
# BZX585-Q series

## Voltage regulator diodes

Rev. 1 — 11 October 2023 Product data sheet

## 1. General description

General-purpose Zener diodes in an SOD523 (SC-79) ultra small flat lead Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Non-repetitive peak reverse power dissipation: ≤ 40 W
- Total power dissipation: ≤ 300 mW
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Two tolerance series: ± 2 % and ± 5 %
- Low differential resistance
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- General regulation functions

## 4. Quick reference data

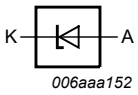
**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 100 mA | [1] | - | - | 1.1 | V |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | | [2] | - | - | 40 | W |

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$
[2] $t_p$ = 100 µs; square wave; $T_j$ = 25 °C before surge

## 5. Pinning information

**Table 2. Pinning**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | K | cathode[1] |   |   |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

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# 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BZX585-B2V4-Q to BZX585-C75-Q[1] | SC-79 | plastic surface-mounted package; 2 leads | SOD523 |

[1] The series consists of 74 types with nominal working voltages from 2.4 V to 75 V.

# 7. Marking

**Table 4. Marking Codes**

| Type number | Marking Code | Type number | Marking Code | Type number | Marking Code | Type number | Marking Code |
|---|---|---|---|---|---|---|---|
| BZX585-B2V4-Q | C1 | BZX585-B15-Q | E0 | BZX585-C2V4-Q | F1 | BZX585-C15-Q | H0 |
| BZX585-B2V7-Q | C2 | BZX585-B16-Q | EA | BZX585-C2V7-Q | F2 | BZX585-C16-Q | HA |
| BZX585-B3V0-Q | C3 | BZX585-B18-Q | EB | BZX585-C3V0-Q | F3 | BZX585-C18-Q | HB |
| BZX585-B3V3-Q | C4 | BZX585-B20-Q | EC | BZX585-C3V3-Q | F4 | BZX585-C20-Q | HC |
| BZX585-B3V6-Q | C5 | BZX585-B22-Q | ED | BZX585-C3V6-Q | F5 | BZX585-C22-Q | HD |
| BZX585-B3V9-Q | C6 | BZX585-B24-Q | EE | BZX585-C3V9-Q | F6 | BZX585-C24-Q | HE |
| BZX585-B4V3-Q | C7 | BZX585-B27-Q | EF | BZX585-C4V3-Q | F7 | BZX585-C27-Q | HF |
| BZX585-B4V7-Q | C8 | BZX585-B30-Q | EG | BZX585-C4V7-Q | F8 | BZX585-C30-Q | HG |
| BZX585-B5V1-Q | C9 | BZX585-B33-Q | EH | BZX585-C5V1-Q | F9 | BZX585-C33-Q | HH |
| BZX585-B5V6-Q | C0 | BZX585-B36-Q | EK | BZX585-C5V6-Q | F0 | BZX585-C36-Q | HK |
| BZX585-B6V2-Q | E1 | BZX585-B39-Q | EL | BZX585-C6V2-Q | H1 | BZX585-C39-Q | HL |
| BZX585-B6V8-Q | E2 | BZX585-B43-Q | EM | BZX585-C6V8-Q | H2 | BZX585-C43-Q | HM |
| BZX585-B7V5-Q | E3 | BZX585-B47-Q | EN | BZX585-C7V5-Q | H3 | BZX585-C47-Q | HN |
| BZX585-B8V2-Q | E4 | BZX585-B51-Q | EP | BZX585-C8V2-Q | H4 | BZX585-C51-Q | HP |
| BZX585-B9V1-Q | E5 | BZX585-B56-Q | ER | BZX585-C9V1-Q | H5 | BZX585-C56-Q | HR |
| BZX585-B10-Q | E6 | BZX585-B62-Q | ES | BZX585-C10-Q | H6 | BZX585-C62-Q | HS |
| BZX585-B11-Q | E7 | BZX585-B68-Q | ET | BZX585-C11-Q | H7 | BZX585-C68-Q | HT |
| BZX585-B12-Q | E8 | BZX585-B75-Q | EU | BZX585-C12-Q | H8 | BZX585-C75-Q | HU |
| BZX585-B13-Q | E9 | - | - | BZX585-C13-Q | H9 | - | - |

