

## Ultrafast Avalanche SMD Rectifier


**SMA (DO-214AC)**

Cathode  Anode

### ADDITIONAL RESOURCES



### FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated pellet chip junction
- Low reverse current
- Low forward voltage
- Soft recovery characteristic
- Ultra fast reverse recovery time
- 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 [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### TYPICAL APPLICATIONS

For use in high frequency rectification and freewheeling application in switching mode converters and inverters for consumer, computer, 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, and 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 meet JESD 201 class 2 whisker test

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

| PRIMARY CHARACTERISTICS |                    |
|-------------------------|--------------------|
| $I_{F(AV)}$             | 2.0 A              |
| $V_{RRM}$               | 50 V, 100 V, 200 V |
| $I_{FSM}$               | 35 A               |
| $I_R$                   | 1.0 $\mu$ A        |
| $V_F$ at $I_F$          | 1.1 V              |
| $t_{rr}$                | 25 ns              |
| $E_R$                   | 20 mJ              |
| $T_J$ max.              | 150 °C             |
| Package                 | SMA (DO-214AC)     |
| Circuit configurations  | Single             |

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                                                             |                   |             |        |        |      |
|----------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|--------|--------|------|
| PARAMETER                                                                                                                  | SYMBOL            | BYG22A      | BYG22B | BYG22D | UNIT |
| Device marking code                                                                                                        |                   | BYG22A      | BYG22B | BYG22D |      |
| Maximum repetitive peak reverse voltage                                                                                    | $V_{RRM}$         | 50          | 100    | 200    | V    |
| Average forward current                                                                                                    | $I_{F(AV)}$       | 2.0         |        |        | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load                                          | $I_{FSM}$         | 35          |        |        | A    |
| Pulse energy in avalanche mode, non repetitive (inductive load switch off) $I_{(BR)R} = 1\text{ A}$ , $T_J = 25\text{ °C}$ | $E_R$             | 20          |        |        | mJ   |
| Operating junction and storage temperature range                                                                           | $T_J$ , $T_{STG}$ | -55 to +150 |        |        | °C   |

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

| PARAMETER                             | TEST CONDITIONS                                                          |                         | SYMBOL                        | BYG22A | BYG22B | BYG22D | UNIT |
|---------------------------------------|--------------------------------------------------------------------------|-------------------------|-------------------------------|--------|--------|--------|------|
| Maximum instantaneous forward voltage | I <sub>F</sub> = 1.0 A                                                   | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 1.0    |        |        | V    |
|                                       | I <sub>F</sub> = 2.0 A                                                   |                         |                               | 1.1    |        |        |      |
| Maximum reverse current               | V <sub>R</sub> = V <sub>RRM</sub>                                        | T <sub>J</sub> = 25 °C  | I <sub>R</sub>                | 1      |        |        | μA   |
|                                       |                                                                          | T <sub>J</sub> = 100 °C |                               | 10     |        |        |      |
| 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>rr</sub>               | 25     |        |        | ns   |

**Note**

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

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

| PARAMETER                                                             | SYMBOL                          | BYG22A | BYG22B | BYG22D | UNIT |
|-----------------------------------------------------------------------|---------------------------------|--------|--------|--------|------|
| Maximum thermal resistance, junction to lead, T <sub>L</sub> = const. | R <sub>θJL</sub>                | 25     |        |        | °C/W |
| Maximum thermal resistance, junction to ambient                       | R <sub>θJA</sub> <sup>(1)</sup> | 150    |        |        | °C/W |
|                                                                       | R <sub>θJA</sub> <sup>(2)</sup> | 125    |        |        |      |
|                                                                       | R <sub>θJA</sub> <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 ( $\text{Al}_2\text{O}_3$ ), 50 mm<sup>2</sup> 35  $\mu\text{m}$  Cu

**ORDERING INFORMATION** (Example)

| PREFERRED P/N                | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|------------------------------|-----------------|------------------------|---------------|------------------------------------|
| BYG22D-E3/TR                 | 0.064           | TR                     | 1800          | 7" diameter plastic tape and reel  |
| BYG22D-E3/TR3                | 0.064           | TR3                    | 7500          | 13" diameter plastic tape and reel |
| BYG22DHE3_A/H <sup>(1)</sup> | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| BYG22DHE3_A/I <sup>(1)</sup> | 0.064           | I                      | 7500          | 13" diameter plastic tape and reel |
| BYG22D-M3/TR                 | 0.064           | TR                     | 1800          | 7" diameter plastic tape and reel  |
| BYG22D-M3/TR3                | 0.064           | TR3                    | 7500          | 13" diameter plastic tape and reel |
| BYG22DHM3_A/H <sup>(1)</sup> | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| BYG22DHM3_A/I <sup>(1)</sup> | 0.064           | I                      | 7500          | 13" diameter plastic tape and reel |

