



**THE DATASHEET OF
BZX585-C7V5,135**





BZX585 series

Voltage regulator diodes

Rev. 5 — 11 October 2016

Product data sheet

1. Product profile

1.1 General description

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

1.2 Features and benefits

- Non-repetitive peak reverse power dissipation: ≤ 40 W
- Total power dissipation: ≤ 300 mW
- AEC-Q101 qualified
- Wide working voltage range: nominal 2.4 V to 75 V (E24 range)
- Two tolerance series: $\pm 2\%$ and $\pm 5\%$
- Low differential resistance

1.3 Applications

- General regulation functions

1.4 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: $t_p \leq 300$ μ s; $\delta \leq 0.02$.

[2] $t_p = 100$ μ s; square wave; $T_j = 25$ °C before surge

2. Pinning information

Table 2. Pinning

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

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|--|---------|--|---------|
| | Name | Description | Version |
| BZX585-B2V4 to BZX585-C75 ^[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.

4. Marking

Table 4. Marking codes

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

5. 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 | | [1] - | see Table 8 and 9 | |
| P_{ZSM} | non-repetitive peak reverse power dissipation | | [1] - | 40 | W |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | [2] - | 300 | mW |
| T_{amb} | ambient temperature | | -65 | +150 | °C |
| T_j | junction temperature | | -65 | +150 | °C |
| T_{stg} | storage temperature | | -65 | +150 | °C |

[1] $t_p = 100\ \mu\text{s}$; square wave; $T_j = 25\text{ °C}$ before surge

[2] Device mounted on an FR4 Printed-Circuit Board (PCB) with approximately 35 mm² Cu area at cathode tab.

6. 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 mm² Cu area at cathode tab.

[2] Soldering point of cathode tab.

7. Characteristics

Table 7. Characteristics

$T_j = 25\text{ °C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-----------------|-----------------------|-----|-----|-----|------|
| V_F | forward voltage | | [1] | | | |
| | | $I_F = 10\text{ mA}$ | - | - | 0.9 | V |
| | | $I_F = 100\text{ mA}$ | - | - | 1.1 | V |

[1] Pulse test: $t_p \leq 300\ \mu\text{s}$; $\delta \leq 0.02$.

Table 8. Characteristics per type; BZX585-B2V4 to BZX585-C24

 $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

| BZX585-xxx | Sel | Working voltage V_Z (V) | | Differential resistance r_{dif} (Ω) | | | | Reverse current I_R (μA) | | Temperature coefficient S_Z (mV/K) | | | Diode capacitance C_d (pF) ^[1] | Non-repetitive peak reverse current I_{ZSM} (A) ^[2] |
|------------|-----|---------------------------|-------|---|-----|---------------------|-----|---|-----------|--------------------------------------|------|-----|---|--|
| | | | | $I_Z = 1\text{ mA}$ | | $I_Z = 5\text{ mA}$ | | | | $I_Z = 5\text{ mA}$ | | | | |
| | | Min | Max | Typ | Max | Typ | Max | Max | V_R (V) | Min | Typ | Max | | |
| 2V4 | B | 2.35 | 2.45 | 275 | 400 | 70 | 100 | 50 | 1 | -3.5 | -1.3 | 0 | 450 | 6 |
| | C | 2.28 | 2.52 | | | | | | | | | | | |
| 2V7 | B | 2.65 | 2.75 | 300 | 450 | 75 | 100 | 20 | 1 | -3.5 | -1.4 | 0 | 440 | 6 |
| | C | 2.57 | 2.84 | | | | | | | | | | | |
| 3V0 | B | 2.94 | 3.06 | 325 | 500 | 80 | 95 | 10 | 1 | -3.5 | -1.6 | 0 | 425 | 6 |
| | C | 2.85 | 3.15 | | | | | | | | | | | |
| 3V3 | B | 3.23 | 3.37 | 350 | 500 | 85 | 95 | 5 | 1 | -3.5 | -1.8 | 0 | 410 | 6 |
| | C | 3.14 | 3.47 | | | | | | | | | | | |
| 3V6 | B | 3.53 | 3.67 | 375 | 500 | 85 | 90 | 5 | 1 | -3.5 | -1.9 | 0 | 390 | 6 |
| | C | 3.42 | 3.78 | | | | | | | | | | | |
| 3V9 | B | 3.82 | 3.98 | 400 | 500 | 85 | 90 | 3 | 1 | -3.5 | -1.9 | 0 | 370 | 6 |
| | C | 3.71 | 4.10 | | | | | | | | | | | |
| 4V3 | B | 4.21 | 4.39 | 410 | 600 | 80 | 90 | 3 | 1 | -3.5 | -1.7 | 0 | 350 | 6 |
| | C | 4.09 | 4.52 | | | | | | | | | | | |
| 4V7 | B | 4.61 | 4.79 | 425 | 500 | 50 | 80 | 3 | 2 | -3.5 | -1.2 | 0.2 | 325 | 6 |
| | C | 4.47 | 4.94 | | | | | | | | | | | |
| 5V1 | B | 5.00 | 5.20 | 400 | 480 | 40 | 60 | 2 | 2 | -2.7 | -0.5 | 1.2 | 300 | 6 |
| | C | 4.85 | 5.36 | | | | | | | | | | | |
| 5V6 | B | 5.49 | 5.71 | 80 | 400 | 15 | 40 | 1 | 2 | -2 | 1.0 | 2.5 | 275 | 6 |
| | C | 5.32 | 5.88 | | | | | | | | | | | |
| 6V2 | B | 6.08 | 6.32 | 40 | 150 | 6 | 10 | 3 | 4 | 0.4 | 2.2 | 3.7 | 250 | 6 |
| | C | 5.89 | 6.51 | | | | | | | | | | | |
| 6V8 | B | 6.66 | 6.94 | 30 | 80 | 6 | 15 | 2 | 4 | 1.2 | 3.0 | 4.5 | 215 | 6 |
| | C | 6.46 | 7.14 | | | | | | | | | | | |
| 7V5 | B | 7.35 | 7.65 | 15 | 80 | 2 | 10 | 1 | 5 | 2.5 | 3.6 | 5.3 | 170 | 4 |
| | C | 7.13 | 7.88 | | | | | | | | | | | |
| 8V2 | B | 8.04 | 8.36 | 20 | 80 | 2 | 10 | 0.7 | 5 | 3.2 | 4.3 | 6.2 | 150 | 4 |
| | C | 7.79 | 8.61 | | | | | | | | | | | |
| 9V1 | B | 8.92 | 9.28 | 20 | 100 | 2 | 10 | 0.5 | 6 | 3.8 | 5.2 | 7 | 120 | 3 |
| | C | 8.65 | 9.56 | | | | | | | | | | | |
| 10 | B | 9.80 | 10.20 | 20 | 150 | 2 | 10 | 0.2 | 7 | 4.5 | 6.0 | 8 | 110 | 3 |
| | C | 9.50 | 10.50 | | | | | | | | | | | |
| 11 | B | 10.78 | 11.22 | 25 | 150 | 2 | 10 | 0.1 | 8 | 5.4 | 6.9 | 9 | 110 | 2.5 |
| | C | 10.45 | 11.55 | | | | | | | | | | | |
| 12 | B | 11.76 | 12.24 | 25 | 150 | 2 | 10 | 0.1 | 8 | 6 | 7.9 | 10 | 105 | 2.5 |
| | C | 11.40 | 12.60 | | | | | | | | | | | |

