

BAS19L, NSVBAS19L, BAS20L, SBAS20L, BAS21L, SBAS21L, BAS21DW5, SBAS21DW5

High Voltage Switching Diode

Features

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

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--------------------------------------------------------------------------------------|-----------------|----------------------|--------|
| Continuous Reverse Voltage BAS19, NSVBAS19 BAS20, SBAS20 BAS21, SBAS21 | V_R | 120 200 250 | Vdc |
| Repetitive Peak Reverse Voltage BAS19, NSVBAS19 BAS20, SBAS20 BAS21, SBAS21 | V_{RRM} | 120 200 250 | Vdc |
| Continuous Forward Current | I_F | 200 | mAdc |
| Peak Forward Surge Current | $I_{FM(surge)}$ | 625 | mAdc |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | °C |
| Power Dissipation (Note 1) | P_D | 385 | mW |
| Electrostatic Discharge | ESD | HM < 500 MM < 400 | V V |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Mounted on FR-5 Board = 1.0 x 0.75 x 0.062 in.



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HIGH VOLTAGE SWITCHING DIODE



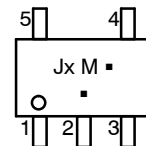
MARKING DIAGRAMS



SOT-23 (TO-236)
CASE 318
STYLE 8



SC-88A (SOT-353)
CASE 419A



- x = P, R, or S
- P = BAS19L, NSVBAS19L
- R = BAS20L, SBAS20L
- S = BAS21L, SBAS21L or BAS21DW5, SBAS21DW5
- M = Date Code
- = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon the manufacturing location.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

**BAS19L, NSVBAS19L, BAS20L, SBAS20L, BAS21L, SBAS21L, BAS21DW5,
SBAS21DW5**

THERMAL CHARACTERISTICS (SOT-23)

| Characteristic | Symbol | Max | Unit |
|-----------------------------------------------------------------------------------------------------------------------|-----------------|-------------|---------------------------|
| Total Device Dissipation FR-5 Board (Note 2) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 225 | mW |
| | | 1.8 | mW/ $^\circ\text{C}$ |
| Thermal Resistance Junction-to-Ambient (SOT-23) | $R_{\theta JA}$ | 556 | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation Alumina Substrate (Note 3) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 300 | mW |
| | | 2.4 | mW/ $^\circ\text{C}$ |
| Thermal Resistance Junction-to-Ambient | $R_{\theta JA}$ | 417 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS (SC-88A)

| Characteristic | Symbol | Max | Unit |
|--------------------------------------------------------------------------------|-----------------|-------------|---------------------------|
| Power Dissipation (Note 4) | P_D | 385 | mW |
| Thermal Resistance - Junction-to-Ambient Derate Above 25°C | $R_{\theta JA}$ | 328 | $^\circ\text{C}/\text{W}$ |
| | | 3.0 | mW/ $^\circ\text{C}$ |
| Maximum Junction Temperature | T_{Jmax} | 150 | $^\circ\text{C}$ |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

2. FR-5 = $1.0 \times 0.75 \times 0.062$ in.
3. Alumina = $0.4 \times 0.3 \times 0.024$ in. 99.5% alumina.
4. Mounted on FR-5 Board = $1.0 \times 0.75 \times 0.062$ in.

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

| Characteristic | Symbol | Min | Max | Unit | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|------|------|-----------------|
| Reverse Voltage Leakage Current ($V_R = 100$ Vdc) ($V_R = 150$ Vdc) ($V_R = 200$ Vdc) ($V_R = 100$ Vdc, $T_J = 150^\circ\text{C}$) ($V_R = 150$ Vdc, $T_J = 150^\circ\text{C}$) ($V_R = 200$ Vdc, $T_J = 150^\circ\text{C}$) | I_R | BAS19, NSVBAS19 | - | 0.1 | $\mu\text{A}dc$ |
| | | BAS20, SBAS20 | - | 0.1 | |
| | | BAS21, SBAS21 | - | 0.1 | |
| | | BAS19 | - | 100 | |
| | | BAS20, SBAS20 | - | 100 | |
| | | BAS21, SBAS21 | - | 100 | |
| Reverse Breakdown Voltage ($I_{BR} = 100$ $\mu\text{A}dc$) ($I_{BR} = 100$ $\mu\text{A}dc$) ($I_{BR} = 100$ $\mu\text{A}dc$) | $V_{(BR)}$ | BAS19, NSVBAS19 | 120 | - | Vdc |
| | | BAS20, SBAS20 | 200 | - | |
| | | BAS21, SBAS21 | 250 | - | |
| Forward Voltage ($I_F = 100$ mA)dc ($I_F = 200$ mA)dc | V_F | - | 1.0 | Vdc | |
| | | - | 1.25 | | |
| Diode Capacitance ($V_R = 0$, $f = 1.0$ MHz) | C_D | - | 5.0 | pF | |
| Reverse Recovery Time ($I_F = I_R = 30$ mA)dc, $I_{R(REC)} = 3.0$ mA)dc, $R_L = 100$) | t_{rr} | - | 50 | ns | |

