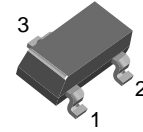




# Small Signal Diode

## BAS31



SOT-23  
CASE 318BM

**ABSOLUTE MAXIMUM RATINGS** ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)  
(Note 1, 2)

Symbol	Parameter	Ratings	Unit	
$V_{RRM}$	Maximum Repetitive Reverse Voltage	120	V	
$I_{F(AV)}$	Average Rectified Forward Current	200	mA	
$I_{FSM}$	Non-Repetitive Peak Forward Surge Current	Pulse Width = 1.0 second	1.0	A
		Pulse Width = 1.0 microsecond	2.0	
$T_{STG}$	Storage Temperature Range	-55 to +150	$^\circ\text{C}$	
$T_J$	Operating Junction Temperature	150	$^\circ\text{C}$	

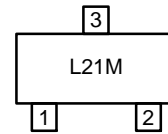
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady-state limits. onsemi should be consulted on applications involving pulsed or low-duty-cycle operations.

**THERMAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)

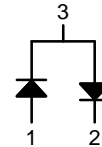
Symbol	Parameter	Ratings	Unit
$P_D$	Power Dissipation	350	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	357	

### MARKING DIAGRAM



L21 = Specific Device Code  
M = Date Code

### CONNECTION DIAGRAM



### ORDERING INFORMATION

Device	Package	Reel	Shipping†
BAS31	SOT-23 3L (Pb-Free, Halide Free)	7"	3000 / Tape & Reel
BAS31-D87Z		13"	10000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

**ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Max	Unit
$V_R$	Breakdown Voltage	$I_R = 1.0 \text{ mA}$	120	-	V
$V_F$	Forward Voltage	$I_F = 10 \text{ mA}$	-	750	mV
		$I_F = 50 \text{ mA}$	-	840	mV
		$I_F = 100 \text{ mA}$	-	900	mV
		$I_F = 200 \text{ mA}$	-	1.00	V
		$I_F = 400 \text{ mA}$	-	1.25	V
$I_R$	Reverse Current	$V_R = 90 \text{ V}$	-	100	nA
		$V_R = 90 \text{ V}, T_A = 150^\circ\text{C}$	-	100	$\mu\text{A}$
$C_T$	Total Capacitance	$V_R = 0 \text{ V}, f = 1.0 \text{ MHz}$	-	35	pF
$t_{rr}$	Reverse Recovery Time	$I_F = I_R = 30 \text{ mA}, I_{RR} = 3.0 \text{ mA}, R_L = 100 \Omega$	-	50	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL PERFORMANCE CHARACTERISTICS

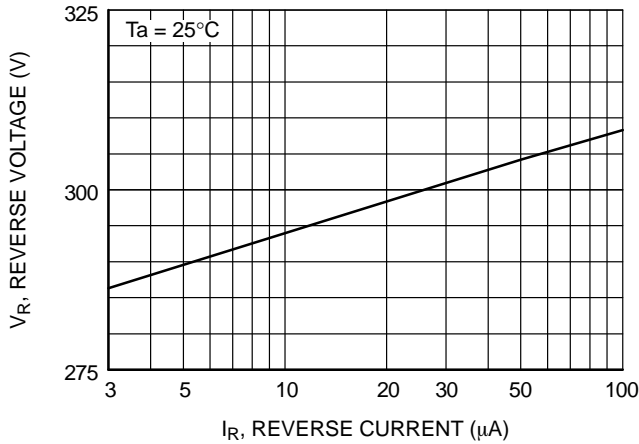
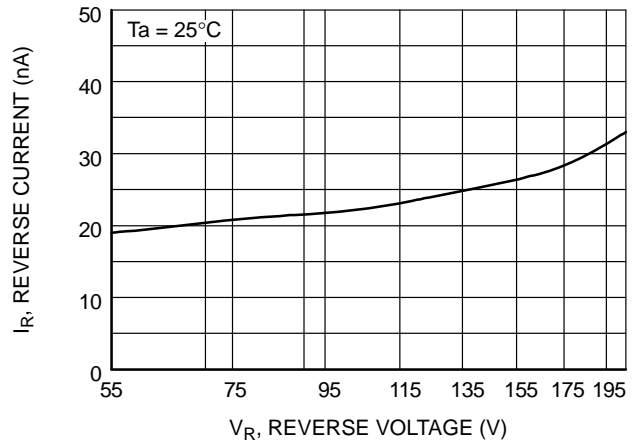
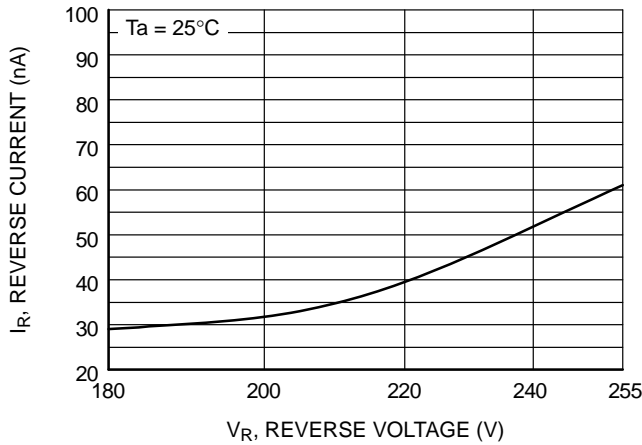


