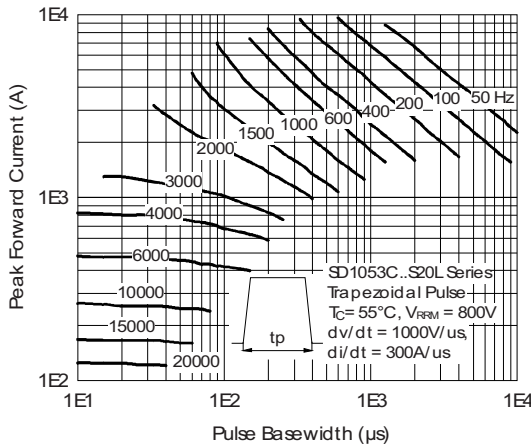


Fig. 31 - Frequency Characteristics

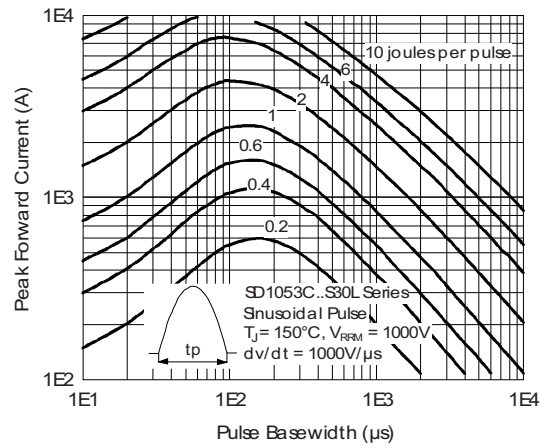


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

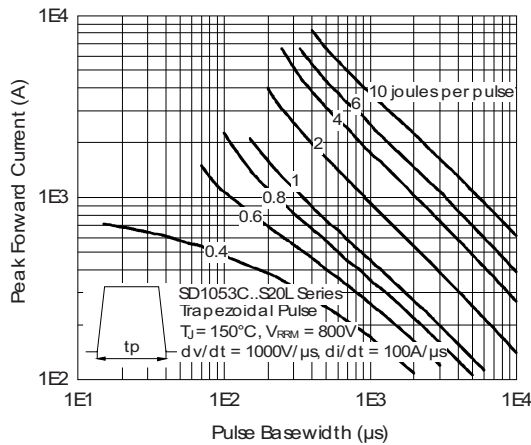


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

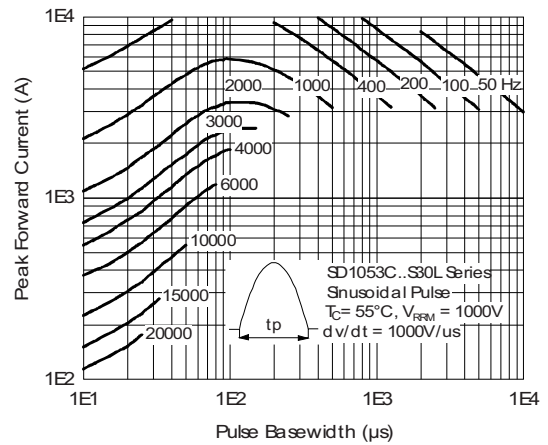


Fig. 35 - Frequency Characteristics

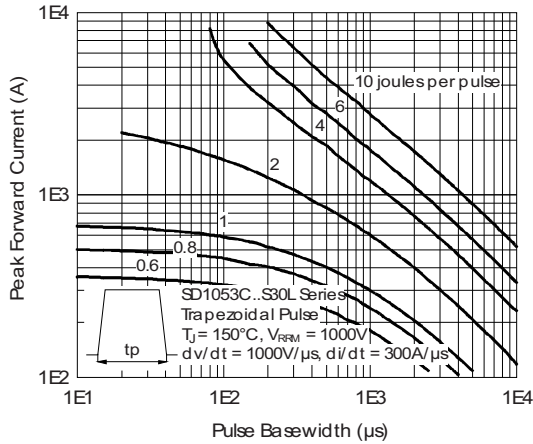


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

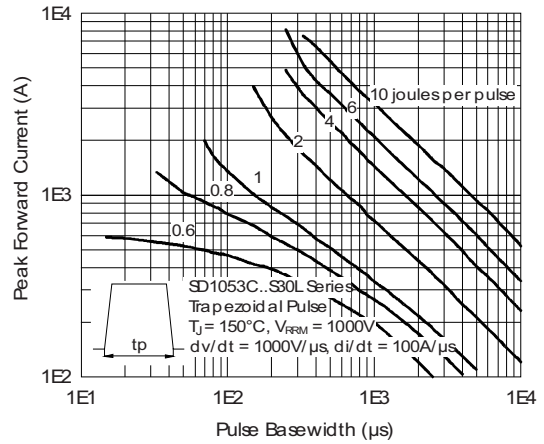


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

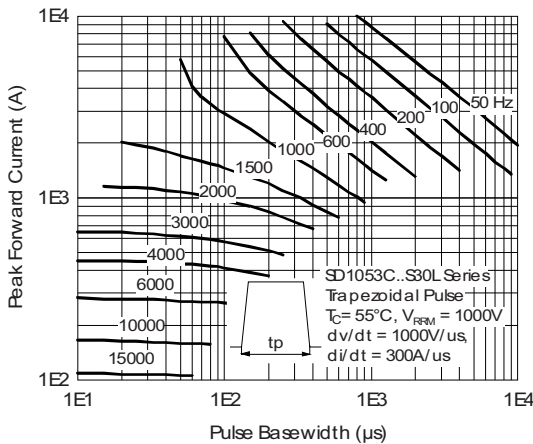


Fig. 37 - Frequency Characteristics



Fig. 39 - Frequency Characteristics

ORDERING INFORMATION TABLE

| | | | | | | | | |
|-------------|------------|-----------|------------|----------|----------|-----------|------------|----------|
| Device code | VS- | SD | 105 | 3 | C | 30 | S30 | L |
|-------------|------------|-----------|------------|----------|----------|-----------|------------|----------|

- 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_{tr} code
- 8** - L = PUK case DO-200AB (B-PUK)

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95246 |

DO-200AB (B-PUK)

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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