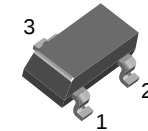


# Small Signal Diode

## 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              |
|             |                                           | Pulse Width = 1.0 microsecond | 2.0              |
| $T_{STG}$   | Storage Temperature Range                 | -55 to +150                   | $^\circ\text{C}$ |
| $T_J$       | Operating Junction Temperature            | 150                           | $^\circ\text{C}$ |

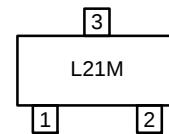
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

- These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
- 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)

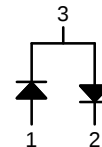
| Symbol          | Parameter                               | Ratings | Unit                      |
|-----------------|-----------------------------------------|---------|---------------------------|
| $P_D$           | Power Dissipation                       | 350     | $^\circ\text{C}/\text{W}$ |
|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

### MARKING DIAGRAM



L21 = Specific Device Code  
M = Date Code

### CONNECTION DIAGRAM



### ORDERING INFORMATION

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

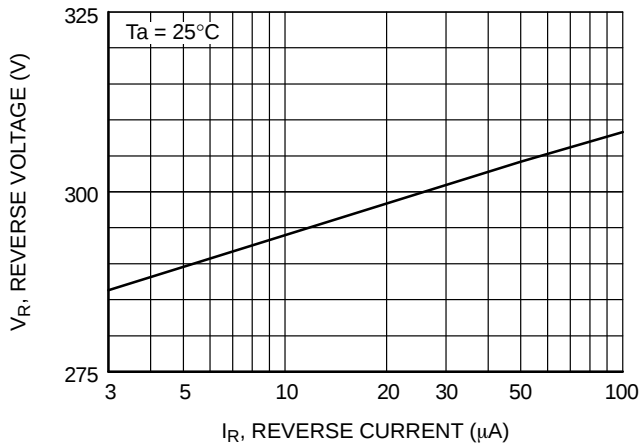
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

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

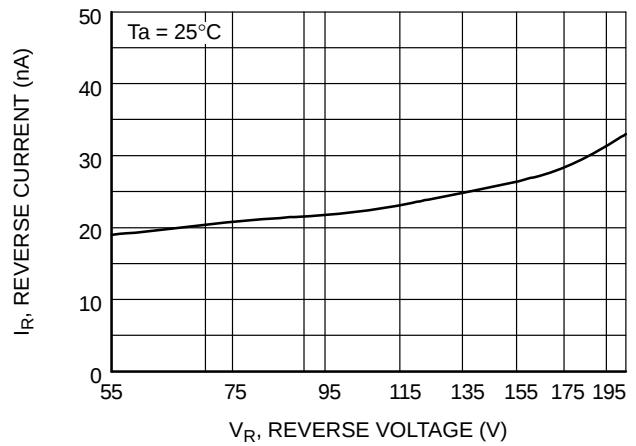
| Symbol   | Parameter             | Conditions                                                             | Min | Max  | Unit          |
|----------|-----------------------|------------------------------------------------------------------------|-----|------|---------------|
| $V_R$    | Breakdown 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

