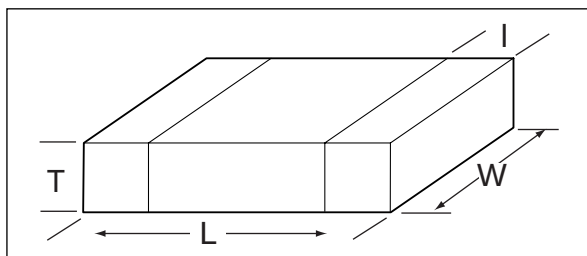


# Transient Voltage Suppressors

## TransGuard® Surface Mount



### HOW TO ORDER

**V C 1206 05 D 150 R**

① ② ③ ④ ⑤ ⑥ ⑦

① **Product Designator:** V = Varistor (TransGuard®)

② **Case Designator:** C = Chip

③ **Case Size Designator**

④ **Working Voltage:**

Where: 03 = 3.3VDC; 14 = 14.0VDC; 30 = 30.0VDC;  
05 = 5.6VDC; 18 = 18.0VDC; 48 = 48.0VDC;  
09 = 9.0VDC; 26 = 26.0VDC; 60 = 60.0VDC

⑤ **Energy:**

Where: A = 0.1J; D = 0.4J; G = 0.9J; K = 2.0J;  
B = 0.2J; E = 0.6J; H = 1.2J; V = 0.02J;  
C = 0.3J; F = 0.7J; J = 1.5J; X = 0.05J

⑥ **Clamping Voltage:**

Where: 100 = 10.0V; 200 = 20.0V; 560 = 56.0V;  
101 = 100.0V; 300 = 30.0V; 580 = 58.0V;  
121 = 120.0V; 390 = 39.0V; 620 = 62.0V;  
150 = 15.5V; 400 = 40.0V; 650 = 65.0V;

⑦ **Standard Packaging (Pcs/Reel):**

| Style  | D     | R     | T      |
|--------|-------|-------|--------|
| VC0402 | -     | 4,000 | 10,000 |
| VC0603 | 1,000 | 4,000 | 10,000 |
| VC0805 | 1,000 | 4,000 | 10,000 |
| VC1206 | 1,000 | 4,000 | 10,000 |
| VC1210 | 1,000 | 2,000 | 10,000 |

### Voltage and Dimensions: millimeters (inches)

| Case Size                     | 0402                       | 0603                                  | 0805                                    | 1206                                 | 1210                       |
|-------------------------------|----------------------------|---------------------------------------|-----------------------------------------|--------------------------------------|----------------------------|
| <b>Voltages</b>               | 5.6, 9.0, 14.0<br>or 18VDC | 3.3, 5.6, 9.0, 14, 18, 26<br>or 30VDC | 3.3, 5.6, 9, 12, 14, 18, 26<br>or 30VDC | 3.3, 5.6, 14, 18, 26, 30<br>or 48VDC | 18, 26, 30, 48<br>or 60VDC |
| <b>Actual Size</b>            | □                          | □                                     | □□                                      | □□                                   | □□□                        |
| <b>Length (L)</b>             | 1.00±0.10 (.040±.004)      | 1.6±0.15 (.063±.006)                  | 2.01±0.2 (0.79±.008)                    | 3.20±0.2 (.126±.008)                 | 3.20±0.6 (.126±.008)       |
| <b>Width (W)</b>              | .50±0.10 (.020±.004)       | 0.8±0.15 (.032±.006)                  | 1.25±0.2 (.049±.008)                    | 1.60±0.2 (.063±.008)                 | 2.49±0.2 (.098±.008)       |
| <b>Thickness (T)</b>          | .60 max. (.024)            | 0.9 max. (.035)                       | 1.02 max. (.040)                        | 1.70 max. (.067)                     | 1.70 max. (.067)           |
| <b>Land Length (l)</b>        | -                          | -                                     | 0.71 max. (.028)                        | 0.71 max. (.028)                     | 0.71 max. (.028)           |
| <b>Termination Band Width</b> | .25±0.15 (.010±.006)       | .035±0.15 (.014±.006)                 | -                                       | -                                    | -                          |
| <b>Termination Separation</b> | .30 (0.12) min.            | 0.7 (.028) min.                       | -                                       | -                                    | -                          |
| <b>Termination Finish*</b>    | Pt/Pd/Ag                   | Pt/Pd/Ag                              | Pt/Pd/Ag                                | Pt/Pd/Ag                             | Pt/Pd/Ag                   |

\*For Ni terminations contact factory.

