



## Standard Avalanche SMD Rectifier



SMA (DO-214AC)

Cathode  Anode

### DESIGN SUPPORT TOOLS AVAILABLE



| PRIMARY CHARACTERISTICS |                                            |
|-------------------------|--------------------------------------------|
| $I_{F(AV)}$             | 1.5 A                                      |
| $V_{RRM}$               | 200 V, 400 V, 600 V, 800 V, 1000 V, 1600 V |
| $I_{FSM}$               | 30 A                                       |
| $I_R$                   | 1.0 $\mu$ A                                |
| $V_F$                   | 1.15 V                                     |
| $E_R$                   | 20 mJ                                      |
| $T_J$ max.              | 150 °C                                     |
| Package                 | SMA (DO-214AC)                             |
| Circuit configuration   | Single                                     |

### FEATURES

- Low profile package
- Ideal for automated placement
- Controlled avalanche characteristics
- Glass passivated pellet chip junction
- Low reverse current
- High surge current 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 [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS  
COMPLIANT  
HALOGEN  
FREE

### 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, HM3 suffix meet JESD 201 class 2 whisker test

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

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                                                                                                                                                           |                |             |        |        |        |        |        |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|--------|--------|--------|--------|--------|------|
| PARAMETER                                                                                                                                                                                                                | SYMBOL         | BYG10D      | BYG10G | BYG10J | BYG10K | BYG10M | BYG10Y | UNIT |
| Device marking code                                                                                                                                                                                                      |                | BYG10D      | BYG10G | BYG10J | BYG10K | BYG10M | BYG10Y |      |
| Maximum repetitive peak reverse voltage                                                                                                                                                                                  | $V_{RRM}$      | 200         | 400    | 600    | 800    | 1000   | 1600   | V    |
| Average forward current                                                                                                                                                                                                  | $I_{F(AV)}$    | 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>$I_{(BR)R} = 1\text{ A}$ , $T_J = 25\text{ °C}$ (for BYG10D thru BYG10M)<br>$I_{(BR)R} = 0.4\text{ A}$ , $T_J = 25\text{ °C}$ (for BYG10Y) | $E_R$          | 20          |        |        |        |        |        | mJ   |
| Operating junction and storage temperature range                                                                                                                                                                         | $T_J, T_{STG}$ | -55 to +150 |        |        |        |        |        | °C   |



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                                                          |                         |                 |        |        |        |        |        |        |      |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|-----------------|--------|--------|--------|--------|--------|--------|------|
| PARAMETER                                                                  | TEST CONDITIONS                                                          |                         | SYMBOL          | BYG10D | BYG10G | BYG10J | BYG10K | BYG10M | BYG10Y | UNIT |
| Maximum instantaneous forward voltage <sup>(1)</sup>                       | I <sub>F</sub> = 1 A                                                     | T <sub>J</sub> = 25 °C  | V <sub>F</sub>  | 1.1    |        |        |        |        |        | V    |
|                                                                            | I <sub>F</sub> = 1.5 A                                                   |                         |                 | 1.15   |        |        |        |        |        |      |
| Maximum DC 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> | 4      |        |        |        |        |        | μs   |

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

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                 |        |        |        |        |        |        |      |
|-------------------------------------------------------------------------|---------------------------------|--------|--------|--------|--------|--------|--------|------|
| PARAMETER                                                               | SYMBOL                          | BYG10D | BYG10G | BYG10J | BYG10K | BYG10M | BYG10Y | UNIT |
| Typical thermal resistance, junction to lead                            | R <sub>θJL</sub>                | 25     |        |        |        |        |        | °C/W |
| Typical 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                      |
| BYG10M-E3/TR                   | 0.064           | TR                     | 1800          | 7" diameter plastic tape and reel  |
| BYG10M-E3/TR3                  | 0.064           | TR3                    | 7500          | 13" diameter plastic tape and reel |
| BYG10MHE3_A/H <sup>(1)</sup>   | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| BYG10MHE3_A/I <sup>(1)</sup>   | 0.064           | I                      | 7500          | 13" diameter plastic tape and reel |
| BYG10M-M3/TR                   | 0.064           | TR                     | 1800          | 7" diameter plastic tape and reel  |
| BYG10M-M3/TR3                  | 0.064           | TR3                    | 7500          | 13" diameter plastic tape and reel |
| BYG10MHM3_A/H <sup>(1)</sup>   | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| BYG10MHM3_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 ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

