

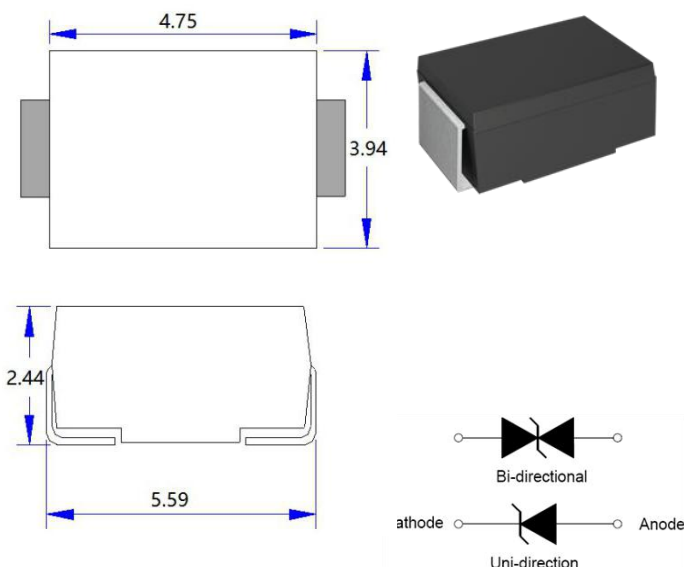
Description

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.

Features

- Glass passivated or planar junction
- Excellent clamping capability
- Repetition rate (duty cycle): 0.01%
- 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°C/10s at terminals.
- Plastic package has Underwriters Laboratory Flammability 94V-0.
- For surface mounted applications in order to optimize board space.

Dimensions & Symbol (Unit: mm Max)



Mechanical Characteristics

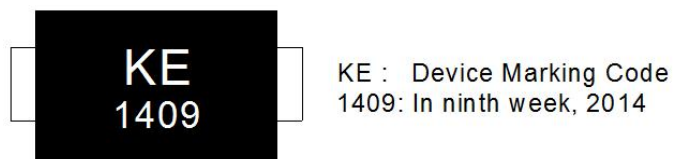
Package: SMB/DO-214AA

- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Polarity: Color band denotes cathode except bi-directional models
- Standard Packaging: 12mm tape (EIA STD RS-481)
- Weight: 0.10g
- Terminal Connections: See Diagram Below
- Marking Information: See Below

Applications

- I/O Interface.
- AC/DC Power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

Marking information



Ordering information

| Out line | Reel (pcs) | Per carton (pcs) | Reel diameters (mm) |
|----------|------------|------------------|---------------------|
| Taping | 3K | 48K | 330 |

Electrical characteristics ($T_A=25^\circ\text{C}$)

