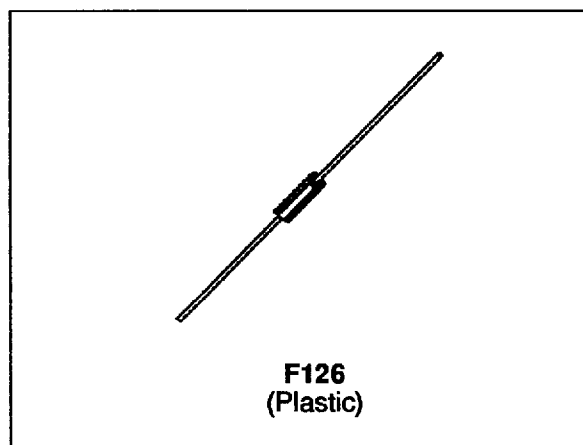


FEATURES

- PEAK PULSE POWER= 400 W @ 1ms
- STAND-OFF VOLTAGE RANGE :
From 5V8 to 376 V
- UNI AND BIDIRECTIONAL TYPES
- LOW CLAMPING FACTOR
- FAST RESPONSE TIME
- UL RECOGNIZED


DESCRIPTION

Transil diodes provide high overvoltage protection by clamping action. Their instantaneous response to transients makes them particularly suited to protect voltage sensitive devices such as MOS Technology and low voltage supplied IC's.

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^{\circ}\text{C}$)

| Symbol | Parameter | Value | Unit |
|--------------------|---|--|--|
| P_p | Peak pulse power dissipation | 400 | W |
| P | Power dissipation on infinite heatsink | $T_{lead} = 75^{\circ}\text{C}$ 1.7 | W |
| T_{stg} T_j | Storage temperature range Maximum junction temperature | - 65 to + 175 175 | $^{\circ}\text{C}$ $^{\circ}\text{C}$ |
| T_L | Maximum lead temperature for soldering during 10 s. | 230 | $^{\circ}\text{C}$ |

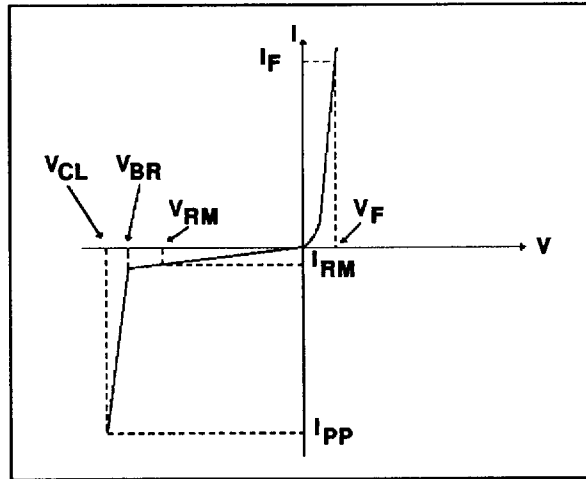
THERMAL RESISTANCES

| Symbol | Parameter | Value | Unit |
|---------------|---|----------------------------------|-----------------------------|
| $R_{th(j-l)}$ | Junction to leads on infinite heatsink | 60 | $^{\circ}\text{C}/\text{W}$ |
| $R_{th(j-a)}$ | Junction to ambient on printed circuit. | $L_{lead} = 10\text{ mm}$ 100 | $^{\circ}\text{C}/\text{W}$ |

BZW04-xx

ELECTRICAL CHARACTERISTICS
($T_{amb} = 25^{\circ}C$)

| Symbol | Parameter |
|------------|---|
| V_{RM} | Stand-off voltage |
| V_{BR} | Breakdown voltage |
| V_{CL} | Clamping voltage |
| I_{RM} | Leakage current @ V_{RM} |
| I_{PP} | Peak pulse current |
| αT | Voltage temperature coefficient |
| V_F | Forward voltage drop $V_F < 3.5V @ I_F = 25 A$ |



