# S-6AJ Series

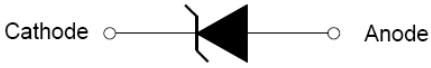
## 600W Transient Voltage Suppressor

### DESCRIPTION:

TVS diodes can be used in a wide range of applications which like consumer electronic products, automotive industries, munitions, telecommunications, aerospace industries, and intelligent control systems.

SMA

Bi-directional




Uni-direction

Symbol

### FEATURES:

- Glass passivated or planner junction
- Excellent clamping capability
- Repetition rate (duty cycle): 0.01%
- Typical $I_R$ less than 1μA above 10V.
- Low profile package and low inductance
- 600W Peak Pulse power capability at 10×1000μs waveform.
- Fast response time: typically less than 1.0ps from 0V to $V_{BR}$ min.
- High temperature soldering: 260℃/10s at terminals.
- Plastic package has Underwriters Laboratory Flammability 94V-0.
- For surface mounted applications in order to optimize board space
- AEC-Q101 qualified.

### ABSOLUTE MAXIMUM RATINGS($T_A$=25ºC, RH=45%-75%, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Power dissipation on infinite heatsink at $T_L$=75℃ | $P_{M(AV)}$ | 3.0 | W |
| Peak pulse power dissipation on 10/1000μs waveform | $P_{PP}$ | 600 | W |
| Maximum instantaneous forward voltage at 25A for unidirectional only | $V_F$ | 3.5 | V |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 35 | ℃/W |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 200 | ℃/W |
| Storage temperature range | $T_{stg}$ | -55 to +150 | ℃ |
| Operating junction temperature range | $T_j$ | -55 to +150 | ℃ |

