



# PRODUCT SPECIFICATION

DOCUMENT NO. ENS000168590

| DESCRIPTION        | DRAWN BY | DESIGNED BY | CHECKED BY | APPROVED BY |
|--------------------|----------|-------------|------------|-------------|
| MLVS1206LDG Series | Sandy    | JamesTeng   | JamesTeng  | Shawn Yeh   |



### 1. Scope

- (1) RoHS compliant
- (2) Meet IEC 61000-4-5 standard
- (3) SMD type zinc oxide based ceramic chip
- (4) Insulator over coat keeps excellent low and stable leakage current
- (5) Quick response time (<0.5ns)
- (6) High transient current capability
- (7) High reliability
- (8) Compact size for EIA1206

### Applications

**Applications** for Mother Board and Notebook, Cellular Phone, PDA, handheld device, DSC, DV, Scanner, and Set-Top Box etc.

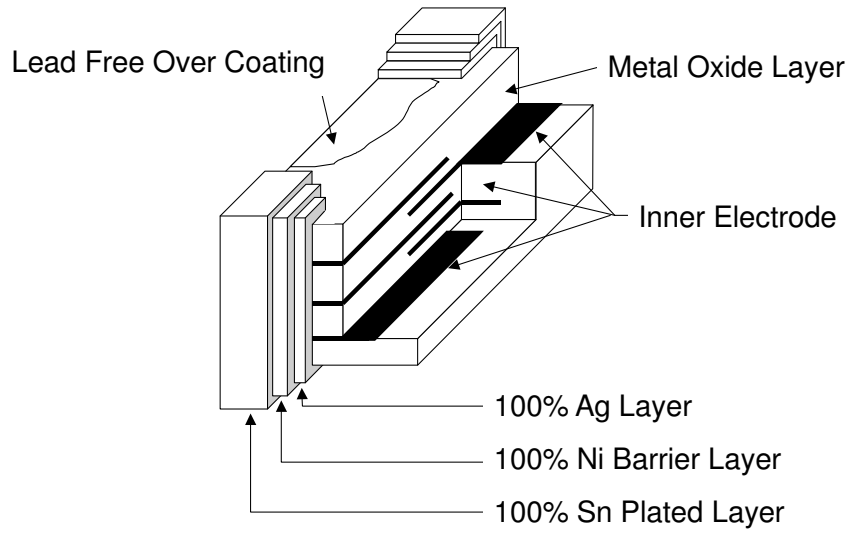
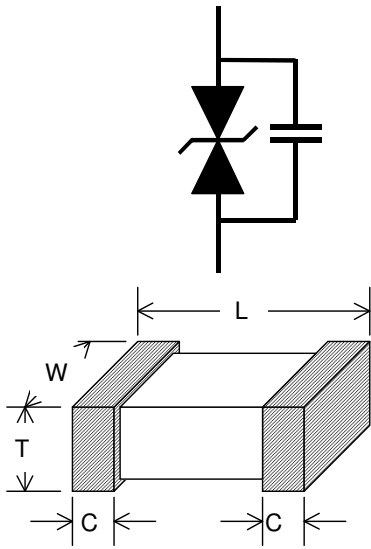
**Suitable** for Push-Button, Power Line and Low Frequency single line over voltage protect.

### 2. Explanation of Part Number

|            |          |             |          |           |            |           |
|------------|----------|-------------|----------|-----------|------------|-----------|
| <u>MLV</u> | <u>S</u> | <u>1206</u> | <u>L</u> | <u>04</u> | <u>202</u> | <u>DG</u> |
| (1)        | (2)      | (3)         | (4)      | (5)       | (6)        | (7)       |

- 1. Multilayer varistor
- 2. Type: S=single
- 3. Size
- 4. Lead free series
- 5. Max. AC voltage
- 6. Typical Capacitance: "202" means  $20 \times 10^2$
- 7. Inpaq Control Code

### 3. Construction & Dimension



| Unit: mm | 1206      |
|----------|-----------|
| L        | 3.20±0.3  |
| W        | 1.60±0.2  |
| T        | 0.80±0.1  |
| C        | 0.50±0.25 |

