

## VOLTAGE REGULATOR DIODES FOR SURFACE MOUNTING

Silicon planar diodes designed for use as low-voltage stabilizers or voltage references. They are available in the international standardized E24 ( $\pm 5\%$ ) range, and also in tolerance ranges of 2% and 3%. The series consists of 37 types with nominal working voltages ranging from 2,4 V to 75 V.

The SM diode is a leadless diode in a hermetically sealed glass SOD80C envelope with tin plated metal discs at each end. It is suitable for "automatic placement" and as such it can withstand immersion soldering.

The diodes are delivered in "super 8" tape.

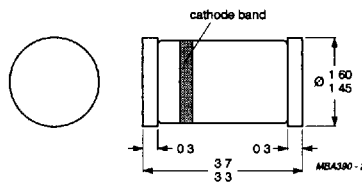
### QUICK REFERENCE DATA

|   |                |                  |
|---|----------------|------------------|
| Working voltage range                                     | $V_Z$          | nom. 2,4 to 75 V |
| Total power dissipation up to flange temperature of 50 °C | $P_{tot}$      | max. 500 mW      |
| Non-repetitive peak reverse power dissipation             | $P_{ZSM}$      | max. 30 W        |
| Junction temperature                                      | $T_j$          | max.: 200 °C     |
| Thermal resistance from junction to tie-point             | $R_{th\ j-tp}$ | = 0,30 K/mW      |

### MECHANICAL DATA

Dimensions in mm

Fig.1 SOD80C.



The BZV55 cathode is indicated by a yellow band.

**RATINGS**

Limiting values in accordance with the Absolute Maximum System (IEC 134).

|   |           |             |                      |
|---|-----------|-------------|----------------------|
| Average forward current (averaged over any 20 ms period)  | $I_F(AV)$ | max.        | 250 mA               |
| Repetitive peak forward current   | $I_{FRM}$ | max.        | 250 mA               |
| Total power dissipation up to $T_{flange} = 50\text{ }^\circ\text{C}$                                       | $P_{tot}$ | max.        | 500 mW               |
| up to $T_{amb} = 50\text{ }^\circ\text{C}$ and mounted on a ceramic substrate of 10 mm x 10 mm x 0,6 mm     | $P_{tot}$ | max.        | 400 mW               |
| Non-repetitive peak reverse power dissipation $t = 100\text{ }\mu\text{s}; T_j = 150\text{ }^\circ\text{C}$ | $P_{ZSM}$ | max.        | 30 W                 |
| Storage temperature   | $T_{stg}$ | -65 to +200 | $^\circ\text{C}$     |
| Junction temperature  | $T_j$     | max.        | 200 $^\circ\text{C}$ |

**THERMAL RESISTANCE**

|  |                |   |           |
|--|----------------|---|-----------|
| From junction to tie-point (flanges)   | $R_{th\ j-tp}$ | = | 0,30 K/mW |
| From junction to ambient when mounted on a ceramic substrate of 10 mm x 10 mm x 0,6 mm | $R_{th\ j-a}$  | = | 0,38 K/mW |

**CHARACTERISTICS**

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

|   |                      |       |   |                  |
|---|----------------------|-------|---|------------------|
| Forward voltage<br>$I_F = 10\text{ mA}$ |                      | $V_F$ | < | 0,9 V            |
| Reverse current                         |                      | $I_R$ | < |                  |
| BZV55- .2V4                             | $V_R = 1\text{ V}$   | $I_R$ | < | 50 $\mu\text{A}$ |
| .2V7                                    | $V_R = 1\text{ V}$   | $I_R$ | < | 20 $\mu\text{A}$ |
| .3V0                                    | $V_R = 1\text{ V}$   | $I_R$ | < | 10 $\mu\text{A}$ |
| .3V3                                    | $V_R = 1\text{ V}$   | $I_R$ | < | 5 $\mu\text{A}$  |
| .3V6                                    | $V_R = 1\text{ V}$   | $I_R$ | < | 5 $\mu\text{A}$  |
| .3V9                                    | $V_R = 1\text{ V}$   | $I_R$ | < | 3 $\mu\text{A}$  |
| .4V3                                    | $V_R = 1\text{ V}$   | $I_R$ | < | 3 $\mu\text{A}$  |
| .4V7                                    | $V_R = 2\text{ V}$   | $I_R$ | < | 3 $\mu\text{A}$  |
| .5V1                                    | $V_R = 2\text{ V}$   | $I_R$ | < | 2 $\mu\text{A}$  |
| .5V6                                    | $V_R = 2\text{ V}$   | $I_R$ | < | 1 $\mu\text{A}$  |
| .6V2                                    | $V_R = 4\text{ V}$   | $I_R$ | < | 3 $\mu\text{A}$  |
| .6V8                                    | $V_R = 4\text{ V}$   | $I_R$ | < | 2 $\mu\text{A}$  |
| .7V5                                    | $V_R = 5\text{ V}$   | $I_R$ | < | 1 $\mu\text{A}$  |
| .8V2                                    | $V_R = 5\text{ V}$   | $I_R$ | < | 700 nA           |
| .9V1                                    | $V_R = 6\text{ V}$   | $I_R$ | < | 500 nA           |
| .10                                     | $V_R = 7\text{ V}$   | $I_R$ | < | 200 nA           |
| .11 to .13                              | $V_R = 8\text{ V}$   | $I_R$ | < | 100 nA           |
| .15 to .75                              | $V_R = 0,7 V_{Znom}$ | $I_R$ | < | 50 nA            |
| . = C for E24 ( $\pm 5\%$ ) tolerance   |                      |       |   |                  |
| . = B for $\pm 2\%$                     |                      |       |   |                  |
| . = F for $\pm 3\%$ .                   |                      |       |   |                  |

