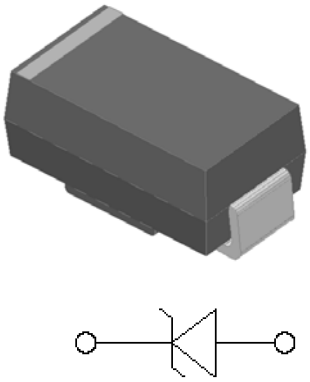
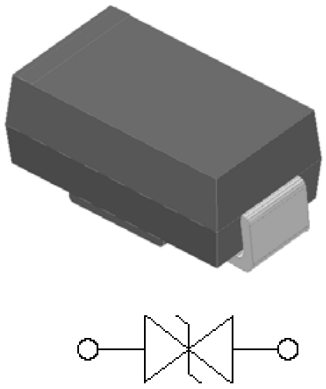
# Surface Mount Transient Voltage Suppressor Diodes

**Uni-directional**



**Bi-directional**



## Features

- For surface mounted applications
- Low-profile package
- Ideal for automated placement
- Available in Unidirectional and Bidirectional
- 600 W peak pulse power capability with a 10/1000 μs 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

## 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 (Ta=25℃ Unless otherwise specified)

| PARAMETER | SYMBOL | UNIT | Max |
|---|---|---|---|
| Peak power dissipation, with a 10/1000us waveform (1) (2) (Fig.1) | $P_{PPM}$ | W | 600 |
| Peak pulse current, with a 10/1000us waveform(1) | $I_{PPM}$ | A | See Next Table |
| Power dissipation, on infinite heat sink at TL=75℃ | $P_D$ | W | 3.0 |
| Peak forward surge current, 8.3 ms single half sine-wave unidirectional only (2) | $I_{FSM}$ | A | 60 |
| Operating junction and storage temperature range | $T_J$,$T_{STG}$ | ℃ | -55 to +150 |
| Electrostatic Discharge（IEC61000-4-2 air discharge） | ESD | KV | ±30 |
| Electrostatic Discharge（IEC61000-4-2 contact discharge） | | | |

## ■Electrical Characteristics（Ta=25℃ Unless otherwise specified）

| PARAMETER | SYMBOL | UNIT | VALUE |
|---|---|---|---|
| Maximum instantaneous forward voltage @ at 25A for unidirectional only | $V_F$ | V | 3.5 |

## ■Thermal Characteristics （$T_a$=25℃ Unless otherwise specified）

| PARAMETER | SYMBOL | UNIT | Conditions | VALUE |
|---|---|---|---|---|
| Thermal resistance(Typical) | $R_{\theta JL}$ | ℃/W | junction to lead | 30 |
| | $R_{\theta JA}$ | ℃/W | junction to ambient | 120 |

Notes:

(1) Non-repetitive current pulse, per Fig. 3 and derated above $T_A$= 25℃per Fig.2

(2) Thermal resistance from junction to ambient and from junction to lead mounted on P.C.B. with 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pad areas

