

# SMD Multilayer Chip Varistor

AMCV-0402

RoHS  
Compliant



1.0 x 0.5 x 0.5 mm

## FEATURES:

- SMD type, small size suitable for high density mounting
- Excellent clamping ratio and strong capability of voltage surge suppression
- Excellent solderability (Ni, Sn plating)

## APPLICATIONS:

- Transient voltage protection and voltage surge suppression for LED lighting
- Suitable for LCD-TV, STB, Switch, Router, PLC, Security System, smart meters, mobile phones
- Suppressing Induced / switching over-voltage caused by lightning and power
- Protecting DC-DC Module, I/O ports, IC driver

## STANDARD SPECIFICATIONS:

**Operating Temperature:** -55°C ~ +125°C

**Storage Temperature:** -10°C ~ +40°C and RH 70% (Max.)

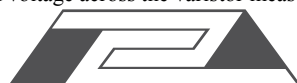
| Part Number        | Max. Working Voltage |                  | Varistor Voltage | Max. Clamping Voltage        |                              | Rated Single Pulse Transient |                     | Typical Capacitance         |
|--------------------|----------------------|------------------|------------------|------------------------------|------------------------------|------------------------------|---------------------|-----------------------------|
|                    | DC                   | AC RMS           |                  | 8/20µs                       | ESD                          | Energy 10/1000µs             | Peak Current 8/20µs |                             |
| Test Condition     | <20µA                |                  | @1mA DC          | 8/20µs                       | ESD                          | Energy 10/1000µs             | Peak Current 8/20µs | @0.5V <sub>rms</sub> , 1MHz |
| Units              | Volts                | Volts            | Volts            | Volts                        | Volts                        | Joules                       | Amps                | pF                          |
| Symbol             | V <sub>WDC</sub>     | V <sub>WAC</sub> | V <sub>B</sub>   | V <sub>C</sub> <sup>*1</sup> | V <sub>C</sub> <sup>*2</sup> | E <sub>T</sub>               | I <sub>P</sub>      | C                           |
| ACMV-0402-5R5-C180 | 5.5                  | 4.0              | 10.0-14.0        | 18                           | 23                           | 0.005                        | 3                   | 18                          |
| ACMV-0402-5R5-C300 | 5.5                  | 4.0              | 10.0-14.0        | 18                           | 23                           | 0.005                        | 5                   | 30                          |
| ACMV-0402-5R5-C500 | 5.5                  | 4.0              | 10.0-14.0        | 18                           | 23                           | 0.01                         | 10                  | 50                          |
| ACMV-0402-5R5-C800 | 5.5                  | 4.0              | 10.0-14.0        | 18                           | 23                           | 0.02                         | 10                  | 80                          |
| ACMV-0402-5R5-C101 | 5.5                  | 4.0              | 10.0-14.0        | 18                           | 23                           | 0.05                         | 20                  | 100                         |
| ACMV-0402-090-C180 | 9.0                  | 6.4              | 11.0-16.0        | 20                           | 26                           | 0.005                        | 3                   | 18                          |
| ACMV-0402-090-C300 | 9.0                  | 6.4              | 11.0-16.0        | 20                           | 26                           | 0.005                        | 5                   | 30                          |
| ACMV-0402-090-C500 | 9.0                  | 6.4              | 11.0-16.0        | 20                           | 26                           | 0.01                         | 10                  | 50                          |
| ACMV-0402-090-C800 | 9.0                  | 6.4              | 11.0-16.0        | 20                           | 26                           | 0.02                         | 15                  | 80                          |
| ACMV-0402-090-C101 | 9.0                  | 6.4              | 11.0-16.0        | 20                           | 26                           | 0.05                         | 20                  | 100                         |
| ACMV-0402-140-C180 | 14.0                 | 10.0             | 16.0-22.0        | 30                           | 39                           | 0.005                        | 3                   | 18                          |
| ACMV-0402-140-C300 | 14.0                 | 10.0             | 16.0-22.0        | 30                           | 39                           | 0.01                         | 5                   | 30                          |
| ACMV-0402-140-C500 | 14.0                 | 10.0             | 16.0-22.0        | 30                           | 39                           | 0.02                         | 10                  | 50                          |
| ACMV-0402-140-C800 | 14.0                 | 10.0             | 16.0-22.0        | 30                           | 39                           | 0.03                         | 15                  | 80                          |
| ACMV-0402-140-C101 | 14.0                 | 10.0             | 16.0-22.0        | 30                           | 39                           | 0.05                         | 20                  | 100                         |
| ACMV-0402-180-C150 | 18.0                 | 12.7             | 22.0-28.0        | 40                           | 48                           | 0.005                        | 2                   | 15                          |
| ACMV-0402-180-C180 | 18.0                 | 12.7             | 22.0-28.0        | 40                           | 48                           | 0.01                         | 5                   | 18                          |
| ACMV-0402-180-C300 | 18.0                 | 12.7             | 22.0-28.0        | 40                           | 48                           | 0.02                         | 10                  | 30                          |
| ACMV-0402-180-C500 | 18.0                 | 12.7             | 22.0-28.0        | 40                           | 48                           | 0.02                         | 10                  | 50                          |
| ACMV-0402-180-C800 | 18.0                 | 12.7             | 22.0-28.0        | 40                           | 48                           | 0.03                         | 15                  | 80                          |
| ACMV-0402-180-C101 | 18.0                 | 12.7             | 22.0-28.0        | 40                           | 48                           | 0.05                         | 20                  | 100                         |
| ACMV-0402-260-C180 | 26.0                 | 18.4             | 31.0-38.0        | 58                           | 70                           | 0.02                         | 5                   | 18                          |
| ACMV-0402-260-C300 | 26.0                 | 18.4             | 31.0-38.0        | 58                           | 70                           | 0.03                         | 10                  | 30                          |
| ACMV-0402-260-C500 | 26.0                 | 18.4             | 31.0-38.0        | 58                           | 70                           | 0.03                         | 10                  | 50                          |

