

# TransGuard® Automotive Series

## Multilayer Varistors for Automotive Applications



### GENERAL DESCRIPTION

The TransGuard Automotive Series are zinc oxide (ZnO) based ceramic semiconductor devices with non-linear, bi-directional voltage-current characteristics.

They have the advantage of offering bi-directional overvoltage protection as well as EMI/RFI attenuation in a single SMT package. The Automotive Series high current and high energy handling capability make them well suited for protection against automotive related transients.

AVX VG series parts (large case size, high energy) are glass encapsulated. These parts provide the same high reliability as traditional VC series parts. The glass encapsulation provides also enhanced resistance against harsh environment or process such as acids, salts, chlorite flux.

Operating Temperature: -55°C to +125°C

### FEATURES

- High Reliability
- High Energy Absorption (Load Dump)
- High Current Handling
- AEC Q200 Qualified
- Bi-Directional protection
- EMI/RFI attenuation
- Multi-strike capability
- Sub 1nS response to ESD strike

### APPLICATIONS

- Internal Combustion Engine (ICE) Vehicles
- Hybrid Electric Vehicles (HEV)
- Plug-in Hybrid Electric Vehicles (PHEV)
- Commercial Vehicles
  - CAN, LIN, FLEXRAY based modules
  - Sensors
  - Module load dump protection
  - Motor/inductive load transient suppression



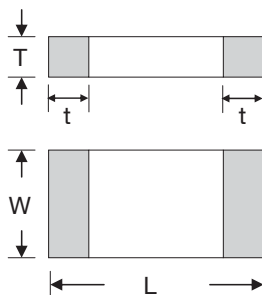
### HOW TO ORDER

| VC                                                                                        | AS                           | 1206                 | 18                         | D                        | 400                         | R                                                                                                          | P                                      |
|-------------------------------------------------------------------------------------------|------------------------------|----------------------|----------------------------|--------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Varistor Chip</b><br>VC = Varistor Chip<br>VG = Varistor Glass<br>Encapsulated<br>Chip | <b>Automotive<br/>Series</b> | <b>Case<br/>Size</b> | <b>Working<br/>Voltage</b> | <b>Energy<br/>Rating</b> | <b>Clamping<br/>Voltage</b> | <b>Package</b><br>D = 7" (1000)*<br>R = 7" (4000)*<br>T = 13" (10,000)*<br>W = 13" (10,000)**<br>0402 only | <b>Termination</b><br>P = Ni/Sn plated |
|                                                                                           |                              | 0402                 | 05 = 5.6Vdc                | 34 = 34Vdc               | A = 0.1J                    | 150 = 18V                                                                                                  |                                        |
|                                                                                           |                              | 0603                 | 09 = 9Vdc                  | 38 = 38Vdc               | B = 0.2J                    | 220 = 22V                                                                                                  |                                        |
|                                                                                           |                              | 0805                 | 12 = 12Vdc                 | 42 = 42Vdc               | C = 0.3J                    | 250 = 27V                                                                                                  |                                        |
|                                                                                           |                              | 1206                 | 14 = 14Vdc                 | 45 = 45Vdc               | D = 0.4J                    | 300 = 32V                                                                                                  |                                        |
|                                                                                           |                              | 1210                 | 16 = 16Vdc                 | 48 = 48Vdc               | E = 0.5J                    | 380 = 38V                                                                                                  |                                        |
|                                                                                           |                              | 1812                 | 18 = 18Vdc                 | 56 = 56Vdc               | F = 0.7J                    | 390 = 42V                                                                                                  |                                        |
|                                                                                           |                              | 2220                 | 26 = 26Vdc                 | 60 = 60Vdc               | H = 1.2J                    | 400 = 42V                                                                                                  |                                        |
|                                                                                           |                              |                      | 30 = 30Vdc                 | 85 = 85Vdc               | J = 1.5J                    | 540 = 54V                                                                                                  |                                        |
|                                                                                           |                              |                      | 31 = 31Vdc                 | K = 0.6J                 | Y = 7.2-12J                 | 151 = 150V                                                                                                 |                                        |

\*Not available for 0402

\*\*Only available for 0402

### PHYSICAL DIMENSIONS: mm (inches)



| Size (EIA) | Length (L)                 | Width (W)                  | Max Thickness (T) | Land Length (t)            |
|------------|----------------------------|----------------------------|-------------------|----------------------------|
| 0402       | 1.00±0.10<br>(0.040±0.004) | 0.50±0.10<br>(0.020±0.004) | 0.60<br>(0.024)   | 0.25±0.15<br>(0.010±0.006) |
| 0603       | 1.60±0.15<br>(0.063±0.006) | 0.80±0.15<br>(0.031±0.006) | 0.90<br>(0.035)   | 0.35±0.15<br>(0.014±0.006) |
| 0805       | 2.01±0.20<br>(0.079±0.008) | 1.25±0.20<br>(0.049±0.008) | 1.02<br>(0.040)   | 0.71 max.<br>(0.028 max.)  |
| 1206       | 3.20±0.20<br>(0.126±0.008) | 1.60±0.20<br>(0.063±0.008) | 1.02<br>(0.040)   | 0.94 max.<br>(0.037 max.)  |
| 1210       | 3.20±0.20<br>(0.126±0.008) | 2.49±0.20<br>(0.098±0.008) | 1.70<br>(0.067)   | 0.14 max.<br>(0.045 max.)  |
| 1812       | 4.50±0.30<br>(0.177±0.012) | 3.20±0.30<br>(0.126±0.012) | 2.00<br>(0.079)   | 1.00 max.<br>(0.040 max.)  |
| 2220       | 5.70±0.40<br>(0.224±0.016) | 5.00±0.40<br>(0.197±0.016) | 2.50<br>(0.098)   | 1.00 max.<br>(0.040 max.)  |