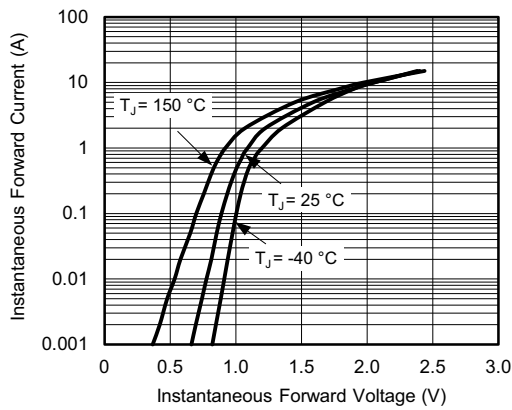


Fig. 1 - Forward Current vs. Forward Voltage

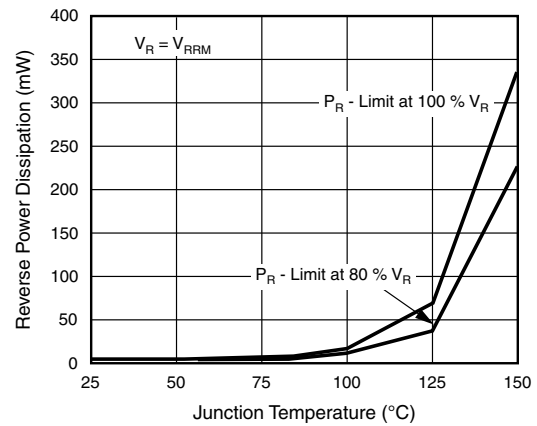


Fig. 4 - Max. Reverse Power Dissipation vs. Junction Temperature

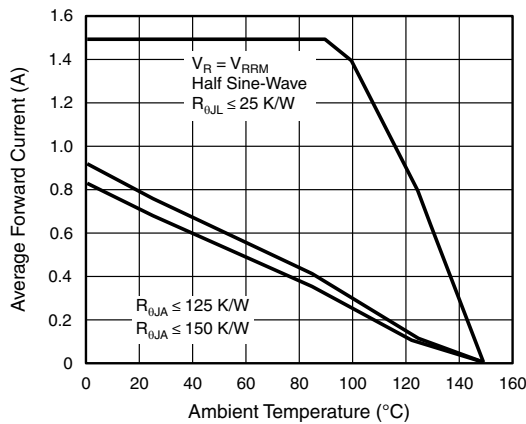


Fig. 2 - Max. Average Forward Current vs. Ambient Temperature

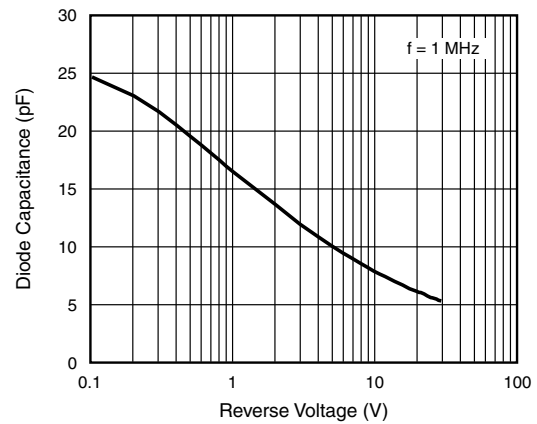


Fig. 5 - Diode Capacitance vs. Reverse Voltage

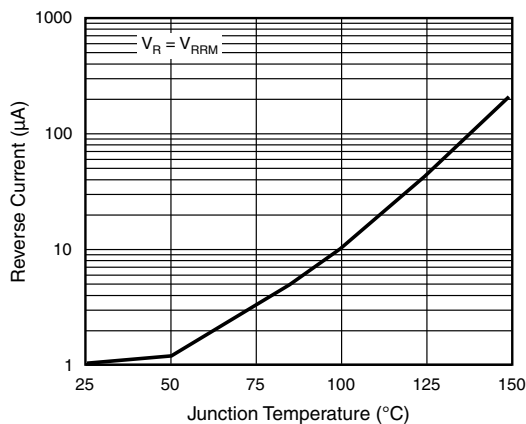


Fig. 3 - Reverse Current vs. Junction Temperature

