

## 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
- Soft recovery characteristics
- Ultrafast 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 of power supply, 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

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

### PRIMARY CHARACTERISTICS

|                       |                     |
|-----------------------|---------------------|
| $I_{F(AV)}$           | 1.5 A               |
| $V_{RRM}$             | 200 V, 400 V, 600 V |
| $I_{FSM}$             | 30 A                |
| $I_R$                 | 1.0 $\mu$ A         |
| $V_F$ at $I_F$        | 1.4 V               |
| $t_{rr}$              | 75 ns               |
| $E_R$                 | 20 mJ               |
| $T_J$ max.            | 150 °C              |
| Package               | SMA (DO-214AC)      |
| Circuit configuration | Single              |

### MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)

| PARAMETER                                                                                                      | SYMBOL         | BYG20D      | BYG20G | BYG20J | UNIT |
|----------------------------------------------------------------------------------------------------------------|----------------|-------------|--------|--------|------|
| Device marking code                                                                                            |                | BYG20D      | BYG20G | BYG20J |      |
| Maximum repetitive peak reverse voltage                                                                        | $V_{RRM}$      | 200         | 400    | 600    | 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>$I_{(BR)R} = 1$ 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                        | BYG20D | BYG20G | BYG20J | UNIT |
|---------------------------------------|--------------------------------------------------------------------------|-------------------------|-------------------------------|--------|--------|--------|------|
| Maximum instantaneous forward voltage | I <sub>F</sub> = 1 A                                                     | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 1.3    |        |        | V    |
|                                       | I <sub>F</sub> = 1.5 A                                                   |                         |                               | 1.4    |        |        |      |
| 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>               | 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                          | BYG20D | BYG20G | BYG20J | UNIT |
|-----------------------------------------------------------------------|---------------------------------|--------|--------|--------|------|
| Typical thermal resistance, junction to lead, T <sub>L</sub> = const. | 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**

(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                      |
|------------------------------|-----------------|------------------------|---------------|------------------------------------|
| BYG20J-E3/TR                 | 0.064           | TR                     | 1800          | 7" diameter plastic tape and reel  |
| BYG20J-E3/TR3                | 0.064           | TR3                    | 7500          | 13" diameter plastic tape and reel |
| BYG20JHE3_A/H <sup>(1)</sup> | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| BYG20JHE3_A/I <sup>(1)</sup> | 0.064           | I                      | 7500          | 13" diameter plastic tape and reel |
| BYG20J-M3/TR                 | 0.064           | TR                     | 1800          | 7" diameter plastic tape and reel  |
| BYG20J-M3/TR3                | 0.064           | TR3                    | 7500          | 13" diameter plastic tape and reel |
| BYG20JHM3_A/H <sup>(1)</sup> | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| BYG20JHM3_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)

