

## Surface Mount Ultrafast Rectifier

eSMP® Series



DO-220AA (SMP)

### FEATURES

- Very low profile - typical height of 1.0 mm
- Ideal for automated placement
- Oxide planar chip junction
- Ultrafast recovery times for high frequency
- Meets MSL level 1 per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition



**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

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

M3 suffix meets JESD 201 class 1A whisker test

**Polarity:** Color band denotes cathode end

### PRIMARY CHARACTERISTICS

|                        |                     |
|------------------------|---------------------|
| $I_{F(AV)}$            | 1.0 A               |
| $V_{RRM}$              | 100 V, 150 V, 200 V |
| $I_{FSM}$              | 30 A                |
| $t_{rr}$               | 25 ns               |
| $V_F$ at $I_F = 1.0$ A | 0.75 V              |
| $T_J$ max.             | 175 °C              |

### 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.

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

| PARAMETER                                                                         | SYMBOL         | UH1PB         | UH1PC | UH1PD | UNIT |
|-----------------------------------------------------------------------------------|----------------|---------------|-------|-------|------|
| Device marking code                                                               |                | HB            | HC    | HD    |      |
| 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 + 175 |       |       | °C   |

## UH1PB, UH1PC, UH1PD

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| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                                                                                       |                         |                               |      |                |      |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------|------|----------------|------|
| PARAMETER                                                                  | TEST CONDITIONS                                                                                       |                         | SYMBOL                        | TYP. | MAX.           | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 0.6 A                                                                                | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.88 | -              | V    |
|                                                                            | I <sub>F</sub> = 1.0 A                                                                                |                         |                               | 0.95 | 1.05           |      |
|                                                                            | I <sub>F</sub> = 0.6 A                                                                                | T <sub>A</sub> = 125 °C |                               | 0.69 | -              |      |
|                                                                            | I <sub>F</sub> = 1.0 A                                                                                |                         |                               | 0.75 | 0.85           |      |
| Reverse current                                                            | Rated V <sub>R</sub>                                                                                  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 1.0            | μA   |
|                                                                            |                                                                                                       | T <sub>A</sub> = 125 °C |                               | 5.0  | 25             |      |
| Maximum reverse recovery time                                              | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A                              | T <sub>A</sub> = 25 °C  | t <sub>rr</sub>               | 19   | 25             | ns   |
|                                                                            | I <sub>F</sub> = 1.0 A, dI/dt = 50 A/μs, V <sub>R</sub> = 30 V, I <sub>rr</sub> = 0.1 I <sub>RM</sub> |                         |                               | 27   | 40             |      |
| Typical softness factor (t <sub>b</sub> /t <sub>a</sub> )                  | I <sub>F</sub> = 1.0 A, dI/dt = 200 A/μs, V <sub>R</sub> = 200 V                                      | T <sub>A</sub> = 125 °C | S                             | 0.4  | -              | -    |
| Maximum reverse recovery current                                           |                                                                                                       |                         | I <sub>RM</sub>               | 3.7  | 5.5            | A    |
| Typical stored charge                                                      |                                                                                                       |                         | Q <sub>rr</sub>               | 48   | -              | nC   |
| Typical junction capacitance                                               |                                                                                                       |                         | 4.0 V, 1 MHz                  |      | C <sub>J</sub> | 16   |

## Notes

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

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                 |       |       |       |      |
|-------------------------------------------------------------------------|---------------------------------|-------|-------|-------|------|
| PARAMETER                                                               | SYMBOL                          | UH1PB | UH1PC | UH1PD | UNIT |
| Typical thermal resistance                                              | R <sub>θJA</sub> <sup>(1)</sup> | 120   |       |       | °C/W |
|                                                                         | R <sub>θJM</sub> <sup>(1)</sup> | 20    |       |       |      |

## 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                      |
| UH1PD-M3/84A                   | 0.024           | 84A                    | 3000          | 7" diameter plastic tape and reel  |
| UH1PD-M3/85A                   | 0.024           | 85A                    | 10 000        | 13" diameter plastic tape and reel |