Table 8. Characteristics per type; BZX585-B2V4 to BZX585-C24 ...continued

 $T_j = 25\text{ °C}$ unless otherwise specified.

| BZX585-xxx | Sel | Working voltage V_Z (V) | | Differential resistance r_{dif} (Ω) | | | | Reverse current I_R (μ A) | | Temperature coefficient S_Z (mV/K) | | | Diode capacitance C_d (pF) ^[1] | Non-repetitive peak reverse current I_{ZSM} (A) ^[2] |
|------------|-----|------------------------------|-------|---|-----|---------------------|-----|-------------------------------------|-----------|---|------|-----|--|---|
| | | | | $I_Z = 1\text{ mA}$ | | $I_Z = 5\text{ mA}$ | | | | $I_Z = 5\text{ mA}$ | | | | |
| | | Min | Max | Typ | Max | Typ | Max | Max | V_R (V) | Min | Typ | Max | | |
| 13 | B | 12.74 | 13.26 | 25 | 170 | 2 | 10 | 0.1 | 8 | 7 | 8.8 | 11 | 105 | 2.5 |
| | C | 12.35 | 13.65 | | | | | | | | | | | |
| 15 | B | 14.70 | 15.30 | 25 | 200 | 3 | 15 | 0.05 | 10.5 | 9.2 | 10.7 | 13 | 100 | 2 |
| | C | 14.25 | 15.75 | | | | | | | | | | | |
| 16 | B | 15.68 | 16.32 | 50 | 200 | 10 | 40 | 0.05 | 11.2 | 10.4 | 12.4 | 14 | 90 | 1.5 |
| | C | 15.20 | 16.80 | | | | | | | | | | | |
| 18 | B | 17.64 | 18.36 | 50 | 225 | 10 | 45 | 0.05 | 12.6 | 12.4 | 14.4 | 16 | 80 | 1.5 |
| | C | 17.10 | 18.90 | | | | | | | | | | | |
| 20 | B | 19.60 | 20.40 | 60 | 225 | 15 | 55 | 0.05 | 14 | 14.4 | 16.4 | 18 | 70 | 1.5 |
| | C | 19.00 | 21.00 | | | | | | | | | | | |
| 22 | B | 21.56 | 22.44 | 60 | 250 | 20 | 55 | 0.05 | 15.4 | 16.4 | 18.4 | 20 | 60 | 1.25 |
| | C | 20.90 | 23.10 | | | | | | | | | | | |
| 24 | B | 23.52 | 24.48 | 60 | 250 | 25 | 70 | 0.05 | 16.8 | 18.4 | 20.4 | 22 | 55 | 1.25 |
| | C | 22.80 | 25.20 | | | | | | | | | | | |

[1] $f = 1\text{ MHz}$; $V_R = 0\text{ V}$ [2] $t_p = 100\text{ }\mu\text{s}$; square wave; $T_j = 25\text{ °C}$ before surge

Table 9. Characteristics per type; BZX585-B27 to BZX585-C75 $T_j = 25\text{ °C}$ unless otherwise specified.