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### ELECTRICAL CHARACTERISTICS

| AVX PN            | V <sub>W</sub> (DC) | V <sub>W</sub> (AC) | V <sub>B</sub> | V <sub>C</sub> | I <sub>VC</sub> | I <sub>L</sub> | E <sub>T</sub> | E <sub>LD</sub> | I <sub>P</sub> | Cap   | Freq | V <sub>Jump</sub> | P <sub>Diss. Max</sub> |
|-------------------|---------------------|---------------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|-------|------|-------------------|------------------------|
| VCAS040205X150 __ | 5.6                 | 4.0                 | 8.5±20%        | 18             | 1               | 35             | 0.05           | -               | 20             | 175   | M    | -                 | 0.001                  |
| VCAS060305A150 __ | 5.6                 | 4.0                 | 8.5±20%        | 18             | 1               | 35             | 0.1            | -               | 30             | 750   | K    | -                 | 0.001                  |
| VCAS080505A150 __ | 5.6                 | 4.0                 | 8.5±20%        | 18             | 1               | 35             | 0.1            | -               | 40             | 1100  | K    | -                 | 0.001                  |
| VCAS080505C150 __ | 5.6                 | 4.0                 | 8.5±20%        | 18             | 1               | 35             | 0.3            | -               | 120            | 3000  | K    | -                 | 0.005                  |
| VCAS120605A150 __ | 5.6                 | 4.0                 | 8.5±20%        | 18             | 1               | 35             | 0.1            | -               | 40             | 1200  | K    | -                 | 0.002                  |
| VCAS120605D150 __ | 5.6                 | 4.0                 | 8.5±20%        | 18             | 1               | 35             | 0.4            | -               | 150            | 3000  | K    | -                 | 0.008                  |
| VCAS040209X200 __ | 9                   | 6.4                 | 12.7±15%       | 22             | 1               | 25             | 0.05           | -               | 20             | 175   | M    | -                 | 0.001                  |
| VCAS060309A200 __ | 9                   | 6.4                 | 12.7±15%       | 22             | 1               | 25             | 0.1            | -               | 30             | 550   | K    | -                 | 0.002                  |
| VCAS080509A200 __ | 9                   | 6.4                 | 12.7±15%       | 22             | 1               | 25             | 0.1            | -               | 40             | 750   | K    | -                 | 0.002                  |
| VCAS080512A250 __ | 12                  | 8.5                 | 16±15%         | 27             | 1               | 25             | 0.1            | -               | 40             | 525   | K    | -                 | 0.002                  |
| VCAS040214X300 __ | 14                  | 10                  | 18.5±12%       | 32             | 1               | 15             | 0.05           | -               | 20             | 85    | K    | 16                | 0.001                  |
| VCAS060314A300 __ | 14                  | 10                  | 18.5±12%       | 32             | 1               | 15             | 0.1            | -               | 30             | 350   | K    | 16                | 0.002                  |
| VCAS080514A300 __ | 14                  | 10                  | 18.5±12%       | 32             | 1               | 15             | 0.1            | -               | 40             | 325   | K    | 16                | 0.002                  |
| VCAS080514C300 __ | 14                  | 10                  | 18.5±12%       | 32             | 1               | 15             | 0.3            | -               | 120            | 900   | K    | 20                | 0.006                  |
| VCAS120614A300 __ | 14                  | 10                  | 18.5±12%       | 32             | 1               | 15             | 0.1            | -               | 40             | 600   | K    | 20                | 0.002                  |
| VCAS120614D300 __ | 14                  | 10                  | 18.5±12%       | 32             | 1               | 15             | 0.4            | -               | 150            | 1050  | K    | 20                | 0.008                  |
| VCAS060316B400 __ | 16                  | 11                  | 25.5±10%       | 42             | 1               | 10             | 0.2            | 0.25            | 30             | 150   | K    | 27.5              | 0.003                  |
| VCAS120616K380 __ | 16                  | 11                  | 25.5±10%       | 38             | 1               | 10             | 0.6            | 1.5             | 200            | 930   | K    | 27.5              | 0.010                  |
| VCAS121016J390 __ | 16                  | 11                  | 25.5±10%       | 42             | 5               | 10             | 1.6            | 3               | 500            | 3100  | K    | 27.5              | 0.030                  |
| VGAS181216P400 __ | 16                  | 11                  | 24.5±10%       | 42             | 5               | 10             | 2.9            | 10              | 1000           | 5000  | K    | 27.5              | 0.070                  |
| VGAS222016Y400 __ | 16                  | 11                  | 24.5±10%       | 42             | 10              | 10             | 7.2            | 25              | 1500           | 13000 | K    | 25.5              | 0.100                  |
| VCAS040218X400 __ | 18                  | 13                  | 25.5±10%       | 42             | 1               | 10             | 0.05           | 0.05            | 20             | 65    | M    | 27.5              | 0.001                  |
| VCAS060318A400 __ | 18                  | 13                  | 25.5±10%       | 42             | 1               | 10             | 0.1            | 0.25            | 30             | 150   | K    | 27.5              | 0.003                  |
| VCAS080518A400 __ | 18                  | 13                  | 25.5±10%       | 42             | 1               | 10             | 0.1            | 0.1             | 30             | 225   | K    | 27.5              | 0.002                  |
| VCAS080518C400 __ | 18                  | 13                  | 25.5±10%       | 42             | 1               | 10             | 0.3            | 1               | 120            | 550   | K    | 27.5              | 0.007                  |
| VCAS120618A400 __ | 18                  | 13                  | 25.5±10%       | 42             | 1               | 10             | 0.1            | 0.5             | 30             | 350   | K    | 27.5              | 0.002                  |
| VCAS120618D400 __ | 18                  | 13                  | 25.5±10%       | 42             | 1               | 10             | 0.4            | 1.5             | 150            | 900   | K    | 27.5              | 0.008                  |
| VCAS120618E380 __ | 18                  | 13                  | 25.5±10%       | 38             | 1               | 10             | 0.5            | 1.5             | 200            | 930   | K    | 27.5              | 0.010                  |