\*1: V<sub>c</sub>, Maximum peak voltage across the varistor measured at a specified pulse current and waveform.

|                 |                  |
|-----------------|------------------|
| Energy Rating   | Pulse & Waveform |
| 0.00-0.05 Joule | 1A, 8/20µs       |
| 0.10 Joule      | 2A, 8/20µs       |
| 0.20-0.50 Joule | 5A, 8/20µs       |

\*2: V<sub>c</sub>, Maximum peak voltage across the varistor measured at 30ns after initiation of pulse on IEC61000-4-2 30A/8KV.

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1.0 x 0.5 x 0.5 mm

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## Test Conditions

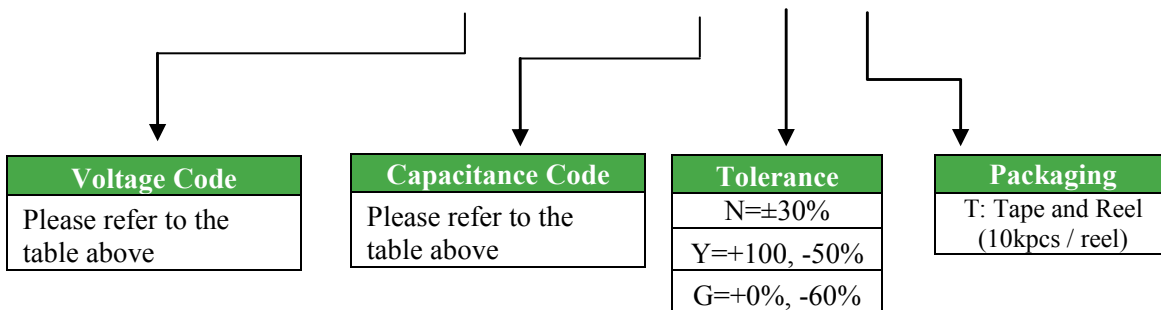
Unless otherwise specified, the standard atmospheric conditions for measurement/test as:

