

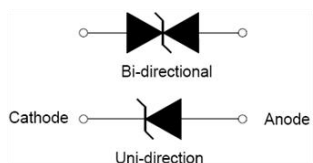
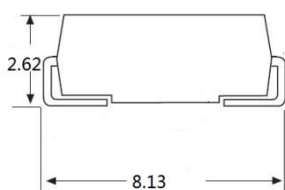
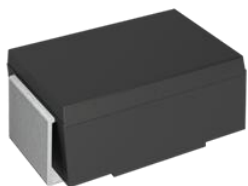
## Description

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
- 5000W Peak Pulse power capability at 10×1000μs waveform.
- Fast response time: typically less than 1.0ps from 0V to V<sub>BR</sub> 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

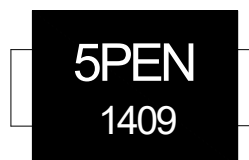
Package: SMC/DO-214AB

- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Polarity: Color band denotes cathode except bi-directional models
- Standard Packaging: 13mm tape (EIA STD RS-481)
- Weight: 0.275g
- 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



5PEN : Device Marking Code  
1409 : In ninth week, 2014

## Ordering Information

| Out line | Reel (pcs) | Per carton (pcs) | Reel diameters (mm) |
|----------|------------|------------------|---------------------|
| Taping   | 3K         | 30K              | 330                 |