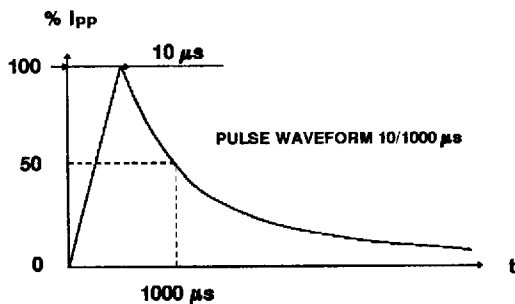
| Types | | $I_{RM} @ V_{RM}$ max | | $V_{BR} @ I_R$ min nom max note2 | | | | $V_{CL} @ I_{PP}$ max 10/1000 μs | | $V_{CL} @ I_{PP}$ max 8/20 μs | | αT max note3 | C typ note4 |
|----------------|---------------|--------------------------|------|--|-----|------|----|---|------|--|-----|----------------------------|-------------------|
| Unidirectional | Bidirectional | μA | V | V | V | V | mA | V | A | V | A | $10^{-4}/^{\circ}C$ | pF |
| BZW04P5V8 | BZW04P5V8B | 1000 | 5.8 | 6.45 | 6.8 | 7.48 | 10 | 10.5 | 38 | 13.4 | 174 | 5.7 | 3500 |
| BZW04-5V8 | BZW04-5V8B | 1000 | 5.8 | 6.45 | 6.8 | 7.14 | 10 | 10.5 | 38 | 13.4 | 174 | 5.7 | 3500 |
| BZW04P6V4 | BZW04P6V4B | 500 | 6.4 | 7.13 | 7.5 | 8.25 | 10 | 11.3 | 35.4 | 14.5 | 160 | 6.1 | 3100 |
| BZW04-6V4 | BZW04-6V4B | 500 | 6.4 | 7.13 | 7.5 | 7.88 | 10 | 11.3 | 35.4 | 14.5 | 160 | 6.1 | 3100 |
| BZW04P7V0 | BZW04P7V0B | 200 | 7.02 | 7.79 | 8.2 | 9.02 | 10 | 12.1 | 33 | 15.5 | 148 | 6.5 | 2700 |
| BZW04-7V0 | BZW04-7V0B | 200 | 7.02 | 7.79 | 8.2 | 8.61 | 10 | 12.1 | 33 | 15.5 | 148 | 6.5 | 2700 |
| BZW04P7V8 | BZW04P7V8B | 50 | 7.78 | 8.65 | 9.1 | 10 | 1 | 13.4 | 30 | 17.1 | 134 | 6.8 | 2300 |
| BZW04-7V8 | BZW04-7V8B | 50 | 7.78 | 8.65 | 9.1 | 9.55 | 1 | 13.4 | 30 | 17.1 | 134 | 6.8 | 2300 |
| BZW04P8V5 | BZW04P8V5B | 10 | 8.55 | 9.5 | 10 | 11 | 1 | 14.5 | 27.6 | 18.6 | 124 | 7.3 | 2000 |
| BZW04-8V5 | BZW04-8V5B | 10 | 8.55 | 9.5 | 10 | 10.5 | 1 | 14.5 | 27.6 | 18.6 | 124 | 7.3 | 2000 |
| BZW04P9V4 | BZW04P9V4B | 5 | 9.4 | 10.5 | 11 | 12.1 | 1 | 15.6 | 25.7 | 20.3 | 113 | 7.5 | 1750 |
| BZW04-9V4 | BZW04-9V4B | 5 | 9.4 | 10.5 | 11 | 11.6 | 1 | 15.6 | 25.7 | 20.3 | 113 | 7.5 | 1750 |
| BZW04P10 | BZW04-9V4B | 5 | 10.2 | 11.4 | 12 | 13.2 | 1 | 16.7 | 24 | 21.7 | 106 | 7.8 | 1550 |
| BZW04-10 | BZW04-10B | 5 | 10.2 | 11.4 | 12 | 12.6 | 1 | 16.7 | 24 | 21.7 | 106 | 7.8 | 1550 |
| BZW04P11 | BZW04P11B | 5 | 11.1 | 12.4 | 13 | 14.3 | 1 | 18.2 | 22 | 23.6 | 97 | 8.1 | 1450 |
| BZW04-11 | BZW04-11B | 5 | 11.1 | 12.4 | 13 | 13.7 | 1 | 18.2 | 22 | 23.6 | 97 | 8.1 | 1450 |
| BZW04P13 | BZW04P13B | 5 | 12.8 | 14.3 | 15 | 16.5 | 1 | 21.2 | 19 | 27.2 | 85 | 8.4 | 1200 |
| BZW04-13 | BZW04-13B | 5 | 12.8 | 14.3 | 15 | 15.8 | 1 | 21.2 | 19 | 27.2 | 85 | 8.4 | 1200 |
| BZW04P14 | BZW04P14B | 5 | 13.6 | 15.2 | 16 | 17.6 | 1 | 22.5 | 17.8 | 28.9 | 80 | 8.6 | 1100 |
| BZW04-14 | BZW04-14B | 5 | 13.6 | 15.2 | 16 | 16.8 | 1 | 22.5 | 17.8 | 28.9 | 80 | 8.6 | 1100 |
| BZW04P15 | BZW04P15B | 5 | 15.3 | 17.1 | 18 | 19.8 | 1 | 25.2 | 16 | 32.5 | 71 | 8.8 | 975 |
| BZW04-15 | BZW04-15B | 5 | 15.3 | 17.1 | 18 | 18.9 | 1 | 25.2 | 16 | 32.5 | 71 | 8.8 | 975 |
| BZW04P17 | BZW04P17B | 5 | 17.1 | 19 | 20 | 22 | 1 | 27.7 | 14.5 | 36.1 | 64 | 9.0 | 850 |
| BZW04-17 | BZW04-17B | 5 | 17.1 | 19 | 20 | 21 | 1 | 27.7 | 14.5 | 36.1 | 64 | 9.0 | 850 |
| BZW04P19 | BZW04P19B | 5 | 18.8 | 20.9 | 22 | 24.2 | 1 | 30.6 | 13 | 39.3 | 59 | 9.2 | 800 |
| BZW04-19 | BZW04-19B | 5 | 18.8 | 20.9 | 22 | 23.1 | 1 | 30.6 | 13 | 39.3 | 59 | 9.2 | 800 |

