

# Ultrafast Avalanche SMD Rectifier



**SMA (DO-214AC)**

Cathode  Anode

## FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated pellet chip junction
- Low reverse current
- High reverse voltage
- 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 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**

## ADDITIONAL RESOURCES



3D Models

## PRIMARY CHARACTERISTICS

|                       |                |
|-----------------------|----------------|
| $I_{F(AV)}$           | 1.5 A          |
| $V_{RRM}$             | 1000 V         |
| $I_{FSM}$             | 30 A           |
| $I_R$                 | 5.0 $\mu$ A    |
| $t_{rr}$              | 75 ns          |
| $V_F$                 | 1.7 V          |
| $E_R$                 | 20 mJ          |
| $T_J$ max.            | 150 °C         |
| Package               | SMA (DO-214AC) |
| Circuit configuration | 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 ( $T_A = 25$ °C unless otherwise noted)

| PARAMETER                                                                                                      | SYMBOL         | BYG23M      | UNIT |
|----------------------------------------------------------------------------------------------------------------|----------------|-------------|------|
| Device marking code                                                                                            |                | BYG23M      |      |
| Maximum repetitive peak reverse voltage                                                                        | $V_{RRM}$      | 1000        | V    |
| Average forward current at $T_A = 65$ °C                                                                       | $I_{F(AV)}$    | 1.5         | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load                              | $I_{FSM}$      | 30          | A    |
| Pulse energy in avalanche mode, non repetitive (inductive load switch off)<br>$I_{(BR)R} = 1$ A, $T_J = 25$ °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      | BYG23M | UNIT          |
|-------------------------------|------------------------------------------------------------------------|-------------------------------------|-------------|--------|---------------|
| Minimum breakdown voltage     | $I_R = 100\text{ }\mu\text{A}$                                         |                                     | $V_{BR}$    | 1000   | V             |
| Maximum instantaneous voltage | $I_F = 1.0\text{ A}$                                                   | $T_J = 25\text{ }^{\circ}\text{C}$  | $V_F^{(1)}$ | 1.7    | V             |
|                               |                                                                        | $T_J = 150\text{ }^{\circ}\text{C}$ |             | 1.35   |               |
| Maximum reverse current       | $V_R = V_{RRM}$                                                        | $T_J = 25\text{ }^{\circ}\text{C}$  | $I_R$       | 5      | $\mu\text{A}$ |
|                               |                                                                        | $T_J = 125\text{ }^{\circ}\text{C}$ |             | 50     |               |
| Maximum reverse recovery time | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{rr} = 0.25\text{ A}$ |                                     | $t_{rr}$    | 75     | 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                | BYG23M | UNIT                 |
|-------------------------------------------------|-----------------------|--------|----------------------|
| Typical thermal resistance, junction to case    | $R_{\theta JC}$       | 25     | $^{\circ}\text{C/W}$ |
| Typical 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, 17 mm<sup>2</sup> 35  $\mu\text{m}$  Cu(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                      |
|------------------------------|-----------------|------------------------|---------------|------------------------------------|
| BYG23M-E3/TR                 | 0.064           | TR                     | 1800          | 7" diameter plastic tape and reel  |
| BYG23M-E3/TR3                | 0.064           | TR3                    | 7500          | 13" diameter plastic tape and reel |
| BYG23MHE3_A/H <sup>(1)</sup> | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| BYG23MHE3_A/I <sup>(1)</sup> | 0.064           | I                      | 7500          | 13" diameter plastic tape and reel |
| BYG23M-M3/TR                 | 0.064           | TR                     | 1800          | 7" diameter plastic tape and reel  |
| BYG23M-M3/TR3                | 0.064           | TR3                    | 7500          | 13" diameter plastic tape and reel |
| BYG23MHM3_A/H <sup>(1)</sup> | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| BYG23MHM3_A/I <sup>(1)</sup> | 0.064           | I                      | 7500          | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

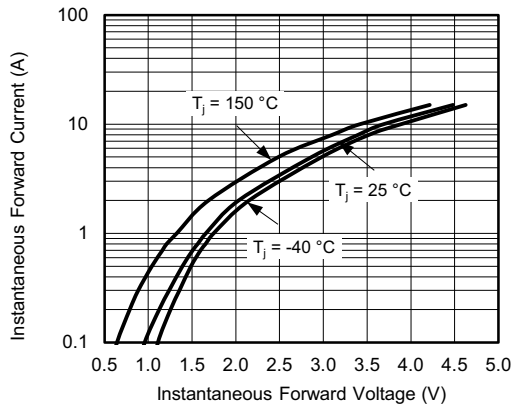
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Max. Forward Current vs. Forward Voltage