#### 4. Part ratings and characteristics

##### 4.1. Ratings (25 °C for characteristics, 125 °C for maximum ratings)

| Symbol           | Working voltage |              | Varistor voltage | Clamping Voltage    | Capacitance | Peak current | Transient energy |
|------------------|-----------------|--------------|------------------|---------------------|-------------|--------------|------------------|
|                  | $V_{RMS}$       | $V_{DC}$     | $V_V$            | $V_C$               | $C_p$       | $i_{max}$    | $W_{max}$        |
| Units            | Volts           | Volts        | Volts            | Volts               | pF          | Amps         | Joules           |
|                  | (Max.)          | (Max.)       |                  | (Max.)              | (Typical)   | (Max.)       | (Max.)           |
| Test Condition   |                 | < 10 $\mu$ A | 1mA DC           | 1 A<br>8/20 $\mu$ s | 1KHz        | 8/20 $\mu$ s | 10/1000 $\mu$ s  |
| MLVS1206L04202DG | 4               | 5.5          | 8~14             | 25                  | 2000        | 200          | 0.3              |
| MLVS1206L11661DG | 11              | 14           | 18~22            | 38                  | 660         | 100          | 0.5              |
| MLVS1206L11841DG | 11              | 14           | 18~22            | 36                  | 840         | 200          | 0.5              |
| MLVS1206L14901DG | 14              | 16           | 22~28            | 42                  | 900         | 200          | 0.6              |
| MLVS1206L17781DG | 17              | 22           | 25~32            | 48                  | 780         | 200          | 0.3              |
| MLVS1206L20601DG | 20              | 26           | 29.7~37.3        | 58                  | 600         | 200          | 0.7              |
| MLVS1206L25651DG | 25              | 31           | 36~44            | 69                  | 650         | 200          | 1                |
| MLVS1206L30601DG | 30              | 38           | 45~55            | 81                  | 600         | 200          | 1.1              |
| MLVS1206L35231DG | 35              | 45           | 54~62            | 108                 | 230         | 200          | 1.1              |
| MLVS1206L40221DG | 40              | 56           | 66~82            | 110                 | 220         | 200          | 1                |
| MLVS1206L50251DG | 50              | 65           | 77~93            | 138                 | 250         | 100          | 0.5              |
| MLVS1206L60121DG | 60              | 85           | 104~126          | 168                 | 120         | 100          | 0.7              |

$V_{RMS}$  – Maximum AC operating voltage the varistor can maintain and not exceed 10 $\mu$ A leakage current

$V_{DC}$  – Maximum DC operating voltage the varistor can maintain and not exceed 10 $\mu$ A leakage current

$V_V$  – Voltage across the device measured at 1mA DC current.  
Equivalent to  $V_b$ , “Breakdown Voltage”.

$V_C$  – Maximum peak voltage across the varistor measured at 8/20 $\mu$ s waveform and 1A pulse current

$C_p$  – Device capacitance measured with zero volt bias 1Vrms.

$i_{max}$  – Maximum peak current which may be applied with 8/20 $\mu$ s waveform without device failure

$W_{max}$  – Maximum energy that may be dissipated with the 10/1000 $\mu$ s waveform without device failure

## 5. General electrical specifications

### 5.1. General technical data

|                                |                       |
|--------------------------------|-----------------------|
| Operating temperature          | -40 ... +125°C        |
| Storage temperature (on board) | -40 ... +125°C        |
| Response time                  | <1 ns                 |
| Solderability                  | 245±5°C, 3 +0/-0.5sec |
| Solder leach resistance        | 260±5°C, 10 ±1sec     |

### 5.2. Environmental Specifications

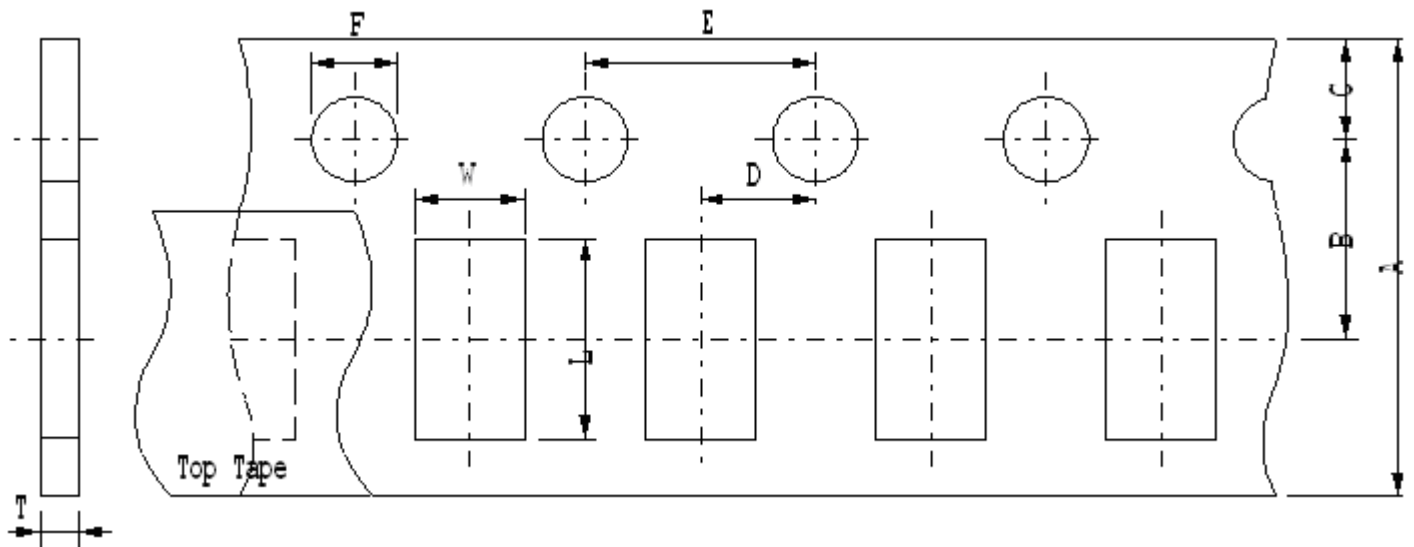
Storage Time: 12 months max.

