



## 1.5SMC Series

Vishay Semiconductors  
formerly General Semiconductor

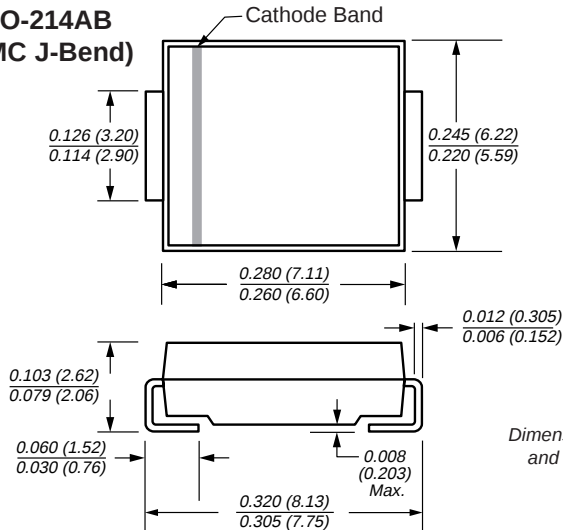
### Surface Mount TRANSZORB® Transient Voltage Suppressors

$V_{(BR)}$  Unidirectional  
6.8 to 540V

$V_{(BR)}$  Bidirectional  
6.8 to 220V

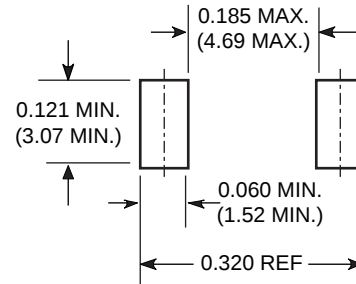
Peak Pulse Power 1500W

DO-214AB  
(SMC J-Bend)



Extended  
Voltage Range

Mounting Pad Layout



### Mechanical Data

**Case:** JEDEC DO-214AB (SMC) molded plastic over passivated junction

**Terminals:** Solder plated, solderable per MIL-STD-750, Method 2026. High temperature soldering: 250°C/10 seconds at terminals.

**Polarity:** For uni-directional types the band denotes the cathode, which is positive with respect to the anode under normal TVS operation.

**Standard Packaging:** 16mm tape (EIA STD RS-481)

**Weight:** 0.007 oz., 0.21 g

**Packaging Codes – Options (Antistatic):**

51 – 1K per Bulk box, 10K/carton

57 – 850 per 7" plastic Reel (16mm tape), 8.5K/carton

9A – 3.5K per 13" plastic Reel (16mm tape), 35K/carton

### Features

- Low profile package with built-in strain relief for surface mounted applications
- Glass passivated junction
- Low incremental surge resistance
- Low inductance
- Excellent clamping capability
- 1500W peak pulse power capability with a 10/1000μs waveform, repetition rate (duty cycle): 0.01%
- Very fast response time
- Plastic package has Underwriters Laboratory Flammability Classification 94V-0

### Devices for Bidirectional Applications

For bi-directional devices, use suffix CA (e.g. 1.5SMC10CA). Electrical characteristics apply in both directions.

### Maximum Ratings & Thermal Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

| Parameter                                                                                  | Symbol          | Value          | Unit               |
|--------------------------------------------------------------------------------------------|-----------------|----------------|--------------------|
| Peak power dissipation with a 10/1000μs waveform <sup>(1)(2)</sup> (Fig. 1)                | PPPM            | 1500           | W                  |
| Peak pulse current with a 10/1000μs waveform <sup>(1)</sup> (Fig. 3)                       | IPPM            | See Next Table | A                  |
| Power dissipation on infinite heatsink, $T_A = 50^\circ\text{C}$                           | $P_{M(AV)}$     | 6.5            | W                  |
| Peak forward surge current 8.3ms single half sine-wave uni-directional only <sup>(2)</sup> | $I_{FSM}$       | 200            | A                  |
| Thermal resistance junction to ambient air <sup>(3)</sup>                                  | $R_{\theta JA}$ | 75             | $^\circ\text{C/W}$ |
| Thermal resistance junction to leads                                                       | $R_{\theta JL}$ | 15             | $^\circ\text{C/W}$ |
| Operating junction and storage temperature range                                           | $T_J, T_{STG}$  | -65 to +150    | $^\circ\text{C}$   |