Figure 1. Reverse Voltage vs. Reverse Current BV – 1.0 to 100  $\mu$ A



GENERAL RULE: The Reverse Current of a diode will approximately double for every ten (10) Degree C increase in Temperature

Figure 2. Reverse Current vs. Reverse Voltage  $I_R$  – 55 to 205 V



GENERAL RULE: The Reverse Current of a diode will approximately double for every ten (10) Degree C increase in Temperature

Figure 3. Reverse Current vs. Reverse Voltage  $I_R$  – 180 to 255 V

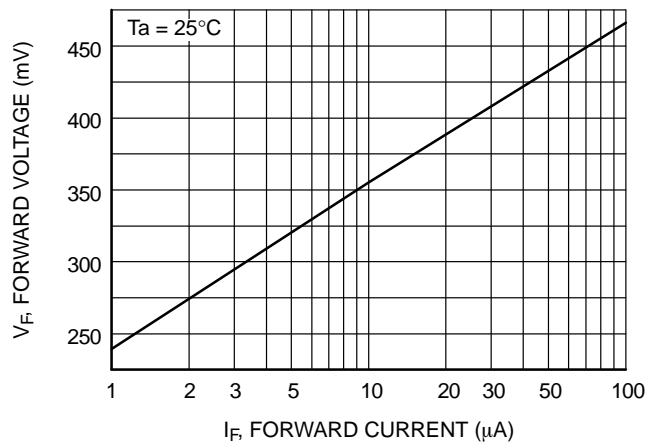


Figure 4. Forward Voltage vs. Forward Current  $V_F$  – 1.0 to 100  $\mu$ A

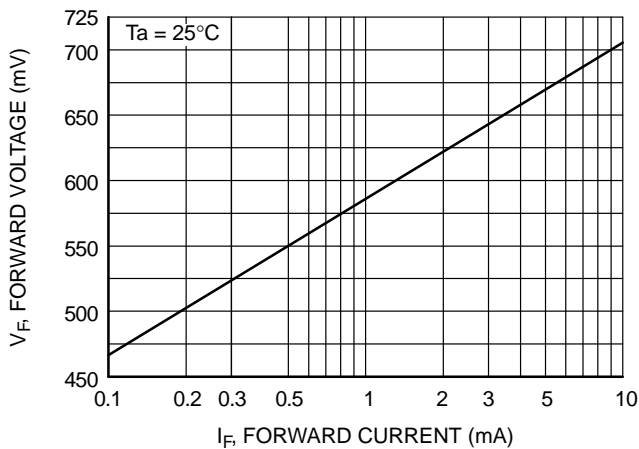


Figure 5. Forward Voltage vs. Forward Current  $V_F$  – 0.1 to 10 mA

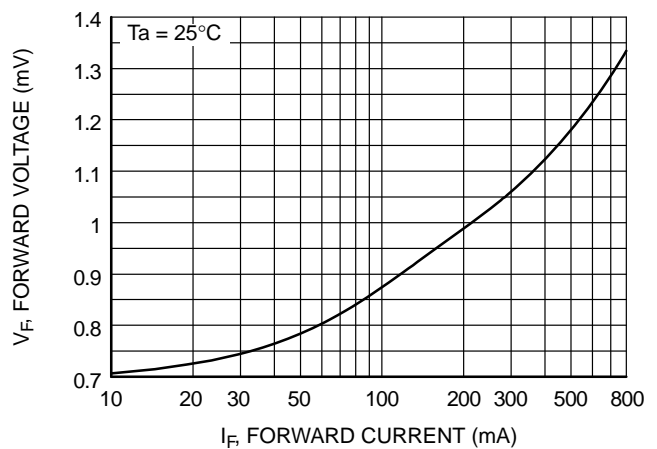
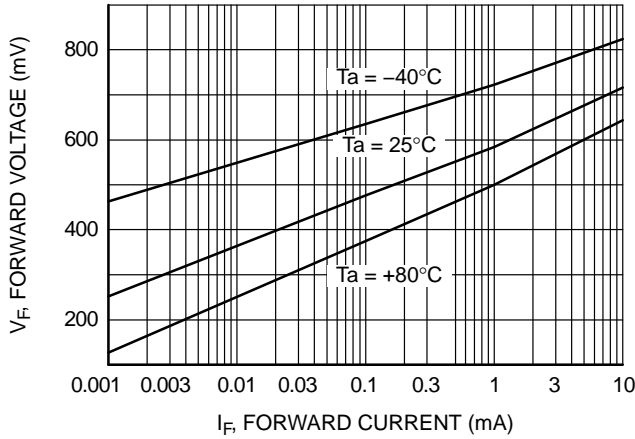


