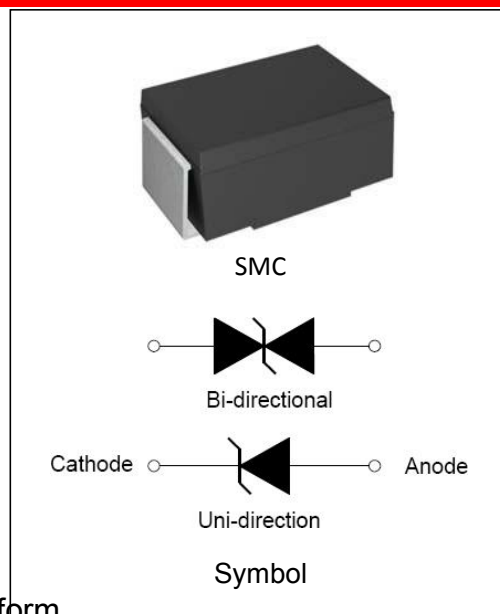


## DESCRIPTION:

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:

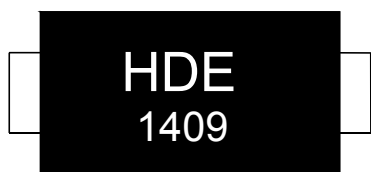
- ✧ Glass passivated or planar junction.
- ✧ Excellent clamping capability.
- ✧ Repetition rate (duty cycle): 0.01%.
- ✧ Typical  $I_R$  less than  $1\mu A$  above 10V.
- ✧ Low profile package and low inductance.
- ✧ 3000W Peak Pulse power capability at  $10\times 1000\mu s$  waveform.
- ✧ Fast response time: typically less than 1.0ps from 0V to  $V_{BR}$  min.
- ✧ High temperature soldering:  $260^\circ C/10s$  at terminals.
- ✧ Plastic package has Underwriters Laboratory Flammability 94V-0.
- ✧ For surface mounted applications in order to optimize board space.



## ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ C$ , RH=45%-75%, unless otherwise noted)

| Parameter   | Symbol      | Value       | Unit       |
|---|-------------|-------------|------------|
| Storage temperature range                                       | $T_{stg}$   | -55 to +150 | $^\circ C$ |
| Operating junction temperature range                            | $T_j$       | -55 to +150 | $^\circ C$ |
| Steady state power dissipation at $T_L=75^\circ C$              | $P_{M(AV)}$ | 8.0         | W          |
| Peak pulse power dissipation on 10/1000 $\mu s$ waveform        | $P_{PP}$    | 3000        | W          |
| Maximum Instantaneous Forward Voltage at 80A for Unidirectional | $V_F$       | 5.0         | V          |

