

VPORT 0402 Lead Free Series

Specification

Product Name	EMI & ESD Suppressor
Series	VPORT Lead Free Series
Size	EIA 0402



VPORT 0402 Lead Free Series Engineering Specification

1. Scope

- (1) Dual function for EMI and ESD
 - (2) Compact size EIA 0402
 - (3) ESD protection for IEC61000-4-2 Level 4
 - (4) Fixed capacitance suitable for high-speed I/O port transient voltage protection
- RoHS Compliance

Applications

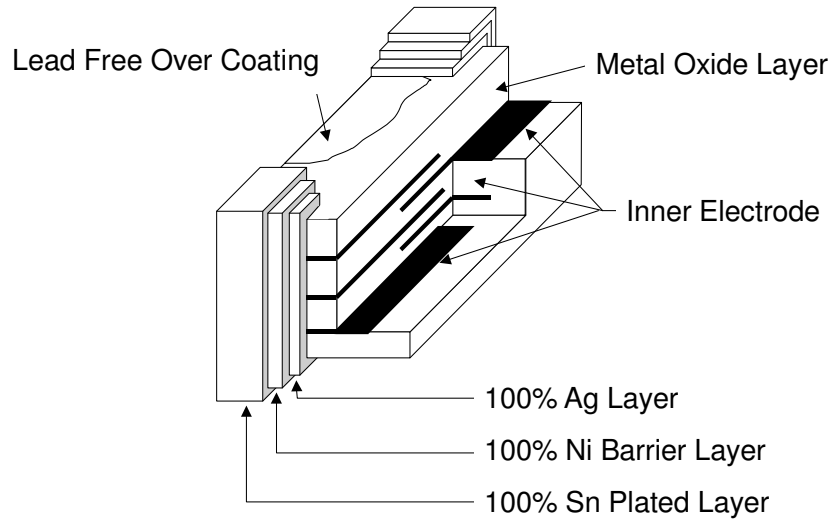
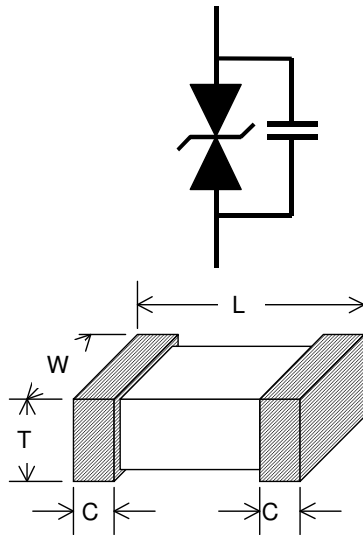
Applications for I/O Port for motherboard, notebook (RS232, USB, PS2, VGA and Audio), Set-Top Box, MP3 Players, DVD Players, and docking system, etc.

2. Explanation of Part Number

<u>V</u>	<u>PORT</u>	<u>0402</u>	<u>L</u>	<u>100</u>	<u>K</u>	<u>V05</u>
(1)	(2)	(3)	(4)	(5)	(6)	(7)

1. Series Type: V=Over Voltage Protection
2. Series Type: PORT=EMI Protection for I/O Port
3. Chip Size (EIA): 0402
4. Suffix L= Lead Free
5. Capacitance: Value- $XX \times 10^N \rightarrow XXN$ Ex: $10pF = 10 \times 10^0 \rightarrow 100$
6. Capacitance Tolerance : K= $\pm 10\%$, M= $\pm 20\%$, No letter: 30%
7. Working Voltage

3. Construction & Dimension



Unit: mm	0402
L	0.96±0.12
W	0.48±0.07
T	0.50±0.10
C	0.25±0.15

4. Part ratings and characteristics:

4.1. Rating(25±5°C)

	Working Voltage		Varistor Voltage	Clamping Voltage	Capacitance
Symbol	V_{RMS}	V_{DC}	V_V	V_C	C_p
Units	Volts	Volts	Volts	Volts	pF
		(Max.)		(Max.)	Tolerance
Test Condition		$< 10 \mu A$	1mA DC	1A 8/20 μs	1MHz
VPORT 0402 L 100 V05	4	5.5	11 – 21	40	10 ± 30%
VPORT 0402 L 330 V05			11 – 21	38	33 ± 30%
VPORT 0402 L 470 V05			9 – 19	36	47 ± 30%
VPORT 0402 L 101 MV05			9 – 11.8	23	100 ± 20%
VPORT 0402 L 101 V05			9 – 19	35	100 ± 30%
VPORT 0402 L 181 V05			8 – 18	34	180 ± 30%
VPORT 0402 L 331 KV05			8 – 10	19	330 ± 10%
VPORT 0402 L 331 MV05			8 – 10	19	330 ± 20%
VPORT 0402 L 331 V05			8 – 18	32	330 ± 30%