BZW04-xx

| Types | | I _{RM} @ V _{RM} | | V _{BR} @ I _R | | | | V _{CL} @ I _{PP} | | V _{CL} @ I _{PP} | | αT | C |
|----------------|---------------|-----------------------------------|------|----------------------------------|-----|------|----|-----------------------------------|--------|-----------------------------------|-------|----------------------|-----|
| Unidirectional | Bidirectional | μA | V | min nom max | | | mA | max | | max | | max | typ |
| | | | | note2 | | | | 10/1000μs | 8/20μs | note3 | note4 | | |
| | | | | V | V | V | | V | A | V | A | 10 ⁻⁴ /°C | pF |
| BZW04P20 | BZW04P20B | 5 | 20.5 | 22.8 | 24 | 26.4 | 1 | 33.2 | 12 | 42.8 | 54 | 9.4 | 725 |
| BZW04-20 | BZW04-20B | 5 | 20.5 | 22.8 | 24 | 25.2 | 1 | 33.2 | 12 | 42.8 | 54 | 9.4 | 725 |
| BZW04P23 | BZW04P23B | 5 | 23.1 | 25.7 | 27 | 29.7 | 1 | 37.5 | 10.7 | 48.3 | 48 | 9.6 | 625 |
| BZW04-23 | BZW04-23B | 5 | 23.1 | 25.7 | 27 | 28.4 | 1 | 37.5 | 10.7 | 48.3 | 48 | 9.6 | 625 |
| BZW04P26 | BZW04P26B | 5 | 25.6 | 28.5 | 30 | 33 | 1 | 41.5 | 9.6 | 53.5 | 43 | 9.7 | 575 |
| BZW04-26 | BZW04-26B | 5 | 25.6 | 28.5 | 30 | 31.5 | 1 | 41.5 | 9.6 | 53.5 | 43 | 9.7 | 575 |
| BZW04P28 | BZW04P28B | 5 | 28.2 | 31.4 | 33 | 36.3 | 1 | 45.7 | 8.8 | 59.0 | 39 | 9.8 | 510 |
| BZW04-28 | BZW04-28B | 5 | 28.2 | 31.4 | 33 | 34.7 | 1 | 45.7 | 8.8 | 59.0 | 39 | 9.8 | 510 |
| BZW04P31 | BZW04P31B | 5 | 30.8 | 34.2 | 36 | 39.6 | 1 | 49.9 | 8 | 64.3 | 36 | 9.9 | 480 |
| BZW04-31 | BZW04-31B | 5 | 30.8 | 34.2 | 36 | 37.8 | 1 | 49.9 | 8 | 64.3 | 36 | 9.9 | 480 |
| BZW04P33 | BZW04P33B | 5 | 33.3 | 37.1 | 39 | 42.9 | 1 | 53.9 | 7.4 | 69.7 | 33 | 10.0 | 450 |
| BZW04-33 | BZW04-33B | 5 | 33.3 | 37.1 | 39 | 41.0 | 1 | 53.9 | 7.4 | 69.7 | 33 | 10.0 | 450 |
| BZW04P37 | BZW04P37B | 5 | 36.8 | 40.9 | 43 | 47.3 | 1 | 59.3 | 6.7 | 76.8 | 30 | 10.1 | 400 |
| BZW04-37 | BZW04-37B | 5 | 36.8 | 40.9 | 43 | 45.2 | 1 | 59.3 | 6.7 | 76.8 | 30 | 10.1 | 400 |
| BZW04P40 | BZW04P40B | 5 | 40.2 | 44.7 | 47 | 51.7 | 1 | 64.8 | 6.2 | 84 | 27 | 10.1 | 370 |
| BZW04-40 | BZW04-40B | 5 | 40.2 | 44.7 | 47 | 49.4 | 1 | 64.8 | 6.2 | 84 | 27 | 10.1 | 370 |