## MARKING



HDE : Device Marking Code  
 1409: In ninth week, 2014

**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                            |
| SMDJ5.0A    | SMDJ5.0CA | HDE     | IDE | 5.0            | 800                            | 6.40                            | 7.00   | 10             | 9.2                             | 326.1                        |
| SMDJ6.0A    | SMDJ6.0CA | HDG     | IDG | 6.0            | 800                            | 6.67                            | 7.37   | 10             | 10.3                            | 291.3                        |
| SMDJ6.5A    | SMDJ6.5CA | HDK     | IDK | 6.5            | 500                            | 7.22                            | 7.98   | 10             | 11.2                            | 267.9                        |
| SMDJ7.0A    | SMDJ7.0CA | HDM     | IDM | 7.0            | 200                            | 7.78                            | 8.60   | 10             | 12.0                            | 250.0                        |
| SMDJ7.5A    | SMDJ7.5CA | HDP     | IDP | 7.5            | 100                            | 8.33                            | 9.21   | 1              | 12.9                            | 232.6                        |
| SMDJ8.0A    | SMDJ8.0CA | HDR     | IDR | 8.0            | 50                             | 8.89                            | 9.83   | 1              | 13.6                            | 220.6                        |
| SMDJ8.5A    | SMDJ8.5CA | HDT     | IDT | 8.5            | 20                             | 9.44                            | 10.40  | 1              | 14.4                            | 208.3                        |
| SMDJ9.0A    | SMDJ9.0CA | HDV     | IDV | 9.0            | 10                             | 10.00                           | 11.10  | 1              | 15.4                            | 194.8                        |
| SMDJ10A     | SMDJ10CA  | HDX     | IDX | 10             | 5                              | 11.10                           | 12.30  | 1              | 17.0                            | 176.5                        |
| SMDJ11A     | SMDJ11CA  | HDZ     | IDZ | 11             | 2                              | 12.20                           | 13.50  | 1              | 18.2                            | 164.8                        |
| SMDJ12A     | SMDJ12CA  | HEE     | IEE | 12             | 2                              | 13.30                           | 14.70  | 1              | 19.9                            | 150.8                        |
| SMDJ13A     | SMDJ13CA  | HEG     | IEG | 13             | 2                              | 14.40                           | 15.90  | 1              | 21.5                            | 139.5                        |
| SMDJ14A     | SMDJ14CA  | HEK     | IEK | 14             | 2                              | 15.60                           | 17.20  | 1              | 23.2                            | 129.3                        |
| SMDJ15A     | SMDJ15CA  | HEM     | IEM | 15             | 2                              | 16.70                           | 18.50  | 1              | 24.4                            | 123.0                        |
| SMDJ16A     | SMDJ16CA  | HEP     | IEP | 16             | 2                              | 17.80                           | 19.70  | 1              | 26.0                            | 115.4                        |
| SMDJ17A     | SMDJ17CA  | HER     | IER | 17             | 2                              | 18.90                           | 20.90  | 1              | 27.6                            | 108.7                        |
| SMDJ18A     | SMDJ18CA  | HET     | IET | 18             | 2                              | 20.00                           | 22.10  | 1              | 29.2                            | 102.7                        |
| SMDJ20A     | SMDJ20CA  | HEV     | IEV | 20             | 2                              | 22.20                           | 24.50  | 1              | 32.4                            | 92.6                         |
| SMDJ22A     | SMDJ22CA  | HEX     | IEX | 22             | 2                              | 24.40                           | 26.90  | 1              | 35.5                            | 84.5                         |
| SMDJ24A     | SMDJ24CA  | HEZ     | IEZ | 24             | 2                              | 26.70                           | 29.50  | 1              | 38.9                            | 77.1                         |
| SMDJ26A     | SMDJ26CA  | HFE     | IFE | 26             | 2                              | 28.90                           | 31.90  | 1              | 42.1                            | 71.3                         |
| SMDJ28A     | SMDJ28CA  | HFG     | IFG | 28             | 2                              | 31.10                           | 34.40  | 1              | 45.4                            | 66.1                         |
| SMDJ30A     | SMDJ30CA  | HFK     | IFK | 30             | 2                              | 33.30                           | 36.80  | 1              | 48.4                            | 62.0                         |
| SMDJ33A     | SMDJ33CA  | HFM     | IFM | 33             | 2                              | 36.70                           | 40.60  | 1              | 53.3                            | 56.3                         |
| SMDJ36A     | SMDJ36CA  | HFP     | IFP | 36             | 2                              | 40.00                           | 44.20  | 1              | 58.1                            | 51.6                         |
| SMDJ40A     | SMDJ40CA  | HFR     | IFR | 40             | 2                              | 44.40                           | 49.10  | 1              | 64.5                            | 46.5                         |
| SMDJ43A     | SMDJ43CA  | HFT     | IFT | 43             | 2                              | 47.80                           | 52.80  | 1              | 69.4                            | 43.2                         |
| SMDJ45A     | SMDJ45CA  | HFV     | IFV | 45             | 2                              | 50.00                           | 55.30  | 1              | 72.7                            | 41.3                         |
| SMDJ48A     | SMDJ48CA  | HFX     | IFX | 48             | 2                              | 53.30                           | 58.90  | 1              | 77.4                            | 38.8                         |
| SMDJ51A     | SMDJ51CA  | HFZ     | IFZ | 51             | 2                              | 56.70                           | 62.70  | 1              | 82.4                            | 36.4                         |

