



# P4SMA6.8A thru P4SMA220CA

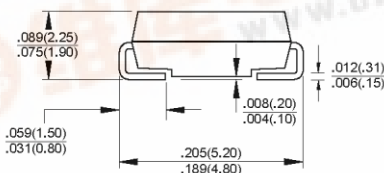
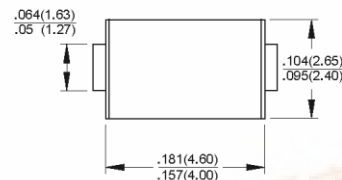
Surface Mount Transient Voltage Suppressors  
Peak Pulse Power 400W Breakdown Voltage 6.8 to 220V

## Features

- ◆ Plastic package has Underwriters Laboratory Flammability Classification 94V-0
- ◆ Optimized for LAN protection applications
- ◆ Ideal for ESD protection of data lines in accordance with IEC 1000-4-2 (IEC801-2)
- ◆ Ideal for EFT protection of data lines in accordance with IEC1000-4-4 (IEC801-4)
- ◆ Low profile package with built-in strain relief for surface mounted applications
- ◆ Glass passivated junction
- ◆ Low incremental surge resistance, excellent clamping capability
- ◆ 400W peak pulse power capability with a 10/1000us waveform, repetition rate (duty cycle): 0.01% (300W above 91V)
- ◆ Very Fast response time
- ◆ High temperature soldering guaranteed: 250°C/10 seconds at terminals



DO-214AC (SMA)



Dimensions in inches and (millimeters)

## Mechanical Data

- ◆ Case: JEDEC DO-214AC molded plastic over passivated chip
- ◆ Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
- ◆ Polarity: For uni-directional types the band denotes the cathode, which is positive with respect to the anode under normal TVS operation
- ◆ Mounting Position: Any
- ◆ Weight: 0.002oz., 0.064g

## Devices for Bidirectional Applications

For bi-directional devices, use suffix CA (e.g. P4SMA10CA). Electrical characteristics apply in both directions.

## Maximum Ratings and Characteristics

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

| Parameter                                                                                   | Symbol          | Value          | Unit               |
|---------------------------------------------------------------------------------------------|-----------------|----------------|--------------------|
| Peak pulse power dissipation with a 10/1000us waveform <sup>(1)(2)</sup> (Fig. 1)           | $P_{PPM}$       | 400            | W                  |
| Peak pulse current with a 10/1000us waveform <sup>(1)</sup> (Fig. 3)                        | $I_{PPM}$       | See Next Table | A                  |
| Power dissipation on infinite heatsink, $T_A = 50^\circ\text{C}$                            | $P_{M(AV)}$     | 1.0            | W                  |
| Peak forward surge current, 8.3ms single half sine-wave uni-directional only <sup>(2)</sup> | $I_{FSM}$       | 40             | A                  |
| Thermal resistance junction to ambient air <sup>(3)</sup>                                   | $R_{\theta JA}$ | 120            | $^\circ\text{C/W}$ |
| Thermal resistance junction to leads                                                        | $R_{\theta JL}$ | 30             | $^\circ\text{C/W}$ |
| Operating junction and storage temperature range                                            | $T_J, T_{STG}$  | -65 to +150    | $^\circ\text{C}$   |

Notes: 1. Non-repetitive current pulse, per Fig. 3 and derated above  $T_A = 25^\circ\text{C}$  per Fig. 2. Rating is 300W above 91V.

2. Mounted on 0.2 x 0.2" (5.0 x 5.0mm) copper pads to each terminal

3. Mounted on minimum recommended pad layout



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# Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.  $V_F=3.5V$  at  $I_F=25A$  (uni-directional only)

