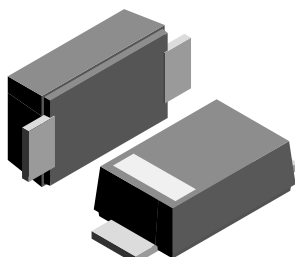
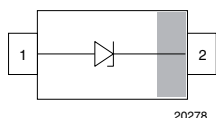


## Surface-Mount ESD Protection Diodes

### eSMP® Series


**SMF (DO-219AB)**

**AUTOMOTIVE  
GRADE**  
Available

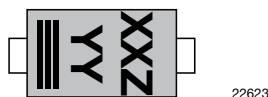


**RoHS  
COMPLIANT**

### 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)

### MARKING (example only)



Bar = cathode marking

YY = type code (see table below)

XX = date code

Z = location code (optional)

### 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** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER                   | TEST CONDITIONS                                                                            | SYMBOL     | VALUE                            | UNIT               |
|-----------------------------|--------------------------------------------------------------------------------------------|------------|----------------------------------|--------------------|
| Peak pulse current          | $t_p = 10/1000\text{ }\mu\text{s}$ waveform                                                | $I_{PPM}$  | see "Electrical Characteristics" | A                  |
| Peak pulse power            | $t_p = 8/20\text{ }\mu\text{s}$ waveform acc. IEC 61000-4-5                                | $P_{PP}$   | 1000                             | W                  |
|                             | $t_p = 10/1000\text{ }\mu\text{s}$ waveform                                                |            | 200                              | W                  |
| Peak forward surge current  | 8.3 ms single half sine-wave                                                               | $I_{FSM}$  | 50                               | A                  |
| ESD immunity                | Contact discharge acc. IEC 61000-4-2; 10 pulses                                            | $V_{ESD}$  | $\pm 30$                         | kV                 |
|                             | Air discharge acc. IEC 61000-4-2; 10 pulses                                                |            | $\pm 30$                         | kV                 |
| Thermal resistance          | Mounted on epoxy glass PCB with 3 mm x 3 mm, Cu pads ( $\geq 40\text{ }\mu\text{m}$ thick) | $R_{thJA}$ | 180                              | K/W                |
| Forward clamping voltage    | $I_F = 50\text{ A}$ , $t_p = 400\text{ }\mu\text{s}$                                       | $V_F$      | 2.5                              | V                  |
| Junction temperature        |                                                                                            | $T_J$      | 175                              | $^{\circ}\text{C}$ |
| Storage temperature range   |                                                                                            | $T_{stg}$  | -65 to +175                      | $^{\circ}\text{C}$ |
| Operating temperature range |                                                                                            | $T_{op}$   | -65 to +175                      | $^{\circ}\text{C}$ |

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PART NUMBER | MARKING CODE | REVERSE BREAKDOWN VOLTAGE at $I_T$ , $t_p = 5\text{ ms}$ |                   | TEST CURRENT $I_T$ (mA) | STAND-OFF VOLTAGE $V_{RWM}$ (V) | MAXIMUM REVERSE CURRENT $I_R$ at $V_{RWM}$ ( $\mu\text{A}$ ) | MAXIMUM PEAK PULSE CURRENT $I_{PPM}$ at $t_p = 10/1000\text{ }\mu\text{s}$ (A) | MAXIMUM REVERSE CLAMPING VOLTAGE at $I_{PPM}$ (V) | TYPICAL CAP. at $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ ( $C_D$ TYP. (pF)) | PROTECTION PATHS $N_{channel}$ |
|-------------|--------------|----------------------------------------------------------|-------------------|-------------------------|---------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------------------|--------------------------------|
|             |              | $V_{BR}$ MIN. (V)                                        | $V_{BR}$ 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                              |

