

# BZX58550-C2V2-QX Datasheet

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|                              |  |
|------------------------------|--|
| DiGi Electronics Part Number | BZX58550-C2V2-QX-DG                                |
| Manufacturer                 | <a href="#">Nexperia USA Inc.</a>                  |
| Manufacturer Product Number  | BZX58550-C2V2-QX                                   |
| Description                  | BZX58550-C2V2-Q/SOD523/SC-79                       |
| Detailed Description         | Zener Diode 2.2 V 300 mW ±5% Surface Mount SOD-523 |

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## Purchase and inquiry

Manufacturer Product Number:

BZX58550-C2V2-QX

Series:

-

Voltage - Zener (Nom) (Vz):

2.2 V

Power - Max:

300 mW

Current - Reverse Leakage @ Vr:

4  $\mu$ A @ 1 V

Operating Temperature:

150°C (TJ)

Qualification:

AEC-Q100

Package / Case:

SC-79, SOD-523

Manufacturer:

Nexperia USA Inc.

Product Status:

Active

Tolerance:

$\pm$ 5%

Impedance (Max) (Zzt):

100 Ohms

Voltage - Forward (Vf) (Max) @ If:

900 mV @ 10 mA

Grade:

Automotive

Mounting Type:

Surface Mount

Supplier Device Package:

SOD-523

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.10.0050

Moisture Sensitivity Level (MSL):

3 (168 Hours)

ECCN:

EAR99



# BZX58550-Q series

## Low-current voltage regulator diodes

Rev. 3 — 26 July 2024

Product data sheet

## 1. General description

Low-current voltage regulator diodes in an SOD523 (SC-79) ultra small and flat lead Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Total power dissipation:  $\leq 300$  mW
- Two tolerance series:  $\pm 2\%$  and approximately  $\pm 5\%$
- Working voltage range: nominal 1.8 V to 51 V
- Specified at a low test current (50  $\mu$ A), ideal for low bias and portable battery-powered applications
- BZX58550-B11-Q to -C51-Q: Intentional minor rise of leakage current for optimized fast switching and noise reduction [[AN90031](#)]
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- Low-current general regulation functions

## 4. Quick reference data

Table 1. Quick reference data

| Symbol    | Parameter               | Conditions               | Min | Typ | Max | Unit |
|-----------|-------------------------|--------------------------|-----|-----|-----|------|
| $V_F$     | forward voltage         | $I_F = 10$ mA [1]        | -   | -   | 0.9 | V    |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C [2] | -   | -   | 300 | mW   |

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

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), with approximately 35 mm<sup>2</sup> Cu area at cathode tab.

## 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.

## 6. Ordering information

Table 3. Ordering information

| Type number       | Package |  |         |
|-------------------|---------|--|---------|
|                   | Name    | Description  | Version |
| BZX58550-Q series | SC-79   | plastic, surface-mounted package; 2 leads; 1.2 mm x 0.8 mm x 0.6 mm body | SOD523  |