| Part Number | | Marking | | V_R | $I_R@V_R$ | $V_{BR}@I_T$ | | I_T | $V_C@I_{PP}$ | $I_{PP}^{\text{①}}$ |
|-------------|-----------|---------|----|-------|---------------|--------------|--------|-------|--------------|---------------------|
| Uni-Polar | Bi-Polar | Uni | Bi | V | μA | min(V) | max(V) | mA | max(V) | A |
| SMBJ3.3A | SMBJ3.3CA | SS | SC | 3.3 | 800 | 4.10 | 5.60 | 10 | 7.3 | 82.5 |
| SMBJ5.0A | SMBJ5.0CA | KE | AE | 5.0 | 800 | 6.40 | 7.00 | 10 | 9.2 | 65.2 |
| SMBJ6.0A | SMBJ6.0CA | KG | AG | 6.0 | 800 | 6.67 | 7.37 | 10 | 10.3 | 58.3 |
| SMBJ6.5A | SMBJ6.5CA | KK | AK | 6.5 | 500 | 7.22 | 7.98 | 10 | 11.2 | 53.6 |
| SMBJ7.0A | SMBJ7.0CA | KM | AM | 7.0 | 200 | 7.78 | 8.60 | 10 | 12.0 | 50.0 |
| SMBJ7.5A | SMBJ7.5CA | KP | AP | 7.5 | 100 | 8.33 | 9.21 | 1 | 12.9 | 46.5 |
| SMBJ8.0A | SMBJ8.0CA | KR | AR | 8.0 | 50 | 8.89 | 9.83 | 1 | 13.6 | 44.1 |
| SMBJ8.5A | SMBJ8.5CA | KT | AT | 8.5 | 20 | 9.44 | 10.40 | 1 | 14.4 | 41.7 |
| SMBJ9.0A | SMBJ9.0CA | KV | AV | 9.0 | 10 | 10.00 | 11.10 | 1 | 15.4 | 39.0 |
| SMBJ10A | SMBJ10CA | KX | AX | 10 | 10 | 11.10 | 12.30 | 1 | 17.0 | 35.3 |
| SMBJ11A | SMBJ11CA | KZ | AZ | 11 | 1 | 12.20 | 13.50 | 1 | 18.2 | 33.0 |
| SMBJ12A | SMBJ12CA | LE | BE | 12 | 1 | 13.30 | 14.70 | 1 | 19.9 | 30.2 |
| SMBJ13A | SMBJ13CA | LG | BG | 13 | 1 | 14.40 | 15.90 | 1 | 21.5 | 27.9 |
| SMBJ14A | SMBJ14CA | LK | BK | 14 | 1 | 15.60 | 17.20 | 1 | 23.2 | 25.9 |
| SMBJ15A | SMBJ15CA | LM | BM | 15 | 1 | 16.70 | 18.50 | 1 | 24.4 | 24.6 |
| SMBJ16A | SMBJ16CA | LP | BP | 16 | 1 | 17.80 | 19.70 | 1 | 26.0 | 23.1 |
| SMBJ17A | SMBJ17CA | LR | BR | 17 | 1 | 18.90 | 20.90 | 1 | 27.6 | 21.8 |
| SMBJ18A | SMBJ18CA | LT | BT | 18 | 1 | 20.00 | 22.10 | 1 | 29.2 | 20.6 |
| SMBJ20A | SMBJ20CA | LV | BV | 20 | 1 | 22.20 | 24.50 | 1 | 32.4 | 18.6 |
| SMBJ22A | SMBJ22CA | LX | BX | 22 | 1 | 24.40 | 26.90 | 1 | 35.5 | 16.9 |
| SMBJ24A | SMBJ24CA | LZ | BZ | 24 | 1 | 26.70 | 29.50 | 1 | 38.9 | 15.4 |
| SMBJ26A | SMBJ26CA | ME | CE | 26 | 1 | 28.90 | 31.90 | 1 | 42.1 | 14.3 |
| SMBJ28A | SMBJ28CA | MG | CG | 28 | 1 | 31.10 | 34.40 | 1 | 45.4 | 13.2 |
| SMBJ30A | SMBJ30CA | MK | CK | 30 | 1 | 33.30 | 36.80 | 1 | 48.4 | 12.4 |
| SMBJ33A | SMBJ33CA | MM | CM | 33 | 1 | 36.70 | 40.60 | 1 | 53.3 | 11.3 |
| SMBJ36A | SMBJ36CA | MP | CP | 36 | 1 | 40.00 | 44.20 | 1 | 58.1 | 10.4 |
| SMBJ40A | SMBJ40CA | MR | CR | 40 | 1 | 44.40 | 49.10 | 1 | 64.5 | 9.3 |
| SMBJ43A | SMBJ43CA | MT | CT | 43 | 1 | 47.80 | 52.80 | 1 | 69.4 | 8.7 |
| SMBJ45A | SMBJ45CA | MV | CV | 45 | 1 | 50.00 | 55.30 | 1 | 72.7 | 8.3 |
| SMBJ48A | SMBJ48CA | MX | CX | 48 | 1 | 53.30 | 58.90 | 1 | 77.4 | 7.8 |

Electrical characteristics ($T_A=25^{\circ}\text{C}$, continued)

