

## Surface Mount Multilayer Varistor

### SV0603E240G0A

#### Description

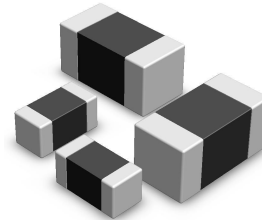
The SV0603E240G0A is based on Multilayer fabrication technology. These components are designed to suppress a variety of transient events, including those specified in IEC 61000-4-2 or other standards used for Electromagnetic Compliance (EMC). The SV0603E240G0A is typically applied to protect integrated circuits and other components at the circuit board level. It can operate over a wider temperature range than zener diodes.

#### Features

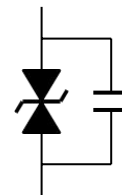
- ◆ SMD type zinc oxide based ceramic chip
- ◆ Lead free plating termination provided good solderability characteristic
- ◆ Insulator overcoat keeps excellent low and stable leakage current
- ◆ Quick response time (<1ns)
- ◆ Meet IEC 61000-4-2 standard
- ◆ Compact size for EIA 0603
- ◆ Low capacitance can meet high speed single transient voltage protection

#### 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.



#### Equivalent Circuits



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

| Symbol    | Minimum | Typical | Maximum | Units |
|-----------|---------|---------|---------|-------|
| $V_{DC}$  | —       | —       | 24      | V     |
| $V_V$     | 100     | —       | 185     | V     |
| $V_C$     | —       | —       | 400     | V     |
| $C_P$     | —       | 4       | —       | pF    |
| $I_{max}$ | —       | —       | 5       | A     |
| $W_{max}$ | —       | —       | 0.01    | J     |

$V_{DC}$  - Maximum DC operating voltage the varistor can maintain and not exceed 30 $\mu$ A 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 8/20 $\mu$ s waveform and 5A pulse current.

$C_P$  - Device capacitance measured with zero volt bias 1Vrms at 1MHz.

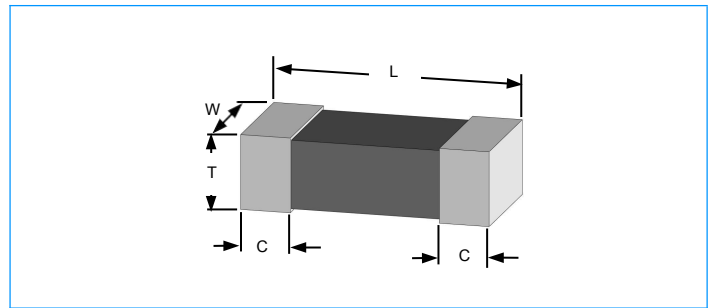
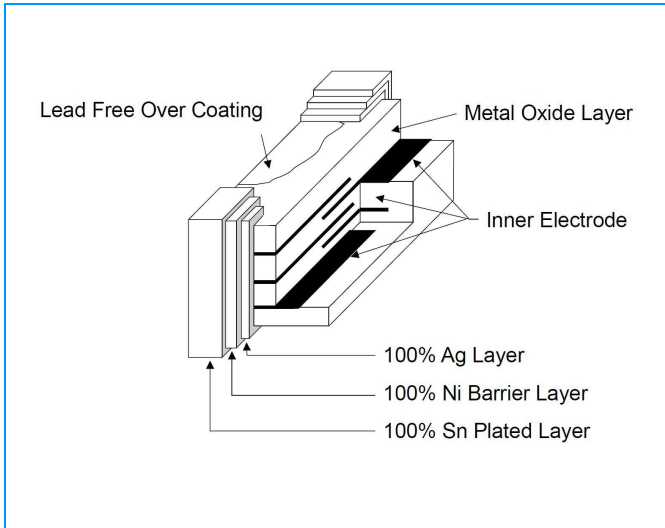
$I_{max}$  - Maximum peak current which may be applied with 8/20 $\mu$ s waveform without device failure.

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

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## Construction & Dimensions



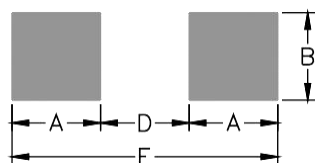
| Size EIA (EIAJ) | 0603 (1608) |             |
|-----------------|-------------|-------------|
| Symbol          | Inches      | Millimeters |
| L               | 0.063±0.006 | 1.60±0.15   |
| W               | 0.031±0.004 | 0.80±0.10   |
| T               | 0.031±0.008 | 0.80±0.20   |
| C               | 0.012±0.008 | 0.30±0.20   |

