

Surface-Mount ESD Capability Rectifiers

eSMP® Series


SMP (DO-220AA)

Cathode Anode

FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Oxide planar chip junction
- Low forward voltage drop
- ESD capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- 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

| | |
|--|----------------------------|
| $I_{F(AV)}$ | 2.0 A |
| V_{RRM} | 100 V, 200 V, 400 V, 600 V |
| I_{FSM} | 32 A |
| V_F at $I_F = 2.0$ A ($T_A = 125$ °C) | 0.85 V |
| I_R | 5 μ A |
| T_J max. | 175 °C |
| Package | SMP (DO-220AA) |
| Circuit configuration | Single |

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: SMP (DO-221AA)

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 automotive grade

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 1A 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 | SE20PB | SE20PD | SE20PG | SE20PJ | UNIT |
|---|-------------------|-------------|--------|--------|--------|------|
| Device marking code | | 20B | 20D | 20G | 20J | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 100 | 200 | 400 | 600 | V |
| Average forward current (fig. 1) | $I_{F(AV)}^{(1)}$ | 2.0 | | | | A |
| | $I_{F(AV)}^{(2)}$ | 1.6 | | | | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I_{FSM} | 32 | | | | A |
| Operating junction and storage temperature range | T_J, T_{STG} | -55 to +175 | | | | °C |

Notes

(1) Mounted on 5.0 mm x 5.0 mm pad areas, 2 oz. FR4 PCB

(2) Free air, mounted on recommended copper pad area



| ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|--|-----------------------------------|-------------|------|------|---------------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage | $I_F = 1.0\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 0.90 | - | V |
| | $I_F = 2.0\text{ A}$ | | | 0.96 | 1.05 | |
| | $I_F = 1.0\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.78 | - | |
| | $I_F = 2.0\text{ A}$ | | | 0.85 | 0.95 | |
| Reverse current | Rated V_R | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | - | 5.0 | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 16 | 100 | |
| Typical reverse recovery time | $I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{rr} = 0.25\text{ A}$ | | t_{rr} | 1.2 | - | μs |
| Typical junction capacitance | 4.0 V, 1 MHz | | C_J | 13 | - | pF |

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
(2) Pulse test: Pulse width $\leq 40\text{ ms}$

| THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|---|-----------------------|--------|--------|--------|--------|--------------------|
| PARAMETER | SYMBOL | SE20PB | SE20PD | SE20PG | SE20PJ | UNIT |
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 105 | | | | $^\circ\text{C/W}$ |
| | $R_{\theta JM}^{(2)}$ | 20 | | | | |

Notes

- (1) Free air, mounted on recommended PCB, 1 oz. pad area; thermal resistance $R_{\theta JA}$ - junction to ambient
(2) Mounted on 5.0 mm x 5.0 mm pad areas, 2 oz. FR4 PCB; $R_{\theta JM}$ - junction to mount

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

| ORDERING INFORMATION (Example) | | | | |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| SE20PJ-M3/84A | 0.024 | 84A | 3000 | 7" diameter plastic tape and reel |
| SE20PJ-M3/85A | 0.024 | 85A | 10 000 | 13" diameter plastic tape and reel |
| SE20PJHM3/84A ⁽¹⁾ | 0.024 | 84A | 3000 | 7" diameter plastic tape and reel |
| SE20PJHM3/85A ⁽¹⁾ | 0.024 | 85A | 10 000 | 13" diameter plastic tape and reel |

