

## Surface Mount Schottky Barrier Rectifier


**DO-214AC (SMA)**

| PRIMARY CHARACTERISTICS |                |
|-------------------------|----------------|
| $I_{F(AV)}$             | 1.5 A          |
| $V_{RRM}$               | 90 V           |
| $I_{FSM}$               | 40 A           |
| $V_F$ at $I_F = 1.0$ A  | 0.75 V         |
| $T_J$ max.              | 150 °C         |
| Package                 | DO-214AC (SMA) |
| Diode variations        | Single die     |

### FEATURES

- Low profile package
- Ideal for automated placement
- Guardring for overvoltage protection
- Low power losses, high efficiency
- Very low switching losses
- High 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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

For use in high frequency inverters, switching power supplies, freewheeling diodes, OR-ing diode, DC/DC converters, and reverse battery protection.

### MECHANICAL DATA

**Case:** DO-214AC (SMA)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS-compliant, commercial grade

Base P/NHE3 - RoHS-compliant, AEC-Q101 qualified

Base P/NHE3\_X - RoHS-compliant, 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 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

**Polarity:** Color band denotes the cathode end

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                     |                |             |            |
|---|----------------|-------------|------------|
| PARAMETER   | SYMBOL         | BYS12-90    | UNIT       |
| Device marking code   |                | BYS 209     |            |
| Maximum repetitive peak reverse voltage                                     | $V_{RRM}$      | 90          | V          |
| Maximum average forward rectified current                                   | $I_{F(AV)}$    | 1.5         | A          |
| Peak forward surge current single half sine-wave superimposed on rated load | $I_{FSM}$      | 40          | A          |
|   |                | 30          |            |
| Voltage rate of change (rated $V_R$ )                                       | dV/dt          | 10 000      | V/ $\mu$ s |
| Junction and storage temperature range                                      | $T_J, T_{STG}$ | -55 to +150 | °C         |



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                      |                                   |        |          |               |
|--|----------------------|-----------------------------------|--------|----------|---------------|
| PARAMETER  | TEST CONDITIONS      |                                   | SYMBOL | BYS12-90 | UNIT          |
| Maximum instantaneous forward voltage <sup>(1)</sup>   | $I_F = 1.0\text{ A}$ | $T_J = 25\text{ }^\circ\text{C}$  | $V_F$  | 750      | mV            |
|  | $I_F = 15\text{ mA}$ |                                   |        | 360      |               |
| Maximum DC reverse current <sup>(1)</sup>  | $V_{RRM}$            | $T_J = 25\text{ }^\circ\text{C}$  | $I_R$  | 100      | $\mu\text{A}$ |
|  |                      | $T_J = 100\text{ }^\circ\text{C}$ |        | 1        | mA            |

**Note**

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

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                                |          |                    |
|---|--------------------------------|----------|--------------------|
| PARAMETER   | SYMBOL                         | BYS12-90 | UNIT               |
| Maximum thermal resistance, junction to lead  | $R_{\theta JL}$                | 25       | $^\circ\text{C/W}$ |
| Maximum thermal resistance, junction to ambient   | $R_{\theta JA}$ <sup>(1)</sup> | 150      | $^\circ\text{C/W}$ |
|   | $R_{\theta JA}$ <sup>(2)</sup> | 125      |                    |
|   | $R_{\theta JA}$ <sup>(3)</sup> | 100      |                    |

**Notes**

- <sup>(1)</sup> Mounted on epoxy-glass hard tissue
- <sup>(2)</sup> Mounted on epoxy-glass hard tissue, 50 mm<sup>2</sup> 35  $\mu\text{m}$  Cu
- <sup>(3)</sup> Mounted on Al-oxide-ceramic (Al<sub>2</sub>O<sub>3</sub>), 50 mm<sup>2</sup> 35  $\mu\text{m}$  Cu

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| BYS12-90-E3/TR                        | 0.064           | TR                     | 1800          | 7" diameter plastic tape and reel  |
| BYS12-90-E3/TR3                       | 0.064           | TR3                    | 7500          | 13" diameter plastic tape and reel |
| BYS12-90HE3/TR <sup>(1)</sup>         | 0.064           | TR                     | 1800          | 7" diameter plastic tape and reel  |
| BYS12-90HE3/TR3 <sup>(1)</sup>        | 0.064           | TR3                    | 7500          | 13" diameter plastic tape and reel |
| BYS12-90HE3_A/H <sup>(1)</sup>        | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| BYS12-90HE3_A/I <sup>(1)</sup>        | 0.064           | I                      | 7500          | 13" diameter plastic tape and reel |

