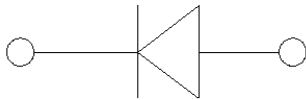
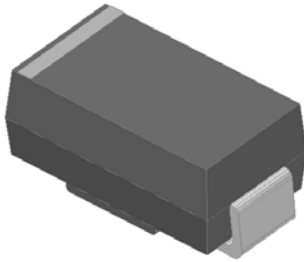
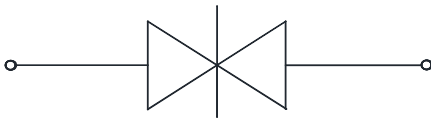
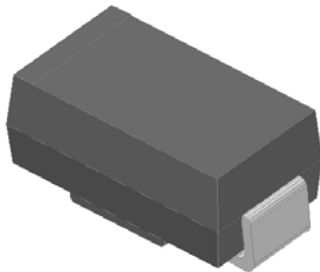


## Surface Mount Transient Voltage Suppressor Diodes

## Uni-directional



## Bi-directional



## Features

- For surface mounted applications
- Low-profile package
- Ideal for automated placement
- Available in Unidirectional and Bidirectional
- 400 W peak pulse power capability with a 10/1000  $\mu$ s waveform
- Low incremental surge resistance, excellent clamping capability
- Very fast response time
- High temperature soldering guaranteed: 260 °C/10 s at terminals
- Meets MSL level 1
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

## 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, telecommunication.

## Mechanical Data

- **Package:** DO-214AC (SMA)  
Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant, halogen-free
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Polarity:** For uni-directional types the band denotes cathode end, no marking on bi-directional types

■Maximum Ratings ( $T_a=25^\circ\text{C}$  Unless otherwise specified)

| PARAMETER                                                                        | SYMBOL         | UNIT             | Max            |
|----------------------------------------------------------------------------------|----------------|------------------|----------------|
| Peak power dissipation, with a 10/1000us waveform (1) (2) (Fig.1)                | $P_{PPM}$      | W                | 400            |
| Peak pulse current, with a 10/1000us waveform (1)                                | $I_{PPM}$      | A                | See Next Table |
| Power dissipation, on infinite heat sink at $T_L=75^\circ\text{C}$               | $P_D$          | W                | 1.0            |
| Peak forward surge current, 8.3 ms single half sine-wave unidirectional only (2) | $I_{FSM}$      | A                | 40             |
| Operating junction and storage temperature range                                 | $T_J, T_{STG}$ | $^\circ\text{C}$ | -55 to +150    |

■Electrical Characteristics ( $T_a=25^\circ\text{C}$  Unless otherwise specified)

| PARAMETER                                                                  | SYMBOL | UNIT | VALUE   |
|----------------------------------------------------------------------------|--------|------|---------|
| Maximum instantaneous forward voltage @ at 25A for unidirectional only (3) | $V_F$  | V    | 3.5/5.0 |
| Maximum instantaneous forward voltage @ at 1A for unidirectional only      | $V_F$  | V    | 1.5     |

