



PRODUCT SPECIFICATION

| DOCUMENT NO. ENS000162210 | | | | |
|---------------------------|----------|-------------|------------|-------------|
| DESCRIPTION | DRAWN BY | DESIGNED BY | CHECKED BY | APPROVED BY |
| MLVS1206LAMFDG Series | Sandy | JamesTeng | JamesTeng | Shawn Yeh |



MLVS1206LAMFDG Series Engineering Specification

1. Scope

- (1) Qualified based on AEC-Q200
- (2) RoHS compliant
- (3) Meet IEC 61000-4-5 standard
- (4) SMD type zinc oxide based ceramic chip
- (5) Insulator over coat keeps excellent low and stable leakage current
- (6) Quick response time (<0.5ns)
- (7) High transient current capability
- (8) High reliability
- (9) Compact size for EIA1206

Applications

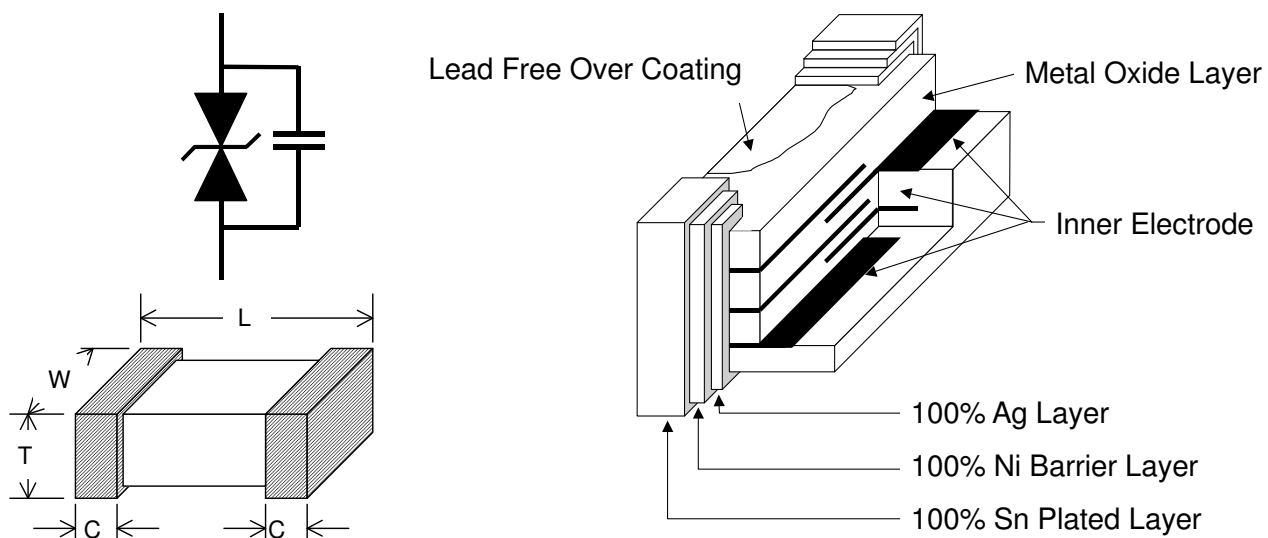
Protection against automotive related transient overvoltage

2. Explanation of Part Number

| | | | | | | | | |
|-------------------|-----------------|--------------------|-----------------|------------------|------------------|-------------------|-----------------|------------------|
| <u>MLV</u> | <u>S</u> | <u>1206</u> | <u>L</u> | <u>AM</u> | <u>04</u> | <u>202</u> | <u>F</u> | <u>DG</u> |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |

1. Multilayer varistor
2. Type: S=single
3. Size
4. Lead free series
5. Automotive series
6. Max. AC voltage
7. Typical Capacitance: "202" means 20×10^2
8. Control Code
9. 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)