# 8. Limiting values

**Table 5. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $I_F$ | forward current | | | - | 200 | mA |
| $I_{ZSM}$ | non-repetitive peak reverse current | $t_p$ = 100 µs; square wave; $T_{amb}$ = 25 °C; prior to surge | - | see Tables 8 and 9 | | |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | $t_p$ = 100 µs; square wave; $T_{amb}$ = 25 °C; prior to surge | - | - | 40 | W |
| $P_{tot}$ | total power dissipation | $T_{amb}$ = 25 °C | [1] | - | 300 | mW |
| $T_j$ | junction temperature | | | -65 | 150 | °C |
| $T_{amb}$ | ambient temperature | | | −65 | +150 | °C |
| $T_{stg}$ | storage temperature | | | −65 | +150 | °C |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB) with approximately 35 $mm^2$ Cu area at cathode tab

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | - | - | 350 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [2] | - | - | 65 | K/W |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB) with approximately 35 $mm^2$ Cu area at cathode tab
[2] Soldering point of cathode tab

# 10. Characteristics

**Table 7. Electrical characteristics**

*$T_j$ = 25 °C unless otherwise specified.*

| Symbol | Parameter | Conditions | | Max | Unit |
|---|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 10 mA | [1] | 0.9 | V |
| | | $I_F$ = 100 mA | [1] | 1.1 | V |