- a. Ambient Temperature:  $20 \pm 15^\circ\text{C}$
- b. Relative Humidity:  $65 \pm 20\%$
- c. Air Pressure: 86 kPa to 106 kPa

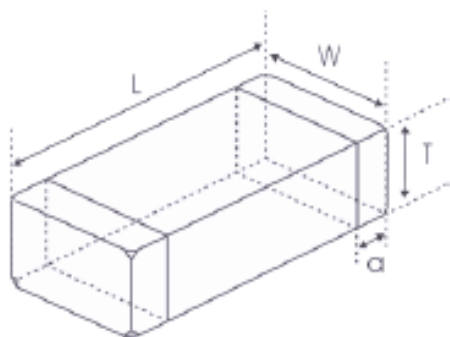
| Items                                | Test Methods and Remarks                               |
|--------------------------------------|--|
| Varistor Voltage at 1mA DC ( $V_B$ ) | Measuring current: 1mA DC<br>Duration: 0.2 to 2 sec    |
| Capacitance (C)                      | Measure source: $0.5 V_{RMS}$<br>Test frequency: 1MHz. |
| Leakage Current ( $I_L$ )            | Measuring voltage: Maximum DC working voltage          |
| Clamping Voltage ( $V_C$ )           | Measuring source: 8/20us waveform, ESD waveform        |

## OPTIONS AND PART IDENTIFICATION:

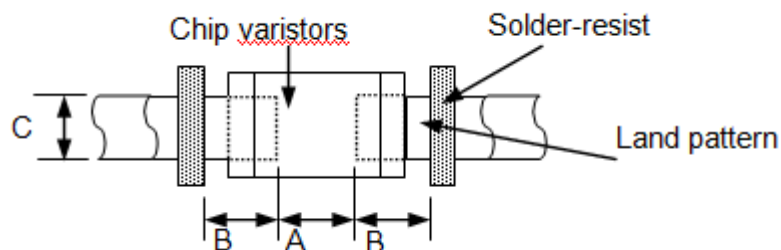
AMCV-0402- - C -



## OUTLINE DIMENSION:



### Recommended Land Pattern



| L              | W              | T              | a              |
|----------------|----------------|----------------|----------------|
| $1.0 \pm 0.15$ | $0.5 \pm 0.15$ | $0.5 \pm 0.15$ | $0.25 \pm 0.1$ |

| A                | B                | C                |
|------------------|------------------|------------------|
| $0.45 \sim 0.55$ | $0.40 \sim 0.50$ | $0.45 \sim 0.55$ |

Dimension: mm

# SMD Multilayer Chip Varistor



1.0 x 0.5 x 0.5 mm

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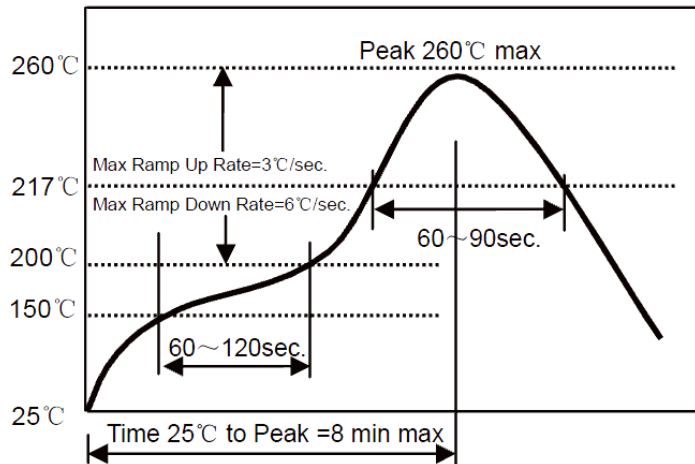
## Materials



|   | Part Name          | Material                                |
|---|--------------------|---|
| 1 | Base Material      | ZnO                                     |
| 2 | Internal Conductor | Ag-Pd                                   |
| 3 | Terminal Electrode | Ag (Inner layer)<br>Ni-Sn (Outer layer) |



