



# BZX84 series

## Voltage regulator diodes

Rev. 6 — 6 March 2014

Product data sheet

## 1. Product profile

### 1.1 General description

Low-power voltage regulator diodes in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

The diodes are available in the normalized E24  $\pm 1\%$  (BZX84-A),  $\pm 2\%$  (BZX84-B) and approximately  $\pm 5\%$  (BZX84-C) tolerance range. The series includes 37 breakdown voltages with nominal working voltages from 2.4 V to 75 V.

### 1.2 Features and benefits

- Total power dissipation:  $\leq 250$  mW
- Working voltage range: nominal 2.4 V to 75 V (E24 range)
- Three tolerance series:  $\pm 1\%$ ,  $\pm 2\%$  and approximately  $\pm 5\%$
- Non-repetitive peak reverse power dissipation:  $\leq 40$  W
- AEC-Q101 qualified

### 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         | $I_F = 10$ mA [1]        | -   | -   | 0.9 | V    |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C [2] | -   | -   | 250 | mW   |

[1] Pulse test:  $t_p \leq 100$   $\mu$ s;  $\delta \leq 0.02$

[2] Device mounted on a FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

## 2. Pinning information

Table 2. Pinning

| Pin | Symbol | Description   | Simplified outline                                                                  | Graphic symbol                                                                      |
|-----|--------|---------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | A      | anode         |  |  |
| 2   | n.c.   | not connected |                                                                                     |                                                                                     |
| 3   | K      | cathode       |                                                                                     |                                                                                     |

## 3. Ordering information

Table 3. Ordering information

| Type number                 | Package  |                                          |         |
|-----------------------------|----------|------------------------------------------|---------|
|                             | Name     | Description                              | Version |
| BZX84 series <sup>[1]</sup> | TO-236AB | plastic surface-mounted package; 3 leads | SOT23   |

[1] The series includes 37 breakdown voltages with nominal working voltages from 2.4 V to 75 V and  $\pm 1\%$ ,  $\pm 2\%$  and  $\pm 5\%$  tolerances.

## 4. Marking

Table 4. Marking codes

| Type number | Marking code <sup>[1]</sup> | Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|-------------|-----------------------------|
| BZX84-A2V4  | *50                         | BZX84-A18   | KF*                         |
| BZX84-A2V7  | *51                         | BZX84-A20   | *C2                         |
| BZX84-A3V0  | *52                         | BZX84-A22   | KG*                         |
| BZX84-A3V3  | *53                         | BZX84-A24   | KH*                         |
| BZX84-A3V6  | *C1                         | BZX84-A27   | *75                         |
| BZX84-A3V9  | *55                         | BZX84-A30   | KJ*                         |
| BZX84-A4V3  | *56                         | BZX84-A33   | KK*                         |
| BZX84-A4V7  | *57                         | BZX84-A36   | *C3                         |
| BZX84-A5V1  | *58                         | BZX84-A39   | *C4                         |
| BZX84-A5V6  | *59                         | BZX84-A43   | *C5                         |
| BZX84-A6V2  | *60                         | BZX84-A51   | *C6                         |
| BZX84-A6V8  | *61                         | BZX84-A75   | *86                         |
| BZX84-A7V5  | *62                         | BZX84-B2V4  | *Z0                         |
| BZX84-A8V2  | *63                         | BZX84-B2V7  | *Z1                         |
| BZX84-A9V1  | *64                         | BZX84-B3V0  | *S1                         |
| BZX84-A10   | *65                         | BZX84-B3V3  | *S2                         |
| BZX84-A11   | *04                         | BZX84-B3V6  | *S3                         |
| BZX84-A12   | *67                         | BZX84-B3V9  | *S4                         |
| BZX84-A13   | *C0                         | BZX84-B4V3  | *S7                         |
| BZX84-A15   | *69                         | BZX84-B4V7  | *S8                         |
| BZX84-A16   | KE*                         | BZX84-B5V1  | *R1                         |

