



## GENERAL DESCRIPTION

The Glass Encapsulated TransGuard® multilayer varistors are zinc oxide (ZnO) based ceramic semiconductor devices with non-linear, bi-directional V-I characteristics.

They have the advantage of offering bi-directional overvoltage protection as well as EMI/RFI attenuation in a single SMT package.

These large case size parts extend TransGuard range into high energy applications. In addition the glass encapsulation provides enhanced resistance against harsh environment or process such as acidic environment, salts or chlorite flux.

## GENERAL CHARACTERISTICS

Operating Temperature:  
-55°C to 125°C

## FEATURES

- Bi-Directional protection
- EMI/RFI attenuation in off-state
- Multi-strike capability
- Sub 1nS response to ESD strike
- High energy / High current
- Glass Encapsulated

## APPLICATIONS

- Professional / Industrial / Commercial Applications
- IC Protection, DC motor protection
- Relays, Controllers, Sensors
- Smart Grids
- Alarms and more
- Various Applications where Glass Encapsulation is Needed for Harsh Environment / Acid-Resistance

## HOW TO ORDER

| V        | G                      | 1812      | 16              | P             | 400              | R            | P                |
|----------|------------------------|-----------|-----------------|---------------|------------------|--------------|------------------|
| Varistor | Glass Encapsulate Chip | Chip Size | Working Voltage | Energy Rating | Clamping Voltage | Package      | Termination      |
|          |                        | 1210      | 16 = 16Vdc      | S = 2.0J      | 400 = 42V        | D = 7" reel  | P = Ni/Sn plated |
|          |                        | 1812      | 22 = 22Vdc      | P = 2.7-3.0J  | 440 = 44V        | R = 7" reel  |                  |
|          |                        | 2220      | 38 = 38Vdc      | U = 4.0-5.0J  | 770 = 77V        | T = 13" reel |                  |
|          |                        |           | 65 = 65Vdc      | Y = 7.2-12J   | 131 = 135V       |              |                  |

## PHYSICAL DIMENSIONS: mm (inches)

| Size (EIA) | Length (L)                 | Width (W)                  | Max Thickness (T) | Land Length (t)           |
|------------|----------------------------|----------------------------|-------------------|---------------------------|
| 1210       | 3.20±0.20<br>(0.126±0.008) | 2.49±0.20<br>(0.098±0.008) | 1.70<br>(0.067)   | 0.14 max.<br>(0.045 max.) |
| 1812       | 4.50±0.30<br>(0.177±0.012) | 3.20±0.30<br>(0.126±0.012) | 2.00<br>(0.079)   | 1.00 max.<br>(0.040 max.) |
| 2220       | 5.70±0.40<br>(0.224±0.016) | 5.00±0.40<br>(0.197±0.016) | 2.50<br>(0.098)   | 1.00 max.<br>(0.040 max.) |

## ELECTRIAL CHARACTERISTICS

| AVX PN       | V <sub>W</sub> (DC) | V <sub>W</sub> (AC) | V <sub>B</sub> | V <sub>C</sub> | I <sub>VC</sub> | I <sub>L</sub> | E <sub>T</sub> | I <sub>P</sub> | Cap   | Freq |
|--------------|---------------------|---------------------|----------------|----------------|-----------------|----------------|----------------|----------------|-------|------|
| VG181216P400 | 16                  | 11                  | 24.5±10%       | 42             | 5               | 10             | 2.9            | 1000           | 5000  | K    |
| VG222016Y400 | 16                  | 11                  | 24.5±10%       | 42             | 10              | 10             | 7.2            | 1500           | 13000 | K    |
| VG121022R440 | 22                  | 17                  | 27±10%         | 44             | 2.5             | 10             | 1.7            | 400            | 1600  | K    |
| VG121038S770 | 38                  | 30                  | 47.0±10%       | 77             | 2.5             | 15             | 2              | 400            | 1000  | K    |
| VG181238U770 | 38                  | 30                  | 47.0±10%       | 77             | 5               | 15             | 4.2            | 800            | 1300  | K    |
| VG222038Y770 | 38                  | 30                  | 47.0±10%       | 77             | 10              | 15             | 12             | 2000           | 4200  | K    |
| VG121065P131 | 65                  | 50                  | 82.0±10%       | 135            | 2.5             | 15             | 2.7            | 350            | 600   | K    |

V<sub>W</sub>(DC) DC Working Voltage [V]  
 V<sub>W</sub>(AC) AC Working Voltage [V]  
 V<sub>B</sub> Typical Breakdown Votage [V @ 1mA<sub>DC</sub>, 25°C]  
 V<sub>C</sub> Clamping Voltage [V @ I<sub>VC</sub>]  
 I<sub>VC</sub> Test Current for V<sub>C</sub> [A, 8x20µs]  
 I<sub>L</sub> Maximum leakage current at the working voltage, 25°C [µA]

E<sub>T</sub> Transient Energy Rating [J, 10x1000µs]  
 I<sub>P</sub> Peak Current Rating [A, 8x20µs]  
 Cap Typical capacitance [pF] @ frequency specified and 0.5V<sub>FB</sub>, 25°C, M = 1MHz, K = 1kHz