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$T_j = 25\text{ }^\circ\text{C}$   
 $\pm 2\%$  tolerance range

| BZV55B | working voltage              |       | differential resistance      |      | temperature coefficient      |      |      | differential resistance  |      |
|--------|------------------------------|-------|------------------------------|------|------------------------------|------|------|--------------------------|------|
|        | $V_Z$ (V)                    |       | $r_{diff}$ ( $\Omega$ )      |      | $S_Z$ (mV/K)                 |      |      | $r_{diff}$ ( $\Omega$ )  |      |
|        | at $I_{Ztest} = 5\text{ mA}$ |       | at $I_{Ztest} = 5\text{ mA}$ |      | at $I_{Ztest} = 5\text{ mA}$ |      |      | at $I_Z = 1\text{ mA}$   |      |
|        | min.                         | max.  | typ.                         | max. | min.                         | typ. | max. | typ.                     | max. |
| B2V4   | 2,35                         | 2,45  | 70                           | 100  | -3,5                         | -1,6 | 0    | 275                      | 600  |
| B2V7   | 2,65                         | 2,75  | 75                           | 100  | -3,5                         | -2,0 | 0    | 300                      | 600  |
| B3V0   | 2,94                         | 3,06  | 80                           | 95   | -3,5                         | -2,1 | 0    | 325                      | 600  |
| B3V3   | 3,23                         | 3,37  | 85                           | 95   | -3,5                         | -2,4 | 0    | 350                      | 600  |
| B3V6   | 3,53                         | 3,67  | 85                           | 90   | -3,5                         | -2,4 | 0    | 375                      | 600  |
| B3V9   | 3,82                         | 3,98  | 85                           | 90   | -3,5                         | -2,5 | 0    | 400                      | 600  |
| B4V3   | 4,21                         | 4,39  | 80                           | 90   | -3,5                         | -2,5 | 0    | 410                      | 600  |
| B4V7   | 4,61                         | 4,79  | 50                           | 80   | -3,5                         | -1,4 | 0,2  | 425                      | 500  |
| B5V1   | 5,00                         | 5,20  | 40                           | 60   | -2,7                         | -0,8 | 1,2  | 400                      | 480  |
| B5V6   | 5,49                         | 5,71  | 15                           | 40   | -2,0                         | 1,2  | 2,5  | 80                       | 400  |
| B6V2   | 6,08                         | 6,32  | 6                            | 10   | 0,4                          | 2,3  | 3,7  | 40                       | 150  |
| B6V8   | 6,66                         | 6,94  | 6                            | 15   | 1,2                          | 3,0  | 4,5  | 30                       | 80   |
| B7V5   | 7,35                         | 7,65  | 6                            | 15   | 2,5                          | 4,0  | 5,3  | 30                       | 80   |
| B8V2   | 8,04                         | 8,36  | 6                            | 15   | 3,2                          | 4,6  | 6,2  | 40                       | 80   |
| B9V1   | 8,92                         | 9,28  | 6                            | 15   | 3,8                          | 5,5  | 7,0  | 40                       | 100  |
| B10    | 9,80                         | 10,20 | 8                            | 20   | 4,5                          | 6,4  | 8,0  | 50                       | 150  |
| B11    | 10,80                        | 11,20 | 10                           | 20   | 5,4                          | 7,4  | 9,0  | 50                       | 150  |
| B12    | 11,80                        | 12,20 | 10                           | 25   | 6,0                          | 8,4  | 10,0 | 50                       | 150  |
| B13    | 12,70                        | 13,30 | 10                           | 30   | 7,0                          | 9,4  | 11,0 | 50                       | 170  |
| B15    | 14,70                        | 15,30 | 10                           | 30   | 9,2                          | 11,4 | 13,0 | 50                       | 200  |
| B16    | 15,70                        | 16,30 | 10                           | 40   | 10,4                         | 12,4 | 14,0 | 50                       | 200  |
| B18    | 17,60                        | 18,40 | 10                           | 45   | 12,4                         | 14,4 | 16,0 | 50                       | 225  |
| B20    | 19,60                        | 20,40 | 15                           | 55   | 14,4                         | 16,4 | 18,0 | 60                       | 225  |
| B22    | 21,60                        | 22,40 | 20                           | 55   | 16,4                         | 18,4 | 20,0 | 60                       | 250  |
| B24    | 23,50                        | 24,50 | 25                           | 70   | 18,4                         | 20,4 | 22,0 | 60                       | 250  |
|        | at $I_{Ztest} = 2\text{ mA}$ |       | at $I_{Ztest} = 2\text{ mA}$ |      | at $I_{Ztest} = 2\text{ mA}$ |      |      | at $I_Z = 0,5\text{ mA}$ |      |
| B27    | 26,50                        | 27,50 | 25                           | 80   | 21,4                         | 23,4 | 25,3 | 65                       | 300  |
| B30    | 29,40                        | 30,60 | 30                           | 80   | 24,4                         | 26,6 | 29,4 | 70                       | 300  |
| B33    | 32,30                        | 33,70 | 35                           | 80   | 27,4                         | 29,7 | 33,4 | 75                       | 325  |
| B36    | 35,30                        | 36,70 | 35                           | 90   | 30,4                         | 33,0 | 37,4 | 80                       | 350  |
| B39    | 38,20                        | 39,80 | 40                           | 130  | 33,4                         | 36,4 | 41,2 | 80                       | 350  |
| B43    | 42,10                        | 43,90 | 45                           | 150  | 37,6                         | 41,2 | 46,6 | 85                       | 375  |
| B47    | 46,10                        | 47,90 | 50                           | 170  | 42,0                         | 46,1 | 51,8 | 85                       | 375  |
| B51    | 50,00                        | 51,00 | 60                           | 180  | 46,6                         | 51,0 | 57,2 | 90                       | 400  |
| B56    | 54,90                        | 57,10 | 70                           | 200  | 52,2                         | 57,0 | 63,8 | 100                      | 425  |
| B62    | 60,80                        | 63,20 | 80                           | 215  | 58,8                         | 64,4 | 71,6 | 120                      | 450  |
| B68    | 66,60                        | 69,40 | 90                           | 240  | 65,6                         | 71,7 | 79,8 | 150                      | 475  |
| B75    | 73,50                        | 76,50 | 95                           | 255  | 73,4                         | 80,2 | 88,6 | 170                      | 500  |