Table 4. Marking codes ...continued

| Type number | Marking code <sup>[1]</sup> | Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|-------------|-----------------------------|
| BZX84-B5V6  | *R2                         | BZX84-C3V9  | *B3                         |
| BZX84-B6V2  | *R5                         | BZX84-C4V3  | *B6                         |
| BZX84-B6V8  | *R6                         | BZX84-C4V7  | Z1*                         |
| BZX84-B7V5  | *R8                         | BZX84-C5V1  | Z2*                         |
| BZX84-B8V2  | *R9                         | BZX84-C5V6  | Z3*                         |
| BZX84-B9V1  | *T1                         | BZX84-C6V2  | Z4*                         |
| BZX84-B10   | *66                         | BZX84-C6V8  | Z5*                         |
| BZX84-B11   | *Z6                         | BZX84-C7V5  | Z6*                         |
| BZX84-B12   | *Z7                         | BZX84-C8V2  | Z7*                         |
| BZX84-B13   | *Z8                         | BZX84-C9V1  | Z8*                         |
| BZX84-B15   | *Z9                         | BZX84-C10   | Z9*                         |
| BZX84-B16   | *70                         | BZX84-C11   | Y1*                         |
| BZX84-B18   | *71                         | BZX84-C12   | Y2*                         |
| BZX84-B20   | *72                         | BZX84-C13   | Y3*                         |
| BZX84-B22   | *73                         | BZX84-C15   | Y4*                         |
| BZX84-B24   | *74                         | BZX84-C16   | Y5*                         |
| BZX84-B27   | *Z5                         | BZX84-C18   | Y6*                         |
| BZX84-B30   | *Z4                         | BZX84-C20   | Y7*                         |
| BZX84-B33   | *Y1                         | BZX84-C22   | Y8*                         |
| BZX84-B36   | *Y2                         | BZX84-C24   | Y9*                         |
| BZX84-B39   | *S0                         | BZX84-C27   | *T2                         |
| BZX84-B43   | *S5                         | BZX84-C30   | *T5                         |
| BZX84-B47   | *S6                         | BZX84-C33   | *T6                         |
| BZX84-B51   | *S9                         | BZX84-C36   | *T7                         |
| BZX84-B56   | *R0                         | BZX84-C39   | *T8                         |
| BZX84-B62   | *R3                         | BZX84-C43   | *B4                         |
| BZX84-B68   | *R4                         | BZX84-C47   | *B5                         |
| BZX84-B75   | *R7                         | BZX84-C51   | *B7                         |
| BZX84-C2V4  | *T3                         | BZX84-C56   | *B8                         |
| BZX84-C2V7  | *T4                         | BZX84-C62   | *B9                         |
| BZX84-C3V0  | *T9                         | BZX84-C68   | *B0                         |
| BZX84-C3V3  | *B1                         | BZX84-C75   | *A1                         |
| BZX84-C3V6  | *B2                         | -           | -                           |

[1] \* = placeholder for manufacturing site code

## 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   |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | [1]                             | -   | 40   | W    |
| $P_{tot}$ | total power dissipation                       | $T_{amb} \leq 25\text{ °C}$ [2] | -   | 250  | mW   |
| $T_{amb}$ | ambient temperature                           |                                 | -   | 150  | °C   |
| $T_{stg}$ | storage temperature                           |                                 | -55 | +150 | °C   |
| $T_j$     | junction temperature                          |                                 | -65 | +150 | °C   |

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

[2] Device mounted on a FR4 PCB, single-sided copper, tin-plated and standard footprint.

## 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] | -   | -   | 500 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | [2]             | -   | -   | 330 | K/W  |

[1] Device mounted on a FR4 PCB, single-sided copper, tin-plated and standard footprint.

[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 | $I_F = 10\text{ mA}$ [1] | -   | -   | 0.9 | V    |

[1] Pulse test:  $t_p \leq 100\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$

