

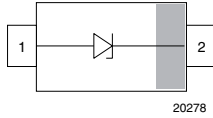


**THE DATASHEET OF  
SMF36A-M3-08**



## Surface-Mount ESD Protection Diodes

### eSMP® Series


**SMF (DO-219AB)**

### MARKING (example only)



Bar = cathode marking  
 YY = type code (see table below)  
 XX = date code  
 Z = location code (optional)

### FEATURES

- 200 W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetition rate (duty cycle): 0.01 %
- Low profile package
- Wave and reflow solderable
- ESD immunity acc. IEC 61000-4-2  $\pm$  30 kV contact discharge  $\pm$  30 kV air discharge
- ESD capability according to AEC-Q101: human body model: class H3B: > 8 kV
- Low incremental surge resistance, excellent clamping capability
- “Low Noise” technology - very fast response time
- AEC-Q101 qualified available
- Compatible to SOD-123W package case outline or SOD-123F and SOD-123FL
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE  
Available

**RoHS**  
COMPLIANT

### LINKS TO ADDITIONAL RESOURCES



| ORDERING INFORMATION  |                                |  |            |               |                                       |   |                         |
|-----------------------|--------------------------------|--|------------|---------------|---------------------------------------|---|-------------------------|
| PART NUMBER (EXAMPLE) | ENVIRONMENTAL AND QUALITY CODE |  |            | REVISION CODE | PACKAGING CODE                        |   | ORDERING CODE (EXAMPLE) |
|                       | AEC-Q101 QUALIFIED             | RoHS-COMPLIANT + LEAD (Pb)-FREE TERMINATIONS | TIN PLATED |               | 3K PER 7" REEL (8 mm TAPE), MOQ = 30K | 10K PER 13" REEL (8 mm TAPE), MOQ = 50K |                         |
| SMF5V0A-              |                                | E  | 3          | -             | 08                                    |   | SMF5V0A-E3-08           |
| SMF5V0A-              | H                              | E  | 3          | _A            | 08                                    |   | SMF5V0A-HE3_A08         |
| SMF5V0A-              |                                | E  | 3          | -             |                                       | 18                                      | SMF5V0A-E3-18           |
| SMF5V0A-              | H                              | E  | 3          | _A            |                                       | 18                                      | SMF5V0A-HE3_A18         |

| PACKAGE DATA   |             |                  |                  |                 |                                      |                              |                            |                              |
|----------------|-------------|------------------|------------------|-----------------|--------------------------------------|------------------------------|----------------------------|------------------------------|
| PACKAGE NAME   | WEIGHT (mg) | HEIGHT MAX. (mm) | LENGTH MAX. (mm) | WIDTH MAX. (mm) | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL   | WHISKER TEST ACC. JESD 201 | SOLDERING CONDITIONS         |
| SMF (DO-219AB) | 15          | 1.08             | 3.9              | 1.9             | UL 94 V-0                            | MSL level 1 (acc. J-STD-020) | Class 2                    | Peak temperature max. 260 °C |



| ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |  |                   |                                  |      |
|---|--|-------------------|----------------------------------|------|
| PARAMETER   | TEST CONDITIONS  | SYMBOL            | VALUE                            | UNIT |
| Peak pulse current  | t <sub>p</sub> = 10/1000 μs waveform                                 | I <sub>PPM</sub>  | see "Electrical Characteristics" | A    |
| Peak pulse power  | t <sub>p</sub> = 8/20 μs waveform acc. IEC 61000-4-5                 | P <sub>PP</sub>   | 1000                             | W    |
|   | t <sub>p</sub> = 10/1000 μs waveform                                 |                   | 200                              | W    |
| Peak forward surge current  | 8.3 ms single half sine-wave   | I <sub>FSM</sub>  | 50                               | A    |
| ESD immunity  | Contact discharge acc. IEC 61000-4-2; 10 pulses                      | V <sub>ESD</sub>  | ± 30                             | kV   |
|   | Air discharge acc. IEC 61000-4-2; 10 pulses                          |                   | ± 30                             | kV   |
| Thermal resistance  | Mounted on epoxy glass PCB with 3 mm x 3 mm, Cu pads (≥ 40 μm thick) | R <sub>thJA</sub> | 180                              | K/W  |
| Forward clamping voltage  | I <sub>F</sub> = 50A, t <sub>p</sub> = 400 μs                        | V <sub>F</sub>    | 2.5                              | V    |
| Junction temperature  |  | T <sub>J</sub>    | 175                              | °C   |
| Storage temperature range   |  | T <sub>stg</sub>  | -65 to +175                      | °C   |
| Operating temperature range   |  | T <sub>op</sub>   | -65 to +175                      | °C   |

