

Low capacitance small signal Schottky diodes

Features

- Low diode capacitance
- Designed for RF applications
- Low profile packages
- Very low parasitic inductor and resistor

Description

The BAS69 series use 15V barrier, with extremely low junction capacitance, suitable for the detection of an RF signal and the compensation of the voltage drift with the temperature. The presented packages make the device ideal in applications where space saving is critical.

The low junction capacitance will reduce the disturbance on the RF signal.

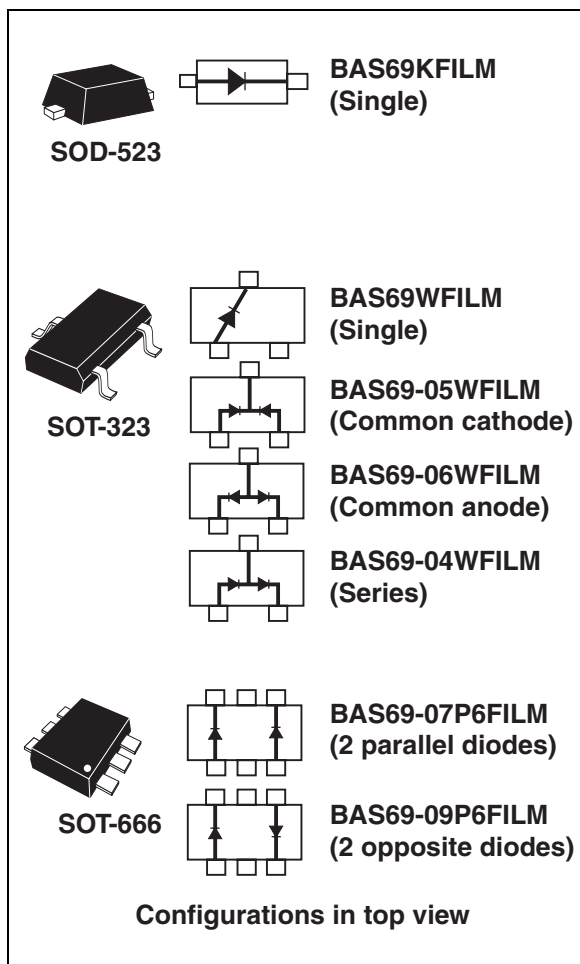


Table 1. Device summary

| Symbol | Value |
|-------------|--------|
| I_F | 10 mA |
| V_{RRM} | 15 V |
| C (typ) | < 1 pF |
| T_j (max) | 150 °C |

1 Characteristics

Table 2. Absolute ratings (limiting values at $T_j = 25\text{ °C}$, unless otherwise specified)

| Symbol | Parameter | | Value | Unit |
|-----------|---|----------------------------------|-------------|------|
| V_{RRM} | Repetitive peak reverse voltage | | 15 | V |
| I_F | Continuous forward current | | 10 | mA |
| I_{FSM} | Surge non repetitive forward current | Half wave, single phase 60 Hz | 2 | A |
| T_{stg} | Storage temperature range | | -65 to +150 | °C |
| T_j | Maximum operating junction temperature ⁽¹⁾ | | 150 | |
| T_L | Maximum soldering temperature ⁽¹⁾ | | 260 | |

1. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

Table 3. Thermal parameters

| Symbol | Parameter | | Value | Unit |
|---------------|------------------------------------|------------------|-------|------|
| $R_{th(j-a)}$ | Junction to ambient ⁽¹⁾ | SOT-323 | 550 | °C/W |
| | | SOD-523, SOT-666 | 600 | |

1. Epoxy printed circuit board with recommended pad layout

Table 4. Static electrical characteristics

| Symbol | Parameter | Test conditions | | Min. | Typ | Max. | Unit |
|-------------|-------------------------|-----------------------|----------------------|------|-----|-------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$ | $V_R = 1\text{ V}$ | | | 0.035 | μA |
| | | $T_j = 125\text{ °C}$ | | | 6 | 30 | |
| | | $T_j = 25\text{ °C}$ | $V_R = 15\text{ V}$ | | | 0.23 | |
| | | $T_j = 125\text{ °C}$ | | | 10 | 100 | |
| $V_F^{(1)}$ | Forward voltage drop | $T_j = 25\text{ °C}$ | $I_F = 1\text{ mA}$ | | 350 | 380 | mV |
| | | $T_j = 125\text{ °C}$ | | | 230 | 260 | |
| | | $T_j = 25\text{ °C}$ | $I_F = 10\text{ mA}$ | | 500 | 570 | |
| | | $T_j = 125\text{ °C}$ | | | 460 | 510 | |

