



**INPAQ**

# PRODUCT SPECIFICATION

DOCUMENT NO. ENS000162210

DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
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## 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

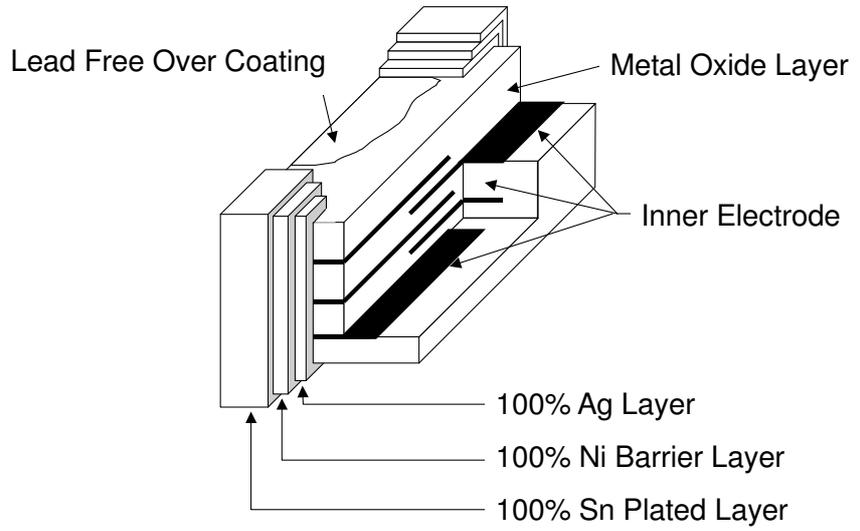
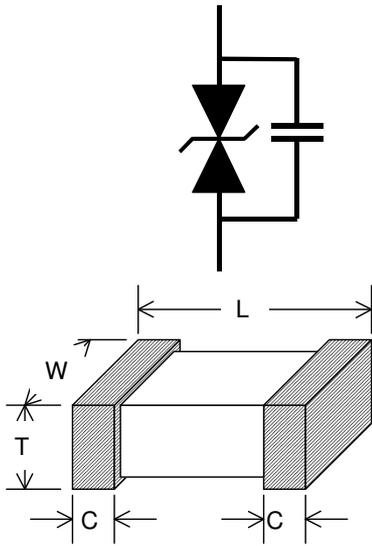
Protection against automotive related transient overvoltage

### 2. Explanation of Part Number

MLV   S   1206   L   AM   04   202   F   DG  
 (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  $20 \times 10^2$
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)

Symbol	Working voltage		Varistor voltage	Clamping Voltage	Capacitance	Peak current	Transient energy
	V <sub>RMS</sub>	V <sub>DC</sub>	V <sub>V</sub>	V <sub>C</sub>	C <sub>p</sub>	i <sub>max</sub>	W <sub>max</sub>
Units	Volts	Volts	Volts	Volts	pF (Typical)	Amps	Joules
	(Max.)	(Max.)		(Max.)		(Max.)	(Max.)
Test Condition		< 10 μA	1mA DC	1 A 8/20μs	1KHz	8/20μs	10/1000μs
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<sub>RMS</sub> – Maximum AC operating voltage the varistor can maintain and not exceed 10μA leakage current

V<sub>DC</sub> – Maximum DC operating voltage the varistor can maintain and not exceed 10μA leakage current

V<sub>V</sub> – Voltage across the device measured at 1mA DC current.  
Equivalent to V<sub>b</sub>, “Breakdown Voltage”.

V<sub>C</sub> – Maximum peak voltage across the varistor measured at 8/20us waveform and 1A pulse current

C<sub>p</sub> – Device capacitance measured with zero volt bias 1Vrms.

i<sub>max</sub> – Maximum peak current which may be applied with 8/20us waveform without device failure

W<sub>max</sub> – Maximum energy that may be dissipated with the 10/1000us 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

