

# 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) $I_{(BR)R} = 1$ 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** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

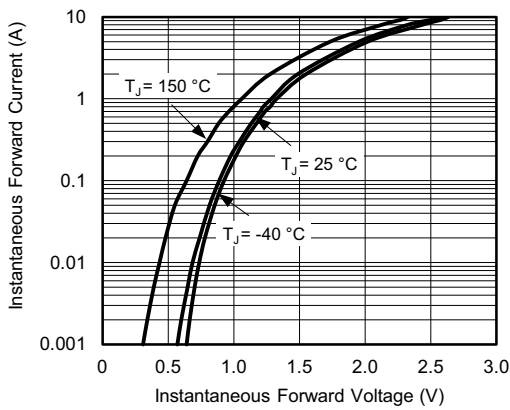


Fig. 1 - Forward Current vs. Forward Voltage

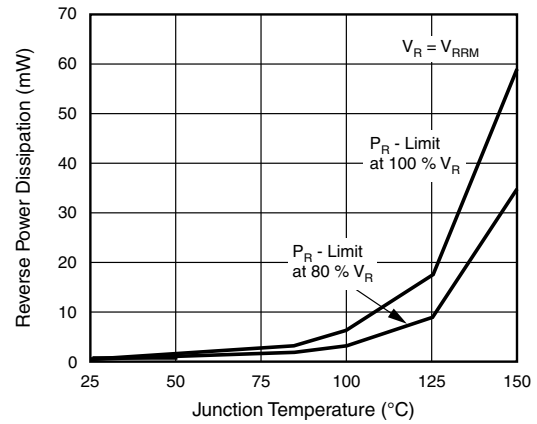


Fig. 4 - Max. Reverse Power Dissipation vs. Junction Temperature

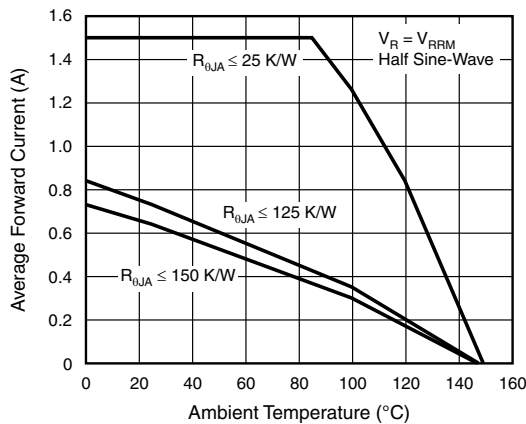


Fig. 2 - Max. Average Forward Current vs. Ambient Temperature

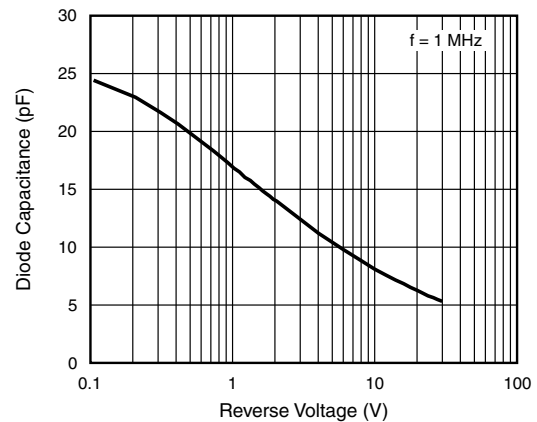


Fig. 5 - Diode Capacitance vs. Reverse Voltage