**Note**

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

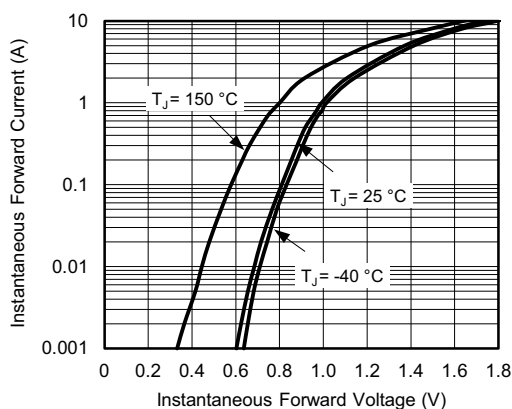
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current vs. Forward Voltage

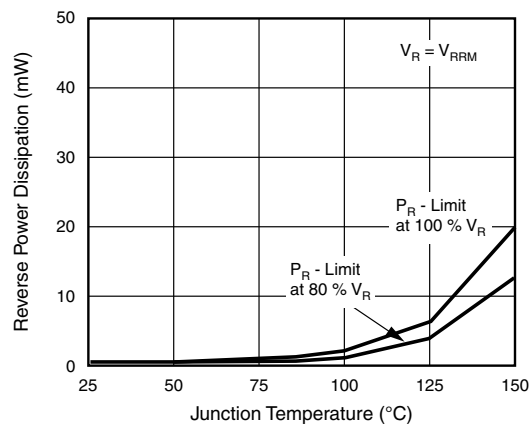


Fig. 4 - Max. Reverse Power Dissipation vs. Junction Temperature

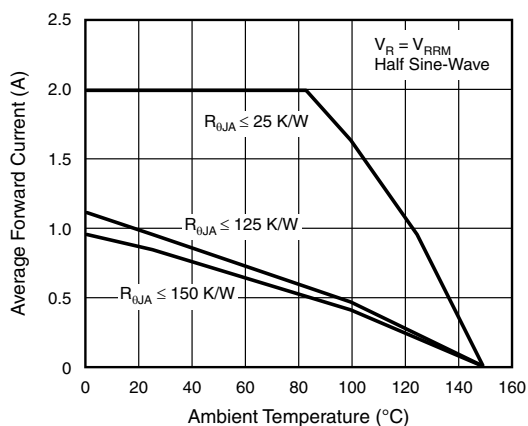


Fig. 2 - Max. Average Forward Current vs. Ambient Temperature

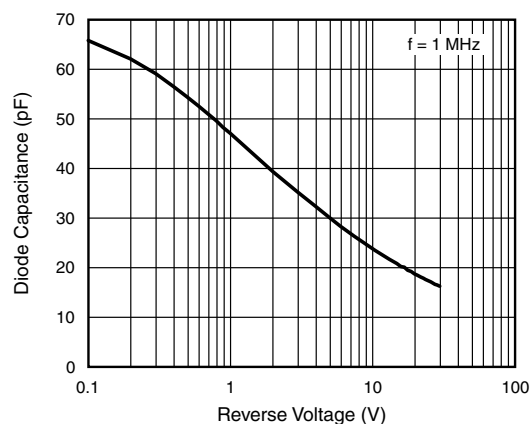


Fig. 5 - Diode Capacitance vs. Reverse Voltage

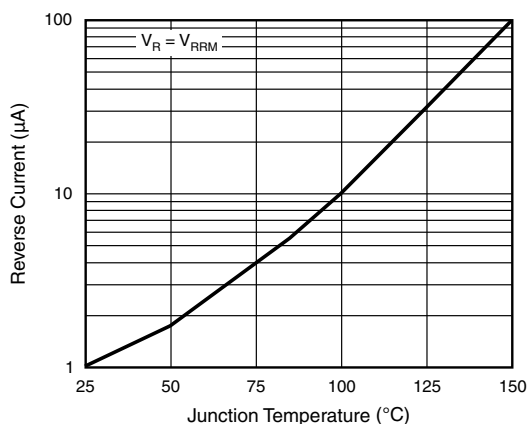


