

# APPROVAL SHEET

## **MULTILAYER CHIP VARISTOR**

For Surge Protection

**Size 0402**

**VZ0402 Green Material Series**

\*Contents in this sheet are subject to change without prior notice.

## DESCRIPTION

Walsin Multilayer Chip Varistor is a family of Transient Voltage Surge Suppression products. Today, electronic circuits are becoming smaller and more sensitive to external interference. Walsin Multilayer Chip Varistor is designed to protect components from destruction of transients and ESD (Electronic Static Discharge). The wide operating voltage and energy range make Walsin Multilayer Chip Varistor suitable for numerous applications on I/O protection, Vcc protection, Keyboard protection, LCD protection, Sensor protection...etc. The Walsin Chip Varistor is 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.

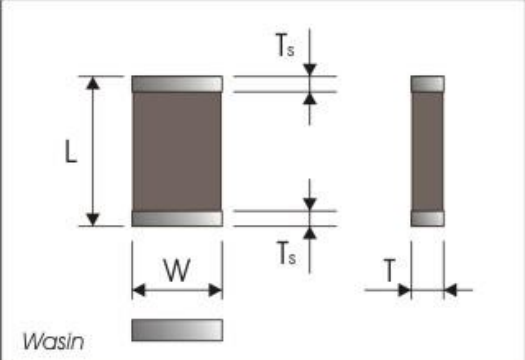
## FEATURES

1. Multilayer fabrication technology
2.  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$  operating temperature Range
3. Operating voltage range  $V_{M(DC)}$  at 5.5V ~ 18V
4. Able to withstand ESD test of IEC-61000-4-2
5. Bi-directional clamping characteristic

## APPLICATIONS

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

## DIMENSIONS

Figure	Symbol	VZ0402 Series
	L	$0.96 \pm 0.14$ mm
	W	$0.50 \pm 0.10$ mm
	T	0.60 mm (max.)
	Ts	$0.25 \pm 0.15$ mm

\*Terminal electrode : Ni / Sn electrode

## DEVICE RATING AND SPECIFICATIONS

Part Number	MAXIMUM RATINGS					SPECIFICATIONS		
	Max. Continuous Working Voltage		Maximum Non-Repetitive Surge Current (8/20 $\mu$ s)	Maximum Non-Repetitive Surge Energy (10/1000 $\mu$ s)	Max. Claming Voltage at Specified Current (8/20 $\mu$ s)	Nominal Voltage At 1mA (DC) Current		Typical Capacitance
	$V_{M(DC)}$	$V_{M(AC)}$	$I_{TM}$	$W_{TM}$	$V_c$	$V_{N(DC)Min.}$	$V_{N(DC)Max}$	@1KHz
	(V)	(V)	(A)	(J)	(V)	(V)	(V)	C (pF)
VZ0402M050AGTN	5.5	4	20	0.05	24 at 1A	8.0	18.0	270
VZ0402M090AGTN	9	6	20	0.05	41 at 1A	11.5	21.5	130
VZ0402M180AGTN	18	14	20	0.05	54 at 1A	23	33	85
VZ0402M200AGTN	20	17	20	0.05	70 at 1A	32	42	35
VZ0402M120AGTN	12	-	-	-	110 at 1A	25	40	7
VZ0402M12LAGTN	12	-	-	-	150 at 1A	45	65	3.5
VZ0402M18LAGTN	18	-	-	-	150 at 1A	45	65	3.5
VZ0402M26LAGTN	26	-	-	-	145 at 1A	45	65	4

- The capacitance value and energy only for customer reference. It is not formal specification.