## ■Electrical Characteristics（$T_a$=25℃ Unless otherwise specified）

| Part Number (Uni) | Part Number (Bi) | Breakdown Voltage $V_{BR}$@$I_T$ | | | Maximum Reverse Leakage $I_R$@ $V_{RWM}$ (μA) | Working Peak Reverse Voltage $V_{RWM}$ (V) | Maximum Reverse Surge Current $I_{PP}$(4) (A) | Maximum Clamping Voltage Vc @ $I_{PP}$ (V) |
|---|---|---|---|---|---|---|---|---|
| | | Min(V) | Max (V) | $I_T$(3)(mA) | | | | |
| SMA6J5.0A | SMA6J5.0CA | 6.40 | 7.07 | 10 | 800 | 5.0 | 65.22 | 9.2 |
| SMA6J6.0A | SMA6J6.0CA | 6.67 | 7.37 | 10 | 800 | 6.0 | 58.25 | 10.3 |
| SMA6J6.5A | SMA6J6.5CA | 7.22 | 7.98 | 10 | 500 | 6.5 | 53.57 | 11.2 |
| SMA6J7.0A | SMA6J7.0CA | 7.78 | 8.60 | 10 | 200 | 7.0 | 50.00 | 12.0 |
| SMA6J7.5A | SMA6J7.5CA | 8.33 | 9.21 | 1 | 100 | 7.5 | 46.51 | 12.9 |
| SMA6J8.0A | SMA6J8.0CA | 8.89 | 9.83 | 1 | 50 | 8.0 | 44.12 | 13.6 |
| SMA6J8.5A | SMA6J8.5CA | 9.44 | 10.40 | 1 | 10 | 8.5 | 41.67 | 14.4 |
| SMA6J9.0A | SMA6J9.0CA | 10.00 | 11.10 | 1 | 5 | 9.0 | 38.96 | 15.4 |
| SMA6J10A | SMA6J10CA | 11.10 | 12.30 | 1 | 5 | 10.0 | 35.29 | 17.0 |
| SMA6J11A | SMA6J11CA | 12.20 | 13.50 | 1 | 5 | 11.0 | 32.97 | 18.2 |
| SMA6J12A | SMA6J12CA | 13.30 | 14.70 | 1 | 5 | 12.0 | 30.15 | 19.9 |
| SMA6J13A | SMA6J13CA | 14.40 | 15.90 | 1 | 1 | 13.0 | 27.91 | 21.5 |
| SMA6J14A | SMA6J14CA | 15.60 | 17.20 | 1 | 1 | 14.0 | 25.86 | 23.2 |
| SMA6J15A | SMA6J15CA | 16.70 | 18.50 | 1 | 1 | 15.0 | 24.59 | 24.4 |
| SMA6J16A | SMA6J16CA | 17.80 | 19.70 | 1 | 1 | 16.0 | 23.08 | 26.0 |
| SMA6J17A | SMA6J17CA | 18.90 | 20.90 | 1 | 1 | 17.0 | 21.74 | 27.6 |
| SMA6J18A | SMA6J18CA | 20.00 | 22.10 | 1 | 1 | 18.0 | 20.55 | 29.2 |
| SMA6J19A | SMA6J19CA | 21.10 | 23.30 | 1 | 1 | 19.0 | 19.49 | 30.8 |
| SMA6J20A | SMA6J20CA | 22.20 | 24.50 | 1 | 1 | 20.0 | 18.52 | 32.4 |
| SMA6J22A | SMA6J22CA | 24.40 | 26.90 | 1 | 1 | 22.0 | 16.90 | 35.5 |
| SMA6J24A | SMA6J24CA | 26.70 | 29.50 | 1 | 1 | 24.0 | 15.42 | 38.9 |
| SMA6J26A | SMA6J26CA | 28.90 | 31.90 | 1 | 1 | 26.0 | 14.25 | 42.1 |