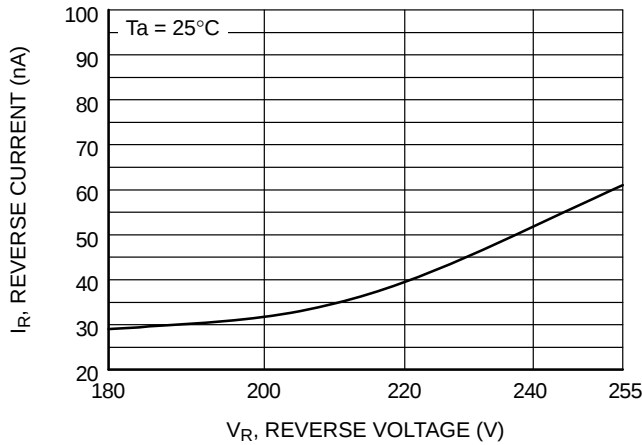


**Figure 1. Reverse Voltage vs. Reverse Current  $BV$  – 1.0 to 100  $\mu\text{A}$**



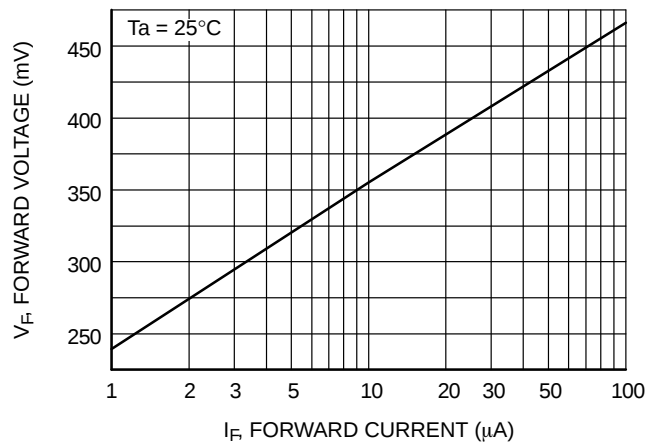
GENERAL RULE: The Reverse Current of a diode will approximately double for every ten (10) Degree C increase in Temperature

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

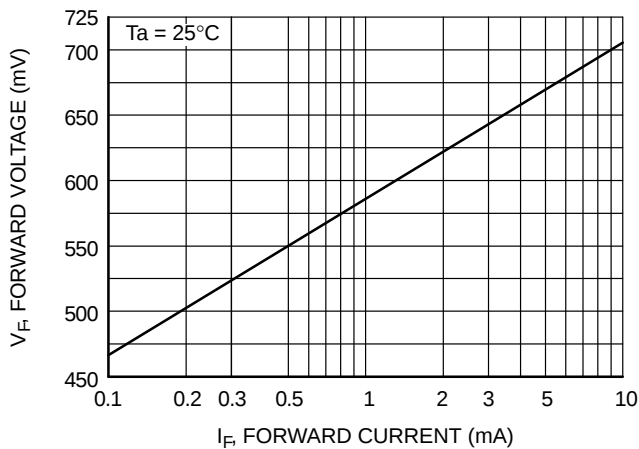


GENERAL RULE: The Reverse Current of a diode will approximately double for every ten (10) Degree C increase in Temperature

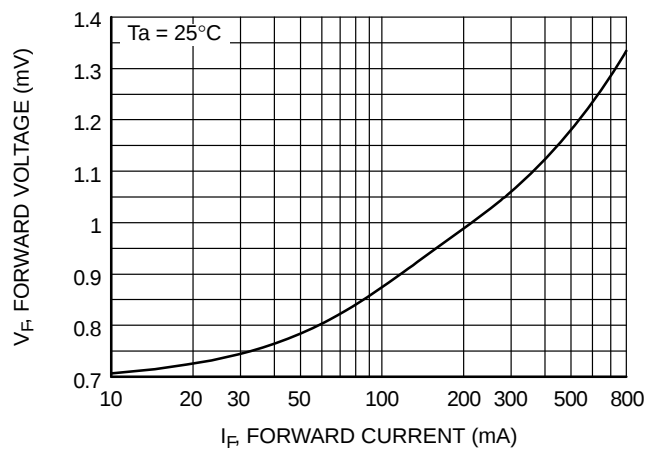
**Figure 3. Reverse Current vs. Reverse Voltage  $I_R$  – 180 to 255 V**



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



**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**

TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)