## 7. Marking

Table 4. Marking Codes

| Type number     | Marking code | Type number    | Marking code | Type number     | Marking code | Type number    | Marking code |
|-----------------|--------------|----------------|--------------|-----------------|--------------|----------------|--------------|
| BZX58550-B1V8-Q | 4H           | BZX58550-B10-Q | 5T           | BZX58550-C1V8-Q | 1C           | BZX58550-C10-Q | 2L           |
| BZX58550-B2V0-Q | 4K           | BZX58550-B11-Q | 5U           | BZX58550-C2V0-Q | 1E           | BZX58550-C11-Q | 2N           |
| BZX58550-B2V2-Q | 4L           | BZX58550-B12-Q | 5X           | BZX58550-C2V2-Q | 1F           | BZX58550-C12-Q | 2S           |
| BZX58550-B2V4-Q | 4N           | BZX58550-B13-Q | 5Y           | BZX58550-C2V4-Q | 1H           | BZX58550-C13-Q | 2T           |
| BZX58550-B2V7-Q | 4S           | BZX58550-B15-Q | 5Z           | BZX58550-C2V7-Q | 1K           | BZX58550-C15-Q | 2U           |
| BZX58550-B3V0-Q | 4T           | BZX58550-B16-Q | 6C           | BZX58550-C3V0-Q | 1L           | BZX58550-C16-Q | 2X           |
| BZX58550-B3V3-Q | 4U           | BZX58550-B18-Q | 6E           | BZX58550-C3V3-Q | 1N           | BZX58550-C18-Q | 2Y           |
| BZX58550-B3V6-Q | 4X           | BZX58550-B20-Q | 6F           | BZX58550-C3V6-Q | 1S           | BZX58550-C20-Q | 3C           |
| BZX58550-B3V9-Q | 4Y           | BZX58550-B22-Q | 6H           | BZX58550-C3V9-Q | 1T           | BZX58550-C22-Q | 3E           |
| BZX58550-B4V3-Q | 4Z           | BZX58550-B24-Q | 6K           | BZX58550-C4V3-Q | 1U           | BZX58550-C24-Q | 3F           |
| BZX58550-B4V7-Q | 5C           | BZX58550-B27-Q | 6L           | BZX58550-C4V7-Q | 1X           | BZX58550-C27-Q | 3H           |
| BZX58550-B5V1-Q | 5E           | BZX58550-B30-Q | 6N           | BZX58550-C5V1-Q | 1Y           | BZX58550-C30-Q | 3K           |
| BZX58550-B5V6-Q | 5F           | BZX58550-B33-Q | 6S           | BZX58550-C5V6-Q | 1Z           | BZX58550-C33-Q | 3L           |
| BZX58550-B6V2-Q | 5H           | BZX58550-B36-Q | 6T           | BZX58550-C6V2-Q | 2C           | BZX58550-C36-Q | 3N           |
| BZX58550-B6V8-Q | 5K           | BZX58550-B39-Q | 6U           | BZX58550-C6V8-Q | 2E           | BZX58550-C39-Q | 3S           |
| BZX58550-B7V5-Q | 5L           | BZX58550-B43-Q | 6X           | BZX58550-C7V5-Q | 2F           | BZX58550-C43-Q | 3T           |
| BZX58550-B8V2-Q | 5N           | BZX58550-B47-Q | 6Y           | BZX58550-C8V2-Q | 2H           | BZX58550-C47-Q | 3U           |
| BZX58550-B9V1-Q | 5S           | BZX58550-B51-Q | 6Z           | BZX58550-C9V1-Q | 2K           | BZX58550-C51-Q | 3X           |

## 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               |    |
| $P_{ZSM}$ | non-repetitive peak reverse power dissipation | $t_p = 100 \mu\text{s}$ ; square wave;<br>$T_j = 25 \text{ }^\circ\text{C}$ ; prior to surge | -   | 40   | W                |    |
| $P_{tot}$ | total power dissipation                       | $T_{amb} \leq 25 \text{ }^\circ\text{C}$   | [1] | -    | 270              | mW |
|           |   |  | [2] | -    | 300              | mW |
|           |   |  | [3] | -    | 440              | mW |
| $T_j$     | junction temperature                          |  | -   | 150  | $^\circ\text{C}$ |    |
| $T_{amb}$ | ambient temperature                           |  | -55 | +150 | $^\circ\text{C}$ |    |
| $T_{stg}$ | storage temperature                           |  | -65 | +150 | $^\circ\text{C}$ |    |

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

[2] Device mounted on an FR4 PCB, with approximately 35 mm<sup>2</sup> Cu area at cathode tab.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

## 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] | -   | -   | 460  | K/W |
|                |  |             | [2] | -   | -   | 350  | K/W |
|                |  |             | [3] | -   | -   | 285  | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [4] | -   | -   | 65   | K/W |

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

[2] Device mounted on an FR4 PCB, with approximately 35 mm<sup>2</sup> Cu area at cathode tab.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