## ■Electrical Characteristics（$T_a$=25℃ Unless otherwise specified）

| Part Number (Uni) | Part Number (Bi) | Breakdown Voltage $V_{BR}$@$I_T$ | | | Maximum Reverse Leakage $I_R$[6]@ $V_{RWM}$ (μA) | Working Peak Reverse Voltage $V_{RWM}$ (V) | Maximum Reverse Surge Current $I_{PP}$[5] (A) | Maximum Clamping Voltage Vc @ $I_{PP}$ (V) |
|---|---|---|---|---|---|---|---|---|
| | | Min(V) | Max (V) | $I_T$[4](mA) | | | | |
| SMA6J28A | SMA6J28CA | 31.10 | 34.40 | 1 | 1 | 28.0 | 13.22 | 45.4 |
| SMA6J30A | SMA6J30CA | 33.30 | 36.80 | 1 | 1 | 30.0 | 12.40 | 48.4 |
| SMA6J33A | SMA6J33CA | 36.70 | 40.60 | 1 | 1 | 33.0 | 11.26 | 53.3 |
| SMA6J36A | SMA6J36CA | 40.00 | 44.20 | 1 | 1 | 36.0 | 10.33 | 58.1 |
| SMA6J40A | SMA6J40CA | 44.40 | 49.10 | 1 | 1 | 40.0 | 9.30 | 64.5 |
| SMA6J43A | / | 47.80 | 52.80 | 1 | 1 | 43.0 | 8.65 | 69.4 |
| SMA6J45A | / | 50.00 | 55.30 | 1 | 1 | 45.0 | 8.25 | 72.7 |
| SMA6J48A | / | 53.30 | 58.90 | 1 | 1 | 48.0 | 7.75 | 77.4 |
| SMA6J51A | / | 56.70 | 62.70 | 1 | 1 | 51.0 | 7.28 | 82.4 |
| SMA6J54A | / | 60.00 | 66.30 | 1 | 1 | 54.0 | 6.89 | 87.1 |
| SMA6J58A | / | 64.40 | 71.20 | 1 | 1 | 58.0 | 6.41 | 93.6 |
| SMA6J60A | / | 66.70 | 73.70 | 1 | 1 | 60.0 | 6.20 | 96.8 |
| SMA6J64A | / | 71.10 | 78.60 | 1 | 1 | 64.0 | 5.83 | 103.0 |
| SMA6J70A | / | 77.80 | 86.00 | 1 | 1 | 70.0 | 5.31 | 113.0 |

Notes:
(3) Pulse test: $t_p$≤50ms.
(4) Surge current waveform per Fig. 3 and derated per Fig.2.

