# Multilayer Chip Varistors

## Features:

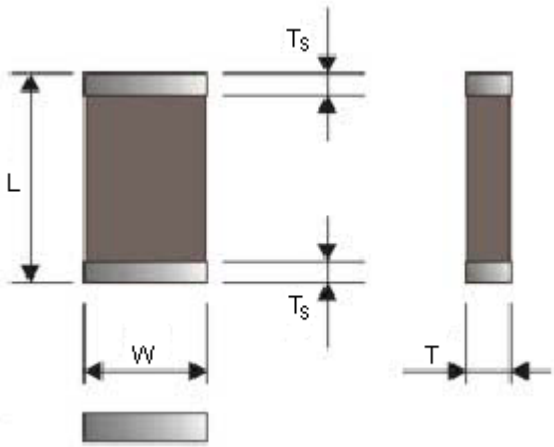
- Multilayer fabrication technology
- -55 to 125°C operating temperature range
- Operating voltage range VM (DC) at 5.5 V to 85 V
- Able to withstand ESD test of IEC-61000-4-2
- Bi-directional clamping characteristic

## Description:

This multilayer chip varistor is a family of transient voltage surge suppression products. Today, electronic circuits are becoming smaller and more sentive to external interference. These multilayer chip varistors are designed to protect components from destruction of transients and ESD (Electronic Static Discharge). The wide operating voltage and energy rage make these multilayer chip varistors suitable for numerous applications on I/O protection, Vcc protection, Keyboard protection, LCD protection, Sensor protection etc
Manufactured by multilayer fabrication technology providing excellent voltage clamping ability and is
supplied in leadless, surface mount form, compatible with modern reflow and wave soldering procedures

## Applications:

Protection of cellular phones, PDA, High Speed Data Line etc
ESD Protection for components sensitive to IEC 61000-4-2, Provides Circuit Board Transient Voltage Protection for Transistors
Protection of Video and Audio Ports




## Dimensions

| Size | VZ0402 | VZ0603 | VZ0805 | VZ1206 |
|---|---|---|---|---|
| L | 1 ± 0.1 | 1.6 ± 0.15 | 2 ± 0.2 | 3.2 ± 0.2 |
| W | 0.5 ± 0.1 | 0.8 ± 0.15 | 1.25 ± 0.2 | 1.6 ± 0.2 |
| T | 0.5 ± 0.1 | 0.8 ± 0.15 | 0.8 ± 0.2 | 0.8 ±0.1 mm*<br>1.1 ±0.2 mm** |
| Ts | 0.25 ± 0.15 | 0.35 ± 0.15 | 0.5 ± 0.2 | 0.65 ± 0.25 |

Terminal electrode : Ni / Sn electrode
Note: * means VZ1206 5.5 V dc to 22 V dc items
** means VZ1206 26 V dc to 85 V dc items

## Electrical Data

| Item | General Specification |
|---|---|
| **Continuous Rating:**<br>Steady State Applied Voltage:<br>DC voltage Range (VMDC)<br>AC voltage Range (VMDC RMS) | <br><br>5.5 V to 85 V<br>4 V to 60 V |
| **Transient Rating:**<br>Non-Repetitive Surge Current (8 / 20ìs)<br>Non-Repetitive Surge Energy, 10 / 1,000ìs Waveform, (WTM)<br>Operating Ambient Temperature Range (TA)<br>Storage Temperature Range (TSTG)<br>Temperature Coefficient (áV) of clamping Voltage (VC) at Specified Test Current | <br>20 A to 100 A<br>0.05 J to 1 J<br>-55°C to 125°C<br>-55°C to 150°C<br><0.01 % / °C |

## Standard Testing Condition

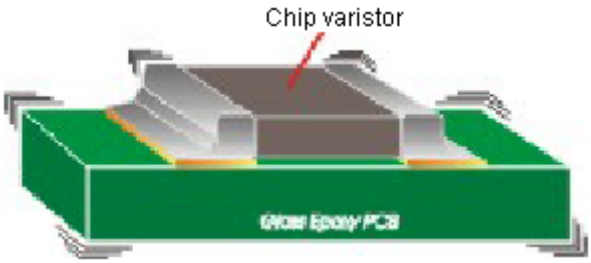
Unless otherwise specified

Temperature : 15 to 35°C
Humidity : 25% RH to 85% RH
Atmospheric Pressure : 86 kPa to 106 kPa