## 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



| Size EIA (EIAJ) | 0603 (1608) |             |
|-----------------|-------------|-------------|
| Symbol          | Inches      | Millimeters |
| A               | 0.040       | 1.02        |
| B               | 0.030       | 0.76        |
| D               | 0.020       | 0.50        |
| E               | 0.100       | 2.54        |

### Precaution for handling of substrate

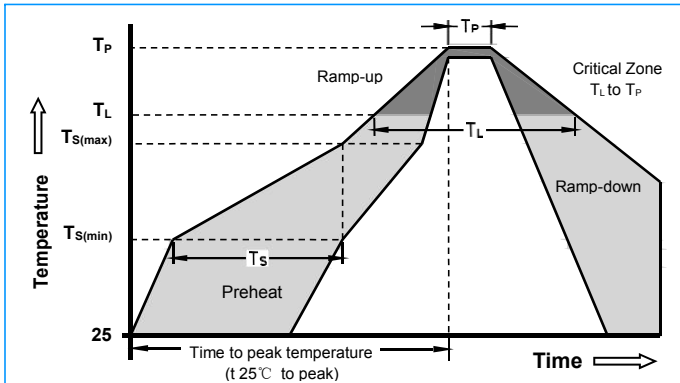
Do not exceed to bend the board after soldering this product extremely. (reference examples)

- 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.

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## 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.

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

## General Technical Data

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

## Environmental Performance

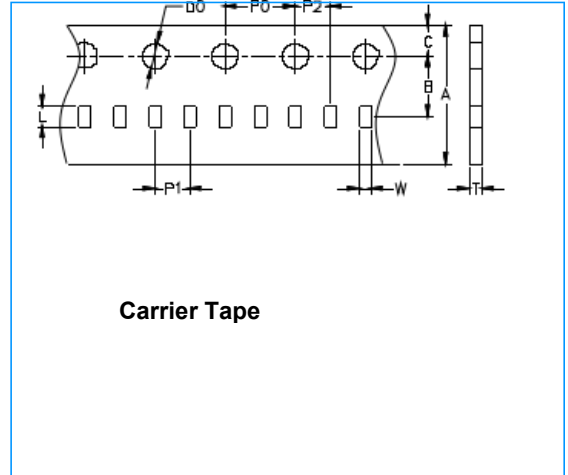
| Item              | Specifications                    | Test Condition                         |
|-------------------|-----------------------------------|--|
| Bias Humidity     | $\Delta V_V / V_V \leq \pm 10 \%$ | 90%RH, 40°C, Working Voltage, 1000 hrs |
| Thermal Shock     | $\Delta V_V / V_V \leq \pm 10 \%$ | -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 hrs        |

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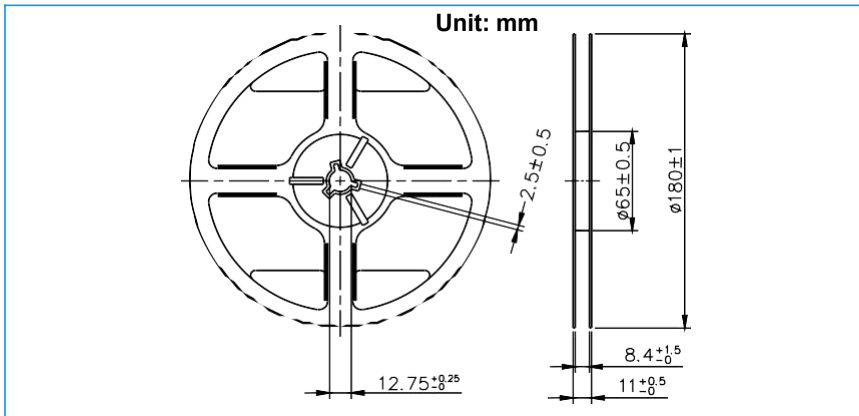
## SV0603E240G0A

### Packaging Information

| Size EIA (EIAJ) | 0603 (1608) |             |
|-----------------|-------------|-------------|
| 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±0.10   |
| D0              | 0.061±0.002 | 1.55±0.05   |
| P0              | 0.157±0.004 | 4.00±0.10   |
| P1              | 0.079±0.002 | 4.00±0.10   |
| P2              | 0.079±0.002 | 2.00±0.05   |
| W               | 0.041±0.006 | 1.05±0.15   |
| L               | 0.075±0.006 | 1.90±0.15   |
| T               | 0.037±0.002 | 0.95±0.05   |



### 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)                        | 0603 (1608) |
|--|-------------|
| Standard Packing Quantity (PCS / reel) | 4,000       |

### The contents of a box :

0603 Series: 6 reels / inner box

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