

## Low capacitance, low series inductance and resistance Schottky diodes

### Features

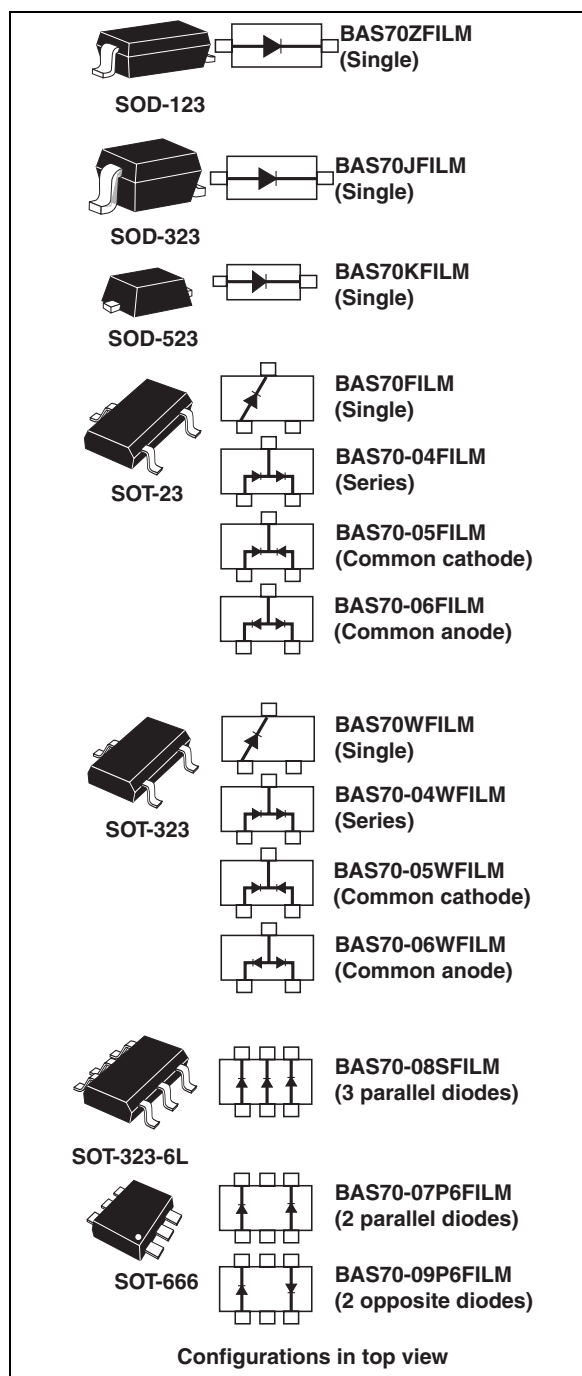
- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- Surface mount device
- Low capacitance diode
- Low resistance and inductance

### Description

The BAS70 series uses 70 V Schottky barrier diodes packaged in SOD-123, SOD-323, SOD-523, SOT-23, SOT-323, SOT-323-6L or SOT-666. These diodes are specially suited for signal detection and temperature compensation in RF applications.

**Table 1. Device summary**

| Symbol      | Value  |
|-------------|--------|
| $I_F$       | 70 mA  |
| $V_{RRM}$   | 70 V   |
| $C$ (max)   | 2 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                                      | 70           | V    |
| $I_F$     | Continuous forward current                                           | 70           | mA   |
| $I_{FSM}$ | Surge non repetitive forward current $t_p = 10\text{ ms}$ Sinusoidal | 1            | A    |
| $T_{stg}$ | Storage temperature range                                            | - 65 to +150 | °C   |
| $T_j$     | Maximum operating junction temperature                               | 150          | °C   |
| $T_L$     | Maximum soldering temperature                                        | 260          | °C   |

