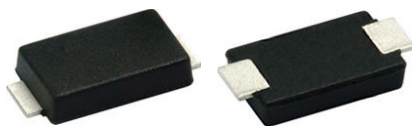


# Surface Mount PAR<sup>®</sup> Transient Voltage Suppressors

High Temperature Stability and High Reliability Conditions

## eSMP<sup>®</sup> Series



Top View

Bottom View

### SlimSMA (DO-221AC)

Cathode  Anode

## DESIGN SUPPORT TOOLS

[click logo to get started](#)

**3D**  
Models  
Available

## FEATURES

- Very low profile - typical height of 0.95 mm
- Junction passivation optimized design passivated anisotropic rectifier technology
- $T_J = 185\text{ }^{\circ}\text{C}$  capability suitable for high reliability and automotive requirement
- Ideal for automated placement
- Uni-directional only
- Excellent clamping capability
- Peak pulse power: 600 W (10/1000  $\mu\text{s}$ )
- AEC-Q101 qualified
- ESD capability: IEC 61000-4-2 level 4
  - 15 kV (air)
  - 8 kV (contact)
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260  $^{\circ}\text{C}$
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

## PRIMARY CHARACTERISTICS

|                                             |                        |
|---------------------------------------------|------------------------|
| $V_{BR}$                                    | 6.8 V to 51 V          |
| $V_{WM}$                                    | 5.8 V to 43.6 V        |
| $P_{PPM}$ (10 x 1000 $\mu\text{s}$ )        | 600 W                  |
| $P_D$ at $T_M = 65\text{ }^{\circ}\text{C}$ | 6 W                    |
| $T_J$ max.                                  | 185 $^{\circ}\text{C}$ |
| Polarity                                    | Uni-directional        |
| Package                                     | SlimSMA (DO-221AC)     |

## 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: SlimSMA (DO-221AC)

Molding compound meets UL 94 V-0 flammability rating  
Base P/NHM3\_X - halogen-free, RoHS-compliant and AEC-Q101 qualified ("X" denotes revision code e.g. A, B,.....)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD22-B102

HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

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

| PARAMETER                                                                   | SYMBOL                   | VALUE          | UNIT               |
|-----------------------------------------------------------------------------|--------------------------|----------------|--------------------|
| Peak pulse power dissipation with a 10/1000 $\mu\text{s}$ waveform          | $P_{PPM}$ <sup>(1)</sup> | 600            | W                  |
| Peak pulse current with a 10/1000 $\mu\text{s}$ waveform                    | $I_{PPM}$ <sup>(1)</sup> | See next table | A                  |
| Power dissipation on infinite heat sink, $T_M = 65\text{ }^{\circ}\text{C}$ | $P_D$ <sup>(2)</sup>     | 6              | W                  |
| Power dissipation, $T_M = 25\text{ }^{\circ}\text{C}$                       | $P_D$ <sup>(3)</sup>     | 1.1            |                    |
| Operating junction and storage temperature range                            | $T_J, T_{STG}$           | -65 to +185    | $^{\circ}\text{C}$ |

### Notes

(1) Non-repetitive current pulse, per fig. 3 and derated above  $T_A = 25\text{ }^{\circ}\text{C}$  per fig. 2.

