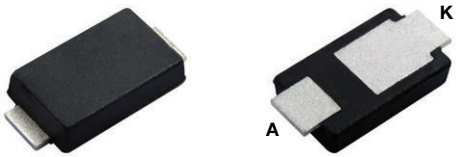
# Surface-Mount ESD Capability Rectifiers

eSMP® Series




Top View Bottom View

SMPA (DO-221BC)

Anode ○—▶|—○ Cathode

## FEATURES

- Very low profile - typical height of 0.95 mm
- Ideal for automated placement
- Oxide planar chip junction
- Low forward voltage drop, low leakage current
- ESD capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Not recommended for PCB bottom side wave mounting
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

## LINKS TO ADDITIONAL RESOURCES

3D Models

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 5.0 A |
| $V_{RRM}$ | 100 V, 200 V, 400 V, 600 V |
| $I_{FSM}$ | 42 A |
| $V_F$ at $I_F$ = 5.0 A ($T_A$ = 125 °C) | 0.95 V |
| $I_R$ | 10 µA |
| $T_J$ max. | 175 °C |
| Package | SMPA (DO-221BC) |
| Circuit configuration | Single |

## TYPICAL APPLICATIONS

General purpose, power line polarity protection, in both consumer and automotive applications.

## MECHANICAL DATA

**Case:** SMPA (DO-221BC)
Molding compound meets UL 94 V-0 flammability rating Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes the cathode end

**MAXIMUM RATINGS** ($T_A$ = 25 °C unless otherwise noted)

| PARAMETER | SYMBOL | SE50PAB | SE50PAD | SE50PAG | SE50PAJ | UNIT |
|---|---|---|---|---|---|---|
| Device marking code | | 50B | 50D | 50G | 50J | |
| Maximum repetitive peak reverse voltage | $V_{RRM}$ | 100 | 200 | 400 | 600 | V |
| Maximum DC forward current | $I_F$ (1) | 5.0 | | | | A |
| | $I_F$ (2) | 1.6 | | | | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$ | 42 | | | | A |
| Operating junction and storage temperature range | $T_J$, $T_{STG}$ | -55 to +175 | | | | °C |

**Notes**

(1) Mounted on 30 mm x 30 mm pad areas, aluminum PCB
(2) Free air, mounted on recommended copper pad area



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| **ELECTRICAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | | **SYMBOL** | **TYP.** | **MAX.** | **UNIT** |
| Instantaneous forward voltage | $I_F$ = 2.5 A | $T_A$ = 25 °C | $V_F$ (1) | 0.94 | - | V |
| | $I_F$ = 5.0 A | | | 1.03 | 1.16 | |
| | $I_F$ = 2.5 A | $T_A$ = 125 °C | | 0.84 | - | |
| | $I_F$ = 5.0 A | | | 0.95 | 1.10 | |
| Reverse current | Rated $V_R$ | $T_A$ = 25 °C | $I_R$ (2) | - | 10 | µA |
| | | $T_A$ = 125 °C | | 13 | 150 | |
| Typical reverse recovery time | $I_F$ = 0.5 A, $I_R$ = 1.0 A, $I_{rr}$ = 0.25 A | | $t_{rr}$ | 2.0 | - | µs |
| Typical junction capacitance | 4.0 V, 1 MHz | | $C_J$ | 32 | - | pF |

**Notes**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 40 ms

| **THERMAL CHARACTERISTICS** ($T_A$ = 25 °c unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **SE50PAB** | **SE50PAD** | **SE50PAG** | **SE50PAJ** | **UNIT** |
| Typical thermal resistance | $R_{\theta JA}$ (1) | 115 | | | | °C/W |
| | $R_{\theta JM}$ (2) | 7 | | | | |

**Notes**

(1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance $R_{\theta JA}$ - junction to ambient

(2) Mounted on 30 mm x 30 mm pad areas aluminum PCB; $R_{\theta JM}$ - junction to mount

| **IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS** ($T_A$ = 25 °C unless otherwise noted) | | | | | |
|---|---|---|---|---|---|
| **STANDARD** | **TEST TYPE** | **TEST CONDITIONS** | **SYMBOL** | **CLASS** | **VALUE** |
| AEC-Q101-001 | Human body model (contact mode) | C = 100 pF, R = 1.5 kΩ | $V_C$ | H3B | > 8 kV |

| **ORDERING INFORMATION** (Example) | | | | |
|---|---|---|---|---|
| **PREFERRED P/N** | **UNIT WEIGHT (g)** | **PREFERRED PACKAGE CODE** | **BASE QUANTITY** | **DELIVERY MODE** |
| SE50PAJ-M3/I | 0.033 | I | 14 000 | 13" diameter plastic tape and reel |
| SE50PAJHM3/H (1) | 0.033 | H | 3500 | 7" diameter plastic tape and reel |
| SE50PAJHM3/I (1) | 0.033 | I | 14 000 | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified


