



Surface Mount Power Voltage-Regulating Diodes

eSMP™ Series



DO-220AA (SMP)

| PRIMARY CHARACTERISTICS | |
|-------------------------|-------------------------------|
| V_Z | 5.6 V to 43 V |
| P_D | 1.5 W at $T_L = 75\text{ °C}$ |
| P_D | 0.5 W at $T_A = 25\text{ °C}$ |
| T_J max. | 150 °C |

TYPICAL APPLICATIONS

For general purpose regulation and protection applications.

FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Low Zener impedance
- Low regulation factor
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**



RoHS
COMPLIANT
HALOGEN
FREE

MECHANICAL DATA

Case: DO-220AA (SMP)

Molding compound meets UL 94 V-0 flammability rating.

Base P/N-M3 - halogen-free and RoHS compliant, commercial grade

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 1A whisker test

Polarity: Color band denotes cathode end

| MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted) | | | |
|--|----------------|---------------|------|
| PARAMETER | SYMBOL | VALUE | UNIT |
| Power dissipation at $T_L = 75\text{ °C}$ (fig. 1) | $P_D^{(1)}$ | 1.5 | W |
| Power dissipation at $T_A = 25\text{ °C}$ (fig. 1) | $P_D^{(2)}$ | 0.5 | W |
| Maximum instantaneous forward voltage at 200 mA for all types | $V_F^{(3)}$ | 1.5 | V |
| Operating junction and storage temperature range | T_J, T_{STG} | - 65 to + 150 | °C |

Notes

(1) Mounted on PCB with 5.0 mm x 5.0 mm copper pads attached to each terminal

(2) Mounted on minimum recommended pad layout

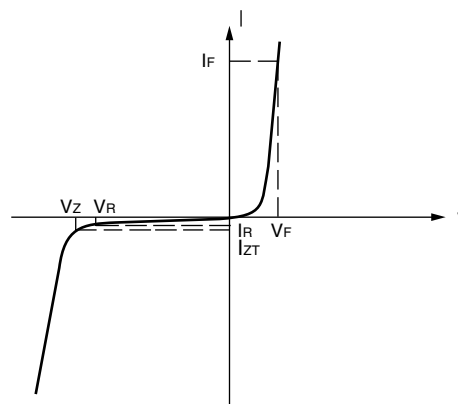
(3) Pulse test: 300 μ s pulse width, 1 % duty cycle

SMPZ3919B thru SMPZ3940B



Vishay General Semiconductor

| ELECTRICAL CHARACTERISTICS | |
|----------------------------|-------------------------------------|
| SYMBOL | PARAMETER |
| V_Z | Reverse Zener voltage at I_{ZT} |
| I_{ZT} | Reverse current |
| Z_{ZT} | Maximum Zener impedance at I_{ZT} |
| I_{ZK} | Reverse current |
| Z_{ZK} | Maximum Zener impedance at I_{ZK} |
| I_R | Reverse leakage current at V_R |
| V_R | Reverse voltage |
| I_F | Forward current |
| V_F | Forward voltage at I_F |
| I_{ZM} | Maximum DC Zener current |



Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

| PART NUMBER | DEVICE MARKING CODE | ZENER VOLTAGE V_Z AT I_{ZT} (V) | | | TEST CURRENT I_{ZT} (mA) | MAXIMUM ZENER IMPEDANCE | | | MAXIMUM REVERSE LEAKAGE CURRENT I_R AT V_R | | MAXIMUM ZENER CURRENT I_{ZM} (mA) |
|-------------|---------------------|-------------------------------------|------|------|----------------------------|-------------------------|------------|----------------------|--|--------------|-------------------------------------|
| | | MIN. | NOM. | MAX. | | Z_{ZT} AT I_{ZT} | | Z_{ZK} AT I_{ZK} | (μA) | (V) | |
| | | | | | | (Ω) | (Ω) | | | | |
| SMPZ3919B | 19B | 5.32 | 5.6 | 5.88 | 66.9 | 5.0 | 700 | 1.0 | 200 | 3.0 | 268 |
| SMPZ3920B | 20B | 5.89 | 6.2 | 6.51 | 60.5 | 2.0 | 700 | 1.0 | 200 | 4.0 | 242 |
| SMPZ3921B | 21B | 6.46 | 6.8 | 7.14 | 55.1 | 2.5 | 400 | 1.0 | 200 | 5.2 | 221 |
| SMPZ3922B | 22B | 7.12 | 7.5 | 7.88 | 50.0 | 3.0 | 400 | 0.5 | 150 | 6.0 | 200 |
| SMPZ3923B | 23B | 7.79 | 8.2 | 8.61 | 45.7 | 3.5 | 400 | 0.5 | 50 | 6.5 | 183 |
| SMPZ3924B | 24B | 8.64 | 9.1 | 9.56 | 41.2 | 4.0 | 500 | 0.5 | 10 | 7.0 | 165 |
| SMPZ3925B | 25B | 9.5 | 10 | 10.5 | 37.5 | 4.5 | 500 | 0.25 | 2.5 | 8.0 | 150 |
| SMPZ3926B | 26B | 10.5 | 11 | 11.6 | 34.1 | 5.5 | 550 | 0.25 | 0.5 | 8.4 | 136 |
| SMPZ3927B | 27B | 11.4 | 12 | 12.6 | 31.2 | 6.5 | 550 | 0.25 | 0.5 | 9.1 | 125 |
| SMPZ3928B | 28B | 12.4 | 13 | 13.7 | 28.8 | 7.0 | 550 | 0.25 | 0.5 | 9.9 | 115 |
| SMPZ3929B | 29B | 14.3 | 15 | 15.8 | 25.0 | 9.0 | 600 | 0.25 | 0.5 | 11.4 | 100 |
| SMPZ3930B | 30B | 15.2 | 16 | 16.8 | 23.4 | 10.0 | 600 | 0.25 | 0.5 | 12.2 | 94 |
| SMPZ3931B | 31B | 17.1 | 18 | 18.9 | 20.8 | 12.0 | 650 | 0.25 | 0.5 | 13.7 | 83 |
| SMPZ3932B | 32B | 19.0 | 20 | 21.0 | 18.7 | 14.0 | 650 | 0.25 | 0.5 | 15.2 | 75 |
| SMPZ3933B | 33B | 20.9 | 22 | 23.1 | 17.0 | 17.5 | 650 | 0.25 | 0.5 | 16.7 | 68 |
| SMPZ3934B | 34B | 22.8 | 24 | 25.2 | 15.6 | 19.0 | 700 | 0.25 | 0.5 | 18.2 | 63 |
| SMPZ3935B | 35B | 25.7 | 27 | 28.4 | 13.9 | 23.0 | 700 | 0.25 | 0.5 | 20.6 | 56 |
| SMPZ3936B | 36B | 28.5 | 30 | 31.5 | 12.5 | 26.0 | 750 | 0.25 | 0.5 | 22.8 | 50 |
| SMPZ3937B | 37B | 31.4 | 33 | 34.7 | 11.4 | 33.0 | 800 | 0.25 | 0.5 | 25.1 | 45 |
| SMPZ3938B | 38B | 34.2 | 36 | 37.8 | 10.4 | 38.0 | 850 | 0.25 | 0.5 | 27.4 | 42 |
| SMPZ3939B | 39B | 37.1 | 39 | 41.0 | 9.6 | 45.0 | 900 | 0.25 | 0.5 | 29.7 | 38 |
| SMPZ3940B | 40B | 40.9 | 43 | 45.2 | 8.7 | 53.0 | 950 | 0.25 | 0.5 | 32.7 | 35 |

THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

| PARAMETER | SYMBOL | LIMIT | UNIT |
|---|-----------------------|-------|--------------------|
| Typical thermal resistance, junction to lead | $R_{\theta JL}^{(1)}$ | 50 | $^\circ\text{C/W}$ |
| Typical thermal resistance, junction to ambient | $R_{\theta JA}^{(2)}$ | 250 | $^\circ\text{C/W}$ |

