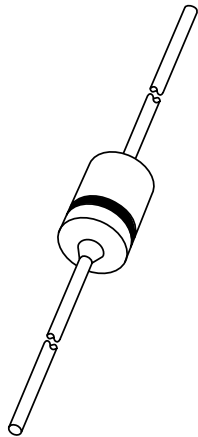


DATA SHEET



BZX79 series Voltage regulator diodes

Product specification
Supersedes data of April 1992
File under Discrete Semiconductors, SC01

1996 Apr 26

Voltage regulator diodes

BZX79 series

FEATURES

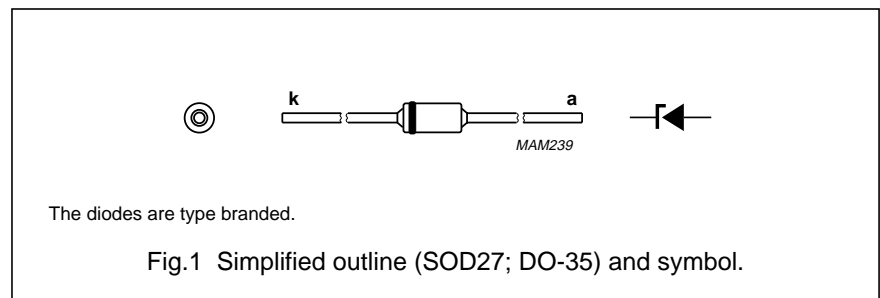
- Total power dissipation: max. 500 mW
- Four tolerance series: $\pm 1\%$, $\pm 2\%$, $\pm 3\%$ and $\pm 5\%$
- Working voltage range: nom. 2.4 to 75 V (E24 range)
- Non-repetitive peak reverse power dissipation: max. 40 W.

APPLICATIONS

- Low voltage stabilizers or voltage references.

DESCRIPTION

Low-power voltage regulator diodes in hermetically sealed leaded glass SOD27 (DO-35) packages. The diodes are available in the normalized E24 $\pm 1\%$ (BZX79-A), $\pm 2\%$ (BZX79-B), $\pm 3\%$ (BZX79-F) and $\pm 5\%$ (BZX79-C) tolerance range. The series consists of 37 types with nominal working voltages from 2.4 to 75 V.



LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|---|---|--------------------------|------|------------------|
| I_F | continuous forward current | | – | 250 | mA |
| I_{ZSM} | non-repetitive peak reverse current | $t_p = 100 \mu\text{s}$; square wave; $T_j = 25 \text{ }^\circ\text{C}$ prior to surge | see Tables 1, 2, 3 and 4 | | |
| P_{tot} | total power dissipation | $T_{amb} = 50 \text{ }^\circ\text{C}$; note 1 | – | 400 | mW |
| | | $T_{amb} = 50 \text{ }^\circ\text{C}$; note 2 | – | 500 | mW |
| P_{ZSM} | non-repetitive peak reverse power dissipation | $t_p = 100 \mu\text{s}$; square wave; $T_j = 25 \text{ }^\circ\text{C}$ prior to surge; see Fig.3 | – | 40 | W |
| T_{stg} | storage temperature | | –65 | +200 | $^\circ\text{C}$ |
| T_j | junction temperature | | –65 | +200 | $^\circ\text{C}$ |

Notes

1. Device mounted on a printed circuit-board without metallization pad; lead length max.
2. Tie-point temperature $\leq 50 \text{ }^\circ\text{C}$; max. lead length 8 mm.

Voltage regulator diodes

BZX79 series

ELECTRICAL CHARACTERISTICS**Total BZX79-A and B and F and C series**T_j = 25 °C; unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MAX. | UNIT |
|----------------|-----------------------|---------------------------------------|------|------|
| V _F | forward voltage | I _F = 10 mA; see Fig.4 | 0.9 | V |
| I _R | reverse current | | | |
| | BZX79-A/B/F/C2V4 | V _R = 1 V | 50 | μA |
| | BZX79-A/B/F/C2V7 | V _R = 1 V | 20 | μA |
| | BZX79-A/B/F/C3V0 | V _R = 1 V | 10 | μA |
| | BZX79-A/B/F/C3V3 | V _R = 1 V | 5 | μA |
| | BZX79-A/B/F/C3V6 | V _R = 1 V | 5 | μA |
| | BZX79-A/B/F/C3V9 | V _R = 1 V | 3 | μA |
| | BZX79-A/B/F/C4V3 | V _R = 1 V | 3 | μA |
| | BZX79-A/B/F/C4V7 | V _R = 2 V | 3 | μA |
| | BZX79-A/B/F/C5V1 | V _R = 2 V | 2 | μA |
| | BZX79-A/B/F/C5V6 | V _R = 2 V | 1 | μA |
| | BZX79-A/B/F/C6V2 | V _R = 4 V | 3 | μA |
| | BZX79-A/B/F/C6V8 | V _R = 4 V | 2 | μA |
| | BZX79-A/B/F/C7V5 | V _R = 5 V | 1 | μA |
| | BZX79-A/B/F/C8V2 | V _R = 5 V | 700 | nA |
| | BZX79-A/B/F/C9V1 | V _R = 6 V | 500 | nA |
| | BZX79-A/B/F/C10 | V _R = 7 V | 200 | nA |
| | BZX79-A/B/F/C11 | V _R = 8 V | 100 | nA |
| | BZX79-A/B/F/C12 | V _R = 8 V | 100 | nA |
| | BZX79-A/B/F/C13 | V _R = 8 V | 100 | nA |
| | BZX79-A/B/F/C15 to 75 | V _R = 0.7V _{Znom} | 50 | nA |