### 0402 Surface Mount

| AVX Part Number       | Working Voltage | Breakdown Voltage | Clamping Voltage | Peak Current      | Transient Energy   | Capacitance        | Inductance       |
|-----------------------|-----------------|-------------------|------------------|-------------------|--------------------|--------------------|------------------|
| Symbol                | V <sub>WM</sub> | V <sub>B</sub>    | V <sub>C</sub>   | I <sub>peak</sub> | E <sub>trans</sub> | C                  | L                |
| Units                 | Volts (max.)    | Volts             | Volts (max.)     | Amp. (max.)       | Joules (max.)      | pF (typ.)          | nH (typ.)        |
| <b>Test Condition</b> | <50μA           | 1mA DC            | 8/20μS†          | 8/20μs            | 10/1000μS          | 0.5Vrms @:<br>1MHz | di/dt = 100mA/nS |
| VC040205X150          | 5.6             | 7.6 ~ 9.3         | 15.5             | 20                | 0.05               | 360                | <1               |
| VC040209X200          | 9.0             | 11.0 ~ 14.0       | 20.0             | 20                | 0.05               | 230                | <1               |
| VC040214X300          | 14.0            | 16.5 ~ 20.3       | 30.0             | 20                | 0.05               | 120                | <1               |
| VC040218X400          | 18.0            | 22.9 ~ 28.0       | 40.0             | 20                | 0.05               | 90                 | <1               |

### 0603 Surface Mount

| AVX Part Number       | Working Voltage | Breakdown Voltage | Clamping Voltage | Peak Current      | Transient Energy   | Capacitance               | Inductance       |
|-----------------------|-----------------|-------------------|------------------|-------------------|--------------------|---------------------------|------------------|
| Symbol                | V <sub>WM</sub> | V <sub>B</sub>    | V <sub>C</sub>   | I <sub>peak</sub> | E <sub>trans</sub> | C                         | L                |
| Units                 | Volts (max.)    | Volts             | Volts (max.)     | Amp. (max.)       | Joules (max.)      | pF (typ.)                 | nH (typ.)        |
| <b>Test Condition</b> | <50μA           | 1mA DC            | 8/20μS†          | 8/20μs            | 10/1000μS          | 0.5Vrms @:<br>1kHz   1MHz | di/dt = 100mA/nS |
| VC060303A100          | 3.3             | 4.1 ~ 6.0         | 10               | 30                | 0.1                | 1800   1230               | <1.0             |
| VC060305A150          | 5.6             | 7.6 ~ 9.3         | 15.5             | 30                | 0.1                | 1000   825                | <1.0             |
| VC060309A200          | 9.0             | 11.0 ~ 14.0       | 20               | 30                | 0.1                | 650   550                 | <1.0             |
| VC060314A300          | 14.0            | 16.5 ~ 20.3       | 30               | 30                | 0.1                | 500   425                 | <1.0             |
| VC060318A400          | 18.0            | 22.9 ~ 28.0       | 40               | 30                | 0.1                | 275   225                 | <1.0             |
| VC060326A580          | 26.0            | 31.0 ~ 38.0       | 58               | 30                | 0.1                | 200   160                 | <1.0             |
| VC060330A650          | 30.0            | 37.0 ~ 46.0       | 65               | 30                | 0.1                | 175   150                 | <1.0             |

Additional information on this product is available from AVX's catalog or AVX's FAX Service. Call 1-800-879-1613 and request document #100.  
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# Transient Voltage Suppressors



