



**THE DATASHEET OF  
SMP11-M3/84A**



## Surface Mount TRANSZORB® Transient Voltage Suppressors

**eSMP® Series**

**SMP (DO-220AA)**

Anode Cathode


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

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Available in unidirectional
- 400 W peak pulse power capability with a 10/1000  $\mu$ s waveform
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- 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)

**TYPICAL APPLICATIONS**

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, and telecommunication.

**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 2 whisker test

**Polarity:** color band denotes cathode end

**LINKS TO ADDITIONAL RESOURCES**


| PRIMARY CHARACTERISTICS  |                  |
|--------------------------|------------------|
| $V_{BR}$ uni-directional | 4.10 V to 44.2 V |
| $V_{WM}$                 | 3.3 V to 36 V    |
| $P_{PPM}$                | 400 W            |
| $I_{FSM}$                | 40 A             |
| $T_J$ max.               | 150 °C           |
| Polarity                 | Unidirectional   |
| Package                  | SMP (DO-220AA)   |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                                 |                |                     |      |
|---|----------------|---------------------|------|
| PARAMETER   | SYMBOL         | VALUE               | UNIT |
| Peak pulse power dissipation with a 10/1000 $\mu$ s waveform (fig. 1) <sup>(1)(2)</sup> | $P_{PPM}$      | 400                 | W    |
| Peak pulse current with a 10/1000 $\mu$ s waveform <sup>(1)</sup>                       | $I_{PPM}$      | See table next page | A    |
| Peak forward surge current 10 ms single half sine-wave <sup>(2)</sup>                   | $I_{FSM}$      | 40                  | A    |
| Maximum instantaneous forward voltage at 25 A <sup>(3)</sup>                            | $V_F$          | 2.5                 | V    |
| Operating junction and storage temperature range  | $T_J, T_{STG}$ | -55 to +150         | °C   |

**Notes**

<sup>(1)</sup> Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25$  °C per fig. 2

<sup>(2)</sup> Mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pads to each terminal

<sup>(3)</sup> Pulse test: 300  $\mu$ s pulse width, 1 % duty cycle



| ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                     |  |      |                         |                                |  |   |   |
|---|---------------------|--|------|-------------------------|--------------------------------|--|---|---|
| DEVICE TYPE   | DEVICE MARKING CODE | BREAKDOWN VOLTAGE $V_{BR}$ AT $I_T$ <sup>(1)</sup> (V) |      | TEST CURRENT $I_T$ (mA) | STAND-OFF VOLTAGE $V_{WM}$ (V) | MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_D$ ( $\mu\text{A}$ ) <sup>(3)</sup> | MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}$ (A) <sup>(2)</sup> | MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V) |
|   |                     | MIN.   | MAX. |                         |                                |  |   |   |
| SMP3V3  | AC                  | 4.10   | 5.10 | 1.0                     | 3.3                            | 200  | 54.8  | 7.3   |
| SMP5.0A   | AE                  | 6.40   | 7.07 | 10                      | 5.0                            | 150  | 43.5  | 9.2   |
| SMP6.0A   | AG                  | 6.67   | 7.37 | 10                      | 6.0                            | 600  | 38.8  | 10.3  |
| SMP6.5A   | AK                  | 7.22   | 7.98 | 10                      | 6.5                            | 100  | 35.7  | 11.2  |
| SMP7.0A   | AM                  | 7.78   | 8.60 | 10                      | 7.0                            | 50   | 33.3  | 12.0  |
| SMP7.5A   | AN                  | 8.33   | 9.21 | 1.0                     | 7.5                            | 50   | 31.0  | 12.9  |
| SMP8.0A   | AR                  | 8.89   | 9.83 | 1.0                     | 8.0                            | 20   | 29.4  | 13.6  |
| SMP11A  | AZ                  | 12.2   | 13.5 | 1.0                     | 11                             | 1.0  | 22.0  | 18.2  |
| SMP12A  | BE                  | 13.3   | 14.7 | 1.0                     | 12                             | 1.0  | 20.1  | 19.9  |
| SMP13A  | BG                  | 14.4   | 15.9 | 1.0                     | 13                             | 1.0  | 18.6  | 21.5  |
| SMP14A  | BK                  | 15.6   | 17.2 | 1.0                     | 14                             | 1.0  | 17.2  | 23.2  |
| SMP15A  | BM                  | 16.7   | 18.5 | 1.0                     | 15                             | 1.0  | 16.4  | 24.4  |
| SMP16A  | BP                  | 17.8   | 19.7 | 1.0                     | 16                             | 1.0  | 15.4  | 26.0  |
| SMP17A  | BR                  | 18.9   | 20.9 | 1.0                     | 17                             | 1.0  | 14.5  | 27.6  |
| SMP18A  | BT                  | 20.0   | 22.1 | 1.0                     | 18                             | 1.0  | 13.7  | 29.2  |
| SMP20A  | BV                  | 22.2   | 24.5 | 1.0                     | 20                             | 1.0  | 12.3  | 32.4  |
| SMP22A  | BX                  | 24.4   | 26.9 | 1.0                     | 22                             | 1.0  | 11.3  | 35.5  |
| SMP24A  | BZ                  | 26.7   | 29.5 | 1.0                     | 24                             | 1.0  | 10.3  | 38.9  |
| SMP26A  | CE                  | 28.9   | 31.9 | 1.0                     | 26                             | 1.0  | 9.5   | 42.1  |
| SMP28A  | CG                  | 31.1   | 34.4 | 1.0                     | 28                             | 1.0  | 8.8   | 45.4  |
| SMP30A  | CK                  | 33.3   | 36.8 | 1.0                     | 30                             | 1.0  | 8.3   | 48.4  |
| SMP33A  | CM                  | 36.7   | 40.6 | 1.0                     | 33                             | 1.0  | 7.5   | 53.3  |
| SMP36A  | CP                  | 40.0   | 44.2 | 1.0                     | 36                             | 1.0  | 6.9   | 58.1  |

**Notes**

- (1)  $V_{BR}$  measured after  $I_T$  applied for 300  $\mu\text{s}$ ,  $I_T$  = square wave pulse or equivalent  
(2) Surge current waveform per fig. 3 and derate per fig. 2  
(3) All terms and symbols are consistent with ANSI/IEEE C62.35

| 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>                     | $R_{\theta JA}$ | 250   | $^\circ\text{C/W}$ |

**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                      |
| SMP3V3-M3/84A                  | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| SMP3V3-M3/85A                  | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |
| SMP11A-M3/84A                  | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| SMP11A-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 - Peak Pulse Power Rating Curve



Fig. 4 - Typical Junction Capacitance



Fig. 2 - Pulse Derating Curve

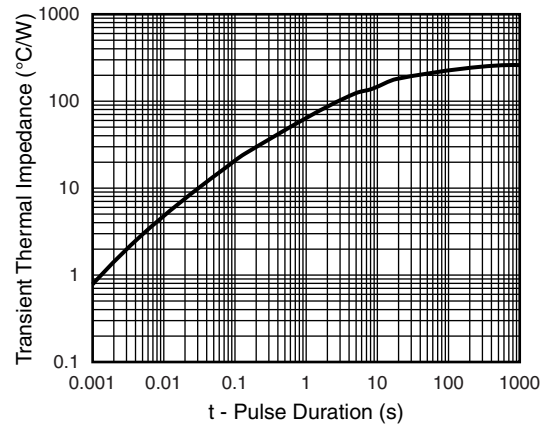


Fig. 5 - Typical Transient Thermal Impedance



Fig. 3 - Pulse Waveform



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### SMP (DO-220AA)





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