[4] Soldering point of cathode tab

## 10. Characteristics

**Table 7. Electrical characteristics**

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

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

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

Table 8. Electrical characteristics per type: BZX58550-B1V8-Q to BZX58550-C36-Q

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

| BZX58550-xxx-Q | Sel. | Working voltage $V_Z$ (V) |       | Differential resistance $r_{diff}$ ( $\Omega$ ) |              | Reverse current $I_R$ ( $\mu$ A) |           | Temperature coefficient $S_Z$ (mV/K) |     | Diode capacitance $C_d$ (pF) |
|----------------|------|---------------------------|-------|---|--------------|----------------------------------|-----------|--------------------------------------|-----|------------------------------|
|                |      | $I_Z = 50\ \mu$ A         |       | $I_Z = 1$ mA                                    | $I_Z = 5$ mA | Max                              | $V_R$ (V) | $I_Z = 5$ mA                         |     | $f = 1$ MHz<br>$V_R = 0$ V   |
|                |      | Min                       | Max   | Max   | Max          |                                  |           | Min                                  | Max | Max                          |
| 1V8            | B    | 1.76                      | 1.84  | 600   | 100          | 7.5                              | 1.0       | -3.5                                 | 0   | 220                          |
|                | C    | 1.71                      | 1.89  |   |              |                                  |           |                                      |     |                              |
| 2V0            | B    | 1.96                      | 2.04  | 600   | 100          | 7                                | 1.0       | -3.5                                 | 0   | 220                          |
|                | C    | 1.88                      | 2.12  |   |              |                                  |           |                                      |     |                              |
| 2V2            | B    | 2.15                      | 2.25  | 600   | 100          | 4                                | 1.0       | -3.5                                 | 0   | 210                          |
|                | C    | 2.09                      | 2.31  |   |              |                                  |           |                                      |     |                              |
| 2V4            | B    | 2.35                      | 2.45  | 600   | 100          | 2                                | 1.0       | -3.5                                 | 0   | 200                          |
|                | C    | 2.28                      | 2.52  |   |              |                                  |           |                                      |     |                              |
| 2V7            | B    | 2.65                      | 2.75  | 600   | 100          | 1                                | 1.0       | -3.5                                 | 0   | 190                          |
|                | C    | 2.565                     | 2.835 |   |              |                                  |           |                                      |     |                              |
| 3V0            | B    | 2.94                      | 3.06  | 600   | 100          | 0.8                              | 1.0       | -3.5                                 | 0.2 | 170                          |
|                | C    | 2.85                      | 3.15  |   |              |                                  |           |                                      |     |                              |
| 3V3            | B    | 3.23                      | 3.37  | 600   | 100          | 7.5                              | 1.5       | -3.5                                 | 1.2 | 160                          |
|                | C    | 3.13                      | 3.47  |   |              |                                  |           |                                      |     |                              |
| 3V6            | B    | 3.53                      | 3.67  | 600   | 95           | 7.5                              | 2.0       | -3.5                                 | 1.2 | 160                          |
|                | C    | 3.42                      | 3.78  |   |              |                                  |           |                                      |     |                              |
| 3V9            | B    | 3.82                      | 3.98  | 600   | 95           | 5.0                              | 2.0       | -2.7                                 | 2.5 | 150                          |
|                | C    | 3.70                      | 4.10  |   |              |                                  |           |                                      |     |                              |
| 4V3            | B    | 4.21                      | 4.39  | 600   | 95           | 4.0                              | 2.0       | -2.7                                 | 2.5 | 150                          |
|                | C    | 4.09                      | 4.52  |   |              |                                  |           |                                      |     |                              |
| 4V7            | B    | 4.61                      | 4.79  | 600   | 80           | 5.0                              | 3.0       | -2.7                                 | 2.5 | 140                          |
|                | C    | 4.47                      | 4.94  |   |              |                                  |           |                                      |     |                              |
| 5V1            | B    | 5.00                      | 5.20  | 500   | 60           | 5.0                              | 3.0       | -2.0                                 | 3.7 | 130                          |
|                | C    | 4.85                      | 5.36  |   |              |                                  |           |                                      |     |                              |
| 5V6            | B    | 5.49                      | 5.71  | 400   | 40           | 2.0                              | 4.0       | -2.0                                 | 3.7 | 120                          |
|                | C    | 5.32                      | 5.88  |   |              |                                  |           |                                      |     |                              |
| 6V2            | B    | 6.08                      | 6.32  | 160   | 10           | 1.0                              | 5.0       | 0.4                                  | 4.5 | 110                          |
|                | C    | 5.89                      | 6.51  |   |              |                                  |           |                                      |     |                              |
| 6V8            | B    | 6.66                      | 6.94  | 80  | 15           | 0.1                              | 5.1       | 1.2                                  | 4.5 | 100                          |
|                | C    | 6.46                      | 7.14  |   |              |                                  |           |                                      |     |                              |
| 7V5            | B    | 7.35                      | 7.65  | 80  | 15           | 0.1                              | 5.7       | 2.5                                  | 5.3 | 150                          |
|                | C    | 7.13                      | 7.88  |   |              |                                  |           |                                      |     |                              |
| 8V2            | B    | 8.04                      | 8.36  | 80  | 15           | 0.1                              | 6.2       | 3.2                                  | 6.2 | 150                          |
|                | C    | 7.79                      | 8.61  |   |              |                                  |           |                                      |     |                              |
| 9V1            | B    | 8.92                      | 9.28  | 100   | 15           | 0.1                              | 6.9       | 3.8                                  | 7.0 | 150                          |
|                | C    | 8.65                      | 9.56  |   |              |                                  |           |                                      |     |                              |
| 10             | B    | 9.80                      | 10.20 | 150   | 20           | 0.1                              | 7.6       | 4.5                                  | 8.0 | 90                           |
|                | C    | 9.50                      | 10.50 |   |              |                                  |           |                                      |     |                              |

