

## 1500W, 6.8V - 200V Surface Mount Transient Voltage Suppressor

### FEATURES

- Ideal for automated placement
- Glass passivated junction
- Excellent clamping capability
- Fast response time: Typically less than 1.0ps
- Typical  $I_R$  less than 1 $\mu$ A above 10V
- Moisture sensitivity level: level 1, per J-STD-020
- AEC-Q101 qualified available:  
ordering code with suffix "H"
- Compliant to RoHS Directive 2011/65/EU and  
in accordance to WEEE 2002/96/EC

### KEY PARAMETERS

| PARAMETER     | VALUE          | UNIT |
|---------------|----------------|------|
| $V_{WM}$      | 5.5 - 171      | V    |
| $V_{BR}$      | 6.8 - 200      | V    |
| $P_{PK}$      | 1500           | W    |
| $T_{J\ MAX}$  | 150            | °C   |
| Package       | DO-214AB (SMC) |      |
| Configuration | Single die     |      |

### APPLICATIONS

- Immunization of sensitive devices in automotive, telecommunications, consumer electronics, and industrial equipment from electrostatic discharge (ESD) and transient voltages induced by load switching and lightning

### MECHANICAL DATA

- Case : DO-214AB (SMC)
- Molding compound meets UL 94V-0 flammability rating
- Terminal : Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity : As marked
- Weight : 0.21 g (approximately)



**DO-214AB (SMC)**

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| PARAMETER                                                                           | SYMBOL    | VALUE       | UNIT |
|-------------------------------------------------------------------------------------|-----------|-------------|------|
| Peak power dissipation at $T_A=25^\circ\text{C}$ , $t_p=1\text{ms}^{(1)}$           | $P_{PK}$  | 1500        | W    |
| Steady state power dissipation at $T_A=25^\circ\text{C}$                            | $P_D$     | 6.5         | W    |
| Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$ | 200         | A    |
| Forward Voltage @ $I_F=50\text{A}$ for Unidirectional only <sup>(2)</sup>           | $V_F$     | 3.5 / 5.0   | V    |
| Junction temperature                                                                | $T_J$     | -55 to +150 | °C   |
| Storage temperature                                                                 | $T_{STG}$ | -55 to +150 | °C   |

#### Notes:

1. Non-repetitive current pulse per Fig. 3 and derated above  $T_A=25^\circ\text{C}$  per Fig. 2
2.  $V_F=3.5\text{V}$  on 1.5SMC6.8 - 1.5SMC91 and  $V_F=5.0\text{V}$  on 1.5SMC100 - 1.5SMC200

#### Devices for Bipolar Applications

1. For bidirectional use C or CA suffix for types 1.5SMC6.8 - types 1.5SMC200A
2. Electrical characteristics apply in both directions

**THERMAL PERFORMANCE**

| PARAMETER                              | SYMBOL          | TYP | UNIT |
|----------------------------------------|-----------------|-----|------|
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 50  | °C/W |
| Junction-to-case thermal resistance    | $R_{\theta JC}$ | 15  | °C/W |