| VCAS121018J390 __ | 18                  | 13                  | 25.5±10%       | 42             | 5               | 10             | 1.6            | 3               | 500            | 3100  | K    | 27.5              | 0.030                  |
| VCAS060326A580 __ | 26                  | 18                  | 34.5±10%       | 60             | 1               | 10             | 0.1            | 0.1             | 30             | 155   | K    | 27.5              | 0.002                  |
| VCAS080526A580 __ | 26                  | 18                  | 34.5±10%       | 60             | 1               | 10             | 0.1            | 0.15            | 30             | 120   | K    | 27.5              | 0.002                  |
| VCAS080526C580 __ | 26                  | 18                  | 34.5±10%       | 60             | 1               | 10             | 0.3            | 0.5             | 100            | 250   | K    | 27.5              | 0.006                  |
| VCAS120626D580 __ | 26                  | 18                  | 34.5±10%       | 60             | 1               | 10             | 0.4            | 1               | 120            | 500   | K    | 27.5              | 0.008                  |
| VCAS120626F540 __ | 26                  | 18                  | 33.0±10%       | 54             | 1               | 15             | 0.7            | 1.5             | 200            | 600   | K    | 27.5              | 0.008                  |
| VCAS121026H560 __ | 26                  | 18                  | 34.5±10%       | 60             | 5               | 10             | 1.2            | 3               | 300            | 2150  | K    | 27.5              | 0.018                  |
| VCAS060330A650 __ | 30                  | 21                  | 41.0±10%       | 67             | 1               | 10             | 0.1            | 0.15            | 30             | 125   | K    | 29                | 0.002                  |
| VCAS080530A650 __ | 30                  | 21                  | 41.0±10%       | 67             | 1               | 10             | 0.1            | 0.15            | 30             | 90    | M    | 29                | 0.002                  |
| VCAS080530C650 __ | 30                  | 21                  | 41.0±10%       | 67             | 1               | 10             | 0.3            | 0.5             | 80             | 250   | K    | 29                | 0.005                  |
| VCAS120630D650 __ | 30                  | 21                  | 41.0±10%       | 67             | 1               | 10             | 0.4            | 1               | 120            | 400   | K    | 29                | 0.008                  |
| VCAS121030H620 __ | 30                  | 21                  | 41.0±10%       | 67             | 5               | 10             | 1.2            | 3               | 280            | 1850  | K    | 29                | 0.018                  |
| VCAS121030S620 __ | 30                  | 21                  | 41.0±10%       | 67             | 5               | 10             | 1.9            | 3               | 300            | 1500  | K    | 29                | 0.038                  |
| VCAS080531C650 __ | 31                  | 25                  | 39.0±10%       | 65             | 1               | 10             | 0.3            | 0.5             | 80             | 250   | K    | 29                | 0.005                  |
| VCAS120631M650 __ | 31                  | 25                  | 39.0±10%       | 65             | 1               | 15             | 1              | 1.5             | 200            | 500   | K    | 29                | 0.008                  |
| VCAS120634N770 __ | 34                  | 30                  | 47.0±10%       | 77             | 1               | 15             | 1.1            | 1.5             | 200            | 400   | K    | 48                | 0.008                  |
| VGAS121034S770 __ | 34                  | 30                  | 47.0±10%       | 77             | 2.5             | 15             | 2              | 3.0             | 400            | 1000  | K    | 48                | 0.040                  |
| VGAS181234U770 __ | 34                  | 30                  | 47.0±10%       | 77             | 5               | 15             | 5              | 6.1             | 800            | 1500  | K    | 48                | 0.080                  |
| VGAS222034Y770 __ | 34                  | 30                  | 47.0±10%       | 77             | 10              | 15             | 12             | 25              | 2000           | 6300  | K    | 48                | 0.240                  |
| VCAS080538C770 __ | 38                  | 30                  | 47.0±10%       | 77             | 1               | 10             | 0.3            | -               | 80             | 200   | K    | 48                | 0.006                  |
| VCAS120642L800 __ | 42                  | 32                  | 51.0±10%       | 80             | 1               | 15             | 0.8            | -               | 180            | 600   | K    | 48                | 0.016                  |
| VCAS120642K900 __ | 42                  | 32                  | 56±10%         | 90             | 1               | 15             | 0.6            | -               | 200            | 260   | K    | 48                | 0.012                  |
| VCAS120645K900 __ | 45                  | 35                  | 56±10%         | 90             | 1               | 25             | 0.6            | -               | 200            | 260   | K    | 48                | 0.012                  |
| VCAS120648D101 __ | 48                  | 34                  | 62.0±10%       | 100            | 1               | 10             | 0.4            | -               | 100            | 225   | K    | 48                | 0.008                  |
| VCAS121048H101 __ | 48                  | 34                  | 62.0±10%       | 100            | 1               | 10             | 1.2            | -               | 250            | 500   | K    | 48                | 0.022                  |
| VCAS120656F111 __ | 56                  | 40                  | 68.0±10%       | 110            | 1               | 15             | 0.7            | -               | 100            | 180   | K    | 48                | 0.014                  |
| VCAS120660M131 __ | 60                  | 50                  | 82.0±10%       | 135            | 1               | 15             | 1              | -               | 150            | 250   | K    | 48                | 0.008                  |
| VCAS121060J121 __ | 60                  | 42                  | 76±10%         | 120            | 5               | 10             | 1.5            | -               | 250            | 400   | K    | 48                | 0.03                   |
| VGAS121065P131 __ | 65                  | 50                  | 82±10%         | 135            | 2.5             | 15             | 2.7            | -               | 350            | 600   | K    | 48                | 0.05                   |
| VCAS121085S151 __ | 85                  | 60                  | 100.0±10%      | 150            | 1               | 35             | 2              | -               | 250            | 275   | K    | 48                | 0.040                  |