Voltage regulator diodes

BZX79 series

Table 1 Per type BZX79-A/B2V4 to A/B24 $T_j = 25\text{ °C}$; unless otherwise specified.

| BZX79- A or B XXX | WORKING VOLTAGE V_Z (V) at $I_{Ztest} = 5\text{ mA}$ | | | | DIFFERENTIAL RESISTANCE r_{dif} (Ω) | | | | TEMP. COEFF. S_Z (mV/K) at $I_{Ztest} = 5\text{ mA}$ (see Figs 5 and 6) | | | DIODE CAP. C_d (pF) at $f = 1\text{ MHz}$; $V_R = 0\text{ V}$ | NON-REPETITIVE PEAK REVERSE CURRENT I_{ZSM} (A) at $t_p = 100\text{ }\mu\text{s}$; $T_{amb} = 25\text{ °C}$ |
|-------------------------|--|-------|--------------------|-------|---|------|------------------------------|------|--|------|------|---|---|
| | Tol. $\pm 1\%$ (A) | | Tol. $\pm 2\%$ (B) | | at $I_{Ztest} = 1\text{ mA}$ | | at $I_{Ztest} = 5\text{ mA}$ | | MIN. | TYP. | MAX. | MAX. | MAX. |
| | MIN. | MAX. | MIN. | MAX. | TYP. | MAX. | TYP. | MAX. | | | | | |
| 2V4 | 2.37 | 2.43 | 2.35 | 2.45 | 275 | 600 | 70 | 100 | -3.5 | -1.6 | 0 | 450 | 6.0 |
| 2V7 | 2.67 | 2.73 | 2.65 | 2.75 | 300 | 600 | 75 | 100 | -3.5 | -2.0 | 0 | 450 | 6.0 |
| 3V0 | 2.97 | 3.03 | 2.94 | 3.06 | 325 | 600 | 80 | 95 | -3.5 | -2.1 | 0 | 450 | 6.0 |
| 3V3 | 3.26 | 3.34 | 3.23 | 3.37 | 350 | 600 | 85 | 95 | -3.5 | -2.4 | 0 | 450 | 6.0 |
| 3V6 | 3.56 | 3.64 | 3.53 | 3.67 | 375 | 600 | 85 | 90 | -3.5 | -2.4 | 0 | 450 | 6.0 |
| 3V9 | 3.86 | 3.94 | 3.82 | 3.98 | 400 | 600 | 85 | 90 | -3.5 | -2.5 | 0 | 450 | 6.0 |
| 4V3 | 4.25 | 4.35 | 4.21 | 4.39 | 410 | 600 | 80 | 90 | -3.5 | -2.5 | 0 | 450 | 6.0 |
| 4V7 | 4.65 | 4.75 | 4.61 | 4.79 | 425 | 500 | 50 | 80 | -3.5 | -1.4 | 0.2 | 300 | 6.0 |
| 5V1 | 5.04 | 5.16 | 5.00 | 5.20 | 400 | 480 | 40 | 60 | -2.7 | -0.8 | 1.2 | 300 | 6.0 |
| 5V6 | 5.54 | 5.66 | 5.49 | 5.71 | 80 | 400 | 15 | 40 | -2.0 | 1.2 | 2.5 | 300 | 6.0 |
| 6V2 | 6.13 | 6.27 | 6.08 | 6.32 | 40 | 150 | 6 | 10 | 0.4 | 2.3 | 3.7 | 200 | 6.0 |
| 6V8 | 6.73 | 6.87 | 6.66 | 6.94 | 30 | 80 | 6 | 15 | 1.2 | 3.0 | 4.5 | 200 | 6.0 |
| 7V5 | 7.42 | 7.58 | 7.35 | 7.65 | 30 | 80 | 6 | 15 | 2.5 | 4.0 | 5.3 | 150 | 4.0 |
| 8V2 | 8.11 | 8.29 | 8.04 | 8.36 | 40 | 80 | 6 | 15 | 3.2 | 4.6 | 6.2 | 150 | 4.0 |
| 9V1 | 9.00 | 9.20 | 8.92 | 9.28 | 40 | 100 | 6 | 15 | 3.8 | 5.5 | 7.0 | 150 | 3.0 |
| 10 | 9.90 | 10.10 | 9.80 | 10.20 | 50 | 150 | 8 | 20 | 4.5 | 6.4 | 8.0 | 90 | 3.0 |
| 11 | 10.89 | 11.11 | 10.80 | 11.20 | 50 | 150 | 10 | 20 | 5.4 | 7.4 | 9.0 | 85 | 2.5 |
| 12 | 11.88 | 12.12 | 11.80 | 12.20 | 50 | 150 | 10 | 25 | 6.0 | 8.4 | 10.0 | 85 | 2.5 |
| 13 | 12.87 | 13.13 | 12.70 | 13.30 | 50 | 170 | 10 | 30 | 7.0 | 9.4 | 11.0 | 80 | 2.5 |
| 15 | 14.85 | 15.15 | 14.70 | 15.30 | 50 | 200 | 10 | 30 | 9.2 | 11.4 | 13.0 | 75 | 2.0 |
| 16 | 15.84 | 16.16 | 15.70 | 16.30 | 50 | 200 | 10 | 40 | 10.4 | 12.4 | 14.0 | 75 | 1.5 |
| 18 | 17.82 | 18.18 | 17.60 | 18.40 | 50 | 225 | 10 | 45 | 12.4 | 14.4 | 16.0 | 70 | 1.5 |
| 20 | 19.80 | 20.20 | 19.60 | 20.40 | 60 | 225 | 15 | 55 | 14.4 | 16.4 | 18.0 | 60 | 1.5 |
| 22 | 21.78 | 22.22 | 21.60 | 22.40 | 60 | 250 | 20 | 55 | 16.4 | 18.4 | 20.0 | 60 | 1.25 |
| 24 | 23.76 | 24.24 | 23.50 | 24.50 | 60 | 250 | 25 | 70 | 18.4 | 20.4 | 22.0 | 55 | 1.25 |

