

## Surface Mount Power Voltage-Regulating Diodes

### eSMP® Series


**SMP (DO-220AA)**

Anode Cathode

### DESIGN SUPPORT TOOLS

[click logo to get started](#)

| PRIMARY CHARACTERISTICS           |                |
|-----------------------------------|----------------|
| $V_Z$ nom.                        | 4.2 V to 38 V  |
| $P_{tot}$ at $T_L = 75\text{ °C}$ | 1500 mW        |
| $P_{tot}$ at $T_L = 25\text{ °C}$ | 600 mW         |
| $T_J$ max.                        | 150 °C         |
| $V_Z$ specification               | Pulse current  |
| Package                           | SMP (DO-220AA) |
| Circuit configuration             | Single         |

### FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Low Zener impedance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
 COMPLIANT  
 HALOGEN  
**FREE**

### TYPICAL APPLICATIONS

For general purpose regulation, industrial, and protection applications.

### MECHANICAL DATA

**Case:** SMP (DO-220AA)

Molding compound meets UL 94 V-0 flammability rating  
 Base P/N-M3 - halogen-free, RoHS-compliant, and industrial 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

| PACKAGE        |        |                                      |                                   |                          |
|----------------|--------|--------------------------------------|-----------------------------------|--------------------------|
| PACKAGE NAME   | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL        | SOLDERING CONDITIONS     |
| SMP (DO-220AA) | 24 mg  | UL 94 V-0                            | MSL level 1 (according J-STD-020) | 260 °C/10 s at terminals |

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)               |           |             |      |
|--|-----------|-------------|------|
| PARAMETER  | SYMBOL    | VALUE       | UNIT |
| Power dissipation at $T_L = 75\text{ °C}$ (fig. 1) <sup>(1)</sup>            | $P_{tot}$ | 1500        | mW   |
| Power dissipation at $T_A = 25\text{ °C}$ (fig. 1) <sup>(2)</sup>            | $P_{tot}$ | 600         | mW   |
| Maximum instantaneous forward voltage at 200 mA for all types <sup>(3)</sup> | $V_F$     | 1.5         | V    |
| Operating junction temperature   | $T_J$     | 150         | °C   |
| Storage temperature range  | $T_{STG}$ | -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  $\mu$ s pulse width, 1 % duty cycle



| ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                     |                     |      |      |              |                                 |                                 |      |
|---|---------------------|---------------------|------|------|--------------|---------------------------------|---------------------------------|------|
| PART NUMBER   | DEVICE MARKING CODE | ZENER VOLTAGE RANGE |      |      | TEST CURRENT | MAXIMUM ZENER DYNAMIC IMPEDANCE | MAXIMUM REVERSE LEAKAGE CURRENT |      |
|   |                     | $V_Z$ AT $I_{ZT}$   |      |      | $I_{ZT}$     | $Z_{ZT}$ AT $I_{ZT}$            | $I_R$ at $V_R$                  |      |
|   |                     | V                   |      |      | mA           | $\Omega$                        | $\mu\text{A}$                   | V    |
|   |                     | MIN.                | NOM. | MAX. |              | MAX.                            | MAX.                            |      |
| PTV 3.9B  | VB                  | 3.9                 | 4.2  | 4.4  | 40           | 15                              | 20                              | 1.0  |
| PTV 4.3B  | VC                  | 4.3                 | 4.6  | 4.8  | 40           | 15                              | 20                              | 1.0  |
| PTV 4.7B  | VD                  | 4.7                 | 5.0  | 5.2  | 40           | 10                              | 20                              | 1.0  |
| PTV 5.1B  | VE                  | 5.1                 | 5.4  | 5.7  | 40           | 8                               | 20                              | 1.0  |
| PTV 5.6B  | VF                  | 5.6                 | 6.0  | 6.3  | 40           | 8                               | 20                              | 1.5  |
| PTV 6.2B  | VG                  | 6.2                 | 6.6  | 7.0  | 40           | 6                               | 20                              | 3.0  |
| PTV 6.8B  | VH                  | 6.8                 | 7.3  | 7.7  | 40           | 6                               | 50                              | 3.5  |
| PTV 7.5B  | VI                  | 7.5                 | 8.0  | 8.4  | 40           | 4                               | 20                              | 4.0  |
| PTV 8.2B  | VJ                  | 8.2                 | 8.8  | 9.3  | 40           | 4                               | 20                              | 5.0  |
| PTV 9.1B  | VK                  | 9.1                 | 9.7  | 10.2 | 40           | 6                               | 20                              | 6.0  |
| PTV 10B   | VL                  | 10.0                | 10.6 | 11.2 | 40           | 6                               | 10                              | 7.0  |
| PTV 11B   | VM                  | 11.0                | 11.7 | 12.3 | 20           | 8                               | 10                              | 8.0  |
| PTV 12B   | VN                  | 12.0                | 12.8 | 13.5 | 20           | 8                               | 10                              | 9.0  |
| PTV 13B   | VO                  | 13.3                | 14.2 | 15.0 | 20           | 10                              | 10                              | 10.0 |
| PTV 15B   | VP                  | 14.7                | 15.6 | 16.5 | 20           | 10                              | 10                              | 11.0 |
| PTV 16B   | VQ                  | 16.2                | 17.3 | 18.3 | 20           | 12                              | 10                              | 12.0 |
| PTV 18B   | VR                  | 18.0                | 19.2 | 20.3 | 20           | 12                              | 10                              | 13.0 |
| PTV 20B   | VS                  | 20.0                | 21.2 | 22.4 | 20           | 14                              | 10                              | 15.0 |
| PTV 22B   | VT                  | 22.0                | 23.3 | 24.5 | 10           | 14                              | 10                              | 17.0 |
| PTV 24B   | VU                  | 24.0                | 25.8 | 27.6 | 10           | 16                              | 10                              | 19.0 |
| PTV 27B   | VV                  | 27.0                | 28.9 | 30.8 | 10           | 16                              | 10                              | 21.0 |
| PTV 30B   | VX                  | 30.0                | 32.0 | 34.0 | 10           | 18                              | 10                              | 23.0 |
| PTV 33B   | VY                  | 33.0                | 35.0 | 37.0 | 10           | 18                              | 10                              | 25.0 |
| PTV 36B   | VZ                  | 36.0                | 38.0 | 40.0 | 10           | 20                              | 10                              | 27.0 |

| THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                 |       |                    |
|--|-----------------|-------|--------------------|
| PARAMETER  | SYMBOL          | LIMIT | UNIT               |
| Typical thermal resistance, junction to lead <sup>(1)</sup>                        | $R_{\theta JL}$ | 50    | $^\circ\text{C/W}$ |
| Typical thermal resistance, junction to ambient <sup>(2)</sup>                     | $R_{\theta JA}$ | 208   | $^\circ\text{C/W}$ |

**Notes**

- (1) Mounted on PCB with 5.0 mm x 5.0 mm copper pad areas 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                      |
| PTV7.5B-M3/84A                 | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| PTV7.5B-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)

