# S1A, S1B, S1D, S1G, S1J, S1K, S1M

Vishay General Semiconductor

COMPLIANT

HALOGEN

FREE

## **Surface Mount Glass Passivated Rectifier**



**SMA (DO-214AC)** 

| PRIMARY CHARACTERISTICS |  |  |  |  |  |  |  |  |
|-------------------------|--|--|--|--|--|--|--|--|
| I <sub>F(AV)</sub>      | 1.0 A  |  |  |  |  |  |  |  |
| V <sub>RRM</sub>        | 50 V, 100 V, 200 V, 400 V, 600 V,<br>800 V, 1000 V |  |  |  |  |  |  |  |
| I <sub>FSM</sub>        | 40 A, 30 A   |  |  |  |  |  |  |  |
| E <sub>AS</sub>         | 5 mJ   |  |  |  |  |  |  |  |
| I <sub>R</sub>          | 1.0 μΑ, 5.0 μΑ                                     |  |  |  |  |  |  |  |
| V <sub>F</sub>          | 1.1 V  |  |  |  |  |  |  |  |
| T <sub>J</sub> max.     | 150 °C   |  |  |  |  |  |  |  |
| Package                 | SMA (DO-214AC)                                     |  |  |  |  |  |  |  |
| Diode variations        | Single   |  |  |  |  |  |  |  |

#### **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
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

### **TYPICAL APPLICATIONS**

For use in general purpose rectification of power supplies, inverters, converters and freewheeling diodes for consumer, automotive, and telecommunication.

#### **MECHANICAL DATA**

Case: SMA (DO-214AC)

Molding compound meets UL 94 V-0 flammability rating Base P/N-E3 - RoHS-compliant, commercial grade Base P/N-M3 - halogen-free, RoHS-compliant, commercial

grade

Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified Base P/NHM3\_X - halogen-free, RoHS-compliant and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B,....)

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

E3, M3, HE3, and HM3 suffix meets JESD 201 class 2 whisker test

Polarity: Color band denotes cathode end

| <b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)                  |                                   |                    |     |     |      |      |     |     |      |
|---|-----------------------------------|--------------------|-----|-----|------|------|-----|-----|------|
| PARAMETER   | SYMBOL                            | S1A                | S1B | S1D | S1G  | S1J  | S1K | S1M | UNIT |
| Device marking code   |                                   | SA SB SD SG SJ S   |     |     | SK   | SM   |     |     |      |
| Maximum recurrent peak reverse voltage  | V <sub>RRM</sub>                  | 50 100 200 400 600 |     |     | 800  | 1000 | V   |     |      |
| Maximum RMS voltage   | V <sub>RMS</sub>                  | 35                 | 70  | 140 | 280  | 420  | 560 | 700 | V    |
| Maximum DC blocking voltage   | V <sub>DC</sub>                   | 50 100 200 400 600 |     | 800 | 1000 | V    |     |     |      |
| Maximum average forward rectified current (fig. 1)                                      | I <sub>F(AV)</sub>                | 1.0                |     |     |      |      | Α   |     |      |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load      | I <sub>FSM</sub>                  | 40 30              |     |     |      | 0    | А   |     |      |
| Non-repetitive peak reverse avalanche energy at 25 °C, I <sub>AS</sub> = 1 A, L = 10 mH | E <sub>AS</sub>                   | 5                  |     |     |      |      | mJ  |     |      |
| Operating junction and storage temperature range  | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150        |     |     |      |      | °C  |     |      |



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| <b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted) |                               |                                   |                 |     |     |     |     |     |     |     |      |
|---|-------------------------------|-----------------------------------|-----------------|-----|-----|-----|-----|-----|-----|-----|------|
| PARAMETER   | TEST CONDITIONS               |                                   | SYMBOL          | S1A | S1B | S1D | S1G | S1J | S1K | S1M | UNIT |
| Maximum instantaneous forward voltage   | 1.0 A                         |                                   | V <sub>F</sub>  | 1.1 |     |     |     |     | ٧   |     |      |
| Maximum DC reverse current  |                               | T <sub>A</sub> = 25 °C            | 1.0             |     | 5   | .0  | μA  |     |     |     |      |
| at rated DC blocking voltage  |                               | T <sub>A</sub> = 125 °C           | .u              | 50  |     |     |     |     |     |     | P    |
| Typical reverse recovery time   | $I_F = 0.5$<br>$I_{rr} = 0.2$ | A, I <sub>R</sub> = 1.0 A,<br>5 A | t <sub>rr</sub> | 1.8 |     |     |     |     | μs  |     |      |
| Typical junction capacitance  | 4.0 V, 1                      | MHz                               | CJ              | 12  |     |     |     |     | pF  |     |      |