Notes

⁽¹⁾ Mounted on PCB with 5.0 mm x 5.0 mm copper pads attached to each terminal

⁽²⁾ Mounted on minimum recommended pad layout



| ORDERING INFORMATION (Example) | | | | |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| SMPZ3925B-M3/84A | 0.024 | 84A | 3000 | 7" diameter plastic tape and reel |
| SMPZ3925B-M3/85A | 0.024 | 85A | 10 000 | 13" diameter plastic tape and reel |

RATINGS AND CHARACTERISTICS CURVES

($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

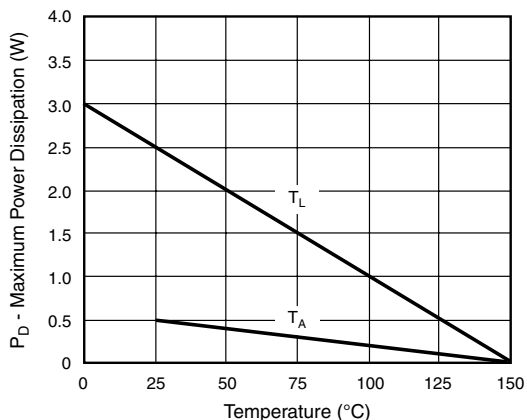


Figure 1. Steady State Power Durlating

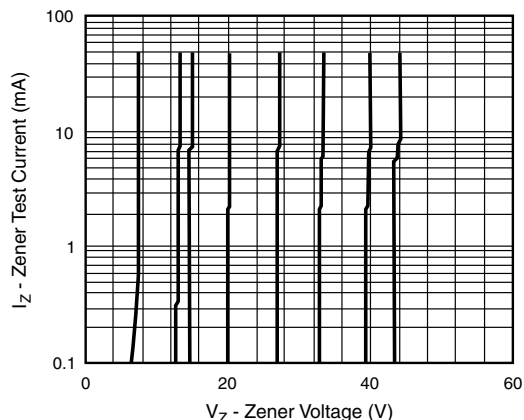