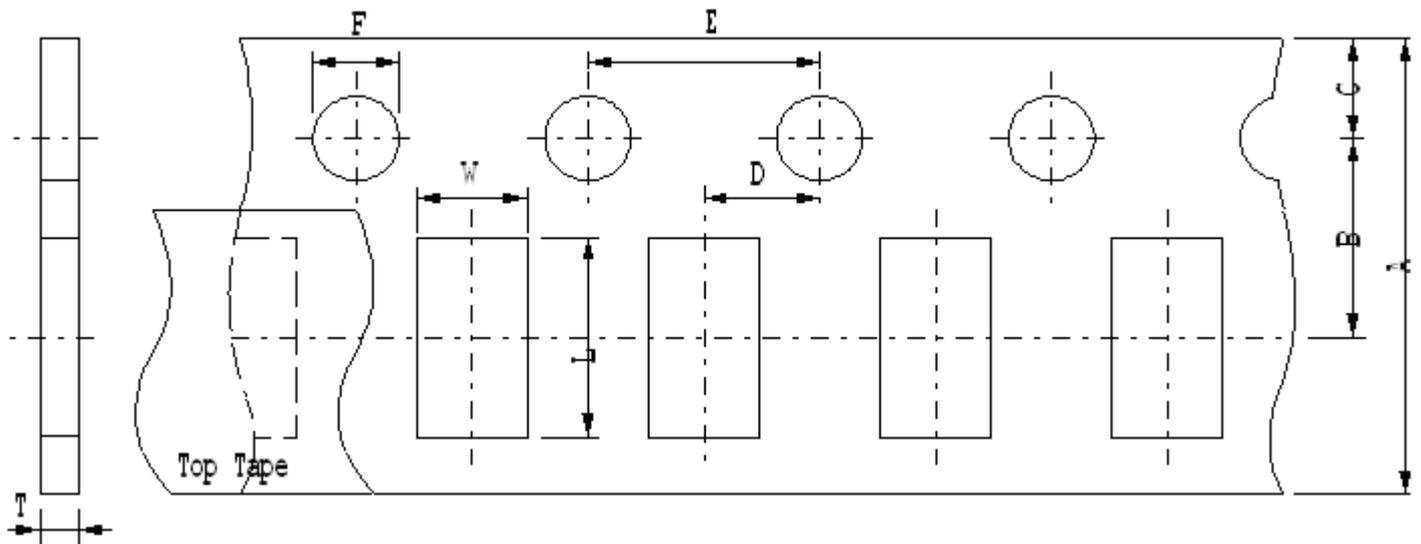
Storage Time: 12 months max.

Storage Temperature: 5 to 40°C

Relative Humidity: 65% max.

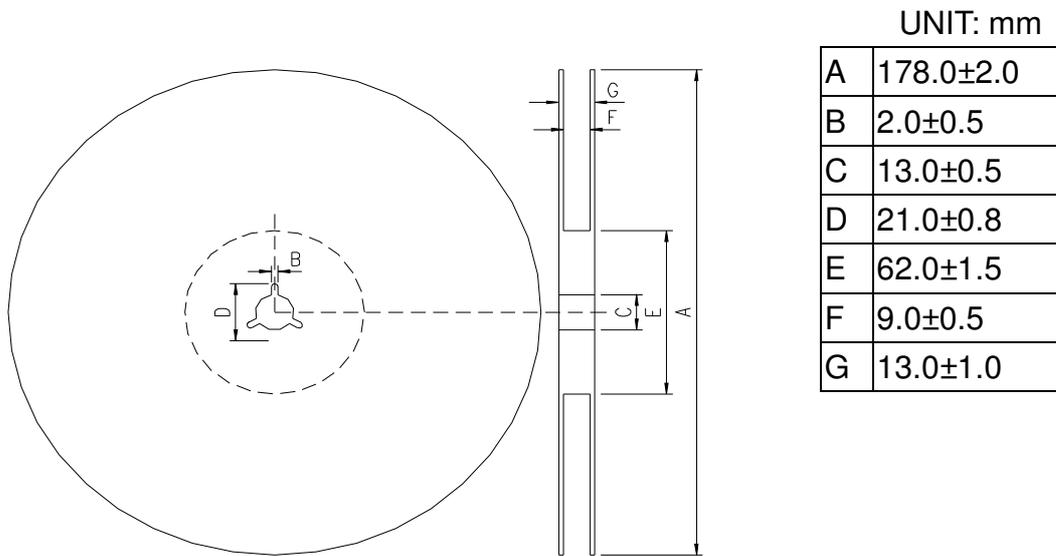
## 6. Taping Package and Label Marking

### 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**



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.