## ■ Characteristics (Typical)

FIG1:Peak Pulse Power Rating Curve

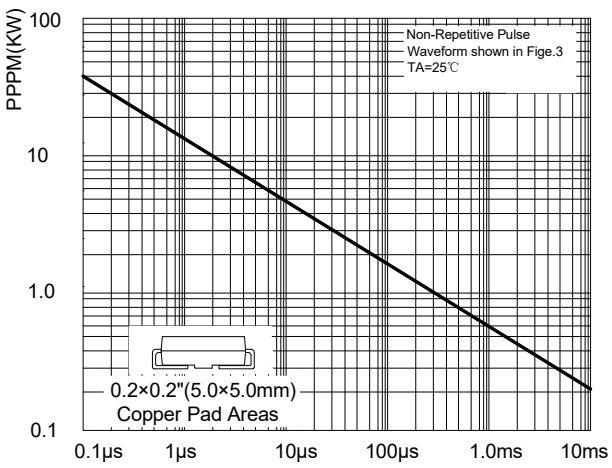



FIG2: Pulse Power or Current vs. Initial Junction Temperature

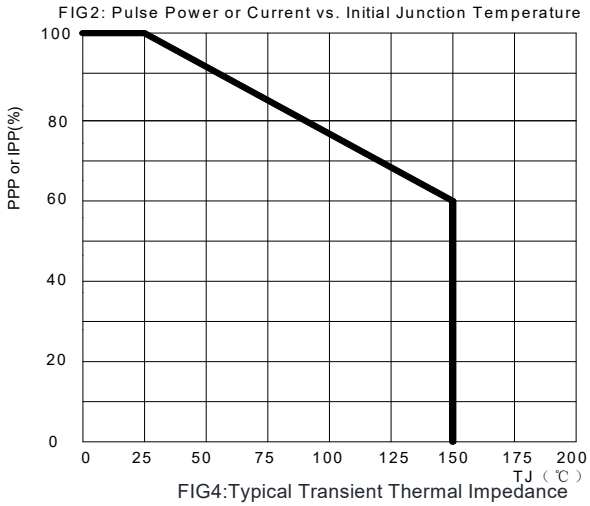



FIG3: Pulse Waveform

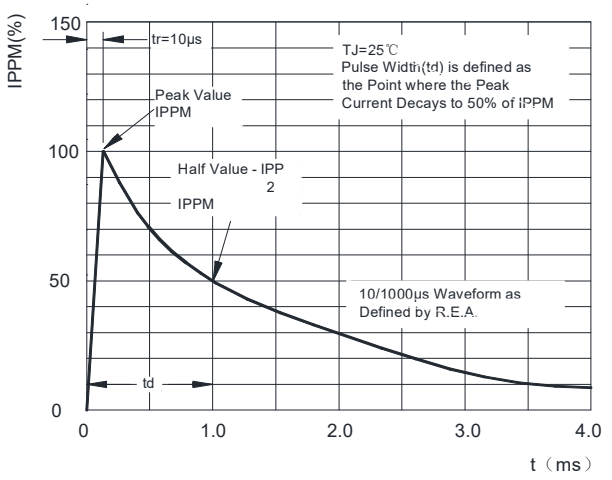
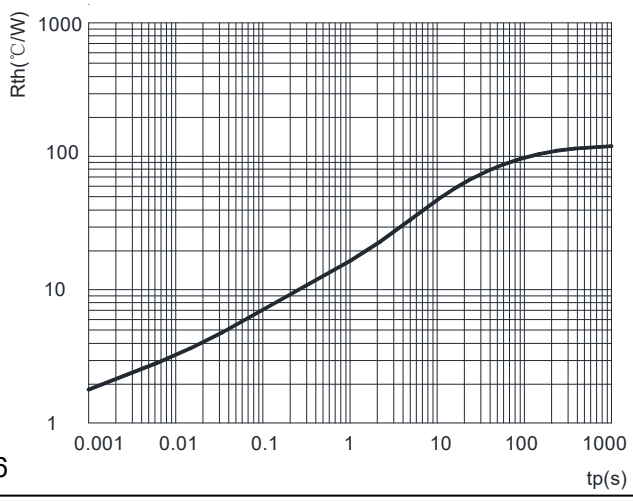



FIG4:Typical Transient Thermal Impedance



## ■ Characteristics (Typical)

FIG5: Maximum Non-Repetitive Surge Current

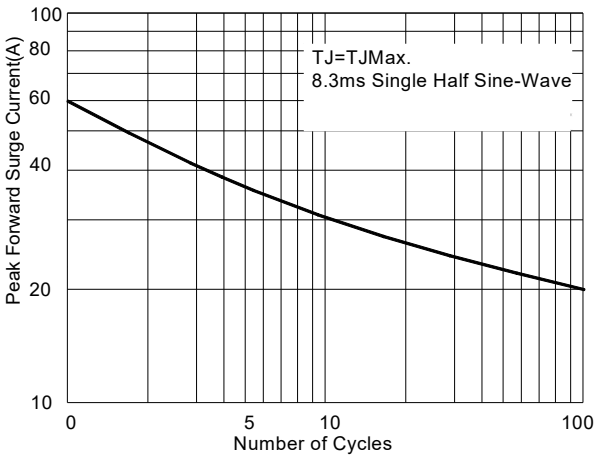
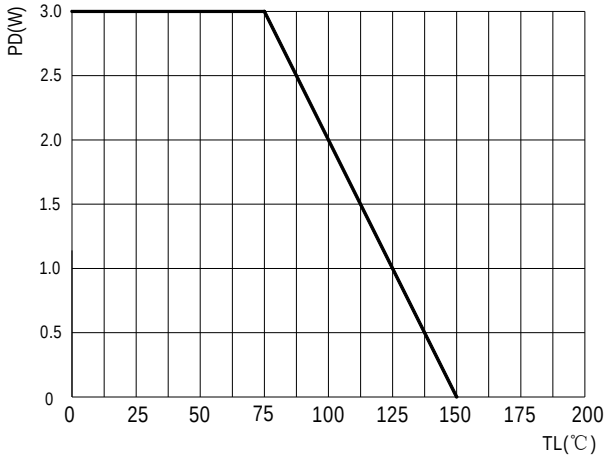