**Table 3. Thermal parameters**

| Symbol        | Parameter                          | Value            | Unit |
|---------------|------------------------------------|------------------|------|
| $R_{th(j-a)}$ | Junction to ambient <sup>(1)</sup> | SOD-123, SOT-23  | 500  |
|               |                                    | SOT-323, SOD-323 | 550  |
|               |                                    | 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 | $T_j = 25\text{ °C}$ | $V_R = 50\text{ V}$  |      | 100  | nA   |
|             |                         |                      | $V_R = 70\text{ V}$  |      | 10   | μA   |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25\text{ °C}$ | $I_F = 1\text{ mA}$  |      | 410  | mV   |
|             |                         |                      | $I_F = 10\text{ mA}$ |      | 750  |      |
|             |                         |                      | $I_F = 15\text{ mA}$ |      | 1000 |      |

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

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

**Table 5. Dynamic characteristics**

| Symbol | Parameter                       | Test conditions                             | Min. | Typ. | Max. | Unit |
|--------|---------------------------------|---------------------------------------------|------|------|------|------|
| C      | Diode capacitance               | $V_R = 0\text{ V}$ , $F = 1\text{ MHz}$     |      |      | 2    | pF   |
| $R_F$  | Differential forward resistance | $I_F = 10\text{ mA}$ , $F = 100\text{ MHz}$ |      | 30   |      | Ω    |
| $L_S$  | Series inductance               |                                             |      | 1.5  |      | nH   |

Figure 1. Average forward power dissipation

Figure 2. Average forward current versus ambient temperature ( $\delta = 1$ )

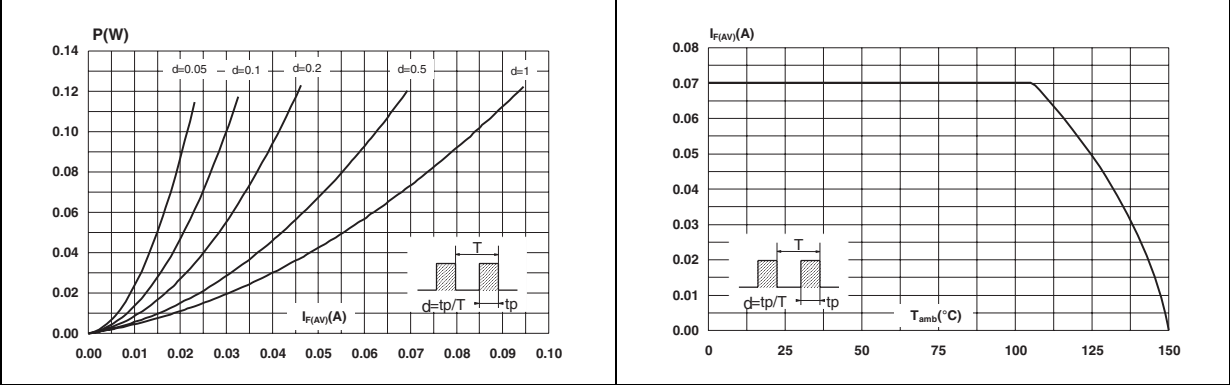


Figure 3. Reverse leakage current versus reverse applied voltage (typical values)

Figure 4. Reverse leakage current versus junction temperature (typical values)

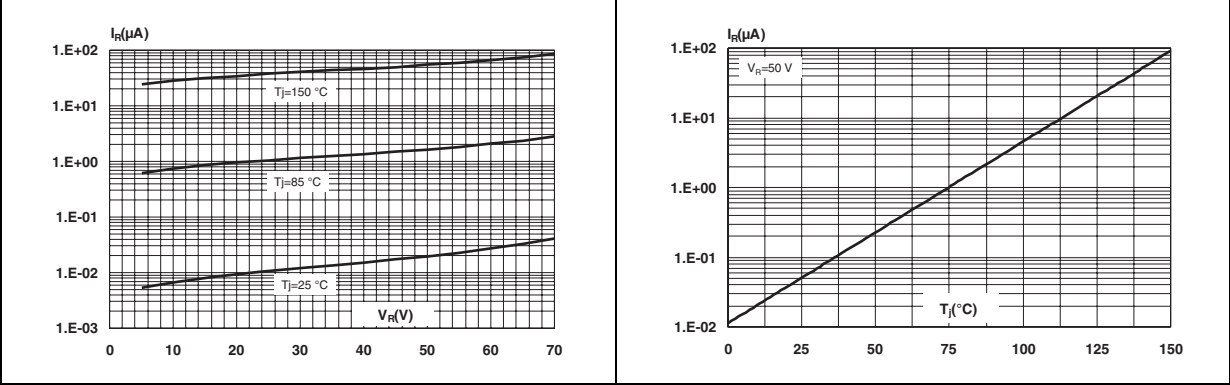


Figure 5. Junction capacitance versus reverse applied voltage (typical values)