**ELECTRICAL CHARACTERISTICS**($T_A$=25℃)

| Part Number | | $V_R$ | $I_R$@ $V_R$ | $V_{BR}$@$I_T$ | | $I_T$ | $V_C$@$I_{PP}$ | $I_{PP}$① |
|---|---|---|---|---|---|---|---|---|
| Uni-Polar | Bi-Polar | V | μA | min(V) | max(V) | mA | max(V) | A |
| S-6AJ5.0A | S-6AJ5.0CA | 5.0 | 100 | 6.40 | 7.00 | 10 | 9.2 | 65.2 |
| S-6AJ6.0A | S-6AJ6.0CA | 6.0 | 100 | 6.67 | 7.37 | 10 | 10.3 | 58.3 |
| S-6AJ6.5A | S-6AJ6.5CA | 6.5 | 50 | 7.22 | 7.98 | 10 | 11.2 | 53.6 |
| S-6AJ7.0A | S-6AJ7.0CA | 7.0 | 50 | 7.78 | 8.60 | 10 | 12.0 | 50.0 |
| S-6AJ7.5A | S-6AJ7.5CA | 7.5 | 50 | 8.33 | 9.21 | 1 | 12.9 | 46.5 |
| S-6AJ8.0A | S-6AJ8.0CA | 8.0 | 20 | 8.89 | 9.83 | 1 | 13.6 | 44.1 |
| S-6AJ8.5A | S-6AJ8.5CA | 8.5 | 10 | 9.44 | 10.40 | 1 | 14.4 | 41.7 |
| S-6AJ9.0A | S-6AJ9.0CA | 9.0 | 5 | 10.00 | 11.10 | 1 | 15.4 | 39.0 |
| S-6AJ10A | S-6AJ10CA | 10.0 | 2 | 11.10 | 12.30 | 1 | 17.0 | 35.3 |
| S-6AJ11A | S-6AJ11CA | 11.0 | 1 | 12.20 | 13.50 | 1 | 18.2 | 33.0 |
| S-6AJ12A | S-6AJ12CA | 12.0 | 1 | 13.30 | 14.70 | 1 | 19.9 | 30.2 |
| S-6AJ13A | S-6AJ13CA | 13.0 | 1 | 14.40 | 15.90 | 1 | 21.5 | 27.9 |
| S-6AJ14A | S-6AJ14CA | 14.0 | 1 | 15.60 | 17.20 | 1 | 23.2 | 25.9 |
| S-6AJ15A | S-6AJ15CA | 15.0 | 1 | 16.70 | 18.50 | 1 | 24.4 | 24.6 |
| S-6AJ16A | S-6AJ16CA | 16.0 | 1 | 17.80 | 19.70 | 1 | 26.0 | 23.1 |
| S-6AJ17A | S-6AJ17CA | 17.0 | 1 | 18.90 | 20.90 | 1 | 27.6 | 21.8 |
| S-6AJ18A | S-6AJ18CA | 18.0 | 1 | 20.00 | 22.10 | 1 | 29.2 | 20.6 |
| S-6AJ20A | S-6AJ20CA | 20.0 | 1 | 22.20 | 24.50 | 1 | 32.4 | 18.6 |
| S-6AJ22A | S-6AJ22CA | 22.0 | 1 | 24.40 | 26.90 | 1 | 35.5 | 16.9 |
| S-6AJ24A | S-6AJ24CA | 24.0 | 1 | 26.70 | 29.50 | 1 | 38.9 | 15.4 |
| S-6AJ26A | S-6AJ26CA | 26.0 | 1 | 28.90 | 31.90 | 1 | 42.1 | 14.3 |
| S-6AJ28A | S-6AJ28CA | 28.0 | 1 | 31.10 | 34.40 | 1 | 45.4 | 13.2 |
| S-6AJ30A | S-6AJ30CA | 30.0 | 1 | 33.30 | 36.80 | 1 | 48.4 | 12.4 |
| S-6AJ33A | S-6AJ33CA | 33.0 | 1 | 36.70 | 40.60 | 1 | 53.3 | 11.3 |
| S-6AJ36A | S-6AJ36CA | 36.0 | 1 | 40.00 | 44.20 | 1 | 58.1 | 10.4 |
| S-6AJ40A | S-6AJ40CA | 40.0 | 1 | 44.40 | 49.10 | 1 | 64.5 | 9.3 |
| S-6AJ43A | S-6AJ43CA | 43.0 | 1 | 47.80 | 52.80 | 1 | 69.4 | 8.7 |
| S-6AJ45A | S-6AJ45CA | 45.0 | 1 | 50.00 | 55.30 | 1 | 72.7 | 8.3 |
| S-6AJ48A | S-6AJ48CA | 48.0 | 1 | 53.30 | 58.90 | 1 | 77.4 | 7.8 |
| S-6AJ51A | S-6AJ51CA | 51.0 | 1 | 56.70 | 62.70 | 1 | 82.4 | 7.3 |