V<sub>W</sub>(DC) DC Working Voltage [V]  
V<sub>W</sub>(AC) AC Working Voltage [V]  
V<sub>B</sub> Typical Breakdown Voltage [V @ 1mA<sub>DC</sub>]  
V<sub>C</sub> Clamping Voltage [V @ I<sub>W</sub>]  
I<sub>VC</sub> Test Current for V<sub>C</sub>  
I<sub>L</sub> Maximum leakage current at the working voltage [μA]

E<sub>T</sub> Transient Energy Rating [J, 10x1000μs]  
I<sub>P</sub> Peak Current Rating [A, 8x20μs]  
Cap Typical capacitance [pF] @ frequency specified and 0.5V<sub>RMS</sub>  
V<sub>Jump</sub> Jump Start (V)  
P Power Dissipation (W)

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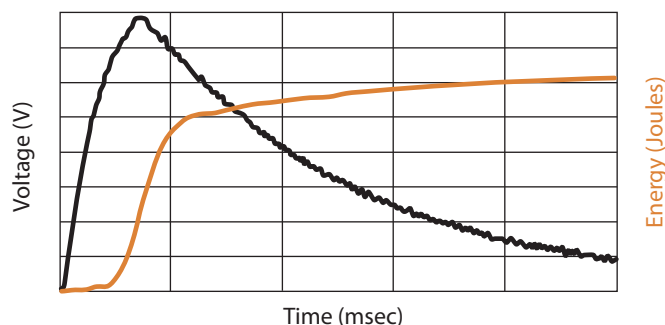
## Multilayer Varistors for Automotive Applications



### AUTOMOTIVE SERIES – LOAD DUMP TEST

According to ISO DP7637 rev 2 Pulse 5

**Automotive Load Dump Pulse  
(According to ISO 7637 Pulse 5)**



When using the test method indicated below, the amount of Energy dissipated by the varistor must not exceed the Load Dump Energy value specified in the product table.

### LOAD DUMP LIBRARY

Typical max Vz versus Pulse duration and Ri

#### 12V SYSTEMS

| VCAS060316B400 | 0.5Ω | 1Ω | 4Ω |
|----------------|------|----|----|
| 100ms          | 37   | 38 | 42 |
| 200ms          | 36   | 37 | 41 |
| 400ms          | 35   | 36 | 39 |
| VCAS120616K380 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 42   | 45 | 55 |
| 200ms          | 40   | 43 | 50 |
| 400ms          | 39   | 40 | 45 |
| VCAS121016J390 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 48   | 53 | 74 |
| 200ms          | 46   | 50 | 64 |
| 400ms          | 43   | 46 | 56 |
| VGAS181216P400 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 46   | 52 | 72 |
| 200ms          | 37   | 41 | 59 |
| 400ms          | 32   | 35 | 51 |
| VGAS222016Y400 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 53   | 60 | 77 |
| 200ms          | 50   | 55 | 73 |
| 400ms          | 47   | 50 | 66 |
| VCAS040218X400 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 38   | 39 | 40 |
| 200ms          | 37   | 37 | 38 |
| 400ms          | 34   | 35 | 36 |
| VCAS060318A400 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 37   | 38 | 42 |
| 200ms          | 36   | 37 | 41 |
| 400ms          | 35   | 36 | 39 |
| VCAS080518A400 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 37   | 39 | 40 |
| 200ms          | 35   | 38 | 39 |
| 400ms          | 33   | 37 | 38 |
| VCAS080518C400 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 40   | 41 | 48 |
| 200ms          | 39   | 40 | 45 |
| 400ms          | 38   | 39 | 42 |
| VCAS120618A400 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 43   | 45 | 55 |
| 200ms          | 41   | 43 | 48 |
| 400ms          | 40   | 41 | 45 |
| VCAS120618D400 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 42   | 45 | 55 |
| 200ms          | 40   | 42 | 50 |
| 400ms          | 39   | 40 | 45 |
| VCAS120618E380 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 42   | 45 | 55 |
| 200ms          | 40   | 43 | 50 |
| 400ms          | 39   | 40 | 45 |
| VCAS121018J390 | 0.5Ω | 1Ω | 4Ω |
| 100ms          | 48   | 53 | 74 |
| 200ms          | 46   | 50 | 64 |
| 400ms          | 43   | 46 | 56 |

