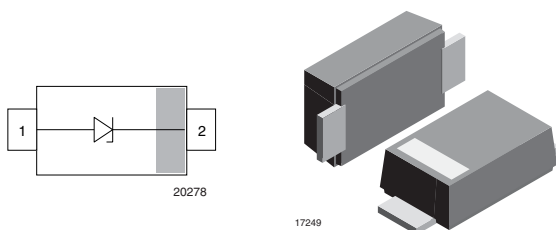
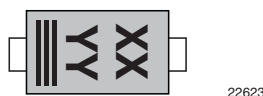




## Surface Mount ESD Protection Diodes



## MARKING (example only)



Bar = cathode marking

YY = type code (see table below)

XX = date code

## 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-protection acc. IEC 61000-4-2  
 $\pm 30$  kV contact discharge  
 $\pm 30$  kV air discharge
- Low incremental surge resistance, excellent clamping capability
- “Low-Noise” technology - very fast response time
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



## ORDERING INFORMATION

| PART<br>NUMBER<br>(EXAMPLE) | ENVIRONMENTAL AND QUALITY CODE |                                                 |              |               | PACKAGING CODE                                  |                                                   | ORDERING CODE<br>(EXAMPLE) |
|-----------------------------|--------------------------------|-------------------------------------------------|--------------|---------------|-------------------------------------------------|---------------------------------------------------|----------------------------|
|                             | AEC-Q101<br>QUALIFIED          | RoHS-COMPLIANT +<br>LEAD (Pb)-FREE TERMINATIONS |              | TIN<br>PLATED | 3K PER 7" REEL<br>(8 mm TAPE),<br>30K/BOX = MOQ | 10K PER 13" REEL<br>(8 mm TAPE),<br>50K/BOX = MOQ |                            |
|                             |                                | STANDARD                                        | HALOGEN-FREE |               |                                                 |                                                   |                            |
| SMF5V0A-                    |                                | E                                               |              | 3             | -08                                             |                                                   | SMF5V0A-E3-08              |
| SMF5V0A-                    |                                |                                                 | M            | 3             | -08                                             |                                                   | SMF5V0A-M3-08              |
| SMF5V0A-                    | H                              | E                                               |              | 3             | -08                                             |                                                   | SMF5V0A-HE3-08             |
| SMF5V0A-                    | H                              |                                                 | M            | 3             | -08                                             |                                                   | SMF5V0A-HM3-08             |
| SMF5V0A-                    |                                | E                                               |              | 3             |                                                 | -18                                               | SMF5V0A-E3-18              |
| SMF5V0A-                    |                                |                                                 | M            | 3             |                                                 | -18                                               | SMF5V0A-M3-18              |
| SMF5V0A-                    | H                              | E                                               |              | 3             |                                                 | -18                                               | SMF5V0A-HE3-18             |
| SMF5V0A-                    | H                              |                                                 | M            | 3             |                                                 | -18                                               | SMF5V0A-HM3-18             |

## PACKAGE DATA

| PACKAGE NAME   | MOLDING COMPOUND | 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) | Standard         | 15          | 1.08             | 3.9              | 1.9             | UL 94 V-0                            | MSL level 1<br>(acc. J-STD-020) | class 2                    | Peak temperature max. 260 °C |
|                | Halogen-free     |             |                  |                  |                 |                                      |                                 |                            |                              |

