

# Surface Mount Power Voltage-Regulating Diodes

eSMP® Series



DO-220AA (SMP)



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

## 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)

## MECHANICAL DATA

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

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

## PRIMARY CHARACTERISTICS

|                                            |               |
|--------------------------------------------|---------------|
| V <sub>Z</sub> nom.                        | 4.2 V to 38 V |
| P <sub>tot</sub> at T <sub>L</sub> = 75 °C | 1500 mW       |
| P <sub>tot</sub> at T <sub>L</sub> = 25 °C | 600 mW        |
| T <sub>J</sub> max.                        | 150 °C        |
| V <sub>Z</sub> specification               | Pulse current |
| Int. construction                          | Single        |

## TYPICAL APPLICATIONS

For general purpose regulation and protection applications.

## PACKAGE

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

## MAXIMUM RATINGS (T<sub>A</sub> = 25 °C unless otherwise noted)

| PARAMETER                                                                    | SYMBOL           | VALUE         | UNIT |
|------------------------------------------------------------------------------|------------------|---------------|------|
| Power dissipation at T <sub>L</sub> = 75 °C (fig. 1) <sup>(1)</sup>          | P <sub>tot</sub> | 1500          | mW   |
| Power dissipation at T <sub>A</sub> = 25 °C (fig. 1) <sup>(2)</sup>          | P <sub>tot</sub> | 600           | mW   |
| Maximum instantaneous forward voltage at 200 mA for all types <sup>(3)</sup> | V <sub>F</sub>   | 1.5           | V    |
| Operating junction temperature                                               | T <sub>J</sub>   | 150           | °C   |
| Storage temperature range                                                    | T <sub>STG</sub> | - 65 to + 150 | °C   |

### Notes

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

<sup>(2)</sup> Mounted on minimum recommended pad layout

<sup>(3)</sup> Pulse test: 300 µs 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 During

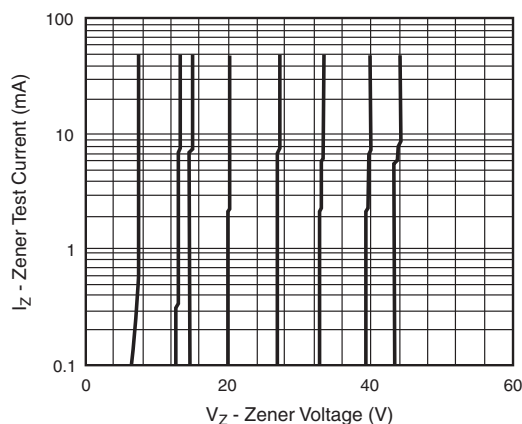


Fig. 3 - Typical Zener Voltage

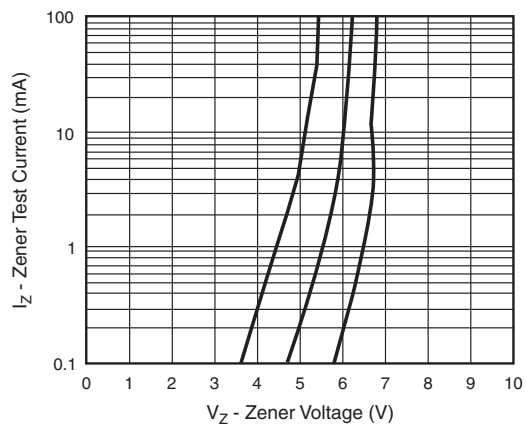
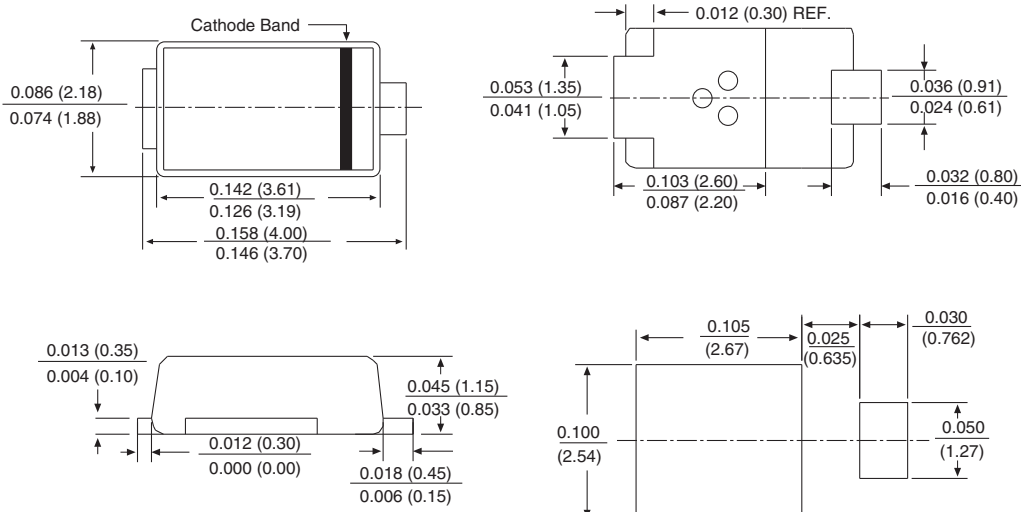


Fig. 2 - Typical Zener Voltage

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-220AA (SMP)





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