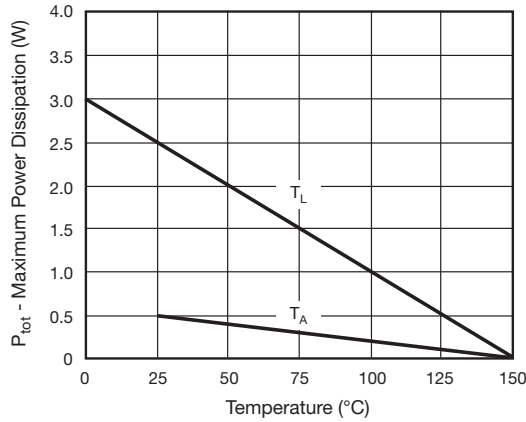


Fig. 1 - Steady State Power Derating

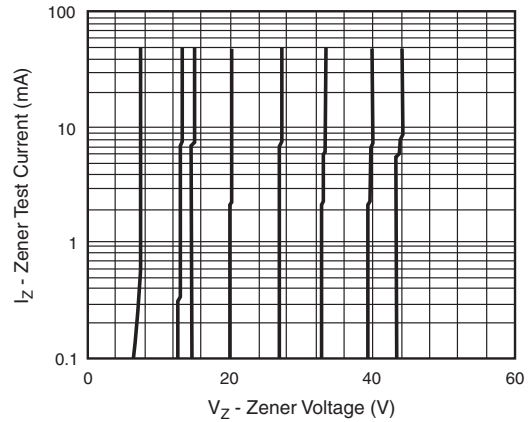


Fig. 3 - Typical Zener Voltage

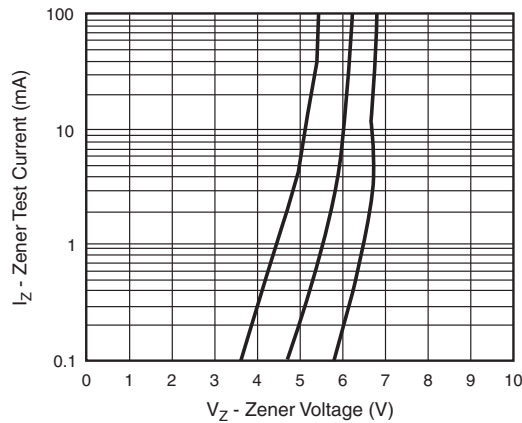
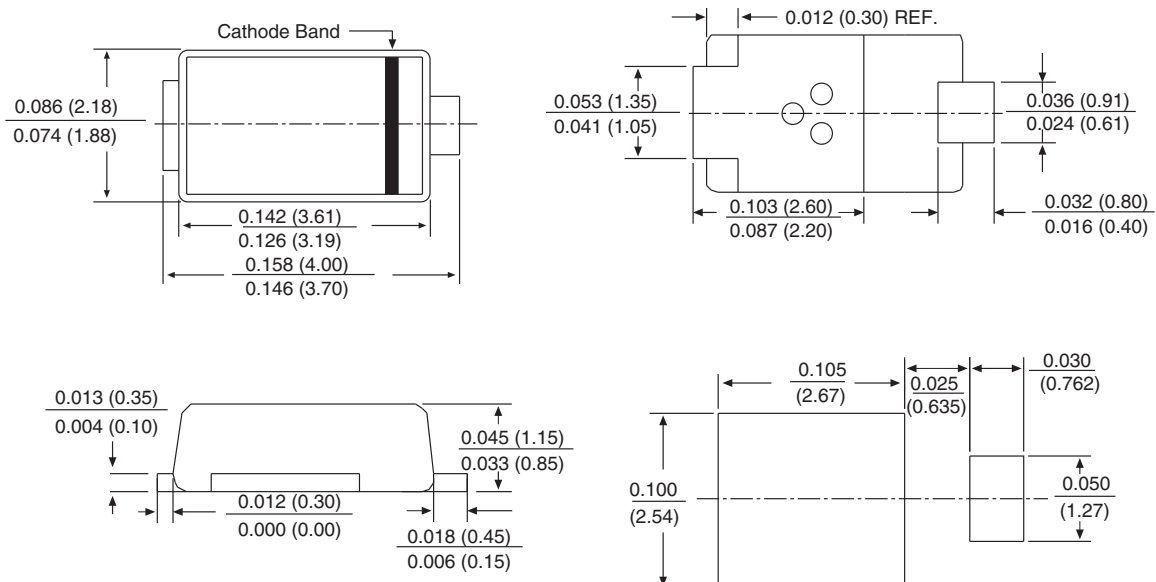


Fig. 2 - Typical Zener Voltage

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**SMP (DO-220AA)**





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