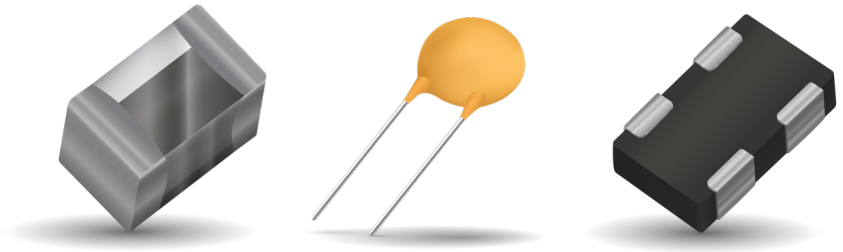
# TECHNICAL PAPER

## Circuit Protection and Signal Integrity Capability Guide



KYOCERA AVX

# Applications Guide

## Circuit Protection & Signal Integrity

| AVX PRODUCTS | Fast Blow SMT Fuse (Surface Mount Fuse) | SMT Broadband LCT Filter (Feedthru) | SMT Broadband LCT Filter Array (Feedthru Array) | SMT High Current Broadband LCT Filter (High Current Feedthru) | SMT Bidirectional Transient Voltage Suppressors & EMI Filters (TransGuard) | SMT Bidirectional Transient Voltage Suppressors & EMI Filters Arrays (MultiGuard) | Low Capacitance SMT Bidirectional Transient Voltage Suppressors & EMI Filters (StaticGuard) | SMT Bidirectional LCT Transient Voltage Suppressor Filters (TransFeed) | Low Capacitance Bidirectional Transient Voltage Suppressors (AntennaGuard) | Bidirectional Transient Voltage Suppressors for Low, Medium & High Speed CAN Networks (CAN BUS Series) | Bidirectional Transient Voltage Suppressors for USB Applications (USB Series) | Bidirectional Transient Voltage Suppressors for Low Leakage CMOS Applications (UltraGuard) | Bidirectional Transient Voltage Suppressors High Energy Transients (Medium Power MLV) | Bidirectional Transient Voltage Suppressors for Jump Start Auto Applications (Medium Power MLV) | Bidirectional Transient Voltage Suppressors for Load Dump & Applications (Medium Power Automotive Series) | Leaded Negative Temperature Coefficient Thermistors (Medium Power MLV for Telecom) | SMT Negative Temperature Coefficient Thermistors (Medium Power Automotive Series) | General Purpose Radial Leaded Power MOV (Metal Oxide Varistors) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **APPLICATIONS** | | | | | | | | | | | | | | | | | | |
| ESD | | | | | | | X | | X | X | X | | | | | | | |
| In Rush Current Limit | | | | | | | | | | | | | | | | X | X | |
| Long Wave Transient | | | | | X | X | | X | | | | | X | X | X | | | X |
| EMI Filtering | | X | X | X | | | | | | | | | | | | | | |
| EMI Filtering + Transient | | | | | X | X | X | X | X | X | X | X | X | X | X | | | |
| Load Dump | | | | | X | | | | | | | | | X | | | | |
| Automotive | | X | | X | X | X | X | X | X | X | | | | X | | X | X | |
| Mil Std 461-E | | | | | X | | | | | | | | | | | | | |
| ISO 7637 | | | | | X | | | | | | | | | X | | | | |
| IEC 61000 | | | | | X | X | X | X | X | X | X | X | X | | | | | X |
| Telecom Protection | | | | | X | | | | | | | | | | X | | | |
| Over Current Protection | X | | | | | | | | | | | | | | | | | |
| Diode Replacement | | | | | X | X | X | | | X | X | X | X | | | | | |
| Zener Replacement | | | | | X | X | X | | | X | X | X | X | | | | | |
| Military A-A-55682 | | | | | X | | | | | | | | | | | | | |
| Radiation Resistance | | | | | X | X | | | | | | | | | | | | |
| Industrial | | X | | X | X | X | X | X | | X | X | | X | | | X | | X |
| UL 1449 | | | | | | | | | | | | | | | | | | X |
| UL 1414 | | | | | | | | | | | | | | | | | | X |
| Medical (EN 60601) | | X | | | X | | | | | | | | | | | | | |
| High Speed Data Line Protection | | | | | | | | | X | | X | | | | | | | |
| Optic Transceiver Protection | | | | | | | | | X | | X | | | | | | | |
| Temperature Sensing | | | | | | | | | | | | | | | | X | X | |
| Low Leakage Circuit | | | | | | | | | | | | X | | | | | | |
| **DATA** | | | | | | | | | | | | | | | | | | |
| Data Sheet | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Application Notes | | X | X | X | X | X | X | | X | X | X | | X | | | X | X | X |
| Reliability Data | | X | | | X | | | | | | | | | | | | | |
| Distributed Element Model | | | | | X | X | X | X | X | X | X | X | X | X | | | | |
| Frequency Response | | X | X | X | X | X | X | X | X | X | X | | X | | | | | |