**Table 8. Characteristics per type; BZX84-A2V4 to BZX84-C24** $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| BZX84-<br>xxx | Sel | Working<br>voltage<br>V <sub>Z</sub> (V) |      | Differential resistance<br>r <sub>dif</sub> (Ω) |     |                       |     | Reverse<br>current<br>I <sub>R</sub> (μA) |                    | Temperature<br>coefficient<br>S <sub>Z</sub> (mV/K) |      |     | Diode<br>capacitance<br>C <sub>d</sub> (pF) <sup>[1]</sup> | Non-repetitive<br>peak reverse<br>current<br>I <sub>ZSM</sub> (A) <sup>[2]</sup> |
|---------------|-----|------------------------------------------|------|-------------------------------------------------|-----|-----------------------|-----|-------------------------------------------|--------------------|-----------------------------------------------------|------|-----|------------------------------------------------------------|----------------------------------------------------------------------------------|
|               |     | I <sub>Z</sub> = 5 mA                    |      | I <sub>Z</sub> = 1 mA                           |     | I <sub>Z</sub> = 5 mA |     |                                           |                    | I <sub>Z</sub> = 5 mA                               |      |     |                                                            |                                                                                  |
|               |     | Min                                      | Max  | Typ                                             | Max | Typ                   | Max | Max                                       | V <sub>R</sub> (V) | Min                                                 | Typ  | Max | Max                                                        | Max                                                                              |
| 2V4           | A   | 2.37                                     | 2.43 | 275                                             | 600 | 70                    | 100 | 50                                        | 1                  | −3.5                                                | −1.6 | 0   | 450                                                        | 6.0                                                                              |
|               | B   | 2.35                                     | 2.45 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 2.2                                      | 2.6  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 2V7           | A   | 2.67                                     | 2.73 | 300                                             | 600 | 75                    | 100 | 20                                        | 1                  | −3.5                                                | −2.0 | 0   | 450                                                        | 6.0                                                                              |
|               | B   | 2.65                                     | 2.75 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 2.5                                      | 2.9  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 3V0           | A   | 2.97                                     | 3.03 | 325                                             | 600 | 80                    | 95  | 10                                        | 1                  | −3.5                                                | −2.1 | 0   | 450                                                        | 6.0                                                                              |
|               | B   | 2.94                                     | 3.06 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 2.8                                      | 3.2  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 3V3           | A   | 3.26                                     | 3.34 | 350                                             | 600 | 85                    | 95  | 5                                         | 1                  | −3.5                                                | −2.4 | 0   | 450                                                        | 6.0                                                                              |
|               | B   | 3.23                                     | 3.37 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 3.1                                      | 3.5  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 3V6           | A   | 3.56                                     | 3.64 | 375                                             | 600 | 85                    | 90  | 5                                         | 1                  | −3.5                                                | −2.4 | 0   | 450                                                        | 6.0                                                                              |
|               | B   | 3.53                                     | 3.67 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 3.4                                      | 3.8  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 3V9           | A   | 3.86                                     | 3.94 | 400                                             | 600 | 85                    | 90  | 3                                         | 1                  | −3.5                                                | −2.5 | 0   | 450                                                        | 6.0                                                                              |
|               | B   | 3.82                                     | 3.98 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 3.7                                      | 4.1  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 4V3           | A   | 4.25                                     | 4.35 | 410                                             | 600 | 80                    | 90  | 3                                         | 1                  | −3.5                                                | −2.5 | 0   | 450                                                        | 6.0                                                                              |
|               | B   | 4.21                                     | 4.39 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 4.0                                      | 4.6  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 4V7           | A   | 4.65                                     | 4.75 | 425                                             | 500 | 50                    | 80  | 3                                         | 2                  | −3.5                                                | −1.4 | 0.2 | 300                                                        | 6.0                                                                              |
|               | B   | 4.61                                     | 4.79 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 4.4                                      | 5.0  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 5V1           | A   | 5.04                                     | 5.16 | 400                                             | 480 | 40                    | 60  | 2                                         | 2                  | −2.7                                                | −0.8 | 1.2 | 300                                                        | 6.0                                                                              |
|               | B   | 5.0                                      | 5.2  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 4.8                                      | 5.4  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 5V6           | A   | 5.54                                     | 5.66 | 80                                              | 400 | 15                    | 40  | 1                                         | 2                  | −2.0                                                | 1.2  | 2.5 | 300                                                        | 6.0                                                                              |
|               | B   | 5.49                                     | 5.71 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 5.2                                      | 6.0  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 6V2           | A   | 6.13                                     | 6.27 | 40                                              | 150 | 6                     | 10  | 3                                         | 4                  | 0.4                                                 | 2.3  | 3.7 | 200                                                        | 6.0                                                                              |
|               | B   | 6.08                                     | 6.32 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 5.8                                      | 6.6  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
| 6V8           | A   | 6.73                                     | 6.87 | 30                                              | 80  | 6                     | 15  | 2                                         | 4                  | 1.2                                                 | 3.0  | 4.5 | 200                                                        | 6.0                                                                              |
|               | B   | 6.66                                     | 6.94 |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |
|               | C   | 6.4                                      | 7.2  |                                                 |     |                       |     |                                           |                    |                                                     |      |     |                                                            |                                                                                  |

