# Standard Avalanche SMD Rectifier

**SMA (DO-214AC)**

Cathode ○—|◀|—○ Anode

## DESIGN SUPPORT TOOLS AVAILABLE

3D Models

| 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 µA |
| $V_F$ | 1.15 V |
| $E_R$ | 20 mJ |
| $T_J$ max. | 150 °C |
| Package | SMA (DO-214AC) |
| Circuit configuration | Single |

## FEATURES

AUTOMOTIVE GRADE Available

RoHS COMPLIANT HALOGEN FREE

- 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

## 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 °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) $I_{(BR)R}$ = 1 A, $T_J$ = 25 °C (for BYG10D thru BYG10M) $I_{(BR)R}$ = 0.4 A, $T_J$ = 25 °C (for BYG10Y) | $E_R$ | 20 | | | | | | mJ |
| Operating junction and storage temperature range | $T_J$, $T_{STG}$ | -55 to +150 | | | | | | °C |

| **ELECTRICAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | | **SYMBOL** | **BYG10D** | **BYG10G** | **BYG10J** | **BYG10K** | **BYG10M** | **BYG10Y** | **UNIT** |
| Maximum instantaneous forward voltage (1) | $I_F$ = 1 A | $T_J$ = 25 °C | $V_F$ | 1.1 | | | | | | V |
| | $I_F$ = 1.5 A | | | 1.15 | | | | | | |
| Maximum DC reverse current | $V_R = V_{RRM}$ | $T_J$ = 25 °C | $I_R$ | 1 | | | | | | µA |
| | | $T_J$ = 100 °C | | 10 | | | | | | |
| Maximum reverse recovery time | $I_F$ = 0.5 A, $I_R$ = 1.0 A, $I_{rr}$ = 0.25 A | | $t_{rr}$ | 4 | | | | | | µs |

**Note**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

| **THERMAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **BYG10D** | **BYG10G** | **BYG10J** | **BYG10K** | **BYG10M** | **BYG10Y** | **UNIT** |
| Typical thermal resistance, junction to lead | $R_{\theta JL}$ | 25 | | | | | | °C/W |
| Typical thermal resistance, junction to ambient | $R_{\theta JA}$ (1) | 150 | | | | | | °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 $mm^2$ 35 µm Cu
(3) Mounted on Al-oxide-ceramic ($Al_2O_3$), 50 $mm^2$ 35 µm 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 (1) | 0.064 | H | 1800 | 7" diameter plastic tape and reel |
| BYG10MHE3_A/I (1) | 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 (1) | 0.064 | H | 1800 | 7" diameter plastic tape and reel |
| BYG10MHM3_A/I (1) | 0.064 | I | 7500 | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES ($T_A$ = 25 °C unless otherwise noted)