Storage Temperature: 5 to 40°C

Relative Humidity: 65% max.

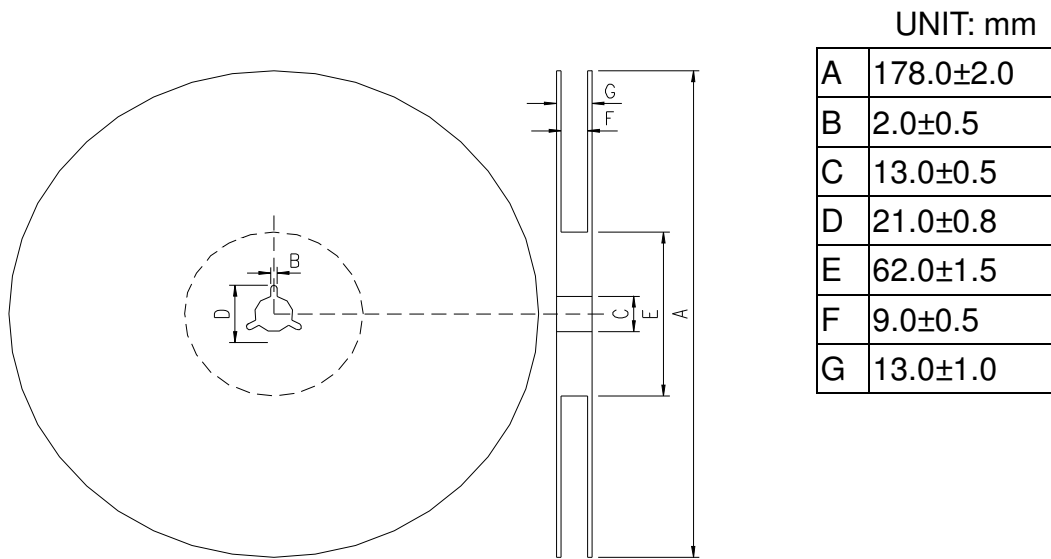
## 6. Taping Package and Label Marking

### 6.1. Carrier tape dimensions



| A     | B     | C     | D     | E     | F     | L     | T     | W     |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 8.00± | 3.50± | 1.75± | 2.00± | 4.00± | 1.50± | 3.50± | 0.95± | 1.90± |
| 0.30  | 0.05  | 0.10  | 0.05  | 0.10  | 0.10  | 0.15  | 0.05  | 0.15  |

**6.2. Taping reel dimensions**



**6.3. Taping specifications**

There shall be the portion having no product in both the head and the end of taping, and there shall be the cover tape in the head of taping.

**6.4. Label Marking**

The label specified as follows shall be put on the side of reel.

- (1) Part No.
- (2) Quantity
- (3) Lot No.

Part No. And Quantity shall be marked on outer packaging.

**6.5. Quantity of products in the taping package**

- (1) Standard quantity: 4000pcs/Reel for MLVS1206L series
- (2) Shipping quantity is a multiple of standard quantity.

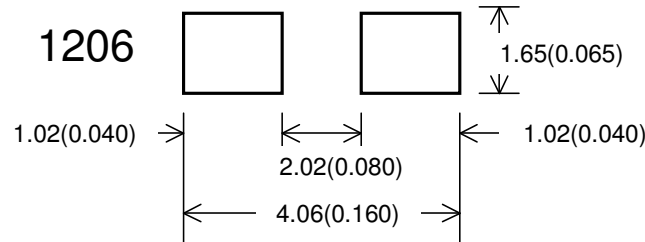
## 7. Precautions for Handling

### 7.1. Solder cream in reflow soldering

Refer to the recommendable land pattern as printing mask pattern for solder cream.