Figure 6. Forward voltage drop versus forward current (typical values)

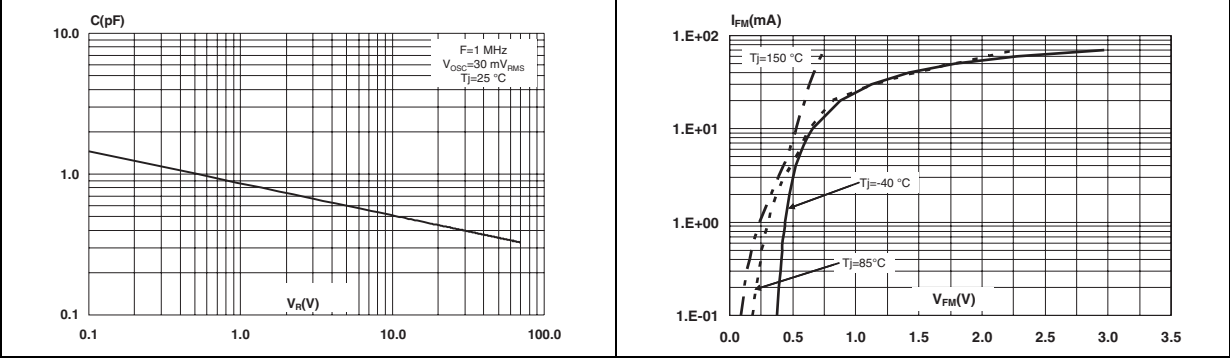


Figure 7. Forward voltage drop versus forward current (typical values)



Figure 8. Differential forward resistance versus forward current (typical values)



Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration



Figure 10. Relative variation of thermal impedance junction to ambient versus pulse duration



Figure 11. Relative variation of thermal impedance junction to ambient versus pulse duration



Figure 12. Relative variation of thermal impedance junction to ambient versus pulse duration



Figure 13. Relative variation of thermal impedance junction to ambient versus pulse duration



Figure 14. Thermal impedance junction to ambient versus copper surface under each lead



## 2 Ordering information scheme

Figure 15. Ordering information scheme

|                               |       |    |    |      |
|-------------------------------|-------|----|----|------|
|                               | BAS70 | xx | xx | FILM |
| <b>Signal Schottky diodes</b> |       |    |    |      |
| $V_{RRM} = 70\text{ V}$       |       |    |    |      |
| <b>Configuration</b>          |       |    |    |      |
| No letter = Single diode      |       |    |    |      |
| 04 = Series diodes            |       |    |    |      |
| 05 = Common cathode           |       |    |    |      |
| 06 = Common anode             |       |    |    |      |
| 07 = 2 Parallel diodes        |       |    |    |      |
| 08 = 3 Parallel diodes        |       |    |    |      |
| 09 = 2 Opposite diodes        |       |    |    |      |
| <b>Package</b>                |       |    |    |      |
| Blank = SOT-23                |       |    |    |      |
| J = SOD-323                   |       |    |    |      |
| W = SOT-323                   |       |    |    |      |
| K = SOD-523                   |       |    |    |      |
| P6 = SOT-666                  |       |    |    |      |
| S = SOT323-6L                 |       |    |    |      |
| Z = SOD-123                   |       |    |    |      |
| <b>Packing</b>                |       |    |    |      |
| FILM = Tape and reel          |       |    |    |      |