1. Pulse test: $t_p \leq 250\text{ ms}$, $\delta \leq 2\%$

Table 5. Dynamic characteristics

| Symbol | Parameter | Test conditions | Min. | Typ | Max. | Unit |
|--------|--------------------|--|------|-----|------|----------|
| C | Diode capacitance | $V_R = 0\text{ V}$, $F = 1\text{ MHz}$ | | | 1.0 | pF |
| R_F | Forward resistance | $I_F = 5\text{ mA}$, $F = 100\text{ MHz}$ | | 15 | | Ω |
| L_S | Series inductance | | | 1.5 | | nH |

Figure 1. Forward voltage drop versus forward current (typical values)

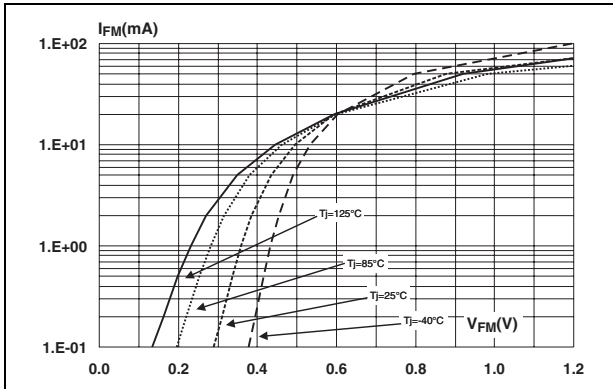


Figure 2. Reverse leakage current versus reverse voltage applied (typical values)

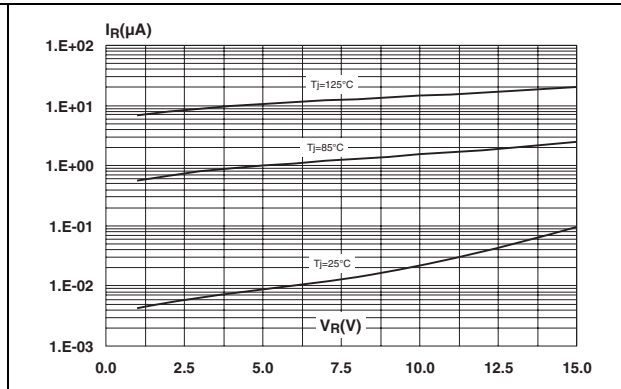


Figure 3. Differential forward resistance versus forward current (typical values)

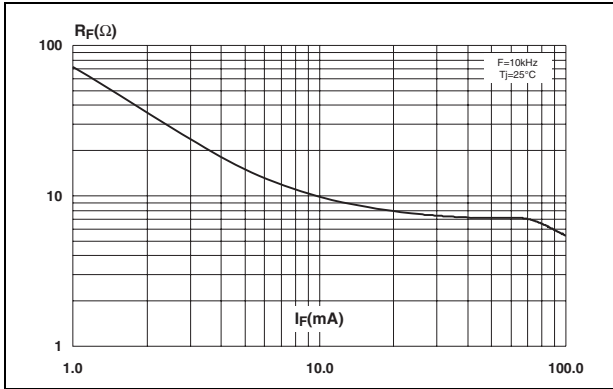


Figure 4. Junction capacitance versus reverse voltage applied (typical values)

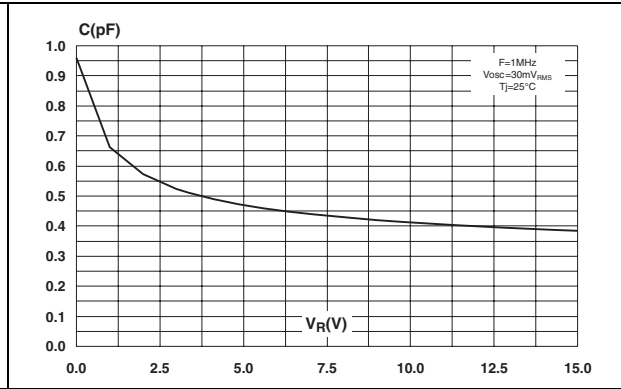


Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (SOT-323)