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Part number | Marking code | Breakdown voltage<br>(Note 1)<br>$V_{BR@I_T}$<br>(V) |       | Test current<br>$I_T$<br>(mA) | Working stand-off voltage<br>$V_{WM}$<br>(V) | Maximum blocking leakage current<br>$I_R@V_{WM}$<br>( $\mu\text{A}$ ) | Maximum peak impulse current<br>(Note 2)<br>$I_{PPM}$<br>(A) | Maximum clamping voltage<br>$V_C@I_{PPM}$<br>(V) | Maximum Temperature Coefficient of $V_{BR}$<br>(%/°C) |
|-------------|--------------|------------------------------------------------------|-------|-------------------------------|----------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------|
|             |              | MIN.                                                 | MAX.  |                               |                                              |                                                                       |                                                              |                                                  |                                                       |
| 1.5SMC6.8   | DDJ          | 6.12                                                 | 7.48  | 10                            | 5.50                                         | 1000                                                                  | 145                                                          | 10.8                                             | 0.057                                                 |
| 1.5SMC6.8A  | DEJ          | 6.46                                                 | 7.14  | 10                            | 5.80                                         | 1000                                                                  | 150                                                          | 10.5                                             | 0.057                                                 |
| 1.5SMC7.5   | DFJ          | 6.75                                                 | 8.25  | 10                            | 6.05                                         | 500                                                                   | 134                                                          | 11.7                                             | 0.061                                                 |
| 1.5SMC7.5A  | DGJ          | 7.13                                                 | 7.88  | 10                            | 6.40                                         | 500                                                                   | 139                                                          | 11.3                                             | 0.061                                                 |
| 1.5SMC8.2   | DHJ          | 7.38                                                 | 9.02  | 10                            | 6.63                                         | 200                                                                   | 126                                                          | 12.5                                             | 0.065                                                 |
| 1.5SMC8.2A  | DKJ          | 7.79                                                 | 8.61  | 10                            | 7.02                                         | 200                                                                   | 130                                                          | 12.1                                             | 0.065                                                 |
| 1.5SMC9.1   | DLJ          | 8.19                                                 | 10.00 | 1.0                           | 7.37                                         | 50                                                                    | 114                                                          | 13.8                                             | 0.068                                                 |
| 1.5SMC9.1A  | DMJ          | 8.65                                                 | 9.55  | 1.0                           | 7.78                                         | 50                                                                    | 117                                                          | 13.4                                             | 0.068                                                 |
| 1.5SMC10    | DNJ          | 9.00                                                 | 11.00 | 1.0                           | 8.10                                         | 10                                                                    | 105                                                          | 15.0                                             | 0.073                                                 |
| 1.5SMC10A   | DPJ          | 9.50                                                 | 10.5  | 1.0                           | 8.55                                         | 10                                                                    | 108                                                          | 14.5                                             | 0.073                                                 |
| 1.5SMC11    | DQJ          | 9.90                                                 | 12.1  | 1.0                           | 8.92                                         | 1                                                                     | 97                                                           | 16.2                                             | 0.075                                                 |
| 1.5SMC11A   | DRJ          | 10.5                                                 | 11.6  | 1.0                           | 9.40                                         | 1                                                                     | 100                                                          | 15.6                                             | 0.075                                                 |
| 1.5SMC12    | DSJ          | 10.8                                                 | 13.2  | 1.0                           | 9.72                                         | 1                                                                     | 91                                                           | 17.3                                             | 0.078                                                 |
| 1.5SMC12A   | DTJ          | 11.4                                                 | 12.6  | 1.0                           | 10.2                                         | 1                                                                     | 94                                                           | 16.7                                             | 0.078                                                 |
| 1.5SMC13    | DUJ          | 11.7                                                 | 14.3  | 1.0                           | 10.5                                         | 1                                                                     | 82                                                           | 19.0                                             | 0.081                                                 |
| 1.5SMC13A   | DVJ          | 12.4                                                 | 13.7  | 1.0                           | 11.1                                         | 1                                                                     | 86                                                           | 18.2                                             | 0.081                                                 |
| 1.5SMC15    | DWJ          | 13.5                                                 | 16.5  | 1.0                           | 12.1                                         | 1                                                                     | 71                                                           | 22.0                                             | 0.084                                                 |
| 1.5SMC15A   | DXJ          | 14.3                                                 | 15.8  | 1.0                           | 12.8                                         | 1                                                                     | 74                                                           | 21.2                                             | 0.084                                                 |
| 1.5SMC16    | DYJ          | 14.4                                                 | 17.6  | 1.0                           | 12.9                                         | 1                                                                     | 67                                                           | 23.5                                             | 0.086                                                 |
| 1.5SMC16A   | DZJ          | 15.2                                                 | 16.8  | 1.0                           | 13.6                                         | 1                                                                     | 70                                                           | 22.5                                             | 0.086                                                 |