| BZW04P44 | BZW04P44B | 5 | 43.6 | 48.5 | 51 | 56.1 | 1 | 70.1 | 5.7 | 91 | 25 | 10.2 | 350 |
| BZW04-44 | BZW04-44B | 5 | 43.6 | 48.5 | 51 | 53.6 | 1 | 70.1 | 5.7 | 91 | 25 | 10.2 | 350 |
| BZW04P48 | BZW04P48B | 5 | 47.8 | 53.2 | 56 | 61.6 | 1 | 77 | 5.2 | 100 | 23 | 10.3 | 320 |
| BZW04-48 | BZW04-48B | 5 | 47.8 | 53.2 | 56 | 58.8 | 1 | 77 | 5.2 | 100 | 23 | 10.3 | 320 |
| BZW04P53 | BZW04P53B | 5 | 53.0 | 58.9 | 62 | 68.2 | 1 | 85 | 4.7 | 111 | 21 | 10.4 | 290 |
| BZW04-53 | BZW04-53B | 5 | 53.0 | 58.9 | 62 | 65.1 | 1 | 85 | 4.7 | 111 | 21 | 10.4 | 290 |
| BZW04P58 | BZW04P58B | 5 | 58.1 | 64.6 | 68 | 74.8 | 1 | 92 | 4.3 | 121 | 19 | 10.4 | 270 |
| BZW04-58 | BZW04-58B | 5 | 58.1 | 64.6 | 68 | 71.4 | 1 | 92 | 4.3 | 121 | 19 | 10.4 | 270 |
| BZW04P64 | BZW04P64B | 5 | 64.1 | 71.3 | 75 | 82.5 | 1 | 103 | 3.9 | 134 | 17 | 10.5 | 250 |
| BZW04-64 | BZW04-64B | 5 | 64.1 | 71.3 | 75 | 78.8 | 1 | 103 | 3.9 | 134 | 17 | 10.5 | 250 |
| BZW04P70 | BZW04P70B | 5 | 70.1 | 77.9 | 82 | 90.2 | 1 | 113 | 3.5 | 146 | 16 | 10.5 | 230 |
| BZW04-70 | BZW04-70B | 5 | 70.1 | 77.9 | 82 | 86.1 | 1 | 113 | 3.5 | 146 | 16 | 10.5 | 230 |
| BZW04P78 | BZW04P78B | 5 | 77.8 | 86.5 | 91 | 100 | 1 | 125 | 3.2 | 162 | 14 | 10.6 | 210 |
| BZW04-78 | BZW04-78B | 5 | 77.8 | 86.5 | 91 | 95.5 | 1 | 125 | 3.2 | 162 | 14 | 10.6 | 210 |
| BZW04P85 | BZW04P85B | 5 | 85.5 | 95.0 | 100 | 110 | 1 | 137 | 2.9 | 178 | 13 | 10.6 | 200 |
| BZW04-85 | BZW04-85B | 5 | 85.5 | 95.0 | 100 | 105 | 1 | 137 | 2.9 | 178 | 13 | 10.6 | 200 |
| BZW04P94 | BZW04P94B | 5 | 94.0 | 105 | 110 | 121 | 1 | 152 | 2.6 | 195 | 12 | 10.7 | 185 |
| BZW04-94 | BZW04-94B | 5 | 94.0 | 105 | 110 | 116 | 1 | 152 | 2.6 | 195 | 12 | 10.7 | 185 |
| BZW04P102 | BZW04P102B | 5 | 102 | 114 | 120 | 132 | 1 | 165 | 2.4 | 212 | 11 | 10.7 | 170 |
| BZW04-102 | BZW04-102B | 5 | 102 | 114 | 120 | 126 | 1 | 165 | 2.4 | 212 | 11 | 10.7 | 170 |
| BZW04P111 | BZW04P111B | 5 | 111 | 124 | 130 | 143 | 1 | 179 | 2.2 | 230 | 10 | 10.7 | 165 |
| BZW04-111 | BZW04-111B | 5 | 111 | 124 | 130 | 137 | 1 | 179 | 2.2 | 230 | 10 | 10.7 | 165 |