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |   |    |  |  |  |  |    |      |      |
|---|---|----|--|--|--|--|----|------|------|
| PARAMETER   | SYMBOL S1A S1B S1D S1G S1J S1K S1M UNIT |    |  |  |  |  |    |      |      |
| Typical thermal resistance (1)  | $R_{\theta JA}$                         | 75 |  |  |  |  | 85 |      | °C/W |
| Typical thermal resistance (*)  | $R_{\theta JL}$                         | 27 |  |  |  |  | 3  | C/VV |      |

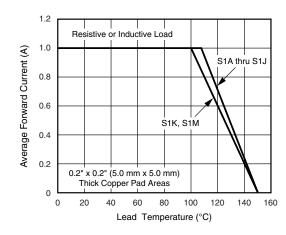
#### Note

<sup>(1)</sup> Thermal resistance from junction to ambient and from junction to lead mounted on PCB with 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pad areas

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |  |  |  |  |  |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|--|--|--|--|--|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |  |  |  |  |  |
| S1J-E3/61T                     | 0.064           | 61T                    | 1800          | 7" diameter plastic tape and reel  |  |  |  |  |  |
| S1J-E3/5AT                     | 0.064           | 5AT                    | 7500          | 13" diameter plastic tape and reel |  |  |  |  |  |
| S1JHE3_A/H (1)                 | 0.064           | Н                      | 1800          | 7" diameter plastic tape and reel  |  |  |  |  |  |
| S1JHE3_A/I (1)                 | 0.064           | I                      | 7500          | 13" diameter plastic tape and reel |  |  |  |  |  |
| S1J-M3/61T                     | 0.064           | 61T                    | 1800          | 7" diameter plastic tape and reel  |  |  |  |  |  |
| S1J-M3/5AT                     | 0.064           | 5AT                    | 7500          | 13" diameter plastic tape and reel |  |  |  |  |  |
| S1JHM3_A/H <sup>(1)</sup>      | 0.064           | Н                      | 1800          | 7" diameter plastic tape and reel  |  |  |  |  |  |
| S1JHM3_A/I <sup>(1)</sup>      | 0.064           | I                      | 7500          | 13" diameter plastic tape and reel |  |  |  |  |  |

### Note

### **RATINGS AND CHARACTERISTICS CURVES** (T<sub>A</sub> = 25 °C unless otherwise noted)





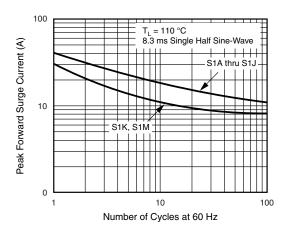


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

<sup>(1)</sup> AEC-Q101 qualified

100

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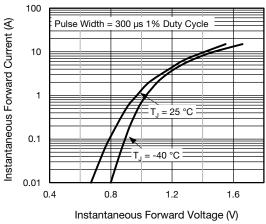


Fig. 3 - Typical Instantaneous Forward Characteristics

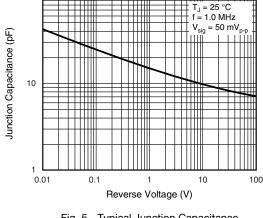


Fig. 5 - Typical Junction Capacitance

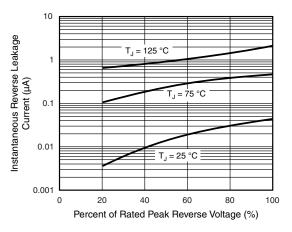


Fig. 4 - Typical Reverse Leakage Characteristics

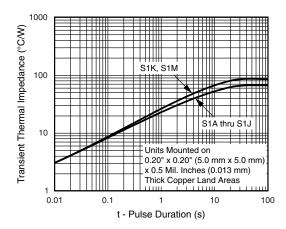
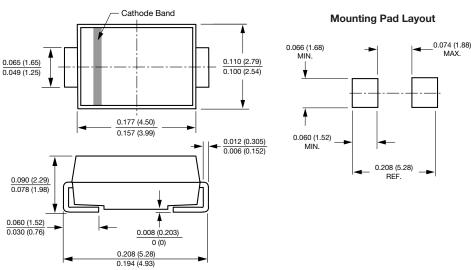


Fig. 6 - Typical Transient Thermal Impedance

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

## **SMA (DO-214AC)**





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