

Surface Mount Ultrafast Avalanche Rectifiers

eSMP® Series



SMP (DO-220AA)

Cathode  Anode

FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Glass passivated pellet chip junction
- Ultrafast recovery times for high frequency
- Low reverse current
- 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



RoHS
COMPLIANT
HALOGEN
FREE

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS

| | |
|------------------------|------------------------------------|
| $I_{F(AV)}$ | 1.0 A |
| V_{RRM} | 200 V, 400 V, 600 V, 800 V, 1000 V |
| I_{FSM} | 30 A, 25 A |
| t_{rr} | 75 ns |
| I_R | 1 μ A |
| E_{AS} | 20 mJ |
| V_F at $I_F = 1.0$ A | 1.6 V |
| T_J max. | 175 °C |
| Package | SMP (DO-220AA) |
| Circuit configuration | Single |

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: SMP (DO-220AA)

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 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

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

| PARAMETER | SYMBOL | AU1PD | AU1PG | AU1PJ | AU1PK | AU1PM | UNIT |
|--|-----------------------------------|-------------|-------|-------|-------|-------|------|
| Device marking code | | AUD | AUG | AUJ | AUK | AUM | |
| Maximum repetitive peak reverse voltage | V _{RRM} | 200 | 400 | 600 | 800 | 1000 | V |
| Average forward current | I _{F(AV)} | 1.0 | | | | | A |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I _{FSM} | 30 | | | 25 | | A |
| Non-repetitive avalanche energy at I _{AS} = 1.0 A, T _A = 25 °C | E _{AS} | 20 | | | | | mJ |
| Operating junction and storage temperature range | T _J , T _{STG} | -55 to +175 | | | | | °C |



| ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | | | | | | |
|--|--|-------------------------|-------------------------------|-------|-------|-------|-------|-------|------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | AU1PD | AU1PG | AU1PJ | AU1PK | AU1PM | UNIT |
| Maximum instantaneous forward voltage | I _F = 1.0 A | T _A = 25 °C | V _F ⁽¹⁾ | 1.5 | | 1.85 | | | V |
| | | T _A = 125 °C | | 1.4 | | 1.6 | | | |
| Maximum reverse current | Rated V _R | T _A = 25 °C | I _R ⁽²⁾ | 1.0 | | | | | μA |
| | | T _A = 125 °C | | 100 | | | | | |
| Maximum reverse recovery time | I _F = 0.5 A, I _R = 1.0 A, I _{rr} = 0.25 A | | t _{rr} | 75 | | | | | ns |
| Typical junction capacitance | 4.0 V, 1 MHz | | C _J | 11 | | | 7.5 | | 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 | AU1PD | AU1PG | AU1PJ | AU1PK | AU1PM | UNIT |
| Typical thermal resistance | R _{θJA} ⁽¹⁾ | 132 | | | | | °C/W |
| | R _{θJM} ⁽¹⁾ | 15 | | | | | |

Note(1) Free air, mounted on recommended copper pad area. Thermal resistance $R_{\theta JA}$ - junction to ambient, $R_{\theta JM}$ - junction to mount at the terminal cathode band

| ORDERING INFORMATION (Example) | | | | |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| AU1PJ-M3/84A | 0.024 | 84A | 3000 | 7" diameter plastic tape and reel |
| AU1PJ-M3/85A | 0.024 | 85A | 10 000 | 13" diameter plastic tape and reel |
| AU1PJHM3/84A ⁽¹⁾ | 0.024 | 84A | 3000 | 7" diameter plastic tape and reel |
| AU1PJHM3/85A ⁽¹⁾ | 0.024 | 85A | 10 000 | 13" diameter plastic tape and reel |