(2) Power dissipation mounted on infinite heat sink

(3) Power dissipation mounted on minimum recommended pad layout

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

| DEVICE TYPE | DEVICE MARKING CODE | BREAKDOWN VOLTAGE $V_{BR}^{(1)}$ AT $I_T$ (V) |      |      | TEST CURRENT $I_T$ (mA) | STAND-OFF VOLTAGE $V_{WM}$ (V) | MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_R$ ( $\mu\text{A}$ ) | $T_J = 150^\circ\text{C}$ MAXIMUM REVERSE LEAKAGE AT $V_{WM}$ $I_R$ ( $\mu\text{A}$ ) | MAXIMUM PEAK PULSE SURGE CURRENT $I_{PPM}$ (A) | MAXIMUM CLAMPING VOLTAGE AT $I_{PPM}$ $V_C$ (V) | TYPICAL TEMP. COEFFICIENT OF $V_{BR}^{(2)}$ $\alpha_T$ ( $^\circ\text{C}$ ) |
|-------------|---------------------|-----------------------------------------------|------|------|-------------------------|--------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------|
|             |                     | MIN.                                          | NOM. | MAX. |                         |                                |                                                             |                                                                                       |                                                |                                                 |                                                                             |
| TA6F6.8A    | AEP                 | 6.45                                          | 6.80 | 7.14 | 10                      | 5.80                           | 500                                                         | 1000                                                                                  | 57.1                                           | 10.5                                            | 0.047                                                                       |
| TA6F7.5A    | AGP                 | 7.13                                          | 7.50 | 7.88 | 10                      | 6.40                           | 250                                                         | 500                                                                                   | 53.1                                           | 11.3                                            | 0.052                                                                       |
| TA6F8.2A    | AKP                 | 7.79                                          | 8.20 | 8.61 | 10                      | 7.02                           | 100                                                         | 200                                                                                   | 49.6                                           | 12.1                                            | 0.056                                                                       |
| TA6F9.1A    | AMP                 | 8.65                                          | 9.10 | 9.55 | 1.0                     | 7.78                           | 25                                                          | 50                                                                                    | 44.8                                           | 13.4                                            | 0.060                                                                       |
| TA6F10A     | APP                 | 9.5                                           | 10.0 | 10.5 | 1.0                     | 8.55                           | 5.0                                                         | 20                                                                                    | 41.4                                           | 14.5                                            | 0.064                                                                       |
| TA6F11A     | ARP                 | 10.5                                          | 11.0 | 11.6 | 1.0                     | 9.40                           | 2.0                                                         | 5.0                                                                                   | 38.5                                           | 15.6                                            | 0.067                                                                       |
| TA6F12A     | ATP                 | 11.4                                          | 12.0 | 12.6 | 1.0                     | 10.2                           | 2.0                                                         | 5.0                                                                                   | 35.9                                           | 16.7                                            | 0.070                                                                       |
| TA6F13A     | AVP                 | 12.4                                          | 13.0 | 13.7 | 1.0                     | 11.1                           | 2.0                                                         | 5.0                                                                                   | 33.0                                           | 18.2                                            | 0.072                                                                       |
| TA6F15A     | AXP                 | 14.3                                          | 15.0 | 15.8 | 1.0                     | 12.8                           | 1.0                                                         | 5.0                                                                                   | 28.3                                           | 21.2                                            | 0.076                                                                       |
| TA6F16A     | AZP                 | 15.2                                          | 16.0 | 16.8 | 1.0                     | 13.6                           | 1.0                                                         | 5.0                                                                                   | 26.7                                           | 22.5                                            | 0.078                                                                       |
| TA6F18A     | BEP                 | 17.1                                          | 18.0 | 18.9 | 1.0                     | 15.3                           | 1.0                                                         | 5.0                                                                                   | 23.5                                           | 25.5                                            | 0.080                                                                       |
| TA6F20A     | BGP                 | 19.0                                          | 20.0 | 21.0 | 1.0                     | 17.1                           | 1.0                                                         | 5.0                                                                                   | 21.7                                           | 27.7                                            | 0.082                                                                       |
| TA6F22A     | BKP                 | 20.9                                          | 22.0 | 23.1 | 1.0                     | 18.8                           | 1.0                                                         | 5.0                                                                                   | 19.6                                           | 30.6                                            | 0.084                                                                       |
| TA6F24A     | BMP                 | 22.8                                          | 24.0 | 25.2 | 1.0                     | 20.5                           | 1.0                                                         | 5.0                                                                                   | 18.1                                           | 33.2                                            | 0.085                                                                       |
| TA6F27A     | BPP                 | 25.7                                          | 27.0 | 28.4 | 1.0                     | 23.1                           | 1.0                                                         | 5.0                                                                                   | 16.0                                           | 37.5                                            | 0.087                                                                       |
| TA6F30A     | BRP                 | 28.5                                          | 30.0 | 31.5 | 1.0                     | 25.6                           | 1.0                                                         | 5.0                                                                                   | 14.5                                           | 41.4                                            | 0.088                                                                       |
| TA6F33A     | BTP                 | 31.4                                          | 33.0 | 34.7 | 1.0                     | 28.2                           | 1.0                                                         | 5.0                                                                                   | 13.1                                           | 45.7                                            | 0.089                                                                       |
| TA6F36A     | BVP                 | 34.2                                          | 36.0 | 37.8 | 1.0                     | 30.8                           | 1.0                                                         | 5.0                                                                                   | 12.0                                           | 49.9                                            | 0.090                                                                       |
| TA6F39A     | BXP                 | 37.1                                          | 39.0 | 41.0 | 1.0                     | 33.3                           | 1.0                                                         | 5.0                                                                                   | 11.1                                           | 53.9                                            | 0.091                                                                       |
| TA6F43A     | BZP                 | 40.9                                          | 43.0 | 45.2 | 1.0                     | 36.8                           | 1.0                                                         | 10.0                                                                                  | 10.1                                           | 59.3                                            | 0.092                                                                       |
| TA6F47A     | CEP                 | 44.7                                          | 47.0 | 49.4 | 1.0                     | 40.2                           | 1.0                                                         | 10.0                                                                                  | 9.3                                            | 64.8                                            | 0.092                                                                       |
| TA6F51A     | CGP                 | 48.5                                          | 51.0 | 53.6 | 1.0                     | 43.6                           | 1.0                                                         | 10.0                                                                                  | 8.6                                            | 70.1                                            | 0.093                                                                       |