## TransGuard® Surface Mount (continued from pg. 100)

### 0805 Surface Mount

| AVX Part Number | Working Voltage | Breakdown Voltage | Clamping Voltage | Peak Current | Transient Energy | Capacitance             | Inductance       |
|-----------------|-----------------|-------------------|------------------|--------------|------------------|-------------------------|------------------|
| Symbol          | $V_{WM}$        | $V_B$             | $V_C$            | $I_{peak}$   | $E_{trans}$      | C                       | L                |
| Units           | Volts (max.)    | Volts             | Volts (max.)     | Amp. (max.)  | Joules (max.)    | pF (typ.)               | nH (typ.)        |
| Test Condition  | <50 $\mu$ A     | 1mA DC            | 8/20 $\mu$ S†    | 8/20 $\mu$ s | 10/1000 $\mu$ S  | 0.5Vrms @:<br>1kHz 1MHz | di/dt = 100mA/nS |
| VC080503A100    | 3.3             | 4.1 ~ 6.0         | 10               | 40           | 0.1              | 1300 930                | <1.5             |
| VC080503C100    | 3.3             | 3.7 ~ 5.6         | 10               | 120          | 0.3              | 5500 4000               | 1.5              |
| VC080505A150    | 5.6             | 7.6 ~ 9.3         | 15.5             | 40           | 0.1              | 1250 860                | <1.5             |
| VC080505C150    | 5.6             | 7.1 ~ 8.7         | 15.5             | 120          | 0.3              | 3500 2400               | 1.5              |
| VC080509A200    | 9               | 11.0 ~ 14.0       | 20               | 40           | 0.1              | 780 585                 | <1.5             |
| VC080512A250    | 12              | 14.0 ~ 18.3       | 25               | 40           | 0.1              | 525 400                 | <1.5             |
| VC080514A300    | 14              | 16.5 ~ 20.3       | 30               | 40           | 0.1              | 375 280                 | <1.5             |
| VC080514C300    | 14              | 15.9 ~ 19.4       | 30               | 120          | 0.3              | 1100 820                | 1.5              |
| VC080518A400    | 18              | 22.9 ~ 28.0       | 40               | 30           | 0.1              | 350 275                 | <1.5             |
| VC080518C400    | 18              | 22.5 ~ 27.5       | 40               | 100          | 0.3              | 650 500                 | 1.5              |
| VC080526A580    | 26              | 31.0 ~ 37.9       | 58               | 30           | 0.1              | 140 110                 | <1.5             |
| VC080526C580    | 26              | 30.5 ~ 37.3       | 58               | 100          | 0.3              | 250 190                 | 1.5              |
| VC080530A650    | 30              | 37.0 ~ 46.0       | 65               | 30           | 0.1              | 100 80                  | <1.5             |

### 1206 Surface Mount

| AVX Part Number | Working Voltage | Breakdown Voltage | Clamping Voltage | Peak Current | Transient Energy | Capacitance             | Inductance       |
|-----------------|-----------------|-------------------|------------------|--------------|------------------|-------------------------|------------------|
| Symbol          | $V_{WM}$        | $V_B$             | $V_C$            | $I_{peak}$   | $E_{trans}$      | C                       | L                |
| Units           | Volts (max.)    | Volts             | Volts (max.)     | Amp. (max.)  | Joules (max.)    | pF (typ.)               | nH (typ.)        |
| Test Condition  | <50 $\mu$ A     | 1mA DC            | 8/20 $\mu$ S†    | 8/20 $\mu$ s | 10/1000 $\mu$ S  | 0.5Vrms @:<br>1kHz 1MHz | di/dt = 100mA/nS |
| VC120603A100    | 3.3             | 4.1 ~ 6.0         | 10               | 40           | 0.1              | 2000 1500               | <1.7             |
| VC120603D100    | 3.3             | 3.7 ~ 5.6         | 10               | 150          | 0.4              | 4700 3800               | 1.7              |
| VC120605A150    | 5.6             | 7.6 ~ 9.3         | 15.5             | 40           | 0.1              | 1200 870                | <1.7             |
| VC120605D150    | 5.6             | 7.1 ~ 8.7         | 15.5             | 150          | 0.4              | 3000 2300               | 1.7              |
| VC120614A300    | 14              | 16.5 ~ 20.3       | 30               | 40           | 0.1              | 600 500                 | <1.7             |
| VC120614D300    | 14              | 15.9 ~ 19.4       | 30               | 150          | 0.4              | 1200 900                | 1.7              |
| VC120618A400    | 18              | 22.9 ~ 28.0       | 40               | 30           | 0.1              | 350 270                 | <1.7             |
| VC120618D400    | 18              | 22.5 ~ 27.5       | 40               | 150          | 0.4              | 800 635                 | 1.7              |
| VC120626D580    | 26              | 30.5 ~ 37.3       | 58               | 120          | 0.4              | 550 450                 | 1.7              |
| VC120630D650    | 30              | 36.0 ~ 45.0       | 65               | 120          | 0.4              | 500 400                 | 1.7              |
| VC120648D101    | 48              | 56.0 ~ 68.0       | 100              | 100          | 0.4              | 225 185                 | 1.7              |

