



**THE DATASHEET OF  
BYG22B-E3/TR3**





## Ultrafast Avalanche SMD Rectifier



SMA (DO-214AC)



### 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)



### ADDITIONAL RESOURCES



| 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             |

### 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

| MAXIMUM RATINGS ( $T_A = 25\text{ }^\circ\text{C}$ 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)<br>$I_{(BR)R} = 1\text{ A}$ , $T_J = 25\text{ }^\circ\text{C}$ | $E_R$             | 20          |        |        | mJ               |
| Operating junction and storage temperature range  | $T_J$ , $T_{STG}$ | -55 to +150 |        |        | $^\circ\text{C}$ |



| ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |  |                                   |             |        |        |        |               |
|---|--|-----------------------------------|-------------|--------|--------|--------|---------------|
| PARAMETER   | TEST CONDITIONS  |                                   | SYMBOL      | BYG22A | BYG22B | BYG22D | UNIT          |
| Maximum instantaneous forward voltage   | $I_F = 1.0\text{ A}$   | $T_J = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 1.0    |        |        | V             |
|   | $I_F = 2.0\text{ A}$   |                                   |             | 1.1    |        |        |               |
| Maximum reverse current   | $V_R = V_{RRM}$  | $T_J = 25\text{ }^\circ\text{C}$  | $I_R$       | 1      |        |        | $\mu\text{A}$ |
|   |  | $T_J = 100\text{ }^\circ\text{C}$ |             | 10     |        |        |               |
| Maximum reverse recovery time   | $I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{rr} = 0.25\text{ A}$ |                                   | $t_{rr}$    | 25     |        |        | ns            |

**Note**(1) 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, $T_L = \text{const.}$                | $R_{\theta JL}$       | 25     |        |        | $^\circ\text{C/W}$ |  |
| Maximum thermal resistance, junction to ambient                                    | $R_{\theta JA}^{(1)}$ | 150    |        |        | $^\circ\text{C/W}$ |  |
|  | $R_{\theta JA}^{(2)}$ | 125    |        |        |                    |  |
|  | $R_{\theta JA}^{(3)}$ | 100    |        |        |                    |  |

**Notes**

(1) Mounted on epoxy-glass hard tissue

(2) Mounted on epoxy-glass hard tissue, 50 mm<sup>2</sup> 35  $\mu\text{m}$  Cu(3) 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**