# 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](http://www.st.com). ECOPACK® is an ST trademark.

**Table 6. SOD-123 dimensions**

| Ref. | Dimensions  |      |            |       |
|------|-------------|------|------------|-------|
|      | Millimeters |      | Inches     |       |
|      | Min.        | Max. | Min.       | Max.  |
| A    |             | 1.45 |            | 0.057 |
| A1   | 0           | 0.1  | 0          | 0.004 |
| A2   | 0.85        | 1.35 | 0.033      | 0.053 |
| b    | 0.55 Typ.   |      | 0.022 Typ. |       |
| c    | 0.15 Typ.   |      | 0.039 Typ. |       |
| D    | 2.55        | 2.85 | 0.1        | 0.112 |
| E    | 1.4         | 1.7  | 0.055      | 0.067 |
| G    | 0.25        |      | 0.01       |       |
| H    | 3.55        | 3.95 | 0.14       | 0.156 |

**Figure 16. SOD-123 footprint (dimensions in mm)**

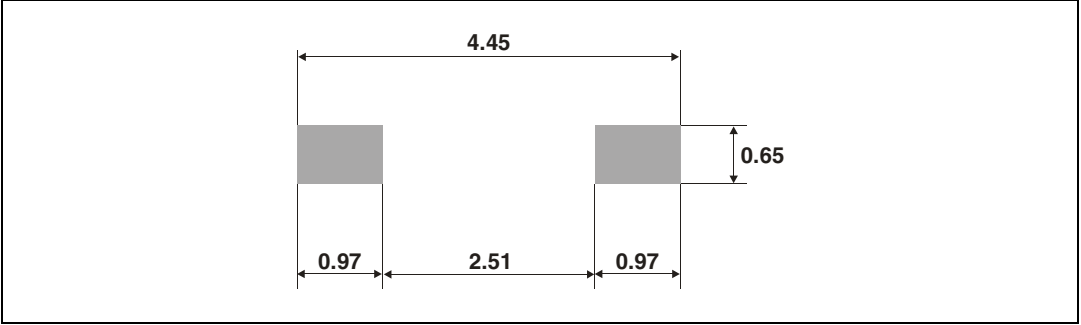


Table 7. SOD-323 dimensions

| Ref. | Dimensions  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A    |             | 1.17 |        | 0.046 |
| A1   | 0           | 0.1  | 0      | 0.004 |
| b    | 0.25        | 0.44 | 0.01   | 0.017 |
| c    | 0.1         | 0.25 | 0.004  | 0.01  |
| D    | 1.52        | 1.8  | 0.06   | 0.071 |
| E    | 1.11        | 1.45 | 0.044  | 0.057 |
| H    | 2.3         | 2.7  | 0.09   | 0.106 |
| L    | 0.1         | 0.46 | 0.004  | 0.02  |
| Q1   | 0.1         | 0.41 | 0.004  | 0.016 |

Figure 17. SOD-323 footprint (dimensions in mm)

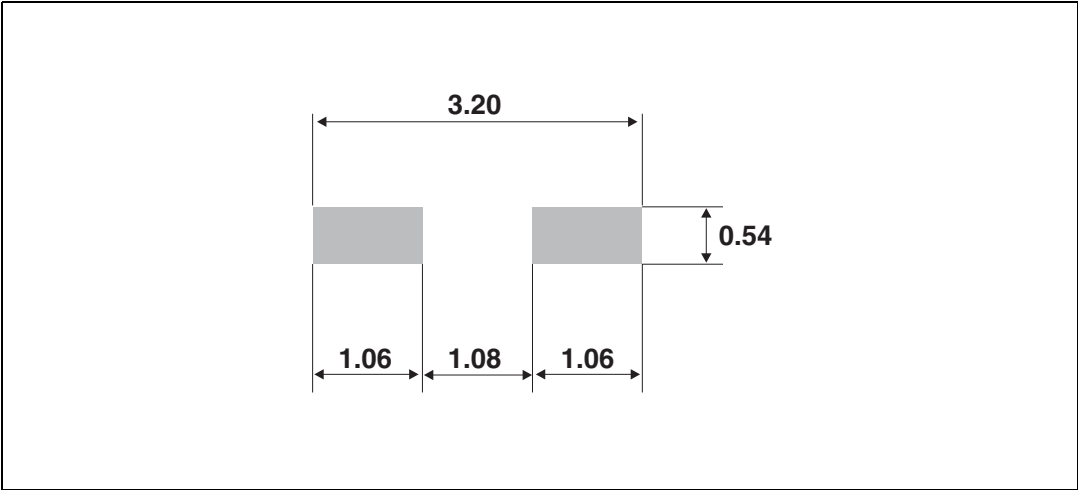


Table 8. SOD-523 dimensions

| 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 18. SOD-523 footprint (dimensions in mm)