## RATINGS AND CHARACTERISTICS CURVES

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

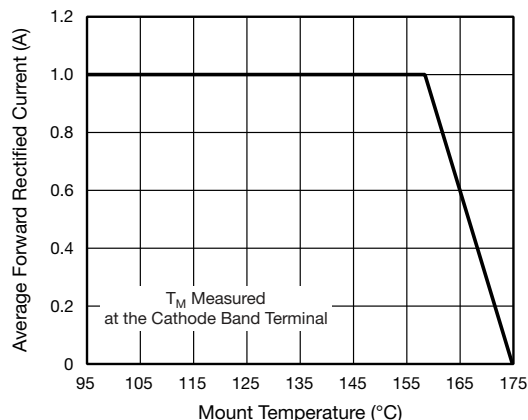


Fig. 1 - Maximum Forward Current Derating Curve

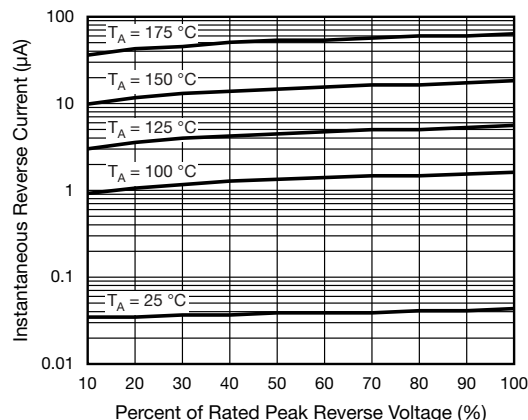


Fig. 4 - Typical Reverse Characteristics

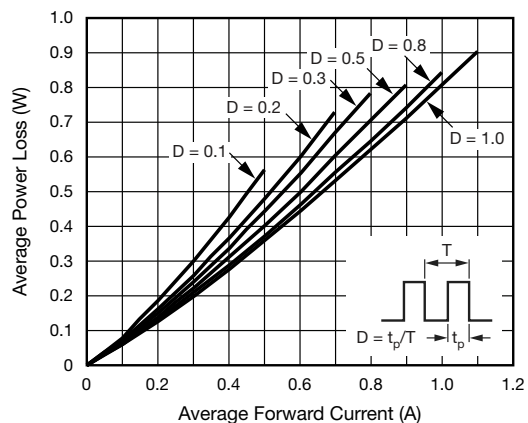


Fig. 2 - Forward Power Loss Characteristics

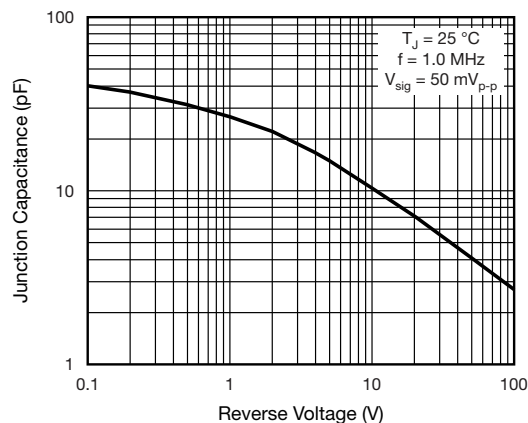


Fig. 5 - Typical Junction Capacitance

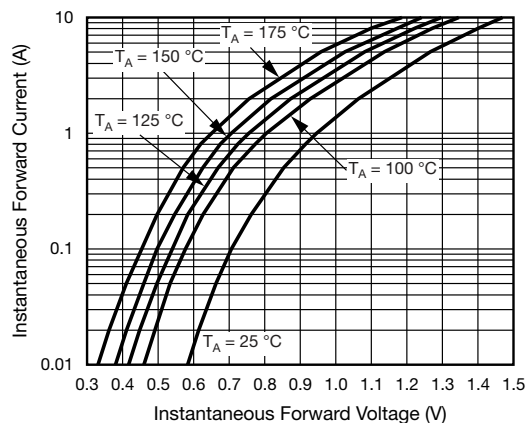


Fig. 3 - Typical Instantaneous Forward Characteristics

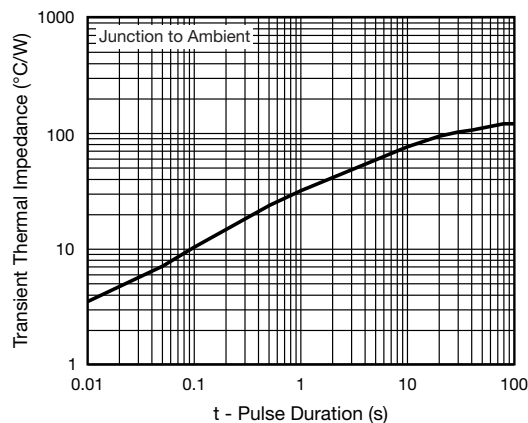
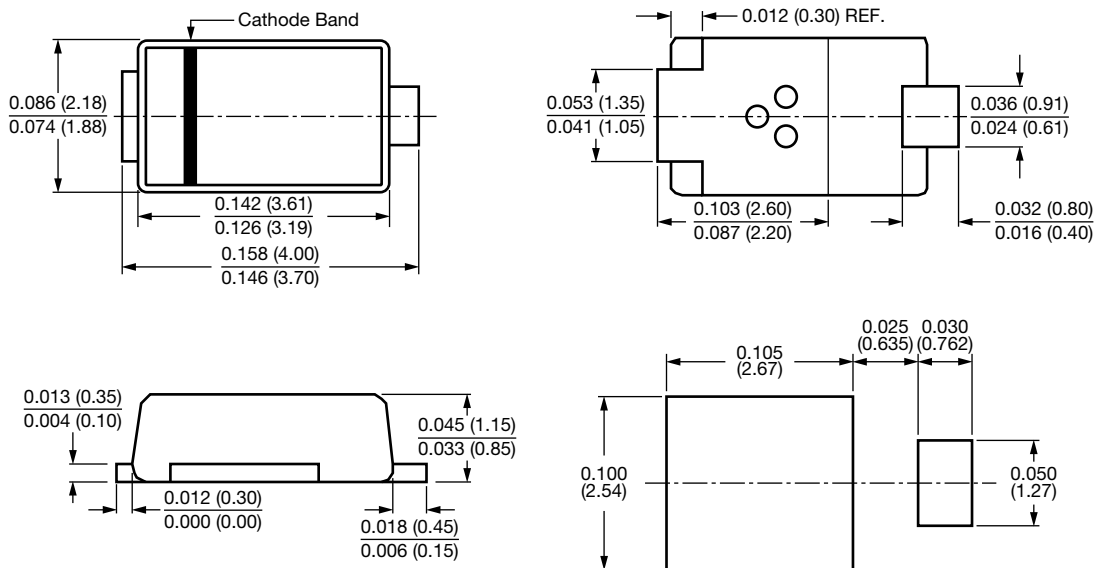


Fig. 6 - Typical Transient Thermal Impedance

## UH1PB, UH1PC, UH1PD

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



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