**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 | TYPE CODE |              | REVERSE BREAKDOWN VOLTAGE at $I_T$ , $t_p = 5\text{ ms}$ | TEST CURRENT | REVERSE WORKING VOLTAGE | REVERSE CURRENT at $V_{RWM}$ | PEAK PULSE CURRENT at $t_p = 10/1000\text{ }\mu\text{s}$ | REVERSE CLAMPING VOLTAGE at $I_{PPM}$ | CAPACITANCE at $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ | PROTECTION PATHS |
|-------------|-----------|--------------|----------------------------------------------------------|--------------|-------------------------|------------------------------|----------------------------------------------------------|---------------------------------------|--------------------------------------------------------|------------------|
|             | STD.      | HALOGEN-FREE | $V_{BR\text{ MIN.}}$ (V)                                 | $I_T$ (mA)   | $V_{RWM}$ (V)           | $I_R$ ( $\mu\text{A}$ )      | $I_{PPM}$ (A)                                            | $V_C\text{ MAX.}$ (V)                 | $C_D\text{ TYP.}$ (pF)                                 | $N_{channel}$    |
| SMF5V0A     | AE        | NE           | 6.40                                                     | 10           | 5                       | 5                            | 21.7                                                     | 9.2                                   | 1120                                                   | 1                |
| SMF6V0A     | AG        | NG           | 6.67                                                     | 10           | 6                       | 26                           | 19.4                                                     | 10.3                                  | 1063                                                   | 1                |
| SMF6V5A     | AK        | NK           | 7.22                                                     | 10           | 6.5                     | 20                           | 17.9                                                     | 11.2                                  | 938                                                    | 1                |
| SMF7V0A     | AM        | NM           | 7.78                                                     | 10           | 7                       | 3                            | 16.7                                                     | 12                                    | 843                                                    | 1                |
| SMF7V5A     | AP        | NP           | 8.33                                                     | 1            | 7.5                     | 0.1                          | 15.5                                                     | 12.9                                  | 773                                                    | 1                |
| SMF8V0A     | AR        | NR           | 8.89                                                     | 1            | 8                       | 0.1                          | 14.7                                                     | 13.6                                  | 706                                                    | 1                |
| SMF8V5A     | AT        | NT           | 9.44                                                     | 1            | 8.5                     | 0.1                          | 13.9                                                     | 14.4                                  | 674                                                    | 1                |
| SMF9V0A     | AV        | NV           | 10                                                       | 1            | 9                       | 0.1                          | 13.5                                                     | 15.4                                  | 640                                                    | 1                |
| SMF10A      | AX        | NX           | 11.1                                                     | 1            | 10                      | 0.1                          | 11.8                                                     | 17                                    | 562                                                    | 1                |
| SMF11A      | AZ        | NZ           | 12.2                                                     | 1            | 11                      | 0.1                          | 11                                                       | 18.2                                  | 509                                                    | 1                |
| SMF12A      | BE        | OE           | 13.3                                                     | 1            | 12                      | 0.1                          | 10.1                                                     | 19.9                                  | 483                                                    | 1                |
| SMF13A      | BG        | OG           | 14.4                                                     | 1            | 13                      | 0.1                          | 9.3                                                      | 21.5                                  | 423                                                    | 1                |
| SMF14A      | BK        | OK           | 15.6                                                     | 1            | 14                      | 0.1                          | 8.6                                                      | 23.2                                  | 392                                                    | 1                |
| SMF15A      | BM        | OM           | 16.7                                                     | 1            | 15                      | 0.1                          | 8.2                                                      | 24.4                                  | 367                                                    | 1                |