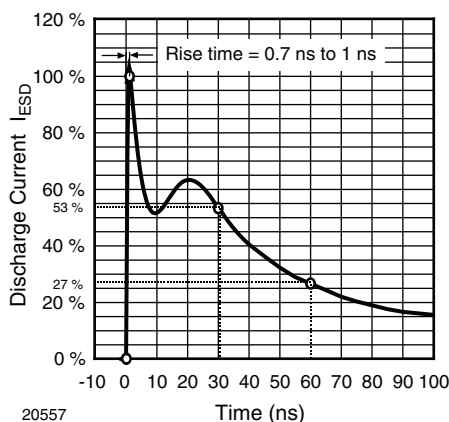
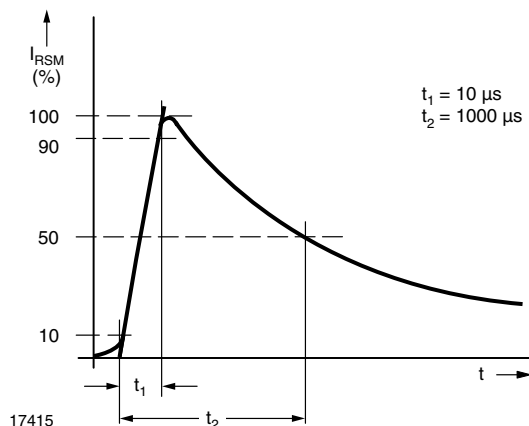
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

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


Fig. 4 - Pulse Waveform

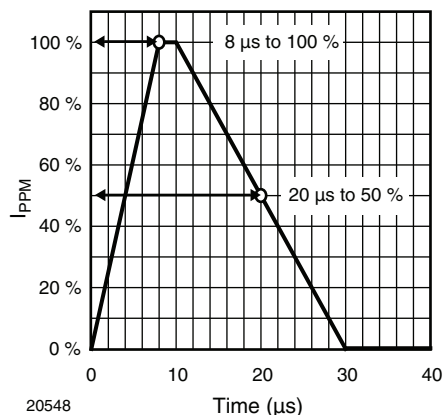
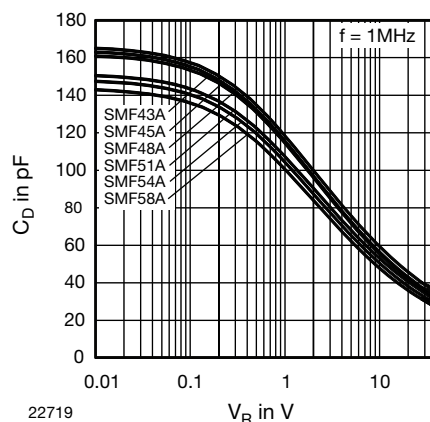
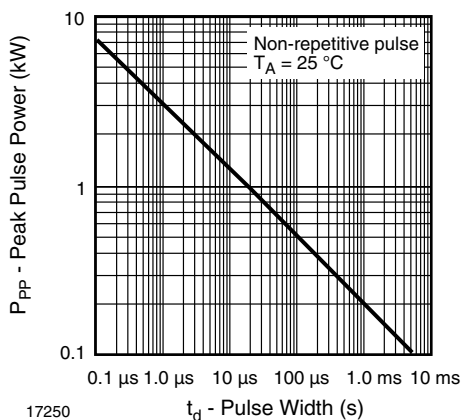
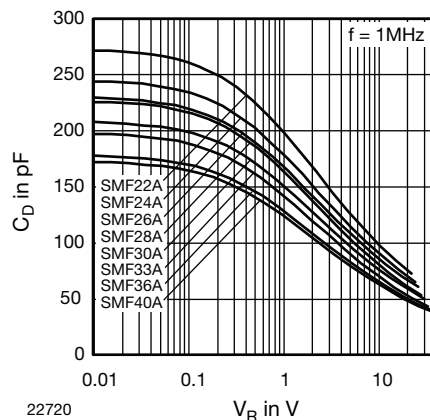