Voltage regulator diodes

BZX79 series

Table 2 Per type BZX79-A/B27 to A/B75 $T_j = 25\text{ °C}$; unless otherwise specified.

| BZX79- A or B XXX | WORKING VOLTAGE V_Z (V) at $I_{Ztest} = 2\text{ mA}$ | | | | DIFFERENTIAL RESISTANCE r_{dif} (Ω) | | | | TEMP. COEFF. S_Z (mV/K) at $I_{Ztest} = 2\text{ mA}$ (see Figs 5 and 6) | | | DIODE CAP. C_d (pF) at $f = 1\text{ MHz}$; $V_R = 0\text{ V}$ | NON-REPETITIVE PEAK REVERSE CURRENT I_{ZSM} (A) at $t_p = 100\text{ }\mu\text{s}$; $T_{amb} = 25\text{ °C}$ |
|-------------------------|--|-------|--------------------|-------|---|------|------------------------------|------|--|------|------|---|---|
| | Tol. $\pm 1\%$ (A) | | Tol. $\pm 2\%$ (B) | | at $I_{Ztest} = 0.5\text{ mA}$ | | at $I_{Ztest} = 2\text{ mA}$ | | MIN. | TYP. | MAX. | MAX. | MAX. |
| | MIN. | MAX. | MIN. | MAX. | TYP. | MAX. | TYP. | MAX. | | | | | |
| 27 | 26.73 | 27.27 | 26.50 | 27.50 | 65 | 300 | 25 | 80 | 21.4 | 23.4 | 25.3 | 50 | 1.0 |
| 30 | 29.70 | 30.30 | 29.40 | 30.60 | 70 | 300 | 30 | 80 | 24.4 | 26.6 | 29.4 | 50 | 1.0 |
| 33 | 32.67 | 33.33 | 32.30 | 33.70 | 75 | 325 | 35 | 80 | 27.4 | 29.7 | 33.4 | 45 | 0.9 |
| 36 | 35.64 | 36.36 | 35.30 | 36.70 | 80 | 350 | 35 | 90 | 30.4 | 33.0 | 37.4 | 45 | 0.8 |
| 39 | 38.61 | 39.39 | 38.20 | 39.80 | 80 | 350 | 40 | 130 | 33.4 | 36.4 | 41.2 | 45 | 0.7 |
| 43 | 42.57 | 43.43 | 42.10 | 43.90 | 85 | 375 | 45 | 150 | 37.6 | 41.2 | 46.6 | 40 | 0.6 |
| 47 | 46.53 | 47.47 | 46.10 | 47.90 | 85 | 375 | 50 | 170 | 42.0 | 46.1 | 51.8 | 40 | 0.5 |
| 51 | 50.49 | 51.51 | 50.00 | 52.00 | 90 | 400 | 60 | 180 | 46.6 | 51.0 | 57.2 | 40 | 0.4 |
| 56 | 55.44 | 56.56 | 54.90 | 57.10 | 100 | 425 | 70 | 200 | 52.2 | 57.0 | 63.8 | 40 | 0.3 |
| 62 | 61.38 | 62.62 | 60.80 | 63.20 | 120 | 450 | 80 | 215 | 58.8 | 64.4 | 71.6 | 35 | 0.3 |
| 68 | 67.32 | 68.68 | 66.60 | 69.40 | 150 | 475 | 90 | 240 | 65.6 | 71.7 | 79.8 | 35 | 0.25 |
| 75 | 74.25 | 75.75 | 73.50 | 76.50 | 170 | 500 | 95 | 255 | 73.4 | 80.2 | 88.6 | 35 | 0.2 |