BZW04-xx

| TYPES | | I _{RM} @ V _{RM} max | | V _{BR} @ I _R min nom max note2 | | | | V _{CL} @ I _{PP} max 10/1000μs | | V _{CL} @ I _{PP} max 8/20μs | | αT max note3 | C typ note4 |
|----------------|----------------|--|-----|--|-----|-----|----|---|-----|--|-----|----------------------|-------------------|
| Unidirectional | Unidirectional | μA | V | V | V | V | mA | V | A | V | A | 10 ⁻⁴ /°C | pF |
| BZW04P128 | BZW04P128B | 5 | 128 | 143 | 150 | 165 | 1 | 207 | 2.0 | 265 | 9 | 10.8 | 145 |
| BZW04-128 | BZW04-128B | 5 | 128 | 143 | 150 | 158 | 1 | 207 | 2.0 | 265 | 9 | 10.8 | 145 |
| BZW04P136 | BZW04P136B | 5 | 136 | 152 | 160 | 176 | 1 | 219 | 1.8 | 282 | 8 | 10.8 | 140 |
| BZW04-136 | BZW04-136B | 5 | 136 | 152 | 160 | 168 | 1 | 219 | 1.8 | 282 | 8 | 10.8 | 140 |
| BZW04P145 | BZW04P145B | 5 | 145 | 161 | 170 | 187 | 1 | 234 | 1.7 | 301 | 7.5 | 10.8 | 135 |
| BZW04-145 | BZW04-145B | 5 | 145 | 161 | 170 | 179 | 1 | 234 | 1.7 | 301 | 7.5 | 10.8 | 135 |
| BZW04P154 | BZW04P154B | 5 | 154 | 171 | 180 | 198 | 1 | 246 | 1.6 | 317 | 7 | 10.8 | 125 |
| BZW04-154 | BZW04-154B | 5 | 154 | 171 | 180 | 189 | 1 | 246 | 1.6 | 317 | 7 | 10.8 | 125 |
| BZW04P171 | BZW04P171B | 5 | 171 | 190 | 200 | 220 | 1 | 274 | 1.5 | 353 | 6.5 | 10.8 | 120 |
| BZW04-171 | BZW04-171B | 5 | 171 | 190 | 200 | 210 | 1 | 274 | 1.5 | 353 | 6.5 | 10.8 | 120 |
| BZW04P188 | BZW04P188B | 5 | 188 | 209 | 220 | 242 | 1 | 328 | 1.4 | 388 | 6 | 10.8 | 110 |
| BZW04-188 | BZW04-188B | 5 | 188 | 209 | 220 | 231 | 1 | 328 | 1.4 | 388 | 6 | 10.8 | 110 |
| BZW04P213 | BZW04P213B | 5 | 213 | 237 | 250 | 275 | 1 | 344 | 1.5 | 442 | 5.2 | 11 | 100 |
| BZW04-213 | BZW04-213B | 5 | 231 | 237 | 250 | 263 | 1 | 344 | 1.5 | 442 | 5.2 | 11 | 100 |
| BZW04P239 | BZW04P239B | 5 | 239 | 266 | 280 | 308 | 1 | 384 | 1.5 | 494 | 4.6 | 11 | 95 |
| BZW04-239 | BZW04-239B | 5 | 239 | 266 | 280 | 294 | 1 | 384 | 1.5 | 494 | 4.6 | 11 | 95 |
| BZW04P256 | BZW04P256B | 5 | 256 | 285 | 300 | 330 | 1 | 414 | 1.2 | 529 | 4.3 | 11 | 90 |
| BZW04-256 | BZW04-256B | 5 | 256 | 285 | 300 | 315 | 1 | 414 | 1.2 | 529 | 4.3 | 11 | 90 |
| BZW04P273 | BZW04P273B | 5 | 273 | 304 | 320 | 352 | 1 | 438 | 1.2 | 564 | 4 | 11 | 85 |
| BZW04-273 | BZW04-273B | 5 | 273 | 304 | 320 | 336 | 1 | 438 | 1.2 | 564 | 4 | 11 | 85 |
| BZW04P299 | BZW04P299B | 5 | 299 | 332 | 350 | 385 | 1 | 482 | 0.9 | 618 | 3.7 | 11 | 80 |
| BZW04-299 | BZW04-299B | 5 | 299 | 332 | 350 | 368 | 1 | 482 | 0.9 | 618 | 3.7 | 11 | 80 |
| BZW04P342 | BZW04P342B | 5 | 342 | 380 | 400 | 440 | 1 | 548 | 0.9 | 706 | 3.2 | 11 | 75 |
| BZW04-342 | BZW04-342B | 5 | 342 | 380 | 400 | 420 | 1 | 548 | 0.9 | 706 | 3.2 | 11 | 75 |
| BZW04P376 | BZW04P376B | 5 | 376 | 418 | 440 | 484 | 1 | 603 | 0.8 | 776 | 3 | 11 | 70 |
| BZW04-376 | BZW04-376B | 5 | 376 | 418 | 440 | 462 | 1 | 603 | 0.8 | 776 | 3 | 11 | 70 |