# Product Capability Chart

## Circuit Protection & Signal Integrity

### Fast Blow SMT Fuse (Surface Mount Fuse)

0402 | 0603 | 0805 | 1206

### SMT Broadband LCT Filter (Feedthru)

0805 | 1206

### SMT Broadband LCT Filter Array (Feedthru Array)

0508 | 0612

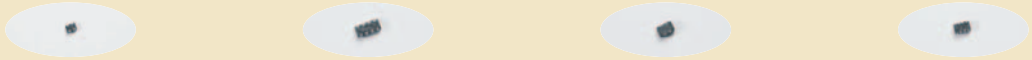
### SMT High Current Broadband LCT Filter (High Current Feedthru)

0805 | 0612

### SMT Bidirectional Transient Voltage Suppressors & EMI Filters (TransGuard)

0402 | 0603 | 0805 | 1206 | 1210 | 1812 | 2220

### SMT Bidirectional Transient Voltage Suppressors & EMI Filters Arrays (MultiGuard)



0405 | 0612 | 0508 (2E) | 0508 (4E)

### Low Capacitance SMT Bidirectional Transient Voltage Suppressors & EMI Filters (StaticGuard)

0402 | 0603 | 0805 | 1206 | 0405 | 0508 | 0612

### SMT Bidirectional LCT Transient Voltage Suppressor Filters (TransFeed)

0805 | 0612

### Low Capacitance Bidirectional Transient Voltage Suppressors (AntennaGuard)



0402 | 0603

### Bidirectional Transient Voltage Suppressors for Low, Medium & High Speed CAN Networks (CAN BUS)

0603 | 0405 | 0612

# Product Capability Chart

## Circuit Protection & Signal Integrity

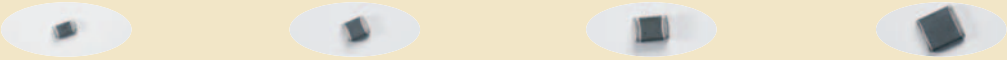
### Bidirectional Transient Voltage Suppressors for USB Applications (USB Series)