| SMF16A      | BP        | OP           | 17.8                                                     | 1            | 16                      | 0.1                          | 7.7                                                      | 26                                    | 343                                                    | 1                |
| SMF17A      | BR        | OR           | 18.9                                                     | 1            | 17                      | 0.1                          | 7.2                                                      | 27.6                                  | 324                                                    | 1                |
| SMF18A      | BT        | OT           | 20                                                       | 1            | 18                      | 0.1                          | 6.8                                                      | 29.2                                  | 320                                                    | 1                |
| SMF20A      | BV        | OV           | 22.2                                                     | 1            | 20                      | 0.1                          | 6.2                                                      | 32.4                                  | 283                                                    | 1                |
| SMF22A      | BX        | OX           | 24.4                                                     | 1            | 22                      | 0.1                          | 5.6                                                      | 35.5                                  | 271                                                    | 1                |
| SMF24A      | BZ        | OZ           | 26.7                                                     | 1            | 24                      | 0.1                          | 5.1                                                      | 38.9                                  | 244                                                    | 1                |
| SMF26A      | CE        | PE           | 28.9                                                     | 1            | 26                      | 0.1                          | 4.8                                                      | 42.1                                  | 230                                                    | 1                |
| SMF28A      | CG        | PG           | 31.1                                                     | 1            | 28                      | 0.1                          | 4.4                                                      | 45.4                                  | 227                                                    | 1                |
| SMF30A      | CK        | PK           | 33.3                                                     | 1            | 30                      | 0.1                          | 4.1                                                      | 48.4                                  | 207                                                    | 1                |
| SMF33A      | CM        | PM           | 36.7                                                     | 1            | 33                      | 0.1                          | 3.8                                                      | 53.3                                  | 198                                                    | 1                |
| SMF36A      | CP        | PP           | 40                                                       | 1            | 36                      | 0.1                          | 3.4                                                      | 58.1                                  | 178                                                    | 1                |
| SMF40A      | CR        | PR           | 44.4                                                     | 1            | 40                      | 0.1                          | 3.1                                                      | 64.5                                  | 172                                                    | 1                |
| SMF43A      | CT        | PT           | 47.8                                                     | 1            | 43                      | 0.1                          | 2.9                                                      | 69.4                                  | 165                                                    | 1                |
| SMF45A      | CV        | PV           | 50                                                       | 1            | 45                      | 0.1                          | 2.8                                                      | 72.7                                  | 162                                                    | 1                |
| SMF48A      | CX        | PX           | 53.3                                                     | 1            | 48                      | 0.1                          | 2.6                                                      | 77.4                                  | 161                                                    | 1                |
| SMF51A      | CZ        | PZ           | 56.7                                                     | 1            | 51                      | 0.1                          | 2.4                                                      | 82.4                                  | 151                                                    | 1                |
| SMF54A      | CA        | PA           | 60                                                       | 1            | 54                      | 0.1                          | 2.25                                                     | 88                                    | 148                                                    | 1                |
| SMF58A      | CC        | PC           | 64.4                                                     | 1            | 58                      | 0.1                          | 2.1                                                      | 95                                    | 144                                                    | 1                |



