

## SMD Photovoltaic Solar Cell Protection Rectifier


**SMC (DO-214AB)**
**DESIGN SUPPORT TOOLS**

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**FEATURES**

- Low profile package
- Ideal for automated placement
- Glass passivated pellet chip junction
- Low forward voltage drop
- Low leakage current
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
FREE

**TYPICAL APPLICATIONS**

For use in solar cell panel blocking diode for protection, using DC forward current without reverse bias.

**MECHANICAL DATA**
**Case:** SMC (DO-214AB)

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - RoHS-compliant, 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 |                |
|-------------------------|----------------|
| $I_{F(AV)}$             | 5.0 A          |
| $V_{RRM}$               | 1000 V         |
| $I_{FSM}$               | 100 A          |
| $I_R$                   | 10 $\mu$ A     |
| $V_F$ at $I_F = 5.0$ A  | 0.90 V         |
| $T_J$ max.              | 150 °C         |
| Package                 | SMC (DO-214AB) |
| Circuit configuration   | Single         |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                                      |                   |                    |      |
|--|-------------------|--------------------|------|
| PARAMETER  | SYMBOL            | S5MS               | UNIT |
| Device marking code  |                   | 5MS                |      |
| Max. repetitive peak reverse voltage   | $V_{RRM}$         | 1000               | V    |
| Max. DC forward current (fig. 1)   | $T_M = 110$ °C    | 5.0 <sup>(1)</sup> | A    |
|  | $T_A = 25$ °C     | 1.6 <sup>(2)</sup> |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load            | $I_{FSM}$         | 100                | A    |
| Operating junction and storage temperature range   | $T_{OP}, T_{STG}$ | -55 to +150        | °C   |
| Junction temperature in DC forward current without reverse bias, $t \leq 1$ h <sup>(3)</sup> | $T_J$             | $\leq 200$         | °C   |

**Notes**

(1) Mounted on 30 mm x 30 mm Al PCB

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

(3) Meets the requirements of IEC 61215 Ed. 2 bypass diode thermal test

| ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |   |                           |             |      |      |               |  |
|---|---|---------------------------|-------------|------|------|---------------|--|
| PARAMETER   | TEST CONDITIONS   |                           | SYMBOL      | TYP. | MAX. | UNIT          |  |
| Instantaneous forward voltage   | $I_F = 2.5 \text{ A}$   | $T_A = 25^\circ\text{C}$  | $V_F^{(1)}$ | 0.94 | -    | V             |  |
|   | $I_F = 5.0 \text{ A}$   |                           |             | 0.99 | 1.15 |               |  |
|   | $I_F = 2.5 \text{ A}$   | $T_A = 125^\circ\text{C}$ |             | 0.82 | -    |               |  |
|   | $I_F = 5.0 \text{ A}$   |                           |             | 0.90 | 1.00 |               |  |
| Reverse current   | Rated $V_R$   | $T_A = 25^\circ\text{C}$  | $I_R^{(2)}$ | -    | 10   | $\mu\text{A}$ |  |
|   |   | $T_A = 125^\circ\text{C}$ |             | 50   | 250  |               |  |
| Max. reverse recovery time  | $I_F = 0.5 \text{ A}, I_R = 1.0 \text{ A}, I_{rr} = 0.25 \text{ A}$ |                           | $t_{rr}$    | 2.5  | -    | $\mu\text{s}$ |  |
| Typical junction capacitance  | 4.0 V, 1 MHz  |                           | $C_J$       | 40   | -    | pF            |  |

**Notes**

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

(2) Pulse test: Pulse width  $\leq 40 \text{ ms}$

| THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |                       |      |                    |  |  |
|--|-----------------------|------|--------------------|--|--|
| PARAMETER  | SYMBOL                | S5MS | UNIT               |  |  |
| Typical thermal resistance   | $R_{\theta JA}^{(1)}$ | 92   | $^\circ\text{C/W}$ |  |  |
|  | $R_{\theta JM}^{(2)}$ | 8    |                    |  |  |

**Notes**

(1) Free air, mounted on recommended copper pad area. Thermal resistance  $R_{\theta JA}$  - junction-to-ambient

(2) Mounted on 30 mm x 30 mm Al PCB. Thermal resistance  $R_{\theta JM}$  - junction-to-mount

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| S5MS-M3/57T                    | 0.211           | 57T                    | 850           | 7" diameter plastic tape and reel  |
| S5MS-M3/9AT                    | 0.211           | 9AT                    | 3500          | 13" diameter plastic tape and reel |

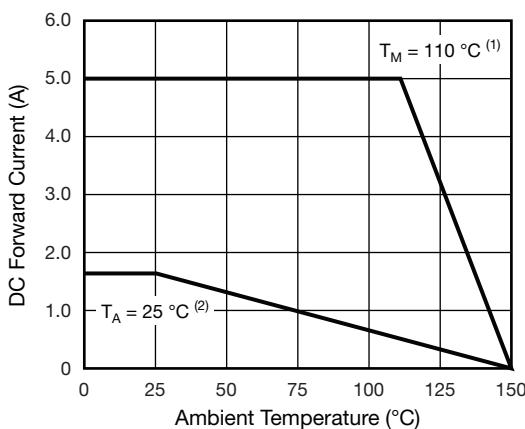
**RATINGS AND CHARACTERISTICS CURVES ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**