Voltage regulator diodes

BZX79 series

Table 3 Per type BZX79-F/C2V4 to F/C24 $T_j = 25\text{ °C}$; unless otherwise specified.

| BZX79- F or C XXX | WORKING VOLTAGE V_Z (V) at $I_{Ztest} = 5\text{ mA}$ | | | | DIFFERENTIAL RESISTANCE r_{dif} (Ω) | | | | TEMP. COEFF. S_Z (mV/K) at $I_{Ztest} = 5\text{ mA}$ (see Figs 5 and 6) | | | DIODE CAP. C_d (pF) at $f = 1\text{ MHz}$; $V_R = 0\text{ V}$ | NON-REPETITIVE PEAK REVERSE CURRENT I_{ZSM} (A) at $t_p = 100\text{ }\mu\text{s}$; $T_{amb} = 25\text{ °C}$ |
|-------------------------|--|-------|--------------------|------|---|------|------------------------------|------|--|------|------|---|---|
| | Tol. $\pm 3\%$ (F) | | Tol. $\pm 5\%$ (C) | | at $I_{Ztest} = 1\text{ mA}$ | | at $I_{Ztest} = 5\text{ mA}$ | | MIN. | TYP. | MAX. | MAX. | MAX. |
| | MIN. | MAX. | MIN. | MAX. | TYP. | MAX. | TYP. | MAX. | | | | | |
| 2V4 | 2.33 | 2.47 | 2.2 | 2.6 | 275 | 600 | 70 | 100 | -3.5 | -1.6 | 0 | 450 | 6.0 |
| 2V7 | 2.62 | 2.78 | 2.5 | 2.9 | 300 | 600 | 75 | 100 | -3.5 | -2.0 | 0 | 450 | 6.0 |
| 3V0 | 2.91 | 3.09 | 2.8 | 3.2 | 325 | 600 | 80 | 95 | -3.5 | -2.1 | 0 | 450 | 6.0 |
| 3V3 | 3.20 | 3.40 | 3.1 | 3.5 | 350 | 600 | 85 | 95 | -3.5 | -2.4 | 0 | 450 | 6.0 |
| 3V6 | 3.49 | 3.71 | 3.4 | 3.8 | 375 | 600 | 85 | 90 | -3.5 | -2.4 | 0 | 450 | 6.0 |
| 3V9 | 3.78 | 4.02 | 3.7 | 4.1 | 400 | 600 | 85 | 90 | -3.5 | -2.5 | 0 | 450 | 6.0 |
| 4V3 | 4.17 | 4.43 | 4.0 | 4.6 | 410 | 600 | 80 | 90 | -3.5 | -2.5 | 0 | 450 | 6.0 |
| 4V7 | 4.56 | 4.84 | 4.4 | 5.0 | 425 | 500 | 50 | 80 | -3.5 | -1.4 | 0.2 | 300 | 6.0 |
| 5V1 | 4.95 | 5.25 | 4.8 | 5.4 | 400 | 480 | 40 | 60 | -2.7 | -0.8 | 1.2 | 300 | 6.0 |
| 5V6 | 5.43 | 5.77 | 5.2 | 6.0 | 80 | 400 | 15 | 40 | -2.0 | 1.2 | 2.5 | 300 | 6.0 |
| 6V2 | 6.01 | 6.39 | 5.8 | 6.6 | 40 | 150 | 6 | 10 | 0.4 | 2.3 | 3.7 | 200 | 6.0 |
| 6V8 | 6.60 | 7.00 | 6.4 | 7.2 | 30 | 80 | 6 | 15 | 1.2 | 3.0 | 4.5 | 200 | 6.0 |
| 7V5 | 7.28 | 7.72 | 7.0 | 7.9 | 30 | 80 | 6 | 15 | 2.5 | 4.0 | 5.3 | 150 | 4.0 |
| 8V2 | 7.95 | 8.45 | 7.7 | 8.7 | 40 | 80 | 6 | 15 | 3.2 | 4.6 | 6.2 | 150 | 4.0 |
| 9V1 | 8.83 | 9.37 | 8.5 | 9.6 | 40 | 100 | 6 | 15 | 3.8 | 5.5 | 7.0 | 150 | 3.0 |
| 10 | 9.70 | 10.30 | 9.4 | 10.6 | 50 | 150 | 8 | 20 | 4.5 | 6.4 | 8.0 | 90 | 3.0 |
| 11 | 10.67 | 11.33 | 10.4 | 11.6 | 50 | 150 | 10 | 20 | 5.4 | 7.4 | 9.0 | 85 | 2.5 |
| 12 | 11.64 | 12.36 | 11.4 | 12.7 | 50 | 150 | 10 | 25 | 6.0 | 8.4 | 10.0 | 85 | 2.5 |
| 13 | 12.61 | 13.39 | 12.4 | 14.1 | 50 | 170 | 10 | 30 | 7.0 | 9.4 | 11.0 | 80 | 2.5 |
| 15 | 14.55 | 15.45 | 13.8 | 15.6 | 50 | 200 | 10 | 30 | 9.2 | 11.4 | 13.0 | 75 | 2.0 |
| 16 | 15.50 | 16.50 | 15.3 | 17.1 | 50 | 200 | 10 | 40 | 10.4 | 12.4 | 14.0 | 75 | 1.5 |
| 18 | 17.50 | 18.50 | 16.8 | 19.1 | 50 | 225 | 10 | 45 | 12.4 | 14.4 | 16.0 | 70 | 1.5 |
| 20 | 19.40 | 20.60 | 18.8 | 21.2 | 60 | 225 | 15 | 55 | 14.4 | 16.4 | 18.0 | 60 | 1.5 |
| 22 | 21.30 | 22.70 | 20.8 | 23.3 | 60 | 250 | 20 | 55 | 16.4 | 18.4 | 20.0 | 60 | 1.25 |
| 24 | 23.30 | 24.70 | 22.8 | 25.6 | 60 | 250 | 25 | 70 | 18.4 | 20.4 | 22.0 | 55 | 1.25 |