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

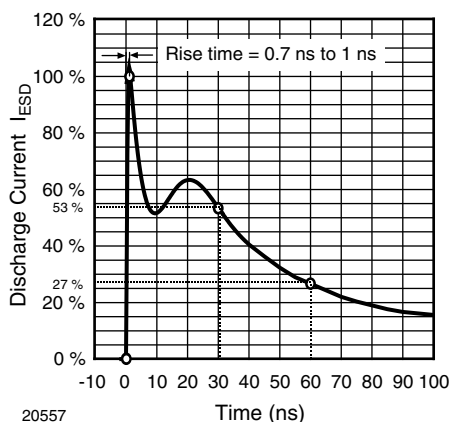


Fig. 1 - ESD Discharge Current Wave Form acc. IEC 61000-4-2 (330  $\Omega$ /150pF)

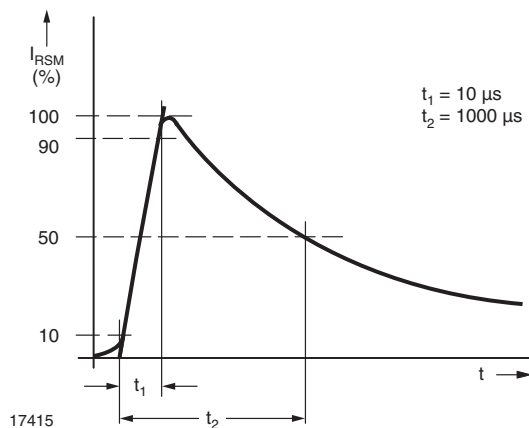


Fig. 4 - Pulse Waveform

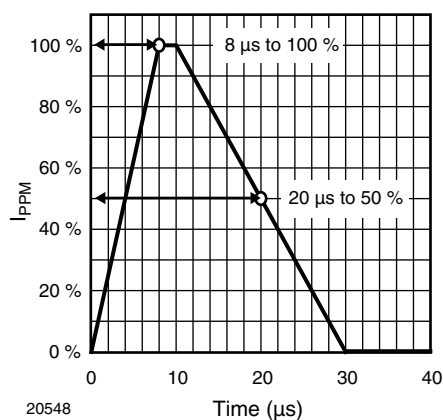


Fig. 2 - 8/20  $\mu\text{s}$  Peak Pulse Current Wave Form acc. IEC 61000-4-5

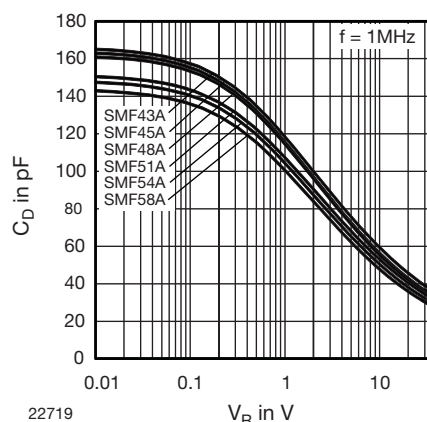


Fig. 5 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

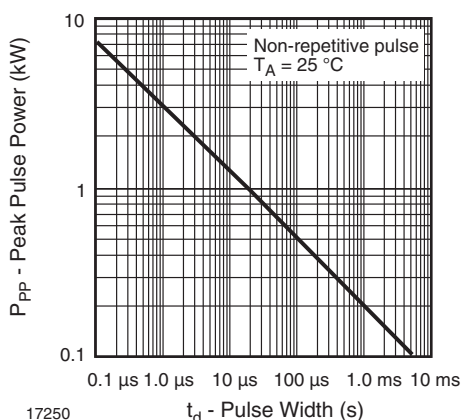


Fig. 3 - Peak Pulse Power Rating

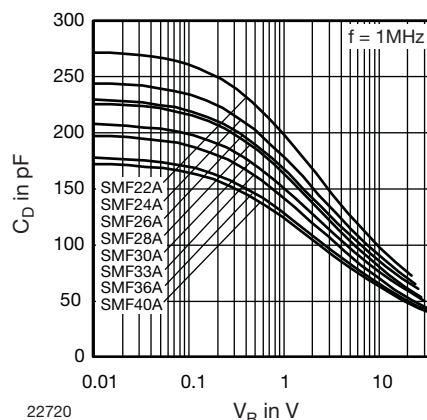


Fig. 6 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

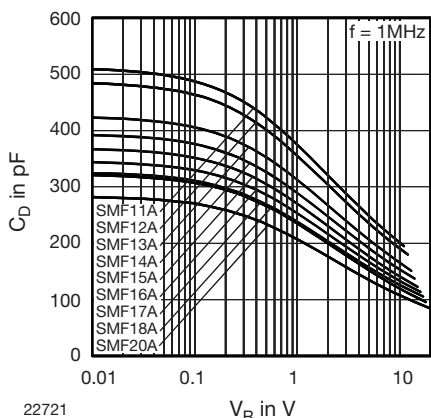