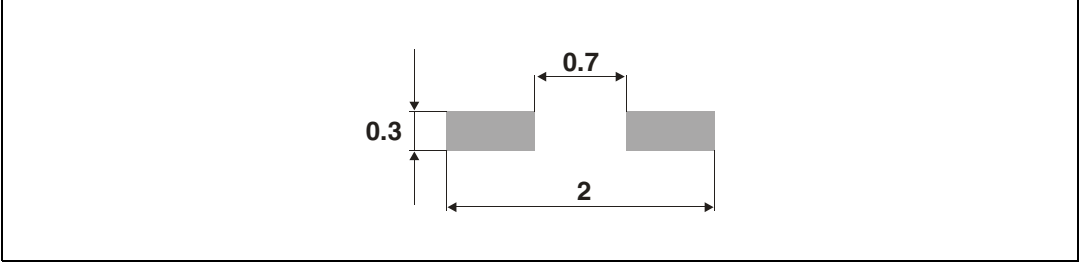


Table 9. SOT-23 dimensions

| Ref. | Dimensions  |      |            |       |
|------|-------------|------|------------|-------|
|      | Millimeters |      | Inches     |       |
|      | Min.        | Max. | Min.       | Max.  |
| A    | 0.89        | 1.4  | 0.035      | 0.055 |
| A1   | 0           | 0.1  | 0          | 0.004 |
| B    | 0.3         | 0.51 | 0.012      | 0.02  |
| c    | 0.085       | 0.18 | 0.003      | 0.007 |
| D    | 2.75        | 3.04 | 0.108      | 0.12  |
| e    | 0.85        | 1.05 | 0.033      | 0.041 |
| e1   | 1.7         | 2.1  | 0.067      | 0.083 |
| E    | 1.2         | 1.6  | 0.047      | 0.063 |
| H    | 2.1         | 2.75 | 0.083      | 0.108 |
| L    | 0.6 typ.    |      | 0.024 typ. |       |
| S    | 0.35        | 0.65 | 0.014      | 0.026 |

Figure 19. SOT-23 footprint (dimensions in mm)

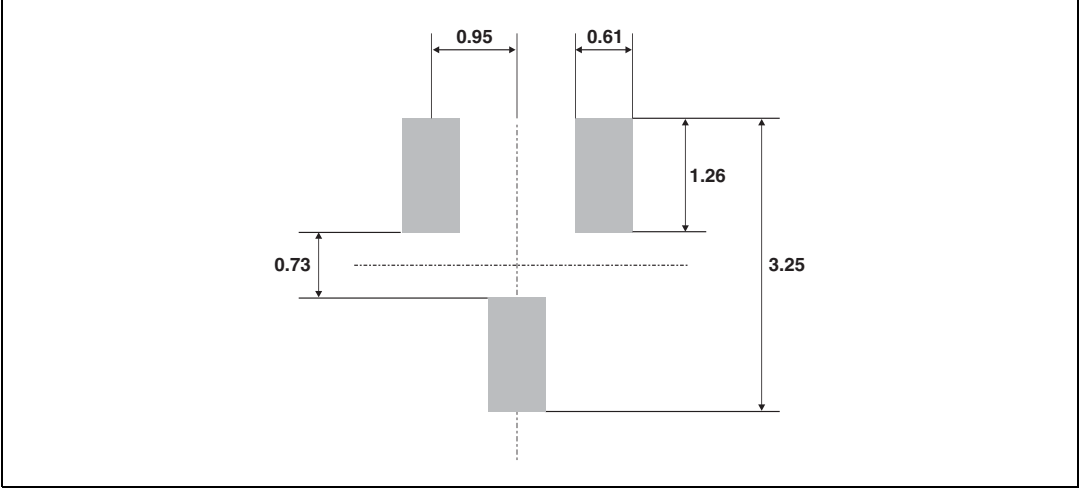


Table 10. SOT-323 dimensions

| 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 20. SOT-323 footprint (dimensions in mm)