**Notes:** (1) Non-repetitive current pulse, per Fig.3 and derated above  $T_A = 25^\circ\text{C}$  per Fig. 2

(2) Mounted on 0.31 x 0.31" (8.0 x 8.0mm) copper pads to each terminal

(3) Mounted on minimum recommended pad layout

## Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.  $V_F = 3.5V$  at  $I_F = 100A$  (uni-directional only)

| General Semiconductor Part Number | Device Marking Code |      | Breakdown Voltage $V_{BR}$ at $I_T^{(1)}$ (V) |      | Test Current $I_T$ (mA) | Stand-off Voltage $V_{WM}$ (V) | Maximum Reverse Leakage at $V_{WM}$ $I_{D(4)}$ ( $\mu A$ ) | Maximum Peak Pulse Current $I_{PPM}^{(2)}$ (A) | Maximum Clamping Voltage at $I_{PPM}$ $V_C$ (V) | Maximum Temp. Coefficient of $V_{BR}$ (% / °C) |
|-----------------------------------|---------------------|------|-----------------------------------------------|------|-------------------------|--------------------------------|------------------------------------------------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|
|                                   | UNI                 | BI   | MIN                                           | MAX  |                         |                                |                                                            |                                                |                                                 |                                                |
| 1.5SMC6.8A                        | 6V8A                | 6V8C | 6.45                                          | 7.14 | 10                      | 5.80                           | 1000                                                       | 143                                            | 10.5                                            | 0.057                                          |
| 1.5SMC7.5A                        | 7V5A                | 7V5C | 7.13                                          | 7.88 | 10                      | 6.40                           | 500                                                        | 133                                            | 11.3                                            | 0.061                                          |
| 1.5SMC8.2A                        | 8V2A                | 8V2C | 7.79                                          | 8.61 | 10                      | 7.02                           | 200                                                        | 124                                            | 12.1                                            | 0.065                                          |
| 1.5SMC9.1A                        | 9V1A                | 9V1C | 8.65                                          | 9.55 | 1.0                     | 7.78                           | 50                                                         | 112                                            | 13.4                                            | 0.068                                          |
| 1.5SMC10A                         | 10A                 | 10C  | 9.50                                          | 10.5 | 1.0                     | 8.55                           | 10                                                         | 103                                            | 14.5                                            | 0.073                                          |
| 1.5SMC11A                         | 11A                 | 11C  | 10.5                                          | 11.6 | 1.0                     | 9.40                           | 5.0                                                        | 96.2                                           | 15.6                                            | 0.075                                          |
| 1.5SMC12A                         | 12A                 | 12C  | 11.4                                          | 12.6 | 1.0                     | 10.2                           | 5.0                                                        | 89.8                                           | 16.7                                            | 0.078                                          |
| 1.5SMC13A                         | 13A                 | 13C  | 12.4                                          | 13.7 | 1.0                     | 11.1                           | 5.0                                                        | 82.4                                           | 18.2                                            | 0.081                                          |
| 1.5SMC15A                         | 15A                 | 15C  | 14.3                                          | 15.8 | 1.0                     | 12.8                           | 1.0                                                        | 70.8                                           | 21.2                                            | 0.084                                          |
| 1.5SMC16A                         | 16A                 | 16C  | 15.2                                          | 16.8 | 1.0                     | 13.6                           | 1.0                                                        | 66.7                                           | 22.5                                            | 0.086                                          |
| 1.5SMC18A                         | 18A                 | 18C  | 17.1                                          | 18.9 | 1.0                     | 15.3                           | 1.0                                                        | 59.5                                           | 25.2                                            | 0.089                                          |
| 1.5SMC20A                         | 20A                 | 20C  | 19.0                                          | 21.0 | 1.0                     | 17.1                           | 1.0                                                        | 54.2                                           | 27.7                                            | 0.090                                          |
| 1.5SMC22A                         | 22A                 | 22C  | 20.9                                          | 23.1 | 1.0                     | 18.8                           | 1.0                                                        | 49.0                                           | 30.6                                            | 0.092                                          |