**Table 8. Characteristics per type; BZX84-A2V4 to BZX84-C24 ...continued** $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| BZX84-<br>xxx | Sel | Working<br>voltage<br>V <sub>Z</sub> (V) |       | Differential resistance<br>r <sub>dif</sub> (Ω) |     |                       |     | Reverse<br>current<br>I <sub>R</sub> (μA) |                    | Temperature<br>coefficient<br>S <sub>Z</sub> (mV/K) |      |      | Diode<br>capacitance<br>C <sub>d</sub> (pF) <sup>[1]</sup> | Non-repetitive<br>peak reverse<br>current<br>I <sub>ZSM</sub> (A) <sup>[2]</sup> |
|---------------|-----|------------------------------------------|-------|-------------------------------------------------|-----|-----------------------|-----|-------------------------------------------|--------------------|-----------------------------------------------------|------|------|------------------------------------------------------------|----------------------------------------------------------------------------------|
|               |     | I <sub>Z</sub> = 5 mA                    |       | I <sub>Z</sub> = 1 mA                           |     | I <sub>Z</sub> = 5 mA |     |                                           |                    | I <sub>Z</sub> = 5 mA                               |      |      |                                                            |                                                                                  |
|               |     | Min                                      | Max   | Typ                                             | Max | Typ                   | Max | Max                                       | V <sub>R</sub> (V) | Min                                                 | Typ  | Max  | Max                                                        | Max                                                                              |
| 7V5           | A   | 7.42                                     | 7.58  | 30                                              | 80  | 6                     | 15  | 1                                         | 5                  | 2.5                                                 | 4.0  | 5.3  | 150                                                        | 4.0                                                                              |
|               | B   | 7.35                                     | 7.65  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 7.0                                      | 7.9   |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 8V2           | A   | 8.11                                     | 8.29  | 40                                              | 80  | 6                     | 15  | 0.7                                       | 5                  | 3.2                                                 | 4.6  | 6.2  | 150                                                        | 4.0                                                                              |
|               | B   | 8.04                                     | 8.36  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 7.7                                      | 8.7   |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 9V1           | A   | 9                                        | 9.2   | 40                                              | 100 | 6                     | 15  | 0.5                                       | 6                  | 3.8                                                 | 5.5  | 7.0  | 150                                                        | 3.0                                                                              |
|               | B   | 8.92                                     | 9.28  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 8.5                                      | 9.6   |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 10            | A   | 9.9                                      | 10.1  | 50                                              | 150 | 8                     | 20  | 0.2                                       | 7                  | 4.5                                                 | 6.4  | 8.0  | 90                                                         | 3.0                                                                              |
|               | B   | 9.8                                      | 10.2  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 9.4                                      | 10.6  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 11            | A   | 10.8                                     | 11.11 | 50                                              | 150 | 10                    | 20  | 0.1                                       | 8                  | 5.4                                                 | 7.4  | 9.0  | 85                                                         | 2.5                                                                              |
|               | B   | 10.8                                     | 11.2  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 10.4                                     | 11.6  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 12            | A   | 11.88                                    | 12.12 | 50                                              | 150 | 10                    | 25  | 0.1                                       | 8                  | 6.0                                                 | 8.4  | 10.0 | 85                                                         | 2.5                                                                              |
|               | B   | 11.8                                     | 12.2  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 11.4                                     | 12.7  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 13            | A   | 12.87                                    | 13.13 | 50                                              | 170 | 10                    | 30  | 0.1                                       | 8                  | 7.0                                                 | 9.4  | 11.0 | 80                                                         | 2.5                                                                              |
|               | B   | 12.7                                     | 13.3  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 12.4                                     | 14.1  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 15            | A   | 14.85                                    | 15.15 | 50                                              | 200 | 10                    | 30  | 0.05                                      | 10.5               | 9.2                                                 | 11.4 | 13.0 | 75                                                         | 2.0                                                                              |
|               | B   | 14.7                                     | 15.3  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 13.8                                     | 15.6  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 16            | A   | 15.84                                    | 16.16 | 50                                              | 200 | 10                    | 40  | 0.05                                      | 11.2               | 10.4                                                | 12.4 | 14.0 | 75                                                         | 1.5                                                                              |
|               | B   | 15.7                                     | 16.3  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 15.3                                     | 17.1  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 18            | A   | 17.82                                    | 18.18 | 50                                              | 225 | 10                    | 45  | 0.05                                      | 12.6               | 12.4                                                | 14.4 | 16.0 | 70                                                         | 1.5                                                                              |
|               | B   | 17.6                                     | 18.4  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 16.8                                     | 19.1  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 20            | A   | 19.8                                     | 20.2  | 60                                              | 225 | 15                    | 55  | 0.05                                      | 14                 | 14.4                                                | 16.4 | 18.0 | 60                                                         | 1.5                                                                              |
|               | B   | 19.6                                     | 20.4  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 18.8                                     | 21.2  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
| 22            | A   | 21.78                                    | 22.22 | 60                                              | 250 | 20                    | 55  | 0.05                                      | 15.4               | 16.4                                                | 18.4 | 20.0 | 60                                                         | 1.25                                                                             |
|               | B   | 21.6                                     | 22.4  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 20.8                                     | 23.3  |                                                 |     |                       |     |                                           |                    |                                                     |      |      |                                                            |                                                                                  |