## STANDARD TESTING CONDITION

Unless otherwise specified


- Temperature : 15 ~ 35°C
- Humidity : 25%RH ~ 85%RH
- Atmospheric pressure : 86kPa ~ 106kPa

## SPECIFICATION

### 1. Electrical Reliability

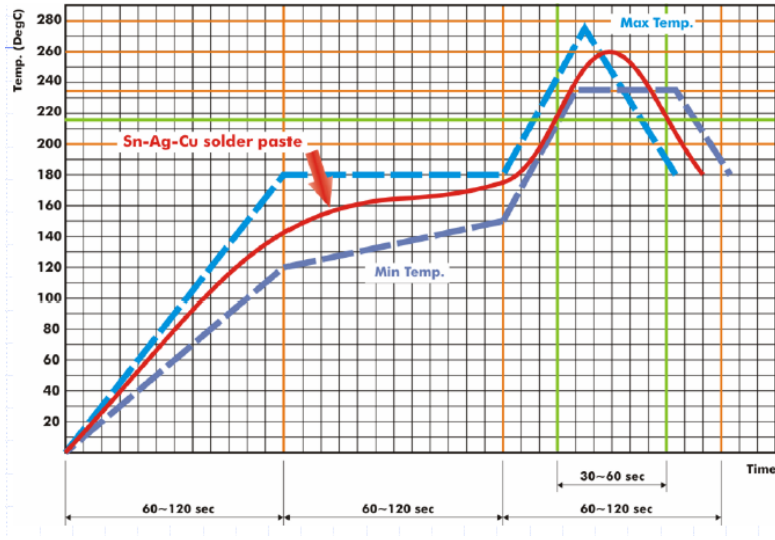
Test item	Test condition / Test method	Specification															
High temperature storage	+125±3°C for 1000 hours Measurement to be made after keeping at room temp. for 24 ±2hr	ΔV at 1mA < 10%															
Low temperature storage	-40±3°C for 1000 hours Measurement to be made after keeping at room temp. for 24 ±2hr	ΔV at 1mA < 10%															
Humidity storage	40±2°C , 90 ~95%RH for 500 hours Measurement to be made after keeping at room temp. for 24 ±2hr	ΔV at 1mA < 10%															
Temperature cycles	Times : 5 cycles <table border="1"> <thead> <tr> <th>Step</th> <th>Temp.(°C)</th> <th>Time(min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>room temp.</td> <td>2~3</td> </tr> <tr> <td>3</td> <td>+125±3°C</td> <td>30±2</td> </tr> <tr> <td>4</td> <td>room temp.</td> <td>2~3</td> </tr> </tbody> </table> Measurement to be made after keeping at room temp. for 24 ±2hr	Step	Temp.(°C)	Time(min.)	1	-55±3	30±3	2	room temp.	2~3	3	+125±3°C	30±2	4	room temp.	2~3	ΔV at 1mA < 10%
Step	Temp.(°C)	Time(min.)															
1	-55±3	30±3															
2	room temp.	2~3															
3	+125±3°C	30±2															
4	room temp.	2~3															

### 2. Mechanical Reliability

Test item	Test condition / Test method	Specification
Solderability	Solder temp. : 230±5°C Immersion time : 2±0.5 sec Immersion and emersion rates : 25mm/s	Min 90% electrode shall be covered with solder.
Resistance to Soldering Heat	Pre-heating : 120~ 150°C , 60 sec Solder temp. : 260±5°C Immersion time : 10±1 sec Measurement to be made after keeping at room temp. for 24 ±2h	ΔV at 1mA < 10% Disappearance of electrode due to immersion into solder shall not exceed 25% of edges of each electrode.
Adhesive Strength of Termination	Solder chip on PCB and applied 0805/1206 Series: 10N(1Kgf) for 10 sec 0402/0603 Series: 5N(0.5Kgf) for 10 sec Chip varistor 	No visible damage
Vibration	Solder chip on PCB. Frequency : 10 Hz~55 Hz~10 Hz (1min) Oscillation amplitude : 1.5 mm Times : 2 hrs in each of three perpendicular direction	No visible damage
Bending Test	The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of 1mm per second until the deflection becomes 1 mm and then the pressure shall be maintained for 5 sec..	No visible damage ΔV at 1mA < 10%