$T_j = 25\text{ }^\circ\text{C}$  $\pm 3\%$  tolerance range

| BZV55F | working voltage                     |       | differential resistance             |      | temperature coefficient             |      |      |
|--------|-------------------------------------|-------|-------------------------------------|------|-------------------------------------|------|------|
|        | $V_Z$ (V)                           |       | $r_{\text{diff}}$ ( $\Omega$ )      |      | $S_Z$ (mV/K)                        |      |      |
|        | at $I_{Z\text{test}} = 5\text{ mA}$ |       | at $I_{Z\text{test}} = 5\text{ mA}$ |      | at $I_{Z\text{test}} = 5\text{ mA}$ |      |      |
|        | min.                                | max.  | typ.                                | max. | min.                                | typ. | max. |
| F2V4   | 2,33                                | 2,47  | 70                                  | 100  | -3,5                                | -1,6 | 0    |
| F2V7   | 2,62                                | 2,78  | 75                                  | 100  | -3,5                                | -2,0 | 0    |
| F3V0   | 2,91                                | 3,09  | 80                                  | 100  | -3,5                                | -2,1 | 0    |
| F3V3   | 3,20                                | 3,40  | 85                                  | 100  | -3,5                                | -2,4 | 0    |
| F3V6   | 3,49                                | 3,71  | 85                                  | 100  | -3,5                                | -2,4 | 0    |
| F3V9   | 3,78                                | 4,02  | 85                                  | 100  | -3,5                                | -2,5 | 0    |
| F4V3   | 4,17                                | 4,43  | 80                                  | 100  | -3,5                                | -2,5 | 0    |
| F4V7   | 4,56                                | 4,84  | 50                                  | 100  | -3,5                                | -1,4 | 0,2  |
| F5V1   | 4,95                                | 5,25  | 40                                  | 80   | -2,7                                | -0,8 | 1,2  |
| F5V6   | 5,43                                | 5,77  | 15                                  | 40   | -2,0                                | 1,2  | 2,5  |
| F6V2   | 6,01                                | 6,39  | 6                                   | 30   | 0,4                                 | 2,3  | 3,7  |
| F6V8   | 6,60                                | 7,00  | 6                                   | 20   | 1,2                                 | 3,0  | 4,5  |
| F7V5   | 7,28                                | 7,72  | 6                                   | 20   | 2,5                                 | 4,0  | 5,3  |
| F8V2   | 7,95                                | 8,45  | 6                                   | 20   | 3,2                                 | 4,6  | 6,2  |
| F9V1   | 8,83                                | 9,37  | 6                                   | 20   | 3,8                                 | 5,5  | 7,0  |
| F10    | 9,70                                | 10,30 | 8                                   | 25   | 4,5                                 | 6,4  | 8,0  |
| F11    | 10,67                               | 11,33 | 10                                  | 25   | 5,4                                 | 7,4  | 9,0  |
| F12    | 11,64                               | 12,36 | 10                                  | 25   | 6,0                                 | 8,4  | 10,0 |
| F13    | 12,61                               | 13,39 | 10                                  | 35   | 7,0                                 | 9,4  | 11,0 |
| F15    | 14,55                               | 15,45 | 10                                  | 40   | 9,2                                 | 11,4 | 13,0 |
| F16    | 15,50                               | 16,50 | 10                                  | 45   | 10,4                                | 12,4 | 14,0 |
| F18    | 17,50                               | 18,50 | 10                                  | 50   | 12,4                                | 14,4 | 16,0 |
| F20    | 19,40                               | 20,60 | 15                                  | 60   | 14,4                                | 16,4 | 18,0 |
| F22    | 21,30                               | 22,70 | 20                                  | 70   | 16,4                                | 18,4 | 20,0 |
| F24    | 23,30                               | 24,70 | 25                                  | 80   | 18,4                                | 20,4 | 22,0 |
|        | at $I_{Z\text{test}} = 2\text{ mA}$ |       | at $I_{Z\text{test}} = 2\text{ mA}$ |      | at $I_{Z\text{test}} = 2\text{ mA}$ |      |      |
| F27    | 26,20                               | 27,80 | 25                                  | 80   | 21,4                                | 23,4 | 25,3 |
| F30    | 29,10                               | 30,90 | 30                                  | 100  | 24,4                                | 26,6 | 29,4 |
| F33    | 32,00                               | 34,00 | 35                                  | 120  | 27,4                                | 29,7 | 33,4 |
| F36    | 34,90                               | 37,10 | 35                                  | 140  | 30,4                                | 33,0 | 37,4 |
| F39    | 37,80                               | 40,20 | 40                                  | 150  | 33,4                                | 36,4 | 41,2 |
| F43    | 41,70                               | 44,30 | 45                                  | 160  | 37,6                                | 41,2 | 46,6 |
| F47    | 45,60                               | 48,40 | 50                                  | 170  | 42,0                                | 46,1 | 51,8 |
| F51    | 49,50                               | 52,50 | 60                                  | 180  | 46,6                                | 51,0 | 57,2 |
| F56    | 54,30                               | 57,70 | 70                                  | 200  | 52,2                                | 57,0 | 63,8 |
| F62    | 60,10                               | 63,90 | 80                                  | 220  | 58,8                                | 64,4 | 71,6 |
| F68    | 66,00                               | 70,00 | 90                                  | 240  | 65,6                                | 71,7 | 79,8 |
| F75    | 72,80                               | 77,20 | 95                                  | 255  | 73,4                                | 80,2 | 88,6 |