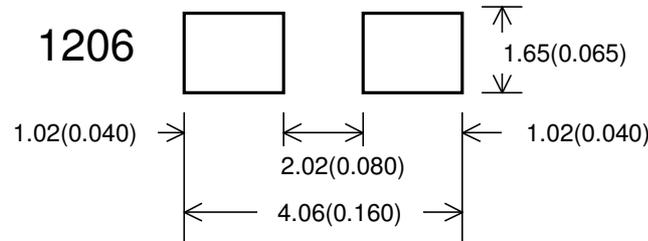
## 7. Precautions for Handling

### 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  $\mu\text{m}$

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.

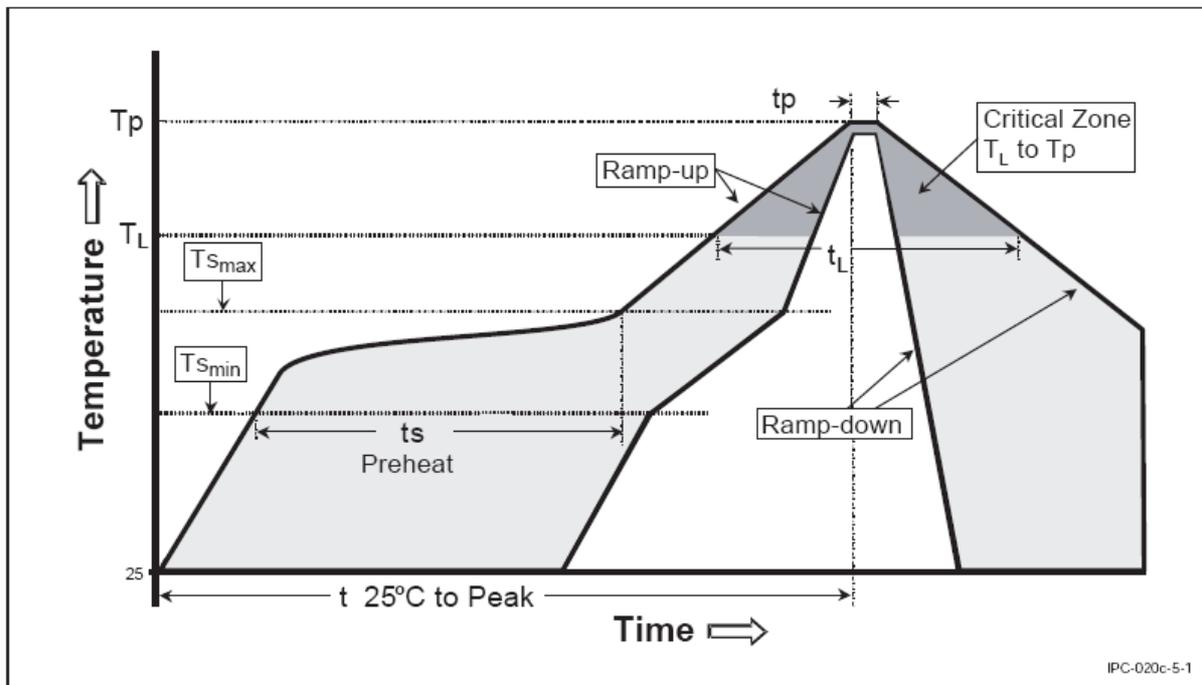
### 7.3. Precaution for soldering

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 (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.
<b>Preheat</b> – Temperature Min (T <sub>smin</sub> ) – Temperature Max (T <sub>smax</sub> ) – Time (t <sub>smin</sub> to t <sub>smax</sub> )	150°C 200°C 60-180 seconds
Time maintained above: – Temperature (T <sub>L</sub> ) – Time (t <sub>L</sub> )	217°C 60-150 seconds
Peak/Classification Temperature (T <sub>p</sub> )	260°C
Time within 5 °C of actual Peak 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.