**SOLDERING CONDITION**

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



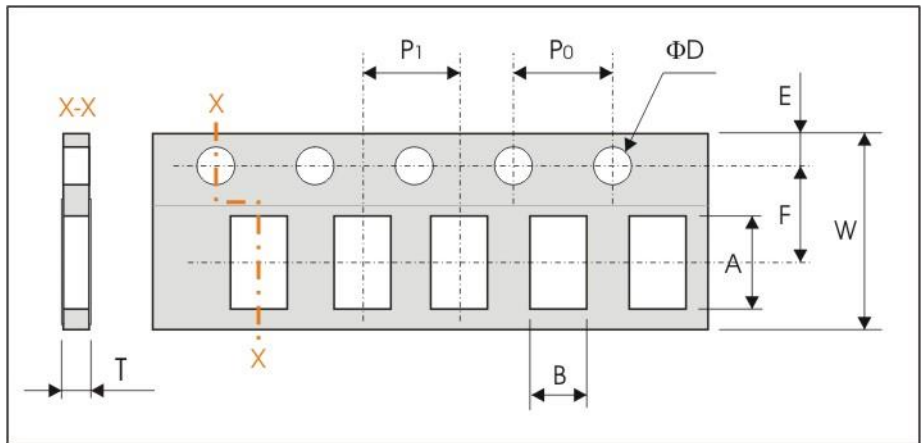
Infrared soldering profile

**ORDERING CODE**

VZ	0402	M	050	A	G	T	
Type Code	Chip Size	Style	Rated Voltage	Capacitance Tolerance	Termination	Packing	Internal Code
VZ: Walsin Varistor	0402 0603	M: Multilayer A: Array	050 = 5.5V 070 = 7V 090 = 9V 140 = 14V 180 = 18V 260 = 26V	A: Standard	G: Green Material	T: Reeled B: Bulk	Blank: None N: New item

**PACKAGING**

Paper Tape specifications (unit :mm) and Packaging quantity

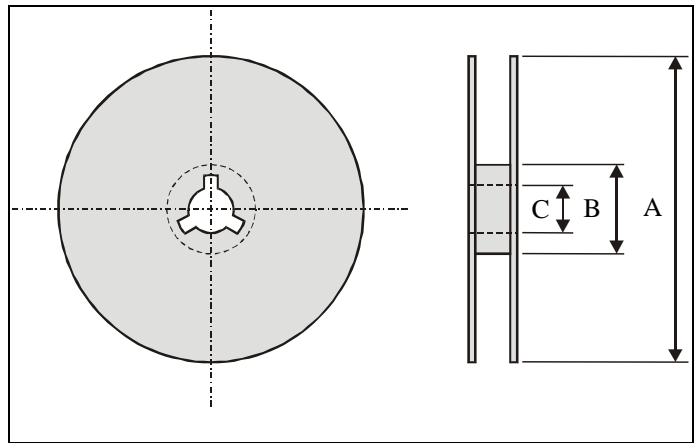


Series	A	B	E	F	ΦD
VH0402 Series	1.12 ± 0.03	0.62 ± 0.03	1.75 ± 0.05	3.50 ± 0.05	1.55 ± 0.05

Series	P0	P1	T	W	Quantity/Reel
VH0402 Series	4.00 ± 0.10	2.00 ± 0.10	0.60 ± 0.03	8.00 ± 0.20	10Kpcs

- Tape Material : Paper tape.

**Reel dimensions**



Index	A	B	C
Dimension (mm)	Φ178	Φ60.0	Φ13.5

## CAUTION OF HANDLING

### 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.

- (1) Aircraft equipment
- (2) Aerospace equipment
- (3) Undersea equipment
- (4) Medical equipment
- (5) Traffic signal equipment
- (6) Applications of similar complexity and /or reliability requirements to the applications listed in the above.

### Storage condition

- (1) Products should be used in 6 months from the day of WALSIN outgoing inspection, which can be confirmed.
- (2) 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.