**Table 8. Characteristics per type; BZX84-A2V4 to BZX84-C24 ...continued** $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| BZX84-xxx | Sel | Working voltage<br>V <sub>Z</sub> (V) |       | Differential resistance<br>r <sub>dif</sub> (Ω) |     |                       |                    | Reverse current<br>I <sub>R</sub> (μA) |      | Temperature coefficient<br>S <sub>Z</sub> (mV/K) |      |      | Diode capacitance<br>C <sub>d</sub> (pF) <sup>[1]</sup> | Non-repetitive peak reverse current<br>I <sub>ZSM</sub> (A) <sup>[2]</sup> |
|-----------|-----|---------------------------------------|-------|-------------------------------------------------|-----|-----------------------|--------------------|----------------------------------------|------|--------------------------------------------------|------|------|---------------------------------------------------------|----------------------------------------------------------------------------|
|           |     |                                       |       |                                                 |     |                       |                    |                                        |      |                                                  |      |      |                                                         |                                                                            |
|           |     | I <sub>Z</sub> = 5 mA                 |       | I <sub>Z</sub> = 1 mA                           |     | I <sub>Z</sub> = 5 mA |                    | I <sub>Z</sub> = 5 mA                  |      |                                                  |      |      |                                                         |                                                                            |
| Min       | Max | Typ                                   | Max   | Typ                                             | Max | Max                   | V <sub>R</sub> (V) | Min                                    | Typ  | Max                                              | Max  | Max  |                                                         |                                                                            |
| 24        | A   | 23.76                                 | 24.24 | 60                                              | 250 | 25                    | 70                 | 0.05                                   | 16.8 | 18.4                                             | 20.4 | 22.0 | 55                                                      | 1.25                                                                       |
|           | B   | 23.5                                  | 24.5  |                                                 |     |                       |                    |                                        |      |                                                  |      |      |                                                         |                                                                            |
|           | C   | 22.8                                  | 25.6  |                                                 |     |                       |                    |                                        |      |                                                  |      |      |                                                         |                                                                            |

