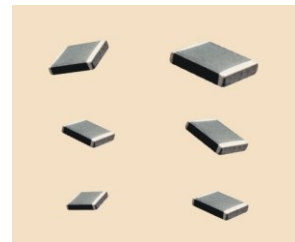


### Description:

The ZV Series of low voltage varistors is designed to protect sensitive electronics devices against high voltage surges in the low voltage region. They offer excellent transient energy absorption due to improved energy volume distribution and power dissipation. Low voltage varistors cover wide DC operating voltage range from 14V to 170V. The ZVY Series is the same except for higher operating temperatures up to 150°C.

ZV varistors are typically applied to protect components at the circuit board level.



### Features:

- Nickel barrier terminations
- AC operating voltage (Vrms) from 11V to 130V
- DC operating voltage (Vdc) from 14V to 170V
- No plastic coating guarantees better flammability rating
- Bi-directional, low clamping voltages
- Broad range of current and energy handling capabilities
- +125°C continuous operating temperature, +150°C for ZVY
- Dimensional and weight savings on PC board
- AgPd end terminations also available
- ZVY high temperature product will have performance characteristics different from the ZV. Contact Stackpole for specific details.
- Compliant with the requirements of AEC-Q200 (Grade 1)
- 100% RoHS compliant and lead free without exemption
- Halogen free
- REACH compliant

### Applications:

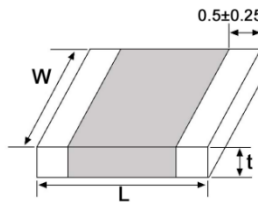
- ESD protection for components sensitive to IEC 1000-4-2, MIL-STD 883C Method 3015.7 and other industry specifications
- Suppression of inductive switching or other low to medium transient events at the circuit board level
- Provides on-board transient voltage protection of ICs and transistors
- Replace larger surface mount TVS Zeners in many applications
- Used to help achieve electromagnetic compliance of end products
- 6 model sizes available 0603, 0805, 1206, 1210, 1812 and 2220

| General Technical Data                    |                                                                  |
|-------------------------------------------|------------------------------------------------------------------|
| Operating Temperature - ZV                | -55 °C to +125 °C                                                |
| Operating Temperature - ZVY               | -55 °C to +150 °C                                                |
| Storage Temperature Range                 | -55 °C to +150 °C                                                |
| Threshold Voltage Temperature Coefficient | < +0.05% / °C                                                    |
| Response time                             | < 2 ns                                                           |
| Ag/Pd Terminations                        | Recommended and suitable for Pb-containing soldering             |
| Nickel Barrier Terminations               | Recommended and suitable for Pb-containing and Pb-free soldering |

## Standard Packaging Options / Quantities

| Series  | Voltage Range (Vrms) | Chip Size |       |        |       |       |        |       |       |        |
|---------|----------------------|-----------|-------|--------|-------|-------|--------|-------|-------|--------|
|         |                      | 0603      |       |        | 0805  |       |        | 1206  |       |        |
|         |                      | K         | T     | G      | K     | T     | G      | K     | T     | G      |
|         |                      | 180mm     | 180mm | 330mm  | 180mm | 180mm | 330mm  | 180mm | 180mm | 330mm  |
| ZV, ZVY | 11 - 14              | 1,000     | 4,000 | 15,000 | 1,000 | 4,000 | 15,000 | 1,000 | 4,000 | 15,000 |
|         |                      | 1,000     | 3,500 | 14,000 | 1,000 | 3,500 | 14,000 | 1,000 | 2,500 | 14,000 |
|         |                      | 1,000     | 3,500 | 14,000 | 1,000 | 3,500 | 14,000 | 1,000 | 2,500 | 10,000 |
|         |                      | N/A       | N/A   | N/A    | N/A   | N/A   | N/A    | 1,000 | 2,000 | 8,000  |
|         | 17                   | Chip Size |       |        |       |       |        |       |       |        |
|         |                      | 1210      |       |        | 1812  |       |        | 2220  |       |        |
|         |                      | K         | T     | G      | K     | T     | G      | K     | T     | G      |
|         |                      | 180mm     | 180mm | 330mm  | 180mm | 180mm | 330mm  | 180mm | 180mm | 330mm  |
|         | 20 - 40              | 1,000     | 4,000 | 15,000 | 1,000 | 1,500 | 6,000  | 1,000 | 1,500 | 5,000  |
|         |                      | 1,000     | 2,500 | 14,000 | 1,000 | 1,500 | 6,000  | 1,000 | 1,500 | 5,000  |
|         |                      | 1,000     | 2,500 | 9,000  | N/A   | 1,000 | 4,000  | N/A   | 1,000 | 4,000  |
|         |                      | 1,000     | 2,000 | 8,000  | N/A   | 1,000 | 4,000  | N/A   | 1,000 | 4,000  |
|         | 50 - 130             | 1,000     | 4,000 | 15,000 | 1,000 | 1,500 | 6,000  | 1,000 | 1,500 | 5,000  |
|         |                      | 1,000     | 2,500 | 14,000 | 1,000 | 1,500 | 6,000  | 1,000 | 1,500 | 5,000  |
|         |                      | 1,000     | 2,500 | 9,000  | N/A   | 1,000 | 4,000  | N/A   | 1,000 | 4,000  |
|         |                      | 1,000     | 2,000 | 8,000  | N/A   | 1,000 | 4,000  | N/A   | 1,000 | 4,000  |