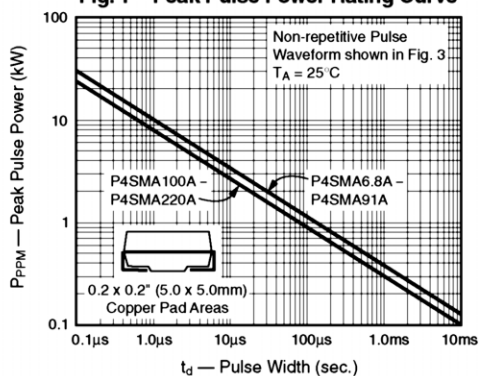
| Device type | Device marking code |      | Breakdown voltage<br>$V_{(BR)}$<br>(Volts) <sup>(1)</sup> |      | Test current at $I_T$ (mA) | Stand-off voltage $V_{WM}$ (Volts) | Maximum reverse leakage at $V_{WM}$<br>$I_D^{(3)}$ (uA) | Maximum peak pulse current $I_{PPM}^{(2)}$ (A) | Maximum clamping voltage at $I_{PPM}$<br>$V_C$ (Volts) | Maximum temperature coefficient of $V_{(BR)}$ (% / °C) |
|-------------|---------------------|------|-----------------------------------------------------------|------|----------------------------|------------------------------------|---------------------------------------------------------|------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|
|             | UNI                 | BI   | Min.                                                      | Max. |                            |                                    |                                                         |                                                |                                                        |                                                        |
| P4SMA6.8A   | 6V8A                | 6V8C | 6.45                                                      | 7.14 | 10                         | 5.80                               | 1000                                                    | 38.1                                           | 10.5                                                   | 0.057                                                  |
| P4SMA7.5A   | 7V5A                | 7V5C | 7.13                                                      | 7.88 | 10                         | 6.40                               | 500                                                     | 35.4                                           | 11.3                                                   | 0.061                                                  |
| P4SMA8.2A   | 8V2A                | 8V2C | 7.79                                                      | 8.61 | 10                         | 7.02                               | 200                                                     | 33.1                                           | 12.1                                                   | 0.065                                                  |
| P4SMA9.1A   | 9V1A                | 9V1C | 8.65                                                      | 9.55 | 1.0                        | 7.78                               | 50                                                      | 29.9                                           | 13.4                                                   | 0.068                                                  |
| P4SMA10A    | 10A                 | 10C  | 9.50                                                      | 10.5 | 1.0                        | 8.55                               | 10                                                      | 27.6                                           | 14.5                                                   | 0.073                                                  |
| P4SMA11A    | 11A                 | 11C  | 10.5                                                      | 11.6 | 1.0                        | 9.40                               | 5.0                                                     | 25.6                                           | 15.6                                                   | 0.075                                                  |
| P4SMA12A    | 12A                 | 12C  | 11.4                                                      | 12.6 | 1.0                        | 10.2                               | 1.0                                                     | 24.0                                           | 16.7                                                   | 0.078                                                  |
| P4SMA13A    | 13A                 | 13C  | 12.4                                                      | 13.7 | 1.0                        | 11.1                               | 1.0                                                     | 22.0                                           | 18.2                                                   | 0.081                                                  |
| P4SMA15A    | 15A                 | 15C  | 14.3                                                      | 15.8 | 1.0                        | 12.8                               | 1.0                                                     | 18.9                                           | 21.2                                                   | 0.084                                                  |
| P4SMA16A    | 16A                 | 16C  | 15.2                                                      | 16.8 | 1.0                        | 13.6                               | 1.0                                                     | 17.8                                           | 22.5                                                   | 0.086                                                  |
| P4SMA18A    | 18A                 | 18C  | 17.1                                                      | 18.9 | 1.0                        | 15.3                               | 1.0                                                     | 15.9                                           | 25.2                                                   | 0.088                                                  |
| P4SMA20A    | 20A                 | 20C  | 19.0                                                      | 21.0 | 1.0                        | 17.1                               | 1.0                                                     | 14.4                                           | 27.7                                                   | 0.090                                                  |
| P4SMA22A    | 22A                 | 22C  | 20.9                                                      | 23.1 | 1.0                        | 18.8                               | 1.0                                                     | 13.1                                           | 30.6                                                   | 0.092                                                  |
| P4SMA24A    | 24A                 | 24C  | 22.8                                                      | 25.2 | 1.0                        | 20.5                               | 1.0                                                     | 12.0                                           | 33.2                                                   | 0.094                                                  |
| P4SMA27A    | 27A                 | 27C  | 25.7                                                      | 28.4 | 1.0                        | 23.1                               | 1.0                                                     | 10.7                                           | 37.5                                                   | 0.096                                                  |
| P4SMA30A    | 30A                 | 30C  | 28.5                                                      | 31.5 | 1.0                        | 25.6                               | 1.0                                                     | 9.7                                            | 41.4                                                   | 0.097                                                  |
| P4SMA33A    | 33A                 | 33C  | 31.4                                                      | 34.7 | 1.0                        | 28.2                               | 1.0                                                     | 8.8                                            | 45.7                                                   | 0.098                                                  |
| P4SMA36A    | 36A                 | 36C  | 34.2                                                      | 37.8 | 1.0                        | 30.8                               | 1.0                                                     | 8.0                                            | 49.9                                                   | 0.099                                                  |