### 1210 Surface Mount

| AVX Part Number | Working Voltage | Breakdown Voltage | Clamping Voltage | Peak Current | Transient Energy | Capacitance             | Inductance       |
|-----------------|-----------------|-------------------|------------------|--------------|------------------|-------------------------|------------------|
| Symbol          | $V_{WM}$        | $V_B$             | $V_C$            | $I_{peak}$   | $E_{trans}$      | C                       | L                |
| Units           | Volts (max.)    | Volts             | Volts (max.)     | Amp. (max.)  | Joules (max.)    | pF (typ.)               | nH (typ.)        |
| Test Condition  | <50 $\mu$ A     | 1mA DC            | 8/20 $\mu$ S†    | 8/20 $\mu$ s | 10/1000 $\mu$ S  | 0.5Vrms @:<br>1kHz 1MHz | di/dt = 100mA/nS |
| VC121018J390    | 18              | 21.5 ~ 26.5       | 39               | 500          | 1.5              | 3100 2400               | 2.0              |
| VC121026H560    | 26              | 29.7 ~ 36.3       | 56               | 300          | 1.2              | 2150 1675               | 2.0              |
| VC121030G620    | 30              | 35.0 ~ 43.0       | 62               | 220          | 0.9              | 1900 1530               | 2.0              |
| VC121030H620    | 30              | 35.0 ~ 43.0       | 62               | 280          | 1.2              | 1975 1575               | 2.0              |
| VC121048G101    | 48              | 54.5 ~ 66.5       | 100              | 220          | 0.9              | 500 430                 | 2.0              |
| VC121048H101    | 48              | 54.5 ~ 66.5       | 100              | 250          | 1.2              | 525 450                 | 2.0              |
| VC121060J121    | 60              | 67.0 ~ 83.0       | 120              | 250          | 1.5              | 450 375                 | 2.0              |

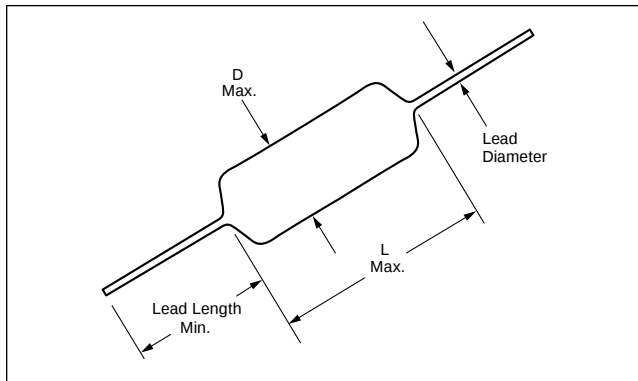
See note page 103

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# Transient Voltage Suppressors

## TransGuard® Axial Lead



|               | VA1000                        | VA2000                        |
|---------------|-------------------------------|-------------------------------|
| Body Length   | (L) = 4.32mm.<br>(.170" Max.) | 4.83mm<br>(.190" Max.)        |
| Body Diameter | (D) = 2.54mm<br>(.100" Max.)  | 3.56mm Max.<br>(.140")        |
| Lead Diameter | 0.51 ± .05mm<br>(.020 ± .002) | 0.51 ± .05mm<br>(.020 ± .002) |
| Lead Length   | 25.4mm<br>(1" Min.)           | 25.4mm<br>(1" Min.)           |

### HOW TO ORDER

**V A 1000 03 D 100 R**

① ② ③ ④ ⑤ ⑥ ⑦

① **Product Designator:** V = Varistor (TransGuard®)

② **Case Designator:** A = Axial

③ **Case Size Designator**

④ **Working Voltage:**

Where: 03 = 3.3VDC; 26 = 26.0VDC;  
05 = 5.6VDC; 30 = 30.0VDC;  
14 = 14.0VDC; 48 = 48.0VDC;  
18 = 18.0VDC; 60 = 60.0VDC