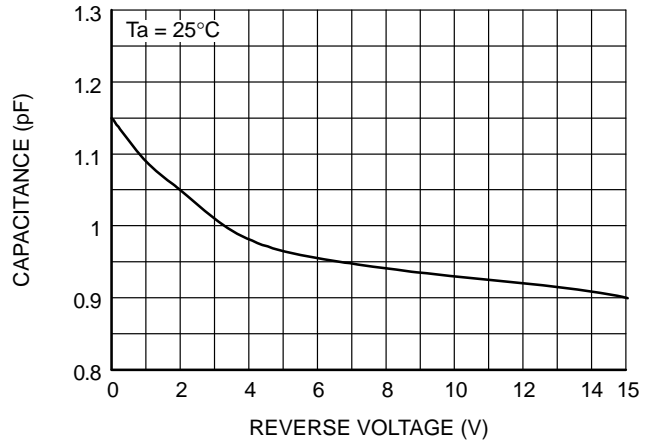
Figure 6. Forward Voltage vs. Forward Current  $V_F$  – 10 to 800 mA

# BAS31

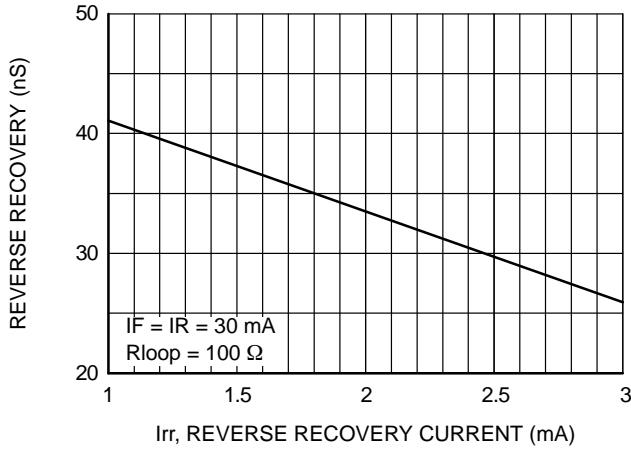
## TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)



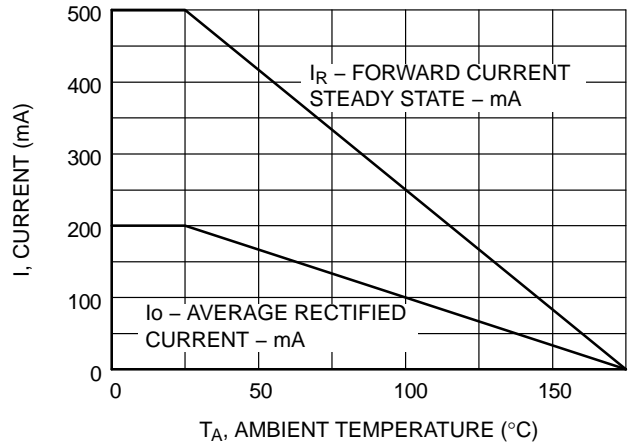
**Figure 7. Forward Voltage vs. Ambient Temperature**  
 $V_F - 1.0 \mu\text{A} - 10 \text{ mA} (-40 \text{ to } +80^\circ\text{C})$