**Notes**

- (1) Pulse test:  $t_p \leq 50$  ms  
 (2) To calculate  $V_{BR}$  vs. junction temperature, use the following formula:  $V_{BR}$  at  $T_J = V_{BR}$  at  $25^\circ\text{C} \times (1 + \alpha_T \times (T_J - 25))$

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

| PARAMETER                                       | SYMBOL                | VALUE | UNIT               |
|-------------------------------------------------|-----------------------|-------|--------------------|
| Typical thermal resistance, junction to ambient | $R_{\theta JA}^{(1)}$ | 145   | $^\circ\text{C/W}$ |
| Typical thermal resistance, junction to mount   | $R_{\theta JM}^{(2)}$ | 20    | $^\circ\text{C/W}$ |

**Notes**

- (1) Mounted on minimum recommended pad layout  
 (2) Mounted on infinite heat sink

**IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS**( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| STANDARD      | TEST TYPE                             | TEST CONDITIONS                | SYMBOL | CLASS | VALUE     |
|---------------|---------------------------------------|--------------------------------|--------|-------|-----------|
| IEC 61000-4-2 | Human body model (contact mode)       | $C = 150$ pF, $R = 330 \Omega$ | $V_C$  | 4     | $> 8$ kV  |
|               | Human body model (air discharge mode) |                                |        |       | $> 15$ kV |

**ORDERING INFORMATION** (Example)

| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| TA6F6.8AHM3_A/H <sup>(1)</sup> | 0.032           | H                      | 3500          | 7" diameter plastic tape and reel  |
| TA6F6.8AHM3_A/I <sup>(1)</sup> | 0.032           | I                      | 14 000        | 13" diameter plastic tape and reel |