| 1.5SMC18    | EDJ          | 16.2                                                 | 19.8  | 1.0                           | 14.5                                         | 1                                                                     | 59                                                           | 26.5                                             | 0.088                                                 |
| 1.5SMC18A   | EEJ          | 17.1                                                 | 18.9  | 1.0                           | 15.3                                         | 1                                                                     | 60                                                           | 25.5                                             | 0.088                                                 |
| 1.5SMC20    | EFJ          | 18.0                                                 | 22.0  | 1.0                           | 16.2                                         | 1                                                                     | 54                                                           | 29.1                                             | 0.090                                                 |
| 1.5SMC20A   | EGJ          | 19.0                                                 | 21.0  | 1.0                           | 17.1                                         | 1                                                                     | 56                                                           | 27.7                                             | 0.090                                                 |
| 1.5SMC22    | EHJ          | 19.8                                                 | 24.2  | 1.0                           | 17.8                                         | 1                                                                     | 49                                                           | 31.9                                             | 0.092                                                 |
| 1.5SMC22A   | EKJ          | 20.9                                                 | 23.1  | 1.0                           | 18.8                                         | 1                                                                     | 51                                                           | 30.6                                             | 0.092                                                 |
| 1.5SMC24    | ELJ          | 21.6                                                 | 26.4  | 1.0                           | 19.4                                         | 1                                                                     | 45                                                           | 34.7                                             | 0.094                                                 |
| 1.5SMC24A   | EMJ          | 22.8                                                 | 25.2  | 1.0                           | 20.5                                         | 1                                                                     | 47                                                           | 33.2                                             | 0.094                                                 |
| 1.5SMC27    | ENJ          | 24.3                                                 | 29.7  | 1.0                           | 21.8                                         | 1                                                                     | 40                                                           | 39.1                                             | 0.096                                                 |
| 1.5SMC27A   | EPJ          | 25.7                                                 | 28.4  | 1.0                           | 23.1                                         | 1                                                                     | 42                                                           | 37.5                                             | 0.096                                                 |
| 1.5SMC30    | EQJ          | 27.0                                                 | 33.0  | 1.0                           | 24.3                                         | 1                                                                     | 36                                                           | 43.5                                             | 0.097                                                 |
| 1.5SMC30A   | ERJ          | 28.5                                                 | 31.5  | 1.0                           | 25.6                                         | 1                                                                     | 38                                                           | 41.4                                             | 0.097                                                 |
| 1.5SMC33    | ESJ          | 29.7                                                 | 36.3  | 1.0                           | 26.8                                         | 1                                                                     | 33                                                           | 47.7                                             | 0.098                                                 |
| 1.5SMC33A   | ETJ          | 31.4                                                 | 34.7  | 1.0                           | 28.2                                         | 1                                                                     | 34                                                           | 45.7                                             | 0.098                                                 |
| 1.5SMC36    | EUJ          | 32.4                                                 | 39.6  | 1.0                           | 29.1                                         | 1                                                                     | 30                                                           | 52.0                                             | 0.099                                                 |
| 1.5SMC36A   | EVJ          | 34.2                                                 | 37.8  | 1.0                           | 30.8                                         | 1                                                                     | 31                                                           | 49.9                                             | 0.099                                                 |
| 1.5SMC39    | EWJ          | 35.1                                                 | 42.9  | 1.0                           | 31.6                                         | 1                                                                     | 27                                                           | 56.4                                             | 0.100                                                 |
| 1.5SMC39A   | EXJ          | 37.1                                                 | 41.0  | 1.0                           | 33.3                                         | 1                                                                     | 29                                                           | 53.9                                             | 0.100                                                 |
| 1.5SMC43    | EYJ          | 38.7                                                 | 47.3  | 1.0                           | 34.8                                         | 1                                                                     | 25                                                           | 61.9                                             | 0.101                                                 |
| 1.5SMC43A   | EZJ          | 40.9                                                 | 45.2  | 1.0                           | 36.8                                         | 1                                                                     | 26                                                           | 59.3                                             | 0.101                                                 |
| 1.5SMC47    | FDJ          | 42.3                                                 | 51.7  | 1.0                           | 38.1                                         | 1                                                                     | 23                                                           | 67.8                                             | 0.101                                                 |
| 1.5SMC47A   | FEJ          | 44.7                                                 | 49.4  | 1.0                           | 40.2                                         | 1                                                                     | 24                                                           | 64.8                                             | 0.101                                                 |
| 1.5SMC51    | FFJ          | 45.9                                                 | 56.1  | 1.0                           | 41.3                                         | 1                                                                     | 21                                                           | 73.5                                             | 0.102                                                 |