| 1.5SMC24A                         | 24A                 | 24C  | 22.8                                          | 25.2 | 1.0                     | 20.5                           | 1.0                                                        | 45.2                                           | 33.2                                            | 0.09                                           |
| 1.5SMC27A                         | 27A                 | 27C  | 25.7                                          | 28.4 | 1.0                     | 23.1                           | 1.0                                                        | 40.0                                           | 37.5                                            | 0.096                                          |
| 1.5SMC30A                         | 30A                 | 30C  | 28.5                                          | 31.5 | 1.0                     | 25.6                           | 1.0                                                        | 36.2                                           | 41.4                                            | 0.097                                          |
| 1.5SMC33A                         | 33A                 | 33C  | 31.4                                          | 34.7 | 1.0                     | 28.2                           | 1.0                                                        | 32.8                                           | 45.7                                            | 0.098                                          |
| 1.5SMC36A                         | 36A                 | 36C  | 34.2                                          | 37.8 | 1.0                     | 30.8                           | 1.0                                                        | 30.1                                           | 49.9                                            | 0.099                                          |
| 1.5SMC39A                         | 39A                 | 39C  | 37.1                                          | 41.0 | 1.0                     | 33.3                           | 1.0                                                        | 27.8                                           | 53.9                                            | 0.100                                          |
| 1.5SMC43A                         | 43A                 | 43C  | 40.9                                          | 45.2 | 1.0                     | 36.8                           | 1.0                                                        | 25.3                                           | 59.3                                            | 0.101                                          |
| 1.5SMC47A                         | 47A                 | 47C  | 44.7                                          | 49.4 | 1.0                     | 40.2                           | 1.0                                                        | 23.1                                           | 64.8                                            | 0.101                                          |
| 1.5SMC51A                         | 51A                 | 51C  | 48.5                                          | 53.6 | 1.0                     | 43.6                           | 1.0                                                        | 21.4                                           | 70.1                                            | 0.102                                          |
| 1.5SMC56A                         | 56A                 | 56C  | 53.2                                          | 58.8 | 1.0                     | 47.8                           | 1.0                                                        | 19.5                                           | 77.0                                            | 0.103                                          |
| 1.5SMC62A                         | 62A                 | 62C  | 58.9                                          | 65.1 | 1.0                     | 53.0                           | 1.0                                                        | 17.6                                           | 85.0                                            | 0.104                                          |
| 1.5SMC68A                         | 68A                 | 68C  | 64.6                                          | 71.4 | 1.0                     | 58.1                           | 1.0                                                        | 16.3                                           | 92.0                                            | 0.104                                          |
| 1.5SMC75A                         | 75A                 | 75C  | 71.3                                          | 78.8 | 1.0                     | 64.1                           | 1.0                                                        | 14.6                                           | 104                                             | 0.105                                          |
| 1.5SMC82A                         | 82A                 | 82C  | 77.9                                          | 86.1 | 1.0                     | 70.1                           | 1.0                                                        | 13.3                                           | 113                                             | 0.105                                          |
| 1.5SMC91A                         | 91A                 | 91C  | 86.5                                          | 95.5 | 1.0                     | 77.8                           | 1.0                                                        | 12.0                                           | 125                                             | 0.106                                          |
| 1.5SMC100A                        | 100A                | 100C | 95.0                                          | 105  | 1.0                     | 85.5                           | 1.0                                                        | 10.9                                           | 137                                             | 0.106                                          |