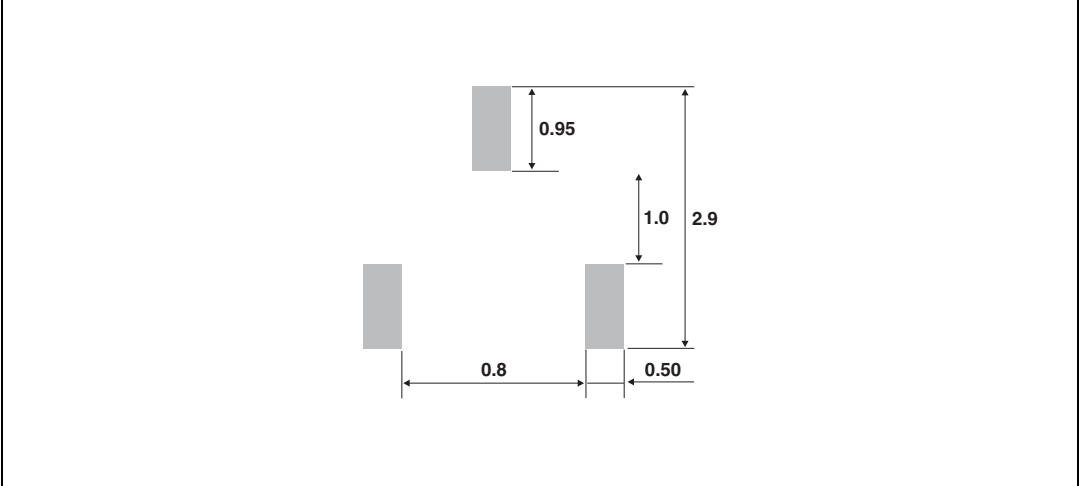


Table 11. SOT323-6L dimensions

| Ref. | Dimensions  |      |            |       |
|------|-------------|------|------------|-------|
|      | Millimeters |      | Inches     |       |
|      | Min.        | Max. | Min.       | Max.  |
| A    | 0.8         | 1.1  | 0.031      | 0.043 |
| A1   | 0           | 0.1  | 0          | 0.004 |
| A2   | 0.8         | 1    | 0.031      | 0.039 |
| b    | 0.15        | 0.3  | 0.006      | 0.012 |
| c    | 0.1         | 0.18 | 0.004      | 0.007 |
| D    | 1.8         | 2.2  | 0.071      | 0.086 |
| E    | 1.15        | 1.35 | 0.045      | 0.053 |
| e    | 0.65 Typ.   |      | 0.025 Typ. |       |
| H    | 1.8         | 2.4  | 0.071      | 0.094 |
| Q    | 0.1         | 0.4  | 0.004      | 0.016 |

Figure 21. SOT323-6L footprint (dimensions in mm)