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## RATINGS AND CHARACTERISTICS CURVES ($T_A$ = 25 °C unless otherwise noted)

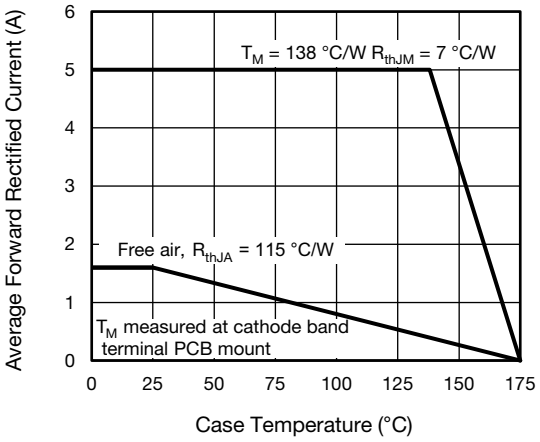



Fig. 1 - Maximum Forward Current Derating Curve

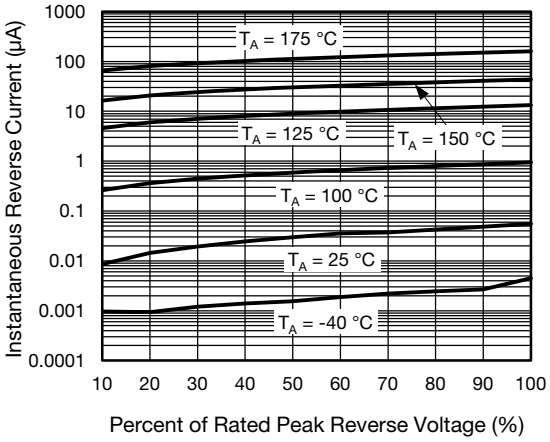



Fig. 4 - Typical Reverse Leakage Characteristics

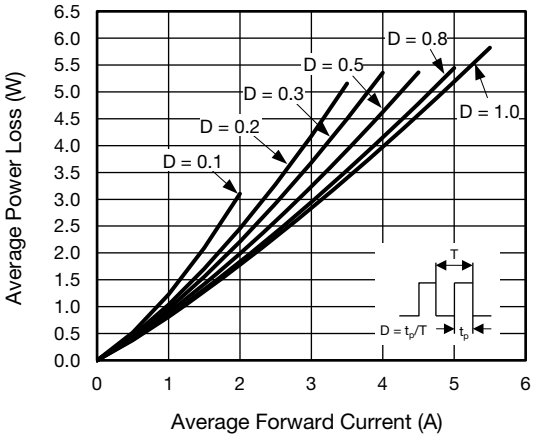



Fig. 2 - Forward Power Loss Characteristics

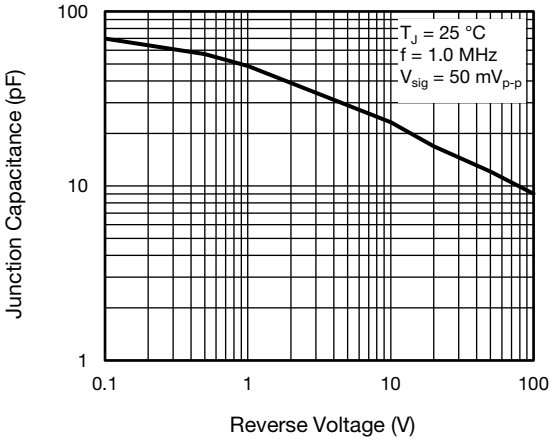