**Electrical Characteristics (T<sub>A</sub>=25°C)**

| Part Number |             | Marking |      | V <sub>R</sub> | I <sub>R</sub> @V <sub>R</sub> | V <sub>BR</sub> @I <sub>T</sub> |        | I <sub>T</sub> | V <sub>C</sub> @I <sub>PP</sub> | I <sub>PP</sub> <sup>①</sup> |
|-------------|-------------|---------|------|----------------|--------------------------------|---------------------------------|--------|----------------|---------------------------------|------------------------------|
| Uni-Polar   | Bi-Polar    | Uni     | Bi   | V              | μA                             | min(V)                          | max(V) | mA             | max(V)                          | A                            |
| 5.0SMDJ11A  | 5.0SMDJ11CA | 5PEN    | 5BEN | 11             | 5                              | 12.20                           | 13.50  | 10             | 18.2                            | 275.0                        |
| 5.0SMDJ12A  | 5.0SMDJ12CA | 5PEP    | 5BEP | 12             | 5                              | 13.30                           | 14.70  | 10             | 19.9                            | 252.0                        |
| 5.0SMDJ13A  | 5.0SMDJ13CA | 5PEQ    | 5BEQ | 13             | 5                              | 14.40                           | 15.90  | 10             | 21.5                            | 233.0                        |
| 5.0SMDJ14A  | 5.0SMDJ14CA | 5PER    | 5BER | 14             | 5                              | 15.60                           | 17.20  | 10             | 23.2                            | 216.0                        |
| 5.0SMDJ15A  | 5.0SMDJ15CA | 5PES    | 5BES | 15             | 5                              | 16.70                           | 18.50  | 1              | 24.4                            | 205.0                        |
| 5.0SMDJ16A  | 5.0SMDJ16CA | 5PET    | 5BET | 16             | 5                              | 17.80                           | 19.70  | 1              | 26.0                            | 193.0                        |
| 5.0SMDJ17A  | 5.0SMDJ17CA | 5PEU    | 5BEU | 17             | 5                              | 18.90                           | 20.90  | 1              | 27.6                            | 181.0                        |
| 5.0SMDJ18A  | 5.0SMDJ18CA | 5PEV    | 5BEV | 18             | 5                              | 20.00                           | 22.10  | 1              | 29.2                            | 172.0                        |
| 5.0SMDJ20A  | 5.0SMDJ20CA | 5PEW    | 5BEW | 20             | 5                              | 22.20                           | 24.50  | 1              | 32.4                            | 155.0                        |
| 5.0SMDJ22A  | 5.0SMDJ22CA | 5PEX    | 5BEX | 22             | 1                              | 24.40                           | 26.90  | 1              | 35.5                            | 141.0                        |
| 5.0SMDJ24A  | 5.0SMDJ24CA | 5PEZ    | 5BEZ | 24             | 1                              | 26.70                           | 29.50  | 1              | 38.9                            | 129.0                        |
| 5.0SMDJ26A  | 5.0SMDJ26CA | 5PFE    | 5BFE | 26             | 1                              | 28.90                           | 31.90  | 1              | 42.1                            | 119.0                        |
| 5.0SMDJ28A  | 5.0SMDJ28CA | 5PFG    | 5BFG | 28             | 1                              | 31.10                           | 34.40  | 1              | 45.4                            | 110.0                        |
| 5.0SMDJ30A  | 5.0SMDJ30CA | 5PFK    | 5BFK | 30             | 1                              | 33.30                           | 36.80  | 1              | 48.4                            | 103.0                        |
| 5.0SMDJ33A  | 5.0SMDJ33CA | 5PFM    | 5BFM | 33             | 1                              | 36.70                           | 40.60  | 1              | 53.3                            | 93.9                         |
| 5.0SMDJ36A  | 5.0SMDJ36CA | 5PFP    | 5BFP | 36             | 1                              | 40.00                           | 44.20  | 1              | 58.1                            | 86.1                         |
| 5.0SMDJ40A  | 5.0SMDJ40CA | 5PFR    | 5BFR | 40             | 1                              | 44.40                           | 49.10  | 1              | 64.5                            | 77.6                         |
| 5.0SMDJ43A  | 5.0SMDJ43CA | 5PFT    | 5BFT | 43             | 1                              | 47.80                           | 52.80  | 1              | 69.4                            | 72.1                         |
| 5.0SMDJ45A  | 5.0SMDJ45CA | 5PFV    | 5BFV | 45             | 1                              | 50.00                           | 55.30  | 1              | 72.7                            | 68.8                         |
| 5.0SMDJ48A  | 5.0SMDJ48CA | 5PFX    | 5BFX | 48             | 1                              | 53.30                           | 58.90  | 1              | 77.4                            | 64.7                         |
| 5.0SMDJ51A  | 5.0SMDJ51CA | 5PFZ    | 5BFZ | 51             | 1                              | 56.70                           | 62.70  | 1              | 82.4                            | 60.7                         |
| 5.0SMDJ54A  | 5.0SMDJ54CA | 5PGE    | 5BGE | 54             | 1                              | 60.00                           | 66.30  | 1              | 87.1                            | 57.5                         |
| 5.0SMDJ58A  | 5.0SMDJ58CA | 5PGG    | 5BGG | 58             | 1                              | 64.40                           | 71.20  | 1              | 93.6                            | 53.5                         |
| 5.0SMDJ60A  | 5.0SMDJ60CA | 5PGK    | 5BGK | 60             | 1                              | 66.70                           | 73.70  | 1              | 96.8                            | 51.7                         |
| 5.0SMDJ64A  | 5.0SMDJ64CA | 5PGM    | 5BGM | 64             | 1                              | 71.10                           | 78.60  | 1              | 103.0                           | 48.6                         |
| 5.0SMDJ70A  | 5.0SMDJ70CA | 5PGP    | 5BGP | 70             | 1                              | 77.80                           | 86.00  | 1              | 113.0                           | 44.3                         |
| 5.0SMDJ75A  | 5.0SMDJ75CA | 5PGR    | 5BGR | 75             | 1                              | 83.30                           | 92.10  | 1              | 121.0                           | 41.4                         |
| 5.0SMDJ78A  | 5.0SMDJ78CA | 5PGT    | 5BGT | 78             | 1                              | 86.70                           | 95.80  | 1              | 126.0                           | 39.7                         |
| 5.0SMDJ85A  | 5.0SMDJ85CA | 5PGV    | 5BGV | 85             | 1                              | 94.40                           | 104.0  | 1              | 137.0                           | 36.5                         |