Fig. 2 - 8/20  $\mu\text{s}$  Peak Pulse Current Wave Form acc. IEC 61000-4-5

Fig. 5 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$ 


Fig. 3 - Peak Pulse Power Rating


Fig. 6 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

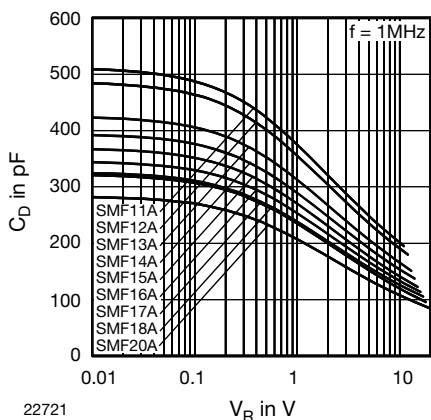


Fig. 7 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

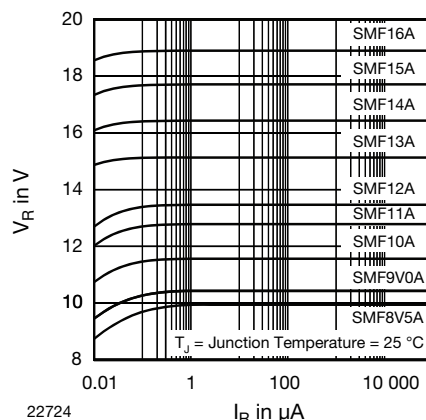


Fig. 10 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

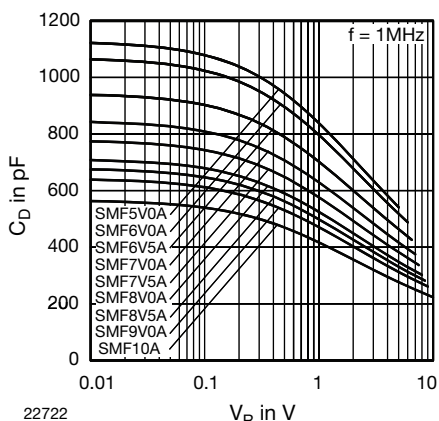


Fig. 8 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

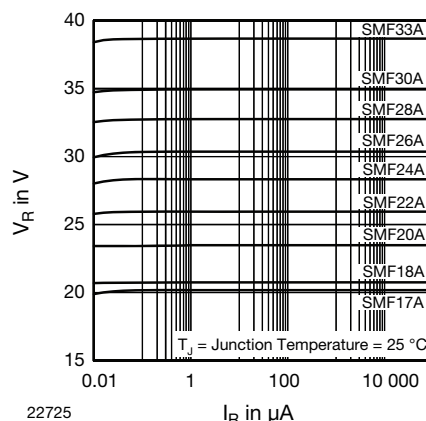


Fig. 11 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

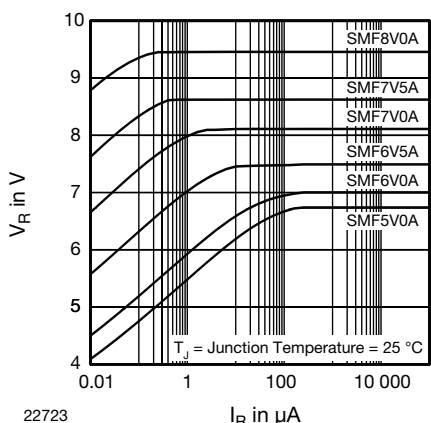