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$

**Table 8. Electrical characteristics per type: BZX585-B2V4-Q to BZX585-C24-Q**

*$T_j$ = 25 °C unless otherwise specified.*

| BZX585- | Sel | Working voltage $V_Z$ (V) | | Differential resistance $r_{diff}$ (Ω) | | | | Reverse current $I_R$ (µA) | | Temperature coefficient $S_Z$ (mV/K) | | | Diode capacit. $C_d$ (pF)[1] | Non-repeti. peak reverse current $I_{ZSM}$ (A) [2] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $I_Z$ = 5 mA | | $I_Z$ = 1 mA | | $I_Z$ = 5 mA | | | | $I_Z$ = 5 mA | | | | |
| | | Min | Max | Typ | Max | Typ | Max | Max | $V_R$ (V) | Min | Typ | Max | Max | Max |
| 2V4-Q | B | 2.35 | 2.45 | 275 | 400 | 70 | 100 | 50.0 | 1.0 | -3.5 | -1.3 | 0 | 450 | 6.0 |
| | C | 2.28 | 2.52 | | | | | | | | | | | |
| 2V7-Q | B | 2.65 | 2.75 | 300 | 450 | 75 | 100 | 20.0 | 1.0 | -3.5 | -1.4 | 0 | 440 | 6.0 |
| | C | 2.57 | 2.84 | | | | | | | | | | | |
| 3V0-Q | B | 2.94 | 3.06 | 325 | 500 | 80 | 95 | 10.0 | 1.0 | -3.5 | -1.6 | 0 | 425 | 6.0 |
| | C | 2.85 | 3.15 | | | | | | | | | | | |
| 3V3-Q | B | 3.23 | 3.37 | 350 | 500 | 85 | 95 | 5.0 | 1.0 | -3.5 | -1.8 | 0 | 410 | 6.0 |
| | C | 3.14 | 3.47 | | | | | | | | | | | |
| 3V6-Q | B | 3.53 | 3.67 | 375 | 500 | 85 | 90 | 5.0 | 1.0 | -3.5 | -1.9 | 0 | 390 | 6.0 |
| | C | 3.42 | 3.78 | | | | | | | | | | | |
| 3V9-Q | B | 3.82 | 3.98 | 400 | 500 | 85 | 90 | 3.0 | 1.0 | -3.5 | -1.9 | 0 | 370 | 6.0 |
| | C | 3.71 | 4.10 | | | | | | | | | | | |
| 4V3-Q | B | 4.21 | 4.39 | 410 | 600 | 80 | 90 | 3.0 | 1.0 | -3.5 | -1.7 | 0 | 350 | 6.0 |
| | C | 4.09 | 4.52 | | | | | | | | | | | |
| 4V7-Q | B | 4.61 | 4.79 | 425 | 500 | 50 | 80 | 3.0 | 2.0 | -3.5 | -1.2 | 0.2 | 325 | 6.0 |
| | C | 4.47 | 4.94 | | | | | | | | | | | |
| 5V1-Q | B | 5.00 | 5.20 | 400 | 480 | 40 | 60 | 2.0 | 2.0 | -2.7 | -0.5 | 1.2 | 300 | 6.0 |
| | C | 4.85 | 5.36 | | | | | | | | | | | |
| 5V6-Q | B | 5.49 | 5.71 | 80 | 400 | 15 | 40 | 1.0 | 2.0 | -2.0 | 1.0 | 2.5 | 275 | 6.0 |
| | C | 5.32 | 5.88 | | | | | | | | | | | |
| 6V2-Q | B | 6.08 | 6.32 | 40 | 150 | 6 | 10 | 3.0 | 4.0 | 0.4 | 2.2 | 3.7 | 250 | 6.0 |
| | C | 5.89 | 6.51 | | | | | | | | | | | |
| 6V8-Q | B | 6.66 | 6.94 | 30 | 80 | 6 | 15 | 2.0 | 4.0 | 1.2 | 3.0 | 4.5 | 215 | 6.0 |
| | C | 6.46 | 7.14 | | | | | | | | | | | |
| 7V5-Q | B | 7.35 | 7.65 | 15 | 80 | 2 | 10 | 1.0 | 5.0 | 2.5 | 3.6 | 5.3 | 170 | 4.0 |
| | C | 7.13 | 7.88 | | | | | | | | | | | |
| 8V2-Q | B | 8.04 | 8.36 | 20 | 80 | 2 | 10 | 0.7 | 5.0 | 3.2 | 4.3 | 6.2 | 150 | 4.0 |
| | C | 7.79 | 8.61 | | | | | | | | | | | |