Note

- (1) AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

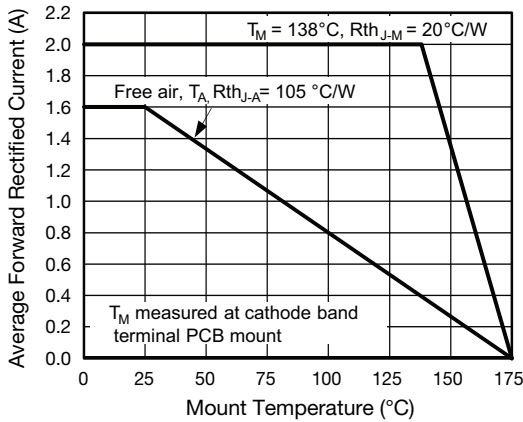


Fig. 1 - Maximum Forward Current Derating Curve

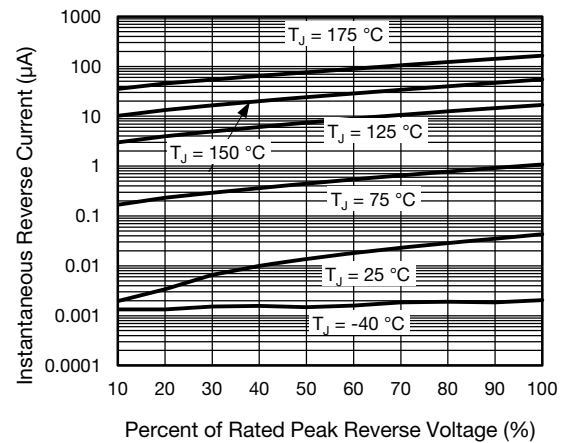


Fig. 4 - Typical Reverse Leakage Characteristics

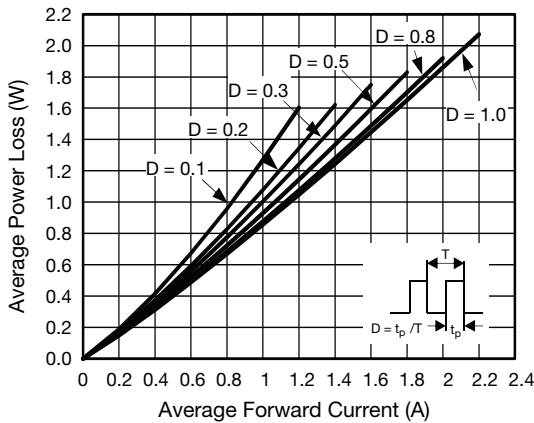


Fig. 2 - Forward Power Loss Characteristics

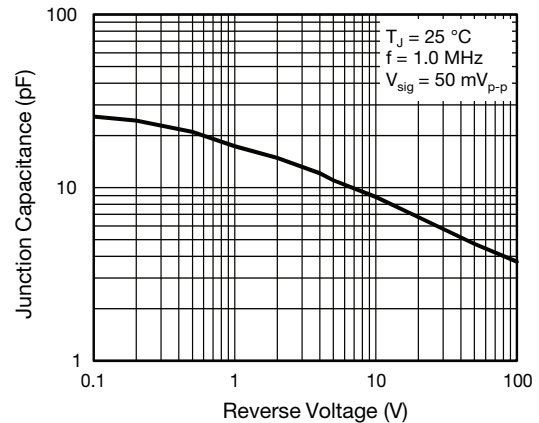


Fig. 5 - Typical Junction Capacitance

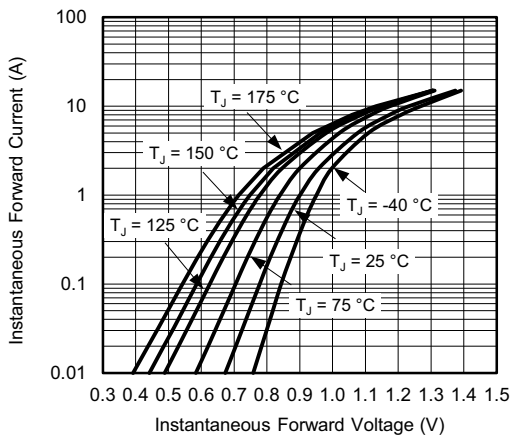


Fig. 3 - Typical Instantaneous Forward Characteristics

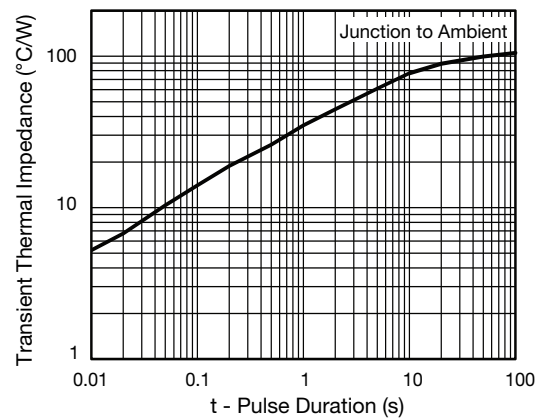
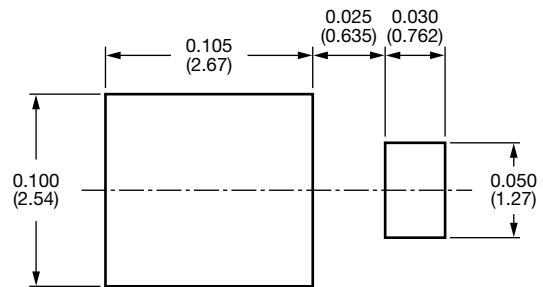
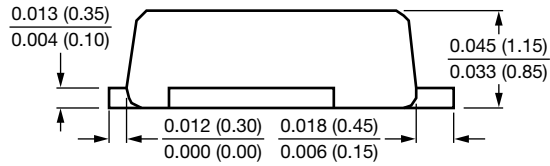
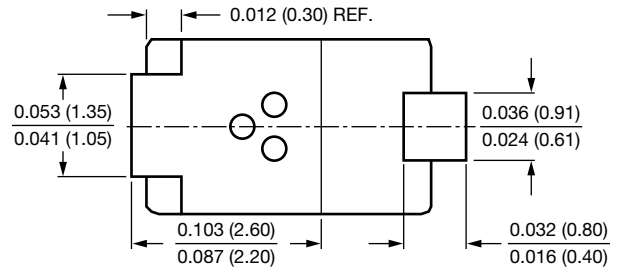
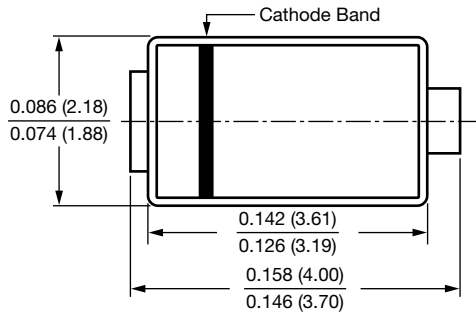


Fig. 6 - Typical Junction Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMP (DO-220AA)





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- Техническая поддержка проекта;
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