| BZX58550-<br>xxx-Q | Sel. | Working voltage<br>$V_Z$ (V) |       | Differential<br>resistance<br>$r_{diff}$ ( $\Omega$ ) |                 | Reverse current<br>$I_R$ ( $\mu$ A) |           | Temperature<br>coefficient<br>$S_Z$ (mV/K) |      | Diode<br>capacitance<br>$C_d$ (pF) |
|--------------------|------|------------------------------|-------|---|-----------------|-------------------------------------|-----------|--|------|------------------------------------|
|                    |      | $I_Z = 50 \mu$ A             |       | $I_Z = 1$<br>mA                                       | $I_Z = 5$<br>mA | Max                                 | $V_R$ (V) | $I_Z = 5$ mA                               |      | $f = 1$ MHz<br>$V_R = 0$ V         |
|                    |      | Min                          | Max   | Max   | Max             |                                     |           | Min  | Max  | Max                                |
| 11                 | B    | 10.80                        | 11.20 | 150   | 20              | 0.05                                | 8.4       | 5.4  | 9.0  | 85                                 |
|                    | C    | 10.45                        | 11.55 |   |                 |                                     |           |  |      |                                    |
| 12                 | B    | 11.80                        | 12.20 | 150   | 25              | 0.05                                | 9.1       | 6.0  | 10   | 85                                 |
|                    | C    | 11.40                        | 12.60 |   |                 |                                     |           |  |      |                                    |
| 13                 | B    | 12.70                        | 13.30 | 170   | 30              | 0.05                                | 9.8       | 7.0  | 11   | 80                                 |
|                    | C    | 12.35                        | 13.65 |   |                 |                                     |           |  |      |                                    |
| 15                 | B    | 14.70                        | 15.30 | 200   | 30              | 0.05                                | 11.4      | 9.2  | 13   | 75                                 |
|                    | C    | 14.25                        | 15.75 |   |                 |                                     |           |  |      |                                    |
| 16                 | B    | 15.70                        | 16.30 | 200   | 40              | 0.05                                | 12.1      | 10.4                                       | 14   | 75                                 |
|                    | C    | 15.20                        | 16.80 |   |                 |                                     |           |  |      |                                    |
| 18                 | B    | 17.60                        | 18.40 | 225   | 45              | 0.05                                | 13.6      | 12.4                                       | 16   | 70                                 |
|                    | C    | 17.10                        | 18.90 |   |                 |                                     |           |  |      |                                    |
| 20                 | B    | 19.60                        | 20.40 | 225   | 55              | 0.05                                | 15.2      | 14.4                                       | 18   | 60                                 |
|                    | C    | 19.00                        | 21.00 |   |                 |                                     |           |  |      |                                    |
| 22                 | B    | 21.60                        | 22.40 | 250   | 55              | 0.05                                | 16.7      | 16.4                                       | 20   | 60                                 |
|                    | C    | 20.90                        | 23.10 |   |                 |                                     |           |  |      |                                    |
| 24                 | B    | 23.50                        | 24.50 | 250   | 70              | 0.05                                | 18.2      | 18.4                                       | 22   | 55                                 |
|                    | C    | 22.80                        | 25.20 |   |                 |                                     |           |  |      |                                    |
| 27                 | B    | 26.50                        | 27.50 | 300   | 80              | 0.05                                | 20.4      | 21.4                                       | 25.3 | 50                                 |
|                    | C    | 25.65                        | 28.35 |   |                 |                                     |           |  |      |                                    |
| 30                 | B    | 29.40                        | 30.60 | 300   | 80              | 0.05                                | 22.8      | 24.4                                       | 29.4 | 50                                 |
|                    | C    | 28.50                        | 31.50 |   |                 |                                     |           |  |      |                                    |
| 33                 | B    | 32.30                        | 33.70 | 325   | 80              | 0.05                                | 25.0      | 27.4                                       | 33.4 | 45                                 |
|                    | C    | 31.35                        | 34.65 |   |                 |                                     |           |  |      |                                    |
| 36                 | B    | 35.30                        | 36.70 | 350   | 90              | 0.05                                | 27.3      | 30.4                                       | 37.4 | 45                                 |
|                    | C    | 34.20                        | 37.80 |   |                 |                                     |           |  |      |                                    |

