

# High Voltage Switching Diode

## BAS21H

### Features

- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### MAXIMUM RATINGS

| Rating                                                                                     | Symbol           | Value | Unit |
|--------------------------------------------------------------------------------------------|------------------|-------|------|
| Continuous Reverse Voltage                                                                 | $V_R$            | 250   | V    |
| Repetitive Peak Reverse Voltage                                                            | $V_{RRM}$        | 250   | V    |
| Peak Forward Current                                                                       | $I_F$            | 200   | mA   |
| Repetitive Peak Forward Current                                                            | $I_{FRM}$        | 500   | mA   |
| Non-Repetitive Peak Forward Surge Current, 60 Hz                                           | $I_{FSM(surge)}$ | 2.5   | A    |
| Non-Repetitive Peak Forward Current (Square Wave, $T_J = 25^\circ\text{C}$ prior to surge) | $I_{FSM}$        |       | A    |
| $t = 1 \mu\text{s}$                                                                        |                  | 20    |      |
| $t = 10 \mu\text{s}$                                                                       |                  | 20    |      |
| $t = 100 \mu\text{s}$                                                                      |                  | 10    |      |
| $t = 1 \text{ ms}$                                                                         |                  | 4     |      |
| $t = 1 \text{ s}$                                                                          |                  | 1     |      |

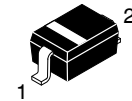
### THERMAL CHARACTERISTICS

| Characteristic                                                         | Symbol          | Max         | Unit                      |
|------------------------------------------------------------------------|-----------------|-------------|---------------------------|
| Total Device Dissipation FR-5 Board, (Note 1) $T_A = 25^\circ\text{C}$ | $P_D$           | 200         | mW                        |
| Derate above $25^\circ\text{C}$                                        |                 | 1.57        | mW/ $^\circ\text{C}$      |
| Thermal Resistance, Junction-to-Ambient                                | $R_{\theta JA}$ | 635         | $^\circ\text{C}/\text{W}$ |
| Junction-to-Lead                                                       | $R_{\theta JL}$ | 240         |                           |
| Junction-to-Top                                                        | $R_{\theta JT}$ | 436         |                           |
| Junction and Storage Temperature Range                                 | $T_J, T_{stg}$  | -55 to +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. FR-5 Minimum Pad

## HIGH VOLTAGE SWITCHING DIODE



SOD-323  
CASE 477  
STYLE 1

### MARKING DIAGRAM



JS = Device Code  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation may vary depending upon manufacturing location.

### ORDERING INFORMATION

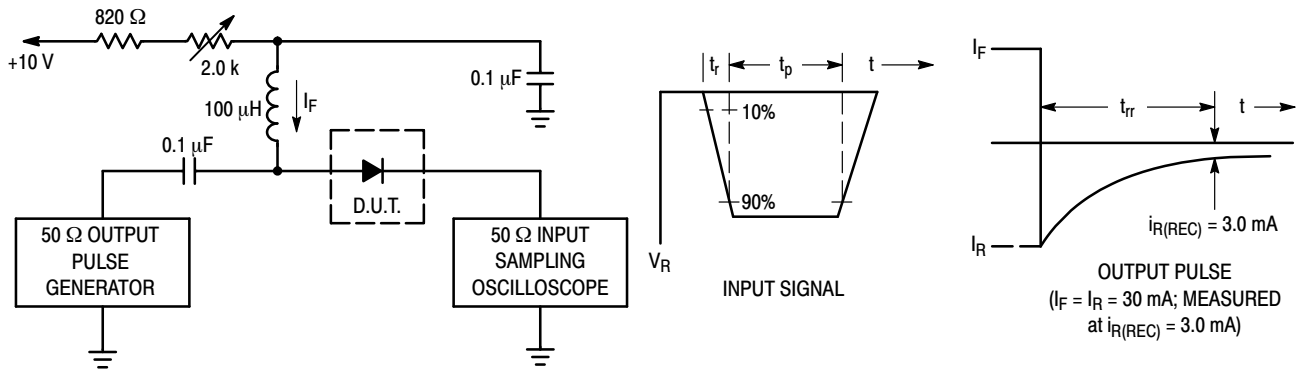
| Device                     | Package              | Shipping <sup>†</sup> |
|----------------------------|----------------------|-----------------------|
| BAS21HT1G,<br>NSVBAS21HT1G | SOD-323<br>(Pb-Free) | 3000 / Tape & Reel    |
| BAS21HT3G,<br>NSVBAS21HT3G | SOD-323<br>(Pb-Free) | 10000 / Tape & 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** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Characteristic                                                                                                          | Symbol     | Min | Max          | Unit                         |
|-------------------------------------------------------------------------------------------------------------------------|------------|-----|--------------|------------------------------|
| <b>OFF CHARACTERISTICS</b>                                                                                              |            |     |              |                              |
| Reverse Voltage Leakage Current<br>( $V_R = 200\text{ Vdc}$ )<br>( $V_R = 200\text{ Vdc}$ , $T_J = 150^\circ\text{C}$ ) | $I_R$      | –   | 0.1<br>100   | $\mu\text{A}$<br>$\text{dc}$ |
| Reverse Breakdown Voltage<br>( $I_{BR} = 100\text{ }\mu\text{A}$ )                                                      | $V_{(BR)}$ | 250 | –            | Vdc                          |
| Forward Voltage<br>( $I_F = 100\text{ mA}$ )<br>( $I_F = 200\text{ mA}$ )                                               | $V_F$      | –   | 1000<br>1250 | mV                           |
| Diode Capacitance<br>( $V_R = 0$ , $f = 1.0\text{ MHz}$ )                                                               | $C_D$      | –   | 5.0          | pF                           |
| Reverse Recovery Time<br>( $I_F = I_R = 30\text{ mA}$ , $R_L = 100\text{ }\Omega$ )                                     | $t_{rr}$   | –   | 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.