| P4SMA39A    | 39A                 | 39C  | 37.1                                                      | 41.0 | 1.0                        | 33.3                               | 1.0                                                     | 7.4                                            | 53.9                                                   | 0.100                                                  |
| P4SMA43A    | 43A                 | 43C  | 40.9                                                      | 45.2 | 1.0                        | 36.8                               | 1.0                                                     | 6.7                                            | 59.3                                                   | 0.101                                                  |
| P4SMA47A    | 47A                 | 47C  | 44.7                                                      | 49.4 | 1.0                        | 40.2                               | 1.0                                                     | 6.2                                            | 64.8                                                   | 0.101                                                  |
| P4SMA51A    | 51A                 | 51C  | 48.5                                                      | 53.6 | 1.0                        | 43.6                               | 1.0                                                     | 5.7                                            | 70.1                                                   | 0.102                                                  |
| P4SMA56A    | 56A                 | 56C  | 53.2                                                      | 58.8 | 1.0                        | 47.8                               | 1.0                                                     | 5.2                                            | 77.0                                                   | 0.103                                                  |
| P4SMA62A    | 62A                 | 62C  | 58.9                                                      | 65.1 | 1.0                        | 53.0                               | 1.0                                                     | 4.7                                            | 85.0                                                   | 0.104                                                  |
| P4SMA68A    | 68A                 | 68C  | 64.6                                                      | 71.4 | 1.0                        | 58.1                               | 1.0                                                     | 4.3                                            | 92.0                                                   | 0.104                                                  |
| P4SMA75A    | 75A                 | 75C  | 71.3                                                      | 78.8 | 1.0                        | 64.1                               | 1.0                                                     | 3.9                                            | 104                                                    | 0.105                                                  |
| P4SMA82A    | 82A                 | 82C  | 77.9                                                      | 86.1 | 1.0                        | 70.1                               | 1.0                                                     | 3.5                                            | 113                                                    | 0.105                                                  |
| P4SMA91A    | 91A                 | 91C  | 86.5                                                      | 95.5 | 1.0                        | 77.8                               | 1.0                                                     | 3.2                                            | 125                                                    | 0.106                                                  |
| P4SMA100A   | 100A                | 100C | 95.0                                                      | 105  | 1.0                        | 85.5                               | 1.0                                                     | 2.2                                            | 137                                                    | 0.106                                                  |
| P4SMA110A   | 110A                | 110C | 105                                                       | 116  | 1.0                        | 94.0                               | 1.0                                                     | 2.0                                            | 152                                                    | 0.107                                                  |
| P4SMA120A   | 120A                | 120C | 114                                                       | 126  | 1.0                        | 102                                | 1.0                                                     | 1.8                                            | 165                                                    | 0.107                                                  |
| P4SMA130A   | 130A                | 130C | 124                                                       | 137  | 1.0                        | 111                                | 1.0                                                     | 1.7                                            | 179                                                    | 0.107                                                  |
| P4SMA150A   | 150A                | 150C | 143                                                       | 158  | 1.0                        | 128                                | 1.0                                                     | 1.4                                            | 207                                                    | 0.106                                                  |
| P4SMA160A   | 160A                | 160C | 152                                                       | 168  | 1.0                        | 136                                | 1.0                                                     | 1.4                                            | 219                                                    | 0.108                                                  |
| P4SMA170A   | 170A                | 170C | 162                                                       | 179  | 1.0                        | 145                                | 1.0                                                     | 1.3                                            | 234                                                    | 0.108                                                  |
| P4SMA180A   | 180A                | 180C | 171                                                       | 189  | 1.0                        | 154                                | 1.0                                                     | 1.2                                            | 246                                                    | 0.108                                                  |
| P4SMA200A   | 200A                | 200C | 190                                                       | 210  | 1.0                        | 171                                | 1.0                                                     | 1.1                                            | 274                                                    | 0.108                                                  |
| P4SMA220A   | 220A                | 220C | 209                                                       | 231  | 1.0                        | 185                                | 1.0                                                     | 0.9                                            | 328                                                    | 0.108                                                  |