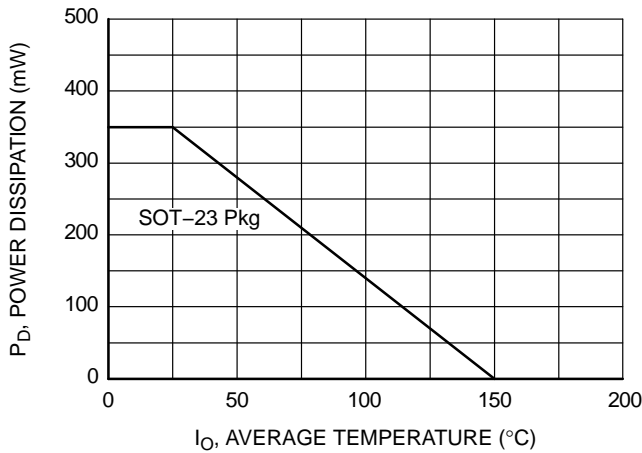
**Figure 8. Capacitance vs. Reverse Voltage**



**Figure 9. Reverse Recovery Time vs. Reverse Recovery Current ( $I_{rr}$ )**

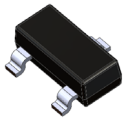


**Figure 10. Average Rectified Current ( $I_O$ ) and Forward Current ( $I_F$ ) vs. Ambient Temperature ( $T_A$ )**



**Figure 11. Power Derating Curve**

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

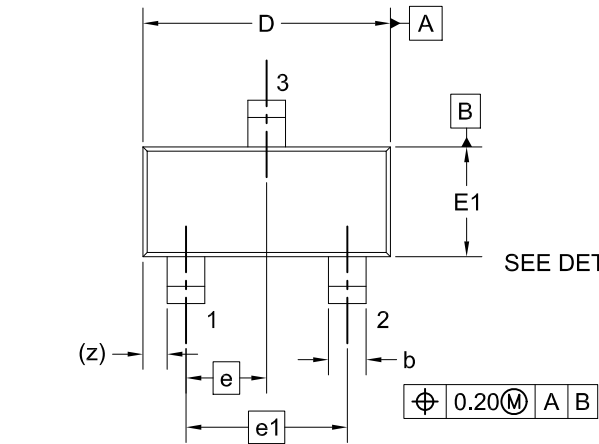


**SOT-23**  
**CASE 318BM**  
**ISSUE A**

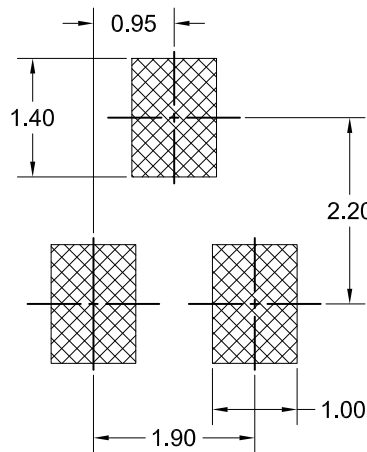
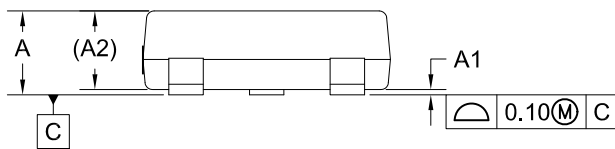
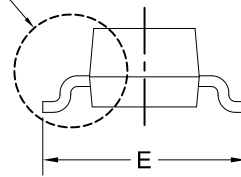
DATE 01 SEP 2021

NOTES: UNLESS OTHERWISE SPECIFIED

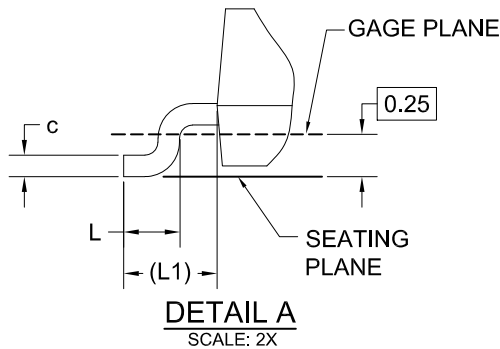
- A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 2009.



SEE DETAIL A



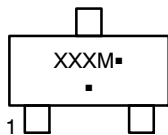
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	---	---	1.20
A1	0.00	0.05	0.10
A2	0.93 REF		
b	0.37	0.44	0.60
c	0.08	0.15	0.23
D	2.72	2.92	3.12
E	2.10	2.40	2.70
E1	1.15	1.30	1.50
e	0.95 BSC		
e1	1.90 BSC		
L	0.20	---	---
L1	0.55 REF		
z	0.29 REF		



LAND PATTERN  
RECOMMENDATION

\*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

### GENERIC MARKING DIAGRAM\*



- XXX = Specific Device Code
- M = Date Code
- = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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