# SMAJ SERIES

Characteristics at Ta = 25°C

Table 1

| Type     |           | Reverse Stand-off Voltage | Breakdown Voltage                |      | Test Current   | Reverse Leakage                   | Max. Clamp Voltage               | Peak Pulse Current | Package              |    |
|----------|-----------|---------------------------|----------------------------------|------|----------------|-----------------------------------|----------------------------------|--------------------|----------------------|----|
|          |           |                           | V <sub>BR</sub> @ I <sub>T</sub> |      | I <sub>T</sub> | I <sub>R</sub> @ V <sub>RRM</sub> | V <sub>C</sub> @ I <sub>PP</sub> | I <sub>PP</sub>    | SMA                  |    |
|          |           | V <sub>RRM</sub>          | Min                              | Max  |                |                                   |                                  |                    | Device Marking Ccode |    |
| UNI      | BI        | V                         | V                                | V    | mA             | μA                                | V                                | A                  | UNI                  | BI |
| SMAJ5.0A | SMAJ5.0CA | 5                         | 6.4                              | 7    | 10             | 800                               | 9.2                              | 43.5               | AE                   | WE |
| SMAJ6.0A | SMAJ6.0CA | 6                         | 6.67                             | 7.37 | 10             | 800                               | 10.3                             | 38.8               | AG                   | WG |
| SMAJ6.5A | SMAJ6.5CA | 6.5                       | 7.22                             | 7.98 | 10             | 500                               | 11.2                             | 35.7               | AK                   | WK |
| SMAJ7.0A | SMAJ7.0CA | 7                         | 7.78                             | 8.6  | 10             | 200                               | 12.0                             | 33.3               | AM                   | WM |
| SMAJ7.5A | SMAJ7.5CA | 7.5                       | 8.33                             | 9.21 | 1              | 100                               | 12.9                             | 31.0               | AP                   | WP |
| SMAJ8.0A | SMAJ8.0CA | 8                         | 8.89                             | 9.83 | 1              | 50                                | 13.6                             | 29.4               | AR                   | WR |
| SMAJ8.5A | SMAJ8.5CA | 8.5                       | 9.44                             | 10.4 | 1              | 20                                | 14.4                             | 27.8               | AT                   | WT |
| SMAJ9.0A | SMAJ9.0CA | 9                         | 10                               | 11.1 | 1              | 10                                | 15.4                             | 26.0               | AV                   | WV |
| SMAJ10A  | SMAJ10CA  | 10                        | 11.1                             | 12.3 | 1              | 5                                 | 17.0                             | 23.5               | AX                   | WX |
| SMAJ11A  | SMAJ11CA  | 11                        | 12.2                             | 13.5 | 1              | 1                                 | 18.2                             | 22.0               | AZ                   | WZ |
| SMAJ12A  | SMAJ12CA  | 12                        | 13.3                             | 14.7 | 1              | 1                                 | 19.9                             | 20.1               | BE                   | XE |
| SMAJ13A  | SMAJ13CA  | 13                        | 14.4                             | 15.9 | 1              | 1                                 | 21.5                             | 18.6               | BG                   | XG |
| SMAJ14A  | SMAJ14CA  | 14                        | 15.6                             | 17.2 | 1              | 1                                 | 23.2                             | 17.2               | BK                   | XK |
| SMAJ15A  | SMAJ15CA  | 15                        | 16.7                             | 18.5 | 1              | 1                                 | 24.4                             | 16.4               | BM                   | XM |
| SMAJ16A  | SMAJ16CA  | 16                        | 17.8                             | 19.7 | 1              | 1                                 | 26.0                             | 15.4               | BP                   | XP |
| SMAJ17A  | SMAJ17CA  | 17                        | 18.9                             | 20.9 | 1              | 1                                 | 27.6                             | 14.5               | BR                   | XR |
| SMAJ18A  | SMAJ18CA  | 18                        | 20                               | 22.1 | 1              | 1                                 | 29.2                             | 13.7               | BT                   | XT |
| SMAJ20A  | SMAJ20CA  | 20                        | 22.2                             | 24.5 | 1              | 1                                 | 32.4                             | 12.3               | BV                   | XV |
| SMAJ22A  | SMAJ22CA  | 22                        | 24.4                             | 26.9 | 1              | 1                                 | 35.5                             | 11.3               | BX                   | XX |
| SMAJ24A  | SMAJ24CA  | 24                        | 26.7                             | 29.5 | 1              | 1                                 | 38.9                             | 10.3               | BZ                   | XZ |
| SMAJ26A  | SMAJ26CA  | 26                        | 28.9                             | 31.9 | 1              | 1                                 | 42.1                             | 9.5                | CE                   | YE |
| SMAJ28A  | SMAJ28CA  | 28                        | 31.1                             | 34.4 | 1              | 1                                 | 45.4                             | 8.8                | CG                   | YG |
| SMAJ30A  | SMAJ30CA  | 30                        | 33.3                             | 36.8 | 1              | 1                                 | 48.4                             | 8.3                | CK                   | YK |
| SMAJ33A  | SMAJ33CA  | 33                        | 36.7                             | 40.6 | 1              | 1                                 | 53.3                             | 7.5                | CM                   | YM |