Voltage regulator diodes

BZX79 series

Table 4 Per type BZX79-F/C27 to F/C75 $T_j = 25\text{ °C}$; unless otherwise specified.

| BZX79- F or C XXX | WORKING VOLTAGE V_Z (V) at $I_{Ztest} = 2\text{ mA}$ | | | | DIFFERENTIAL RESISTANCE r_{dif} (Ω) | | | | TEMP. COEFF. S_Z (mV/K) at $I_{Ztest} = 2\text{ mA}$ (see Figs 5 and 6) | | | DIODE CAP. C_d (pF) at $f = 1\text{ MHz}$; $V_R = 0\text{ V}$ | NON-REPETITIVE PEAK REVERSE CURRENT I_{ZSM} (A) at $t_p = 100\text{ }\mu\text{s}$; $T_{amb} = 25\text{ °C}$ |
|-------------------------|--|-------|--------------------|------|---|------|------------------------------|------|--|------|------|---|---|
| | Tol. $\pm 3\%$ (F) | | Tol. $\pm 5\%$ (C) | | at $I_{Ztest} = 0.5\text{ mA}$ | | at $I_{Ztest} = 2\text{ mA}$ | | MIN. | TYP. | MAX. | MAX. | MAX. |
| | MIN. | MAX. | MIN. | MAX. | TYP. | MAX. | TYP. | MAX. | | | | | |
| 27 | 26.20 | 27.80 | 25.1 | 28.9 | 65 | 300 | 25 | 80 | 21.4 | 23.4 | 25.3 | 50 | 1.0 |
| 30 | 29.10 | 30.90 | 28.0 | 32.0 | 70 | 300 | 30 | 80 | 24.4 | 26.6 | 29.4 | 50 | 1.0 |
| 33 | 32.00 | 34.00 | 31.0 | 35.0 | 75 | 325 | 35 | 80 | 27.4 | 29.7 | 33.4 | 45 | 0.9 |
| 36 | 34.90 | 37.10 | 34.0 | 38.0 | 80 | 350 | 35 | 90 | 30.4 | 33.0 | 37.4 | 45 | 0.8 |
| 39 | 37.80 | 40.20 | 37.0 | 41.0 | 80 | 350 | 40 | 130 | 33.4 | 36.4 | 41.2 | 45 | 0.7 |
| 43 | 41.70 | 44.30 | 40.0 | 46.0 | 85 | 375 | 45 | 150 | 37.6 | 41.2 | 46.6 | 40 | 0.6 |
| 47 | 45.60 | 48.40 | 44.0 | 50.0 | 85 | 375 | 50 | 170 | 42.0 | 46.1 | 51.8 | 40 | 0.5 |
| 51 | 49.50 | 52.50 | 48.0 | 54.0 | 90 | 400 | 60 | 180 | 46.6 | 51.0 | 57.2 | 40 | 0.4 |
| 56 | 54.30 | 57.70 | 52.0 | 60.0 | 100 | 425 | 70 | 200 | 52.2 | 57.0 | 63.8 | 40 | 0.3 |
| 62 | 60.10 | 63.90 | 58.0 | 66.0 | 120 | 450 | 80 | 215 | 58.8 | 64.4 | 71.6 | 35 | 0.3 |
| 68 | 66.00 | 70.00 | 64.0 | 72.0 | 150 | 475 | 90 | 240 | 65.6 | 71.7 | 79.8 | 35 | 0.25 |
| 75 | 72.80 | 77.20 | 70.0 | 79.0 | 170 | 500 | 95 | 255 | 73.4 | 80.2 | 88.6 | 35 | 0.2 |