FIG6:Steady State Power Dissipation

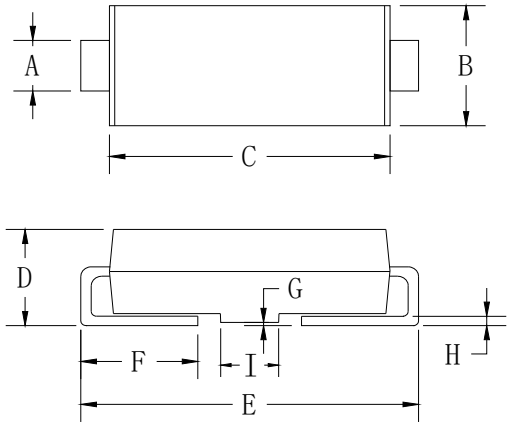



## ■Ordering Information (Example)

| PREFERED P/N | PACKAGE CODE | UNIT WEIGHT(g) | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---|---|---|---|---|---|---|
| SMA6J SERIES | F1 | Approximate 0.059 | 5000 | / | 80000 | 13” reel |
| SMA6J SERIES | F2 | Approximate 0.059 | 7500 | / | 120000 | 13” reel |
| SMA6J SERIES | F3 | Approximate 0.059 | 7500 | / | 60000 | 13” reel |
| SMA6J SERIES | F4 | Approximate 0.059 | 1800 | 7200 | 57600 | 7” reel |
| SMA6J SERIES | F5 | Approximate 0.059 | 2000 | 8000 | 64000 | 7” reel |
| SMA6J SERIES | F6 | Approximate 0.059 | 5000 | / | 100000 | 13” reel |

## ■ Outline Dimensions

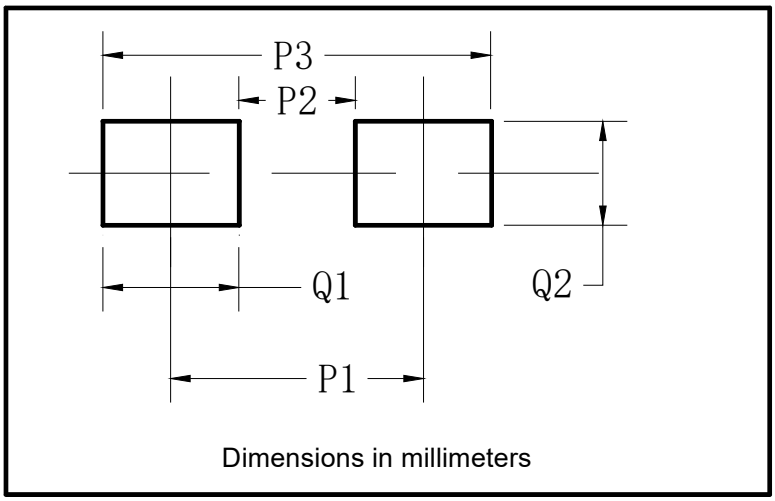
DO-214AC(SMA)




Dimensions in millimeters

| DO-214AC(SMA) | | |
|---|---|---|
| Dim | Min | Max |
| A | 1.25 | 1.58 |
| B | 2.40 | 2.83 |
| C | 4.00 | 4.75 |
| D | 1.90 | 2.30 |
| E | 4.93 | 5.28 |
| F | 0.76 | 1.41 |
| G | 0.05 | 0.20 |
| H | 0.15 | 0.31 |
| I | 1.70 | 2.10 |

## ■Suggested Pad Layout




| DO-214AC(SMA) | |
|---|---|
| **Dim** | **Millimeters** |
| P1 | 4.00 |
| P2 | 1.50 |
| P3 | 6.50 |
| Q1 | 2.50 |
| Q2 | 1.70 |

## Disclaimer

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