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Part number | Marking code | Breakdown voltage<br>(Note 1)<br>$V_{BR}@I_T$<br>(V) |      | Test current<br>$I_T$<br>(mA) | Working stand-off voltage<br>$V_{WM}$<br>(V) | Maximum blocking leakage current<br>$I_R@V_{WM}$<br>( $\mu\text{A}$ ) | Maximum peak impulse current<br>(Note 2)<br>$I_{PPM}$<br>(A) | Maximum clamping voltage<br>$V_C@I_{PPM}$<br>(V) | Maximum Temperature Coefficient of $V_{BR}$<br>(%/°C) |
|-------------|--------------|------------------------------------------------------|------|-------------------------------|----------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------|
|             |              | MIN.                                                 | MAX. |                               |                                              |                                                                       |                                                              |                                                  |                                                       |
| 1.5SMC51A   | FGJ          | 48.5                                                 | 53.6 | 1.0                           | 43.6                                         | 1                                                                     | 22                                                           | 70.1                                             | 0.102                                                 |
| 1.5SMC56    | FHJ          | 50.4                                                 | 61.6 | 1.0                           | 45.4                                         | 1                                                                     | 19                                                           | 80.5                                             | 0.103                                                 |
| 1.5SMC56A   | FKJ          | 53.2                                                 | 58.8 | 1.0                           | 47.8                                         | 1                                                                     | 20                                                           | 77.0                                             | 0.103                                                 |
| 1.5SMC62    | FLJ          | 55.8                                                 | 68.2 | 1.0                           | 50.2                                         | 1                                                                     | 17                                                           | 89.0                                             | 0.104                                                 |
| 1.5SMC62A   | FMJ          | 58.9                                                 | 65.1 | 1.0                           | 53.0                                         | 1                                                                     | 18                                                           | 85.0                                             | 0.104                                                 |
| 1.5SMC68    | FNJ          | 61.2                                                 | 74.8 | 1.0                           | 55.1                                         | 1                                                                     | 16                                                           | 98.0                                             | 0.104                                                 |
| 1.5SMC68A   | FPJ          | 64.6                                                 | 71.4 | 1.0                           | 58.1                                         | 1                                                                     | 17                                                           | 92.0                                             | 0.104                                                 |
| 1.5SMC75    | FQJ          | 67.5                                                 | 82.5 | 1.0                           | 60.7                                         | 1                                                                     | 14                                                           | 108                                              | 0.105                                                 |
| 1.5SMC75A   | FRJ          | 71.3                                                 | 78.8 | 1.0                           | 64.1                                         | 1                                                                     | 15                                                           | 103                                              | 0.105                                                 |
| 1.5SMC82    | FSJ          | 73.8                                                 | 90.2 | 1.0                           | 66.4                                         | 1                                                                     | 13                                                           | 118                                              | 0.105                                                 |
| 1.5SMC82A   | FTJ          | 77.9                                                 | 86.1 | 1.0                           | 70.1                                         | 1                                                                     | 13.9                                                         | 113                                              | 0.105                                                 |
| 1.5SMC91    | FUJ          | 81.9                                                 | 100  | 1.0                           | 73.7                                         | 1                                                                     | 12                                                           | 131                                              | 0.106                                                 |
| 1.5SMC91A   | FVJ          | 86.5                                                 | 95.5 | 1.0                           | 77.8                                         | 1                                                                     | 12.6                                                         | 125                                              | 0.106                                                 |
| 1.5SMC100   | FWJ          | 90                                                   | 110  | 1.0                           | 81.0                                         | 1                                                                     | 10.9                                                         | 144                                              | 0.106                                                 |