**Electrical Characteristics (T<sub>A</sub>=25°C, Continued)**

| Part Number |              | Marking |      | V <sub>R</sub> | I <sub>R</sub> @V <sub>R</sub> | V <sub>BR</sub> @I <sub>T</sub> |        | I <sub>T</sub> | V <sub>C</sub> @I <sub>PP</sub> | I <sub>PP</sub> <sup>①</sup> |
|-------------|--------------|---------|------|----------------|--------------------------------|---------------------------------|--------|----------------|---------------------------------|------------------------------|
| Uni-Polar   | Bi-Polar     | Uni     | Bi   | V              | μA                             | min(V)                          | max(V) | mA             | max(V)                          | A                            |
| 5.0SMDJ90A  | 5.0SMDJ90CA  | 5PGX    | 5BGX | 90             | 1                              | 100.0                           | 111.0  | 1              | 146.0                           | 34.3                         |
| 5.0SMDJ100A | 5.0SMDJ100CA | 5PGZ    | 5BGZ | 100            | 1                              | 111.0                           | 123.0  | 1              | 162.0                           | 30.9                         |
| 5.0SMDJ110A | 5.0SMDJ110CA | 5PHE    | 5BHE | 110            | 1                              | 122.0                           | 135.0  | 1              | 177.0                           | 28.3                         |
| 5.0SMDJ120A | 5.0SMDJ120CA | 5PHG    | 5BHG | 120            | 1                              | 133.0                           | 147.0  | 1              | 193.0                           | 26.0                         |
| 5.0SMDJ130A | 5.0SMDJ130CA | 5PHK    | 5BHK | 130            | 1                              | 144.0                           | 159.0  | 1              | 209.0                           | 24.0                         |
| 5.0SMDJ150A | 5.0SMDJ150CA | 5PHM    | 5BHM | 150            | 1                              | 167.0                           | 185.0  | 1              | 243.0                           | 20.6                         |
| 5.0SMDJ160A | 5.0SMDJ160CA | 5PHP    | 5BHP | 160            | 1                              | 178.0                           | 197.0  | 1              | 259.0                           | 19.3                         |
| 5.0SMDJ170A | 5.0SMDJ170CA | 5PHR    | 5BHR | 170            | 1                              | 189.0                           | 209.0  | 1              | 275.0                           | 18.2                         |

① Surge waveform: 10/1000μs

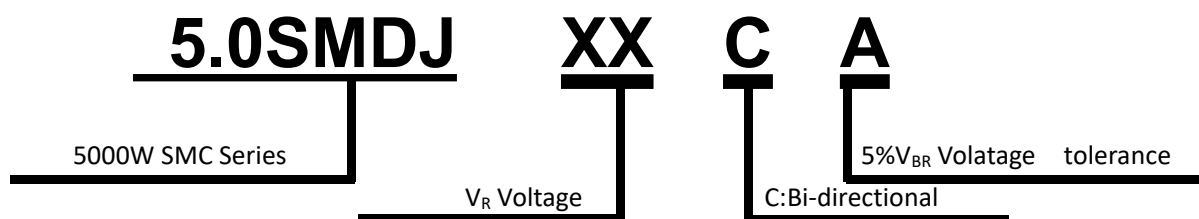
V<sub>R</sub>: Stand-off Voltage -- Maximum voltage that can be applied

V<sub>BR</sub>: Breakdown Voltage

V<sub>C</sub>: Clamping Voltage -- Peak voltage measured across the suppressor at a specified I<sub>pp</sub>