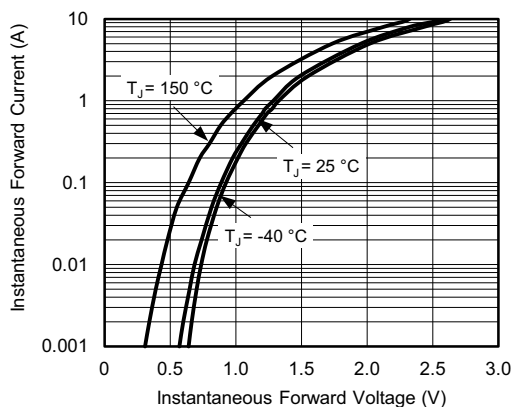


Fig. 1 - Forward Current vs. Forward Voltage

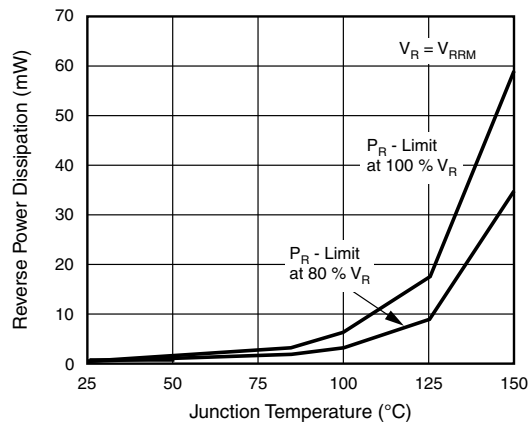


Fig. 4 - Max. Reverse Power Dissipation vs. Junction Temperature

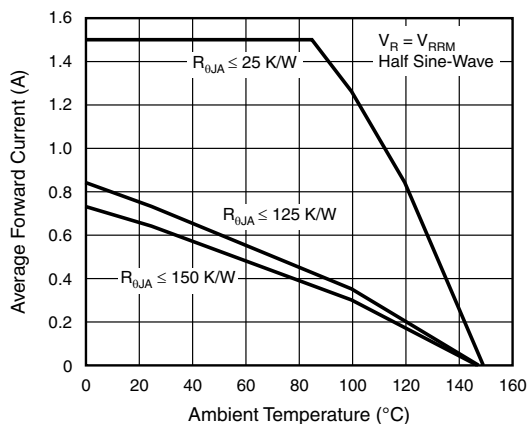


Fig. 2 - Max. Average Forward Current vs. Ambient Temperature

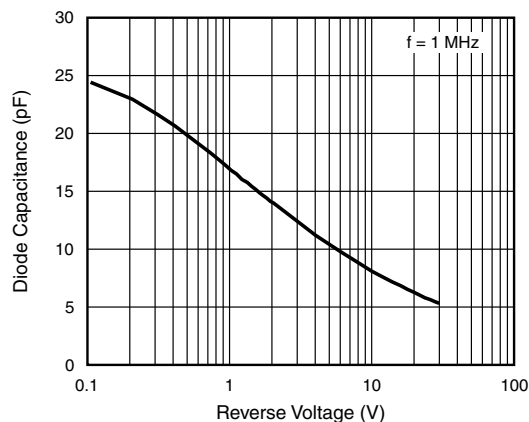


Fig. 5 - Diode Capacitance vs. Reverse Voltage

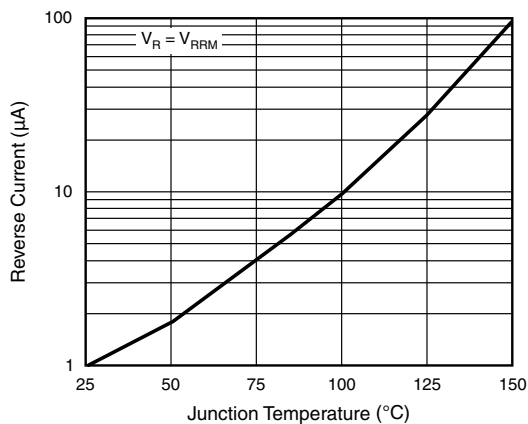


Fig. 3 - Reverse Current vs. Junction Temperature