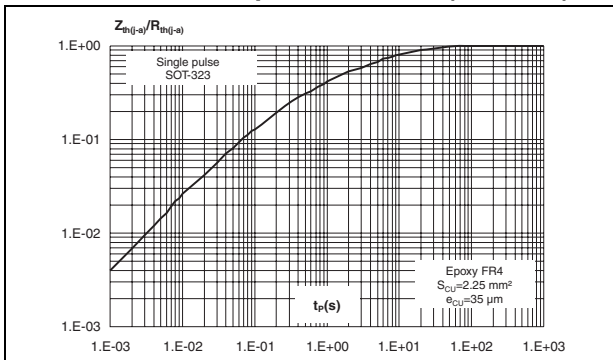


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration (SOT-666)

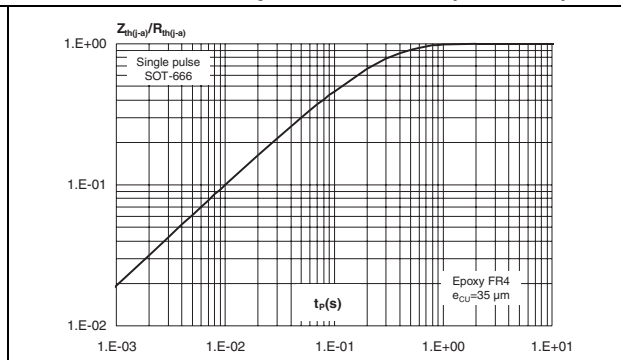


Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (SOD-523)

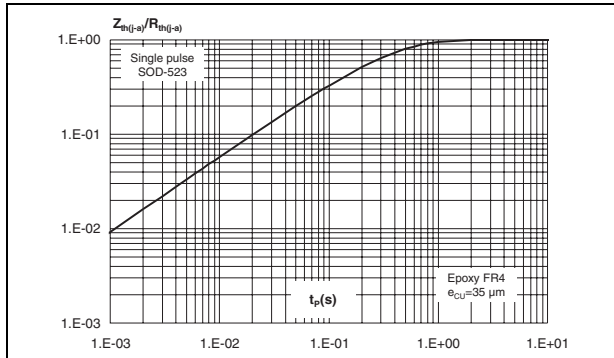
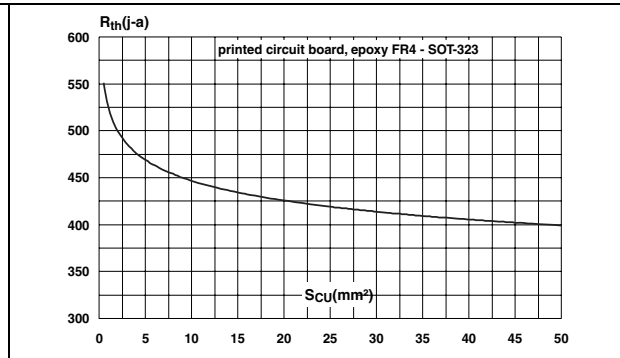
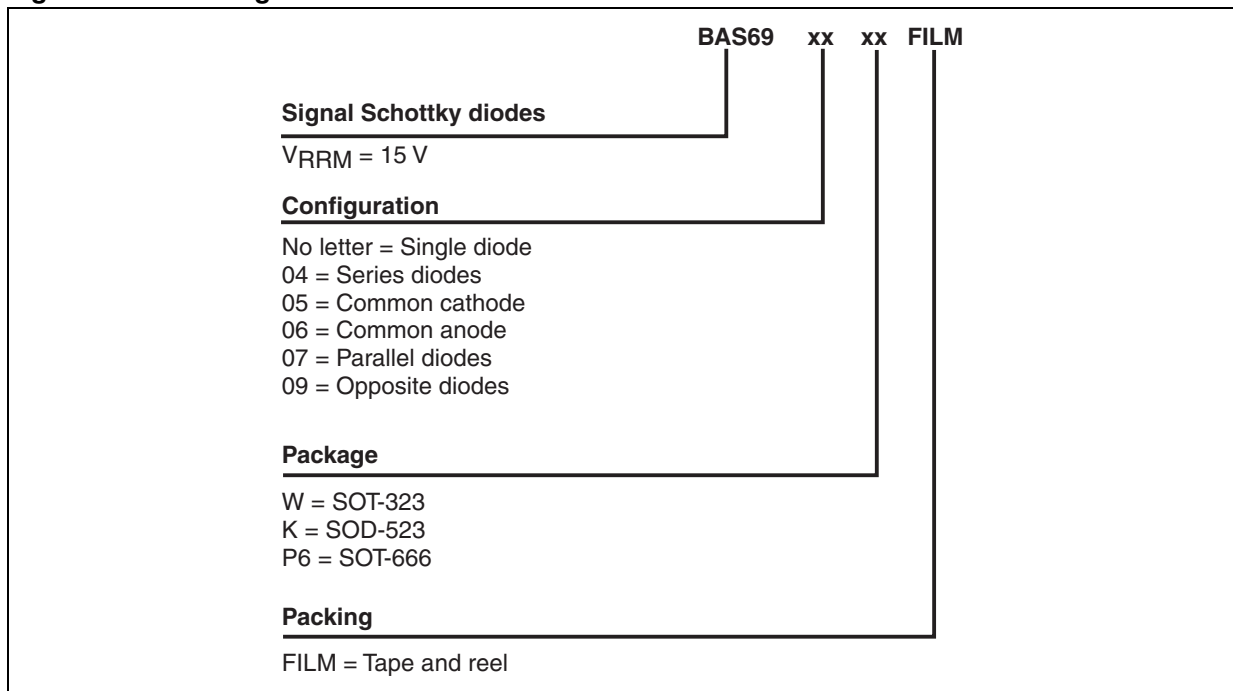