| SMAJ36A  | SMAJ36CA  | 36                        | 40                               | 44.2 | 1              | 1                                 | 58.1                             | 6.9                | CP                   | YP |
| SMAJ40A  | SMAJ40CA  | 40                        | 44.4                             | 49.1 | 1              | 1                                 | 64.5                             | 6.2                | CR                   | YR |
| SMAJ43A  | SMAJ43CA  | 43                        | 47.8                             | 52.8 | 1              | 1                                 | 69.4                             | 5.8                | CT                   | YT |
| SMAJ45A  | SMAJ45CA  | 45                        | 50                               | 55.3 | 1              | 1                                 | 72.7                             | 5.5                | CV                   | YV |
| SMAJ48A  | SMAJ48CA  | 48                        | 53.3                             | 58.9 | 1              | 1                                 | 77.4                             | 5.2                | CX                   | YX |
| SMAJ51A  | SMAJ51CA  | 51                        | 56.7                             | 62.7 | 1              | 1                                 | 82.4                             | 4.9                | CZ                   | YZ |
| SMAJ54A  | SMAJ54CA  | 54                        | 60                               | 66.3 | 1              | 1                                 | 87.1                             | 4.6                | RE                   | ZE |
| SMAJ58A  | SMAJ58CA  | 58                        | 64.4                             | 71.2 | 1              | 1                                 | 93.6                             | 4.3                | RG                   | ZG |
| SMAJ60A  | SMAJ60CA  | 60                        | 66.7                             | 73.7 | 1              | 1                                 | 96.8                             | 4.1                | RK                   | ZK |
| SMAJ64A  | SMAJ64CA  | 64                        | 71.1                             | 78.6 | 1              | 1                                 | 103.0                            | 3.9                | RM                   | ZM |
| SMAJ70A  | SMAJ70CA  | 70                        | 77.8                             | 86   | 1              | 1                                 | 113.0                            | 3.5                | RP                   | ZP |
| SMAJ75A  | SMAJ75CA  | 75                        | 83.3                             | 92.1 | 1              | 1                                 | 121.0                            | 3.3                | RR                   | ZR |
| SMAJ78A  | SMAJ78CA  | 78                        | 86.7                             | 95.8 | 1              | 1                                 | 126.0                            | 3.2                | RT                   | ZT |
| SMAJ85A  | SMAJ85CA  | 85                        | 94.4                             | 104  | 1              | 1                                 | 137.0                            | 2.9                | RV                   | ZV |
| SMAJ90A  | SMAJ90CA  | 90                        | 100                              | 111  | 1              | 1                                 | 146.0                            | 2.7                | RX                   | ZX |
| SMAJ100A | SMAJ100CA | 100                       | 111                              | 123  | 1              | 1                                 | 162.0                            | 2.5                | RZ                   | ZZ |
| SMAJ110A | SMAJ110CA | 110                       | 122                              | 135  | 1              | 1                                 | 177.0                            | 2.3                | SE                   | VE |
| SMAJ120A | SMAJ120CA | 120                       | 133                              | 147  | 1              | 1                                 | 193.0                            | 2.1                | SG                   | VG |
| SMAJ130A | SMAJ130CA | 130                       | 144                              | 159  | 1              | 1                                 | 209.0                            | 1.9                | SK                   | VK |
| SMAJ150A | SMAJ150CA | 150                       | 167                              | 185  | 1              | 1                                 | 243.0                            | 1.6                | SM                   | VM |
| SMAJ160A | SMAJ160CA | 160                       | 178                              | 197  | 1              | 1                                 | 259.0                            | 1.5                | SP                   | VP |
| SMAJ170A | SMAJ170CA | 170                       | 189                              | 209  | 1              | 1                                 | 275.0                            | 1.5                | SR                   | VR |
| SMAJ180A | SMAJ180CA | 180                       | 201                              | 222  | 1              | 1                                 | 292.0                            | 1.4                | ST                   | VT |
| SMAJ200A | SMAJ200CA | 200                       | 224                              | 247  | 1              | 1                                 | 324.0                            | 1.2                | SV                   | VV |
| SMAJ220A | SMAJ220CA | 220                       | 246                              | 272  | 1              | 1                                 | 356.0                            | 1.1                | SX                   | VX |
| SMAJ250A | SMAJ250CA | 250                       | 279                              | 309  | 1              | 1                                 | 405.0                            | 1.0                | SZ                   | VZ |
| SMAJ300A | SMAJ300CA | 300                       | 335                              | 371  | 1              | 1                                 | 486.0                            | 0.8                | TE                   | UE |
| SMAJ350A | SMAJ350CA | 350                       | 391                              | 432  | 1              | 1                                 | 567.0                            | 0.7                | TG                   | UG |
| SMAJ400A | SMAJ400CA | 400                       | 447                              | 494  | 1              | 1                                 | 648.0                            | 0.6                | TK                   | UK |
| SMAJ440A | SMAJ440CA | 440                       | 492                              | 543  | 1              | 1                                 | 713.0                            | 0.6                | TM                   | UM |