**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> ® |
|-------------|-----------|---------|-----|----------------|--------------------------------|---------------------------------|--------|----------------|---------------------------------|-------------------|
| Uni-Polar   | Bi-Polar  | Uni     | Bi  | V              | μA                             | min(V)                          | max(V) | mA             | max(V)                          | A                 |
| SMDJ54A     | SMDJ54CA  | HGE     | IGE | 54             | 2                              | 60.00                           | 66.30  | 1              | 87.1                            | 34.4              |
| SMDJ58A     | SMDJ58CA  | HGG     | IGG | 58             | 2                              | 64.40                           | 71.20  | 1              | 93.6                            | 32.1              |
| SMDJ60A     | SMDJ60CA  | HGK     | IGK | 60             | 2                              | 66.70                           | 73.70  | 1              | 96.8                            | 31.0              |
| SMDJ64A     | SMDJ64CA  | HGM     | IGM | 64             | 2                              | 71.10                           | 78.60  | 1              | 103.0                           | 29.1              |
| SMDJ70A     | SMDJ70CA  | HGP     | IGP | 70             | 2                              | 77.80                           | 86.00  | 1              | 113.0                           | 26.5              |
| SMDJ75A     | SMDJ75CA  | HGR     | IGR | 75             | 2                              | 83.30                           | 92.10  | 1              | 121.0                           | 24.8              |
| SMDJ78A     | SMDJ78CA  | HGT     | IGT | 78             | 2                              | 86.70                           | 95.80  | 1              | 126.0                           | 23.8              |
| SMDJ85A     | SMDJ85CA  | HGV     | IGV | 85             | 2                              | 94.40                           | 104.0  | 1              | 137.0                           | 21.9              |
| SMDJ90A     | SMDJ90CA  | HGX     | IGX | 90             | 2                              | 100.0                           | 111.0  | 1              | 146.0                           | 20.5              |
| SMDJ100A    | SMDJ100CA | HGZ     | IGZ | 100            | 2                              | 111.0                           | 123.0  | 1              | 162.0                           | 18.5              |
| SMDJ110A    | SMDJ110CA | HHE     | IHE | 110            | 2                              | 122.0                           | 135.0  | 1              | 177.0                           | 16.9              |
| SMDJ120A    | SMDJ120CA | HHG     | IHG | 120            | 2                              | 133.0                           | 147.0  | 1              | 193.0                           | 15.5              |
| SMDJ130A    | SMDJ130CA | HHK     | IHK | 130            | 2                              | 144.0                           | 159.0  | 1              | 209.0                           | 14.4              |
| SMDJ150A    | SMDJ150CA | HHM     | IHM | 150            | 2                              | 167.0                           | 185.0  | 1              | 243.0                           | 12.3              |
| SMDJ160A    | SMDJ160CA | HHP     | IHP | 160            | 2                              | 178.0                           | 197.0  | 1              | 259.0                           | 11.6              |
| SMDJ170A    | SMDJ170CA | HHR     | IHR | 170            | 2                              | 189.0                           | 209.0  | 1              | 275.0                           | 10.9              |
| SMDJ180A    | SMDJ180CA | HHT     | IHT | 180            | 2                              | 201.0                           | 222.0  | 1              | 292.0                           | 10.3              |
| SMDJ190A    | SMDJ190CA | HHV     | IHV | 190            | 2                              | 211.0                           | 234.0  | 1              | 307.0                           | 9.7               |
| SMDJ200A    | SMDJ200CA | HHX     | IHX | 200            | 2                              | 224.0                           | 247.0  | 1              | 324.0                           | 9.3               |
| SMDJ210A    | SMDJ210CA | HHZ     | IHZ | 210            | 2                              | 233.0                           | 258.0  | 1              | 337.0                           | 8.8               |
| SMDJ220A    | SMDJ220CA | HIE     | IIE | 220            | 2                              | 246.0                           | 272.0  | 1              | 356.0                           | 8.4               |

① Surge waveform: 10/1000μs

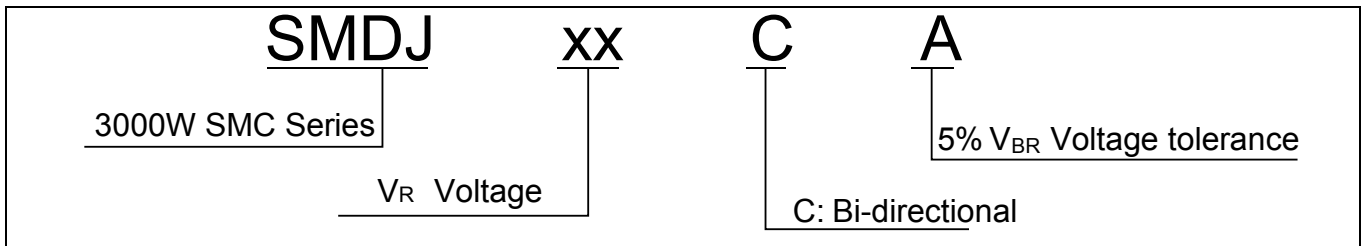
V<sub>R</sub>: Stand-off Voltage -- Maximum voltage that can be applied