**ELECTRICAL CHARACTERISTICS**($T_A$=25℃, continued)

| Part Number | | $V_R$ | $I_R$@ $V_R$ | $V_{BR}$@$I_T$ | | $I_T$ | $V_C$@$I_{PP}$ | $I_{PP}$① |
|---|---|---|---|---|---|---|---|---|
| Uni-Polar | Bi-Polar | V | μA | min(V) | max(V) | mA | max(V) | A |
| S-6AJ54A | S-6AJ54CA | 54.0 | 1 | 60.00 | 66.30 | 1 | 87.1 | 6.9 |
| S-6AJ58A | S-6AJ58CA | 58.0 | 1 | 64.40 | 71.20 | 1 | 93.6 | 6.4 |
| S-6AJ60A | S-6AJ60CA | 60.0 | 1 | 66.70 | 73.70 | 1 | 96.8 | 6.2 |
| S-6AJ64A | S-6AJ64CA | 64.0 | 1 | 71.10 | 78.60 | 1 | 103.0 | 5.8 |
| S-6AJ70A | S-6AJ70CA | 70.0 | 1 | 77.80 | 86.00 | 1 | 113.0 | 5.3 |
| S-6AJ75A | S-6AJ75CA | 75.0 | 1 | 83.30 | 92.10 | 1 | 121.0 | 5.0 |
| S-6AJ78A | S-6AJ78CA | 78.0 | 1 | 86.70 | 95.80 | 1 | 126.0 | 4.8 |
| S-6AJ85A | S-6AJ85CA | 85.0 | 1 | 94.40 | 104.0 | 1 | 137.0 | 4.4 |
| S-6AJ90A | S-6AJ90CA | 90.0 | 1 | 100.0 | 111.0 | 1 | 146.0 | 4.1 |
| S-6AJ100A | S-6AJ100CA | 100.0 | 1 | 100.0 | 111.0 | 1 | 162.0 | 3.7 |
| S-6AJ110A | S-6AJ110CA | 110.0 | 1 | 111.0 | 123.0 | 1 | 177.0 | 3.4 |
| S-6AJ120A | S-6AJ120CA | 120.0 | 1 | 122.0 | 135.0 | 1 | 193.0 | 3.1 |
| S-6AJ130A | S-6AJ130CA | 130.0 | 1 | 133.0 | 147.0 | 1 | 209.0 | 2.9 |
| S-6AJ150A | S-6AJ150CA | 150.0 | 1 | 144.0 | 159.0 | 1 | 243.0 | 2.5 |
| S-6AJ160A | S-6AJ160CA | 160.0 | 1 | 167.0 | 185.0 | 1 | 259.0 | 2.3 |
| S-6AJ170A | S-6AJ170CA | 170.0 | 1 | 178.0 | 197.0 | 1 | 275.0 | 2.2 |
| S-6AJ180A | S-6AJ180CA | 180.0 | 1 | 189.0 | 209.0 | 1 | 292.0 | 2.1 |
| S-6AJ200A | S-6AJ200CA | 200.0 | 1 | 201.0 | 222.0 | 1 | 324.0 | 1.9 |

① Surge waveform: 10/1000μs

$V_R$: Stand-off Voltage -- Maximum voltage that can be applied

$V_{BR}$: Breakdown Voltage

$V_C$: Clamping Voltage -- Peak voltage measured across the suppressor at a specified Ipp