Table 9. Electrical characteristics per type: BZX58550-B39-Q to BZX58550-C51-Q

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

| BZX58550-xxx-Q | Sel. | Working voltage $V_Z$ (V) |       | Differential resistance $r_{diff}$ ( $\Omega$ ) |                      | Reverse current $I_R$ ( $\mu\text{A}$ ) |           | Temperature coefficient $S_Z$ (mV/K) |      | Diode capacitance $C_d$ (pF)               |
|----------------|------|---------------------------|-------|---|----------------------|---|-----------|--------------------------------------|------|--|
|                |      | $I_Z = 50\ \mu\text{A}$   |       | $I_Z = 0.5\ \text{mA}$                          | $I_Z = 2\ \text{mA}$ | Max                                     | $V_R$ (V) | Min                                  | Max  | $f = 1\ \text{MHz}$<br>$V_R = 0\ \text{V}$ |
|                |      | Min                       | Max   | Max   | Max                  |   |           |                                      |      | Max  |
| 39             | B    | 38.20                     | 39.80 | 350   | 130                  | 0.05                                    | 29.6      | 33.4                                 | 41.2 | 45   |
|                | C    | 37.05                     | 40.95 |   |                      |   |           |                                      |      |  |
| 43             | B    | 42.10                     | 43.90 | 375   | 150                  | 0.05                                    | 32.6      | 37.6                                 | 46.6 | 40   |
|                | C    | 40.85                     | 45.15 |   |                      |   |           |                                      |      |  |
| 47             | B    | 46.10                     | 47.90 | 375   | 170                  | 0.05                                    | 32.9      | 42.0                                 | 51.8 | 40   |
|                | C    | 44.00                     | 50.00 |   |                      |   |           |                                      |      |  |
| 51             | B    | 50.00                     | 52.00 | 400   | 180                  | 0.05                                    | 35.7      | 46.6                                 | 57.2 | 40   |
|                | C    | 48.00                     | 54.00 |   |                      |   |           |                                      |      |  |

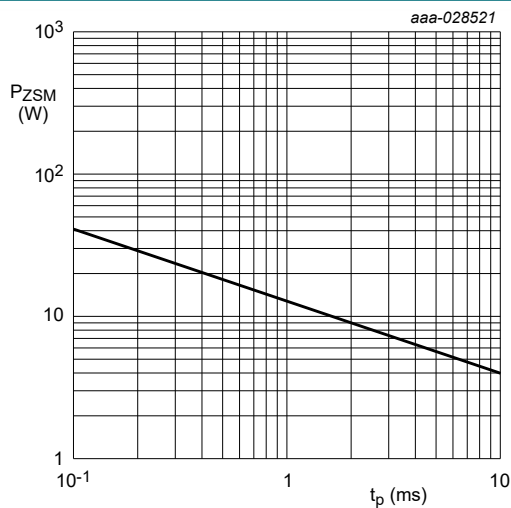
 $T_j = 25\text{ °C}$  (before surge)