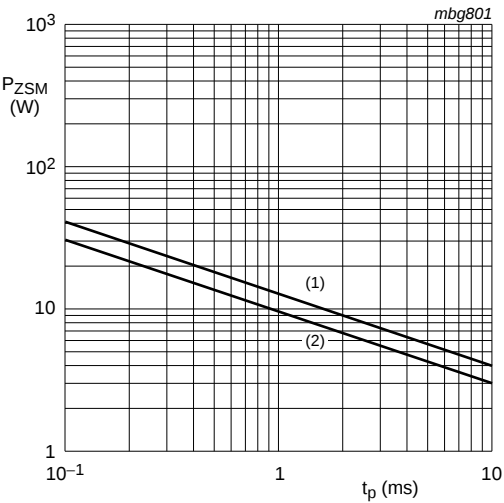
[1]  $f = 1\text{ MHz}$ ;  $V_R = 0\text{ V}$ [2]  $t_p = 100\text{ }\mu\text{s}$ ; square wave;  $T_j = 25\text{ }^{\circ}\text{C}$  before surge**Table 9. Characteristics per type; BZX84-A27 to BZX84-C75** $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| BZX84-<br>xxx | Sel | Working<br>voltage<br>V <sub>Z</sub> (V) |       | Differential resistance<br>r <sub>dif</sub> (Ω) |     |                       |                    | Reverse<br>current<br>I <sub>R</sub> (μA) |      | Temperature<br>coefficient<br>S <sub>Z</sub> (mV/K) |      |      | Diode<br>capacitance<br>C <sub>d</sub> (pF) <sup>[1]</sup> | Non-repetitive<br>peak reverse<br>current<br>I <sub>ZSM</sub> (A) <sup>[2]</sup> |
|---------------|-----|------------------------------------------|-------|-------------------------------------------------|-----|-----------------------|--------------------|-------------------------------------------|------|-----------------------------------------------------|------|------|------------------------------------------------------------|----------------------------------------------------------------------------------|
|               |     |                                          |       |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
|               |     | I <sub>Z</sub> = 2 mA                    |       | I <sub>Z</sub> = 0.5 mA                         |     | I <sub>Z</sub> = 2 mA |                    | I <sub>Z</sub> = 2 mA                     |      |                                                     |      |      |                                                            |                                                                                  |
| Min           | Max | Typ                                      | Max   | Typ                                             | Max | Max                   | V <sub>R</sub> (V) | Min                                       | Typ  | Max                                                 | Max  | Max  |                                                            |                                                                                  |
| 27            | A   | 26.73                                    | 27.27 | 65                                              | 300 | 25                    | 80                 | 0.05                                      | 18.9 | 21.4                                                | 23.4 | 25.3 | 50                                                         | 1.0                                                                              |
|               | B   | 26.5                                     | 27.5  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 25.1                                     | 28.9  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
| 30            | A   | 29.7                                     | 30.30 | 70                                              | 300 | 30                    | 80                 | 0.05                                      | 21   | 24.4                                                | 26.6 | 29.4 | 50                                                         | 1.0                                                                              |
|               | B   | 29.4                                     | 30.6  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 28.0                                     | 32.0  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
| 33            | A   | 32.67                                    | 33.33 | 75                                              | 325 | 35                    | 80                 | 0.05                                      | 23.1 | 27.4                                                | 29.7 | 33.4 | 45                                                         | 0.9                                                                              |
|               | B   | 32.3                                     | 33.7  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 31.0                                     | 35.0  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
| 36            | A   | 35.64                                    | 36.36 | 80                                              | 350 | 35                    | 90                 | 0.05                                      | 25.2 | 30.4                                                | 33.0 | 37.4 | 45                                                         | 0.8                                                                              |
|               | B   | 35.3                                     | 36.7  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 34.0                                     | 38.0  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
| 39            | A   | 38.61                                    | 39.39 | 80                                              | 350 | 40                    | 130                | 0.05                                      | 27.3 | 33.4                                                | 36.4 | 41.2 | 45                                                         | 0.7                                                                              |
|               | B   | 38.2                                     | 39.8  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 37.0                                     | 41.0  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
| 43            | A   | 42.57                                    | 43.43 | 85                                              | 375 | 45                    | 150                | 0.05                                      | 30.1 | 37.6                                                | 41.2 | 46.6 | 40                                                         | 0.6                                                                              |
|               | B   | 42.1                                     | 43.9  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 40.0                                     | 46.0  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
| 47            | B   | 46.1                                     | 47.9  | 85                                              | 375 | 50                    | 170                | 0.05                                      | 32.9 | 42.0                                                | 46.1 | 51.8 | 40                                                         | 0.5                                                                              |
|               | C   | 44.0                                     | 50.0  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
| 51            | A   | 50.49                                    | 51.51 | 90                                              | 400 | 60                    | 180                | 0.05                                      | 35.7 | 46.6                                                | 51.0 | 57.2 | 40                                                         | 0.4                                                                              |
|               | B   | 50.0                                     | 52.0  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |
|               | C   | 48.0                                     | 54.0  |                                                 |     |                       |                    |                                           |      |                                                     |      |      |                                                            |                                                                                  |

**Table 9. Characteristics per type; BZX84-A27 to BZX84-C75 ...continued** $T_j = 25\text{ °C}$  unless otherwise specified.