I<sub>R</sub>: Reverse Leakage Current

**Part Number Code**

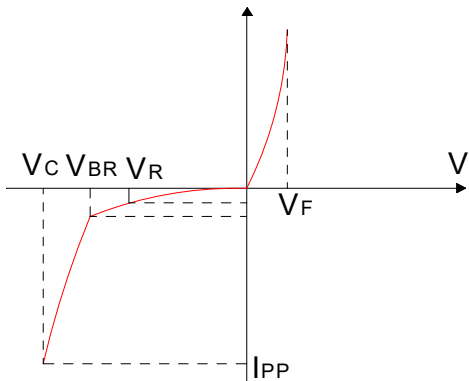


**Absolute Maximum Ratings** (T<sub>A</sub>=25°C, RH=45%-75%, unless otherwise noted)

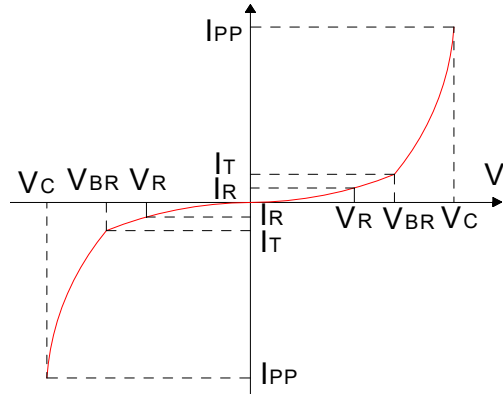
| Parameter  | Symbol             | Value       | Unit |
|--|--------------------|-------------|------|
| Storage temperature range  | T <sub>stg</sub>   | -55 to +150 | °C   |
| Operating junction temperature range                             | T <sub>j</sub>     | -55 to +150 | °C   |
| Steady state power dissipation at T <sub>L</sub> =75°C           | P <sub>M(AV)</sub> | 10          | W    |
| Peak pulse power dissipation on 10/1000μs waveform               | P <sub>PP</sub>    | 5000        | W    |
| Maximum Instantaneous Forward Voltage at 100A for Unidirectional | V <sub>F</sub>     | 5.0         | V    |

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

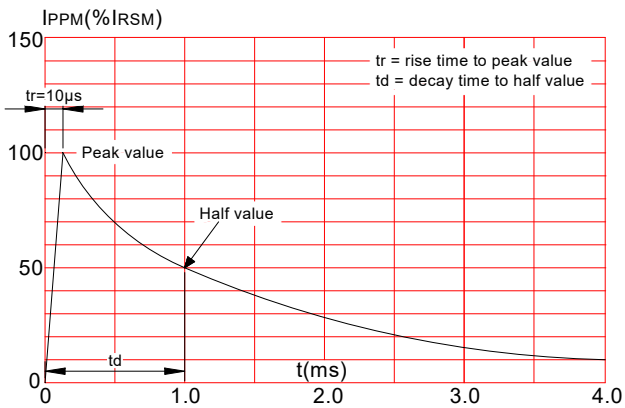
**FIG.1:V- I curve characteristics (Uni-directional)**



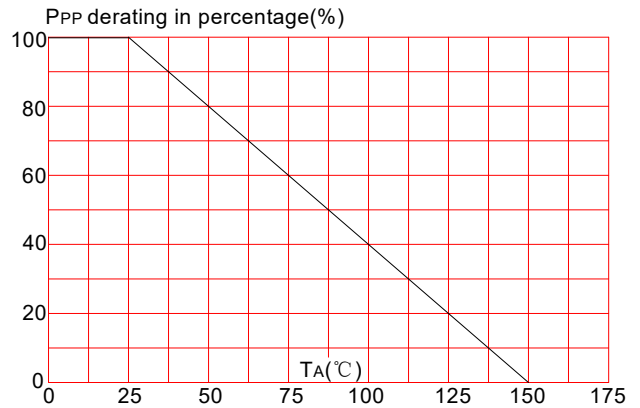
**FIG.2:V- I curve characteristics (Bi-directional)**