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

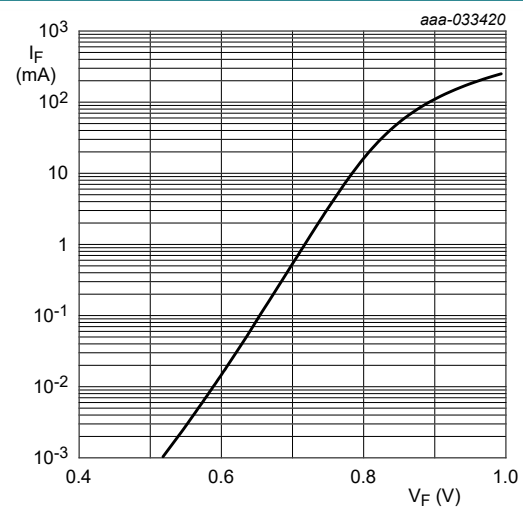
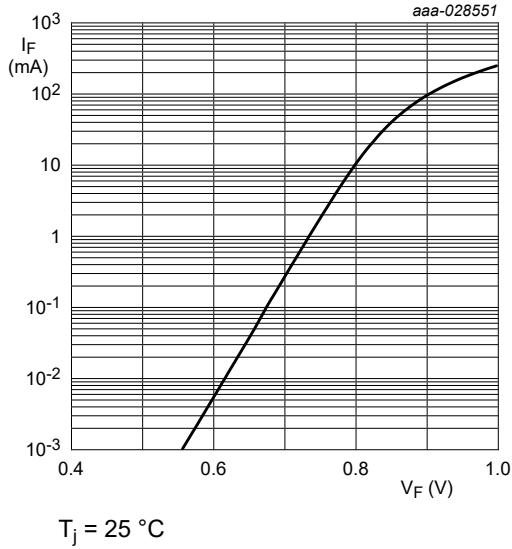
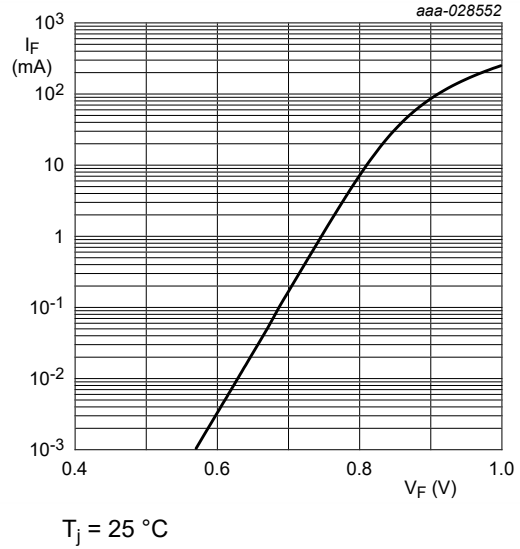
 $T_j = 25\text{ °C}$ 

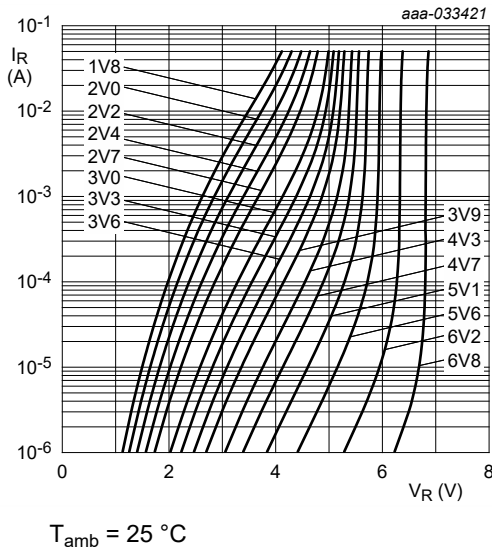
Fig. 2. Forward current as a function of forward voltage; typical values (BZX58550-B/C1V8-Q)



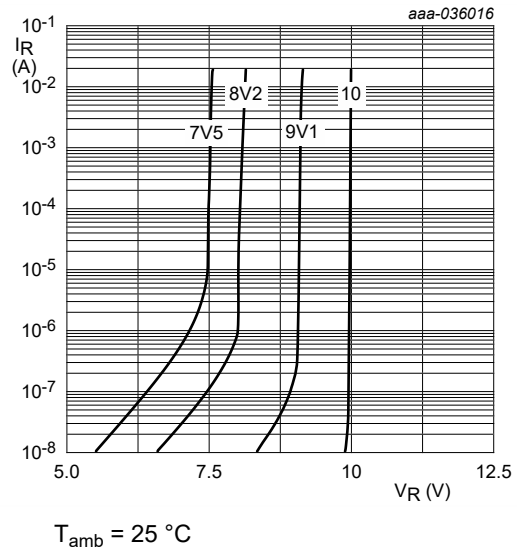
**Fig. 3. Forward current as a function of forward voltage; typical values (BZX58550-B/C6V8-Q)**