Voltage regulator diodes

BZX79 series

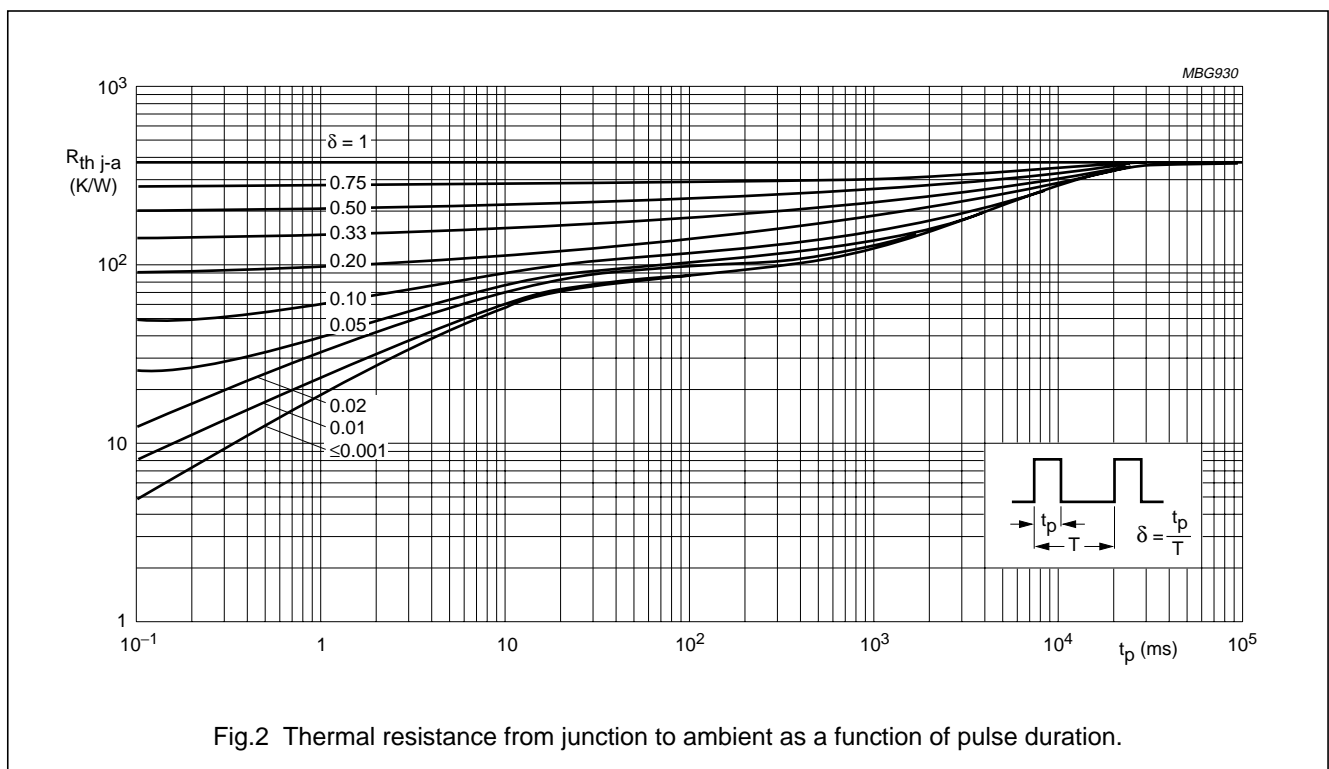
THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|----------------|---|--|-------|------|
| $R_{th\ j-tp}$ | thermal resistance from junction to tie-point | lead length 8 mm. | 300 | K/W |
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | lead length max.; see Fig.2 and note 1 | 380 | K/W |