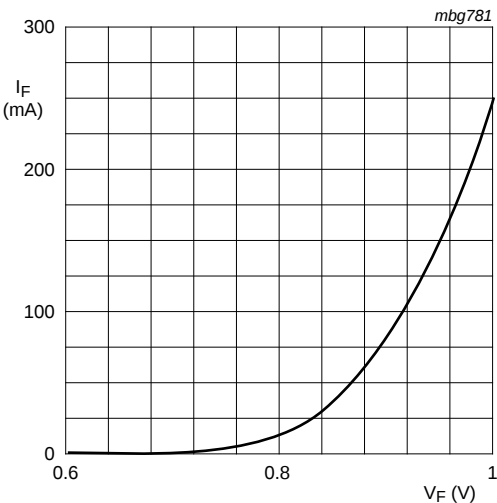
| BZX84-xxx | Sel | Working voltage<br>V <sub>Z</sub> (V) |       | Differential resistance<br>r <sub>dif</sub> (Ω) |     |                       |     | Reverse current<br>I <sub>R</sub> (μA) |                    | Temperature coefficient<br>S <sub>Z</sub> (mV/K) |      |      | Diode capacitance<br>C <sub>d</sub> (pF) <sup>[1]</sup> | Non-repetitive peak reverse current<br>I <sub>ZSM</sub> (A) <sup>[2]</sup> |
|-----------|-----|---------------------------------------|-------|-------------------------------------------------|-----|-----------------------|-----|----------------------------------------|--------------------|--------------------------------------------------|------|------|---------------------------------------------------------|----------------------------------------------------------------------------|
|           |     | I <sub>Z</sub> = 2 mA                 |       | I <sub>Z</sub> = 0.5 mA                         |     | I <sub>Z</sub> = 2 mA |     |                                        |                    | I <sub>Z</sub> = 2 mA                            |      |      |                                                         |                                                                            |
|           |     | Min                                   | Max   | Typ                                             | Max | Typ                   | Max | Max                                    | V <sub>R</sub> (V) | Min                                              | Typ  | Max  | Max                                                     | Max                                                                        |
| 56        | B   | 54.9                                  | 57.1  | 100                                             | 425 | 70                    | 200 | 0.05                                   | 39.2               | 52.2                                             | 57.0 | 63.8 | 40                                                      | 0.3                                                                        |
|           | C   | 52.0                                  | 60.0  |                                                 |     |                       |     |                                        |                    |                                                  |      |      |                                                         |                                                                            |
| 62        | B   | 60.8                                  | 63.2  | 120                                             | 450 | 80                    | 215 | 0.05                                   | 43.4               | 58.8                                             | 64.4 | 71.6 | 35                                                      | 0.3                                                                        |
|           | C   | 58.0                                  | 66.0  |                                                 |     |                       |     |                                        |                    |                                                  |      |      |                                                         |                                                                            |
| 68        | B   | 66.6                                  | 69.4  | 150                                             | 475 | 90                    | 240 | 0.05                                   | 47.6               | 65.6                                             | 71.7 | 79.8 | 35                                                      | 0.25                                                                       |
|           | C   | 64.0                                  | 72.0  |                                                 |     |                       |     |                                        |                    |                                                  |      |      |                                                         |                                                                            |
| 75        | A   | 74.25                                 | 75.75 | 170                                             | 500 | 95                    | 255 | 0.05                                   | 52.5               | 73.4                                             | 80.2 | 88.6 | 35                                                      | 0.20                                                                       |
|           | B   | 73.5                                  | 76.5  |                                                 |     |                       |     |                                        |                    |                                                  |      |      |                                                         |                                                                            |
|           | C   | 70.0                                  | 79.0  |                                                 |     |                       |     |                                        |                    |                                                  |      |      |                                                         |                                                                            |

[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



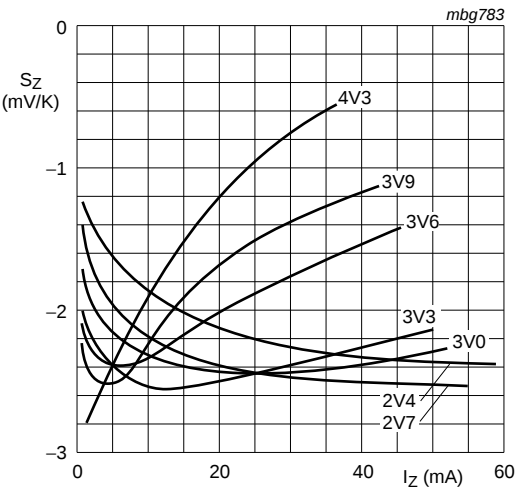
- (1)  $T_j = 25^\circ\text{C}$  (before surge)
- (2)  $T_j = 150^\circ\text{C}$  (before surge)

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



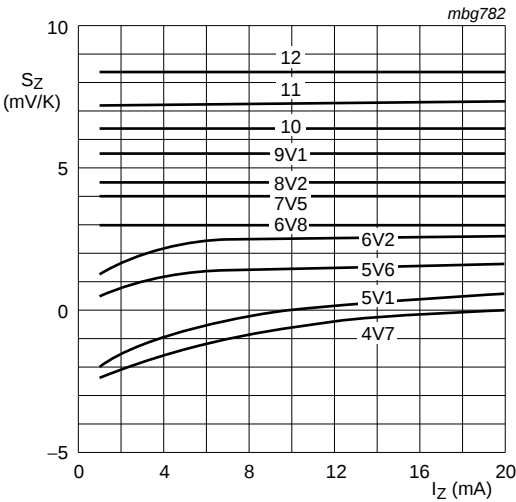
$T_j = 25^\circ\text{C}$

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



BZX84-A/B/C2V4 to BZX84-A/B/C4V3  
 $T_j = 25^\circ\text{C}$  to  $150^\circ\text{C}$

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



BZX84-A/B/C4V7 to BZX84-A/B/C12  
 $T_j = 25^\circ\text{C}$  to  $150^\circ\text{C}$