| BZX585- | Sel | Working voltage $V_Z$ (V) | | Differential resistance $r_{diff}$ (Ω) | | | | Reverse current $I_R$ (μA) | | Temperature coefficient $S_Z$ (mV/K) | | | Diode capacit. $C_d$ (pF)[1] | Non-repeti. peak reverse current $I_{ZSM}$ (A) [2] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $I_Z$ = 5 mA | | $I_Z$ = 1 mA | | $I_Z$ = 5 mA | | | | $I_Z$ = 5 mA | | | | |
| | | Min | Max | Typ | Max | Typ | Max | Max | $V_R$ (V) | Min | Typ | Max | Max | Max |
| 9V1-Q | B | 8.92 | 9.28 | 20 | 100 | 2 | 10 | 0.5 | 6.0 | 3.8 | 5.2 | 7.0 | 120 | 3.0 |
| | C | 8.65 | 9.56 | | | | | | | | | | | |
| 10-Q | B | 9.80 | 10.20 | 20 | 150 | 2 | 10 | 0.2 | 7.0 | 4.5 | 6.0 | 8.0 | 110 | 3.0 |
| | C | 9.50 | 10.50 | | | | | | | | | | | |
| 11-Q | B | 10.78 | 11.22 | 25 | 150 | 2 | 10 | 0.1 | 8.0 | 5.4 | 6.9 | 9.0 | 110 | 2.5 |
| | C | 10.45 | 11.55 | | | | | | | | | | | |
| 12-Q | B | 11.76 | 12.24 | 25 | 150 | 2 | 10 | 0.1 | 8.0 | 6.0 | 7.9 | 10.0 | 105 | 2.5 |
| | C | 11.40 | 12.60 | | | | | | | | | | | |
| 13-Q | B | 12.74 | 13.26 | 25 | 170 | 2 | 10 | 0.1 | 8.0 | 7.0 | 8.8 | 11.0 | 105 | 2.5 |
| | C | 12.35 | 13.65 | | | | | | | | | | | |
| 15-Q | B | 14.70 | 15.30 | 25 | 200 | 3 | 15 | 0.05 | 10.5 | 9.2 | 10.7 | 13.0 | 100 | 2.0 |
| | C | 14.25 | 15.75 | | | | | | | | | | | |
| 16-Q | B | 15.68 | 16.32 | 50 | 200 | 10 | 40 | 0.05 | 11.2 | 10.4 | 12.4 | 14.0 | 90 | 1.5 |
| | C | 15.20 | 16.80 | | | | | | | | | | | |
| 18-Q | B | 17.64 | 18.36 | 50 | 225 | 10 | 45 | 0.05 | 12.6 | 12.4 | 14.4 | 16.0 | 80 | 1.5 |
| | C | 17.10 | 18.90 | | | | | | | | | | | |
| 20-Q | B | 19.60 | 20.40 | 60 | 225 | 15 | 55 | 0.05 | 14.0 | 14.4 | 16.4 | 18.0 | 70 | 1.5 |
| | C | 19.00 | 21.00 | | | | | | | | | | | |
| 22-Q | B | 21.56 | 22.44 | 60 | 250 | 20 | 55 | 0.05 | 15.4 | 16.4 | 18.4 | 20.0 | 60 | 1.25 |
| | C | 20.90 | 23.10 | | | | | | | | | | | |
| 24-Q | B | 23.52 | 24.48 | 60 | 250 | 25 | 70 | 0.05 | 16.8 | 18.4 | 20.4 | 22.0 | 55 | 1.25 |
| | C | 22.80 | 25.20 | | | | | | | | | | | |

[1] f = 1 MHz; $V_R$ = 0 V

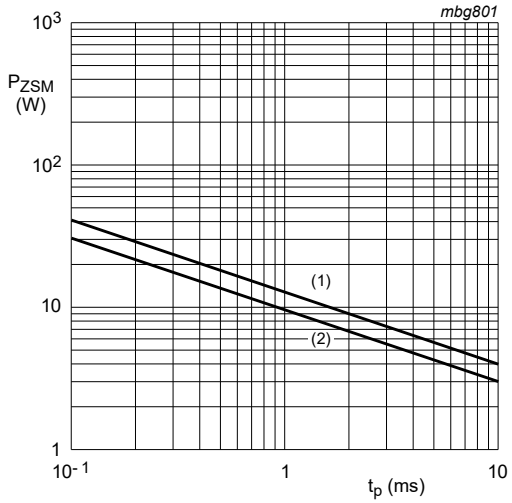
[2] $t_p$ = 100 μs; square wave; $t_j$ = 25 °C before surge