- Notes: 1. A 2.0 k $\Omega$  variable resistor adjusted for a Forward Current ( $I_F$ ) of 30 mA.  
2. Input pulse is adjusted so  $I_{R(\text{peak})}$  is equal to 30 mA.  
3.  $t_p \gg t_{rr}$

**Figure 1. Recovery Time Equivalent Test Circuit**

TYPICAL CHARACTERISTICS

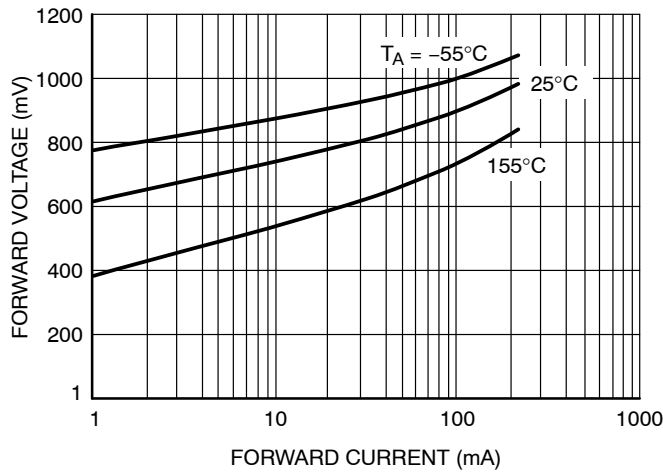


Figure 2. Forward Voltage

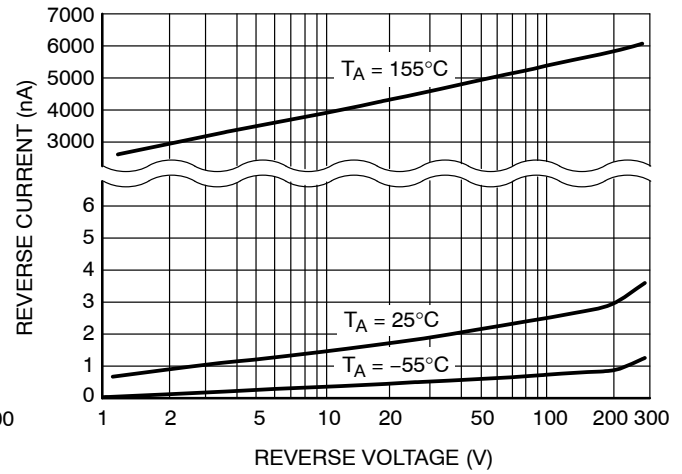


Figure 3. Reverse Leakage

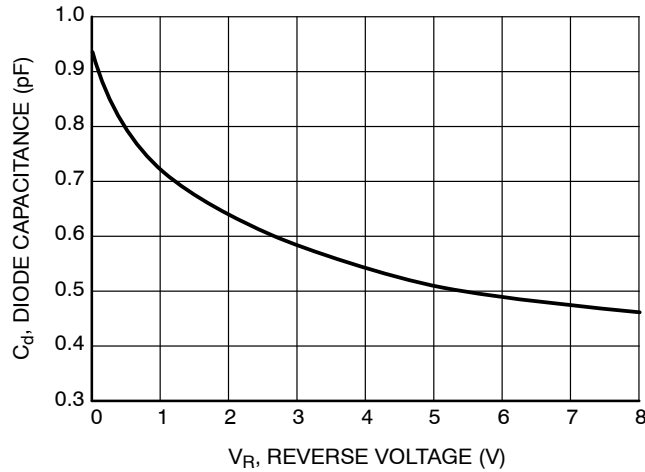


Figure 4. Diode Capacitance

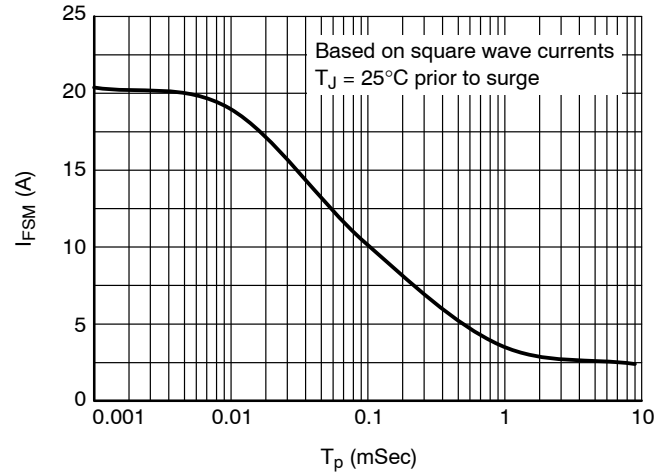


Figure 5. Maximum Non-repetitive Peak Forward Current as a Function of Pulse Duration, Typical Values

# MECHANICAL CASE OUTLINE

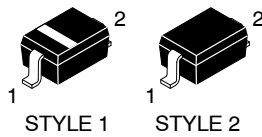
## PACKAGE DIMENSIONS

ON Semiconductor®

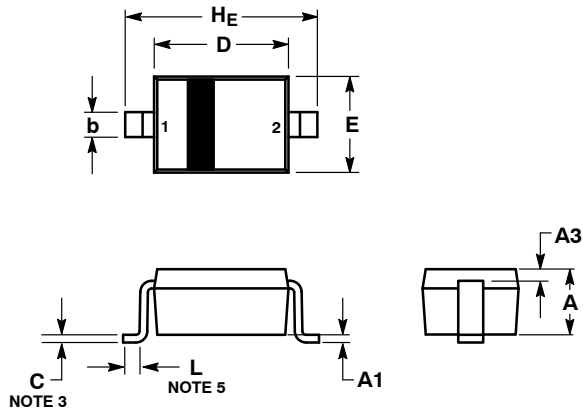
ON

SOD-323  
CASE 477-02  
ISSUE H

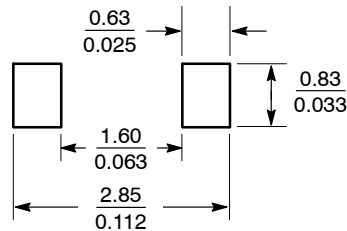
DATE 13 MAR 2007



SCALE 4:1



### SOLDERING FOOTPRINT\*



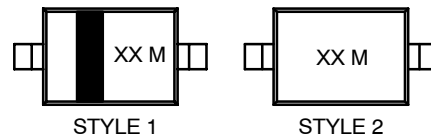
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. LEAD THICKNESS SPECIFIED PER L/F DRAWING WITH SOLDER PLATING.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DIMENSION L IS MEASURED FROM END OF RADIUS.

| DIM | MILLIMETERS |      |       | INCHES    |       |       |
|-----|-------------|------|-------|-----------|-------|-------|
|     | MIN         | NOM  | MAX   | MIN       | NOM   | MAX   |
| A   | 0.80        | 0.90 | 1.00  | 0.031     | 0.035 | 0.040 |
| A1  | 0.00        | 0.05 | 0.10  | 0.000     | 0.002 | 0.004 |
| A3  | 0.15 REF    |      |       | 0.006 REF |       |       |
| b   | 0.25        | 0.32 | 0.4   | 0.010     | 0.012 | 0.016 |
| C   | 0.089       | 0.12 | 0.177 | 0.003     | 0.005 | 0.007 |
| D   | 1.60        | 1.70 | 1.80  | 0.062     | 0.066 | 0.070 |
| E   | 1.15        | 1.25 | 1.35  | 0.045     | 0.049 | 0.053 |
| L   | 0.08        |      |       | 0.003     |       |       |
| HE  | 2.30        | 2.50 | 2.70  | 0.090     | 0.098 | 0.105 |

### GENERIC MARKING DIAGRAM\*



XX = Specific Device Code  
M = Date Code

\*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.

STYLE 1:  
PIN 1. CATHODE (POLARITY BAND)  
2. ANODE

STYLE 2:  
NO POLARITY

|                  |             |                                                                                                                                                                                  |
|------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | SOD-323     | PAGE 1 OF 1                                                                                                                                                                      |

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