

APPROVAL SHEET

MULTILAYER CHIP VARISTOR

For ESD Protection at High Speed Application

VH0402 Green Material Series– RoHS Compliance

*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

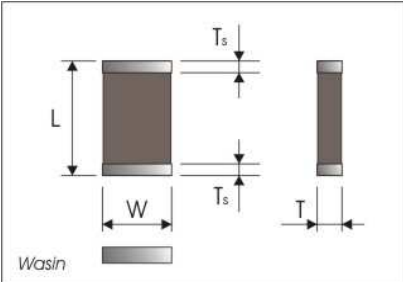
1. Multilayer fabrication technology
2. -55°C to 125°C operating temperature Range
3. Operating voltage range $V_{M(DC)}$ at $5\text{V} \sim 24\text{V}$
4. Able to withstand ESD test of IEC-61000-4-2
5. Bi-directional clamping characteristic

APPLICATIONS

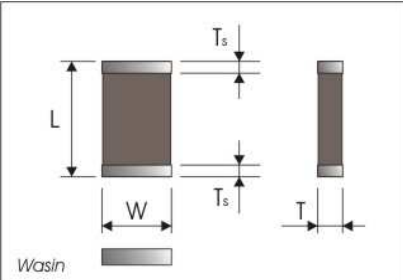
1. Protection of cellular phones, PDA, High Speed Data Line...etc.
2. ESD Protection for components sensitive to IEC 61000-4-2, Provides Circuit Board Transient Voltage Protection for Transistors.
3. Protection of Video & Audio Ports.

DIMENSIONS

General Varistor

Figure	Symbol	VH0402 Series
	L	$1.00 \pm 0.10 \text{ mm}$
	W	$0.50 \pm 0.10 \text{ mm}$
	T	$0.50 \pm 0.10 \text{ mm}$
	Ts	$0.25 \pm 0.15 \text{ mm}$

Ultra Low Cap. Varistor

Figure	Symbol	VH0402 Series
	L	$1.00 \pm 0.10 \text{ mm}$
	W	$0.52 \pm 0.05 \text{ mm}$
	T	$0.36 \pm 0.05 \text{ mm}$
	Ts	$0.20 \pm 0.10 \text{ mm}$

*Terminal electrode : Ni / Sn electrode

DEVICE RATING AND SPECIFICATIONS

General Vairstor

Part Number	MAXIMUM RATINGS			SPECIFICATIONS			
	Max. Continuous Working Voltage	Maximum Non-Repetitive Surge Energy (10/1000 μ s)	Max. Clamping Voltage at Specified Current (8/20 μ s)	Nominal Voltage At 1mA (DC) Current		Maximum Capacitance	
						@1MHz	
	$V_{M(DC)}$	W_{TM}	V_c	$V_{N(DC)Min.}$	$V_{N(DC)Max.}$	C	
(V)	(J)	(V)	(V)	(V)	(pF)	%	
VH0402M050CGT5R0	5	0.05	55 at 1A	20	30	5	+80/-20
VH0402M050CGT100	5	0.05	60 at 1A	24	36	10	\pm 30
VH0402M050CGT220	5	0.05	45 at 1A	15	25	22	\pm 30
VH0402M050CGT330	5	0.05	45 at 1A	15	25	33	\pm 30
VH0402M050CGT560	5	0.05	45 at 1A	15	25	56	\pm 30
VH0402M050CGT101	5	0.05	30 at 1A	11	21	100	\pm 30
VH0402M120CGT5R0	12	0.05	85 at 1A	33	50	5	+80/-20
VH0402M120CGT100	12	0.05	70 at 1A	27	42	10	\pm 30
VH0402M120CGT220	12	0.05	55 at 1A	20	30	22	\pm 30
VH0402M120CGT330	12	0.05	55 at 1A	20	30	33	\pm 30
VH0402M120CGT560	12	0.05	55 at 1A	20	30	56	\pm 30
VH0402M120CGT101	12	0.05	55 at 1A	20	30	100	\pm 30
VH0402M240CGT0R8	24	0.05	200 at 1A	100	150	0.8~1	\pm 30
VH0402M240CGT2R5	24	0.05	200 at 1A	100	150	2~4	\pm 30

Ultra Low Cap. Vairstor

Part Number	SPECIFICATIONS					
	Max. Continuous Working Voltage	Typical ESD Trigger Voltage	Typical ESD clamping Voltage after 30ns	Leakage Current @ V_{DC}	Minimum ESD pulse withstand	Capacitance
						@1MHz
	$V_{M(DC)}$	V_T	V_{clamp}	μ A.	Times.	C_p
(V)	(V)	(V)	(V)		(pF)	
VH0402M240CGT0R20	24	150	30	0,05	>2000	0.2 -0.1/+0.05
VH0402M240CGT0R05	24	300	50	0.001	>2000	0.05 +0.05/-0.05