| Part Number | | Marking | | V_R | $I_R@V_R$ | $V_{BR}@I_T$ | | I_T | $V_C@I_{PP}$ | $I_{PP}^{\textcircled{1}}$ |
|-------------|-----------|---------|----|-------|---------------|--------------|--------|-------|--------------|----------------------------|
| Uni-Polar | Bi-Polar | Uni | Bi | V | μA | min(V) | max(V) | mA | max(V) | A |
| SMBJ51A | SMBJ51CA | MZ | CZ | 51 | 1 | 56.70 | 62.70 | 1 | 82.4 | 7.3 |
| SMBJ54A | SMBJ54CA | NE | DE | 54 | 1 | 60.00 | 66.30 | 1 | 87.1 | 6.9 |
| SMBJ58A | SMBJ58CA | NG | DG | 58 | 1 | 64.40 | 71.20 | 1 | 93.6 | 6.4 |
| SMBJ60A | SMBJ60CA | NK | DK | 60 | 1 | 66.70 | 73.70 | 1 | 96.8 | 6.2 |
| SMBJ64A | SMBJ64CA | NM | DM | 64 | 1 | 71.10 | 78.60 | 1 | 103.0 | 5.8 |
| SMBJ70A | SMBJ70CA | NP | DP | 70 | 1 | 77.80 | 86.00 | 1 | 113.0 | 5.3 |
| SMBJ75A | SMBJ75CA | NR | DR | 75 | 1 | 83.30 | 92.10 | 1 | 121.0 | 5.0 |
| SMBJ78A | SMBJ78CA | NT | DT | 78 | 1 | 86.70 | 95.80 | 1 | 126.0 | 4.8 |
| SMBJ85A | SMBJ85CA | NV | DV | 85 | 1 | 94.40 | 104.0 | 1 | 137.0 | 4.4 |
| SMBJ90A | SMBJ90CA | NX | DX | 90 | 1 | 100.0 | 111.0 | 1 | 146.0 | 4.1 |
| SMBJ100A | SMBJ100CA | NZ | DZ | 100 | 1 | 111.0 | 123.0 | 1 | 162.0 | 3.7 |
| SMBJ110A | SMBJ110CA | PE | EE | 110 | 1 | 122.0 | 135.0 | 1 | 177.0 | 3.4 |
| SMBJ120A | SMBJ120CA | PG | EG | 120 | 1 | 133.0 | 147.0 | 1 | 193.0 | 3.1 |
| SMBJ130A | SMBJ130CA | PK | EK | 130 | 1 | 144.0 | 159.0 | 1 | 209.0 | 2.9 |
| SMBJ150A | SMBJ150CA | PM | EM | 150 | 1 | 167.0 | 185.0 | 1 | 243.0 | 2.5 |
| SMBJ160A | SMBJ160CA | PP | EP | 160 | 1 | 178.0 | 197.0 | 1 | 259.0 | 2.3 |
| SMBJ170A | SMBJ170CA | PR | ER | 170 | 1 | 189.0 | 209.0 | 1 | 275.0 | 2.2 |
| SMBJ180A | SMBJ180CA | PT | ET | 180 | 1 | 201.0 | 222.0 | 1 | 292.0 | 2.1 |
| SMBJ190A | SMBJ190CA | PV | EV | 190 | 1 | 211.0 | 234.0 | 1 | 307.0 | 2.0 |
| SMBJ200A | SMBJ200CA | PX | EX | 200 | 1 | 224.0 | 247.0 | 1 | 324.0 | 1.9 |
| SMBJ210A | SMBJ210CA | PZ | EZ | 210 | 1 | 233.0 | 258.0 | 1 | 337.0 | 1.8 |
| SMBJ220A | SMBJ220CA | QE | FE | 220 | 1 | 246.0 | 272.0 | 1 | 356.0 | 1.7 |
| SMBJ250A | SMBJ250CA | QG | FG | 250 | 1 | 279.0 | 309.0 | 1 | 405.0 | 1.5 |
| SMBJ300A | SMBJ300CA | QK | FK | 300 | 1 | 335.0 | 371.0 | 1 | 486.0 | 1.3 |
| SMBJ350A | SMBJ350CA | QM | FM | 350 | 1 | 391.0 | 432.0 | 1 | 567.0 | 1.1 |
| SMBJ400A | SMBJ400CA | QP | FP | 400 | 1 | 447.0 | 494.0 | 1 | 648.0 | 0.9 |
| SMBJ440A | SMBJ440CA | QR | FR | 440 | 1 | 492.0 | 543.0 | 1 | 713.0 | 0.8 |

① Surge waveform: 10/1000 μs

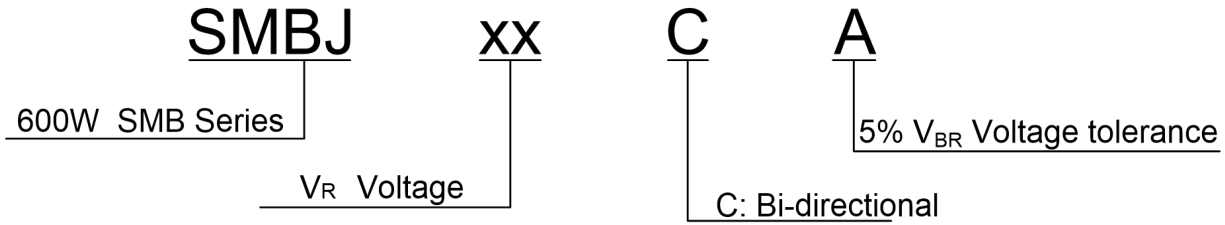
V_R : Stand-off Voltage -- Maximum voltage that can be applied

