



High Current Density Surface Mount Ultrafast Rectifiers

eSMP® Series



DO-220AA (SMP)

PRIMARY CHARACTERISTICS

| | |
|-------------|---------------------|
| $I_{F(AV)}$ | 1.0 A |
| V_{RRM} | 100 V, 150 V, 200 V |
| t_{rr} | 15 ns |
| V_F | 0.92 V |
| T_J max. | 150 °C |

TYPICAL APPLICATIONS

For use in secondary rectification and freewheeling for ultrafast switching speeds of AC/DC and DC/DC converters for both consumer and automotive applications.

FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Glass passivated chip junction
- Ultrafast recovery times for high efficiency
- Low forward voltage, low power losses
- Low thermal resistance
- Meets MSL level 1 per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

AUTOMOTIVE
GRADE
Available



RoHS
COMPLIANT
HALOGEN
FREE

MECHANICAL DATA

Case: DO-220AA (SMP)

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 ($T_A = 25\text{ °C}$ unless otherwise noted)

| PARAMETER | SYMBOL | ES1PB | ES1PC | ES1PD | UNIT |
|---|----------------|---------------|-------|-------|------|
| Device marking code | | EB | EC | ED | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 100 | 150 | 200 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}$ | 1.0 | | | A |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I_{FSM} | 30 | | | A |
| Operating junction and storage temperature range | T_J, T_{STG} | - 55 to + 150 | | | °C |

ES1PB, ES1PC, ES1PD

Vishay General Semiconductor



| ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | | |
|--|--|-------------------------|-------------------------------|-------|------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | VALUE | UNIT |
| Maximum instantaneous forward voltage | I _F = 0.6 A | T _J = 25 °C | V _F ⁽¹⁾ | 0.865 | V |
| | I _F = 1 A | | | 0.920 | |
| Maximum reverse current at rated V _R | | | I _R ⁽²⁾ | 5.0 | μA |
| | | | | 500 | |
| Maximum reverse recovery time | I _F = 0.5 A, I _R = 1 A, I _{rr} = 0.25 A | | t _{rr} | 15 | ns |
| Typical reverse recovery time | I _F = 1.0 A, V _R = 30 V, dI/dt = 50 A/μs, I _{rr} = 10 % I _{RM} | T _J = 25 °C | t _{rr} | 25 | ns |
| | | T _J = 100 °C | | 30 | |
| Typical stored charge | I _F = 1.0 A, V _R = 30 V, dI/dt = 50 A/μs, I _{rr} = 10 % I _{RM} | T _J = 25 °C | Q _{rr} | 8 | nC |
| | | T _J = 100 °C | | 10 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | C _J | 10 | 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 °C unless otherwise noted) | | | | | |
|---|---------------------------------|-------|-------|-------|------|
| PARAMETER | SYMBOL | ES1PB | ES1PC | ES1PD | UNIT |
| Typical thermal resistance | R _{θJA} ⁽¹⁾ | 105 | | | °C/W |
| | R _{θJL} ⁽¹⁾ | 15 | | | |
| | R _{θJC} ⁽¹⁾ | 20 | | | |

Note

(1) Thermal resistance from junction to ambient and junction to lead mounted on P.C.B. with 5.0 mm x 5.0 mm copper pad areas. $R_{\theta JL}$ is measured at the terminal of cathode band. $R_{\theta JC}$ is measured at the top center of the body

| ORDERING INFORMATION (Example) | | | | |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| ES1PB-M3/84A | 0.024 | 84A | 3000 | 7" diameter plastic tape and reel |
| ES1PB-M3/85A | 0.024 | 85A | 10 000 | 13" diameter plastic tape and reel |
| ES1PBHM3/84A ⁽¹⁾ | 0.024 | 84A | 3000 | 7" diameter plastic tape and reel |
| ES1PBHM3/85A ⁽¹⁾ | 0.024 | 85A | 10 000 | 13" diameter plastic tape and reel |