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



BZX84-A/B/C2V4 to BZX84-A/B/C6V8  
 $T_{amb} = 25\text{ }^{\circ}\text{C}$

Fig 5. Reverse current as a function of reverse voltage; typical values



BZX84-A/B/C7V5 to BZX84-A/B/C24  
 $T_{amb} = 25\text{ }^{\circ}\text{C}$

Fig 6. Reverse current as a function of reverse voltage; typical values



BZX84-A/B/C27 to BZX84-A/B/C75  
 $T_{amb} = 25\text{ }^{\circ}\text{C}$

Fig 7. Reverse current as a function of reverse 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. Packing information

Table 10. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

| Type number                 | Package          | Description                    | Packing quantity |       |
|-----------------------------|------------------|--------------------------------|------------------|-------|
|                             |                  |                                | 3000             | 10000 |
| BZX84 series <sup>[2]</sup> | SOT23 (TO-236AB) | 4 mm pitch, 8 mm tape and reel | -215             | -235  |

- [1] For further information and the availability of packing methods, see [Section 14](#).
- [2] The series includes 37 breakdown voltages with nominal working voltages from 2.4 V to 75 V and  $\pm 1\%$ ,  $\pm 2\%$  and  $\pm 5\%$  tolerances.

11. Soldering



Fig 9. Reflow soldering footprint SOT23 (TO-236AB)



Fig 10. Wave soldering footprint SOT23 (TO-236AB)

## 12. Revision history

Table 11. Revision history

| Document ID      | Release date                                  | Data sheet status     | Change notice | Supersedes       |
|------------------|-----------------------------------------------|-----------------------|---------------|------------------|
| BZX84_SER v.6    | 20140306                                      | Product data sheet    | -             | BZX84_SER v.5    |
| Modifications:   | • Descriptive title of the document corrected |                       |               |                  |
| BZX84_SER v.5    | 20130918                                      | Product data sheet    | -             | BZX84_SER v.4    |
| BZX84_SER v.4    | 20130322                                      | Product data sheet    | -             | BZX84_SERIES v.3 |
| BZX84_SERIES v.3 | 20030410                                      | Product data sheet    | -             | BZX84 v.2        |
| BZX84 v.2        | 19990518                                      | Product specification | -             | BZX84 v.1        |
| BZX84 v.1        | 19960426                                      | Product specification | -             | -                |

## 13. Legal information

### 13.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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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## 14. Contact information

For more information, please visit: <http://www.nexperia.com>

For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)

## 15. Contents

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|           |                                          |           |
|-----------|------------------------------------------|-----------|
| <b>1</b>  | <b>Product profile</b> . . . . .         | <b>1</b>  |
| 1.1       | General description . . . . .            | 1         |
| 1.2       | Features and benefits . . . . .          | 1         |
| 1.3       | Applications . . . . .                   | 1         |
| 1.4       | Quick reference data . . . . .           | 1         |
| <b>2</b>  | <b>Pinning information</b> . . . . .     | <b>2</b>  |
| <b>3</b>  | <b>Ordering information</b> . . . . .    | <b>2</b>  |
| <b>4</b>  | <b>Marking</b> . . . . .                 | <b>2</b>  |
| <b>5</b>  | <b>Limiting values</b> . . . . .         | <b>4</b>  |
| <b>6</b>  | <b>Thermal characteristics</b> . . . . . | <b>4</b>  |
| <b>7</b>  | <b>Characteristics</b> . . . . .         | <b>4</b>  |
| <b>8</b>  | <b>Test information</b> . . . . .        | <b>10</b> |
| 8.1       | Quality information . . . . .            | 10        |
| <b>9</b>  | <b>Package outline</b> . . . . .         | <b>11</b> |
| <b>10</b> | <b>Packing information</b> . . . . .     | <b>11</b> |
| <b>11</b> | <b>Soldering</b> . . . . .               | <b>12</b> |
| <b>12</b> | <b>Revision history</b> . . . . .        | <b>13</b> |
| <b>13</b> | <b>Legal information</b> . . . . .       | <b>14</b> |
| 13.1      | Data sheet status . . . . .              | 14        |
| 13.2      | Definitions . . . . .                    | 14        |
| 13.3      | Disclaimers . . . . .                    | 14        |
| 13.4      | Trademarks . . . . .                     | 15        |
| <b>14</b> | <b>Contact information</b> . . . . .     | <b>15</b> |
| <b>15</b> | <b>Contents</b> . . . . .                | <b>16</b> |