⑤ **Energy:**

Where: A = 0.1J; D = 0.4J; G = 0.9J; K = 2.0J;  
B = 0.2J; E = 0.6J; H = 1.2J; V = 0.02J;  
C = 0.3J; F = 0.7J; J = 1.5J; X = 0.05J

⑥ **Clamping Voltage:**

Where: 100 = 10.0V; 300 = 30.0V;  
101 = 100.0V; 400 = 40.0V;  
121 = 120.V; 580 = 58.0V;  
150 = 15.5V; 650 = 65.0V2

⑦ **Standard Packaging (Pcs/Reel):**

| Style  | D     | R     | T     |
|--------|-------|-------|-------|
| VA1000 | 1,000 | 3,000 | 7,500 |
| VA2000 | 1,000 | 2,500 | 5,000 |

### Axial Leaded Devices

| AVX Part Number | Working Voltage | Breakdown Voltage | Clamping Voltage | Peak Current | Transient Energy | Capacitance             | Inductance       |
|-----------------|-----------------|-------------------|------------------|--------------|------------------|-------------------------|------------------|
| Symbol          | $V_{WM}$        | $V_B$             | $V_C$            | $I_{peak}$   | $E_{trans}$      | C                       | L                |
| Units           | Volts (max.)    | Volts             | Volts (max.)     | Amp. (max.)  | Joules (max.)    | pF (typ.)               | nH (typ.)        |
| Test Condition  | <50μA           | 1mA DC            | 8/20μs†          | 8/20μs       | 10/1000μs        | 0.5Vrms @:<br>1kHz 1MHz | di/dt = 100mA/nS |
| VA100003A100    | 3.3             | 4.1 ~ 6.0         | 10               | 40           | 0.1              | 1500 1100               | 3.5              |
| VA100003D100    | 3.3             | 3.7 ~ 5.6         | 10               | 150          | 0.4              | 4700 3800               | 3.5              |
| VA100005A150    | 5.6             | 7.6 ~ 9.3         | 15.5             | 40           | 0.1              | 1000 750                | 3.5              |
| VA100005D150    | 5.6             | 7.1 ~ 8.7         | 15.5             | 150          | 0.4              | 2800 2150               | 3.5              |
| VA100014A300    | 14              | 16.5 ~ 20.3       | 30               | 40           | 0.1              | 400 300                 | 3.5              |
| VA100014D300    | 14              | 15.9 ~ 19.4       | 30               | 150          | 0.4              | 1200 900                | 3.5              |
| VA100018A400    | 18              | 22.9 ~ 28.0       | 40               | 40           | 0.1              | 350 270                 | 3.5              |
| VA100018D400    | 18              | 22.5 ~ 27.5       | 40               | 150          | 0.4              | 900 700                 | 3.5              |
| VA100026D580    | 26              | 30.5 ~ 37.3       | 58               | 120          | 0.4              | 700 550                 | 3.5              |
| VA100030D650    | 30              | 36.0 ~ 45.0       | 65               | 120          | 0.4              | 600 500                 | 3.5              |
| VA100048D101    | 48              | 56.0 ~ 68.0       | 100              | 100          | 0.4              | 200 165                 | 3.5              |
| VA200060K121    | 60              | 67.0 ~ 83.0       | 120              | 300          | 2.0              | 400 340                 | 3.5              |

$V_{WM}$ —Maximum steady-state DC operating voltage the varistor can maintain and not exceed 50μA leakage current

$V_B$ —Voltage across the device measured at 1mA DC current

$V_C$ —Maximum peak voltage across the varistor measured at a specified pulse current and waveform

†Transient Energy Rating      Pulse Current & Waveform  
     .1 Joule                              2A 8/20μs  
     .2-.3 Joules                        5A 8/20μs  
     ≥.4Joules                            10A 8/20μs

$I_{peak}$ —Maximum peak current which may be applied with the specified waveform without device failure

$E_{Trans}$ —Maximum energy which may be dissipated with the specific waveform without device failure

C—Device capacitance measured with zero volt bias at .5Vrms and 1kHz

L—Device inductance measured with a current edge rate of 100mA/nS

Dimensions: Millimeters (Inches)

Additional information on this product is available from AVX's catalog or AVX's FAX Service.  
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