**Table 9. Electrical characteristics per type: BZX585-B27-Q to BZX585-C75-Q**

| BZX585- | Sel | Working voltage $V_Z$ (V) | | Differential resistance $r_{diff}$ (Ω) | | | | Reverse current $I_R$ (μA) | | Temperature coefficient $S_Z$ (mV/K) | | | Diode capacit. $C_d$ (pF)[1] | Non-repeti. peak reverse current $I_{ZSM}$ (A) [2] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $I_Z$ = 2 mA | | $I_Z$ = 0.5 mA | | $I_Z$ = 2 mA | | | | $I_Z$ = 2 mA | | | | |
| | | Min | Max | Typ | Max | Typ | Max | Max | $V_R$ (V) | Min | Typ | Max | Max | Max |
| 27-Q | B | 26.46 | 27.54 | 65 | 300 | 25 | 80 | 0.05 | 18.9 | 21.4 | 23.4 | 25.3 | 50 | 1.0 |
| | C | 25.65 | 28.35 | | | | | | | | | | | |
| 30-Q | B | 29.40 | 30.60 | 70 | 300 | 30 | 80 | 0.05 | 21.0 | 24.4 | 26.6 | 29.4 | 50 | 1.0 |
| | C | 28.50 | 31.50 | | | | | | | | | | | |
| 33-Q | B | 32.34 | 33.66 | 75 | 325 | 35 | 80 | 0.05 | 23.1 | 27.4 | 29.7 | 33.4 | 45 | 0.9 |
| | C | 31.35 | 34.65 | | | | | | | | | | | |
| 36-Q | B | 35.28 | 36.72 | 80 | 350 | 35 | 90 | 0.05 | 25.2 | 30.4 | 33.0 | 37.4 | 45 | 0.8 |
| | C | 34.20 | 37.80 | | | | | | | | | | | |
| 39-Q | B | 38.22 | 39.78 | 80 | 350 | 40 | 130 | 0.05 | 27.3 | 33.4 | 36.4 | 41.2 | 45 | 0.7 |
| | C | 37.05 | 40.95 | | | | | | | | | | | |
| 43-Q | B | 42.14 | 43.86 | 85 | 375 | 45 | 150 | 0.05 | 30.1 | 37.6 | 41.2 | 46.6 | 40 | 0.6 |
| | C | 40.85 | 45.15 | | | | | | | | | | | |
| 47-Q | B | 46.06 | 47.94 | 85 | 375 | 50 | 170 | 0.05 | 32.9 | 42.0 | 46.1 | 51.8 | 40 | 0.5 |
| | C | 44.65 | 49.35 | | | | | | | | | | | |
| 51-Q | B | 49.98 | 52.02 | 90 | 400 | 60 | 180 | 0.05 | 35.7 | 46.6 | 51.0 | 57.2 | 40 | 0.4 |
| | C | 48.45 | 53.55 | | | | | | | | | | | |
| 56-Q | B | 54.88 | 57.12 | 100 | 425 | 70 | 200 | 0.05 | 39.2 | 52.2 | 57.0 | 63.8 | 40 | 0.3 |
| | C | 53.20 | 58.80 | | | | | | | | | | | |
| 62-Q | B | 60.76 | 63.24 | 120 | 450 | 80 | 215 | 0.05 | 43.4 | 58.8 | 64.4 | 71.6 | 35 | 0.3 |
| | C | 58.90 | 65.10 | | | | | | | | | | | |
| 68-Q | B | 66.64 | 69.36 | 150 | 475 | 90 | 240 | 0.05 | 47.6 | 65.6 | 71.7 | 79.8 | 35 | 0.25 |
| | C | 64.60 | 71.40 | | | | | | | | | | | |
| 75-Q | B | 73.50 | 76.50 | 170 | 500 | 95 | 255 | 0.05 | 52.5 | 73.4 | 80.2 | 88.6 | 35 | 0.2 |
| | C | 71.25 | 78.75 | | | | | | | | | | | |

[1] f = 1 MHz; $V_R$ = 0 V

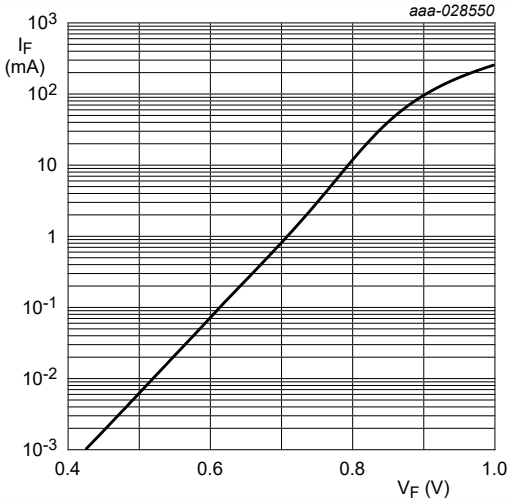
[2] $t_p$ = 100 μs; square wave; $t_j$ = 25 °C before surge