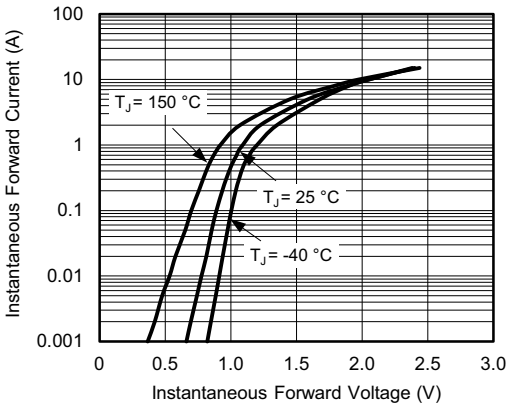



Fig. 1 - Forward Current vs. Forward Voltage

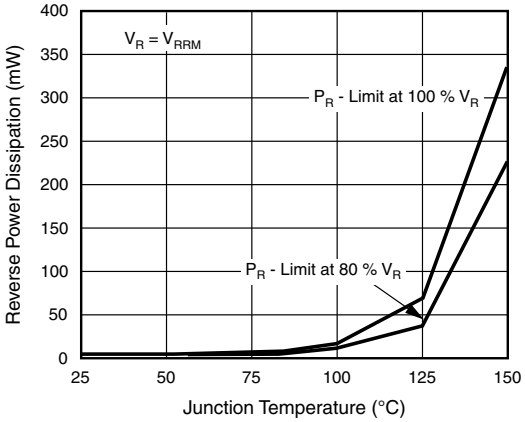



Fig. 4 - Max. Reverse Power Dissipation vs. Junction Temperature

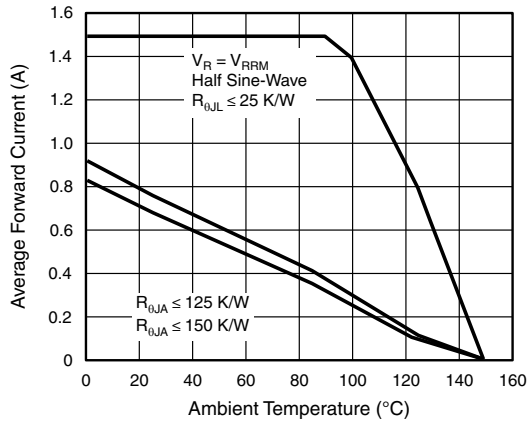



Fig. 2 - Max. Average Forward Current vs. Ambient Temperature

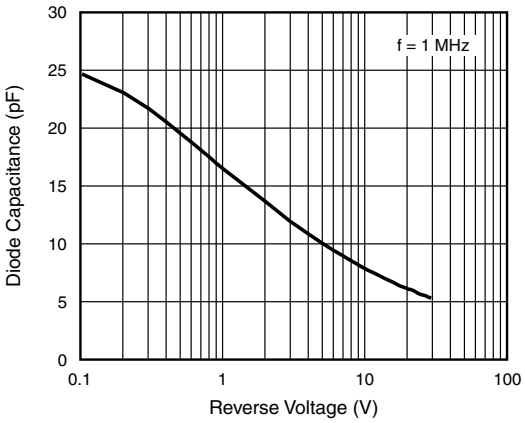



Fig. 5 - Diode Capacitance vs. Reverse Voltage

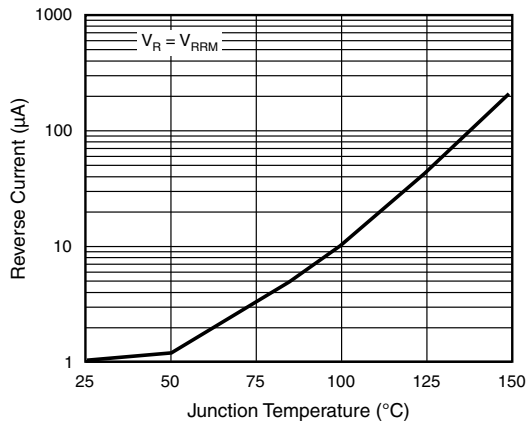



Fig. 3 - Reverse Current vs. Junction Temperature

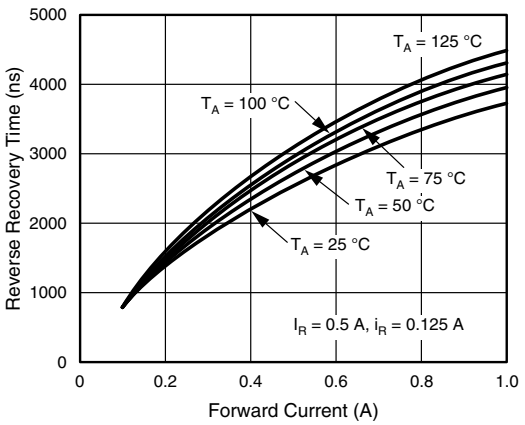



Fig. 6 - Reverse Recovery Time vs. Forward Current

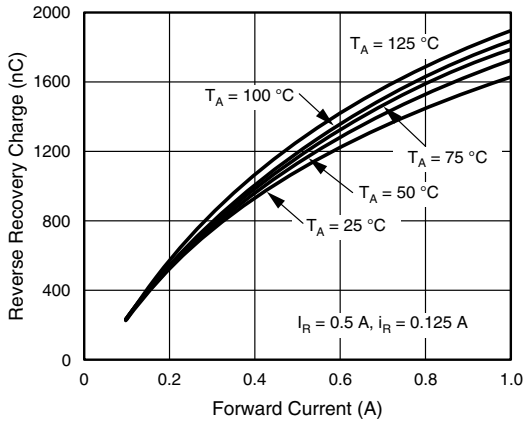
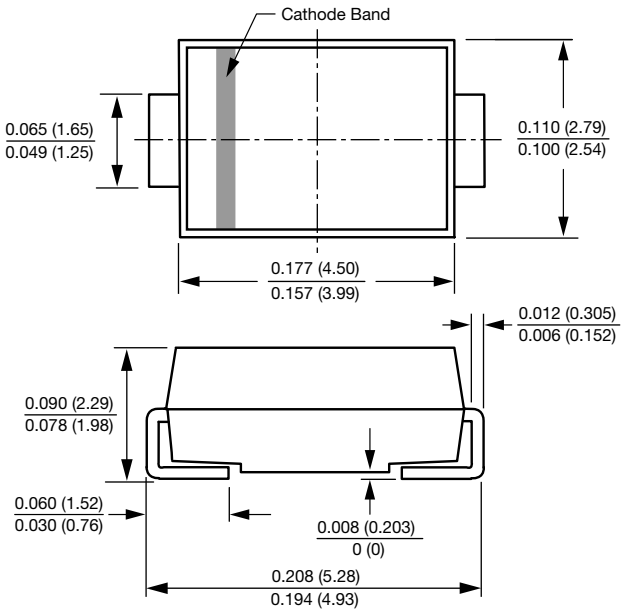


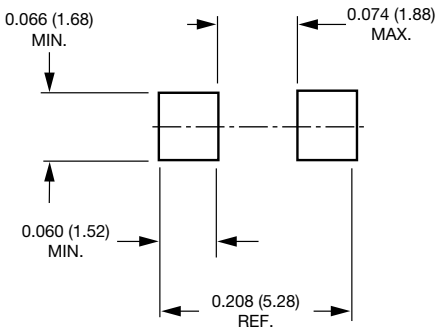

Fig. 7 - Reverse Recovery Charge vs. Forward Current

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

**SMA (DO-214AC)**




**Mounting Pad Layout**



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