## Device Ratings and Dimensions



| Part Number     | V <sub>RMS</sub><br>(volts) | V <sub>DC</sub><br>(volts) | V <sub>N</sub><br>(1 mA)<br>(volts) | V <sub>C</sub><br>(volts) | I <sub>C</sub><br>(8/20 uSec)<br>(amps) | W <sub>MAX</sub><br>(10/1000 uSec)<br>(joules) | P <sub>MAX</sub><br>(watts) | I <sub>MAX</sub><br>(8/20 uSec)<br>(amps) | C <sub>TYP</sub><br>(@ 1 kHz)<br>(pF) | L <sub>TYP</sub><br>(100 mA/nSec)<br>(nH) | L<br>(mm)   | W<br>(mm)   | t <sub>MAX</sub><br>(mm) |
|-----------------|-----------------------------|----------------------------|-------------------------------------|---------------------------|-----------------------------------------|------------------------------------------------|-----------------------------|-------------------------------------------|---------------------------------------|-------------------------------------------|-------------|-------------|--------------------------|
| ZV11K0603...300 | 11                          | 14                         | 18                                  | 33                        | 1                                       | 0.2                                            | 0.003                       | 30                                        | 210                                   | 1                                         | 1.60 ± 0.20 | 0.80 ± 0.10 | 0.95                     |
| ZV11K0805...121 | 11                          | 14                         | 18                                  | 33                        | 1                                       | 0.3                                            | 0.005                       | 120                                       | 400                                   | 1.5                                       | 2.00 ± 0.25 | 1.25 ± 0.20 | 0.80                     |
| ZV11K1206...201 | 11                          | 14                         | 18                                  | 33                        | 1                                       | 0.6                                            | 0.008                       | 200                                       | 1300                                  | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 0.85                     |
| ZV11K1210...401 | 11                          | 14                         | 18                                  | 33                        | 3                                       | 1.3                                            | 0.01                        | 400                                       | 2600                                  | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 0.85                     |
| ZV11K1812...801 | 11                          | 14                         | 18                                  | 33                        | 5                                       | 2                                              | 0.015                       | 800                                       | 5100                                  | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.25                     |
| ZV11K2220...122 | 11                          | 14                         | 18                                  | 33                        | 10                                      | 5.5                                            | 0.02                        | 1200                                      | 12000                                 | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.25                     |
| ZV14K0603...300 | 14                          | 18                         | 22                                  | 38                        | 1                                       | 0.3                                            | 0.003                       | 30                                        | 195                                   | 1                                         | 1.60 ± 0.20 | 0.80 ± 0.10 | 0.95                     |
| ZV14K0805...121 | 14                          | 18                         | 22                                  | 38                        | 1                                       | 0.4                                            | 0.005                       | 120                                       | 355                                   | 1.5                                       | 2.00 ± 0.25 | 1.25 ± 0.20 | 0.80                     |
| ZV14K1206...201 | 14                          | 18                         | 22                                  | 38                        | 1                                       | 0.6                                            | 0.008                       | 200                                       | 950                                   | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 0.85                     |
| ZV14K1210...401 | 14                          | 18                         | 22                                  | 38                        | 3                                       | 1.6                                            | 0.01                        | 400                                       | 2000                                  | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 0.85                     |
| ZV14K1812...801 | 14                          | 18                         | 22                                  | 38                        | 5                                       | 2.4                                            | 0.015                       | 800                                       | 4200                                  | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.25                     |
| ZV14K2220...122 | 14                          | 18                         | 22                                  | 38                        | 10                                      | 6                                              | 0.02                        | 1200                                      | 9400                                  | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.25                     |
| ZV17K0603...300 | 17                          | 22                         | 27                                  | 44                        | 1                                       | 0.3                                            | 0.003                       | 30                                        | 185                                   | 1                                         | 1.60 ± 0.20 | 0.80 ± 0.10 | 0.95                     |
| ZV17K0805...121 | 17                          | 22                         | 27                                  | 44                        | 1                                       | 0.4                                            | 0.005                       | 120                                       | 315                                   | 1.5                                       | 2.00 ± 0.25 | 1.25 ± 0.20 | 1.05                     |
| ZV17K1206...201 | 17                          | 22                         | 27                                  | 44                        | 1                                       | 0.7                                            | 0.008                       | 200                                       | 740                                   | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 1.25                     |
| ZV17K1210...401 | 17                          | 22                         | 27                                  | 44                        | 3                                       | 1.8                                            | 0.01                        | 400                                       | 1700                                  | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.35                     |
| ZV17K1812...801 | 17                          | 22                         | 27                                  | 44                        | 5                                       | 2.8                                            | 0.015                       | 800                                       | 3500                                  | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.25                     |
| ZV17K2220...122 | 17                          | 22                         | 27                                  | 44                        | 10                                      | 7.5                                            | 0.02                        | 1200                                      | 7700                                  | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.25                     |