Fig. 1 - Forward Current Derating Curve

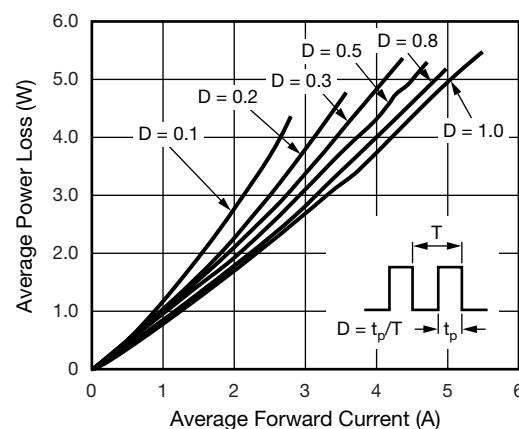


Fig. 2 - Forward Power Loss Characteristics

**Notes**

(1) Mounted on 30 mm x 30 mm Al PCB  $T_M$  measured at the terminal ( $R_{\theta JM} = 8^\circ\text{C/W}$ )

(2) Free air, mounted on recommended copper pad area  
( $R_{\theta JA} = 92^\circ\text{C/W}$ )

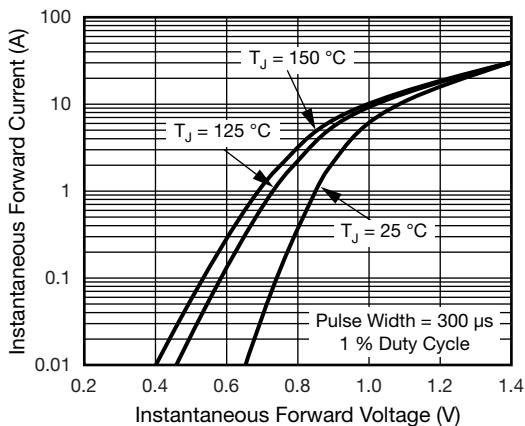


Fig. 3 - Typical Instantaneous Forward Characteristics

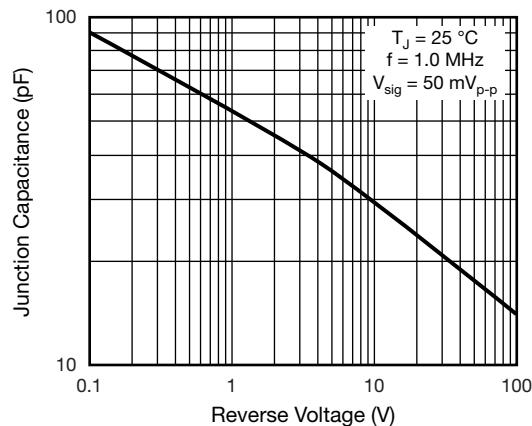


Fig. 5 - Typical Junction Capacitance

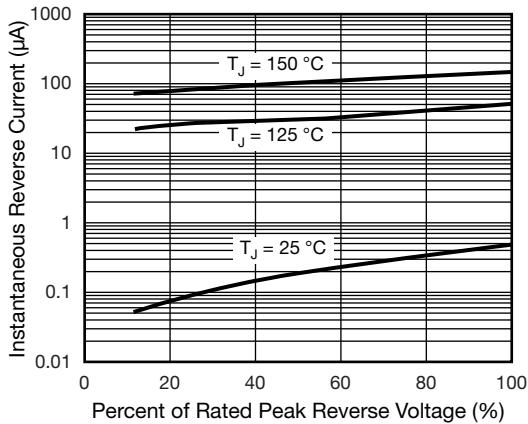
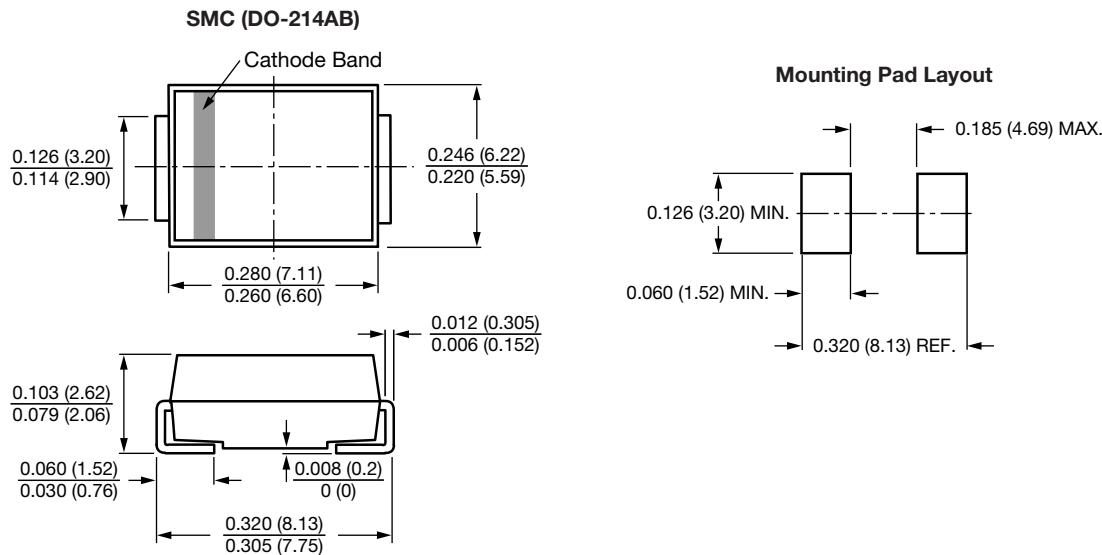


Fig. 4 - Typical Reverse Characteristics

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



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