Figure 3. Typical Zener Voltage

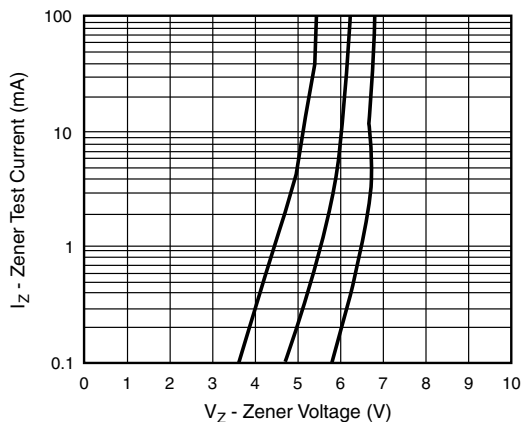


Figure 2. Typical Zener Voltage

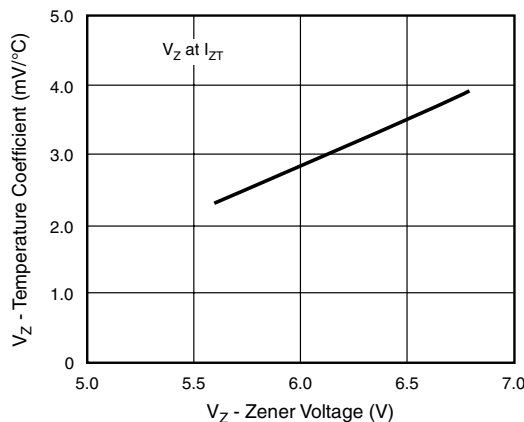


Figure 4. Typical Temperature Coefficients

SMPZ3919B thru SMPZ3940B



Vishay General Semiconductor

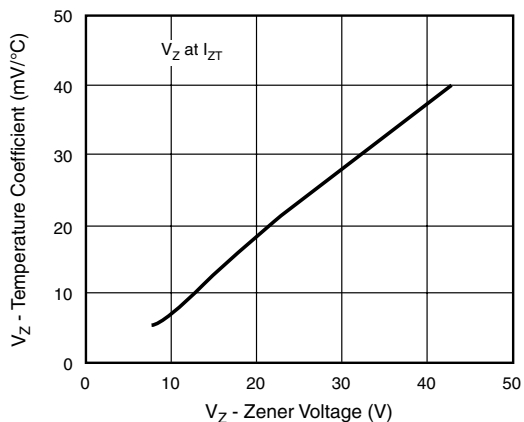


Figure 5. Typical Temperature Coefficients

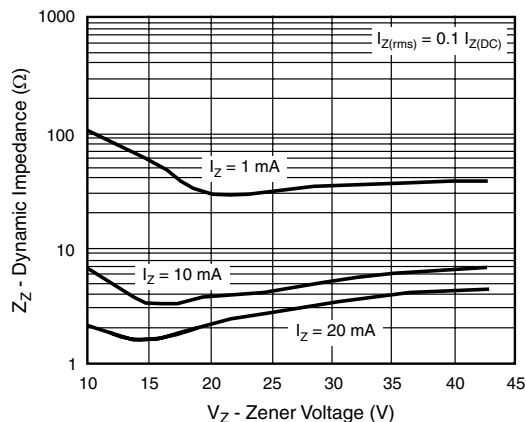


Figure 7. Typical Zener Impedance

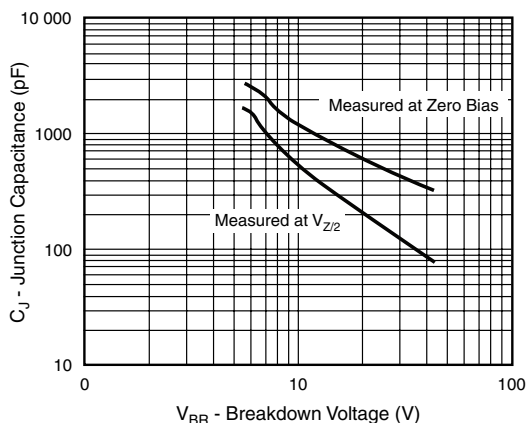
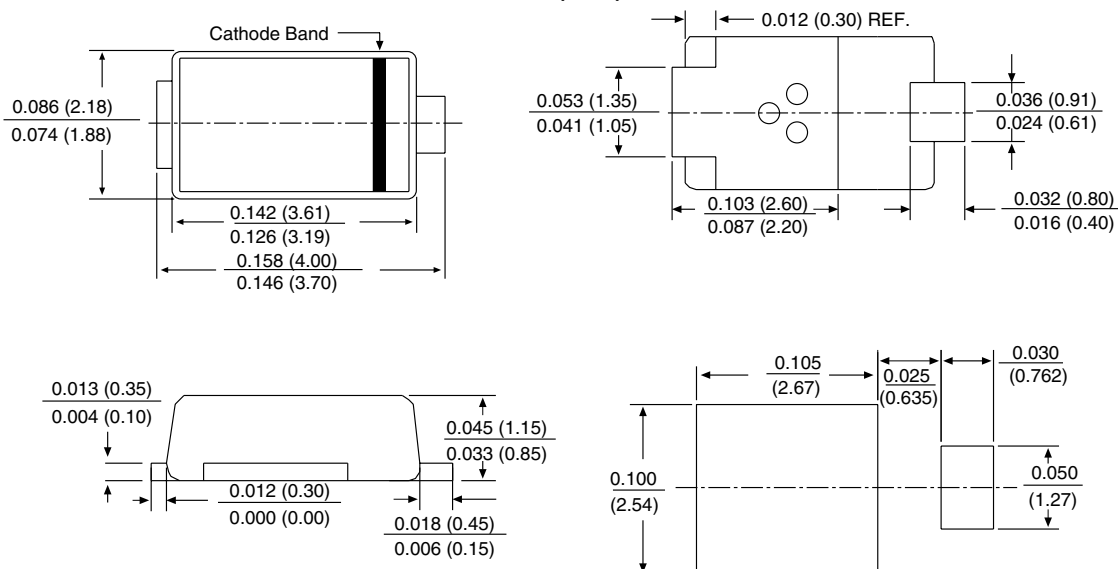


Figure 6. Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-220AA (SMP)





Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.