V_{BR} : Breakdown Voltage

V_C : Clamping Voltage -- Peak voltage measured across the suppressor at a specified I_{pp}

I_R : Reverse Leakage Current

Part Number Code



Absolute Maximum Ratings ($T_A=25^\circ\text{C}$, RH=45%-75%, unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|-------------|-------------|------------------|
| Storage temperature range | T_{stg} | -55 to +150 | $^\circ\text{C}$ |
| Operating junction temperature range | T_j | -55 to +150 | $^\circ\text{C}$ |
| Steady state power dissipation at $T_L=75^\circ\text{C}$ | $P_{M(AV)}$ | 5.0 | W |
| Peak pulse power dissipation on 10/1000 μs waveform | P_{PP} | 600 | W |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional | V_F | 5.0 | V |

Ratings And V-I Characteristics Curves ($T_A=25^\circ\text{C}$, unless otherwise noted)

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

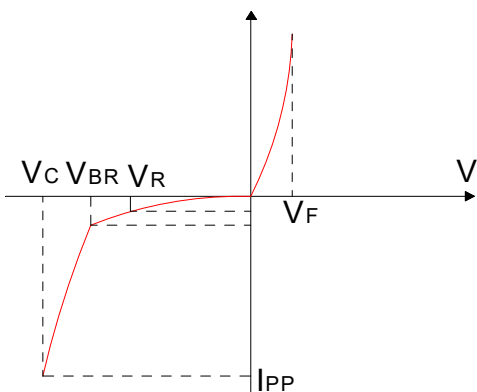


FIG.2:V- I curve characteristics (Bi-directional)

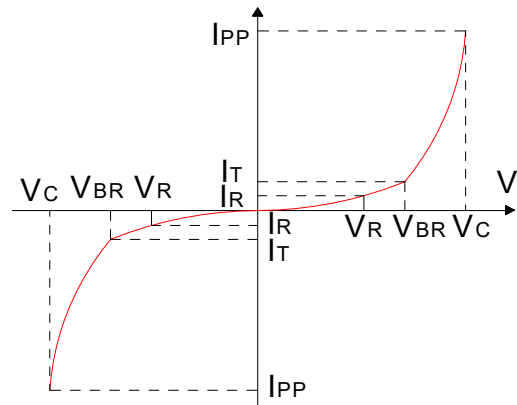


FIG.3: Pulse waveform

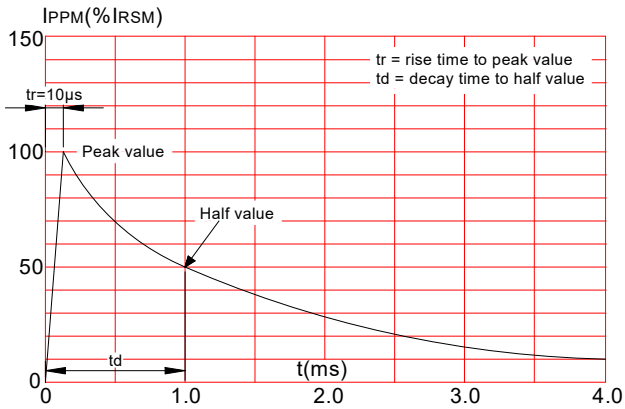
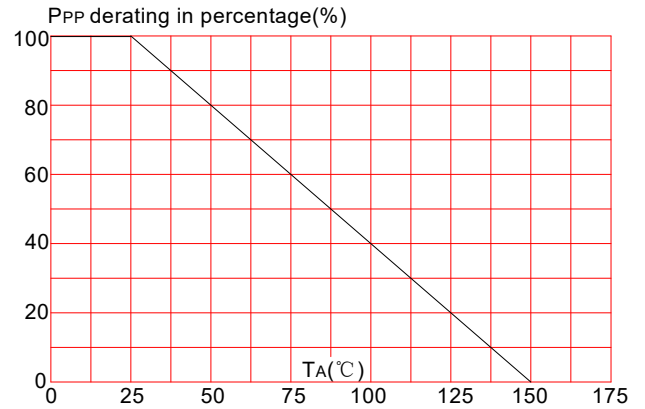
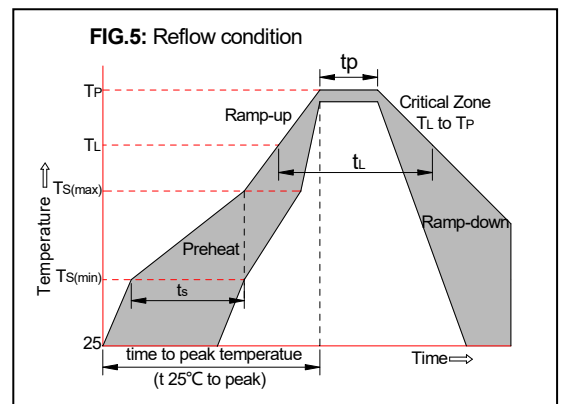