Fig. 3 - Reverse Current vs. Junction Temperature

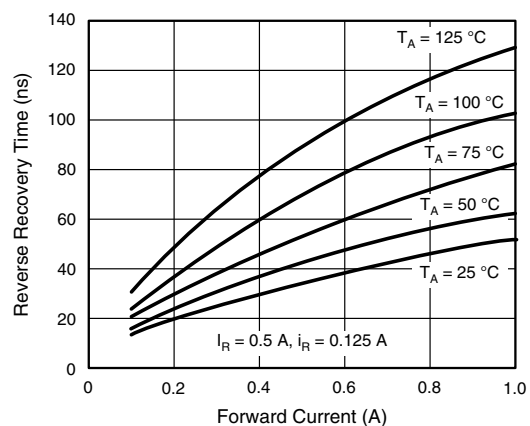


Fig. 6 - Max. Reverse Recovery Time vs. Forward Current

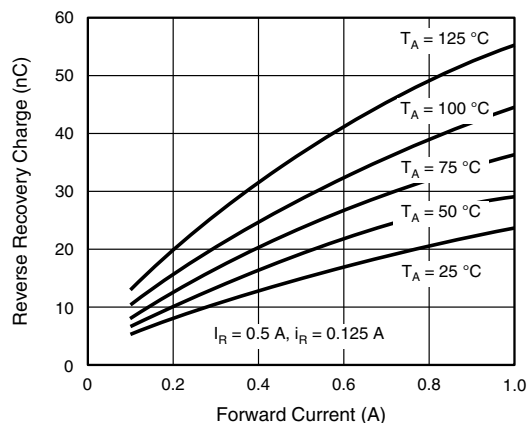


Fig. 7 - Max. Reverse Recovery Charge vs. Forward Current

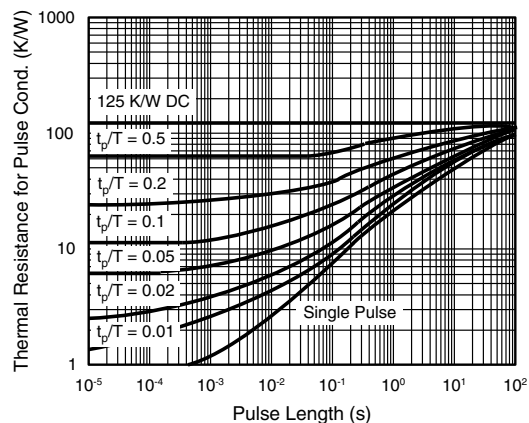
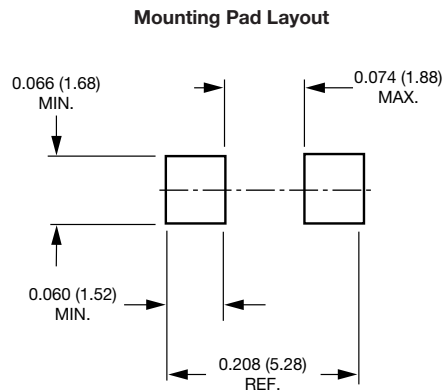
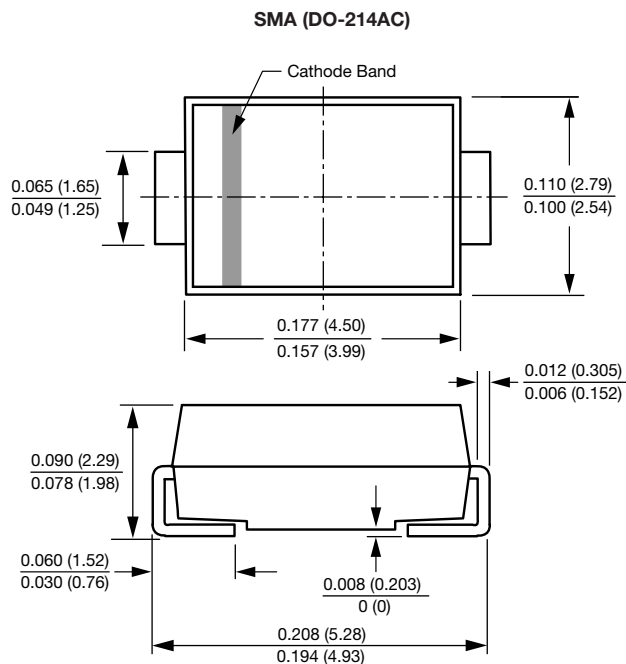


Fig. 8 - Thermal Response

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




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