Fig. 7 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

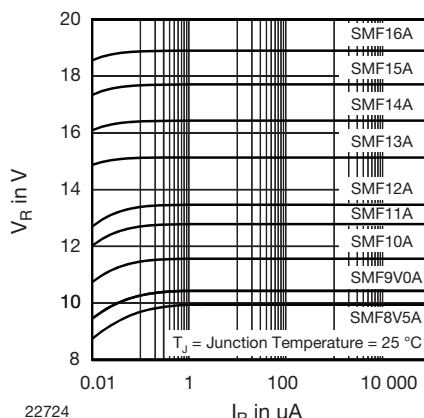


Fig. 10 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

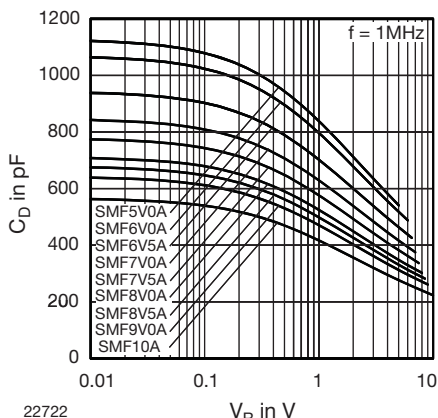


Fig. 8 - Typical Capacitance  $C_D$  vs. Reverse Voltage  $V_R$

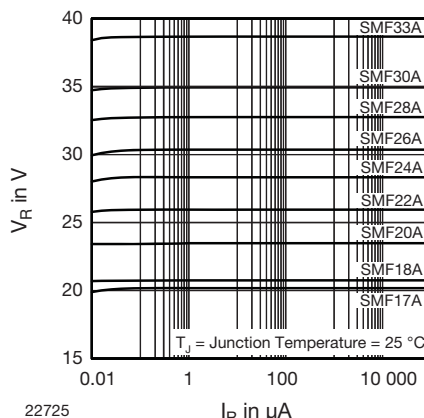


Fig. 11 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

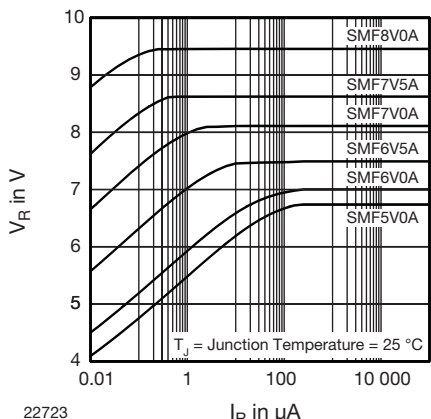


Fig. 9 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$

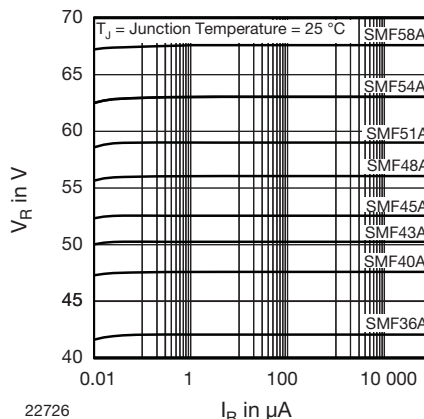
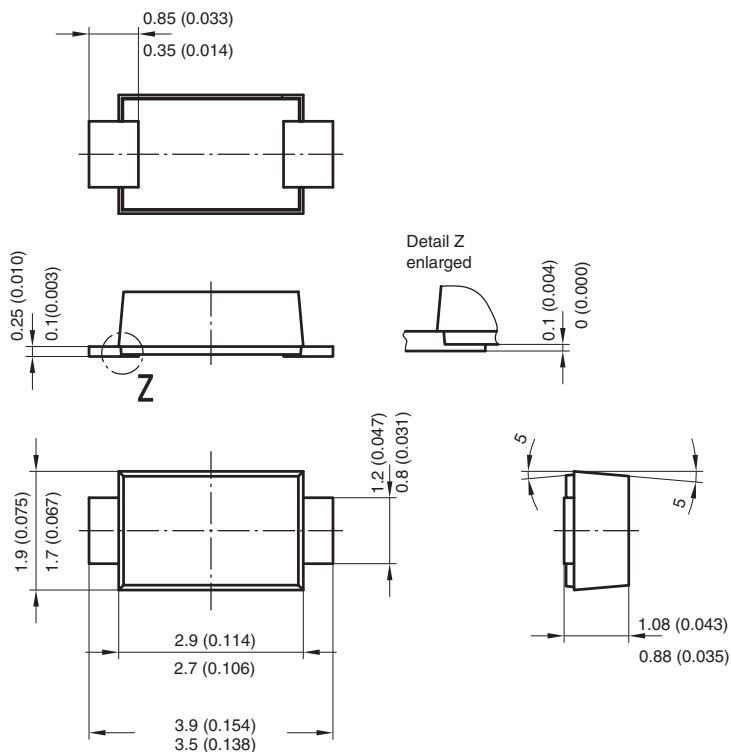


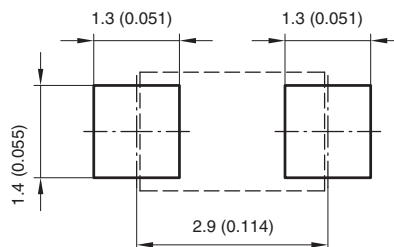
Fig. 12 - Typical Reverse Voltage  $V_R$  vs. Reverse Current  $I_R$