Note

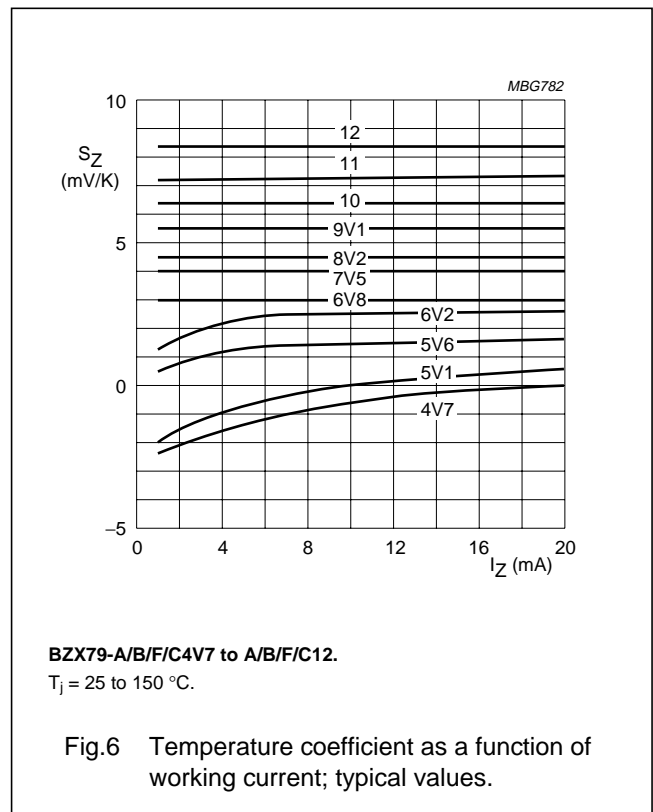
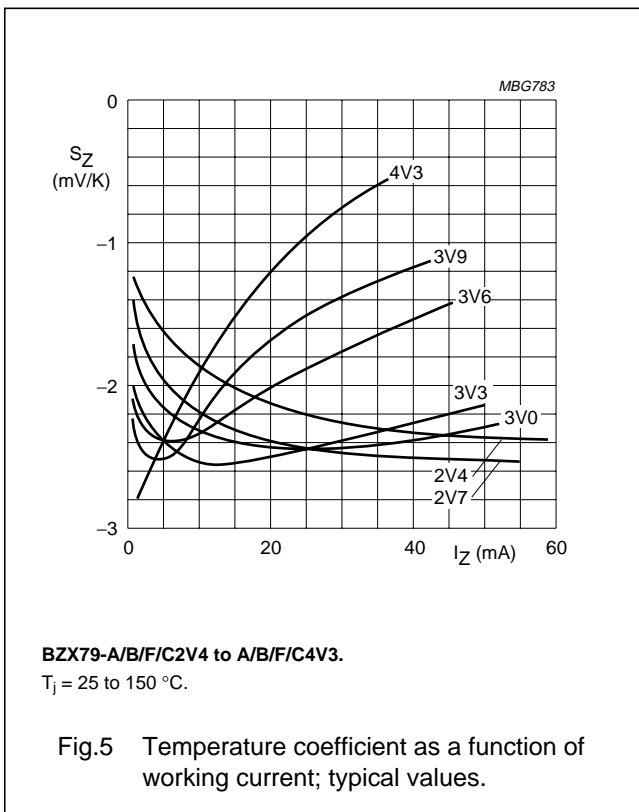
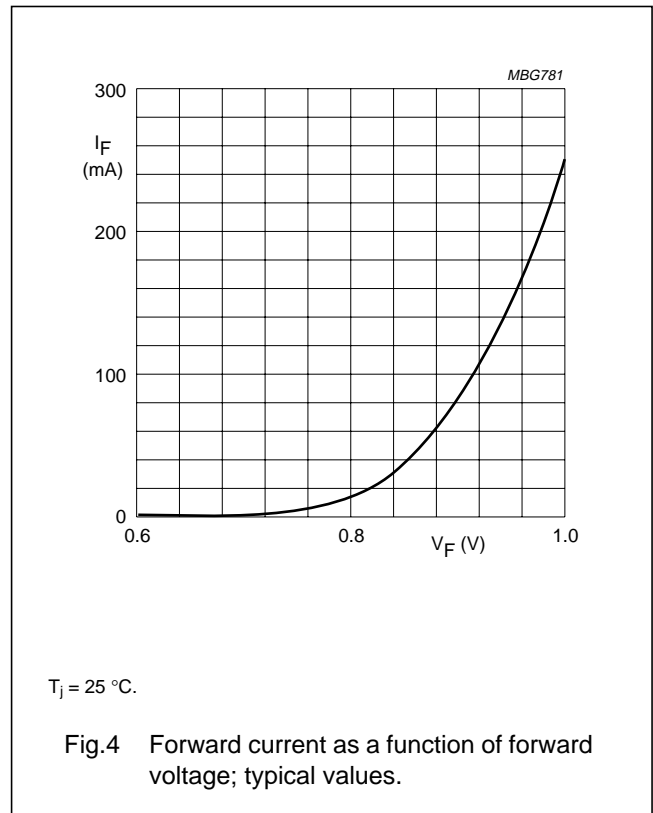
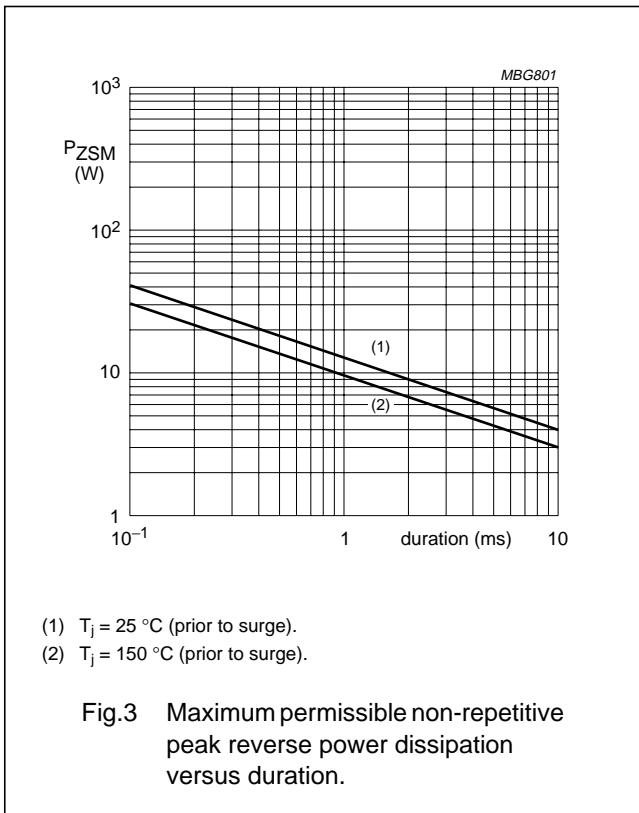
1. Device mounted on a printed circuit-board without metallization pad.