#### 24V SYSTEMS

| VCAS060326A580 | 0.5Ω | 1Ω  | 4Ω  |
|----------------|------|-----|-----|
| 100ms          | 51   | 56  | 58  |
| 200ms          | 50   | 54  | 56  |
| 400ms          | 49   | 51  | 53  |
| VCAS080526A580 | 0.5Ω | 1Ω  | 4Ω  |
| 100ms          | 51   | 53  | 59  |
| 200ms          | 49   | 51  | 57  |
| 400ms          | 48   | 50  | 51  |
| VCAS080526C580 | 0.5Ω | 1Ω  | 4Ω  |
| 100ms          | 51   | 54  | 62  |
| 200ms          | 49   | 51  | 56  |
| 400ms          | 48   | 49  | 51  |
| VCAS120626D580 | 0.5Ω | 1Ω  | 4Ω  |
| 100ms          | 52   | 60  | 68  |
| 200ms          | 50   | 57  | 65  |
| 400ms          | 47   | 54  | 61  |
| VCAS121026H560 | 0.5Ω | 1Ω  | 4Ω  |
| 100ms          | 61   | 74  | 91  |
| 200ms          | 59   | 69  | 82  |
| 400ms          | 55   | 64  | 70  |
| VCAS060330A650 | 0.5Ω | 1Ω  | 4Ω  |
| 100ms          | 57   | 59  | 63  |
| 200ms          | 56   | 58  | 61  |
| 400ms          | 54   | 57  | 58  |
| VCAS080530A650 | 0.5Ω | 1Ω  | 4Ω  |
| 100ms          | 58   | 62  | 66  |
| 200ms          | 56   | 61  | 64  |
| 400ms          | 53   | 57  | 61  |
| VCAS080530C650 | 0.5Ω | 1Ω  | 4Ω  |
| 100ms          | 58   | 61  | 63  |
| 200ms          | 57   | 58  | 62  |
| 400ms          | 55   | 56  | 59  |
| VCAS120630D650 | 0.5Ω | 1Ω  | 4Ω  |
| 100ms          | 61   | 70  | 75  |
| 200ms          | 57   | 66  | 69  |
| 400ms          | 56   | 62  | 64  |
| VCAS121030H620 | 0.5Ω | 1Ω  | 4Ω  |
| 100ms          | 70   | 77  | 98  |
| 200ms          | 64   | 70  | 89  |
| 400ms          | 56   | 65  | 70  |
| VGAS181234U770 | 1Ω   | 4Ω  | 8Ω  |
| 100ms          | 87   | 110 | 125 |
| 200ms          | 82   | 97  | 114 |
| 400ms          | 75   | 85  | 95  |
| VGAS222034Y770 | 1Ω   | 4Ω  | 8Ω  |
| 100ms          | 100  | 125 | 165 |
| 200ms          | 91   | 115 | 155 |
| 400ms          | 84   | 104 | 120 |



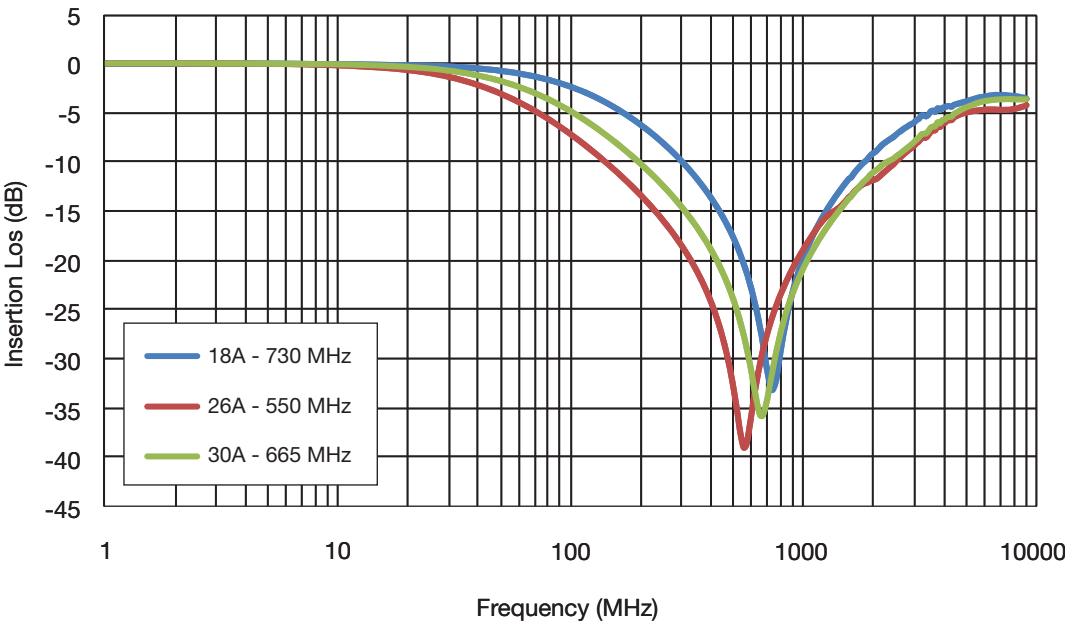
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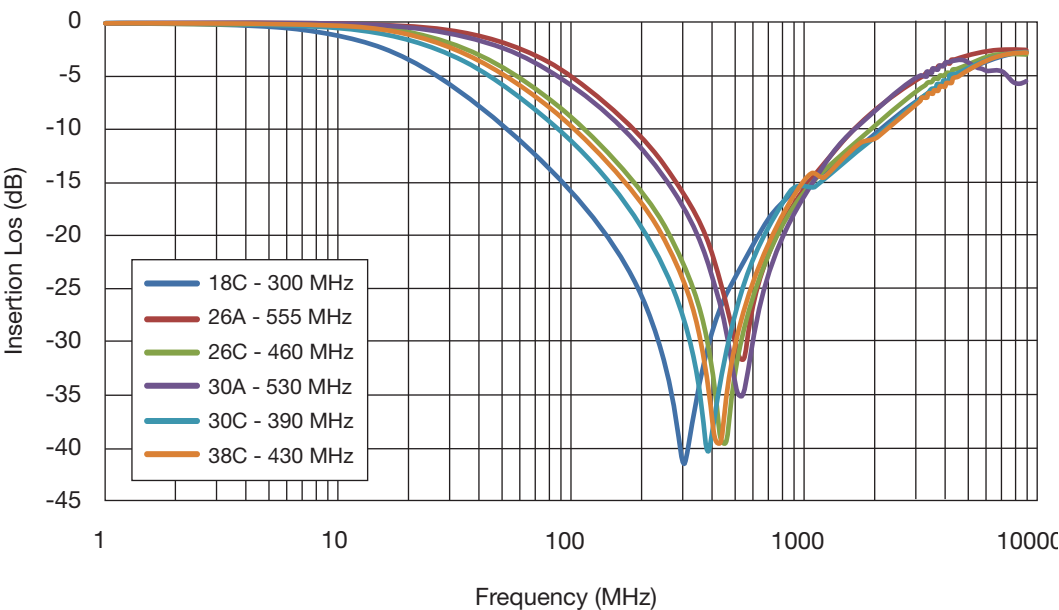
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### FORWARD TRANSMISSION CHARACTERISTICS (S21)