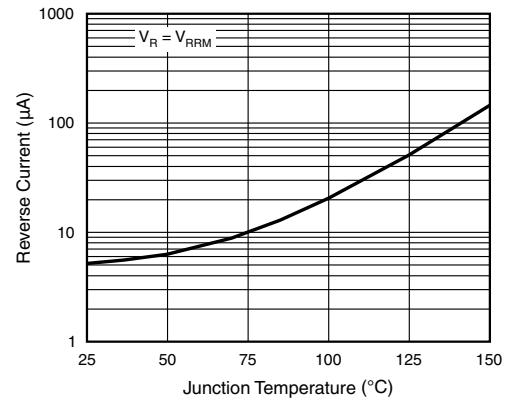


Fig. 4 - Reverse Current vs. Junction Temperature

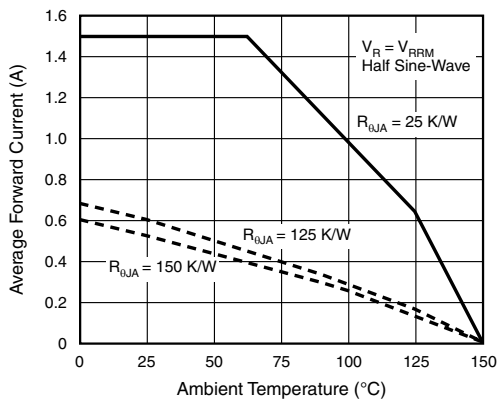


Fig. 2 - Max. Average Forward Current vs. Ambient Temperature

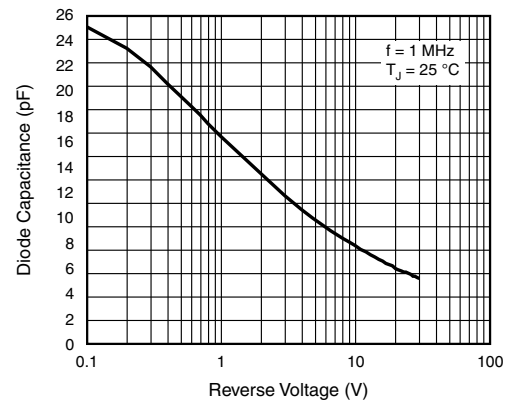


Fig. 5 - Diode Capacitance vs. Reverse Voltage

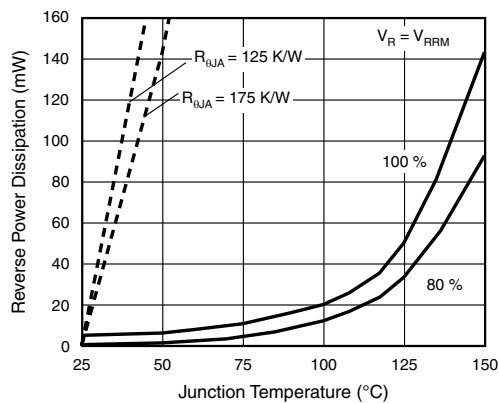
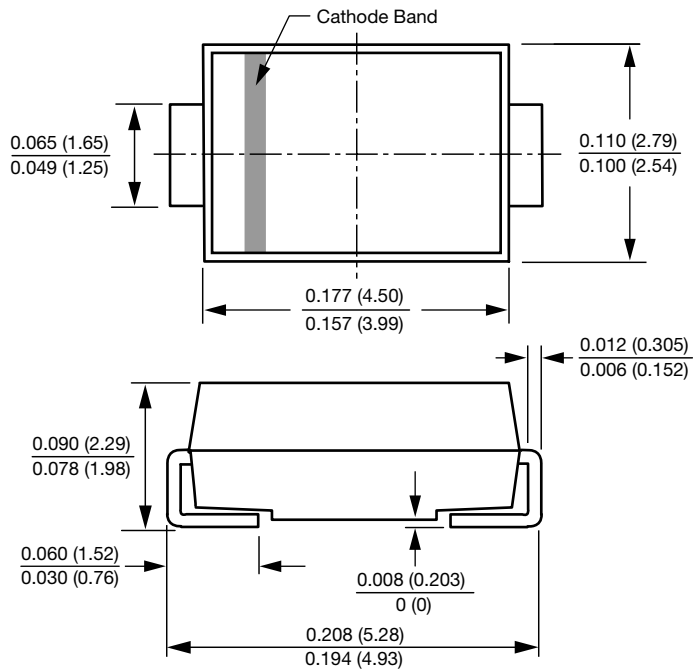
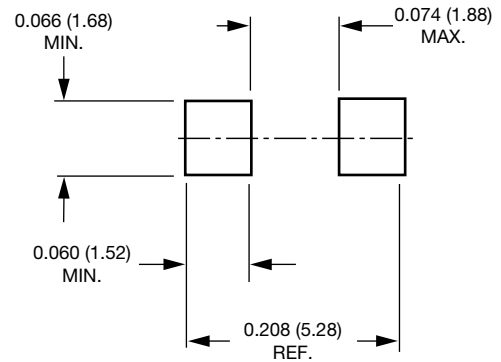


Fig. 3 - Max. Reverse Power Dissipation vs. Junction Temperature

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

**SMA (DO-214AC)**

**Mounting Pad Layout**




## Disclaimer

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