| 1.5SMC100A  | FXJ          | 95                                                   | 105  | 1.0                           | 85.5                                         | 1                                                                     | 11.4                                                         | 137                                              | 0.106                                                 |
| 1.5SMC110   | FYJ          | 99                                                   | 121  | 1.0                           | 89.2                                         | 1                                                                     | 9.9                                                          | 158                                              | 0.107                                                 |
| 1.5SMC110A  | FZJ          | 105                                                  | 116  | 1.0                           | 94.0                                         | 1                                                                     | 10.3                                                         | 152                                              | 0.107                                                 |
| 1.5SMC120   | GDJ          | 108                                                  | 132  | 1.0                           | 97.2                                         | 1                                                                     | 9.1                                                          | 173                                              | 0.107                                                 |
| 1.5SMC120A  | GEJ          | 114                                                  | 126  | 1.0                           | 102.0                                        | 1                                                                     | 9.5                                                          | 165                                              | 0.107                                                 |
| 1.5SMC130   | GFJ          | 117                                                  | 143  | 1.0                           | 105.0                                        | 1                                                                     | 8.4                                                          | 187                                              | 0.107                                                 |
| 1.5SMC130A  | GGJ          | 124                                                  | 137  | 1.0                           | 111.0                                        | 1                                                                     | 8.7                                                          | 179                                              | 0.107                                                 |
| 1.5SMC150   | GHJ          | 135                                                  | 165  | 1.0                           | 121.0                                        | 1                                                                     | 7.3                                                          | 215                                              | 0.108                                                 |
| 1.5SMC150A  | GKJ          | 143                                                  | 158  | 1.0                           | 128.0                                        | 1                                                                     | 7.6                                                          | 207                                              | 0.108                                                 |
| 1.5SMC160   | GLJ          | 144                                                  | 176  | 1.0                           | 130.0                                        | 1                                                                     | 6.8                                                          | 230                                              | 0.108                                                 |
| 1.5SMC160A  | GMJ          | 152                                                  | 168  | 1.0                           | 136.0                                        | 1                                                                     | 7.1                                                          | 219                                              | 0.108                                                 |
| 1.5SMC170   | GNJ          | 153                                                  | 187  | 1.0                           | 138.0                                        | 1                                                                     | 6.4                                                          | 244                                              | 0.108                                                 |
| 1.5SMC170A  | GPJ          | 162                                                  | 179  | 1.0                           | 145.0                                        | 1                                                                     | 6.7                                                          | 234                                              | 0.108                                                 |
| 1.5SMC180   | GQJ          | 162                                                  | 198  | 1.0                           | 146.0                                        | 1                                                                     | 6.1                                                          | 258                                              | 0.108                                                 |
| 1.5SMC180A  | GRJ          | 171                                                  | 189  | 1.0                           | 154.0                                        | 1                                                                     | 6.4                                                          | 246                                              | 0.108                                                 |
| 1.5SMC200   | GSJ          | 180                                                  | 220  | 1.0                           | 162.0                                        | 1                                                                     | 5.4                                                          | 287                                              | 0.108                                                 |
| 1.5SMC200A  | GTJ          | 190                                                  | 210  | 1.0                           | 171.0                                        | 1                                                                     | 5.7                                                          | 274                                              | 0.108                                                 |