Note

(1) Automotive grade



RATINGS AND CHARACTERISTICS CURVES

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

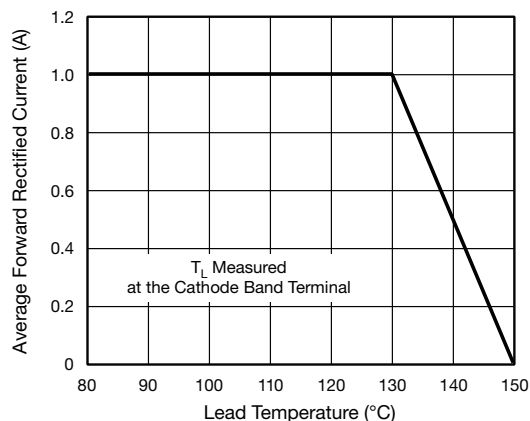


Fig. 1 - Maximum Forward Current Derating Curve

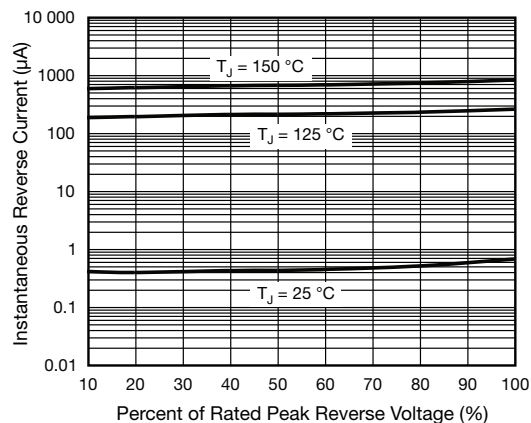


Fig. 4 - Typical Reverse Leakage Characteristics

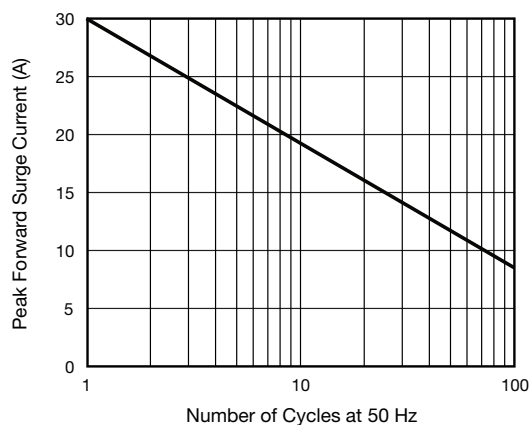


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

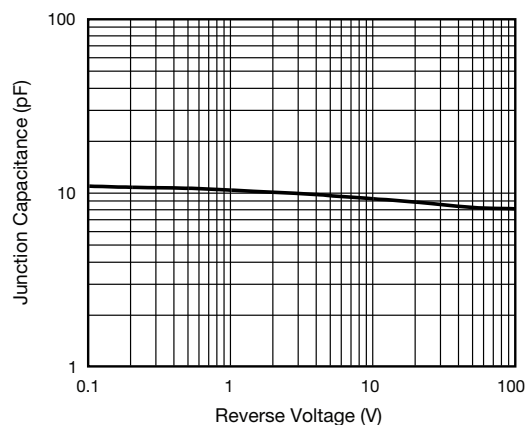


Fig. 5 - Typical Junction Capacitance

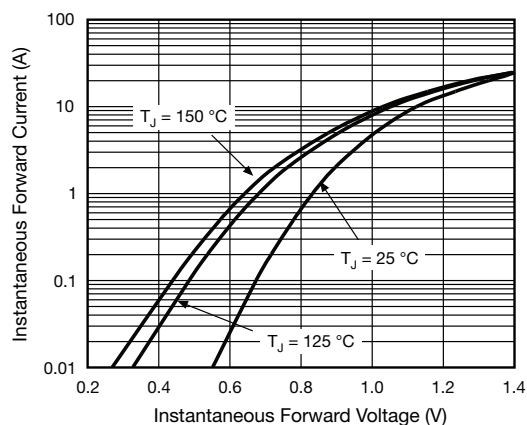


Fig. 3 - Typical Instantaneous Forward Characteristics

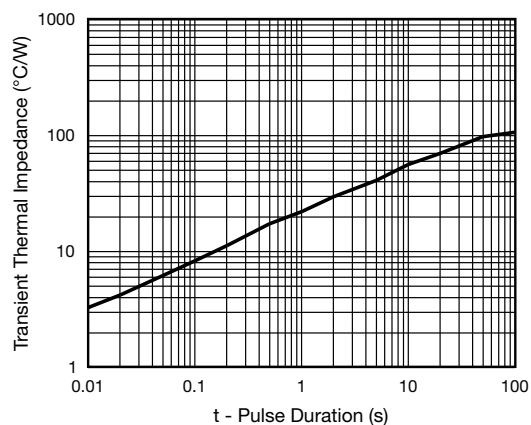
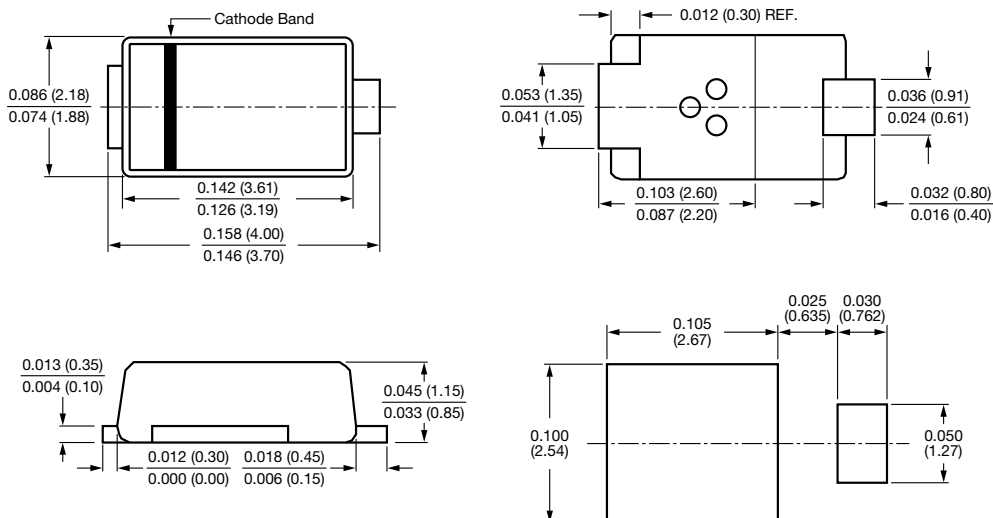


Fig. 6 - Typical Transient Thermal Impedance

ES1PB, ES1PC, ES1PD

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**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)
DO-220AA (SMP)



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