(1) $T_j$ = 25 °C (before surge)

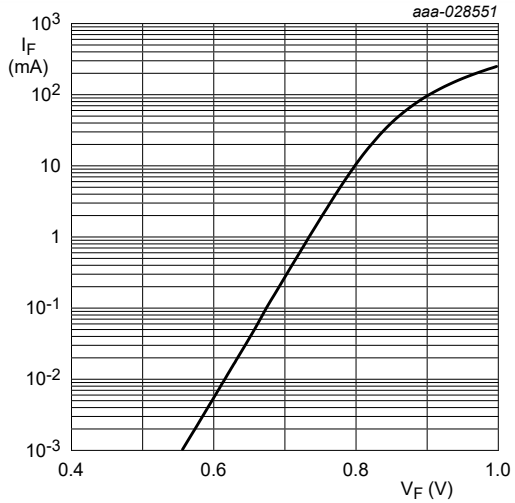
(2) $T_j$ = 150 °C (before surge)

**Fig. 1. Non-repetitive peak reverse power dissipation as a function of pulse duration; maximum values**



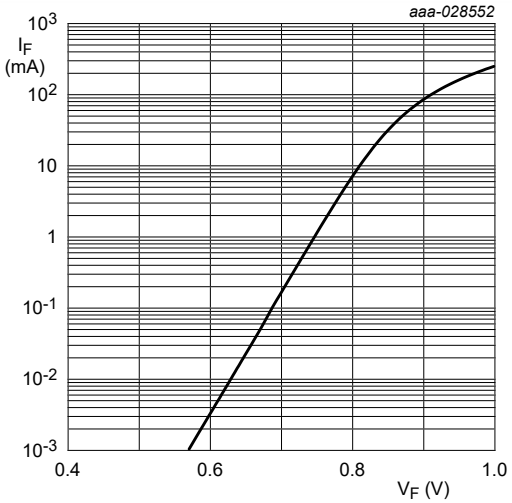

$T_j$ = 25 °C

**Fig. 2. Forward current as a function of forward voltage; typical values (BZX585-B/C2V4-Q)**



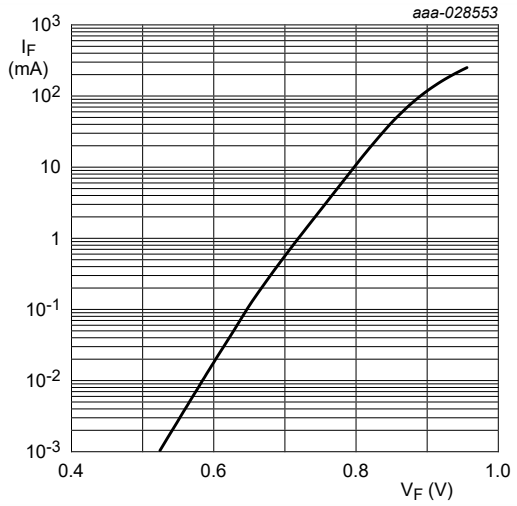

$T_j$ = 25 °C

**Fig. 3. Forward current as a function of forward voltage; typical values (BZX585-B/C6V8-Q)**



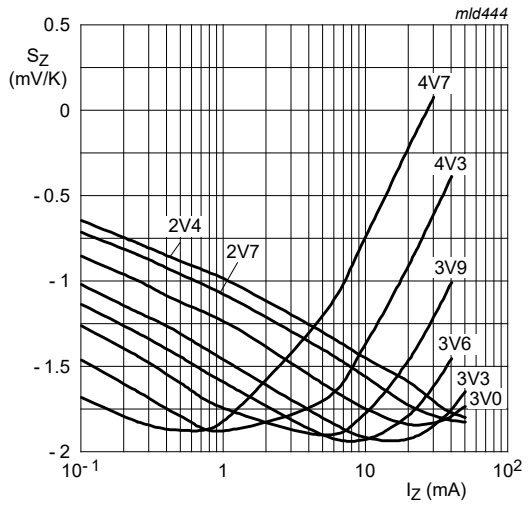

$T_j$ = 25 °C

**Fig. 4. Forward current as a function of forward voltage; typical values (BZX585-B/C7V5-Q)**



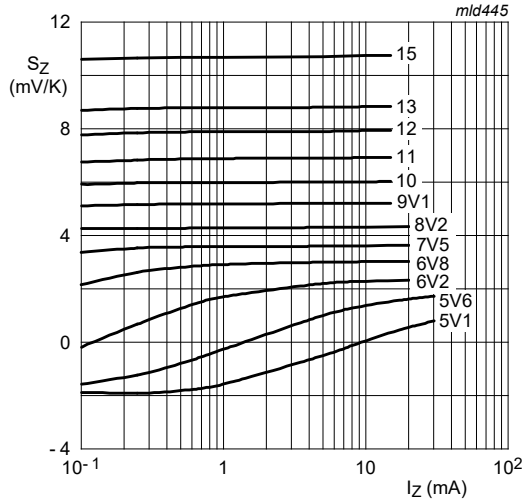

$T_j$ = 25 °C

**Fig. 5. Forward current as a function of forward voltage; typical values (BZX585-B/C75-Q)**



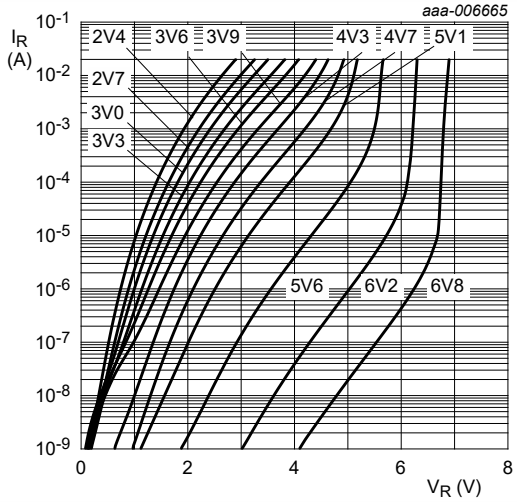