- Note 1:** For surges greater than the maximum values, the diode will present a short-circuit Anode - Cathode
- Note 2:** Pulse test: $t_p < 50$ ms.
- Note 3:** $\Delta V_{BR} = \alpha T \cdot (T_{amb} - 25) \cdot V_{BR}(25^\circ C)$
- Note 4:** $V_R = 0$ V, $F = 1$ MHz. For bidirectional types, capacitance value is divided by 2.

Fig. 1: Power dissipation derating versus ambient temperature

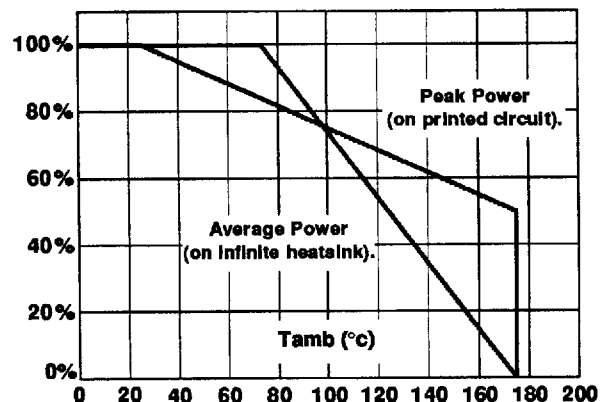


Fig. 2 : Peak pulse power versus exponential pulse duration.

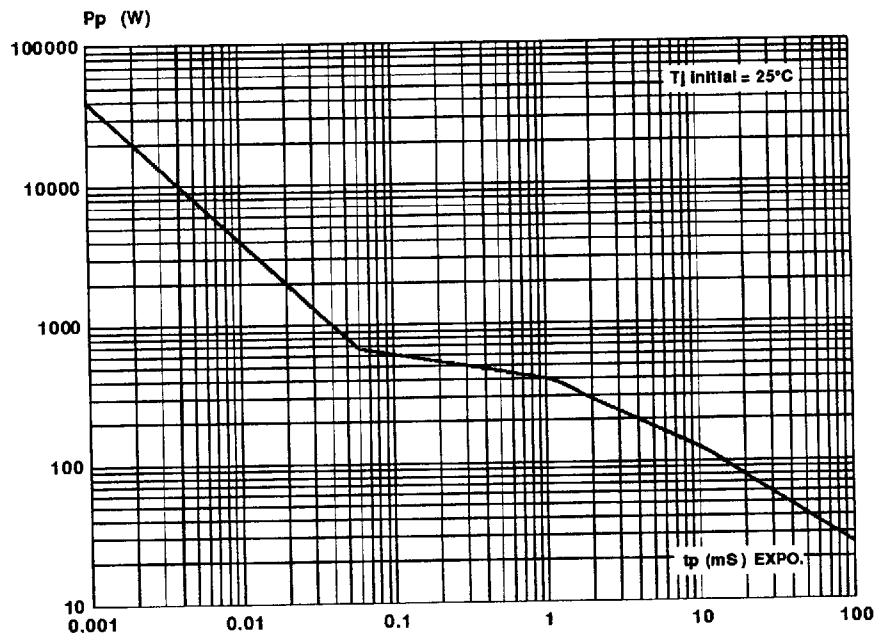
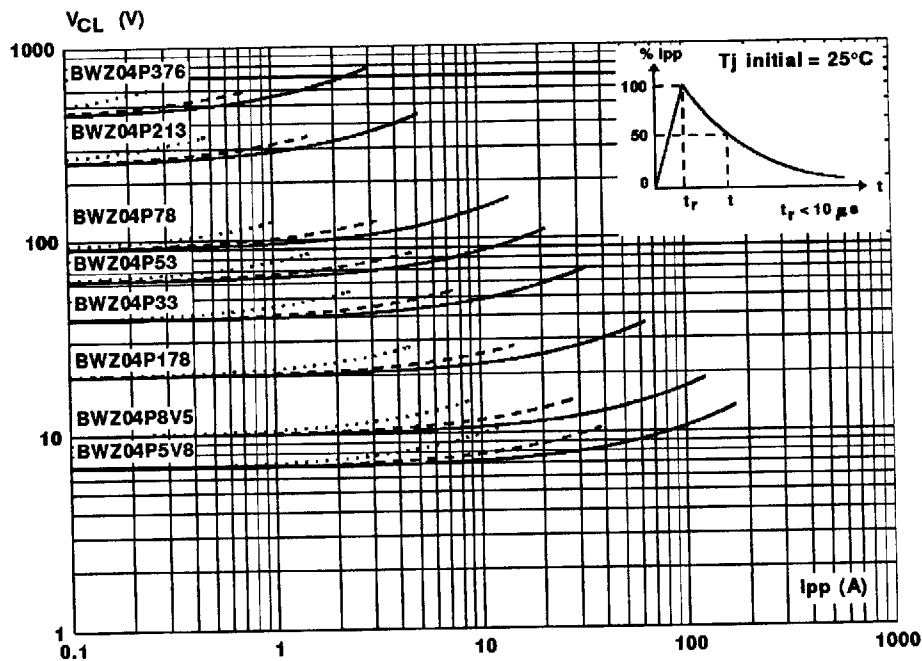