$T_j = 25\text{ }^\circ\text{C}$   
 $\pm 5\%$  tolerance range

| BZV55C | working voltage              |       | differential resistance      |      | temperature coefficient      |      |      | differential resistance  |      |
|--------|------------------------------|-------|------------------------------|------|------------------------------|------|------|--------------------------|------|
|        | $V_Z$ (V)                    |       | $r_{diff}$ ( $\Omega$ )      |      | $S_Z$ (mV/K)                 |      |      | $r_{diff}$ ( $\Omega$ )  |      |
|        | at $I_{Ztest} = 5\text{ mA}$ |       | at $I_{Ztest} = 5\text{ mA}$ |      | at $I_{Ztest} = 5\text{ mA}$ |      |      | at $I_Z = 1\text{ mA}$   |      |
|        | min.                         | max.  | typ.                         | max. | min.                         | typ. | max. | typ.                     | max. |
| C2V4   | 2,20                         | 2,60  | 70                           | 100  | -3,5                         | -1,6 | 0    | 275                      | 600  |
| C2V7   | 2,50                         | 2,90  | 75                           | 100  | -3,5                         | -2,0 | 0    | 300                      | 600  |
| C3V0   | 2,80                         | 3,20  | 80                           | 95   | -3,5                         | -2,1 | 0    | 325                      | 600  |
| C3V3   | 3,10                         | 3,50  | 85                           | 95   | -3,5                         | -2,4 | 0    | 350                      | 600  |
| C3V6   | 3,40                         | 3,80  | 85                           | 90   | -3,5                         | -2,4 | 0    | 375                      | 600  |
| C3V9   | 3,70                         | 4,10  | 85                           | 90   | -3,5                         | -2,5 | 0    | 400                      | 600  |
| C4V3   | 4,00                         | 4,60  | 80                           | 90   | -3,5                         | -2,5 | 0    | 410                      | 600  |
| C4V7   | 4,40                         | 5,00  | 50                           | 80   | -3,5                         | -1,4 | 0,2  | 425                      | 500  |
| C5V1   | 4,80                         | 5,40  | 40                           | 60   | -2,7                         | -0,8 | 1,2  | 400                      | 480  |
| C5V6   | 5,20                         | 6,00  | 15                           | 40   | -2,0                         | 1,2  | 2,5  | 80                       | 400  |
| C6V2   | 5,80                         | 6,60  | 6                            | 10   | 0,4                          | 2,3  | 3,7  | 40                       | 150  |
| C6V8   | 6,40                         | 7,20  | 6                            | 15   | 1,2                          | 3,0  | 4,5  | 30                       | 80   |
| C7V5   | 7,00                         | 7,90  | 6                            | 15   | 2,5                          | 4,0  | 5,3  | 30                       | 80   |
| C8V2   | 7,70                         | 8,70  | 6                            | 15   | 3,2                          | 4,6  | 6,2  | 40                       | 80   |
| C9V1   | 8,50                         | 9,60  | 6                            | 15   | 3,8                          | 5,5  | 7,0  | 40                       | 100  |
| C10    | 9,40                         | 10,60 | 8                            | 20   | 4,5                          | 6,4  | 8,0  | 50                       | 150  |
| C11    | 10,40                        | 11,60 | 10                           | 20   | 5,4                          | 7,4  | 9,0  | 50                       | 150  |
| C12    | 11,40                        | 12,70 | 10                           | 25   | 6,0                          | 8,4  | 10,0 | 50                       | 150  |
| C13    | 12,40                        | 14,10 | 10                           | 30   | 7,0                          | 9,4  | 11,0 | 50                       | 170  |
| C15    | 13,80                        | 15,60 | 10                           | 30   | 9,2                          | 11,4 | 13,0 | 50                       | 200  |
| C16    | 15,30                        | 17,10 | 10                           | 40   | 10,4                         | 12,4 | 14,0 | 50                       | 200  |
| C18    | 16,80                        | 19,10 | 10                           | 45   | 12,4                         | 14,4 | 16,0 | 50                       | 225  |
| C20    | 18,80                        | 21,20 | 15                           | 55   | 14,4                         | 16,4 | 18,0 | 60                       | 225  |
| C22    | 20,80                        | 23,30 | 20                           | 55   | 16,4                         | 18,4 | 20,0 | 60                       | 250  |
| C24    | 22,80                        | 25,60 | 25                           | 70   | 18,4                         | 20,4 | 22,0 | 60                       | 250  |
|        | at $I_{Ztest} = 2\text{ mA}$ |       | at $I_{Ztest} = 2\text{ mA}$ |      | at $I_{Ztest} = 2\text{ mA}$ |      |      | at $I_Z = 0,5\text{ mA}$ |      |
| C27    | 25,10                        | 28,90 | 25                           | 80   | 21,4                         | 23,4 | 25,3 | 65                       | 300  |
| C30    | 28,00                        | 32,00 | 30                           | 80   | 24,4                         | 26,6 | 29,4 | 70                       | 300  |
| C33    | 31,00                        | 35,00 | 35                           | 80   | 27,4                         | 29,7 | 33,4 | 75                       | 325  |
| C36    | 34,00                        | 38,00 | 35                           | 90   | 30,4                         | 33,0 | 37,4 | 80                       | 350  |
| C39    | 37,00                        | 41,00 | 40                           | 130  | 33,4                         | 36,4 | 41,2 | 80                       | 350  |
| C43    | 40,00                        | 46,00 | 45                           | 150  | 37,6                         | 41,2 | 46,6 | 85                       | 375  |
| C47    | 44,00                        | 50,00 | 50                           | 170  | 42,0                         | 46,1 | 51,8 | 85                       | 375  |
| C51    | 48,00                        | 54,00 | 60                           | 180  | 46,6                         | 51,0 | 57,2 | 90                       | 400  |
| C56    | 52,00                        | 60,00 | 70                           | 200  | 52,2                         | 57,0 | 63,8 | 100                      | 425  |
| C62    | 58,00                        | 66,00 | 80                           | 215  | 58,8                         | 64,4 | 71,6 | 120                      | 450  |
| C68    | 64,00                        | 72,00 | 90                           | 240  | 65,6                         | 71,7 | 79,8 | 150                      | 475  |
| C75    | 70,00                        | 79,00 | 95                           | 255  | 73,4                         | 80,2 | 88,6 | 170                      | 500  |

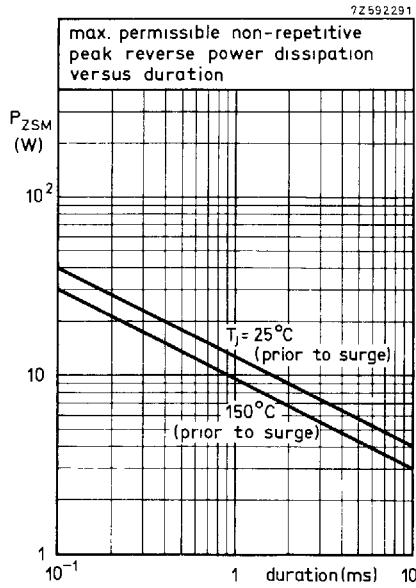


Fig. 2.