# SMAJ SERIES

Notes:

- (4) Pulse test:  $t_p \leq 50\text{ms}$
- (5) Surge current waveform per Fig. 3 and derated per Fig.2.
- (6) For bi-directional types having  $V_{RWM}$  of 10 V and less, the  $I_R$  limit is doubled.

## ■ Characteristics (Typical)

FIG1: Peak Pulse Power Rating Curve

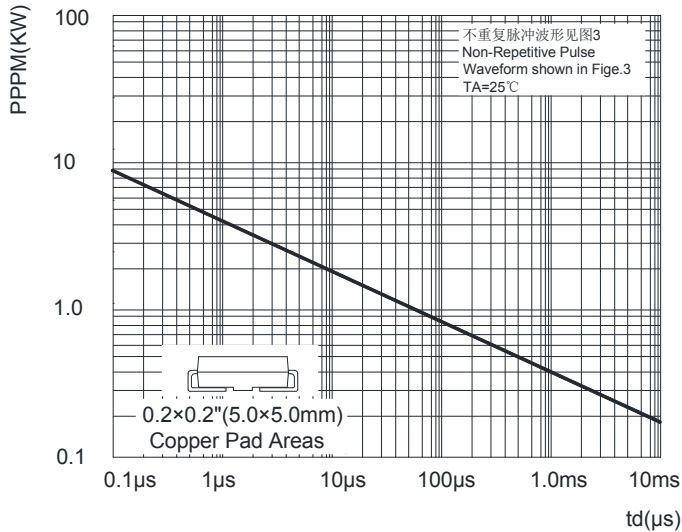


FIG2: Pulse Power or Current vs. Initial Junction Temperature

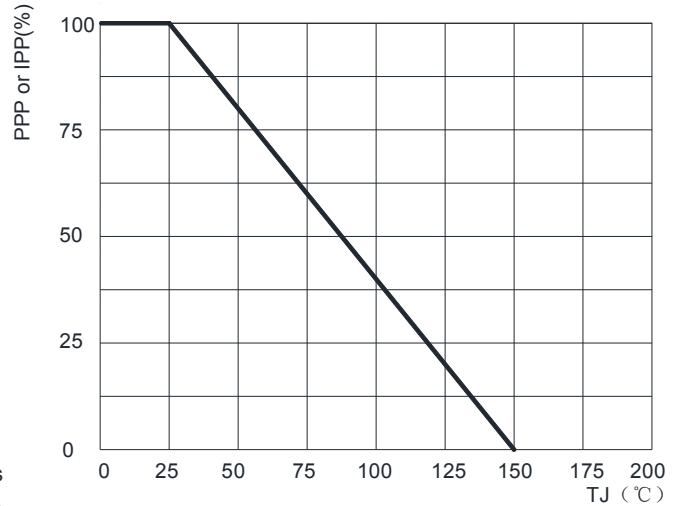


FIG3: Pulse Waveform

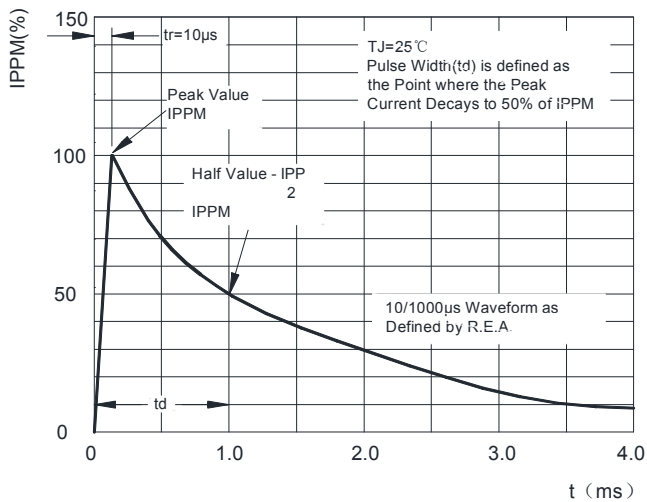


FIG4: Typical Transient Thermal Impedance

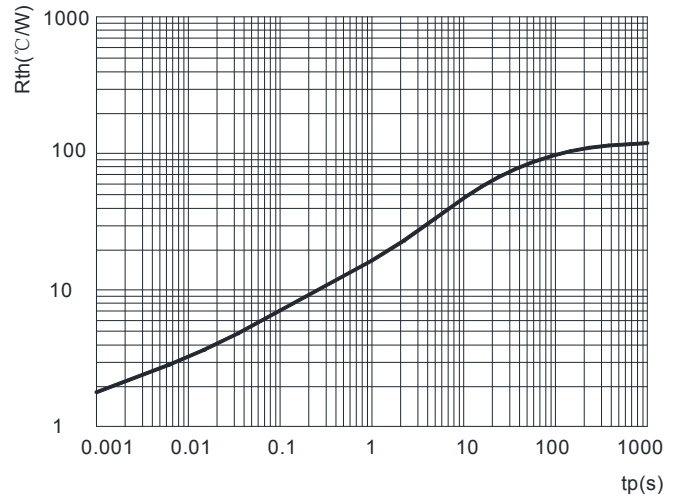
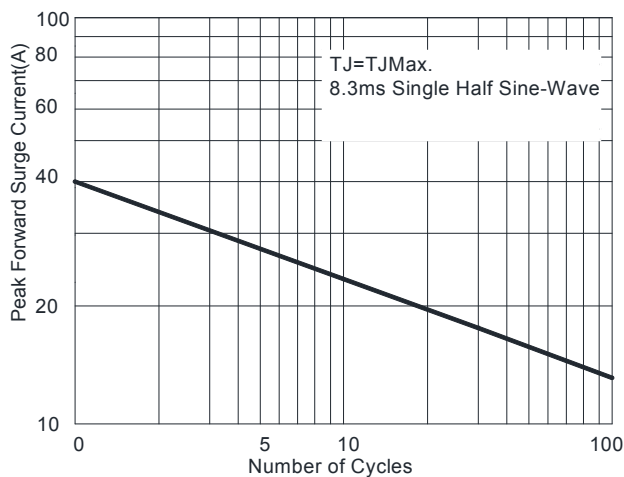