**Note**

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

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

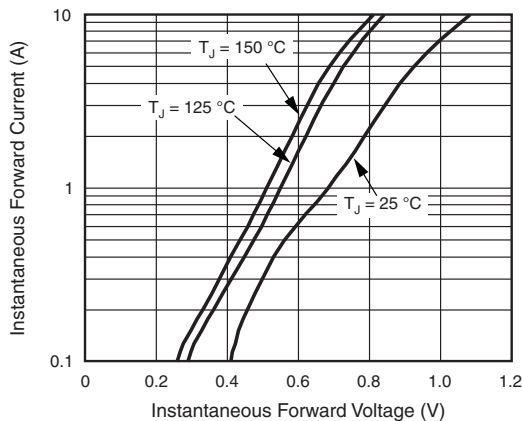


Fig. 1 - Forward Current vs. Forward Voltage

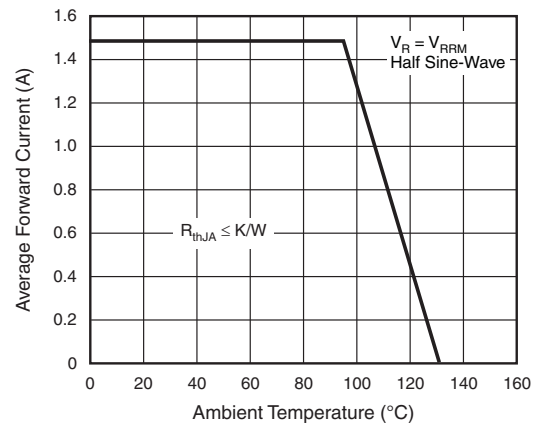


Fig. 2 - Max. Average Forward Current vs. Ambient Temperature

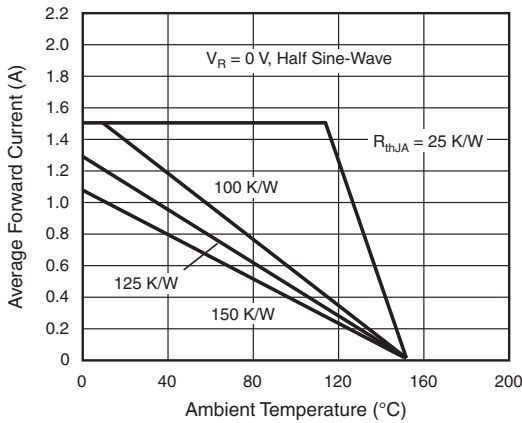


Fig. 3 - Max. Average Forward Current vs. Ambient Temperature

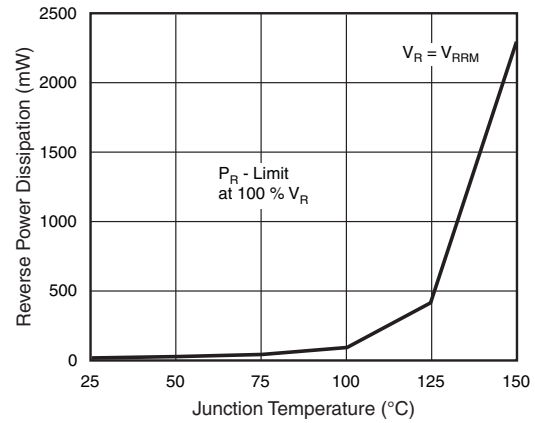


Fig. 5 - Max. Reverse Power Dissipation vs. Junction Temperature

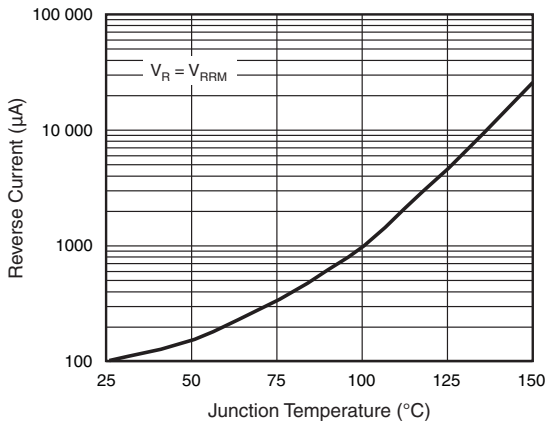


Fig. 4 - Reverse Current vs. Junction Temperature

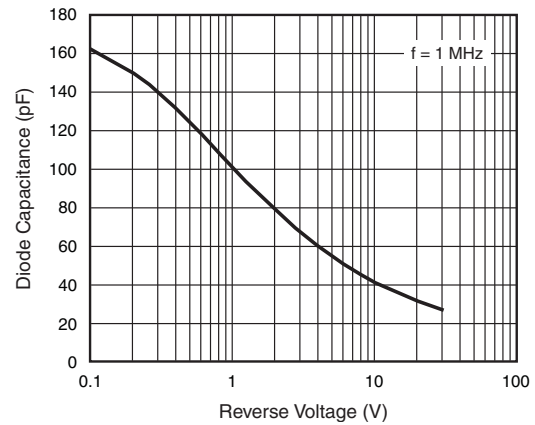
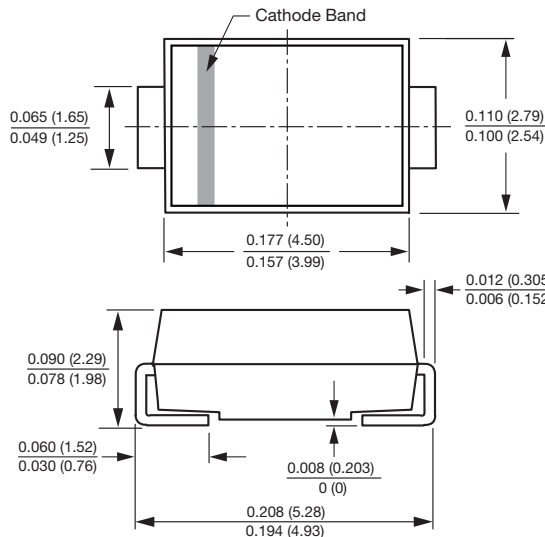


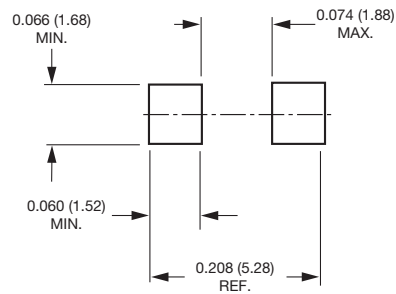
Fig. 6 - Diode Capacitance vs. Reverse Voltage

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**DO-214AC (SMA)**



**Mounting Pad Layout**





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