TANDARD TESTING CONDITION

Unless otherwise specified


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

SPECIFICATION

1. Electrical Reliability

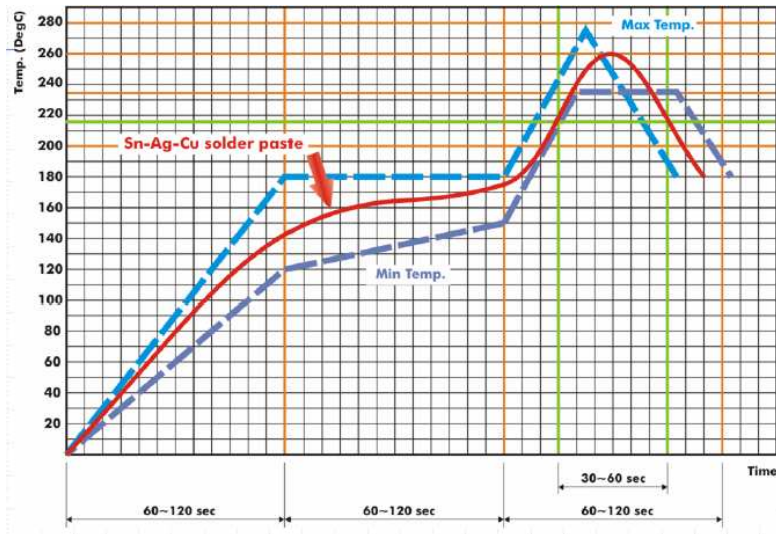
Test item	Test condition / Test method	Specification															
High temperature storage	+125±3°C for 1000 hours Measurement to be made after keeping at room temp. for 24±2hr	△V at 1mA < 10%															
Low temperature storage	-40±3°C for 1000 hours Measurement to be made after keeping at room temp. for 24±2hr	△V 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	△V at 1mA < 10%															
Temperature cycles	Times : 5 cycles <table border="1" style="margin-left: 20px;"> <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	△V 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	△V 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 Vairstor 	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 △V 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

General Vaistor

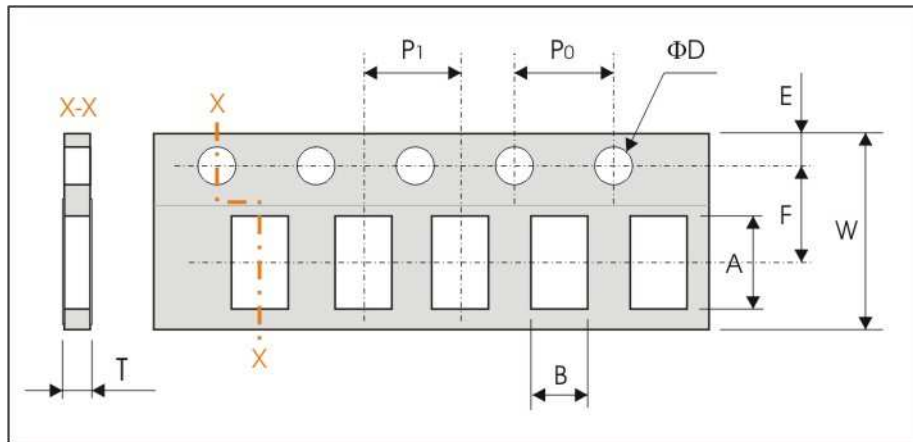
VH	0402	M	050	C	G	T	330
Type Code	Chip Size	Style	Rated Voltage	Capacitance Tolerance	Termination	Packing	Capacitance Code (pF)
V: Walsin Varistor H: High Speed or RF	0402	M: Multilayer A: Array	050 = 5.5V 120 = 12V 240 = 24V	C: Capacitance control code for ESD protection varistor	G: Green Material	T: Reeled B: Bulk	Two significant digits followed by number of zeros 2R5 = 2.5pF (when C < 10pF) 100 = 10 x 10 ⁰ = 10pF 220 = 22 x 10 ⁰ = 22pF 330 = 33 x 10 ⁰ = 33pF 560 = 56 x 10 ⁰ = 56pF 101 = 10 x 10 ¹ = 100pF

Ultra Low Cap. Vaistor

VH	0402	M	060	C	G	T	0R20
Type Code	Chip Size	Style	Rated Voltage	Capacitance Tolerance	Termination	Packing	Capacitance Code (pF)
V: Walsin Varistor H: High Speed or RF	0402	M: Multilayer A: Array	240 = 24V	C: Capacitance control code for ESD protection varistor	G: Green Material	T: Reeled B: Bulk	Three significant digits followed by number of zeros 0R05= 0.05pF 0R20= 0.20pF

PACKAGING

Paper Tape specifications (unit :mm) and Packaging quantity

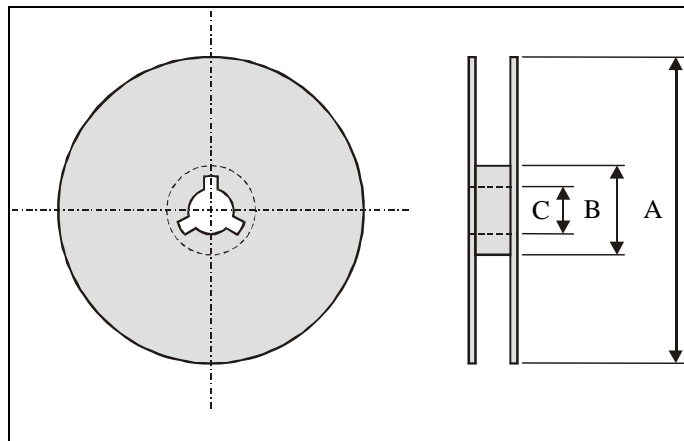


Series	A	B	E	F	ΦD
VH0402 Series	1.12 ± 0.03	0.62 ± 0.03	1.75 ± 0.05	3.50 ± 0.05	1.55 ± 0.05

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.