Fig. 9 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

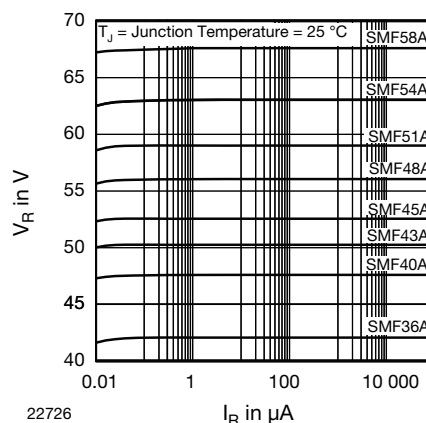
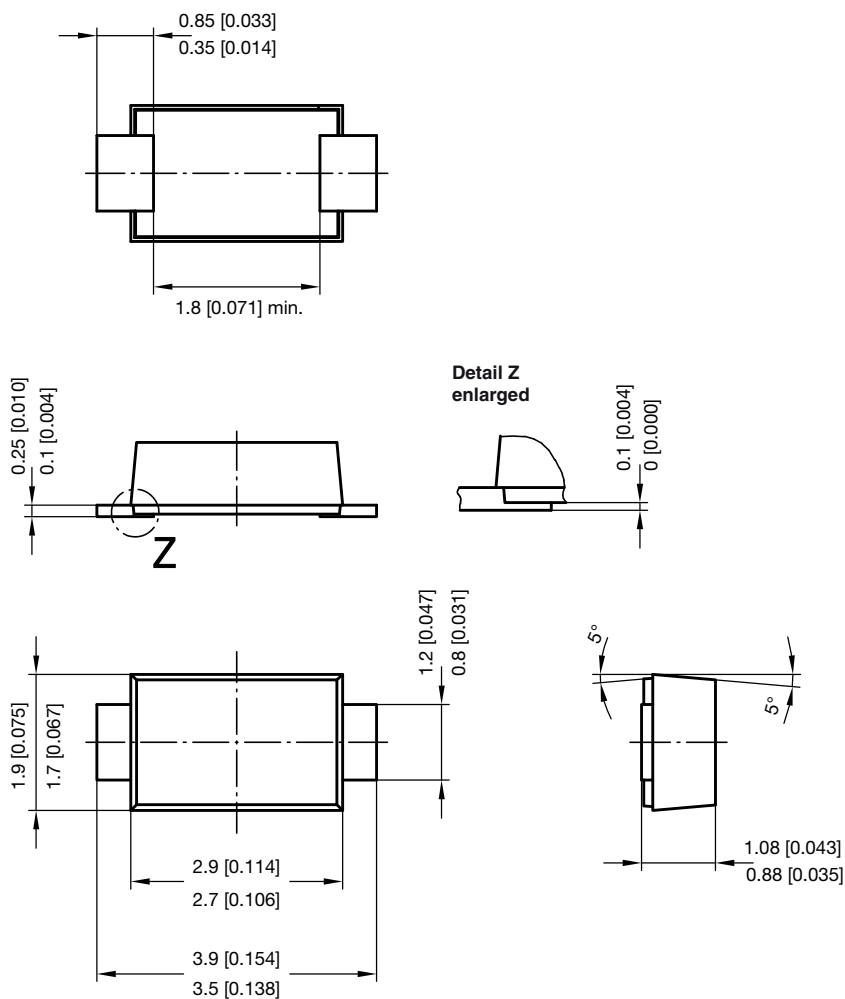
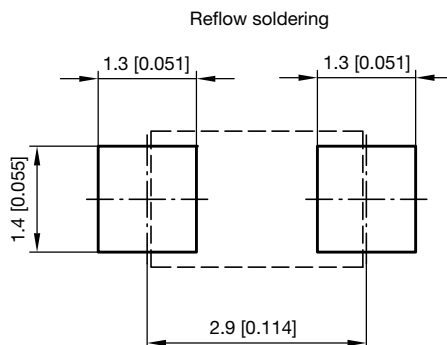


Fig. 12 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

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


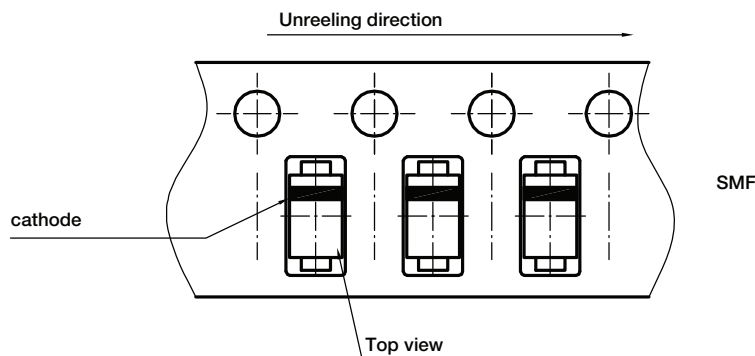
foot print recommendation:



Created - Date: 15. February 2005  
Rev. 6 - Date: 24.Feb.2021  
Document no.: S8-V-3915.01-001 (4)  
22989



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



Document no.: S8-V-3717.02-003 (4)

Created - Date: 09. Feb. 2010

22670



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