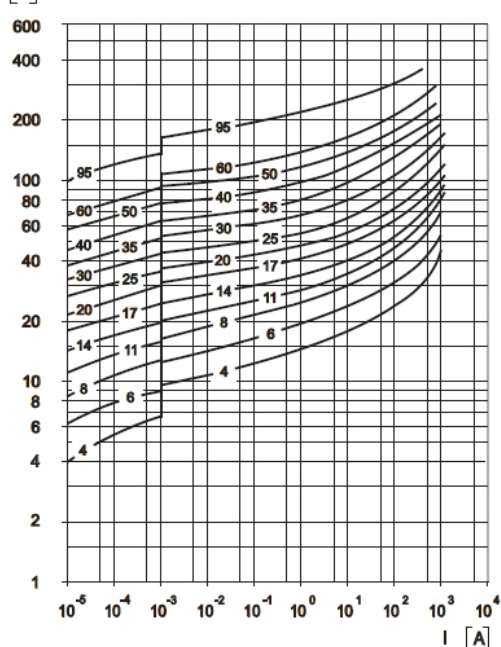
**Device Ratings and Dimensions (cont.)**

| Part Number      | V <sub>RMS</sub><br>(volts) | V <sub>DC</sub><br>(volts) | V <sub>N</sub><br>(1 mA)<br>(volts) | V <sub>C</sub><br>(volts) | I <sub>C</sub><br>(8/20 uSec)<br>(amps) | W <sub>MAX</sub><br>(10/1000 uSec)<br>(joules) | P <sub>MAX</sub><br>(watts) | I <sub>MAX</sub><br>(8/20 uSec)<br>(amps) | C <sub>TYP</sub><br>(@ 1 kHz)<br>(pF) | L <sub>TYP</sub><br>(100 mA/nSec)<br>(nH) | L<br>(mm)   | W<br>(mm)   | t <sub>MAX</sub><br>(mm) |
|------------------|-----------------------------|----------------------------|-------------------------------------|---------------------------|-----------------------------------------|------------------------------------------------|-----------------------------|-------------------------------------------|---------------------------------------|-------------------------------------------|-------------|-------------|--------------------------|
| ZV20K0603...300  | 20                          | 26                         | 33                                  | 54                        | 1                                       | 0.3                                            | 0.003                       | 30                                        | 175                                   | 1                                         | 1.60 ± 0.20 | 0.80 ± 0.10 | 0.95                     |
| ZV20K0805...121  | 20                          | 26                         | 33                                  | 54                        | 1                                       | 0.4                                            | 0.005                       | 120                                       | 290                                   | 1.5                                       | 2.00 ± 0.25 | 1.25 ± 0.20 | 1.05                     |
| ZV20K1206...201  | 20                          | 26                         | 33                                  | 54                        | 1                                       | 0.8                                            | 0.008                       | 200                                       | 620                                   | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 1.25                     |
| ZV20K1210...401  | 20                          | 26                         | 33                                  | 54                        | 3                                       | 2                                              | 0.01                        | 400                                       | 1400                                  | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.35                     |
| ZV20K1812...801  | 20                          | 26                         | 33                                  | 54                        | 5                                       | 3                                              | 0.015                       | 800                                       | 3000                                  | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.55                     |
| ZV20K2220...122  | 20                          | 26                         | 33                                  | 54                        | 10                                      | 8                                              | 0.02                        | 1200                                      | 6500                                  | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.45                     |
| ZV25K0603...300  | 25                          | 31                         | 39                                  | 65                        | 1                                       | 0.1                                            | 0.003                       | 30                                        | 165                                   | 1                                         | 1.60 ± 0.20 | 0.80 ± 0.10 | 0.95                     |
| ZV25K0805...121  | 25                          | 31                         | 39                                  | 65                        | 1                                       | 0.2                                            | 0.005                       | 120                                       | 260                                   | 1.5                                       | 2.00 ± 0.25 | 1.25 ± 0.20 | 1.05                     |
| ZV25K1206...201  | 25                          | 31                         | 39                                  | 65                        | 1                                       | 1                                              | 0.008                       | 200                                       | 510                                   | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 1.25                     |
| ZV25K1210...401  | 25                          | 31                         | 39                                  | 65                        | 3                                       | 1.8                                            | 0.01                        | 400                                       | 1060                                  | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.45                     |
| ZV25K1812...801  | 25                          | 31                         | 39                                  | 65                        | 5                                       | 3.9                                            | 0.015                       | 800                                       | 2300                                  | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.55                     |
| ZV25K2220...122  | 25                          | 31                         | 39                                  | 65                        | 10                                      | 9.5                                            | 0.02                        | 1200                                      | 5000                                  | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.45                     |
| ZV30K0603...300  | 30                          | 38                         | 47                                  | 77                        | 1                                       | 0.1                                            | 0.003                       | 30                                        | 160                                   | 1                                         | 1.60 ± 0.20 | 0.80 ± 0.10 | 0.95                     |
| ZV30K0805...121  | 30                          | 38                         | 47                                  | 77                        | 1                                       | 0.2                                            | 0.005                       | 120                                       | 230                                   | 1.5                                       | 2.00 ± 0.25 | 1.25 ± 0.20 | 1.05                     |