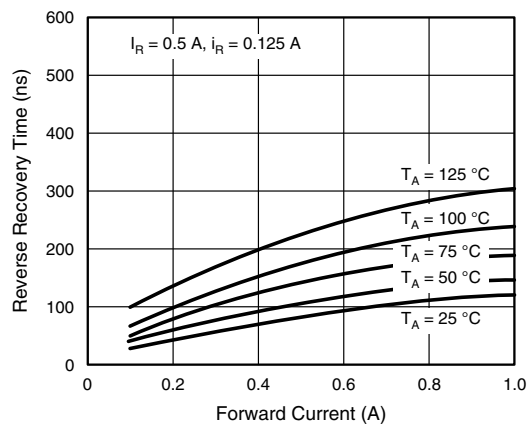


Fig. 6 - Reverse Recovery Time vs. Forward Current

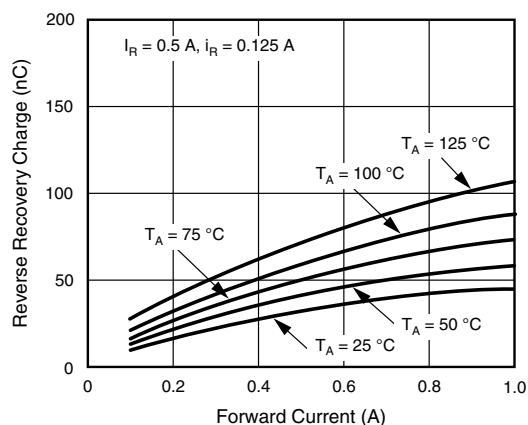


Fig. 7 - Reverse Recovery Charge vs. Forward Current

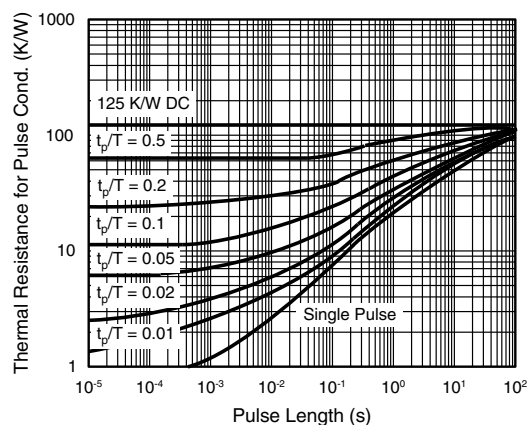
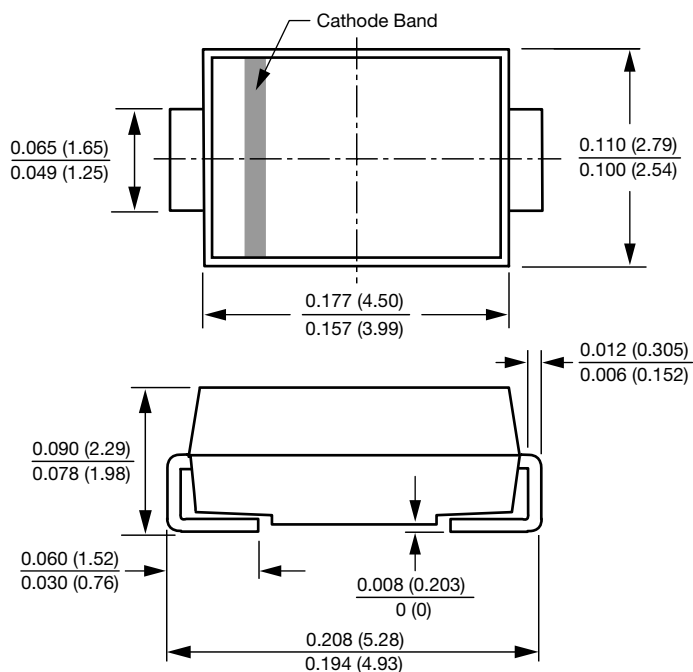
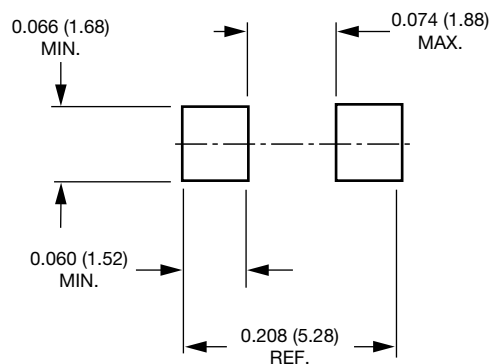


Fig. 8 - Thermal Response

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

**SMA (DO-214AC)**

**Mounting Pad Layout**




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