0603 Case Size



0805 Case Size

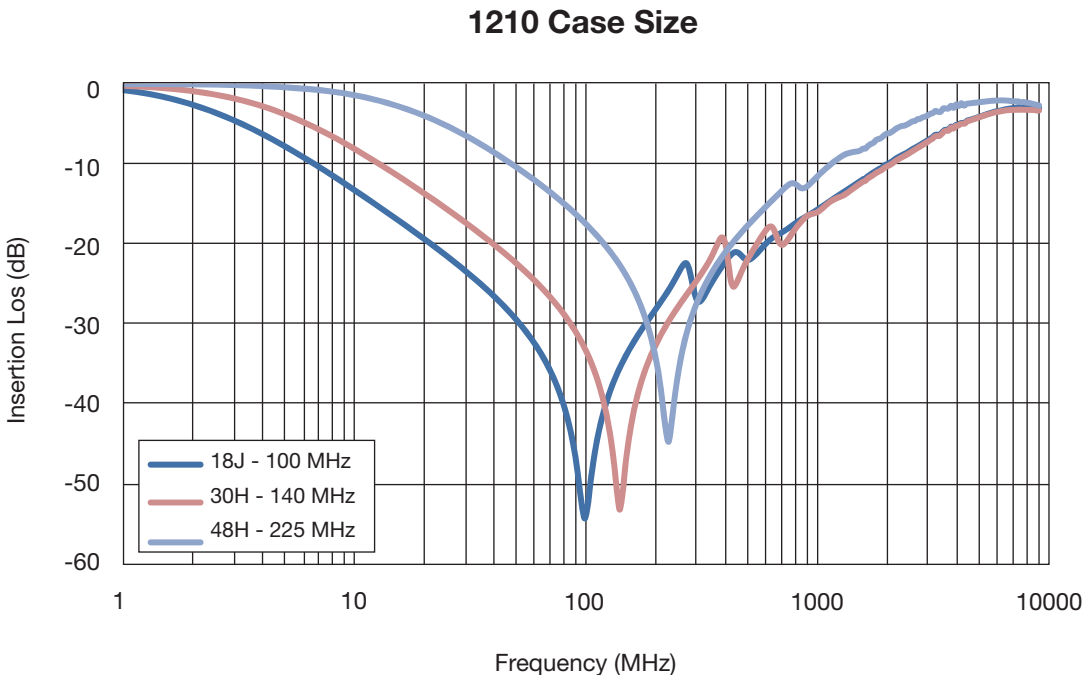
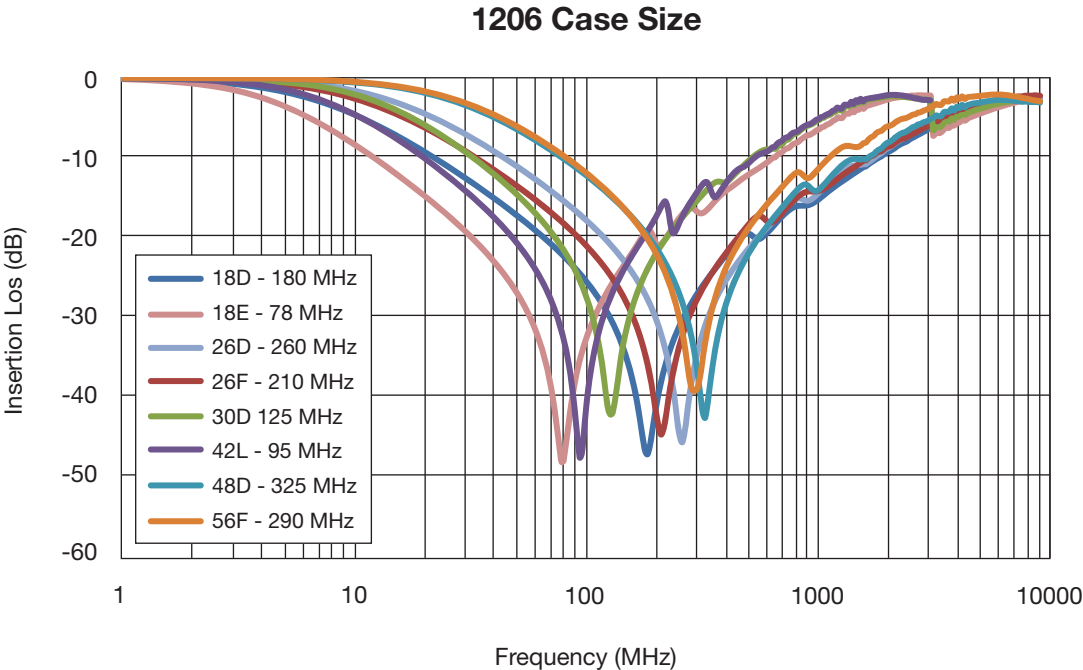


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## Multilayer Varistors for Automotive Applications