FIG.4: Pulse derating curve

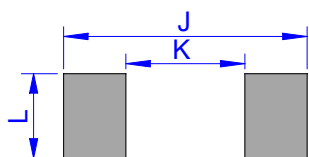
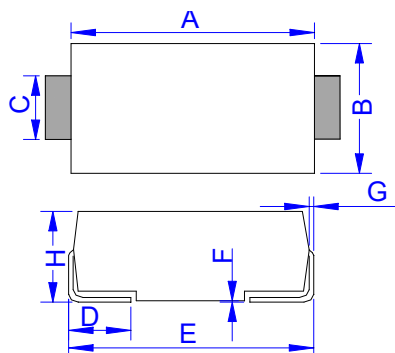


Soldering Parameters

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



Package Mechanical Data

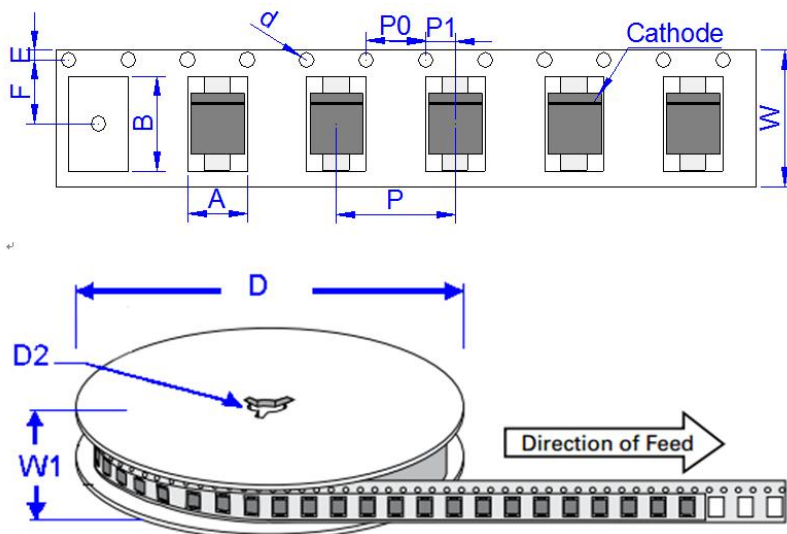


DO-214AA (SMB)

| Ref. | Dimensions | | | |
|------|-------------|-------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.25 | 4.75 | 0.167 | 0.187 |
| B | 3.30 | 3.94 | 0.130 | 0.155 |
| C | 1.85 | 2.21 | 0.073 | 0.087 |
| D | 0.76 | 1.52 | 0.030 | 0.060 |
| E | 5.08 | 5.59 | 0.200 | 0.220 |
| F | 0.051 | 0.203 | 0.002 | 0.008 |
| G | 0.15 | 0.31 | 0.006 | 0.012 |
| H | 2.11 | 2.44 | 0.083 | 0.096 |
| J | 6.80 | | 0.270 | |
| K | | 2.60 | | 0.100 |
| L | 2.40 | | 0.090 | |

Tape & Reel Specification - SMB

| Ref. | Dimensions | |
|------|-------------|---------------|
| | Millimeters | Inches |
| A | 3.76 ± 0.2 | 0.144 ± 0.012 |
| B | 5.69 ± 0.2 | 0.244 ± 0.012 |
| d | 1.5 ± 0.25 | 0.059 ± 0.004 |
| D | 330.0 | 13.0 |
| D2 | 13 ± 1 | 0.512 ± 0.039 |
| E | 1.75 ± 0.2 | 0.059 ± 0.008 |
| F | 5.5 ± 0.1 | 0.222 ± 0.008 |
| P | 8.0 ± 0.2 | 0.315 ± 0.008 |
| P0 | 4.0 ± 0.2 | 0.157 ± 0.008 |
| P1 | 2.0 ± 0.2 | 0.079 ± 0.008 |
| W | 12.0 ± 0.3 | 0.472 ± 0.008 |
| W1 | 16.8 ± 2.0 | 0.661 ± 0.079 |



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