| ZV30K1206...201  | 30                          | 38                         | 47                                  | 77                        | 1                                       | 1.2                                            | 0.008                       | 200                                       | 450                                   | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 1.25                     |
| ZV30K1210...301  | 30                          | 38                         | 47                                  | 77                        | 3                                       | 2.1                                            | 0.01                        | 300                                       | 850                                   | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.45                     |
| ZV30K1812...801  | 30                          | 38                         | 47                                  | 77                        | 5                                       | 4.4                                            | 0.015                       | 800                                       | 1800                                  | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.55                     |
| ZV30K2220...122  | 30                          | 38                         | 47                                  | 77                        | 10                                      | 12.2                                           | 0.02                        | 1200                                      | 4000                                  | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.45                     |
| ZV35K1206...121  | 35                          | 45                         | 56                                  | 90                        | 1                                       | 0.6                                            | 0.008                       | 120                                       | 400                                   | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 1.25                     |
| ZV35K1210...251  | 35                          | 45                         | 56                                  | 90                        | 3                                       | 2.2                                            | 0.01                        | 250                                       | 670                                   | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.45                     |
| ZV35K1812...601  | 35                          | 45                         | 56                                  | 90                        | 5                                       | 4.2                                            | 0.015                       | 600                                       | 1340                                  | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.55                     |
| ZV35K2220...102  | 35                          | 45                         | 56                                  | 90                        | 10                                      | 7.6                                            | 0.02                        | 1000                                      | 3000                                  | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.45                     |
| ZV40K1206...121  | 40                          | 56                         | 68                                  | 110                       | 1                                       | 0.8                                            | 0.008                       | 120                                       | 370                                   | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 1.25                     |
| ZV40K1210...251  | 40                          | 56                         | 68                                  | 110                       | 3                                       | 2.4                                            | 0.01                        | 250                                       | 570                                   | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.45                     |
| ZV40K1812...601  | 40                          | 56                         | 68                                  | 110                       | 5                                       | 4.8                                            | 0.015                       | 600                                       | 1000                                  | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.55                     |
| ZV40K2220...102  | 40                          | 56                         | 68                                  | 110                       | 10                                      | 9.2                                            | 0.02                        | 1000                                      | 2200                                  | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.45                     |
| ZV50K1206...121  | 50                          | 65                         | 82                                  | 135                       | 1                                       | 0.8                                            | 0.008                       | 120                                       | 340                                   | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 1.65                     |
| ZV50K1210...251  | 50                          | 65                         | 82                                  | 135                       | 3                                       | 1.7                                            | 0.01                        | 250                                       | 470                                   | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.75                     |
| ZV50K1812...401  | 50                          | 65                         | 82                                  | 135                       | 5                                       | 4.8                                            | 0.015                       | 400                                       | 710                                   | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.85                     |
| ZV50K2220...801  | 50                          | 65                         | 82                                  | 135                       | 10                                      | 5.8                                            | 0.02                        | 800                                       | 1500                                  | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.85                     |
| ZV60K1206...121  | 60                          | 85                         | 100                                 | 165                       | 1                                       | 0.9                                            | 0.008                       | 120                                       | 330                                   | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 1.65                     |