Fig. 3 : Clamping voltage versus peak pulse current.
 Exponential waveform $t_p = 20 \mu s$ —————
 $t_p = 1 ms$ - - - - -
 $t_p = 10 ms$
 $t_r < 10 \mu s$



Note : The curves of the figure 3 are specified for a junction temperature of 25 °C before surge.
 The given results may be extrapolated for other junction temperatures by using the following formula :
 $\Delta V_{BR} = \alpha T \cdot (T_{amb} - 25) \cdot V_{BR} (25^\circ C)$
 For intermediate voltages, extrapolate the given results.

Fig. 4a : Capacitance versus reverse applied voltage for unidirectional types (typical values).

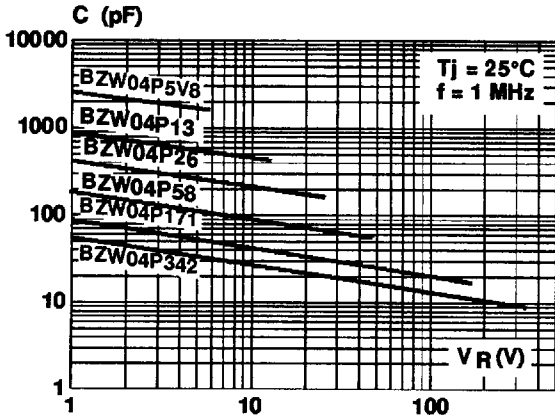


Fig. 4b : Capacitance versus reverse applied voltage for bidirectional types (typical values).

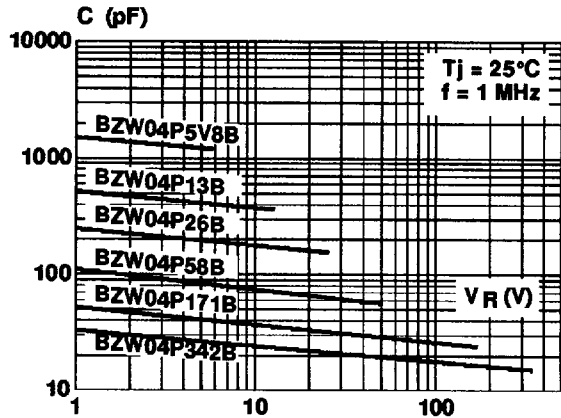


Fig. 5 : Peak forward voltage drop versus peak forward current (typical values for unidirectional types).

Note : For units with $V_{BR} > 200$ V V_F is twice than shown.