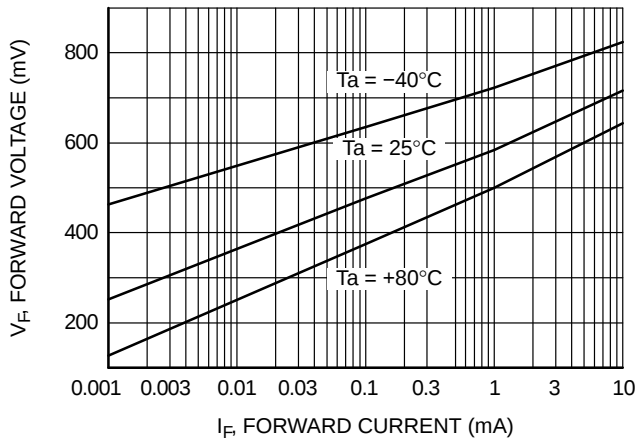


Figure 7. Forward Voltage vs. Ambient Temperature  
 $V_F - 1.0 \mu\text{A} - 10 \text{ mA} (-40 \text{ to } +80^\circ\text{C})$

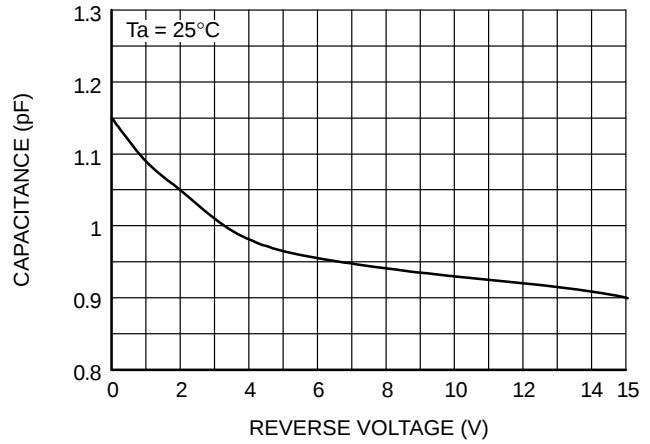


Figure 8. Capacitance vs. Reverse Voltage

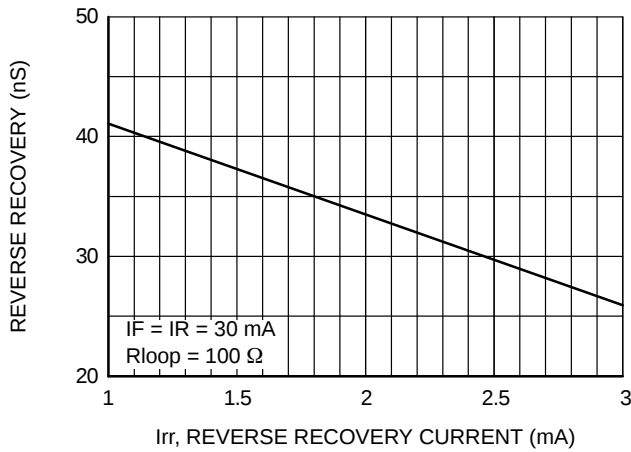


Figure 9. Reverse Recovery Time vs. Reverse Recovery Current ( $I_{rr}$ )

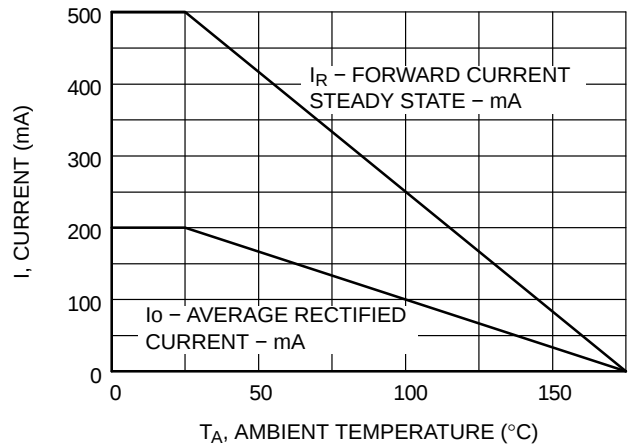


Figure 10. Average Rectified Current ( $I_O$ ) and Forward Current ( $I_F$ ) vs. Ambient Temperature ( $T_A$ )