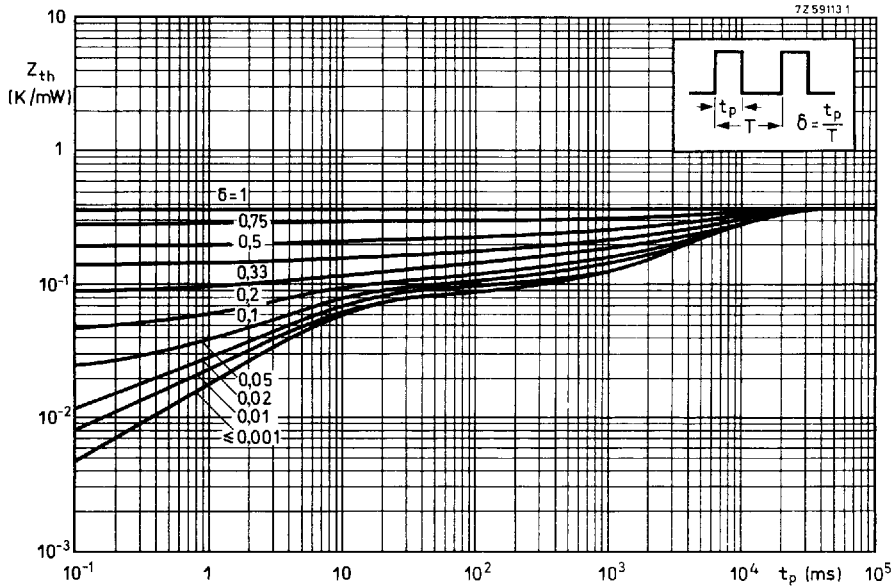


Fig. 3.

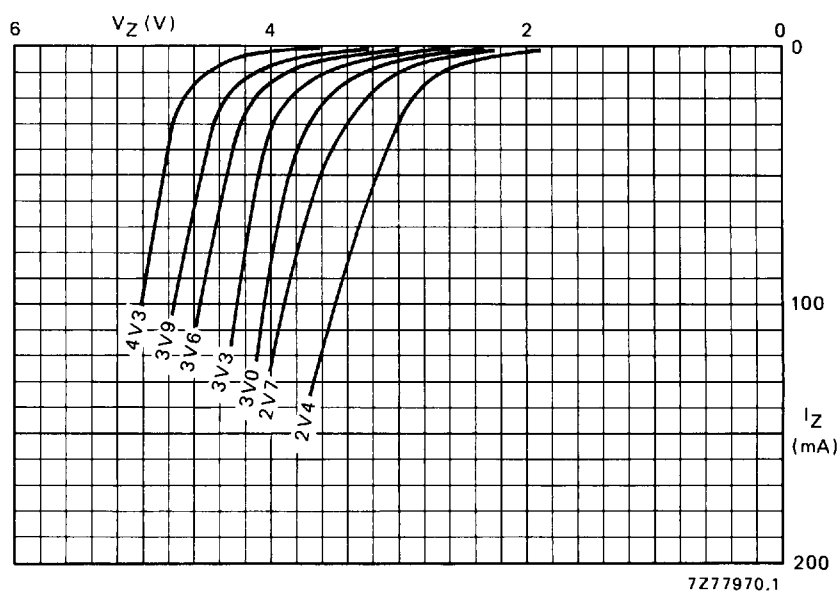


Fig. 4 Static characteristics; typical values;  $T_{amb} = 25\text{ }^\circ\text{C}$ .

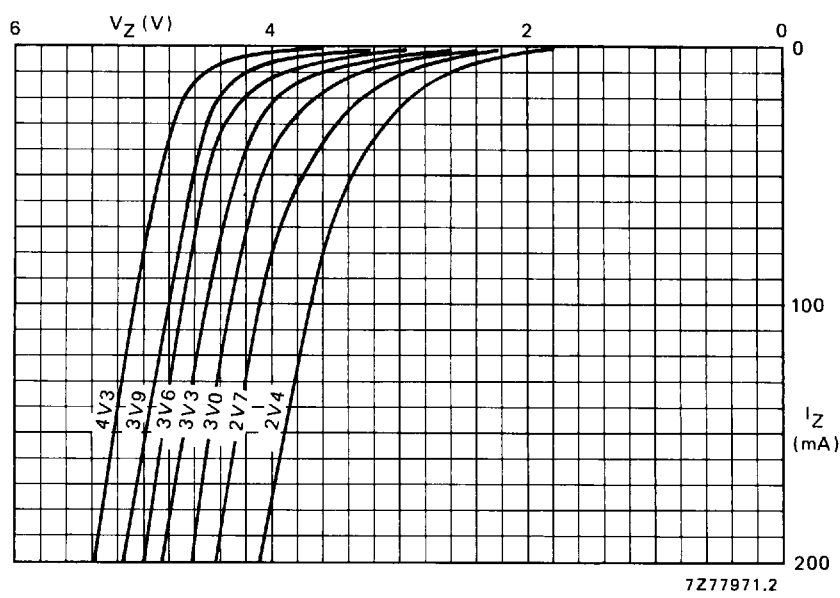


Fig. 5 Dynamic characteristics; typical values;  $T_j = 25\text{ }^\circ\text{C}$ .