**FIG.3: Pulse waveform**

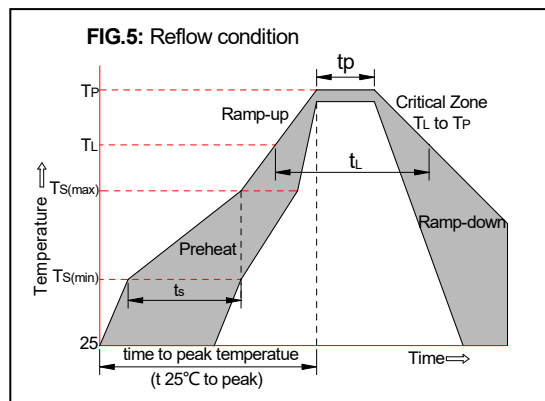


**FIG.4: Pulse derating curve**

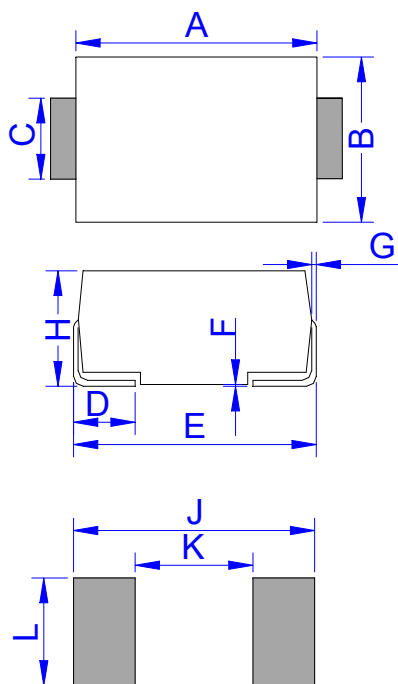


**Soldering Parameters**

| 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                       |



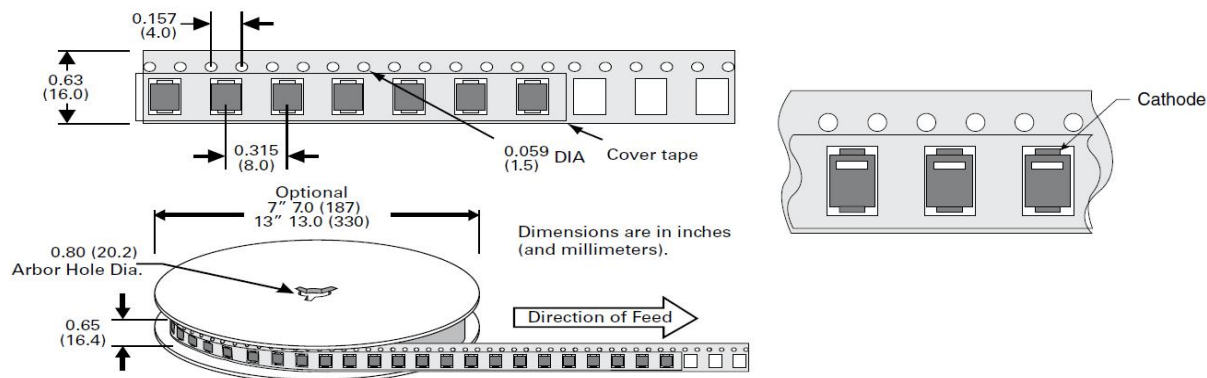
**Package Mechanical Data**



DO-214AB (SMC)

| Ref. | Dimensions  |       |        |       |
|------|-------------|-------|--------|-------|
|      | Millimeters |       | Inches |       |
|      | Min.        | Max.  | Min.   | Max.  |
| A    | 6.60        | 7.11  | 0.260  | 0.280 |
| B    | 5.59        | 6.20  | 0.220  | 0.244 |
| C    | 2.75        | 3.20  | 0.108  | 0.126 |
| D    | 0.76        | 1.52  | 0.030  | 0.060 |
| E    | 7.74        | 8.13  | 0.305  | 0.320 |
| F    | 0.051       | 0.203 | 0.002  | 0.008 |
| G    | 0.15        | 0.31  | 0.006  | 0.012 |
| H    | 2.15        | 2.62  | 0.085  | 0.103 |
| J    | 8.12        |       | 0.320  |       |
| K    |             | 4.69  |        | 0.185 |
| L    | 3.07        |       | 0.121  |       |

## Tape & Reel Specification – SMC/DO-214AB



## Contact Information

WPMTEK Incorporated Limited

Floor 1 Building 4#, Binxianghua Industry Park, No.7,

Huada Road, Hualian Community, Longhua New District, Shenzhen

TEL: 86755-29308003 FAX: 86755-23739900

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