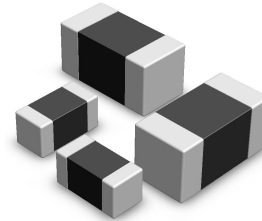


## Surface Mount Multilayer Varistor

### SV0402E9R0G0B

#### Description

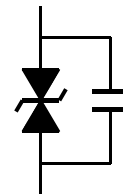
The SV0402E9R0G0B is based on Multilayer fabrication technology. These components are designed to suppress a variety of transient events, including those specified in IEC 61000-4-2 or other standards used for Electromagnetic Compliance (EMC). The SV0402E9R0G0B is typically applied to protect integrated circuits and other components at the circuit board level. It can operate over a wider temperature range than zener diodes.



#### Features

- ◆ Lead Free type
- ◆ SMD type zinc oxide based ceramic chip
- ◆ Insulator over coat keeps excellent low and stable leakage current
- ◆ Plating termination provided good solderability characteristic
- ◆ Quick response time (<1ns)
- ◆ Low clamping voltage
- ◆ Meet IEC61000-4-2 standard
- ◆ Low capacitance can meet high speed single transient voltage protection

#### Equivalent Circuits



#### Applications

- ◆ Low capacitance product applications for high-speed signal lines such as HDMI, DVI, USB, IEEE 1394 Port etc.
- ◆ Normal capacitance product applications for I/O Port (RS232, USB, PS2, VGA, Audio) on Mother Board and Notebook, Set-Top Box, MP3 Players, DVD Players, and Docking System etc.

## Surface Mount Multilayer Varistor

**SV0402E9R0G0B**

### Electrical Characteristics (25±5°C)

Symbol	Minimum	Typical	Maximum	Units
$V_{DC}$	—	—	9	V
$V_V$	11	—	17	
$V_C$	—	—	35	V
$C_P$	—	5	—	pF

$V_{DC}$  – Maximum DC operating voltage the varistor can maintain and not exceed 10μA leakage current.

$V_V$  – Voltage across the device measure at 1mA DC current.

Equivalent to  $V_B$  “breakdown voltage”

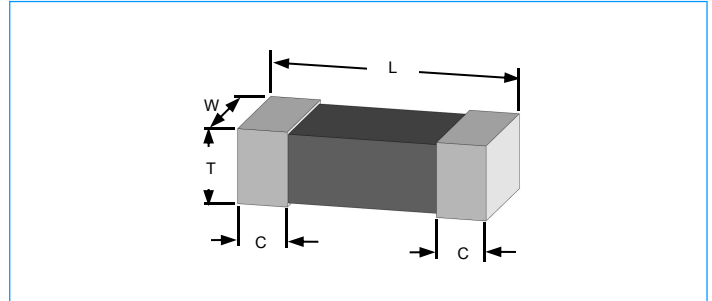
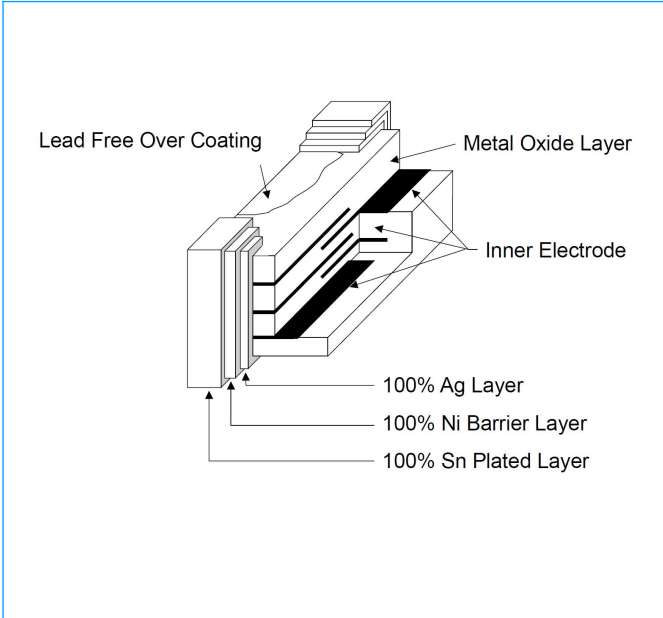
$V_C$  – Maximum peak current across the varistor with 8/20μs waveform and 1A pulse current.

$C_P$  – Device capacitance measured with zero volt bias 1Vrms at 1MHz. The pF is ±30%.

# Surface Mount Multilayer Varistor

SV0402E9R0G0B

## Construction & Dimensions



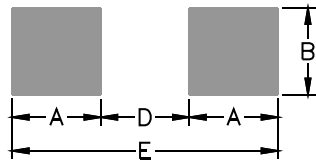
Size EIA (EIAJ)	0402 (1005)	
Symbol	Inches	Millimeters
L	0.038±0.005	0.96±0.12
W	0.019±0.003	0.48±0.007
T	0.020±0.004	0.50±0.10
C	0.010±0.006	0.25±0.15

## Pad Layouts & Precaution for handling of substrate

### 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 200µm



### Precaution for handling of substrate

Do not exceed to bend the board after soldering this product extremely. (reference examples)