(1) AEC-Q101 qualified



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

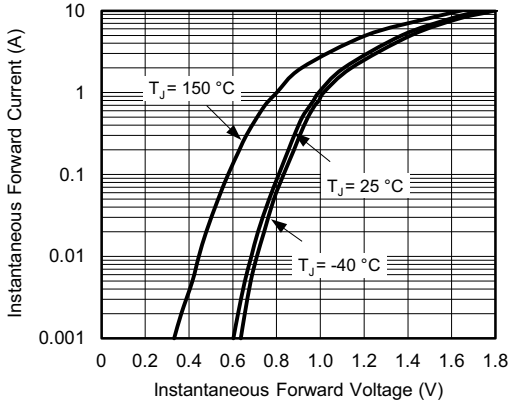


Fig. 1 - Forward Current vs. Forward Voltage

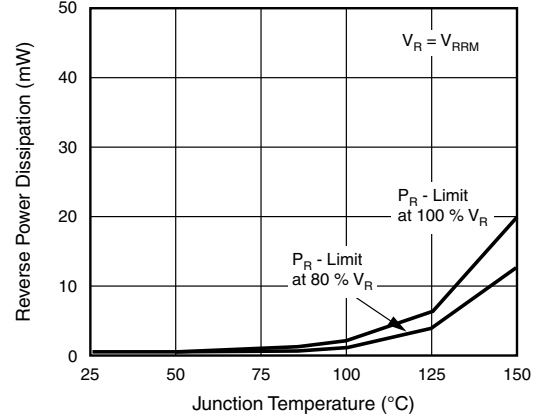


Fig. 4 - Max. Reverse Power Dissipation vs. Junction Temperature

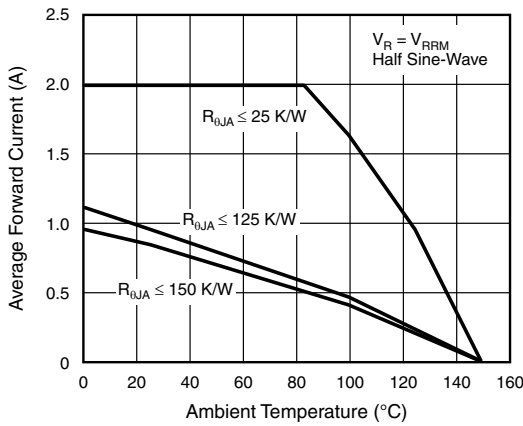


Fig. 2 - Max. Average Forward Current vs. Ambient Temperature

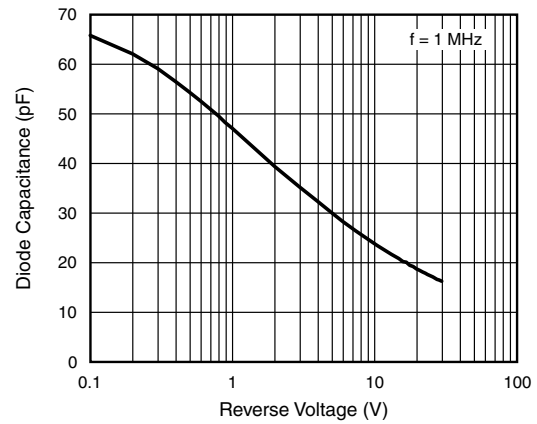


Fig. 5 - Diode Capacitance vs. Reverse Voltage

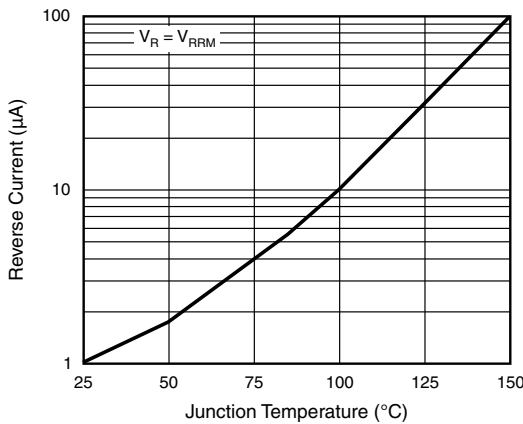


Fig. 3 - Reverse Current vs. Junction Temperature

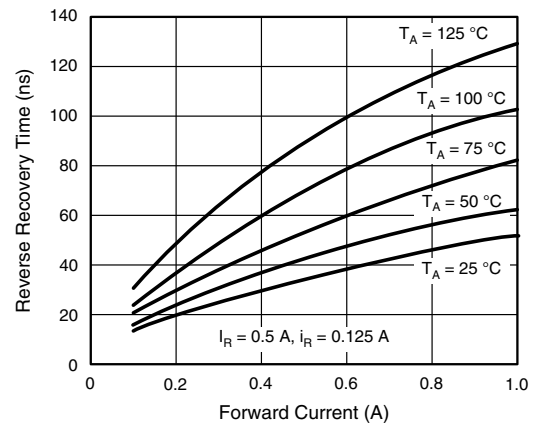


Fig. 6 - Max. Reverse Recovery Time vs. Forward Current

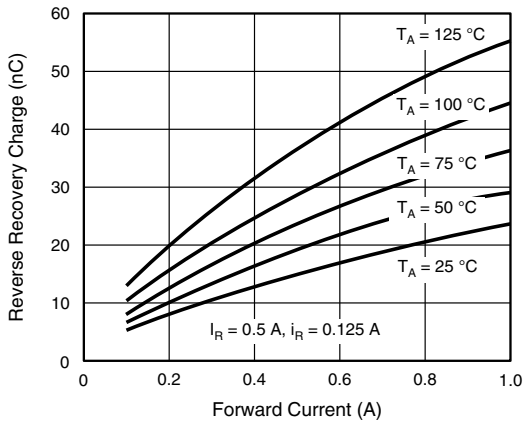


Fig. 7 - Max. Reverse Recovery Charge vs. Forward Current

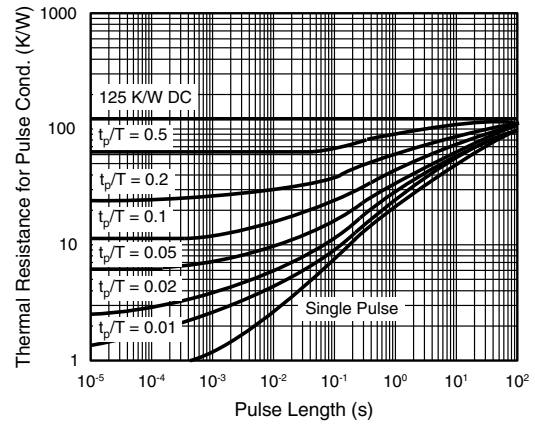
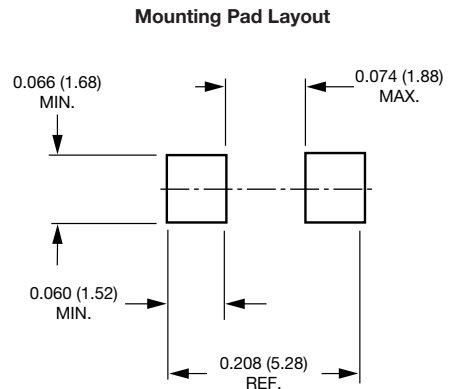
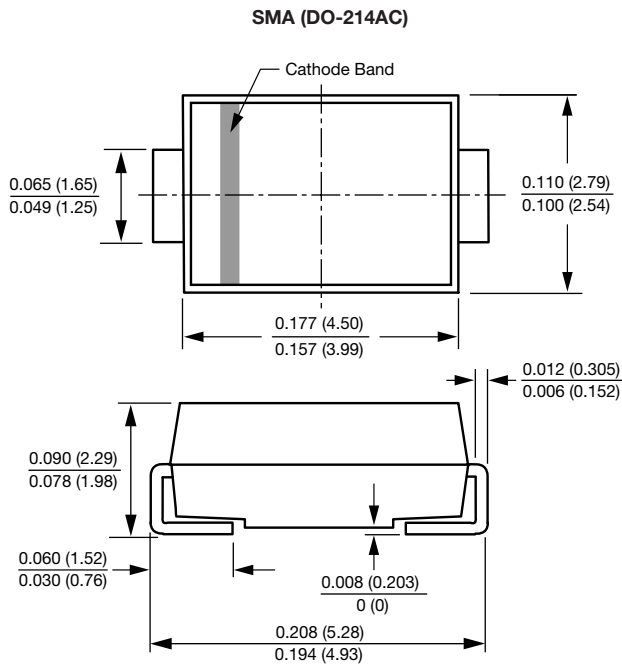


Fig. 8 - Thermal Response

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





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