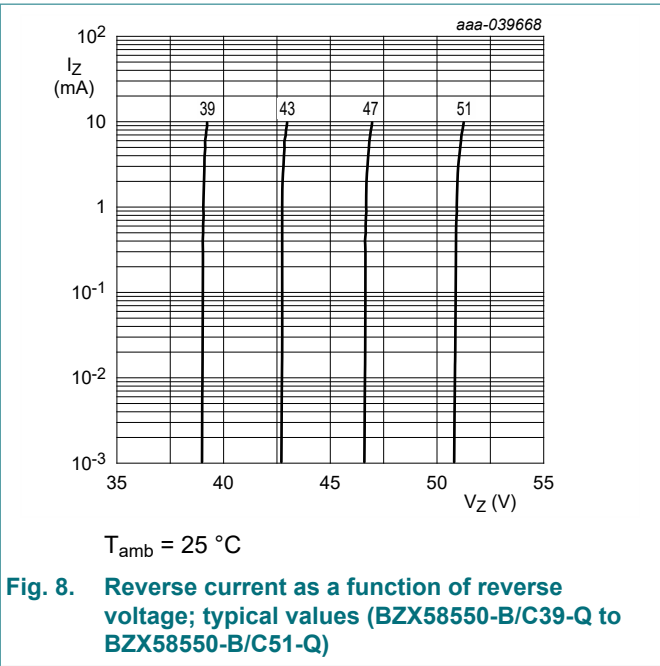
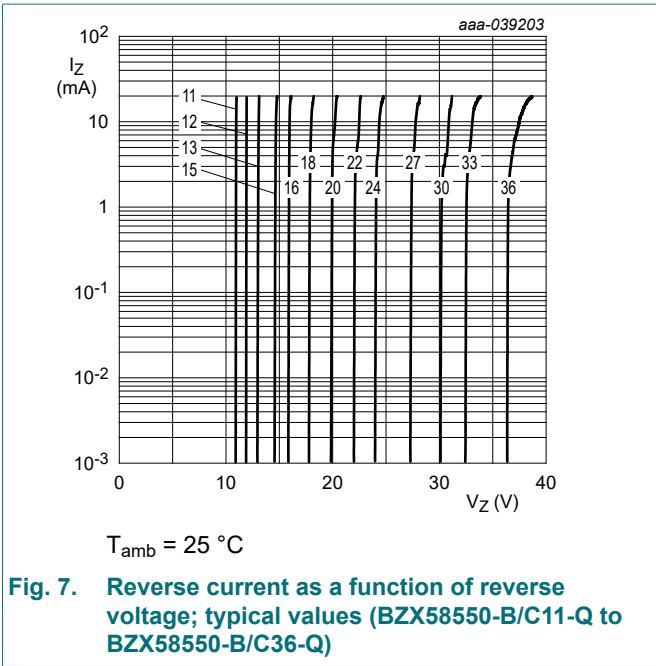
**Fig. 4. Forward current as a function of forward voltage; typical values (BZX58550-B/C7V5-Q)**