GRAPHICAL DATA



Voltage regulator diodes

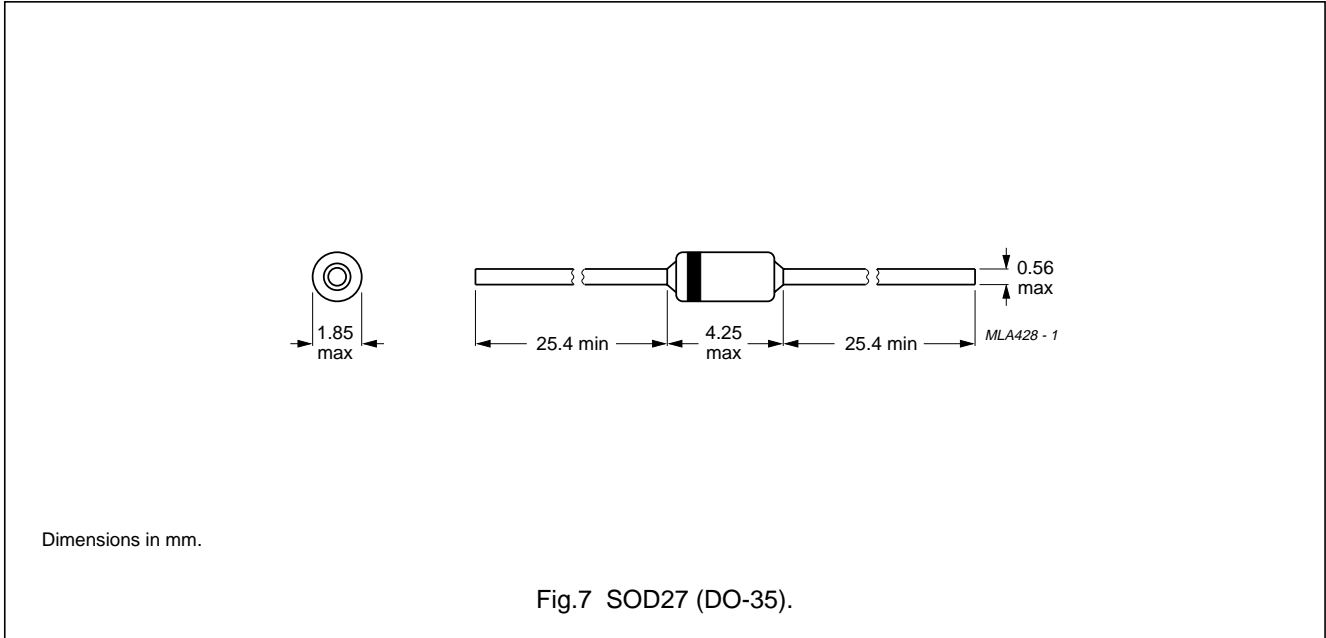
BZX79 series



Voltage regulator diodes

BZX79 series

PACKAGE OUTLINE



DEFINITIONS

| | |
|---|---|
| Data sheet status | |
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| Limiting values | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.