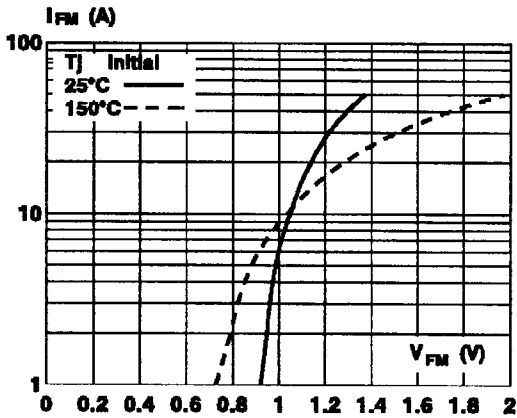
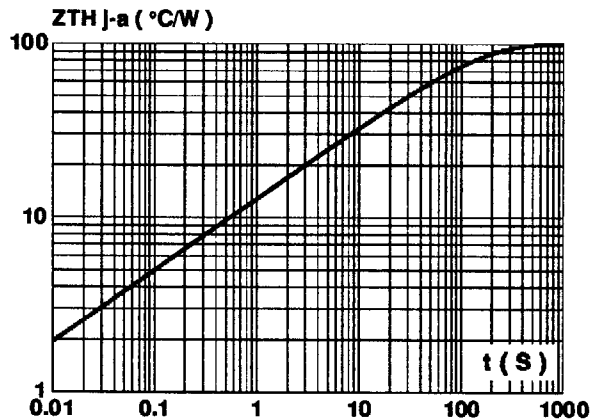
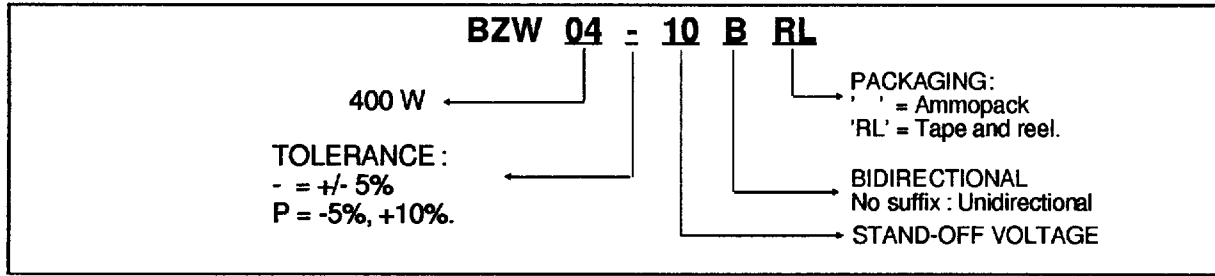


Fig. 6 : Transient thermal impedance junction-ambient versus pulse duration. For a mounting on PC Board with $L_{lead} = 10$ mm.

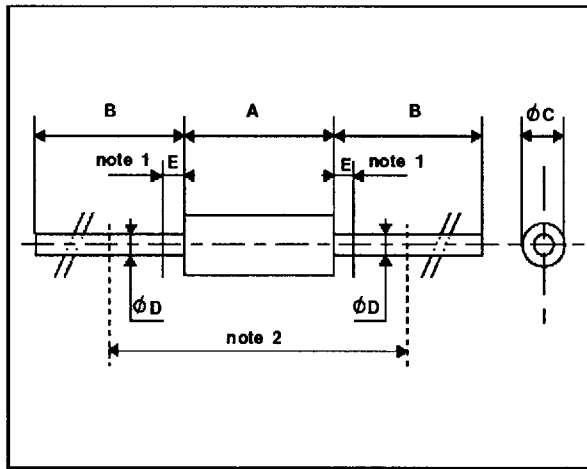


ORDER CODE



MARKING : Logo, Date Code, Type Code, Cathode Band (for unidirectional types only).

PACKAGE MECHANICAL DATA
 F126 (Plastic)



Weight = 0.4 g.

Packaging : standard packaging is in tape and reel.

| REF. | DIMENSIONS | | | | NOTES |
|----------|-------------|------|--------|-------|---|
| | Millimeters | | Inches | | |
| | Min. | Max. | Min. | Max. | |
| A | 6.05 | 6.35 | 0.238 | 0.250 | 1 - The lead diameter ϕ D is not controlled over zone E |
| B | 26 | | 1.024 | | |
| ϕ C | 2.95 | 3.05 | 0.116 | 0.120 | 2 - The minimum axial length within which the device may be placed with its leads bent at right angles is 0.59" (15 mm) |
| ϕ D | 0.76 | 0.86 | 0.029 | 0.034 | |
| E | | 1.27 | | 0.050 | |

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