**Notes:**

1.  $V_{BR}$  measure after  $I_T$  applied for 30ms,  $I_T$ =square wave pulse or equivalent
2. Surge current waveform per Fig. 3 and derate per Fig. 2
3. For bipolar types having  $V_{WM}$  of 10 V and under, the  $I_R$  limit is doubled
4. For bidirectional use C or CA suffix for types 1.5SMC6.8 - 1.5SMC200A
5. All terms and symbols are consistent with ANSI/IEEE C62.35

**ORDERING INFORMATION**

| <b>ORDERING CODE</b><br>(Note 1, 2, 3) | <b>PACKAGE</b> | <b>PACKING</b>           |
|----------------------------------------|----------------|--------------------------|
| 1.5SMCxxxxHR7G                         | SMC            | 850 / 7" Plastic reel    |
| 1.5SMCxxxxHR6G                         | SMC            | 3,000 / 13" Paper reel   |
| 1.5SMCxxxxHM6G                         | SMC            | 3,000 / 13" Plastic reel |
| 1.5SMCxxxx R7G                         | SMC            | 850 / 7" Plastic reel    |
| 1.5SMCxxxx R6G                         | SMC            | 3,000 / 13" Paper reel   |
| 1.5SMCxxxx M6G                         | SMC            | 3,000 / 13" Plastic reel |
| 1.5SMCxxxxHV7G                         | Matrix SMC     | 850 / 7" Plastic reel    |
| 1.5SMCxxxxHV6G                         | Matrix SMC     | 3,000 / 13" Plastic reel |
| 1.5SMCxxxx V7G                         | Matrix SMC     | 850 / 7" Plastic reel    |
| 1.5SMCxxxx V6G                         | Matrix SMC     | 3,000 / 13" Plastic reel |
| 1.5SMCxxxxHR7                          | SMC            | 850 / 7" Plastic reel    |
| 1.5SMCxxxxHR6                          | SMC            | 3,000 / 13" Paper reel   |
| 1.5SMCxxxxHM6                          | SMC            | 3,000 / 13" Plastic reel |
| 1.5SMCxxxx R7                          | SMC            | 850 / 7" Plastic reel    |
| 1.5SMCxxxx R6                          | SMC            | 3,000 / 13" Paper reel   |
| 1.5SMCxxxx M6                          | SMC            | 3,000 / 13" Plastic reel |

**Note 1:**

"xxxx" defines voltage from 6.8V  
(1.5SMC6.8) to 200V (1SMC200A)

**Note 2:**

"H" means AEC-Q101 qualified

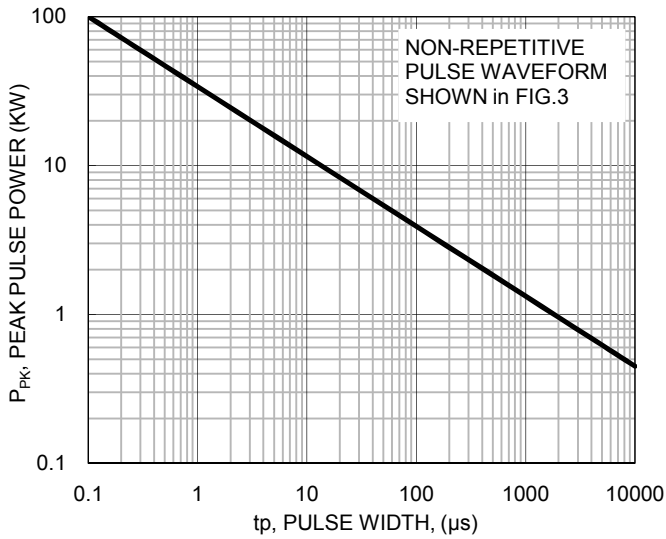
**Note 3:**

"G" means green compound (halogen free)