| | Working voltage | | Varistor voltage | Clamping Voltage | Capacitance | Peak current | Transient energy |
|---------------------|-----------------|--------------|------------------|---------------------|-------------|--------------|------------------|
| Symbol | 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 8/20 μs | 1KHz | 8/20 μs | 10/1000 μs |
| MLVS1206LAM04202FDG | 4 | 5.5 | 8~14 | 25 | 2000 | 200 | 0.3 |
| MLVS1206LAM11661FDG | 11 | 14 | 18~22 | 38 | 660 | 100 | 0.5 |
| MLVS1206LAM11841FDG | 11 | 14 | 18~22 | 36 | 840 | 200 | 0.5 |
| MLVS1206LAM14901FDG | 14 | 16 | 22~28 | 42 | 900 | 200 | 0.6 |
| MLVS1206LAM17781FDG | 17 | 22 | 25~32 | 48 | 780 | 200 | 0.3 |
| MLVS1206LAM20601FDG | 20 | 26 | 29.7~37.3 | 58 | 600 | 200 | 0.7 |
| MLVS1206LAM25651FDG | 25 | 31 | 36~44 | 69 | 650 | 200 | 1 |
| MLVS1206LAM30601FDG | 30 | 38 | 45~55 | 81 | 600 | 200 | 1.1 |
| MLVS1206LAM35231FDG | 35 | 45 | 54~62 | 108 | 230 | 200 | 1.1 |
| MLVS1206LAM40221FDG | 40 | 56 | 66~82 | 110 | 220 | 200 | 1 |
| MLVS1206LAM50251FDG | 50 | 65 | 77~93 | 138 | 250 | 100 | 0.5 |
| MLVS1206LAM60121FDG | 60 | 85 | 104~126 | 168 | 120 | 100 | 0.7 |

V_{RMS} – Maximum AC operating voltage the varistor can maintain and not exceed 10 μA leakage current

V_{DC} – Maximum DC operating voltage the varistor can maintain and not exceed 10 μA 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 μs 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 μs waveform without device failure

W_{max} – Maximum energy that may be dissipated with the 10/1000 μs 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

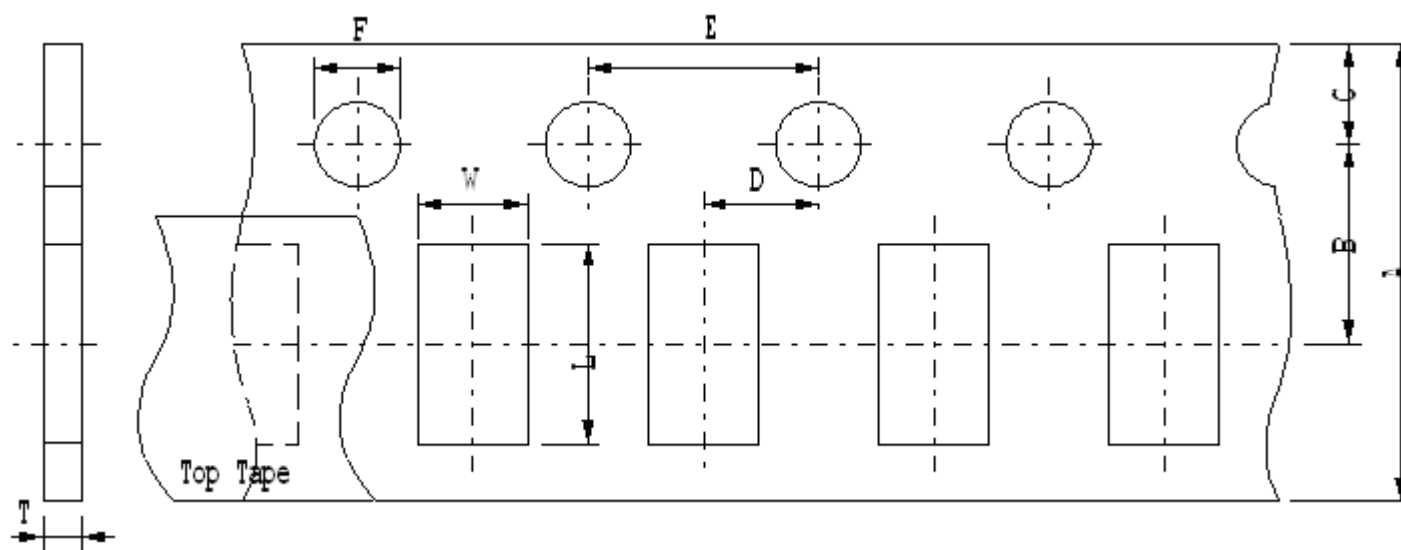
Storage Time: 12 months max.

Storage Temperature: 5 to 40°C

Relative Humidity: 65% max.