## REFLOW PROFILE:



|                             |                               |
|-----------------------------|-------------------------------|
| Preheat Condition           | 150 to 200 °C; 60 to 120 sec. |
| Allowed time above 217 °C   | 60 to 90 sec.                 |
| Max temperature             | 260 °C                        |
| Max time at max temperature | 10 sec.                       |
| Solder paste                | Sn/3.0Ag/0.5Cu                |
| Allowed Reflow time         | 2x max.                       |

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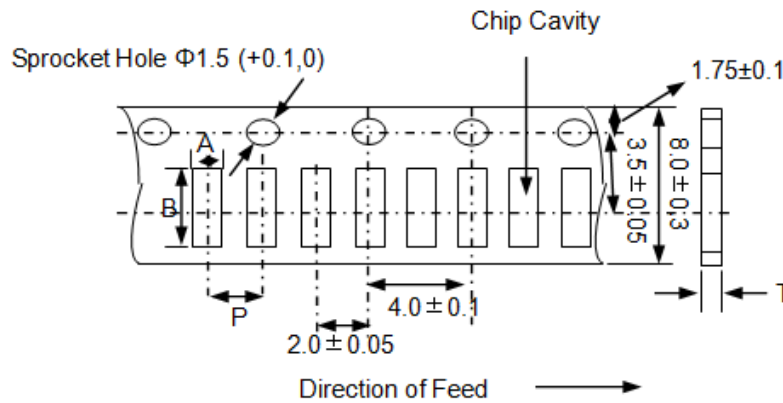


1.0 x 0.5 x 0.5 mm

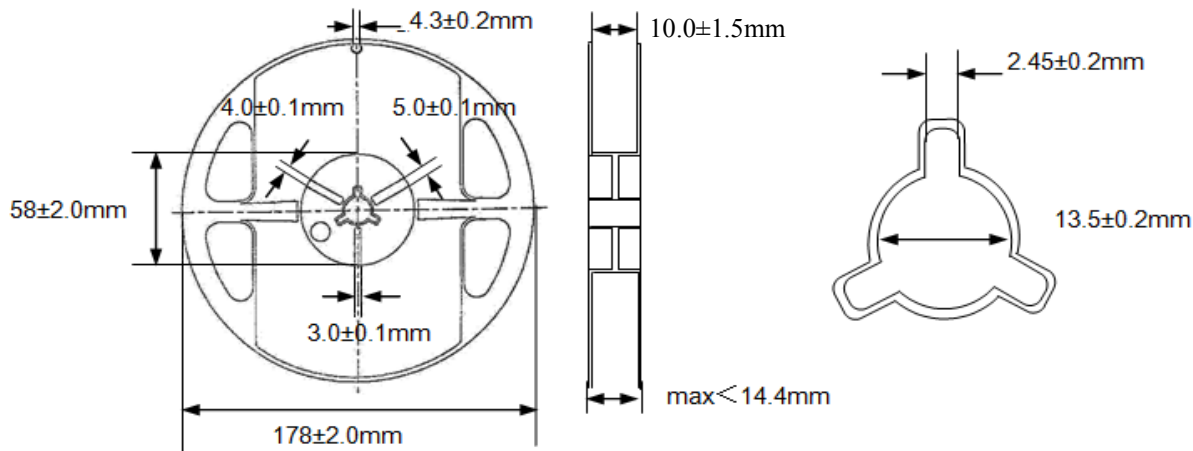
## TAPE & REEL:

### Packing

T: 10,000pcs / reel



| A        | B        | P        | T (max) |
|----------|----------|----------|---------|
| 0.65±0.1 | 1.15±0.1 | 2.0±0.05 | 0.8     |



### Storage Conditions

- The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to high humidity. Package must be stored at 40°C or less and 70% RH or less.
- The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to dust of harmful gas (e.g. HCl, sulfurous gas of H<sub>2</sub>S).
- Packaging material may be deformed if package are stored where they are exposed to heat of direct sunlight.
- Solderability shall be guaranteed for 6 months from the date of delivery on condition that they are stored at the environment specified in **a**. The parts that are stored more than 6 months shall be checked solderability before use.

**Dimension: mm**

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