## Specifications:

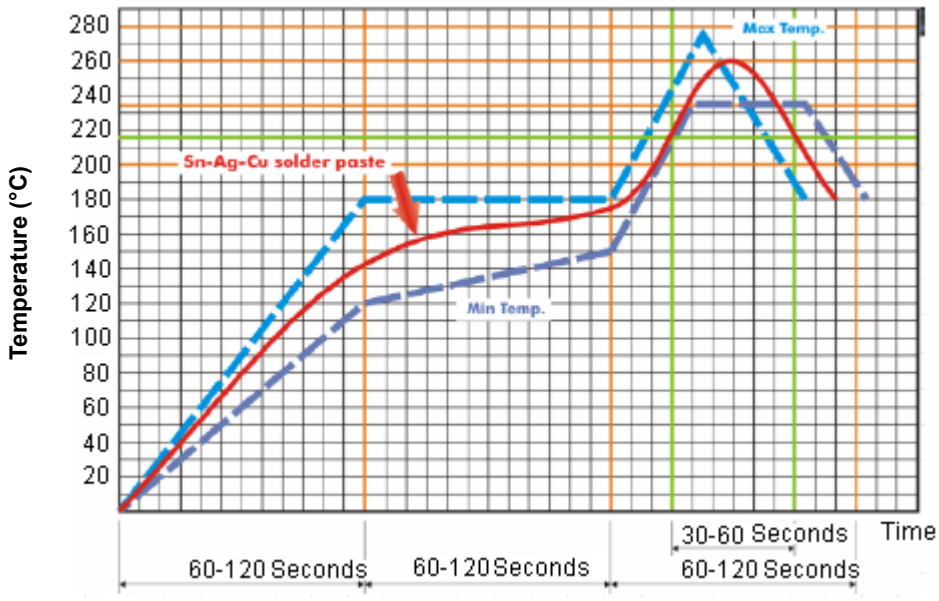
**1. Electrical Reliability**

| Test item | Test Condition / Test Method | Specification |
|---|---|---|
| High temperature storage | +125 ±3°C for 1,000 hours<br>Measurement to be made after keeping at room temperature for 24 ±2 hours | ΔV at 1 mA <10% |
| Low temperature storage | +40 ±3°C for 1,000 hours<br>Measurement to be made after keeping at room temperature for 24 ±2 hours | |
| Humidity storage | 40 ±2°C, 90 to 95% RH for 500 hours<br>Measurement to be made after keeping at room temperature for 24 ±2 hours | |
| Temperature cycles | **Times : 5 cycles**<br>Step / Temperature (°C) / Time (minimum)<br>1 / -55 ±3 / 30 ±3<br>2 / Room temperature / 2 to 3<br>3 / +125°C 3°C / 30 ±2<br>4 / Room temperature / 2 to 3<br>Measurement to be made after keeping at room temperature for 24 ±2 hours | |
| Solderability | Solder temperature : 230 ±5°C<br>Immersion time : 2 ±0.5 seconds<br>Immersion and emersion rates : 25 mm / s | Minimum 90% electrode shall be covered with solder |
| Resistance to Soldering Heat | Pre-heating :120 to 150°C, 60 seconds<br>Solder temperature : 260 ±5°C<br>Immersion time : 10 ±1 seconds<br>Measurement to be made after keeping at room temperature for 24 ±2 hours | ΔV at 1 mA <10%<br>Disappearance of electrode due to immersion into solder shall not exceed 25% of edges of each electrode |

| Test item | Test condition / Test method | Specification |
|---|---|---|
| Adhesive Strength of Termination | Solder chip on PCB and applied<br>0805 / 1206 Series : 10N (1 kgf) for 10 seconds<br>0402 / 0603 Series : 5N (0.5 kgf) for 10 seconds<br>  | No visible damage |
| Vibration | Solder chip on PCB<br>Frequency : 10 Hz to 55 Hz to 10 Hz (1 minimum)<br>Oscillation amplitude : 1.5 mm<br>Times : 2 hours in each of three perpendicular direction | |
| Bending Test | The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of 1 mm per second until the deflection becomes 1 mm and then the pressure shall be maintained for 5 seconds | No visible damage<br>ΔV at 1 mA < 10% |

## Soldering Condition

Typical examples of soldering processes that provide reliable joints without any damage are given in figure below:




**Infrared Soldering Profile**

## Caution of Handing

**Limitation of Applications**

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects, which might directly cause damage to the third party's life, body or property

- Aircraft equipment
- Aerospace equipment
- Undersea equipment
- Medical equipment
- Traffic signal equipment
- Applications of similar complexity and / or reliability requirements to the applications listed in the above

**Storage Condition**

- Products should be used in 6 months from the day of WALSIN outgoing inspection, which can be confirmed
- Storage environment condition

  - Products should be storage in the warehouse on the following conditions
  - Temperature : -10 to +40°C
  - Humidity : 30 to 70% relative humidity
  - Don't keep products in corrosive gases such as sulfur. Chlorine gas or acid or it may cause oxidization of electrode, resulting in poor solderability
  - Products should be storage on the palette for the prevention of the influence from humidity, dust and son on
  - Products should be storage in the warehouse without heat shock, vibration, direct sunlight and so on
  - Products should be storage under the airtight packaged condition

## Specifications Table

| Description | Chip Size L x W (in inches) | Style | Rated Voltage (V dc) | Capacitance Tolerance | Termination | Packing | Part Number |
|---|---|---|---|---|---|---|---|
| Varistor, 0402, 4 V ac | 04 × 02 | Multilayer | 5.5 | Standard | Green Material | Reeled | MCFT000302 |
| Varistor, 0402, 6 V ac | | | 9 | | | | MCFT000303 |
| Varistor, 0402, 8 V ac | | | 11 | | | | MCFT000304 |
| Varistor, 0402, 11 V ac | | | 14 | | | | MCFT000305 |
| Varistor, 0402, 14 V ac | | | 18 | | | | MCFT000306 |
| Varistor, 0603, 4 V ac | 06 × 03 | | 5.5 | | | | MCFT000307 |
| Varistor, 0603, 6 V ac | | | 9 | | | | MCFT000308 |
| Varistor, 0603, 11 V ac | | | 14 | | | | MCFT000309 |
| Varistor, 0603, 14 V ac | | | 18 | | | | MCFT000310 |
| Varistor, 0603, 20 V ac | | | 26 | | | | MCFT000311 |
| Varistor, 0603, 25 V ac | | | 30 | | | | MCFT000312 |
| Varistor, 0603, 30 V ac | | | 38 | | | | MCFT000313 |
| Varistor, 0805, 4 V ac | 08 × 05 | | 5.5 | | | | MCFT000314 |
| Varistor, 0805, 6 V ac | | | 9 | | | | MCFT000315 |
| Varistor, 0805, 14 V ac | | | 18 | | | | MCFT000316 |

## Specifications Table

| Description | Chip Size L x W (in inches) | Style | Rated Voltage (V dc) | Capacitance Tolerance | Termination | Packing | Part Number |
|---|---|---|---|---|---|---|---|
| Varistor, 0805, 17 V ac | 08 × 05 | Multilayer | 22 | Standard | Green Material | Reeled | MCFT000317 |
| Varistor, 0805, 20 V ac | | | 26 | | | | MCFT000318 |
| Varistor, 0805, 25 V ac | | | 30 | | | | MCFT000319 |
| Varistor, 0805, 30 V ac | | | 38 | | | | MCFT000320 |
| Varistor, 0805, 35 V ac | | | 45 | | | | MCFT000321 |
| Varistor, 1206, 4 V ac | 12 × 06 | | 5.5 | | | | MCFT000322 |
| Varistor, 1206, 11 V ac | | | 14 | | | | MCFT000323 |
| Varistor, 1206, 14 V ac | | | 18 | | | | MCFT000324 |
| Varistor, 1206, 17 V ac | | | 22 | | | | MCFT000325 |
| Varistor, 1206, 20 V ac | | | 26 | | | | MCFT000326 |
| Varistor, 1206, 25 V ac | | | 30 | | | | MCFT000327 |
| Varistor, 1206, 30 V ac | | | 38 | | | | MCFT000328 |
| Varistor, 1206, 35 V ac | | | 45 | | | | MCFT000329 |
| Varistor, 1206, 40 V ac | | | 56 | | | | MCFT000330 |
| Varistor, 1206, 50 V ac | | | 65 | | | | MCFT000331 |
| Varistor, 1206, 60 V ac | | | 85 | | | | MCFT000332 |