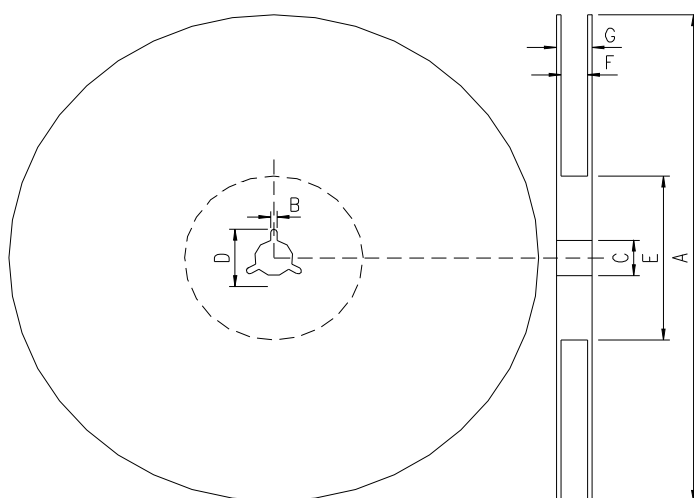
6. Taping Package and Label Marking

6.1. Carrier tape dimensions



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

6.2. Taping reel dimensions



UNIT: mm

| | |
|---|-----------|
| A | 178.0±2.0 |
| B | 2.0±0.5 |
| C | 13.0±0.5 |
| D | 21.0±0.8 |
| E | 62.0±1.5 |
| F | 9.0±0.5 |
| G | 13.0±1.0 |

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 MLVS1206LAMF series
- (2) Shipping quantity is a multiple of standard quantity.

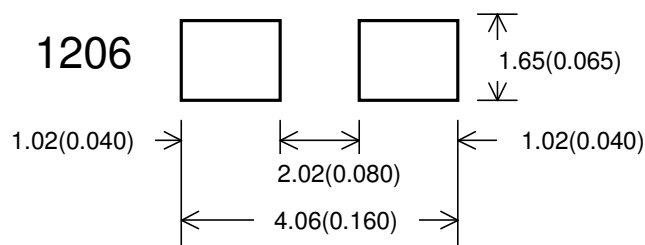
7. Precautions for Handling

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 μm

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.

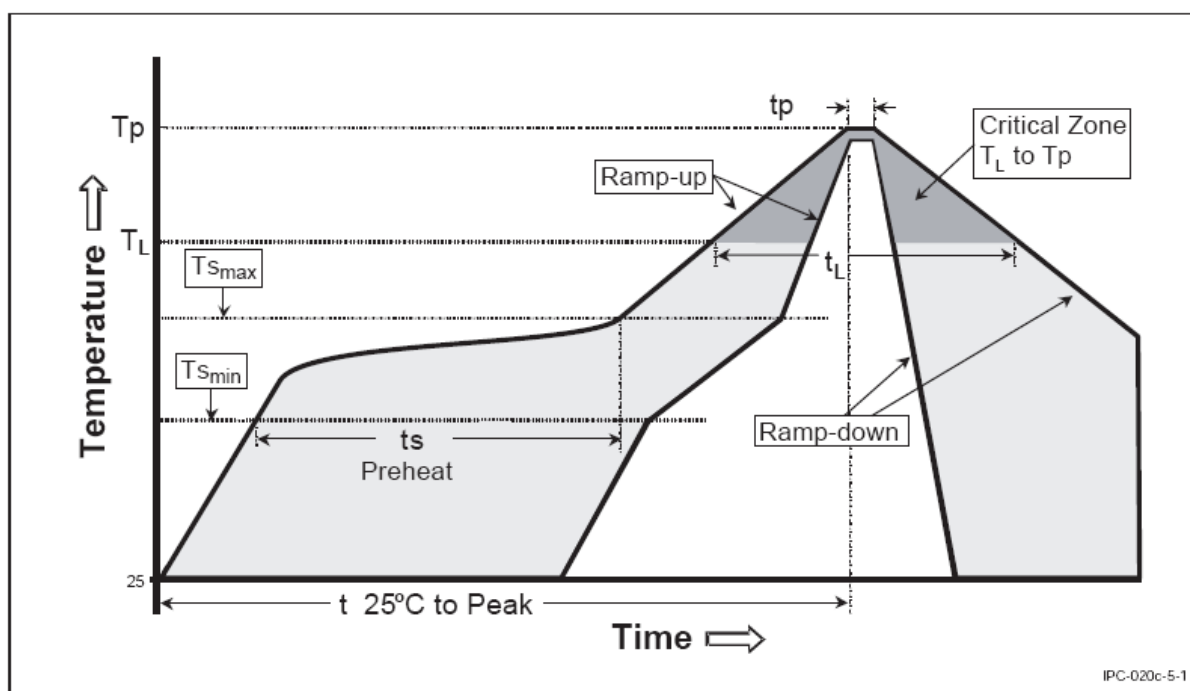
7.3. Precaution for soldering

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 (T _{smax} to T _p) | 3°C/second max. |
| Preheat – Temperature Min (T _{smin}) – Temperature Max (T _{smax}) – Time (t _{smin} to t _{smax}) | 150°C 200°C 60-180 seconds |
| Time maintained above: – Temperature (T _L) – Time (t _L) | 217°C 60-150 seconds |
| Peak/Classification Temperature (T _p) | 260°C |
| Time within 5 °C of actual Peak Temperature (t _p) | 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.