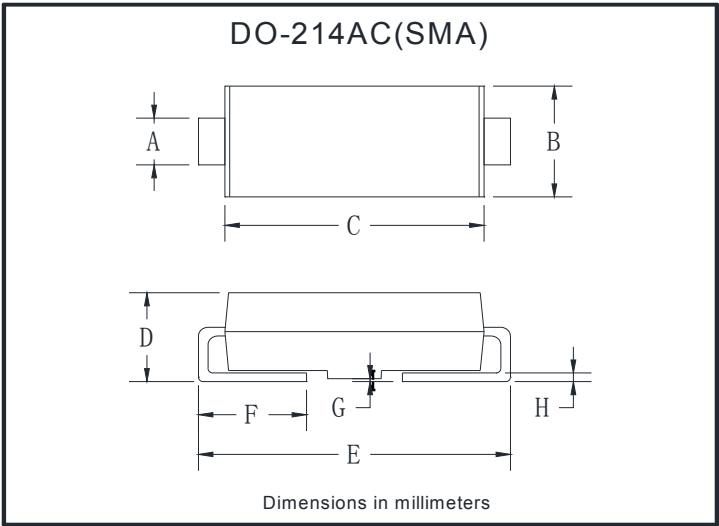
FIG5: Maximum Non-Repetitive Surge Current



# SMAJ SERIES

## ■Ordering Information (Example)

| P/N           | PKG           | QTY  |
|---------------|---------------|------|
| SMAJXXXXA(CA) | SMA(DO-214AC) | 5000 |



| DO-214AC(SMA) |      |      |
|---------------|------|------|
| Dim           | Min  | Max  |
| A             | 1.25 | 1.58 |
| B             | 2.40 | 2.83 |
| C             | 4.25 | 4.75 |
| D             | 1.90 | 2.30 |
| E             | 4.93 | 5.28 |
| F             | 0.76 | 1.41 |
| G             | 0.08 | 0.20 |
| H             | 0.15 | 0.31 |