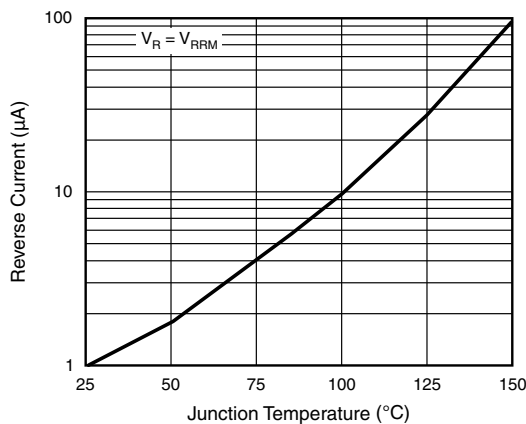


Fig. 3 - Reverse Current vs. Junction Temperature

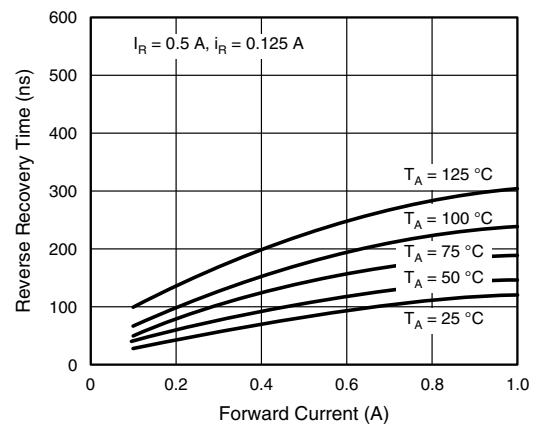


Fig. 6 - Reverse Recovery Time vs. Forward Current

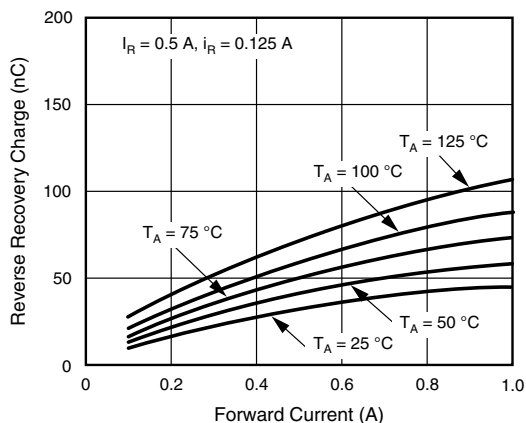


Fig. 7 - Reverse Recovery Charge vs. Forward Current

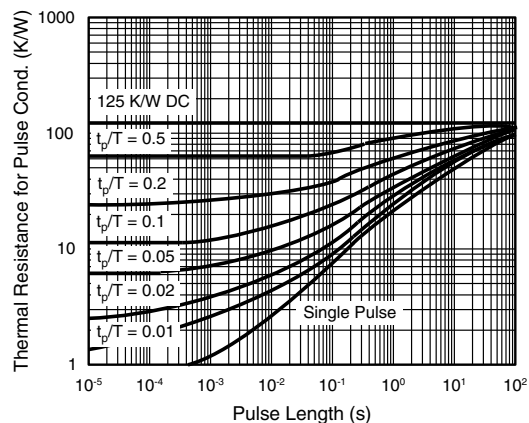
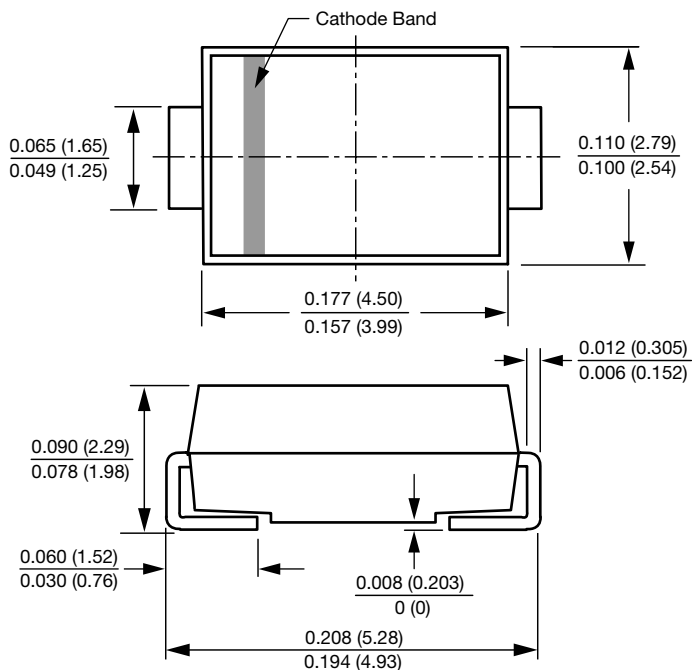
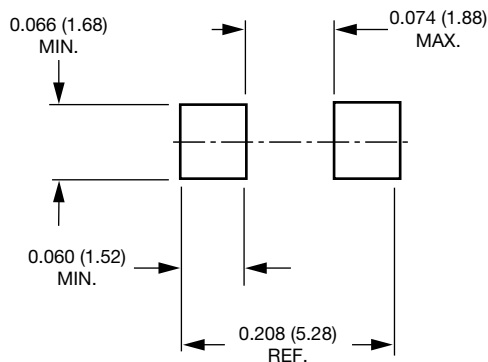


Fig. 8 - Thermal Response

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

**SMA (DO-214AC)**

**Mounting Pad Layout**




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