Note

(1) AEC-Q101 qualified



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

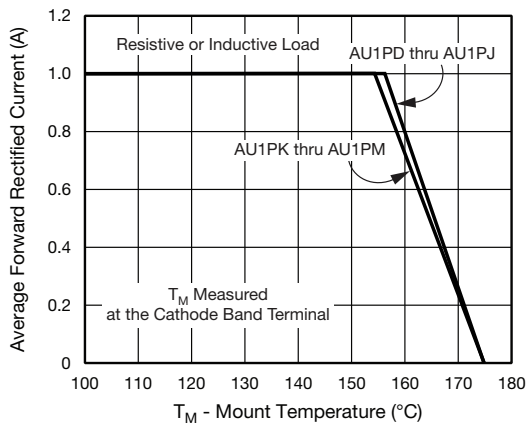


Fig. 1 - Maximum Forward Current Derating Curve

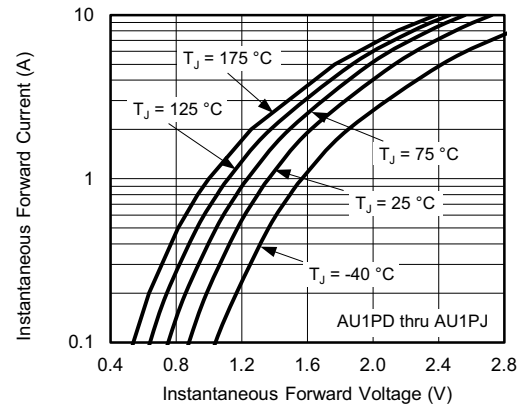


Fig. 4 - Typical Instantaneous Forward Characteristics

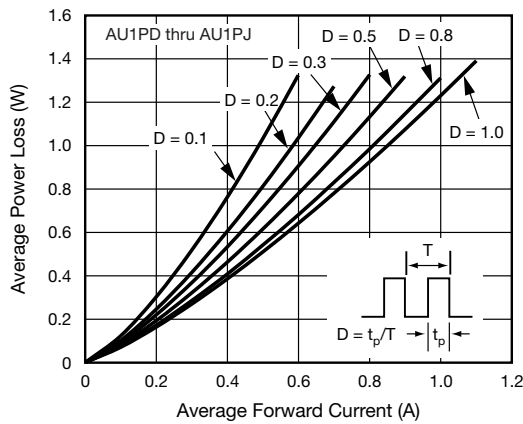


Fig. 2 - Forward Power Loss Characteristics

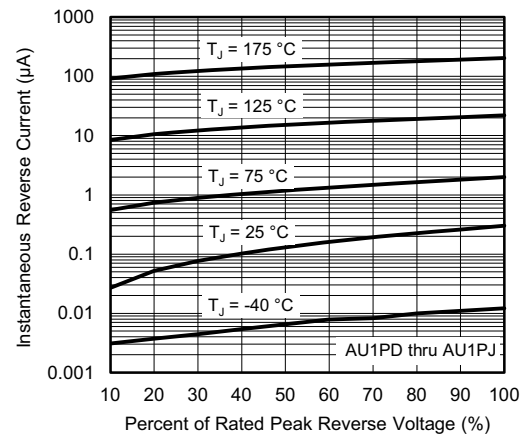


Fig. 5 - Typical Instantaneous Forward Characteristics

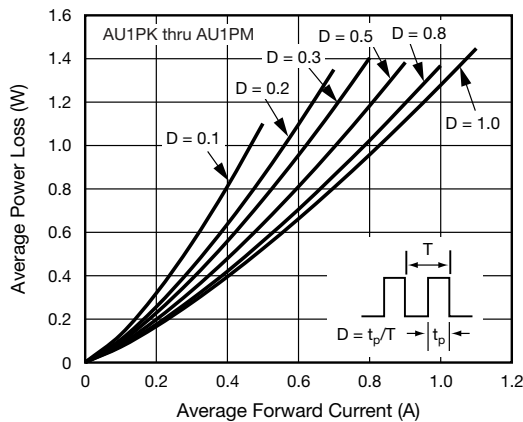


Fig. 3 - Forward Power Loss Characteristics