BAS19L, NSVBAS19L, BAS20L, SBAS20L, BAS21L, SBAS21L, BAS21DW5, SBAS21DW5



- Notes: 1. A 2.0 kΩ 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



Figure 2. V_F vs. I_F



Figure 3. I_R vs. V_R



Figure 4. Capacitance

**BAS19L, NSVBAS19L, BAS20L, SBAS20L, BAS21L, SBAS21L, BAS21DW5,
SBAS21DW5**

ORDERING INFORMATION

| Device | Package | Shipping† |
|---------------|---------------------|---------------------|
| BAS19LT1G | SOT-23 (Pb-Free) | 3000 / Tape & Reel |
| BAS19LT3G | SOT-23 (Pb-Free) | 10000 / Tape & Reel |
| NSVBAS19LT1G* | SOT-23 (Pb-Free) | 3000 / Tape & Reel |
| BAS20LT1G | SOT-23 (Pb-Free) | 3000 / Tape & Reel |
| BAS20LT3G | SOT-23 (Pb-Free) | 10000 / Tape & Reel |
| SBAS20LT1G* | SOT-23 (Pb-Free) | 3000 / Tape & Reel |
| BAS21LT1G | SOT-23 (Pb-Free) | 3000 / Tape & Reel |
| SBAS21LT1G* | SOT-23 (Pb-Free) | 3000 / Tape & Reel |
| BAS21LT3G | SOT-23 (Pb-Free) | 10000 / Tape & Reel |
| SBAS21LT3G* | SOT-23 (Pb-Free) | 10000 / Tape & Reel |
| BAS21DW5T1G | SC-88A (Pb-Free) | 3000 / Tape & Reel |
| SBAS21DW5T1G* | SC-88A (Pb-Free) | 3000 / Tape & Reel |
| SBAS21DW5T3G* | SC-88A (Pb-Free) | 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.

*S and NSV Prefixes for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

BAS19L, NSVBAS19L, BAS20L, SBAS20L, BAS21L, SBAS21L, BAS21DW5, SBAS21DW5

PACKAGE DIMENSIONS

SOT-23 (TO-236)
CASE 318-08
ISSUE AP

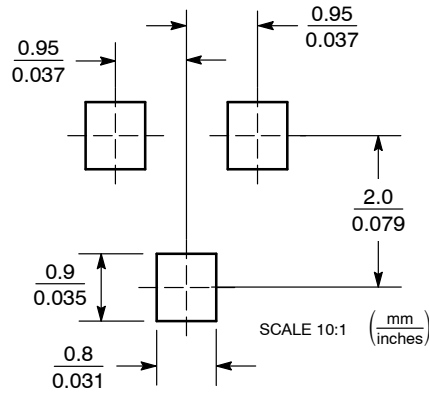


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
 4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| DIM | MILLIMETERS | | | INCHES | | |
|-----|-------------|------|------|--------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.89 | 1.00 | 1.11 | 0.035 | 0.040 | 0.044 |
| A1 | 0.01 | 0.06 | 0.10 | 0.001 | 0.002 | 0.004 |
| b | 0.37 | 0.44 | 0.50 | 0.015 | 0.018 | 0.020 |
| c | 0.09 | 0.13 | 0.18 | 0.003 | 0.005 | 0.007 |
| D | 2.80 | 2.90 | 3.04 | 0.110 | 0.114 | 0.120 |
| E | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 |
| e | 1.78 | 1.90 | 2.04 | 0.070 | 0.075 | 0.081 |
| L | 0.10 | 0.20 | 0.30 | 0.004 | 0.008 | 0.012 |
| L1 | 0.35 | 0.54 | 0.69 | 0.014 | 0.021 | 0.029 |
| HE | 2.10 | 2.40 | 2.64 | 0.083 | 0.094 | 0.104 |
| θ | 0° | --- | 10° | 0° | --- | 10° |

- STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

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.

BAS19L, NSVBAS19L, BAS20L, SBAS20L, BAS21L, SBAS21L, BAS21DW5, SBAS21DW5

PACKAGE DIMENSIONS

SC-88A (SC-70-5/SOT-353)
CASE 419A-02
ISSUE K

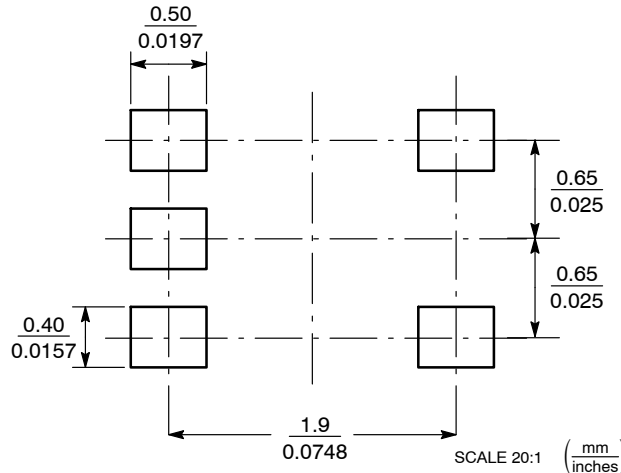


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419A-01 OBSOLETE. NEW STANDARD 419A-02.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.071 | 0.087 | 1.80 | 2.20 |
| B | 0.045 | 0.053 | 1.15 | 1.35 |
| C | 0.031 | 0.043 | 0.80 | 1.10 |
| D | 0.004 | 0.012 | 0.10 | 0.30 |
| G | 0.026 BSC | | 0.65 BSC | |
| H | --- | 0.004 | --- | 0.10 |
| J | 0.004 | 0.010 | 0.10 | 0.25 |
| K | 0.004 | 0.012 | 0.10 | 0.30 |
| N | 0.008 REF | | 0.20 REF | |
| S | 0.079 | 0.087 | 2.00 | 2.20 |

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.

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Как с нами связаться

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