$T_j$ = 25 °C to 150 °C

**Fig. 6. Temperature coefficient as a function of working current; typical values (BZX585-B/C2V4-Q to B/C4V7-Q)**



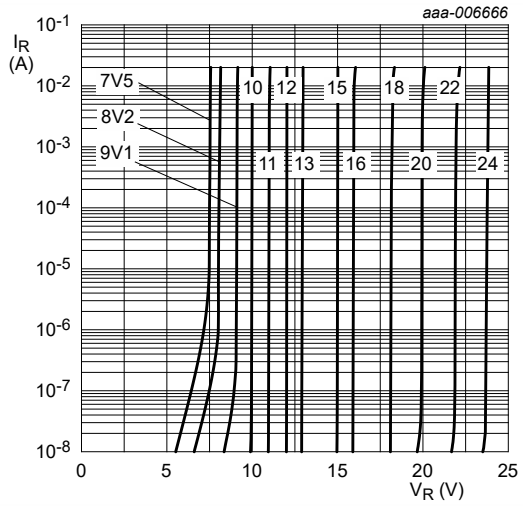

$T_j$ = 25 °C to 150 °C

**Fig. 7. Temperature coefficient as a function of working current; typical values (BZX585-B/C5V1-Q to B/C15-Q)**



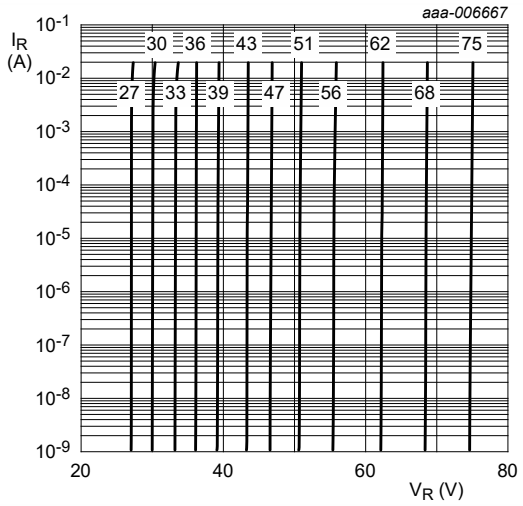

$T_j$ = 25 °C

**Fig. 8. Reverse current as a function of reverse voltage; typical values (BZX585-B/C2V4-Q to BZX585-B/C6V8-Q)**




$T_j$ = 25 °C

**Fig. 9. Reverse current as a function of reverse voltage; typical values (BZX585-B/C7V5-Q to BZX585-B/C24-Q)**




$T_j$ = 25 °C

**Fig. 10. Reverse current as a function of reverse voltage; typical values (BZX585-B/C27-Q to BZX585-B/C75-Q)**

# 11. Test information

## Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