| ELECTRICAL CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |              |   |                          |                                  |  |   |   |  |  |                                       |
|---|--------------|---|--------------------------|----------------------------------|--|---|---|--|--|---------------------------------------|
| PART NUMBER   | MARKING CODE | REVERSE BREAKDOWN VOLTAGE at I <sub>T</sub> , t <sub>p</sub> = 5 ms |                          | TEST CURRENT I <sub>T</sub> (mA) | STAND-OFF VOLTAGE V <sub>RWM</sub> (V) | MAXIMUM REVERSE CURRENT I <sub>R</sub> (μA) at V <sub>RWM</sub> | MAXIMUM PEAK PULSE CURRENT I <sub>PPM</sub> (A) t <sub>p</sub> = 10/1000 μs | MAXIMUM REVERSE CLAMPING VOLTAGE V <sub>C</sub> MAX. (V) at I <sub>PPM</sub> | TYPICAL CAP. at V <sub>R</sub> = 0 V, f = 1 MHz C <sub>D</sub> TYP. (pF) | PROTECTION PATHS N <sub>channel</sub> |
|   |              | V <sub>BR</sub> MIN. (V)  | V <sub>BR</sub> MAX. (V) |                                  |  |   |   |  |  |                                       |
| SMF5V0A   | AE           | 6.40  | 7.1                      | 10                               | 5                                      | 5   | 21.7  | 9.2  | 1120   | 1                                     |
| SMF6V0A   | AG           | 6.67  | 7.4                      | 10                               | 6                                      | 26  | 19.4  | 10.3   | 1063   | 1                                     |
| SMF6V5A   | AK           | 7.22  | 8                        | 10                               | 6.5                                    | 20  | 17.9  | 11.2   | 938  | 1                                     |
| SMF7V0A   | AM           | 7.78  | 8.6                      | 10                               | 7                                      | 3   | 16.7  | 12   | 843  | 1                                     |
| SMF7V5A   | AP           | 8.33  | 9.3                      | 1                                | 7.5                                    | 0.1   | 15.5  | 12.9   | 773  | 1                                     |
| SMF8V0A   | AR           | 8.89  | 9.9                      | 1                                | 8                                      | 0.1   | 14.7  | 13.6   | 706  | 1                                     |
| SMF8V5A   | AT           | 9.44  | 10.5                     | 1                                | 8.5                                    | 0.1   | 13.9  | 14.4   | 674  | 1                                     |
| SMF9V0A   | AV           | 10  | 11.2                     | 1                                | 9                                      | 0.1   | 13.5  | 15.4   | 640  | 1                                     |
| SMF10A  | AX           | 11.1  | 12.3                     | 1                                | 10                                     | 0.1   | 11.8  | 17   | 562  | 1                                     |
| SMF11A  | AZ           | 12.2  | 13.5                     | 1                                | 11                                     | 0.1   | 11  | 18.2   | 509  | 1                                     |
| SMF12A  | BE           | 13.3  | 14.7                     | 1                                | 12                                     | 0.1   | 10.1  | 19.9   | 483  | 1                                     |
| SMF13A  | BG           | 14.4  | 16                       | 1                                | 13                                     | 0.1   | 9.3   | 21.5   | 423  | 1                                     |
| SMF14A  | BK           | 15.6  | 17.3                     | 1                                | 14                                     | 0.1   | 8.6   | 23.2   | 392  | 1                                     |
| SMF15A  | BM           | 16.7  | 18.5                     | 1                                | 15                                     | 0.1   | 8.2   | 24.4   | 367  | 1                                     |
| SMF16A  | BP           | 17.8  | 19.7                     | 1                                | 16                                     | 0.1   | 7.7   | 26   | 343  | 1                                     |
| SMF17A  | BR           | 18.9  | 20.9                     | 1                                | 17                                     | 0.1   | 7.2   | 27.6   | 324  | 1                                     |