(1) Print solder in a thickness of 150 to 200  $\mu\text{m}$

Dimensions: millimeters (inches)



### 7.2. Precaution for handling of substrate

Do not exceed to bend the board after soldering this product extremely.

(Reference examples)

- Mounting place must be as far as possible from the position, which is close to the break line of board, or on the line of large holes of board.
- Do not bend extremely the board, in mounting another component.  
If necessary, use back-up pin (support pin) to prevent from bending extremely.
- Do not break the board by hand. We recommend using the machine or the jig to break it.

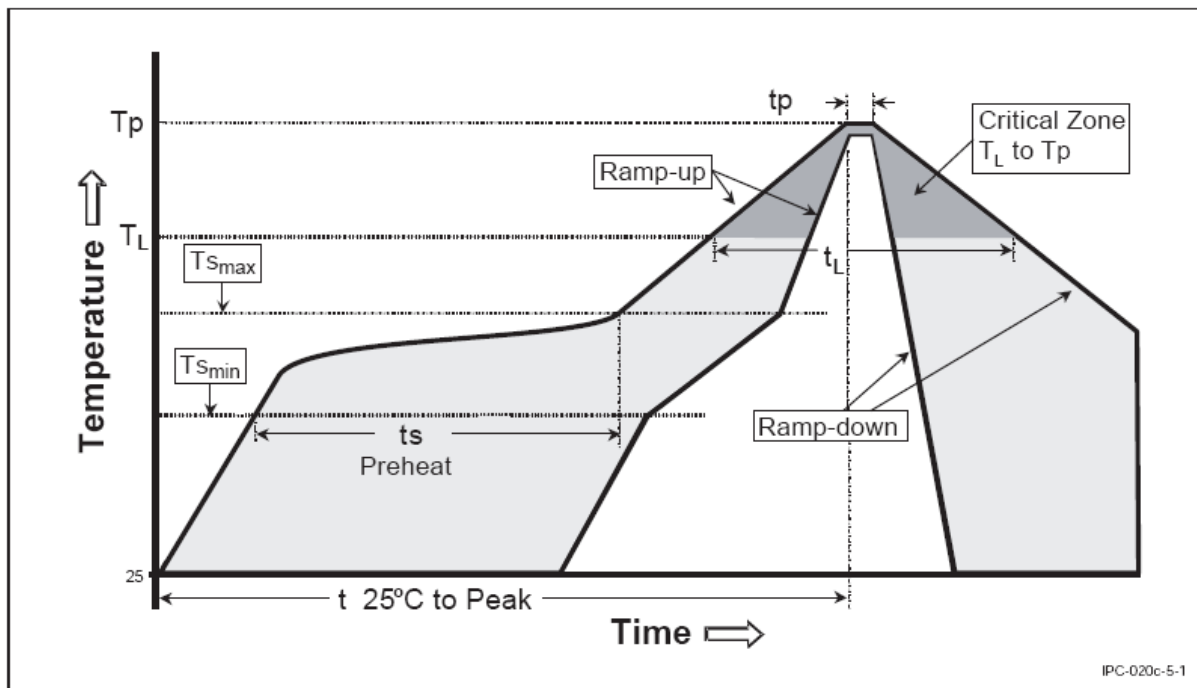
### 7.3. Precaution for soldering

Note that rapid heating, rapid cooling or local heating will easily damage the component.

Do not give heat shock over 100°C in the process of soldering. We recommend taking preheating and gradual cooling.

7.4. Recommendable reflow soldering

| Profile Feature  | Pb-Free Assembly                 |
|--|----------------------------------|
| Average Ramp-Up Rate<br>(T <sub>smax</sub> to T <sub>p</sub> )   | 3°C/second max.                  |
| <b>Preheat</b><br>– Temperature Min (T <sub>smin</sub> )<br>– Temperature Max (T <sub>smax</sub> )<br>– Time (t <sub>smin</sub> to t <sub>smax</sub> ) | 150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>– Temperature (T <sub>L</sub> )<br>– Time (t <sub>L</sub> )  | 217°C<br>60-150 seconds          |
| Peak/Classification Temperature (T <sub>p</sub> )  | 260°C                            |
| Time within 5 °C of actual Peak<br>Temperature (t <sub>p</sub> )   | 20-40 seconds                    |
| Ramp-Down Rate   | 6°C/second max.                  |
| Time 25 °C to Peak Temperature   | 8 minutes max.                   |



\*According to J-STD-020C



**7.5. Solder gun procedure**

Note the follows, in case of using solder gun for replacement.

- (1) Use solder tip temperature must be less than 350°C for the period within 3 seconds by using soldering gun under 30W.
- (2) Soldering gun tip shall not touch component directly.

**7.6. Soldering volume**

Apply proper volume of solder paste, too much may cause crack of component body.