### FORWARD TRANSMISSION CHARACTERISTICS (S21)



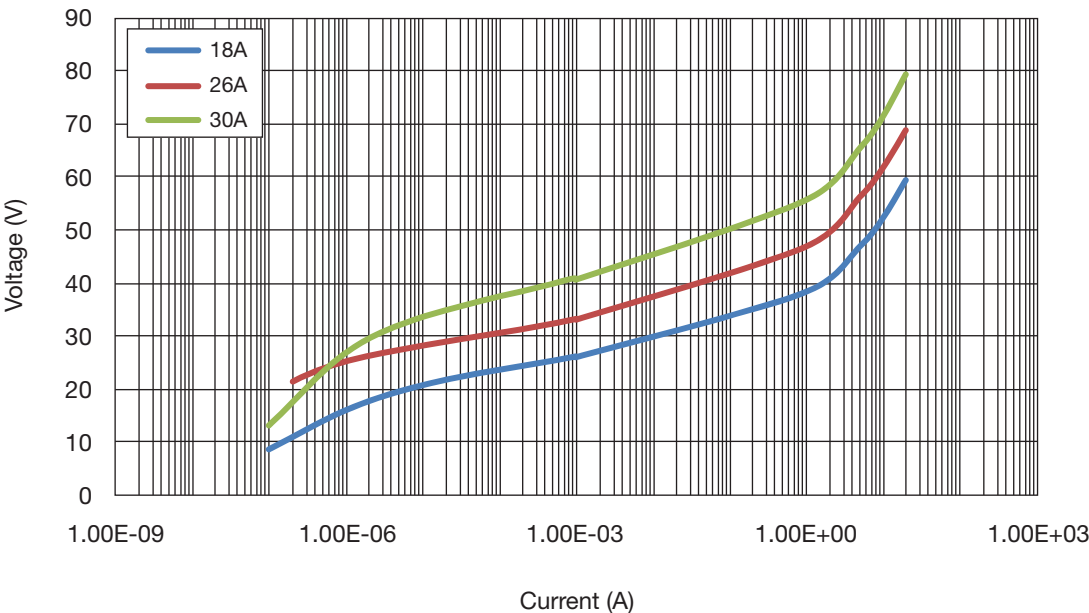
# TransGuard® Automotive Series

## Multilayer Varistors for Automotive Applications

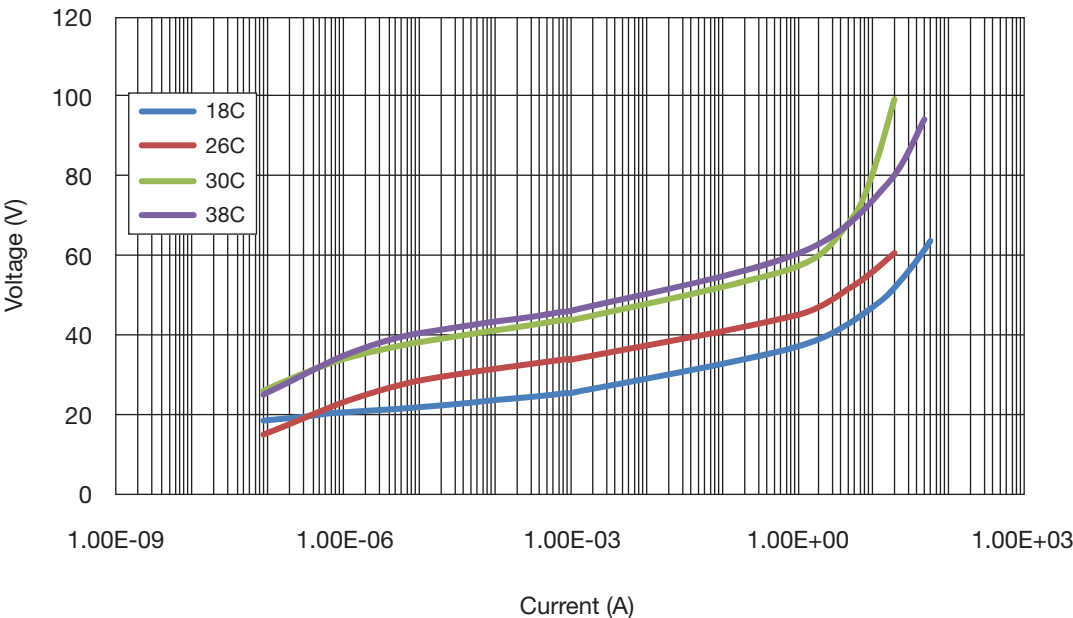


### V-I CHARACTERISTICS

0603 Case Size



0805 Case Size



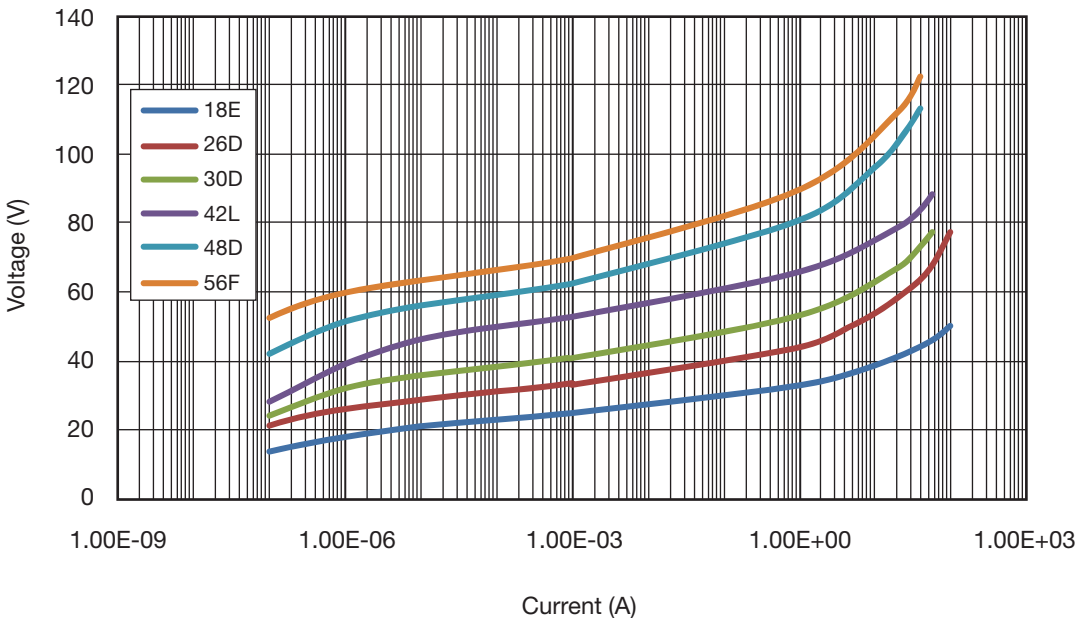
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## Multilayer Varistors for Automotive Applications