Fig. 5 - Typical Junction Capacitance

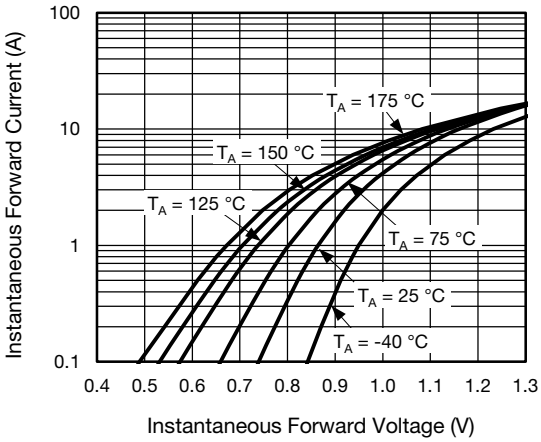



Fig. 3 - Typical Instantaneous Forward Characteristics

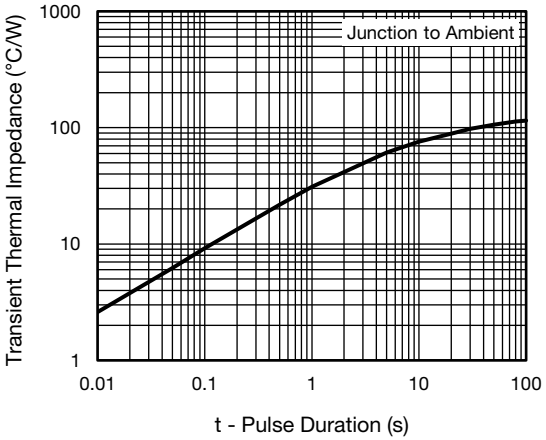
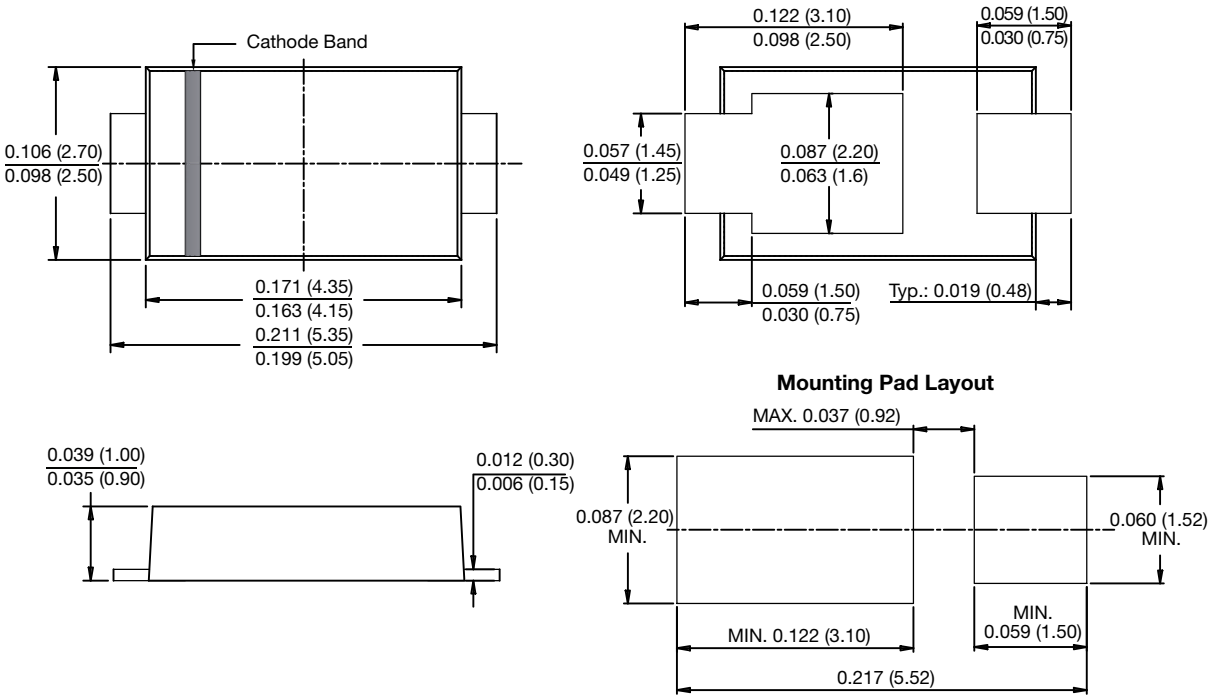



Fig. 6 - Typical Transient Thermal Impedances


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**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**SMPA (DO-221BC)**





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