| 1.5SMC110A                        | 110A                | 110C | 105                                           | 116  | 1.0                     | 94.0                           | 1.0                                                        | 9.9                                            | 152                                             | 0.107                                          |
| 1.5SMC120A                        | 120A                | 120C | 114                                           | 126  | 1.0                     | 102                            | 1.0                                                        | 9.1                                            | 165                                             | 0.107                                          |
| 1.5SMC130A                        | 130A                | 130C | 124                                           | 137  | 1.0                     | 111                            | 1.0                                                        | 8.4                                            | 179                                             | 0.107                                          |
| 1.5SMC150A                        | 150A                | 150C | 143                                           | 158  | 1.0                     | 128                            | 1.0                                                        | 7.2                                            | 207                                             | 0.106                                          |
| 1.5SMC160A                        | 160A                | 160C | 152                                           | 168  | 1.0                     | 136                            | 1.0                                                        | 6.8                                            | 219                                             | 0.108                                          |
| 1.5SMC170A                        | 170A                | 170C | 162                                           | 179  | 1.0                     | 145                            | 1.0                                                        | 6.4                                            | 234                                             | 0.108                                          |
| 1.5SMC180A                        | 180A                | 180C | 171                                           | 189  | 1.0                     | 154                            | 1.0                                                        | 6.1                                            | 246                                             | 0.108                                          |
| 1.5SMC200A                        | 200A                | 200C | 190                                           | 210  | 1.0                     | 171                            | 1.0                                                        | 5.5                                            | 274                                             | 0.108                                          |
| 1.5SMC220A                        | 220A                | 220C | 209                                           | 231  | 1.0                     | 185                            | 1.0                                                        | 4.6                                            | 328                                             | 0.108                                          |
| 1.5SMC250A                        | 250A                | —    | 237                                           | 263  | 1.0                     | 214                            | 1.0                                                        | 4.4                                            | 344                                             | 0.110                                          |
| 1.5SMC300A                        | 300A                | —    | 285                                           | 315  | 1.0                     | 256                            | 1.0                                                        | 3.6                                            | 414                                             | 0.110                                          |
| 1.5SMC350A                        | 350A                | —    | 333                                           | 368  | 1.0                     | 300                            | 1.0                                                        | 3.1                                            | 482                                             | 0.110                                          |
| 1.5SMC400A                        | 400A                | —    | 380                                           | 420  | 1.0                     | 342                            | 1.0                                                        | 2.7                                            | 548                                             | 0.110                                          |
| 1.5SMC440A                        | 440A                | —    | 418                                           | 462  | 1.0                     | 376                            | 1.0                                                        | 2.5                                            | 602                                             | 0.110                                          |
| 1.5SMC480A                        | 480A                | —    | 456                                           | 504  | 1.0                     | 408                            | 1.0                                                        | 2.28                                           | 658                                             | 0.110                                          |
| 1.5SMC510A                        | 510A                | —    | 485                                           | 535  | 1.0                     | 434                            | 1.0                                                        | 2.15                                           | 698                                             | 0.110                                          |
| 1.5SMC540A                        | 540A                | —    | 513                                           | 567  | 1.0                     | 459                            | 1.0                                                        | 2.03                                           | 740                                             | 0.110                                          |