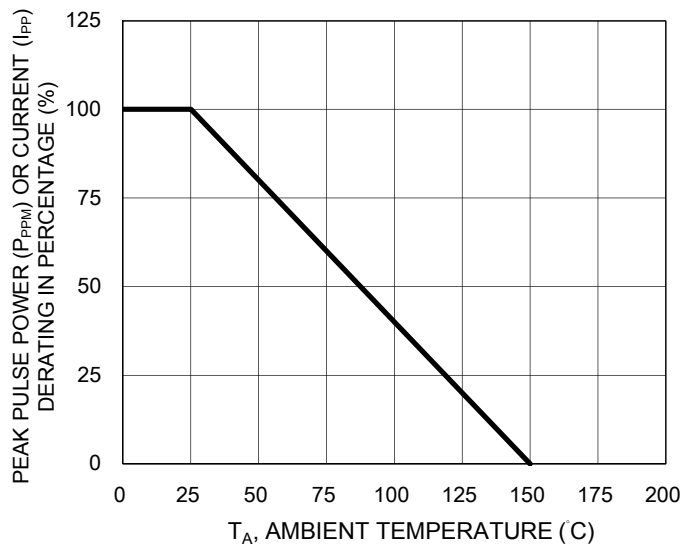
## CHARACTERISTICS CURVES

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

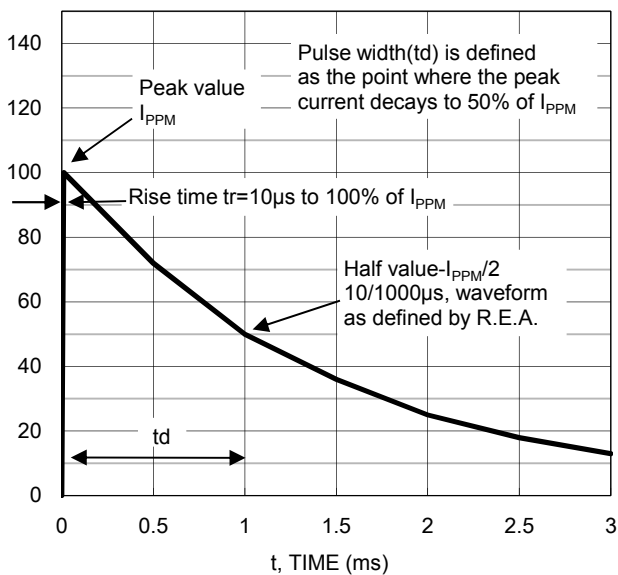
**Fig.1 Peak Pulse Power Rating Curve**



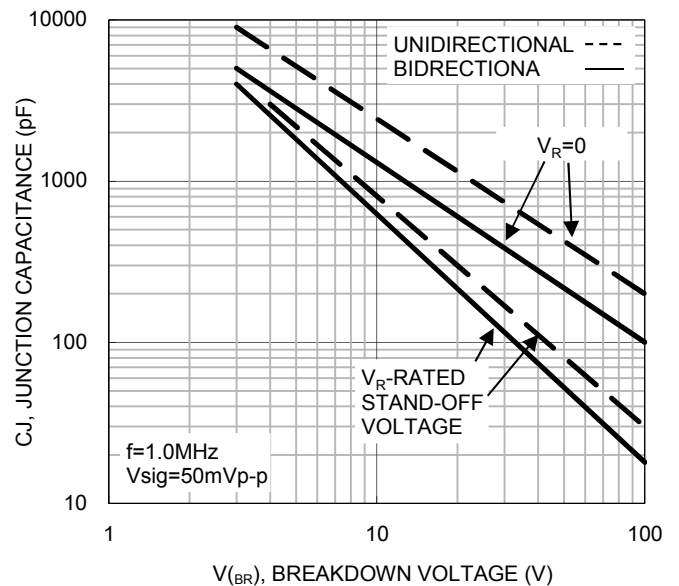
**Fig.2 Pulse Derating Curve**



**Fig.3 Clamping Power Pulse Waveform**



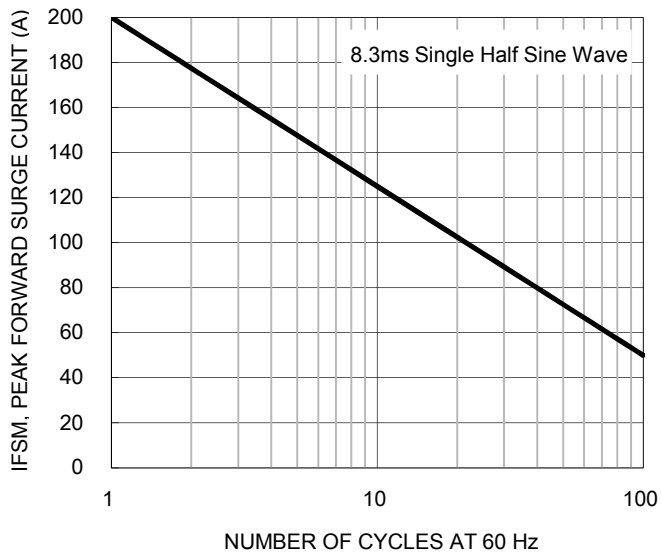
**Fig.4 Typical Junction Capacitance**



## CHARACTERISTICS CURVES

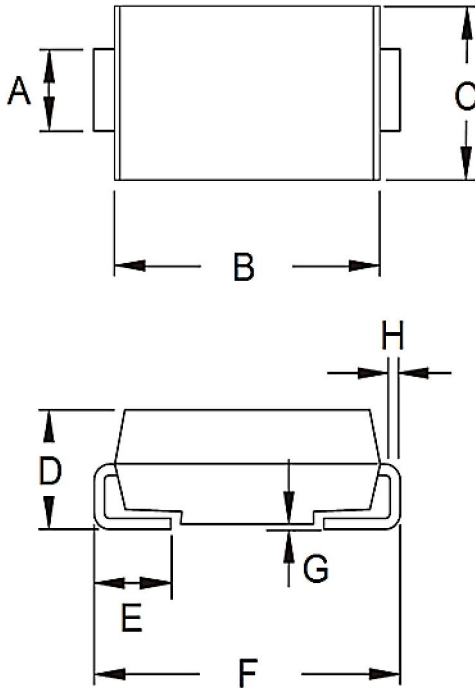
( $T_A = 25^\circ\text{C}$  unless otherwise noted)

**Fig.5 Maximum Non-repetitive Forward Surge Current  
Unidirectional Only**



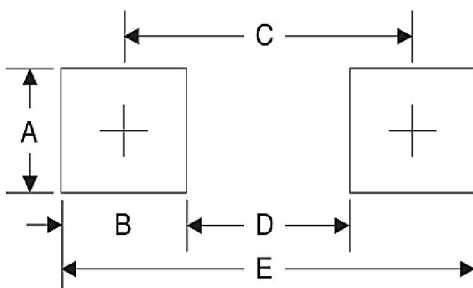
## PACKAGE OUTLINE DIMENSIONS

DO-214AB (SMC)



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min.      | Max. | Min.        | Max.  |
| A    | 2.90      | 3.20 | 0.114       | 0.126 |
| B    | 6.60      | 7.11 | 0.260       | 0.280 |
| C    | 5.59      | 6.22 | 0.220       | 0.245 |
| D    | 2.00      | 2.62 | 0.079       | 0.103 |
| E    | 1.00      | 1.60 | 0.039       | 0.063 |
| F    | 7.75      | 8.13 | 0.305       | 0.320 |
| G    | 0.10      | 0.20 | 0.004       | 0.008 |
| H    | 0.15      | 0.31 | 0.006       | 0.012 |

## SUGGESTED PAD LAYOUT



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 3.30      | 0.130       |
| B      | 2.50      | 0.098       |
| C      | 6.80      | 0.268       |
| D      | 4.40      | 0.173       |
| E      | 9.40      | 0.370       |

## MARKING DIAGRAM

SMC

Matrix SMC



Note: Cathode band for unidirectional products only

P/N =Marking Code

G =Green Compound

YW =Date Code

F =Factory Code

## Notice

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