- Notes:**
- 1.  $V_{(BR)}$  measured after  $I_T$  applied for 300us,  $I_T$ =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 CA62.35
  - 4. For bidirectional types with  $V_R$  10 Volts and less, the  $I_D$  limit is doubled

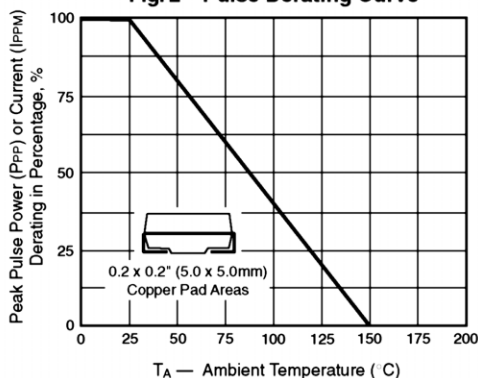
## RATINGS AND CHARACTERISTIC CURVES

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

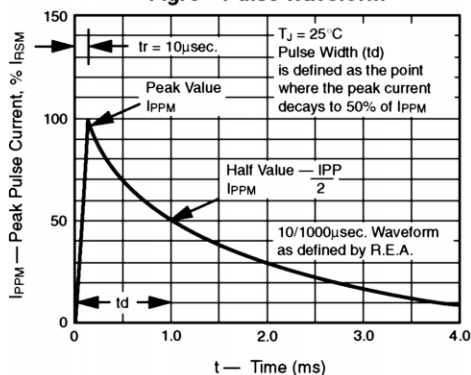
**Fig. 1 – Peak Pulse Power Rating Curve**



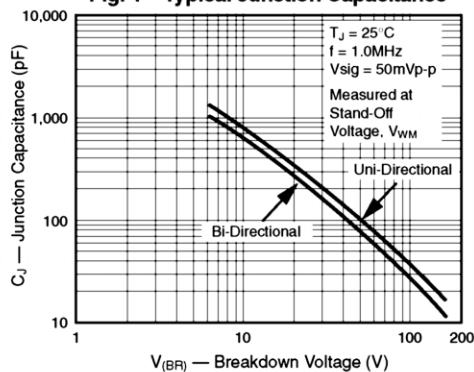
**Fig. 2 – Pulse Derating Curve**



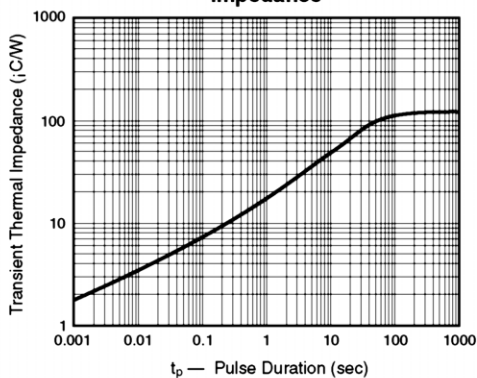
**Fig. 3 – Pulse Waveform**



**Fig. 4 – Typical Junction Capacitance**



**Fig. 5 – Typical Transient Thermal Impedance**



**Fig. 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only**