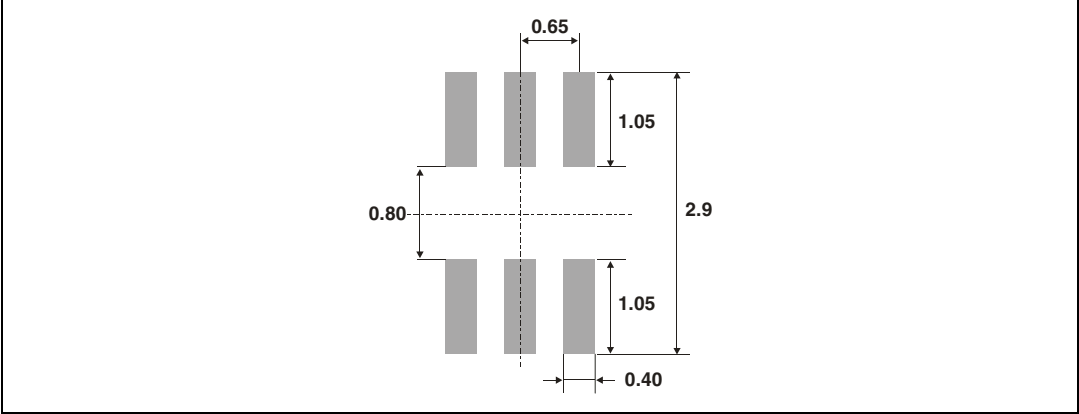
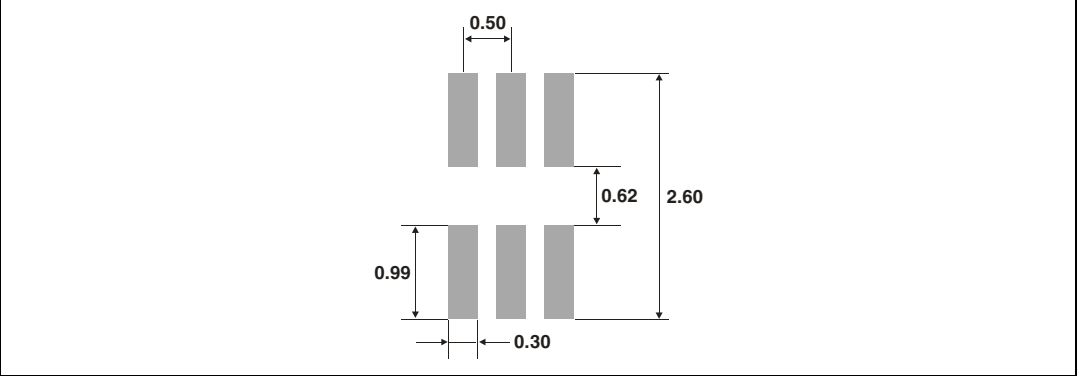


Table 12. SOT-666 dimensions

| 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 22. SOT-666 footprint (dimensions in mm)



## 4 Ordering information

**Table 13. Ordering information**

| Order code     | Marking | Package                   | Weight | Base qty | Delivery mode |
|----------------|---------|---------------------------|--------|----------|---------------|
| BAS70ZFILM     | Z70     | SOD-123                   | 10 mg  | 3000     | Tape and reel |
| BAS70FILM      | D76     | SOT-23 Single             | 10 mg  | 3000     | Tape and reel |
| BAS70-04FILM   | D96     | SOT-23 Series             | 10 mg  | 3000     | Tape and reel |
| BAS70-05FILM   | D97     | SOT-23<br>Common cathode  | 10 mg  | 3000     | Tape and reel |
| BAS70-06FILM   | D98     | SOT-23<br>Common anode    | 10 mg  | 3000     | Tape and reel |
| BAS70WFILM     | D28     | SOT-323 Single            | 6 mg   | 3000     | Tape and reel |
| BAS70-04WFILM  | D31     | SOT-323 Series            | 6 mg   | 3000     | Tape and reel |
| BAS70-05WFILM  | D30     | SOT-323<br>Common cathode | 6 mg   | 3000     | Tape and reel |
| BAS70-06WFILM  | D29     | SOT-323<br>Common anode   | 6 mg   | 3000     | Tape and reel |
| BAS70-08SFILM  | D33     | SOT323-6L 3 Parallel      | 6 mg   | 3000     | Tape and reel |
| BAS70JFILM     | 76      | SOD-323                   | 5 mg   | 3000     | Tape and reel |
| BAS70KFILM     | 76      | SOD-523                   | 1.4 mg | 3000     | Tape and reel |
| BAS70-07P6FILM | P7      | SOT-666 2 Parallel        | 2.9 mg | 3000     | Tape and reel |
| BAS70-09P6FILM | Q7      | SOT-666 2 Opposite        | 2.9 mg | 3000     | Tape and reel |

## 5 Revision history

**Table 14. Document revision history**

| Date        | Revision | Changes                                                                                    |
|-------------|----------|--------------------------------------------------------------------------------------------|
| 24-Jul-2006 | 1        | BAS70J / W datasheets merged. ECOPACK statement added. SOD-523 and SOT-666 packages added. |
| 12-Oct-2009 | 2        | Updated Table 8 quote "L1" from 0.10 to 0.05.                                              |

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2009 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)