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

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

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

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

5 General electrical specifications

5.1 General technical data

Operating temperature	-40 to +85°C
Storage temperature (on board)	-40 to +85°C
Response time	<1ns
Solderability	245±5 °C, 3 ±1sec
Solder leach resistance	260±5°C,10±1sec

5.2 Environmental Specifications

Characteristics	Specifications	Test condition
Bias humidity	$\Delta V_V / V_V \leq \pm 10\%$	90%RH, 40°C, Working voltage, 1000 hours
Thermal shock	$\Delta V_V / V_V \leq \pm 10\%$	-40 °C to 85°C, 30 min. Cycle, 5 cycles
Full load voltage	$\Delta V_V / V_V \leq \pm 10\%$	Working voltage, 85 °C, 1000 hours

5.3 Storage Condition with package

Storage Time: 12 months max.

Storage Temperature: 5 to 40°C

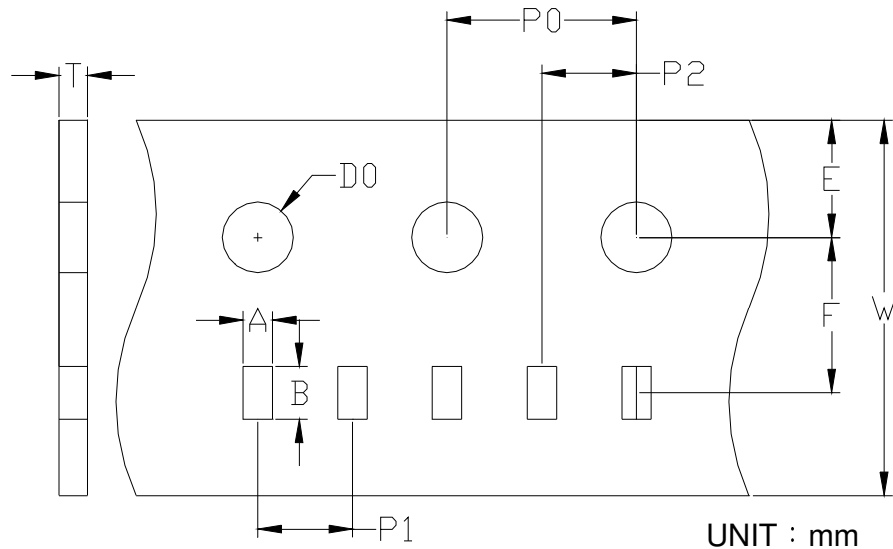
Relative Humidity: to 65%

6 Taping Package and Label Marking

6.1 Packaging method

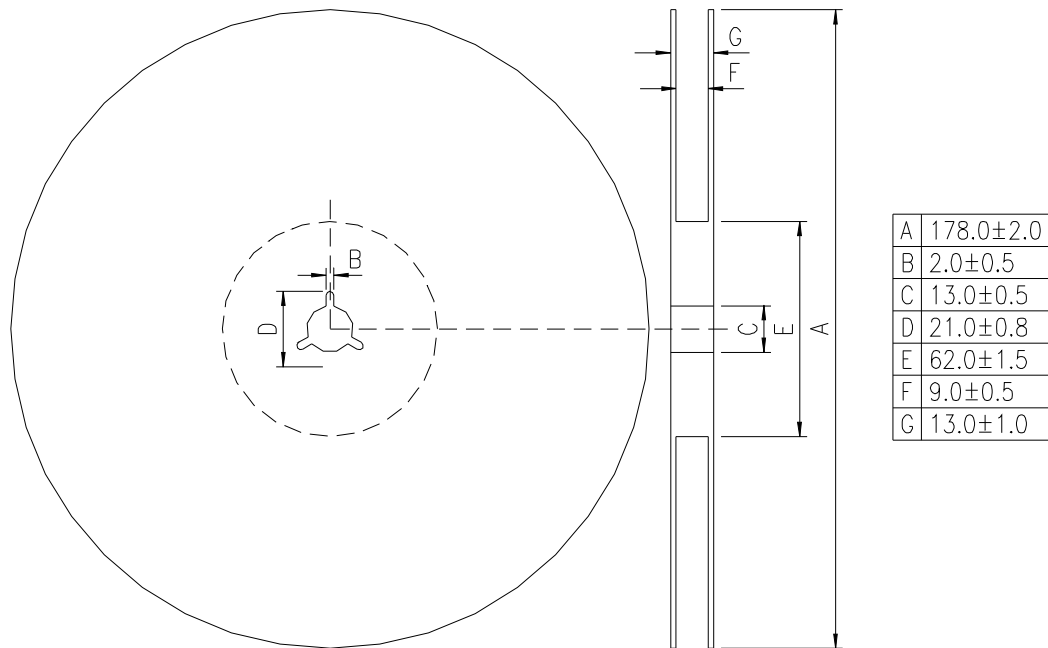
Products shall be heat-sealed in the chip pocket, spacing pitch 4-mm of paper carrier tape with cover tape, and the carrier tape shall be reeled to the reel.