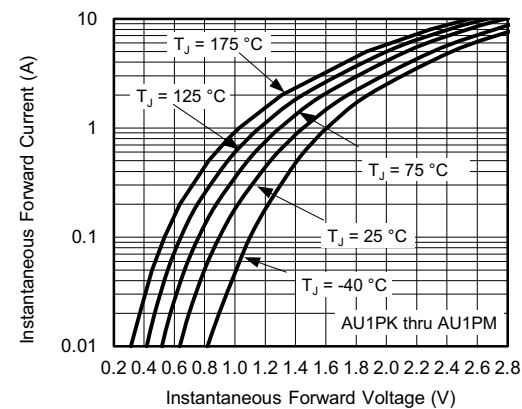


Fig. 6 - Typical Reverse Characteristics

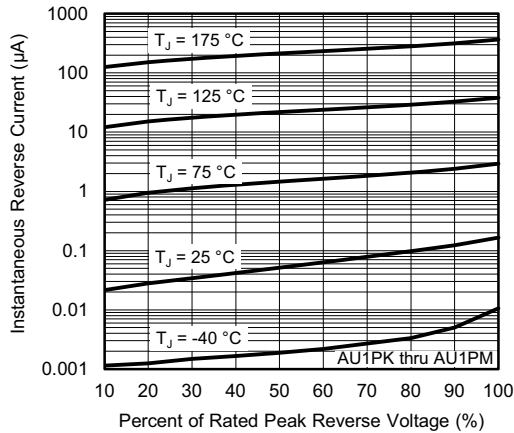


Fig. 7 - Typical Reverse Characteristics

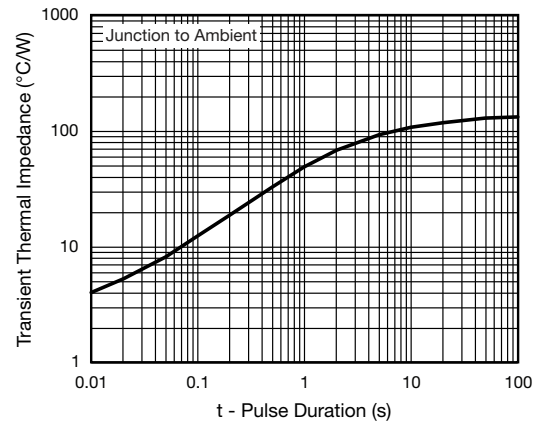


Fig. 9 - Typical Transient Thermal Impedance

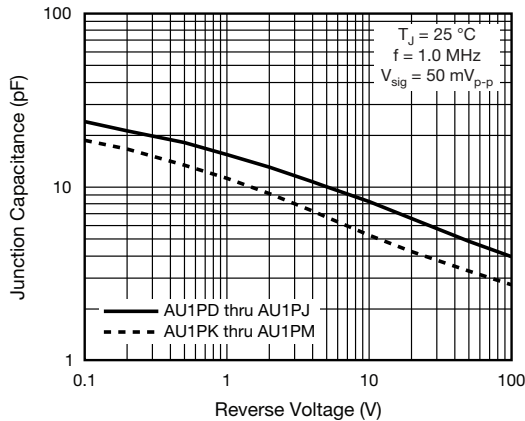
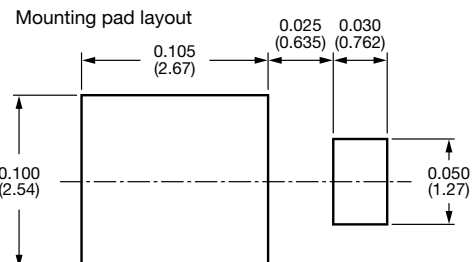
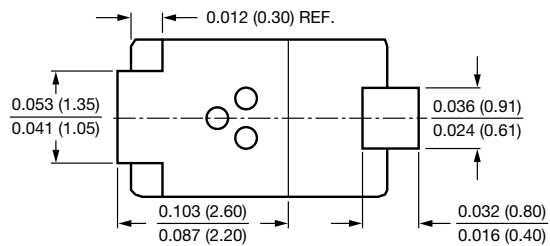
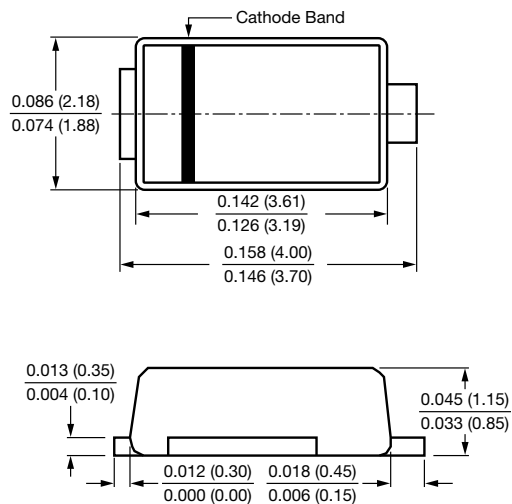


Fig. 8 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMP (DO-220AA)





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