**PACKAGE DIMENSIONS** in millimeters (inches): **SMF**



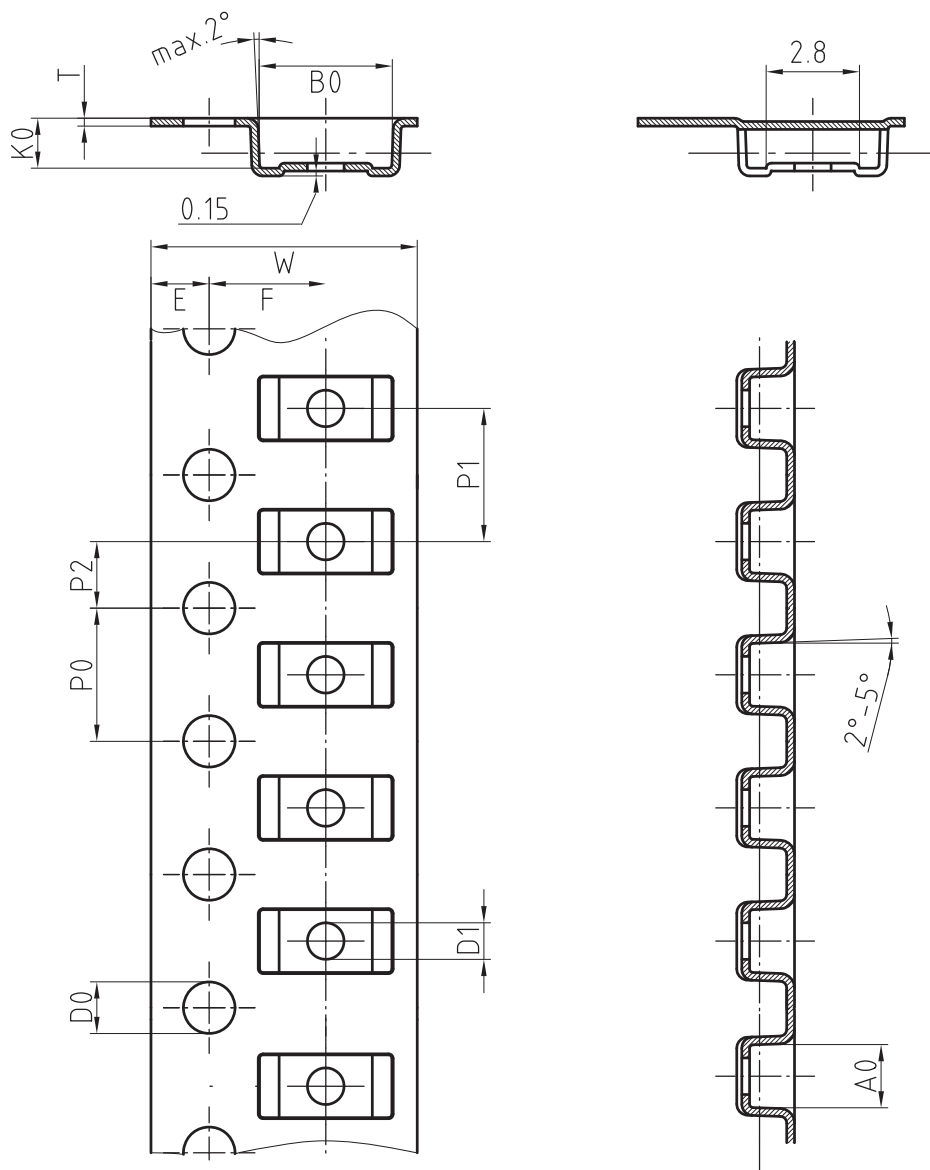
Foot print recommendation:



Created - Date: 15. February 2005  
Rev. 3 - Date: 13. March 2007  
Document no.: S8-V-3915.01-001 (4)  
17247



**BLISTERTAPE DIMENSIONS** in millimeters (inches)



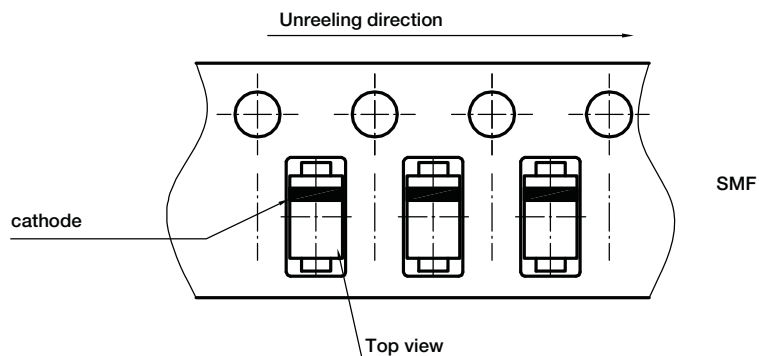
|      |     |     |     |     |       |     |     |     |     |    |      |     |
|------|-----|-----|-----|-----|-------|-----|-----|-----|-----|----|------|-----|
| Mat: | A0  | B0  | K0  | W   | T     | P0  | P2  | P1  | D0  | D1 | E    | F   |
| PS   | 1.9 | 4.0 | 1.5 | 8.0 | 0.235 | 4.0 | 2.0 | 4.0 | 1.5 | 1  | 1.75 | 3.5 |

Document-No.: S8-V-3717.02-001 (3)

18513



**ORIENTATION IN CARRIER TAPE - SMF**



Document no.: S8-V-3717.02-003 (4)  
Created - Date: 09. Feb. 2010  
22670



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## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**





Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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**Факс:** 8 (812) 320-02-42

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**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.