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>

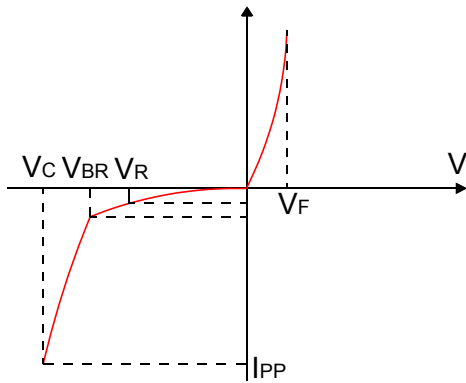
I<sub>R</sub>: Reverse Leakage Current

**ORDERING INFORMATION**

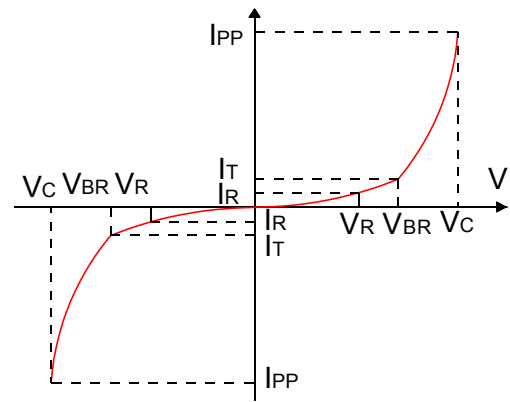


**RATINGS AND V-I CHARACTERISTICS CURVES ( $T_A=25^\circ\text{C}$ , unless otherwise noted)**

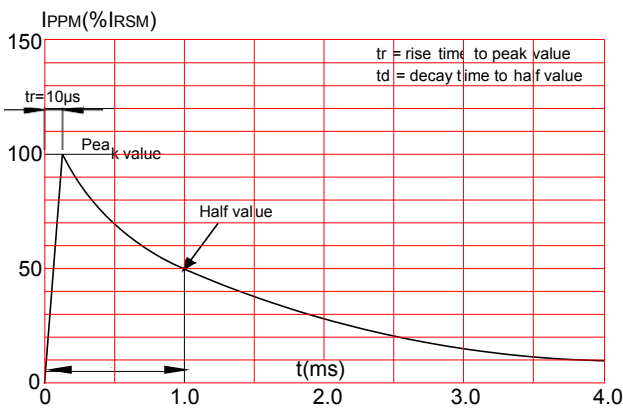
**FIG.1: V- I curve characteristics (Uni-directional)**



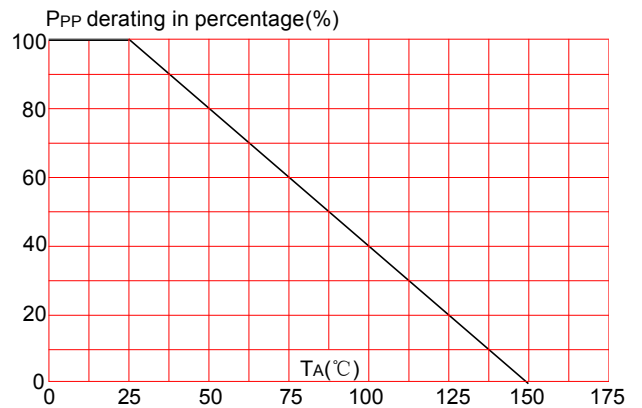
**FIG.2: V- I curve characteristics (Bi-directional)**



**FIG.3: Pulse waveform**

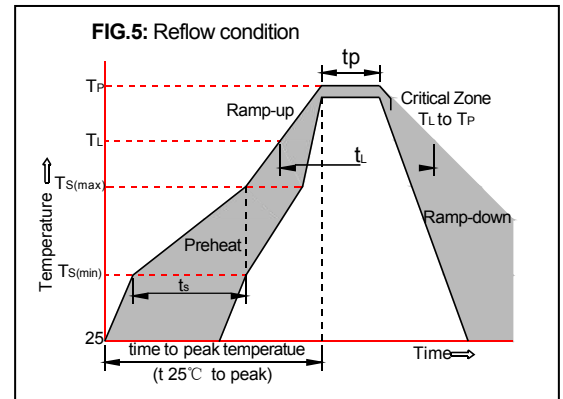
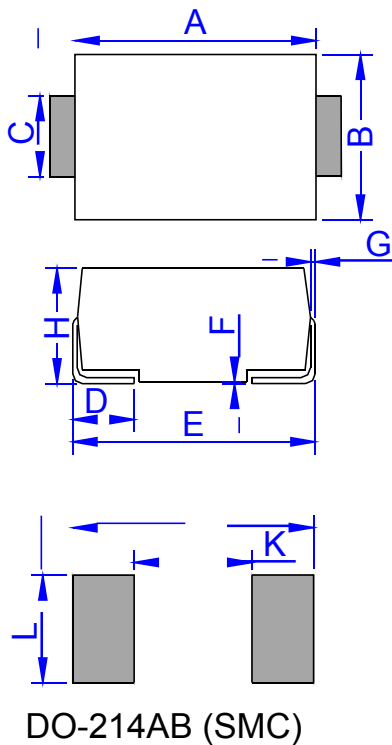


**FIG.4: Pulse derating curve**



**SOLDERING PARAMETERS**

|   |                                   |                                 |
|---|-----------------------------------|---------------------------------|
| Reflow Condition  |                                   | Pb-Free assembly<br>(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**


| 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 AND REEL SPECIFICATION-SMC**

| PART No.   | PACKAGE      | QUANTITY | TAPE & REEL |
|------------|--------------|----------|-------------|
| SMDJxxCA/A | SMC(DO214AB) | 3,000    | 13inch      |

Website: <http://www.jksemi.com>

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