# 12. Package outline

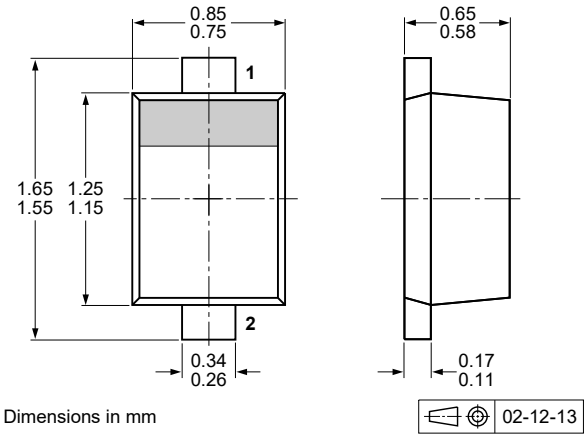



**Fig. 11. Package outline SOD523 (SC-79)**

## 13. Soldering

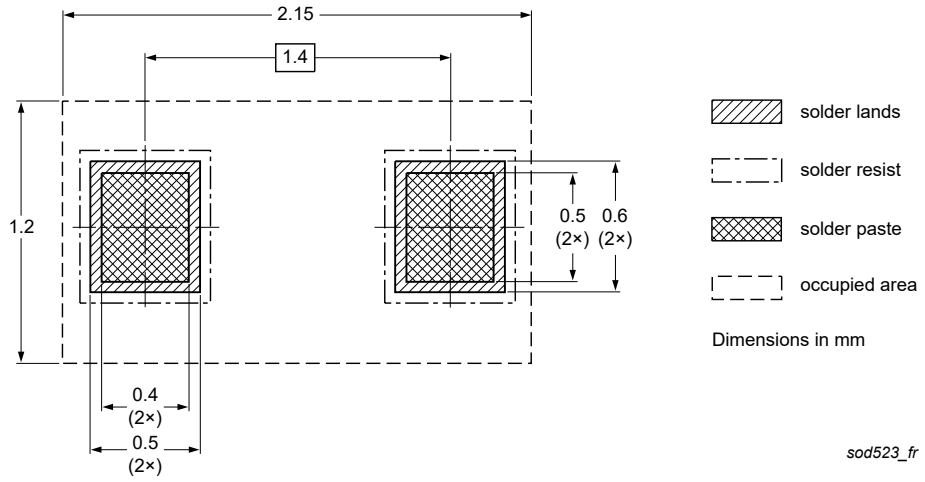



**Fig. 12. Reflow soldering footprint SOD523 (SC-79)**

# 14. Revision history

**Table 10. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BZX585-Q_SER v.1 | 20231011 | Product data sheet | - | - |

# 15. Legal information

## Data sheet status

| Document status [1][2] | Product status [3] | Definition |
|---|---|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at https://www.nexperia.com.

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**Date of release: 11 October 2023**

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