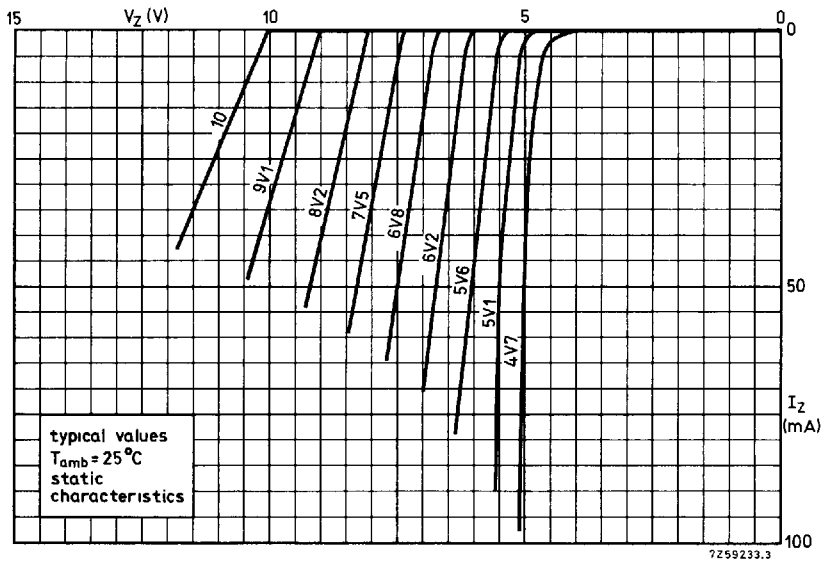


Fig. 6.

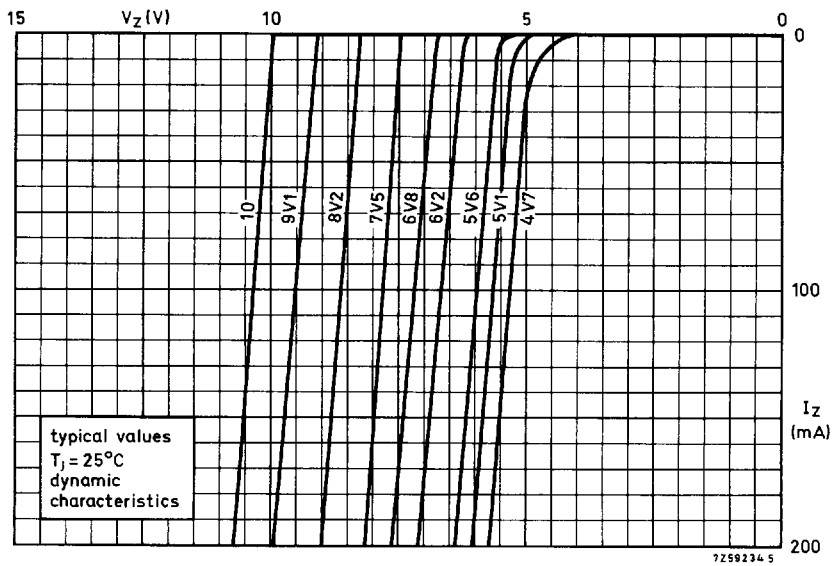


Fig. 7.



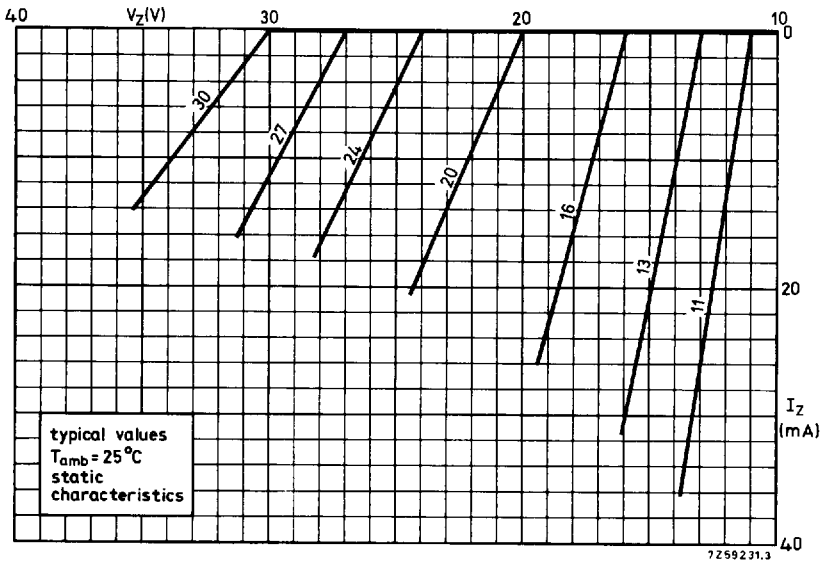


Fig. 8.

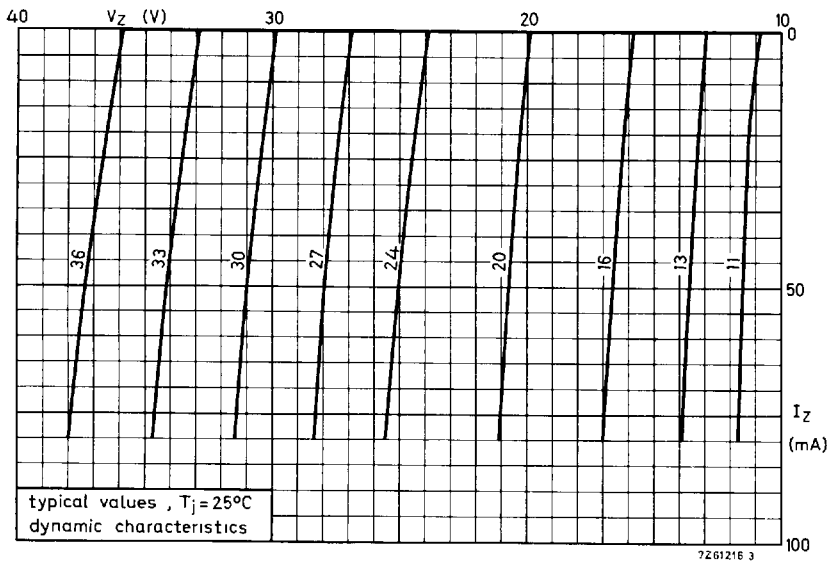


Fig. 9.

