



## 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
- 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)



## 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

## 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

MAXIMUM RATINGS ( $T_A = 25$  °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) $I_{(BR)R} = 1$ 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	BYG22A	BYG22B	BYG22D	UNIT
Maximum instantaneous forward voltage	I <sub>F</sub> = 1.0 A	T <sub>J</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	1.0			V
	I <sub>F</sub> = 2.0 A			1.1			
Maximum 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>	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 <sub>L</sub> = const.	R <sub>θJL</sub>	25			°C/W
Maximum 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
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 ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

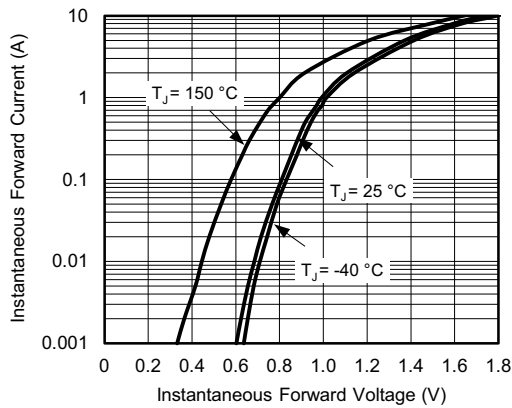


Fig. 1 - Forward Current vs. Forward Voltage

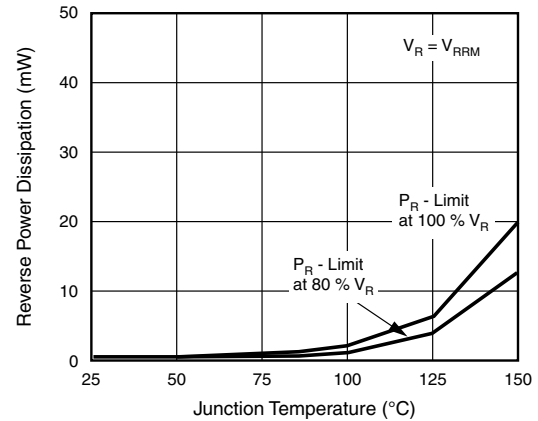


Fig. 4 - Max. Reverse Power Dissipation vs. Junction Temperature

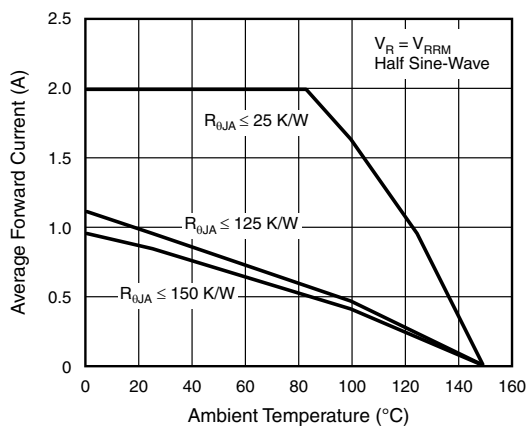


Fig. 2 - Max. Average Forward Current vs. Ambient Temperature

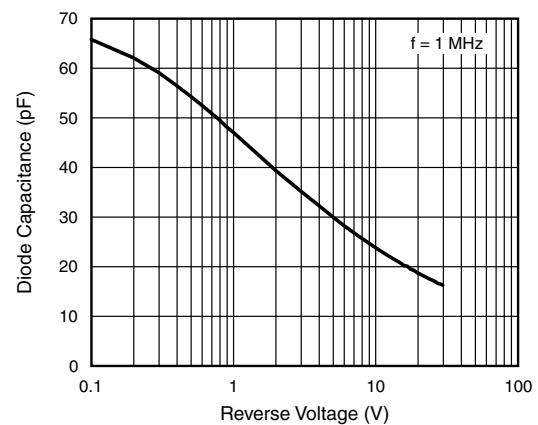


Fig. 5 - Diode Capacitance vs. Reverse Voltage

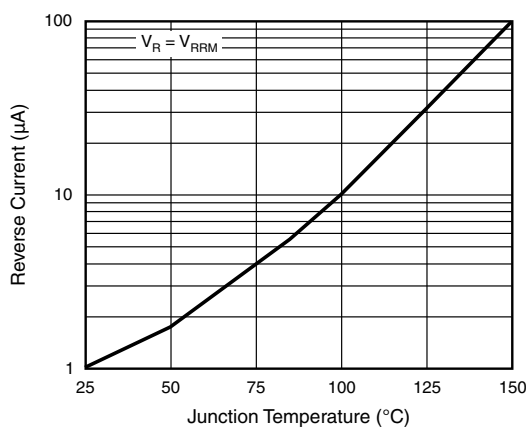


Fig. 3 - Reverse Current vs. Junction Temperature

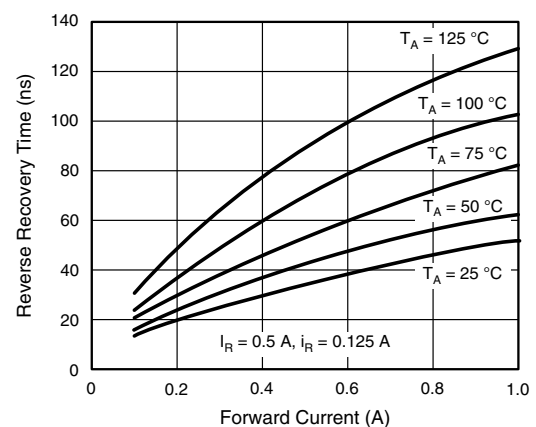


Fig. 6 - Max. Reverse Recovery Time vs. Forward Current

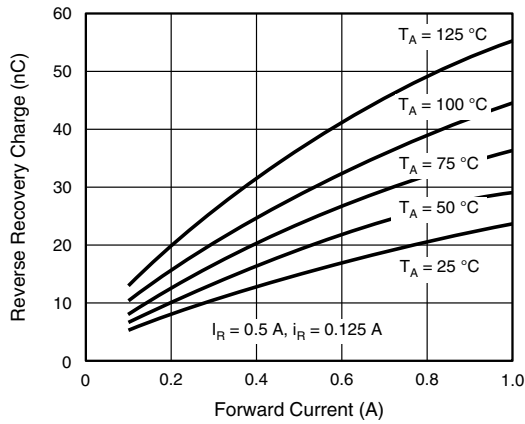


Fig. 7 - Max. Reverse Recovery Charge vs. Forward Current

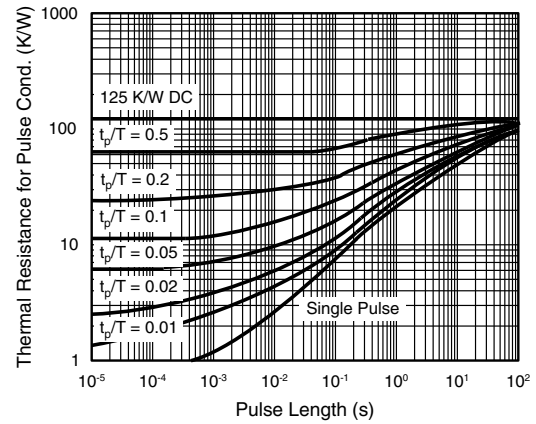
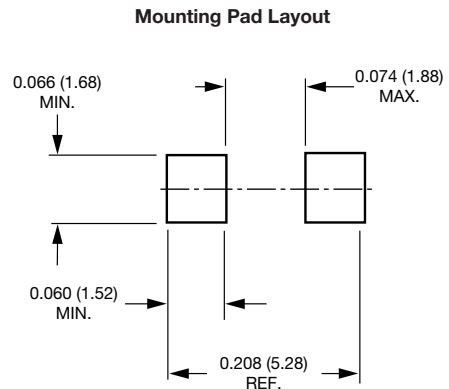
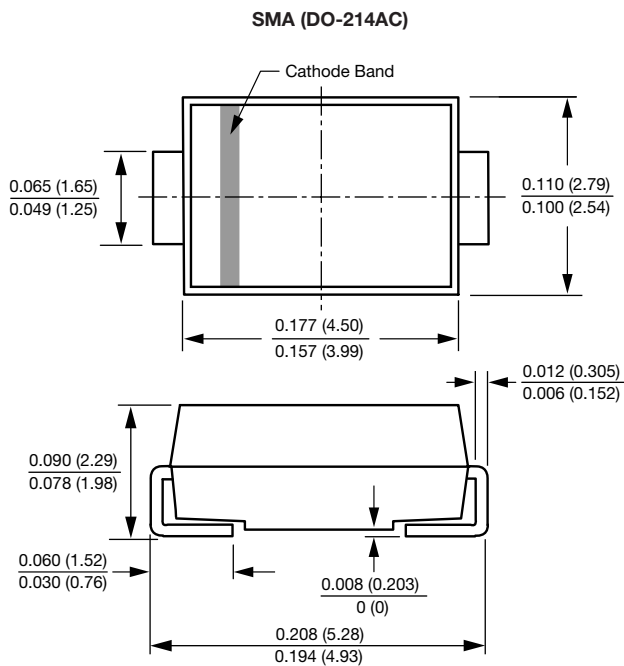


Fig. 8 - Thermal Response

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




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