**Fig. 5. Reverse current as a function of reverse voltage; typical values (BZX58550-B/C1V8-Q to BZX58550-B/C6V8-Q)**



**Fig. 6. Reverse current as a function of reverse voltage; typical values (BZX58550-B/C7V5-Q to BZX58550-B/C10-Q)**

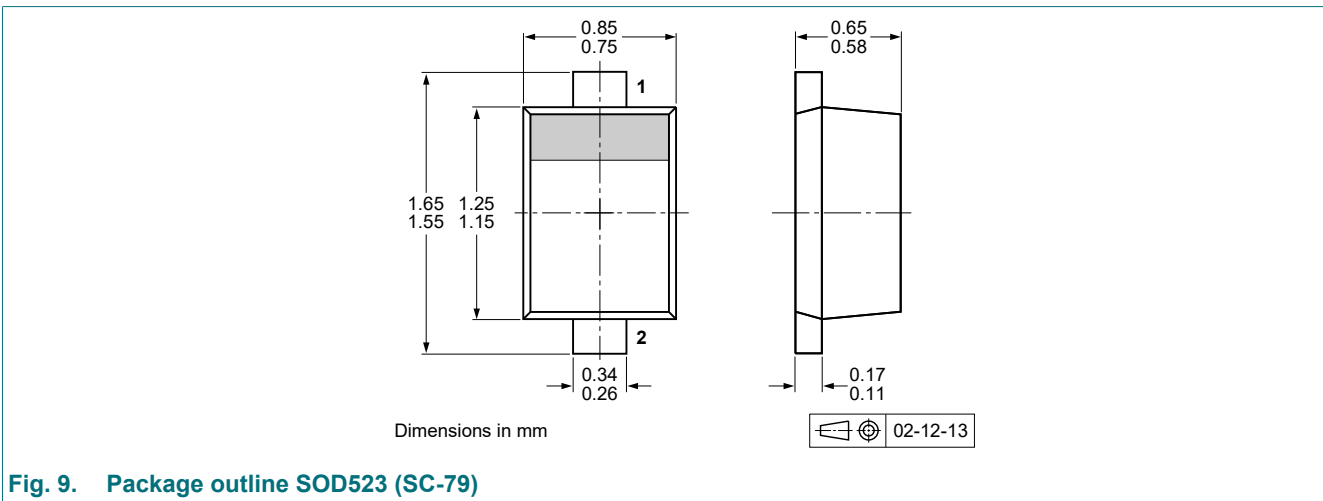


## 11. Test information

### 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



### 13. Soldering

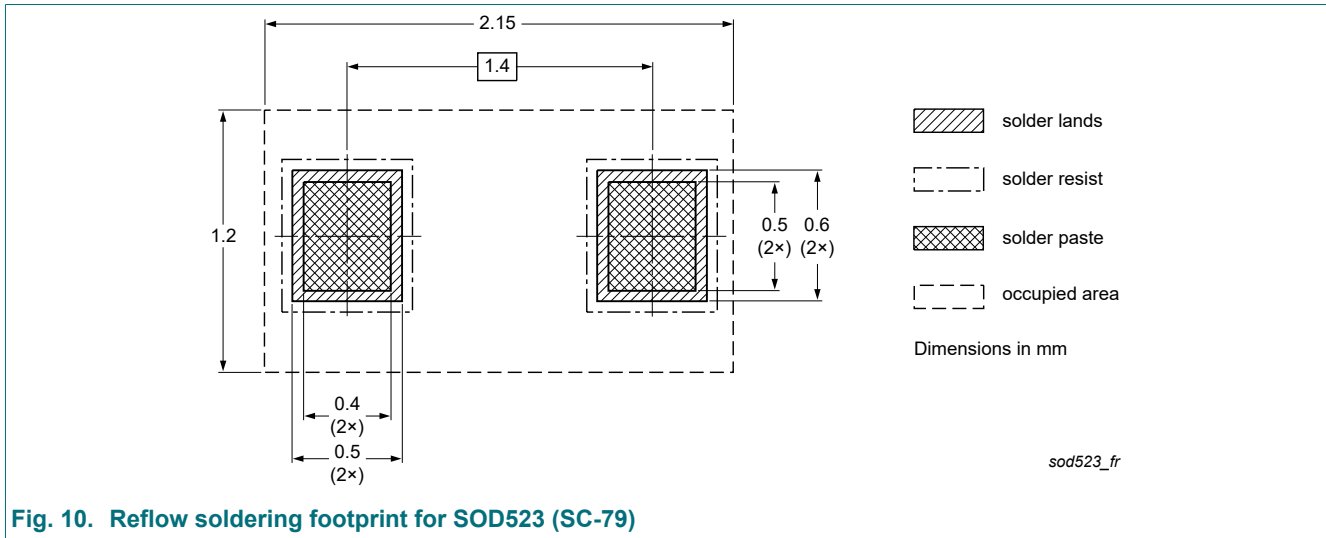


Fig. 10. Reflow soldering footprint for SOD523 (SC-79)

## 14. Revision history

**Table 10. Revision history**

| Document ID        | Release date                               | Data sheet status  | Change notice | Supersedes         |
|--------------------|--|--------------------|---------------|--------------------|
| BZX58550-Q_SER v.3 | 20240726                                   | Product data sheet | -             | BZX58550-Q_SER v.2 |
| Modifications:     | • B and C selections 11 V up to 51 V added |                    |               |                    |
| BZX58550-Q_SER v.2 | 20230117                                   | Product data sheet | -             | BZX58550-Q_SER v.1 |
| BZX58550-Q_SER v.1 | 20210824                                   | 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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