Figure 8. Thermal resistance junction to ambient versus copper surface under each lead



2 Ordering information scheme

Figure 9. Ordering information scheme



3 Package information

- Epoxy meets UL94, V0
- Lead-free packages

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK[®] specifications, grade definitions and product status are available at: www.st.com. ECOPACK[®] is an ST trademark.

Table 6. SOD-523 dimensions

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.50 | 0.60 | 0.70 | 0.020 | 0.024 | 0.028 |
| E | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |
| E1 | 1.10 | 1.20 | 1.30 | 0.043 | 0.047 | 0.051 |
| D | 0.70 | 0.80 | 0.90 | 0.028 | 0.031 | 0.035 |
| b | 0.25 | | 0.35 | 0.010 | | 0.014 |
| c | 0.07 | | 0.20 | 0.003 | | 0.008 |
| L | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| L1 | 0.05 | | 0.20 | 0.002 | | 0.008 |

Figure 10. SOD-523 footprint (dimensions in mm)

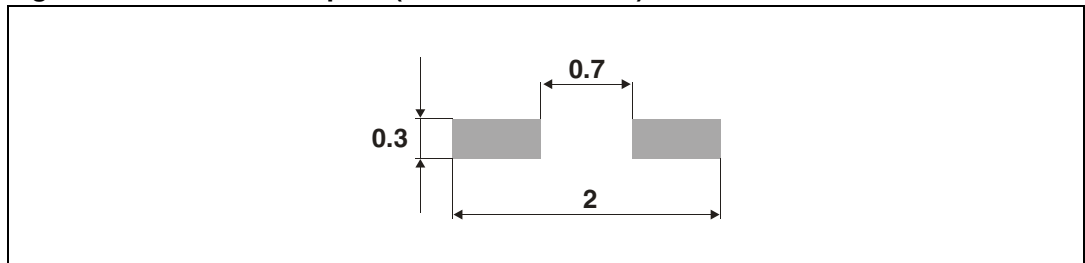


Table 7. SOT-323 dimensions

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.8 | | 1.1 | 0.031 | | 0.043 |
| A1 | 0.0 | | 0.1 | 0.0 | | 0.004 |
| b | 0.25 | | 0.4 | 0.010 | | 0.016 |
| c | 0.1 | | 0.26 | 0.004 | | 0.010 |
| D | 1.8 | 2.0 | 2.2 | 0.071 | 0.079 | 0.086 |
| E | 1.15 | 1.25 | 1.35 | 0.045 | 0.049 | 0.053 |
| e | | 0.65 | | | 0.026 | |
| H | 1.8 | 2.1 | 2.4 | 0.071 | 0.083 | 0.094 |
| L | 0.1 | 0.2 | 0.3 | 0.004 | 0.008 | 0.012 |
| q | 0 | | 30° | 0 | | 30° |

Figure 11. SOT-323 footprint (dimensions in mm)