| SMF18A  | BT           | 20  | 22.3                     | 1                                | 18                                     | 0.1   | 6.8   | 29.2   | 320  | 1                                     |
| SMF20A  | BV           | 22.2  | 24.6                     | 1                                | 20                                     | 0.1   | 6.2   | 32.4   | 283  | 1                                     |
| SMF22A  | BX           | 24.4  | 27                       | 1                                | 22                                     | 0.1   | 5.6   | 35.5   | 271  | 1                                     |
| SMF24A  | BZ           | 26.7  | 29.6                     | 1                                | 24                                     | 0.1   | 5.1   | 38.9   | 244  | 1                                     |
| SMF26A  | CE           | 28.9  | 32                       | 1                                | 26                                     | 0.1   | 4.8   | 42.1   | 230  | 1                                     |
| SMF28A  | CG           | 31.1  | 34.4                     | 1                                | 28                                     | 0.1   | 4.4   | 45.4   | 227  | 1                                     |
| SMF30A  | CK           | 33.3  | 36.9                     | 1                                | 30                                     | 0.1   | 4.1   | 48.4   | 207  | 1                                     |
| SMF33A  | CM           | 36.7  | 40.6                     | 1                                | 33                                     | 0.1   | 3.8   | 53.3   | 198  | 1                                     |
| SMF36A  | CP           | 40  | 44.3                     | 1                                | 36                                     | 0.1   | 3.4   | 58.1   | 178  | 1                                     |
| SMF40A  | CR           | 44.4  | 49.1                     | 1                                | 40                                     | 0.1   | 3.1   | 64.5   | 172  | 1                                     |
| SMF43A  | CT           | 47.8  | 52.9                     | 1                                | 43                                     | 0.1   | 2.9   | 69.4   | 165  | 1                                     |
| SMF45A  | CV           | 50  | 55.3                     | 1                                | 45                                     | 0.1   | 2.8   | 72.7   | 162  | 1                                     |
| SMF48A  | CX           | 53.3  | 59                       | 1                                | 48                                     | 0.1   | 2.6   | 77.4   | 161  | 1                                     |
| SMF51A  | CZ           | 56.7  | 62.7                     | 1                                | 51                                     | 0.1   | 2.4   | 82.4   | 151  | 1                                     |
| SMF54A  | CA           | 60  | 66                       | 1                                | 54                                     | 0.1   | 2.25  | 88   | 148  | 1                                     |
| SMF58A  | CC           | 64.4  | 70.8                     | 1                                | 58                                     | 0.1   | 2.1   | 95   | 144  | 1                                     |

## TYPICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)



Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330 Ω/150pF)



Fig. 4 - Pulse Waveform



Fig. 2 - 8/20 μs Peak Pulse Current Wave Form acc. IEC 61000-4-5



Fig. 5 - Typical Capacitance C<sub>D</sub> vs. Reverse Voltage V<sub>R</sub>



Fig. 3 - Peak Pulse Power Rating



Fig. 6 - Typical Capacitance C<sub>D</sub> vs. Reverse Voltage V<sub>R</sub>



Fig. 7 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$



Fig. 10 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$



Fig. 8 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$



Fig. 11 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$



Fig. 9 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$



Fig. 12 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$



## PACKAGE DIMENSIONS in millimeters (inches): SMF (DO-219AB)



foot print recommendation:



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**ORIENTATION IN CARRIER TAPE - SMF (DO-219AB)**



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22670



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