$I_R$: Reverse Leakage Current

## ORDERING INFORMATION:

S-6AJ xx C A

600W SMA Series

$V_R$ Voltage

C: Bi-directional

5% $V_{BR}$ Voltage tolerance

## RATINGS AND V-I CHARACTERISTICS CURVES ($T_A$=25ºC, unless otherwise noted)

**FIG.1:V- I curve characteristics (Uni-directional)**

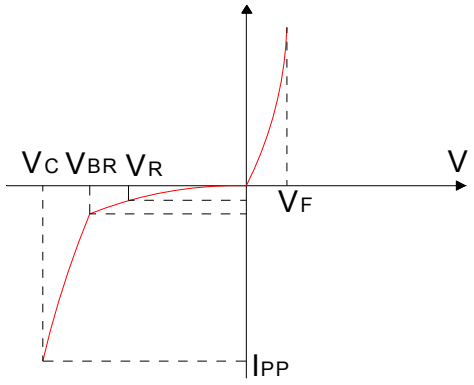



**FIG.2:V- I curve characteristics (Bi-directional)**

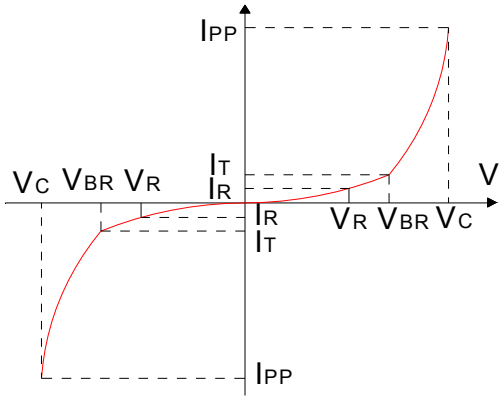



**FIG.3: Pulse waveform**

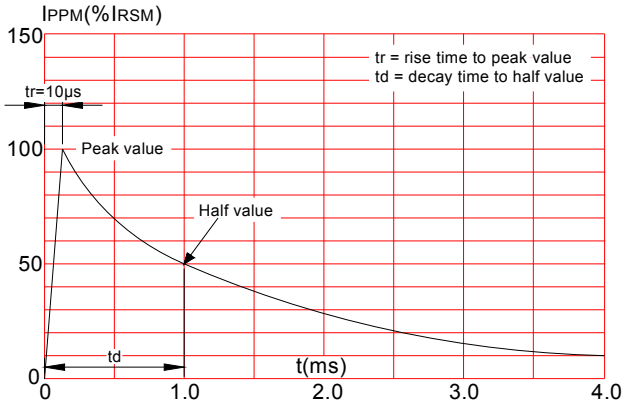
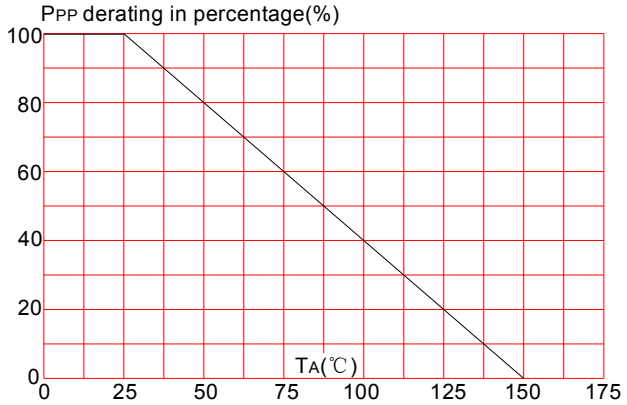


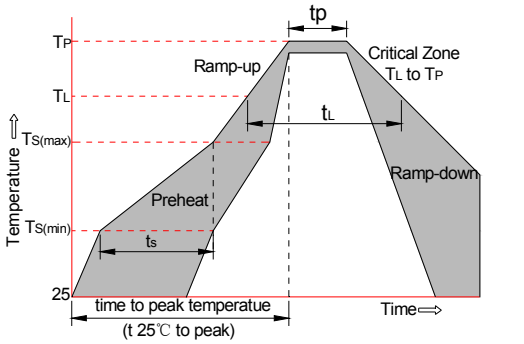

**FIG.4: Pulse derating curve**



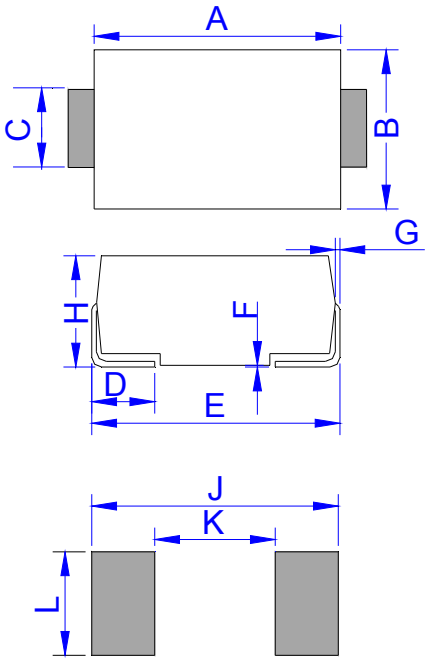
## SOLDERING PARAMETERS

| | | |
|---|---|---|
| Reflow Condition | | Pb-Free assembly (see FIG.5) |
| Pre Heat | -Temperature Min ($T_{s(min)}$) | +150℃ |
| | -Temperature Max($T_{s(max)}$) | +200℃ |
| | -Time (Min to Max) (ts) | 60-180 secs. |
| Average ramp up rate (Liquid us Temp ($T_L$)to peak) | | 3℃/sec. Max |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate | | 3℃/sec. Max |
| Reflow | -Temperature($T_L$)(Liquid us) | +217℃ |
| | -Temperature($t_L$) | 60-150 secs. |
| Peak Temp ($T_p$) | | +260(+0/-5)℃ |
| Time within 5℃of actual Peak Temp ($t_p$) | | 30 secs. Max |
| Ramp-down Rate | | 6℃/sec. Max |
| Time 25℃ to Peak Temp ($T_P$) | | 8 min. Max |
| Do not exceed | | +260℃ |