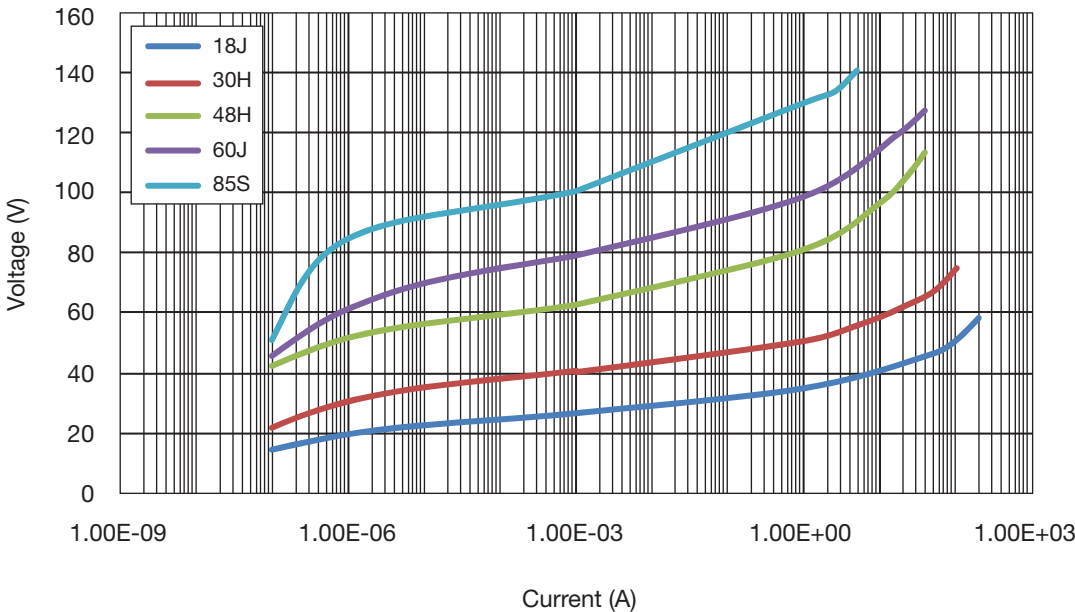


### V-I CHARACTERISTICS

1206 Case Size



1210 Case Size

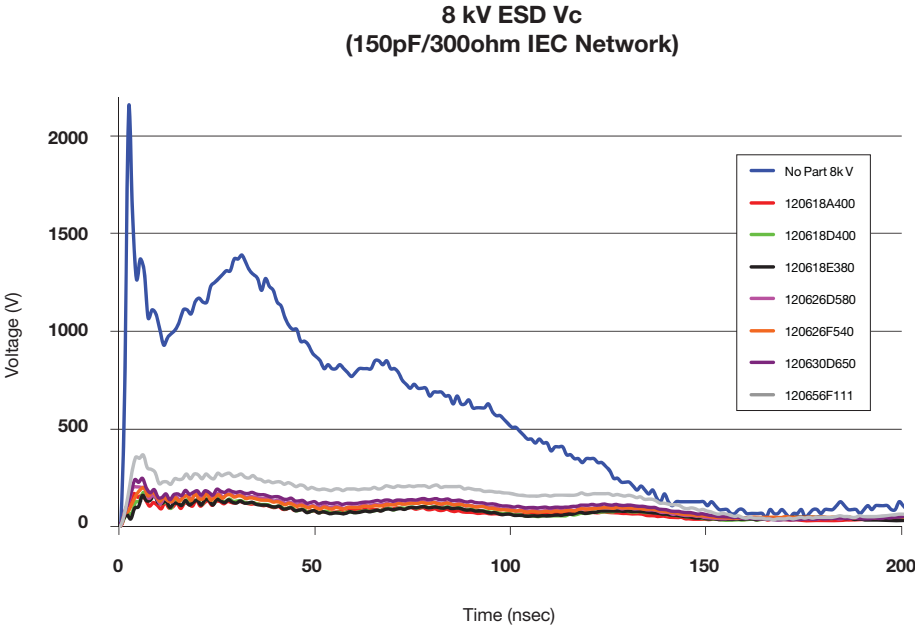


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## Multilayer Varistors for Automotive Applications



### ESD V-I CHARACTERISTICS



### TYPICAL VOLTAGE AT 8 KV PULSE

| 8kV Pulse                   | Peak Voltage (V) | 30ns Voltage (V) | 100ns Voltage (V) |
|-----------------------------|------------------|------------------|-------------------|
| No Part<br>(No Suppression) | 2130             | 1370             | 517               |
| 120618A400                  | 171              | 123              | 65                |
| 120618D400                  | 177              | 133              | 66                |
| 120618E380                  | 161              | 121              | 63                |
| 120626D580                  | 203              | 155              | 88                |
| 120626F540                  | 201              | 159              | 84                |
| 120630D650                  | 249              | 177              | 106               |
| 120656F111                  | 366              | 262              | 169               |

**ESD 8 kV IEC 61000-4-2 150pF / 330Ω Resistor**  
**VC060318A400**