Notes: (1) Pulse test:  $t_p \leq 50ms$

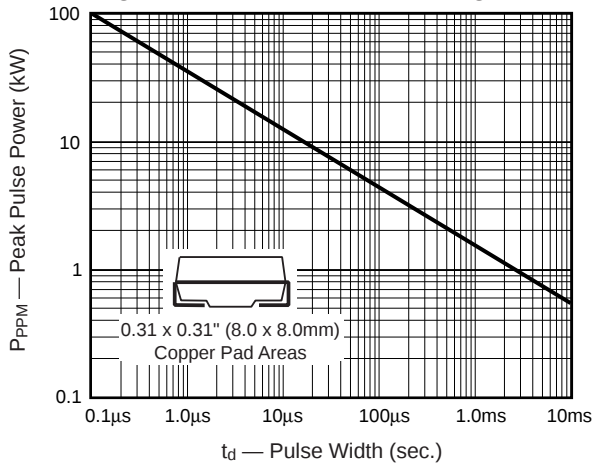
(2) Surge current waveform per Fig. 3 and derate per Fig. 2

(3) All terms and symbols are consistent with ANSI/IEEE CA62.35

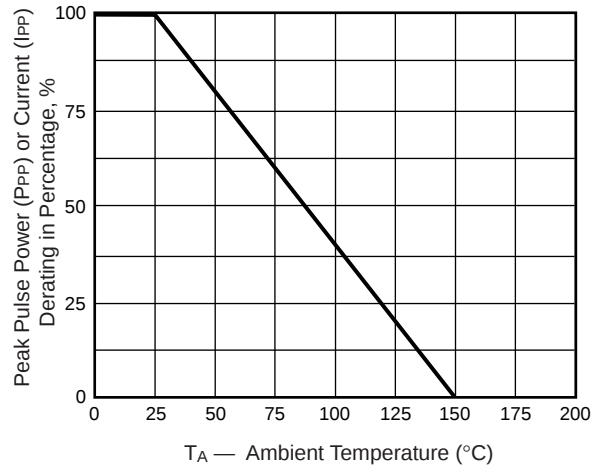
(4) For bidirectional types with  $V_R$  10 volts and less, the  $I_D$  limit is doubled

## Ratings and Characteristic Curves ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

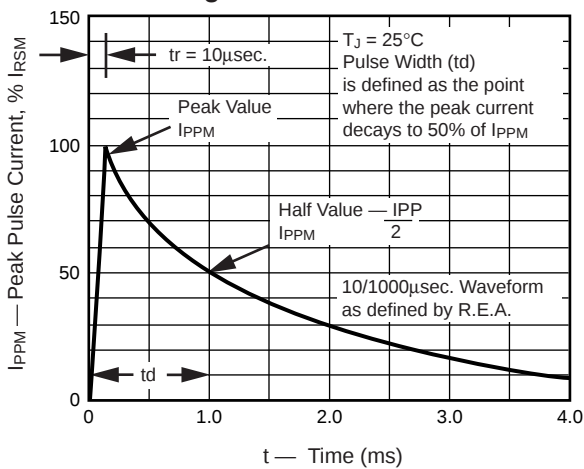
**Fig. 1 – Peak Pulse Power Rating Curve**



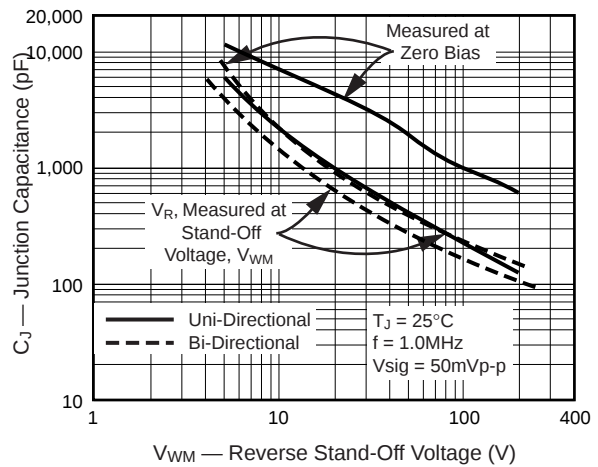
**Fig. 2 – Pulse Derating Curve**



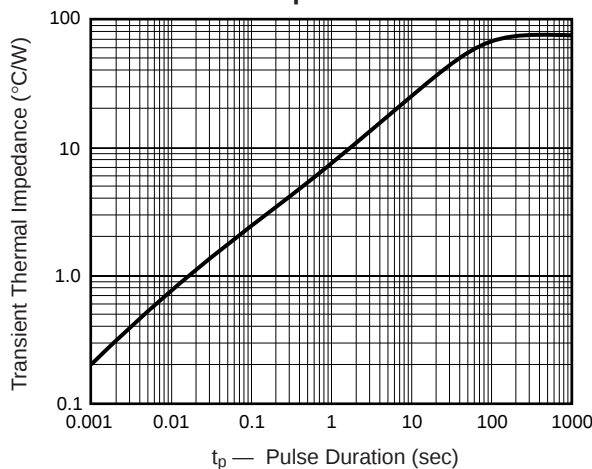
**Fig. 3 – Pulse Waveform**



**Fig. 4 – Typical Junction Capacitance Uni-Directional**



**Fig. 5 – Typical Transient Thermal Impedance**



**Fig. 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Use Only**