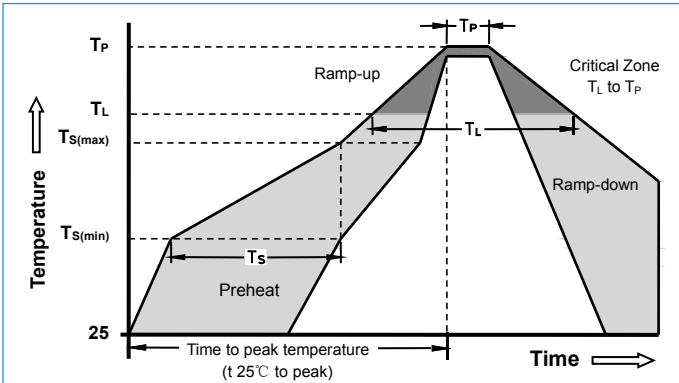
- Mounting place must be as far as possible from the position, which is close to the break line of board or on the line of large holes of board.
- Do not bend extremely the board, in mounting another component. If necessary, use back-up pin (support pin) to prevent from bending extremely.
- Do not break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

Size EIA (EIAJ)	0402 (1005)	
Symbol	Inches	Millimeters
A	0.024	0.61
B	0.020	0.51
D	0.020	0.51
E	0.067	1.70

# Surface Mount Multilayer Varistor

SV0402E9R0G0B

## Soldering Parameters



## Precaution for Soldering

Note that this product will be easily damaged by rapid heating, rapid cooling or local heating. Do not give heat shock over 100°C in the process of soldering. We recommend to take preheating and gradual cooling

### Soldering gun procedure

- Note the follows, in case of using solder gun for replacement.
- 1) The tip temperature must be less than 280 for the period within 3 seconds by using soldering gun under 30W
  - 2) The soldering gun tip shall not touch this product directly.

### Soldering volume

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

<b>Reflow Condition</b>		Pb-Free assembly
<b>Pre Heat</b>	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max ( $T_{s(max)}$ )	+200°C
	-Time (min to max) ( $T_s$ )	60 - 180 Seconds
<b>Average ramp up rate ( Liquidus Temp <math>T_L</math>) to peak</b>		3°C/Second Max
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		3°C/Second Max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	+217°C
	- Time (min to max) ( $T_L$ )	60 - 150 Seconds
<b>Peak Temperature (<math>T_P</math>)</b>		260 +0/-5°C
<b>Time within 5°C of actual peak Temperature (<math>T_P</math>)</b>		20-40 Seconds
<b>Ramp-down Rate</b>		6°C/Second Max
<b>Time 25°C to peak Temperature (<math>T_P</math>)</b>		8 minutes Max

## General Technical Data

<b>Operating Temperature</b>		-40 ~ +85°C
<b>Storage Temperature</b>		-40 ~ +85°C
<b>Response Time</b>		<1 ns
<b>Solderability</b>		245±5°C, 3±1sec
<b>Solder leach resistance</b>		260±5°C, 10±1sec
<b>Taping Package Storage Condition</b>	<b>Storage Temperature</b>	5 ~ 40°C
	<b>Relative Humidity</b>	To 65%
	<b>Storage Time</b>	12 Months max

## Environmental Performance

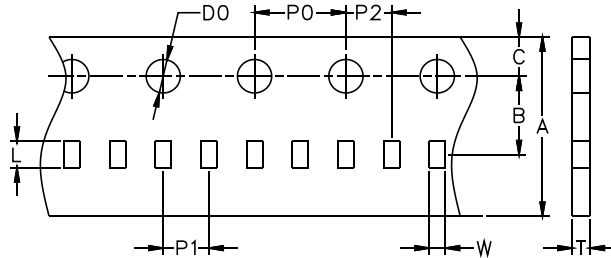
Item	Specifications	Test Condition
<b>Bias Humidity</b>	$\Delta V_V / V_V \leq \pm 10 \%$	90%RH, 40°C, Working Voltage, 1000 hrs
<b>Thermal Shock</b>	$\Delta V_V / V_V \leq \pm 10 \%$	-40°C to 85°C, 30 min. cycle, 5 cycles
<b>Full Load Voltage</b>	$\Delta V_V / V_V \leq \pm 10 \%$	Working Voltage, 85°C, 1000 hrs

# Surface Mount Multilayer Varistor

SV0402E9R0G0B

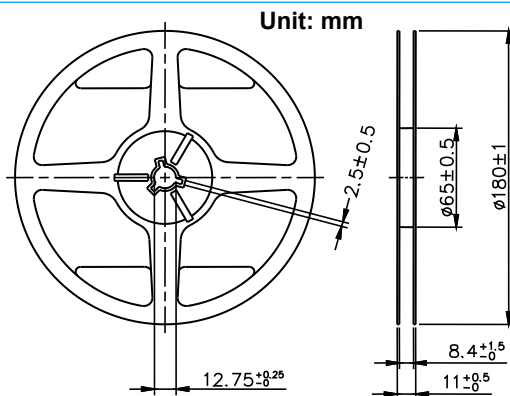
## Packaging Information

### Carrier Tape Dimensions



Size EIA (EIAJ)	0402 (1005)	
Symbol	Inches	Millimeters
A	0.315±0.012	8.00±0.30
B	0.138±0.002	3.50±0.05
C	0.069±0.002	1.75±0.05
D0	0.061±0.002	1.55±0.05
P0	0.157±0.004	4.00±0.10
P1	0.079±0.002	2.00±0.05
P2	0.079±0.002	2.00±0.05
W	0.023±0.001	0.59±0.03
L	0.044±0.001	1.12±0.03
T	0.024±0.001	0.60±0.03

### Taping Reel Dimensions



### 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 heat of taping.

### Quantity of products in the taping package

SIZE EIA (EIAJ)	0402 (1005)
Standard Packing Quantity (PCS / reel)	10,000

### The contents of a box :

0402 Series: 6 reels / inner box