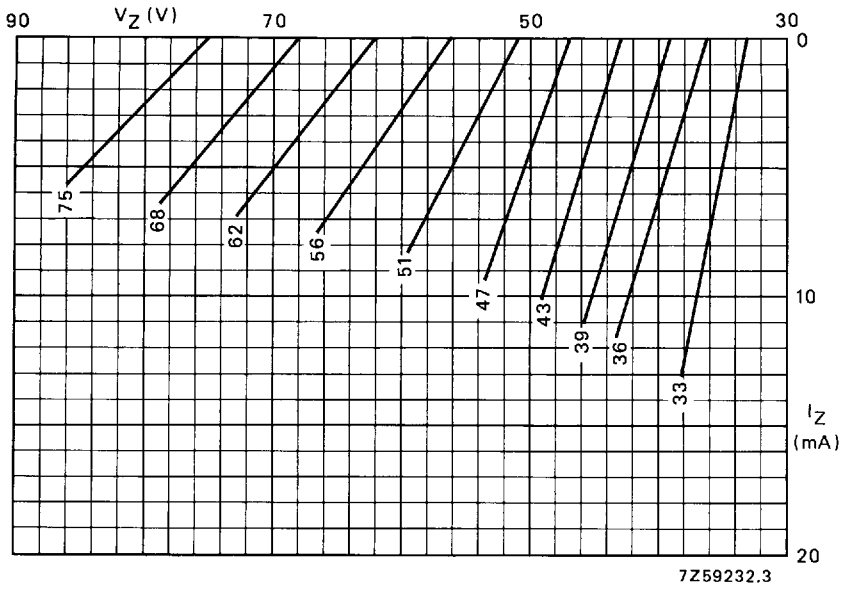


Fig. 10 Static characteristics; typical values;  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

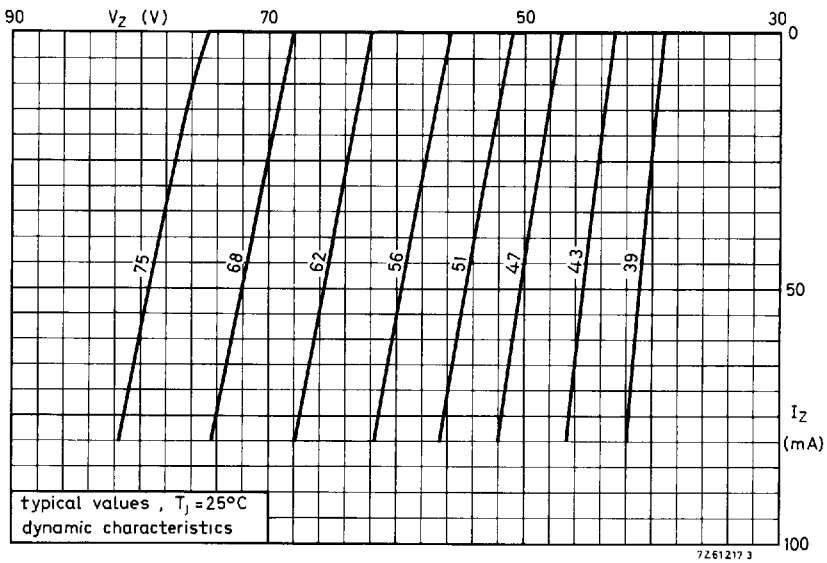


Fig. 11.

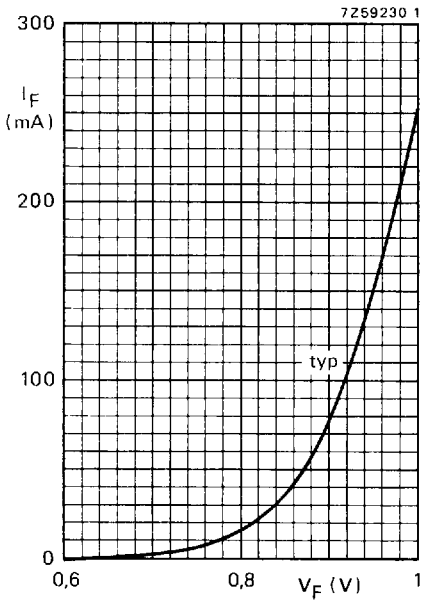


Fig. 12  $T_j = 25^\circ\text{C}$ .

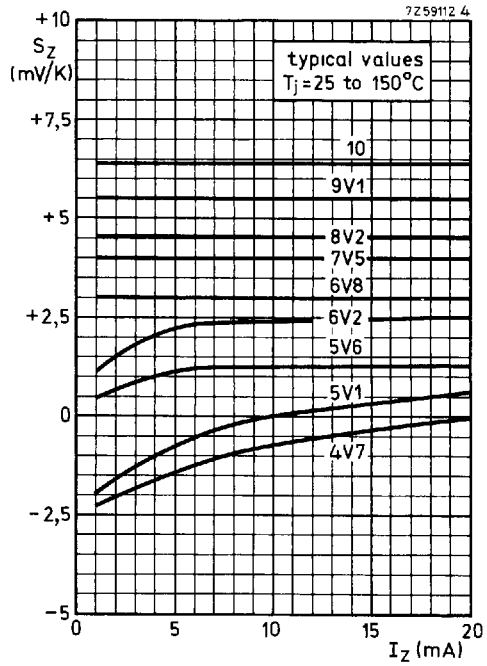


Fig. 13.

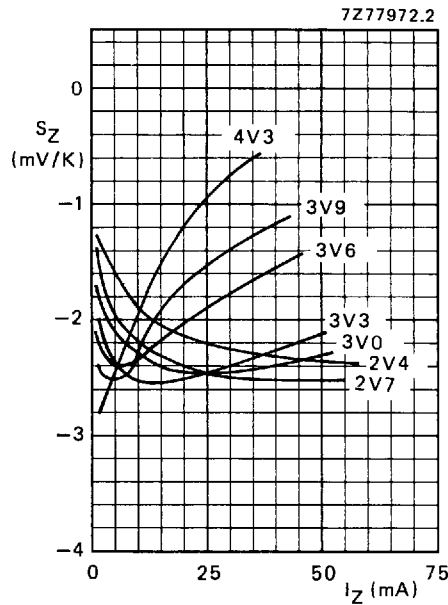


Fig. 14 Typical values;  $T_j = 25 \text{ to } 150^\circ\text{C}$ .