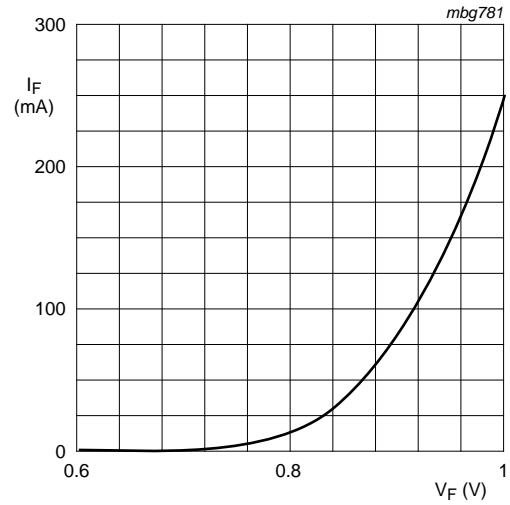
| BZX585 -xxx | Sel | Working voltage V_Z (V) | | Differential resistance r_{dif} (Ω) | | | | Reverse current I_R (μ A) | | Temperature coefficient S_Z (mV/K) | | | Diode capacitance C_d (pF) ^[1] | Non-repetitive peak reverse current I_{ZSM} (A) ^[2] |
|----------------|-----|------------------------------|-------|---|-----|---------------------|-----|-------------------------------------|-----------|---|------|------|--|---|
| | | $I_Z = 2\text{ mA}$ | | $I_Z = 0.5\text{ mA}$ | | $I_Z = 2\text{ mA}$ | | Max | V_R (V) | $I_Z = 2\text{ mA}$ | | | | |
| | | Min | Max | Typ | Max | Typ | Max | | | Min | Typ | Max | | |
| 27 | 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 | B | 29.40 | 30.60 | 70 | 300 | 30 | 80 | 0.05 | 21 | 24.4 | 26.6 | 29.4 | 50 | 1.0 |
| | C | 28.50 | 31.50 | | | | | | | | | | | |
| 33 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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] $f = 1\text{ MHz}$; $V_R = 0\text{ V}$ [2] $t_p = 100\text{ }\mu\text{s}$; square wave; $T_j = 25\text{ °C}$ before surge



- (1) $T_j = 25\text{ °C}$ (before surge)
- (2) $T_j = 150\text{ °C}$ (before surge)

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



$T_j = 25\text{ °C}$

Fig 2. Forward current as a function of forward voltage; typical values



BZX585-B/C2V4 to BZX585-B/C4V7
 $T_j = 25\text{ °C}$ to 150 °C

Fig 3. Temperature coefficient as a function of working current; typical values



BZX585-B/C5V1 to BZX585-B/C15
 $T_j = 25\text{ °C}$ to 150 °C

Fig 4. Temperature coefficient as a function of working current; typical values



$T_j = 25\text{ }^\circ\text{C}$
 BZX585-B/C2V7 to BZX585-B/C8V2

Fig 5. Working current as a function of working voltage; typical values



$T_j = 25\text{ }^\circ\text{C}$
 BZX585-B/C10 to BZX585-B/C36

Fig 6. Working current as a function of working voltage; typical values

8. Test information

8.1 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.

9. Package outline



10. Soldering



11. Revision history

Table 10. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--|-----------------------|---------------|----------------|
| BZX585_SER v.5 | 20161011 | Product data sheet | - | BZX585_SER v.4 |
| Modifications: | <ul style="list-style-type: none"> • The format of this document has been redesigned to comply with the new identity guidelines of NXP Semiconductors • Legal texts have been adapted to the new company name where appropriate. • Section 1 "Product profile": enhanced. • Table 5: T_{amb} added. • Table 8 and Table 9: updated • Figure 1, Figure 5 and Figure 6: added • Section 8 "Test information": added. • Figure 7: replaced by minimized package outline • Section 10 "Soldering": added • Section 12 "Legal information": updated | | | |
| BZX585_SER v.4 | 20040622 | Product data sheet | - | BZX585_SER v.3 |
| BZX585_SER v.3 | 20040326 | Product specification | - | BZX585_SER v.2 |
| BZX585_SER v.2 | 20001020 | Product specification | - | BZX585_SER v.1 |
| BZX585_SER v.1 | 20000606 | Product specification | - | - |

12. Legal information

12.1 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 URL <http://www.nexperia.com>.

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13. Contact information

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For sales office addresses, please send an email to: salesaddresses@nexperia.com

14. Contents

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