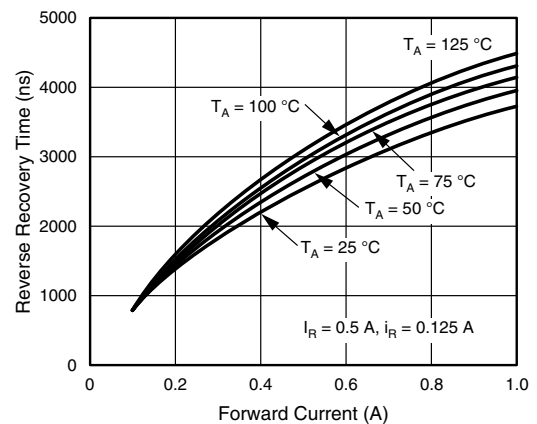


Fig. 6 - Reverse Recovery Time vs. Forward Current

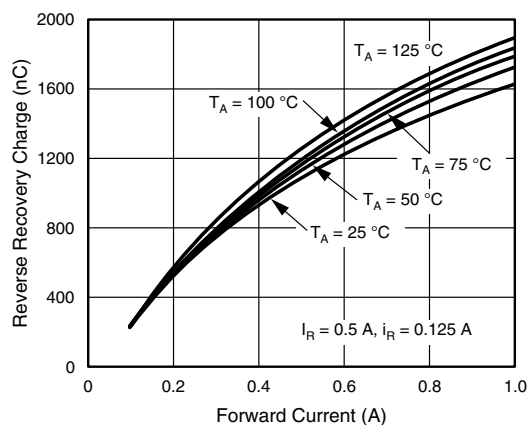
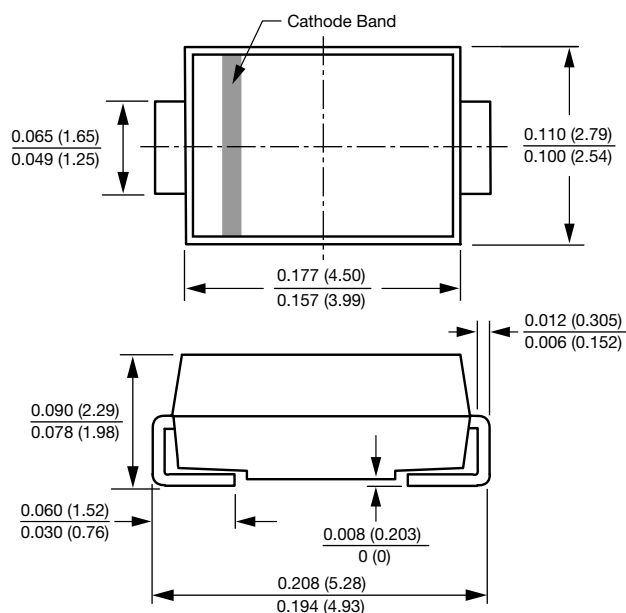


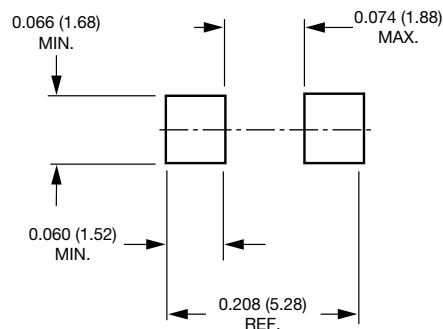
Fig. 7 - Reverse Recovery Charge vs. Forward Current

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### SMA (DO-214AC)



### Mounting Pad Layout





## Disclaimer

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