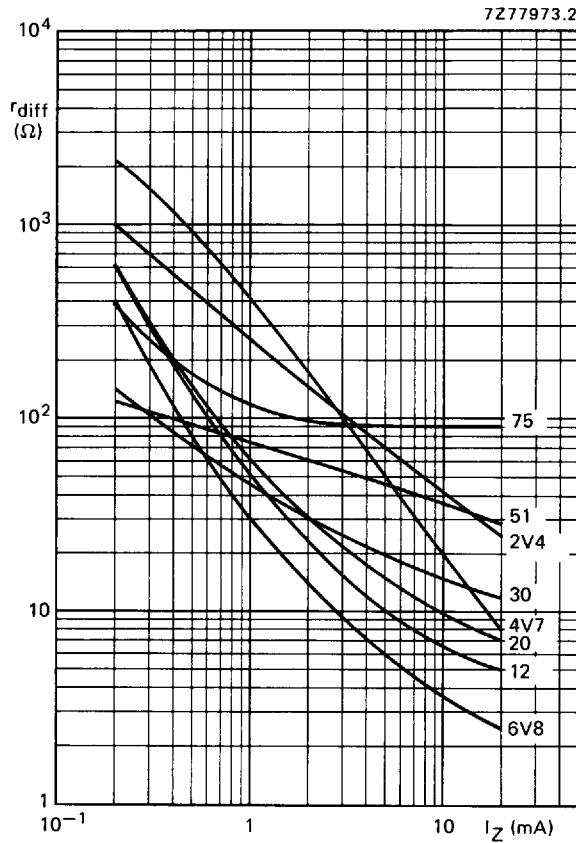


Fig. 15 Typical values;  $T_j = 25\text{ }^\circ\text{C}$ ;  $f = 1\text{ kHz}$ .

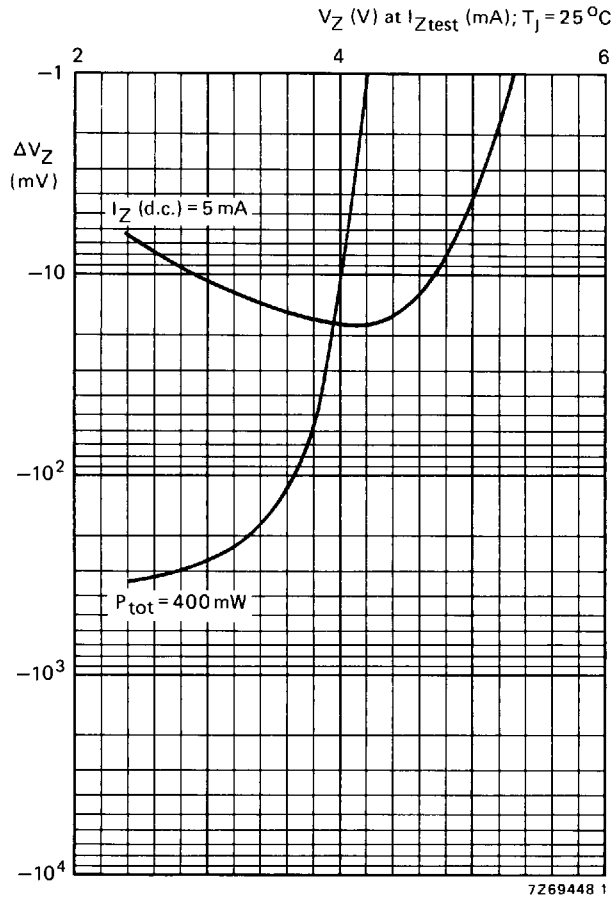


Fig. 16 Typical change of working voltage under operating conditions at  $T_{\text{amb}} = 25^\circ\text{C}$ .

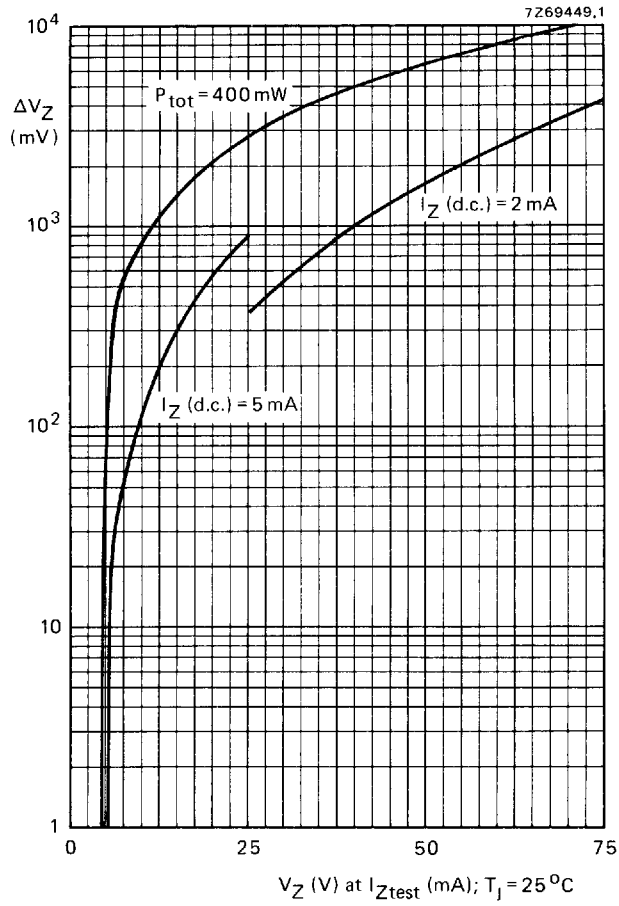


Fig. 17 Typical change of working voltage under operating conditions at  $T_{amb} = 25^\circ\text{C}$ .