6.2 Carrier tape dimensions



Type	A	B	W	E	F	P0	P1	P2	D0	T
0402	0.59 ±0.03	1.2 ±0.03	8.0 ±0.1	1.75 ±0.05	3.5 ±0.05	4.0 ±0.1	2.0 ±0.05	2.0 ±0.05	1.55 ±0.05	0.60 ±0.03

6.3 Taping reel dimensions



6.4 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.

6.5 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.

6.6 Quantity of products in the taping package

- (1) Standard quantity: 10,000pcs / reel for VPORT 0402 lead free series
- (2) Shipping quantity is a multiple of standard quantity.

7 Precautions for Handling

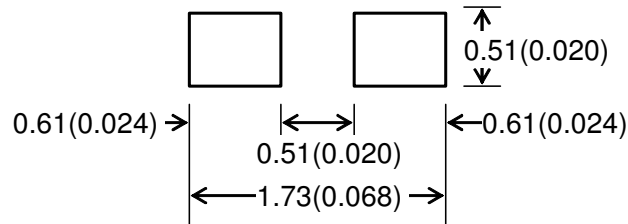
7.1 Solder cream in reflow soldering

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)

0402



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.

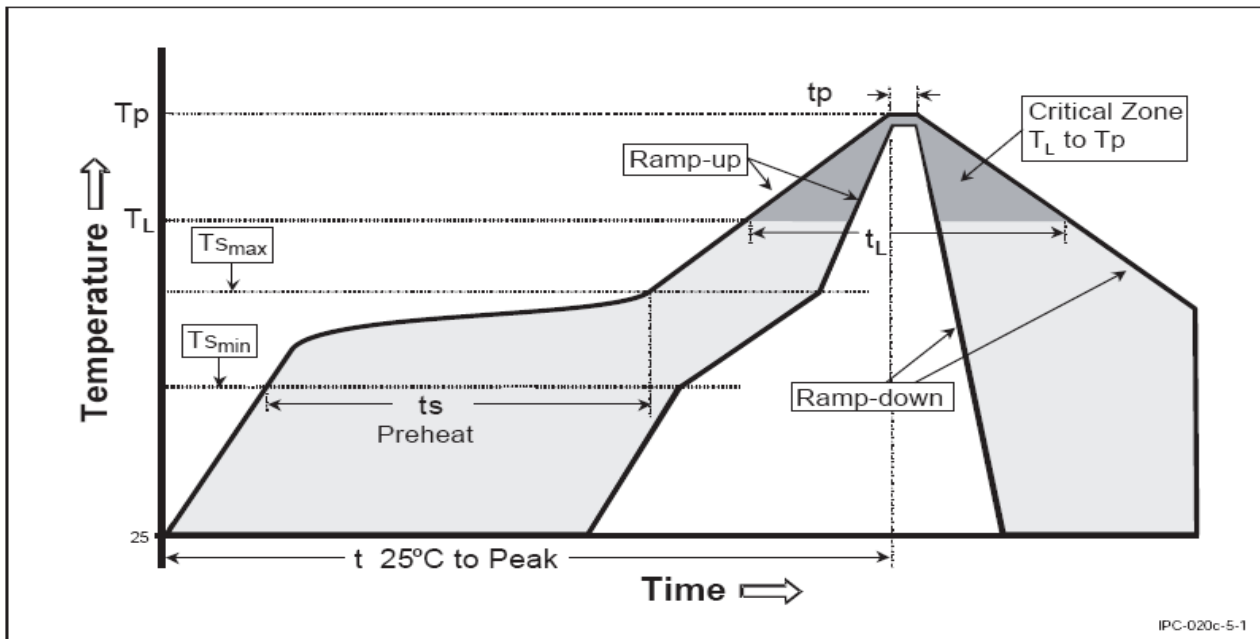
7.3 Precaution for soldering

Note that rapid heating, rapid cooling or local heating will easily damage this product.

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.



*Reference: J-STD-020C

7.5 Caution of flow soldering

We can not recommend the flow soldering to this product, because we afraid that solder bridge happens owing to narrow 0.8mm pitch of this product.

7.6 Soldering gun procedure

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

- (1) 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 this product directly.

7.7 Soldering volume

Note that excess of soldering volume will easily get crack the body of this product.