**Note**

- (1) AEC-Q101 qualified



### RATINGS AND CHARACTERISTICS CURVES ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

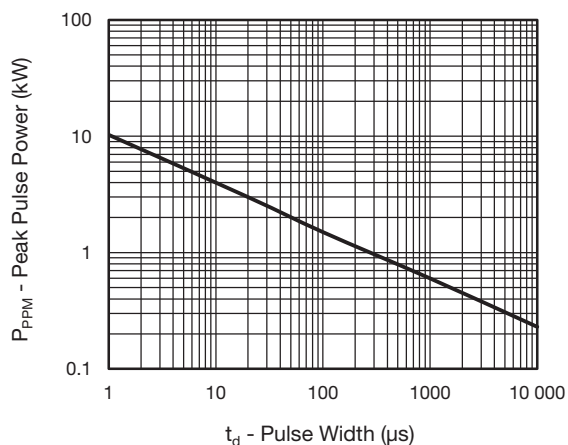


Fig. 1 - Peak Pulse Power Rating Curve

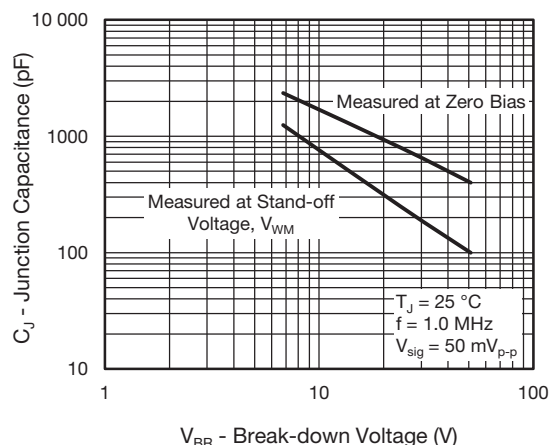


Fig. 4 - Typical Junction Capacitance

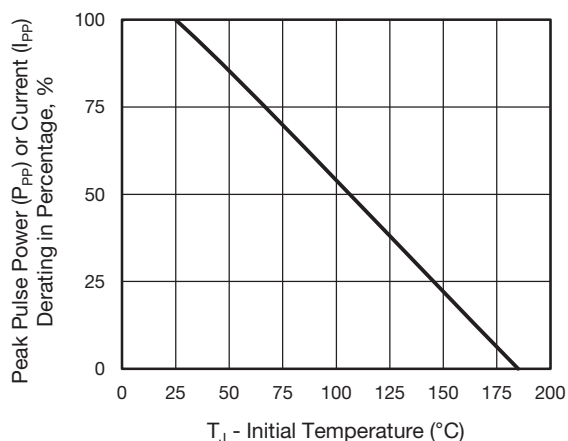


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

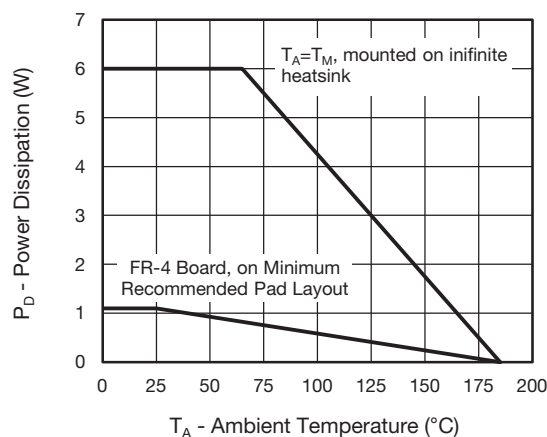


Fig. 5 - Power Dissipation Derating Curve

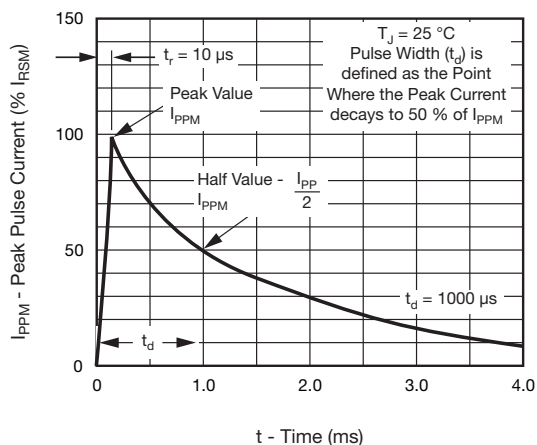


Fig. 3 - Pulse Waveform

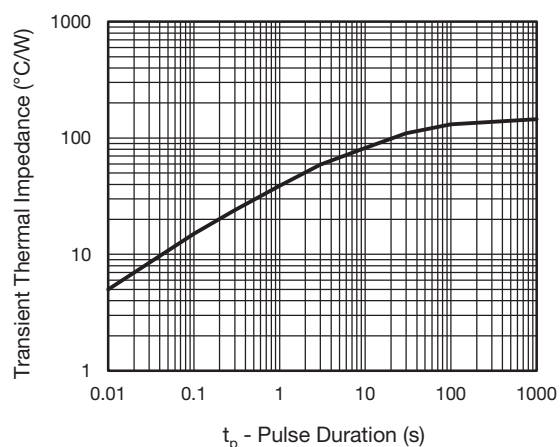
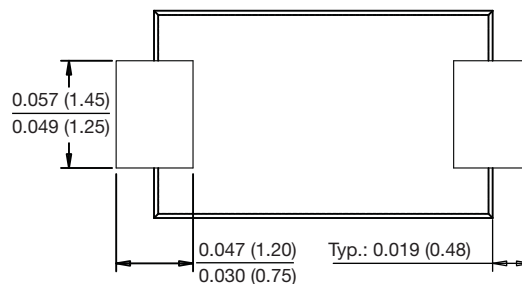
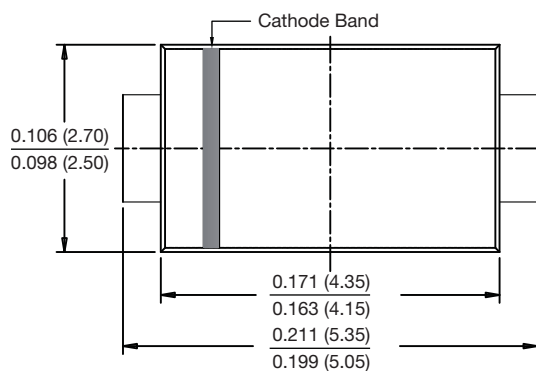


Fig. 6 - Typical Transient Thermal Impedance

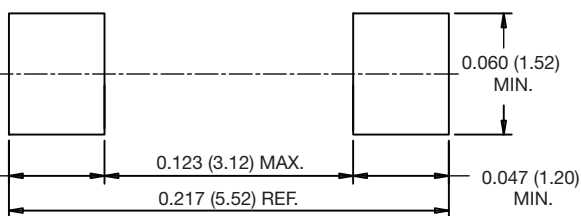
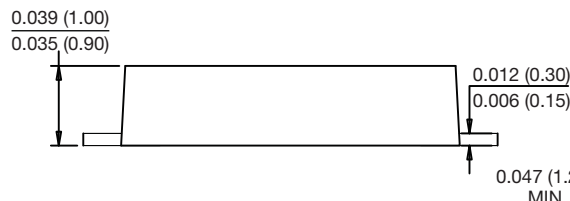


### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### SlimSMA (DO-221AC)



#### Mounting Pad Layout





## Disclaimer

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