| ZV60K1210...251  | 60                          | 85                         | 100                                 | 165                       | 3                                       | 2.2                                            | 0.01                        | 250                                       | 390                                   | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.75                     |
| ZV60K1812...401  | 60                          | 85                         | 100                                 | 165                       | 5                                       | 5.8                                            | 0.015                       | 400                                       | 580                                   | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.85                     |
| ZV60K2220...801  | 60                          | 85                         | 100                                 | 165                       | 10                                      | 6.2                                            | 0.02                        | 800                                       | 1000                                  | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.85                     |
| ZV75K1206...121  | 75                          | 100                        | 120                                 | 200                       | 1                                       | 0.9                                            | 0.008                       | 120                                       | 240                                   | 1.8                                       | 3.20 ± 0.30 | 1.60 ± 0.20 | 1.70                     |
| ZV75K1210...251  | 75                          | 100                        | 120                                 | 200                       | 3                                       | 2.2                                            | 0.01                        | 250                                       | 330                                   | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.80                     |
| ZV75K1812...401  | 75                          | 100                        | 120                                 | 200                       | 5                                       | 5.8                                            | 0.015                       | 400                                       | 440                                   | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.90                     |
| ZV75K2220...801  | 75                          | 100                        | 120                                 | 200                       | 10                                      | 6.2                                            | 0.02                        | 800                                       | 700                                   | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.90                     |
| ZV95K1210...201  | 95                          | 125                        | 150                                 | 250                       | 3                                       | 2.6                                            | 0.01                        | 200                                       | 240                                   | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.80                     |
| ZV95K1812...301  | 95                          | 125                        | 150                                 | 250                       | 5                                       | 5.2                                            | 0.015                       | 300                                       | 340                                   | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.90                     |
| ZV95K2220...501  | 95                          | 125                        | 150                                 | 250                       | 10                                      | 7.4                                            | 0.02                        | 500                                       | 600                                   | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.90                     |
| ZV115K1210...201 | 115                         | 150                        | 180                                 | 300                       | 3                                       | 2.6                                            | 0.01                        | 200                                       | 200                                   | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.80                     |
| ZV115K1812...301 | 115                         | 150                        | 180                                 | 300                       | 5                                       | 5.2                                            | 0.015                       | 300                                       | 310                                   | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.90                     |
| ZV115K2220...501 | 115                         | 150                        | 180                                 | 300                       | 10                                      | 7.4                                            | 0.02                        | 500                                       | 560                                   | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.90                     |
| ZV130K1210...201 | 130                         | 170                        | 205                                 | 340                       | 3                                       | 2.6                                            | 0.01                        | 200                                       | 150                                   | 1.8                                       | 3.20 ± 0.30 | 2.50 ± 0.25 | 1.80                     |
| ZV130K1812...301 | 130                         | 170                        | 205                                 | 340                       | 5                                       | 5.2                                            | 0.015                       | 300                                       | 240                                   | 2.5                                       | 4.70 ± 0.40 | 3.20 ± 0.30 | 1.90                     |
| ZV130K2220...501 | 130                         | 170                        | 205                                 | 340                       | 10                                      | 7.4                                            | 0.02                        | 500                                       | 500                                   | 3                                         | 5.70 ± 0.50 | 5.00 ± 0.40 | 1.90                     |

