



**THE DATASHEET OF
SMF24A-E3-08**



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 μ 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

 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 _{amb} = 25 °C, unless otherwise specified) | | | | |
|---|--|-------------------|----------------------------------|------|
| PARAMETER | TEST CONDITIONS | SYMBOL | VALUE | UNIT |
| Peak pulse current | t _p = 10/1000 μs waveform | I _{PPM} | see "Electrical Characteristics" | A |
| Peak pulse power | t _p = 8/20 μs waveform acc. IEC 61000-4-5 | P _{PP} | 1000 | W |
| | t _p = 10/1000 μs 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} | ± 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 _{thJA} | 180 | K/W |
| Forward clamping voltage | I _F = 50A, t _p = 400 μs | V _F | 2.5 | V |
| Junction temperature | | T _J | 175 | °C |
| Storage temperature range | | T _{stg} | -65 to +175 | °C |
| Operating temperature range | | T _{op} | -65 to +175 | °C |

| ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified) | | | | | | | | | | |
|---|--------------|---|--------------------------|----------------------------------|--|---|---|--|--|---------------------------------------|
| PART NUMBER | MARKING CODE | REVERSE BREAKDOWN VOLTAGE at I _T , t _p = 5 ms | | TEST CURRENT I _T (mA) | STAND-OFF VOLTAGE V _{RWM} (V) | MAXIMUM REVERSE CURRENT I _R (μA) at V _{RWM} | MAXIMUM PEAK PULSE CURRENT I _{PPM} (A) t _p = 10/1000 μs | MAXIMUM REVERSE CLAMPING VOLTAGE V _C MAX. (V) at I _{PPM} | TYPICAL CAP. at V _R = 0 V, f = 1 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 °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_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:



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



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