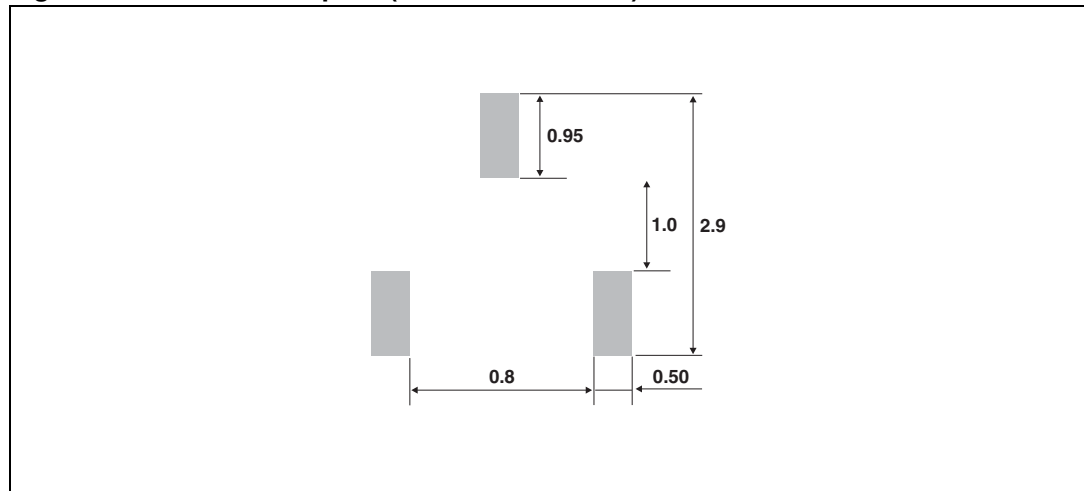
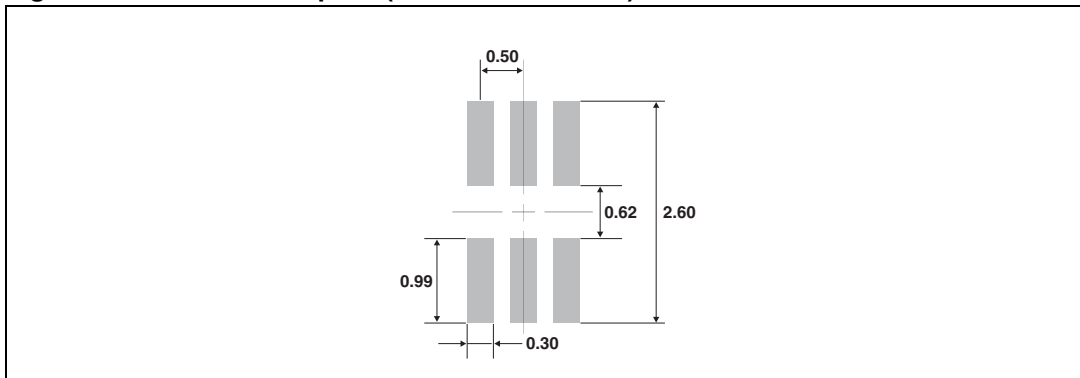


Table 8. SOT-666 dimensions

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.45 | | 0.60 | 0.018 | | 0.024 |
| A3 | 0.08 | | 0.18 | 0.003 | | 0.007 |
| b | 0.17 | | 0.34 | 0.007 | | 0.013 |
| b1 | 0.19 | 0.27 | 0.34 | 0.007 | 0.011 | 0.013 |
| D | 1.50 | | 1.70 | 0.059 | | 0.067 |
| E | 1.50 | | 1.70 | 0.059 | | 0.067 |
| E1 | 1.10 | | 1.30 | 0.043 | | 0.051 |
| e | | 0.50 | | | 0.020 | |
| L1 | | 0.19 | | | 0.007 | |
| L2 | 0.10 | | 0.30 | 0.004 | | 0.012 |
| L3 | | 0.10 | | | 0.004 | |

Figure 12. SOT-666 footprint (dimensions in mm)



4 Ordering information

Table 9. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|----------------|---------|---------------------------|--------|----------|---------------|
| BAS69WFILM | 23 | SOT-323 Single | 6 mg | 3000 | Tape and reel |
| BAS69-04WFILM | 24 | SOT-323 Series | 6 mg | 3000 | Tape and reel |
| BAS69-05WFILM | 25 | SOT-323 Common cathode | 6 mg | 3000 | Tape and reel |
| BAS69-06WFILM | 26 | SOT-323 Common anode | 6 mg | 3000 | Tape and reel |
| BAS69KFILM | 65 | SOD-523 Single | 1.4 mg | 3000 | Tape and reel |
| BAS69-09P6FILM | 69 | SOT-666 Opposite | 2.9 mg | 3000 | Tape and reel |
| BAS69-07P6FILM | 67 | SOT-666 Parallel | 2.9 mg | 3000 | Tape and reel |

5 Revision history

Table 10. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 24-Jul-2006 | 1 | First issue |
| 12-Oct-2009 | 2 | Updated Table 6 quote "L1" from 0.10 to 0.05. |

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