## Protection Level

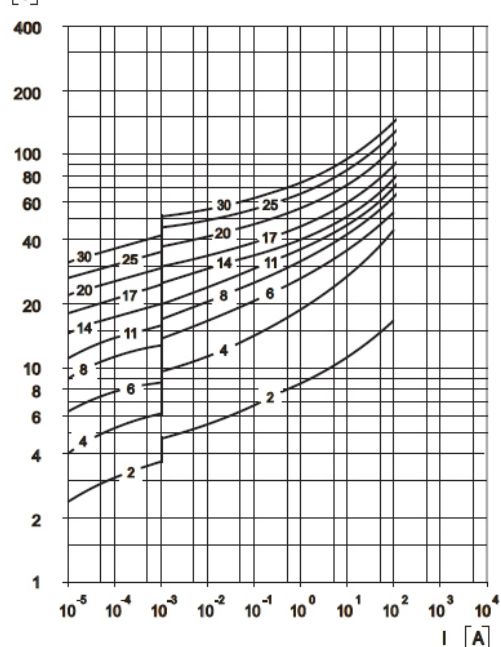
Model Size 0603

ZV11M...30K



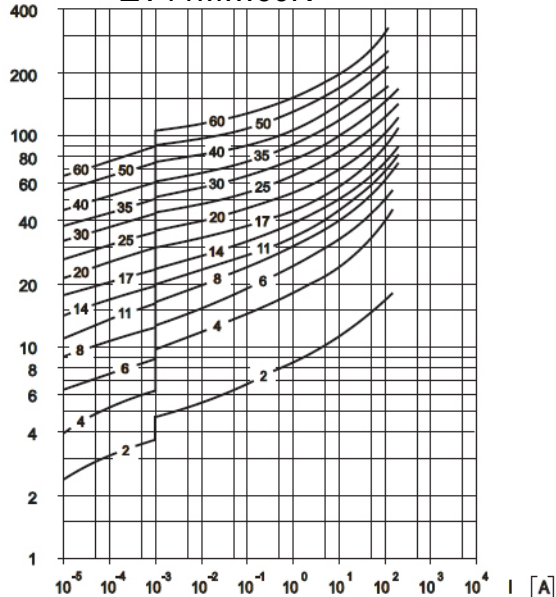
Model Size 0805

ZV11M...30K



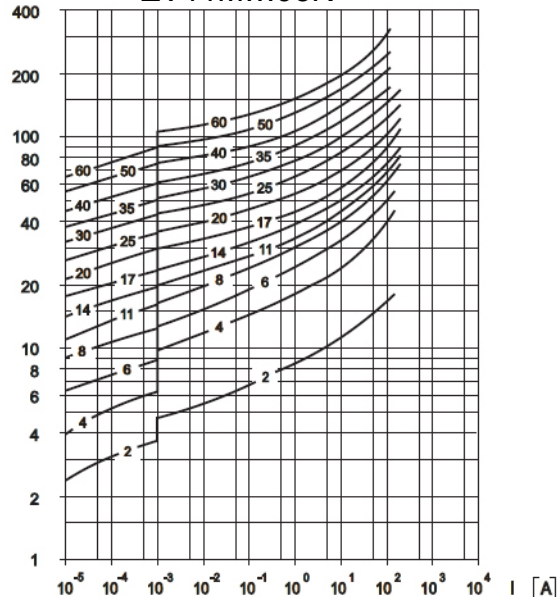
Model Size 1206

ZV11M...60K



Model Size 1210

ZV11M...95K

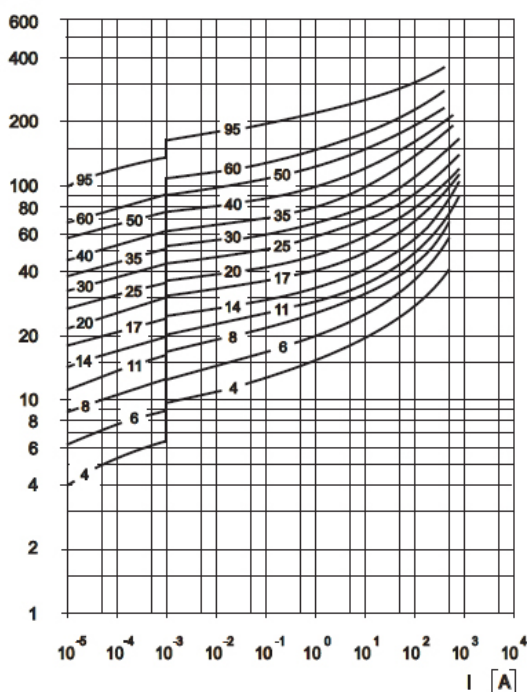


(With the worst-case condition in the tolerance region)

### Protection Level

Model Size 1812

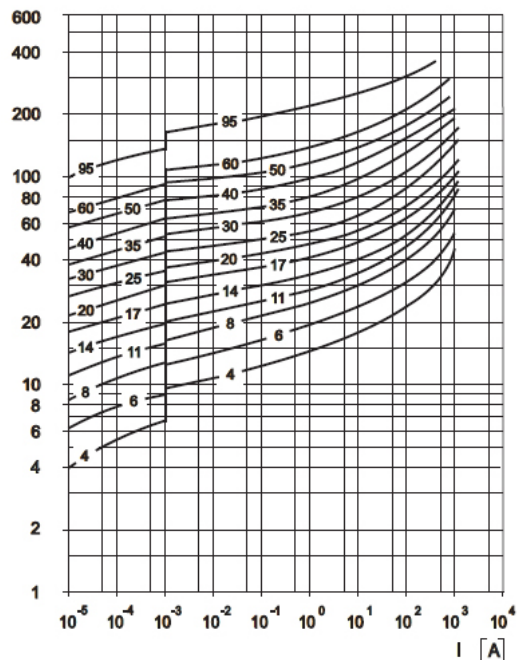
ZV11M...95K



(With the worst-case condition in the tolerance region)

Model Size 2220

ZV11M...95K



### RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

### RoHS Compliance Status

| Standard Product Series | Description                       | Package / Termination Type | Standard Series RoHS Compliant | Lead-Free Termination Composition                                                                                 | Lead-Free Mfg. Effective Date (Std Product Series) | Lead-Free Effective Date Code (YY/WW) |
|-------------------------|-----------------------------------|----------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------|
| ZV/ZVY                  | Standard Low Voltage SMD Varistor | SMD                        | YES                            | Proprietary Barrier Termination (special designation "N") for lead-free assembly; AgPd for Pb-containing assembly | Always                                             | Always                                |

### “Conflict Metals” Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the “conflict region” of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

### Compliance to “REACH”

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, “The Registration, Evaluation, Authorization and Restriction of Chemicals”, otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

### Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

### How to Order