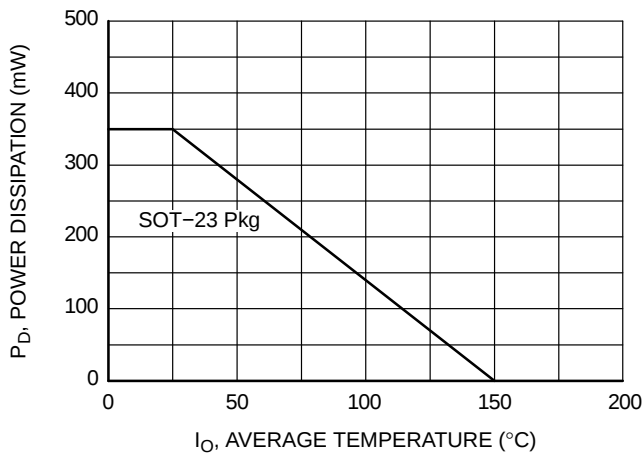
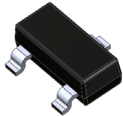
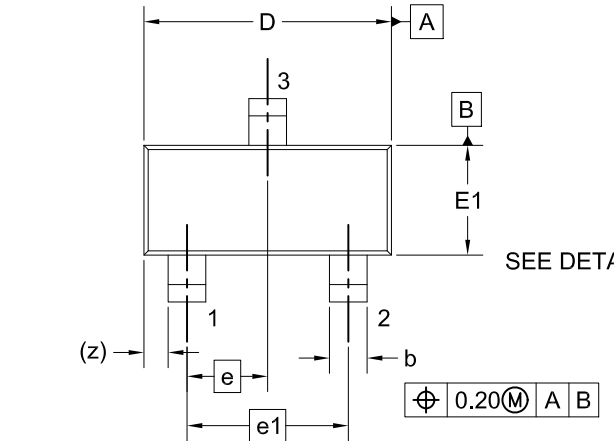


Figure 11. Power Derating Curve


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

DATE 01 SEP 2021

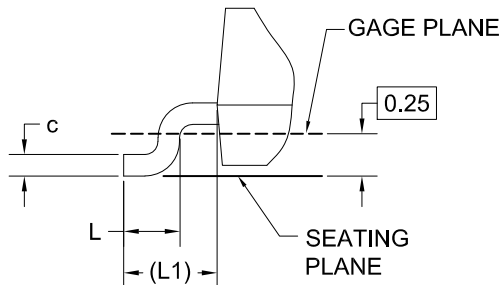
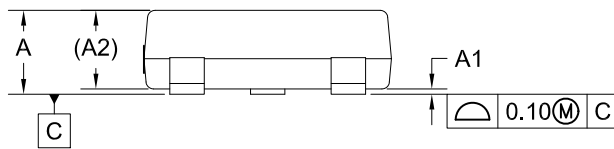
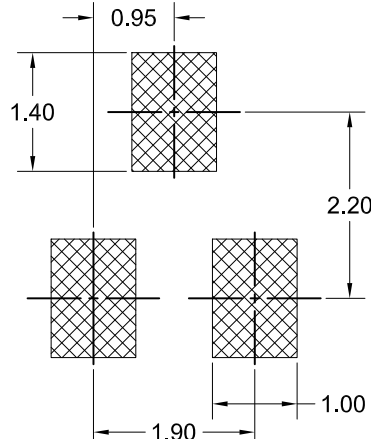
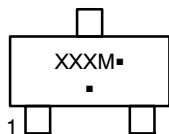


SEE DETAIL A

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.

| 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    |      |      |


**DETAIL A**  
SCALE: 2X

**LAND PATTERN**  
**RECOMMENDATION**
**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.

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

|                         |                    |                                                                                                                                                                                  |
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