**FIG.5:** Reflow condition



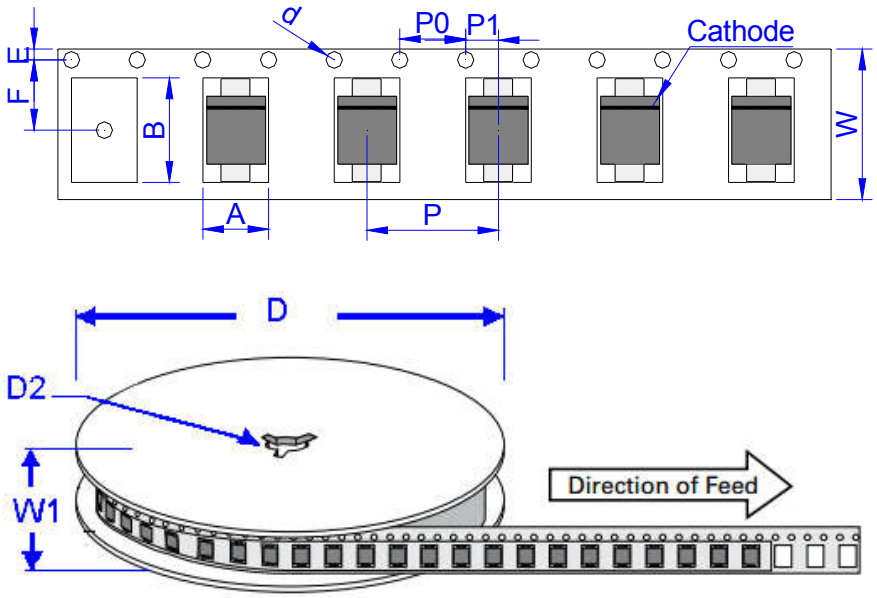

## PACKAGE MECHANICAL DATA




DO-214AC (SMA)

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.10 | 4.65 | 0.161 | 0.183 |
| B | 2.50 | 3.00 | 0.098 | 0.118 |
| C | 1.23 | 1.65 | 0.048 | 0.065 |
| D | 0.75 | 1.52 | 0.030 | 0.060 |
| E | 4.87 | 5.30 | 0.192 | 0.209 |
| F | 0.000 | 0.203 | 0.000 | 0.008 |
| G | 0.15 | 0.31 | 0.006 | 0.012 |
| H | 1.96 | 2.44 | 0.077 | 0.096 |
| J | 6.50 | | 0.256 | |
| K | | 2.30 | | 0.090 |
| L | 1.70 | | 0.067 | |

## TAPE AND REEL SPECIFICATION-SMA




| Ref. | Dimensions | |
|---|---|---|
| | Millimeters | Inches |
| A | 2.79 ± 0.3 | 0.110 ± 0.012 |
| B | 5.33 ± 0.3 | 0.210 ± 0.012 |
| d | 1.5 ± 0.1 | 0.059 ± 0.004 |
| D | 330.0 | 13.0 |
| D2 | 13 ± 1 | 0.512 ± 0.039 |
| E | 1.5 ± 0.2 | 0.059 ± 0.008 |
| F | 5.65 ± 0.2 | 0.222 ± 0.008 |
| P | 4.0 ± 0.2 | 0.157 ± 0.008 |
| P0 | 4.0 ± 0.2 | 0.157 ± 0.008 |
| P1 | 2.0 ± 0.2 | 0.079 ± 0.008 |
| W | 12.0 ± 0.2 | 0.472 ± 0.008 |
| W1 | 16.8 ± 2.0 | 0.661 ± 0.079 |

| OUTLINE | REEL (PCS) | PER CARTON (PCS) | REEL DIAMETERS (mm) |
|---|---|---|---|
| TAPING | 5,000 | 80,000 | 330 |



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