0402 | 0603 | 0405 | 0508 | 0612

### Bidirectional Transient Voltage Suppressors for Low Leakage CMOS Applications (UltraGuard)

0402 | 0603 | 0805 | 1206 | 0405 | 0612

### Bidirectional Transient Voltage Suppressors for High Energy Transients (Medium Power MLV)

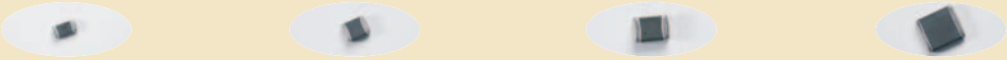


1206 | 1210 | 1812 | 2220

### Bidirectional Transient Voltage Suppressors for Load Dump & Jump Start Auto Applications

1206 | 1210 | 1812 | 2220

### Bidirectional Transient Voltage Suppressors for Telecom Applications (Medium Power MLV for Telecom)

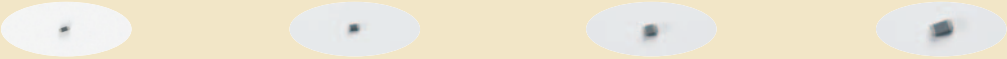


1206 | 1210 | 1812 | 2220

### Leaded Negative Temperature Coefficient Thermistors

ND03 | ND06 | ND09

### SMT Negative Temperature Coefficient Thermistors



0402 | 0603 | 0805 | 1206

### General Purpose Radial Leaded Power MOV (Metal Oxide Varistors)

VE07 | VE09 | VE13 | VE17 | VE24

For all the latest information on innovations from AVX Corporation, visit our website at www.avx.com

# Terminology Guide

## Circuit Protection & Signal Integrity

**Fast Blow SMT Fuse (Surface Mount Fuse)**
High accuracy, fast blow, surface mount fuses. Case sizes: 0402, 0603, 0805, 1206, 0612. Current ratings 250 mA to 5 Amps.

**SMT Broadband LCT Filter (Feedthru)**
Miniature surface mount broadband LC T configuration EMI filters. FeedThru current ratings to 300 mA.

**SMT Broadband LCT Filter Array (Feedthru Array)**
Miniature surface mount broadband 4 element LC T configuration EMI filter arrays. FeedThru current ratings of 300 mA.

**SMT High Current Broadband LCT Filter (High Current Feedthru)**
High current, surface mount, broadband LC T configuration filters. Feedthru currents up to 5 Amps.

**SMT Bidirectional Transient Voltage Suppressors & EMI Filters (TransGuard)**
Miniature surface mount, bidirectional transient voltage suppressor. Steady state operating voltages of 3.3 volts to 60 volts. Case sizes: 0402, 0603, 0805, 1206, 1210, 1812, 2220.

**SMT Bidirectional Transient Voltage Suppressors & EMI Filter Arrays (MultiGuard)**
Miniature surface mount bidirectional transient voltage suppressor 2 or 4 element arrays. Steady state operating voltages of 5.6 volts to 18 volts. Case sizes: 0405, 0508, 0612.

**Low Capacitance SMT Bidirectional Transient Voltage Suppressors & EMI Filters (StaticGuard)**
Bidirectional transient voltage suppressor intended for low leakage CMOS based IC protection. Can be operated at voltages up to 18V. Case sizes: 0402, 0405, 0508, 0603, 0612, 0805, 1206.

**SMT Bidirectional LCT Transient Voltage Suppressor Filters (TransFeed)**
Miniature bidirectional transient voltage suppressor filter LC T configuration. Relatively narrow band, high attenuation filter. Discrete filter in 0508 package, 4 element array filter in 0612 package.

**Low Capacitance Bidirectional Transient Voltage Suppressors (AntennaGuard)**
Low capacitance, bidirectional transient voltage suppressor intended for high speed or high frequency applications. Available in 0402 and 0603 case sizes. Capacitance values of 3 pF and 12 pF available.

**Bidirectional Transient Voltage Suppressors for Low, Medium & High Speed CAN Networks (CAN BUS Series)**
Bidirectional transient voltage suppressor intended for high speed and slow speed CAN circuitry. Available configurations: 0603 discrete, 0405 two element array, 0612 four element array.

**Bidirectional Transient Voltage Suppressors for USB Applications (USB Series)**
Bidirectional transient voltage suppressor intended for Universal Serial Bus applications. Available configurations: 0402 and 0603 discrete; 0405 two element array; 0508 three element array; 0612 four element array.

**Bidirectional Transient Voltage Suppressors for Low Leakage CMOS Applications (UltraGuard)**
Low leakage, bidirectional transient voltage suppressor intended for CMOS battery powered designs. Steady state operating voltages of 3, 5, 7, 10 and 15 volts (DC). Available configurations: 0402, 0603 and 0805 discrete; 0405 two element array; 0508 and 0612 four element array.

**Bidirectional Transient Voltage Suppressors for High Energy Transients (Medium Power MLV)**
Medium power, bidirectional transient voltage suppressor. Available in operating voltages of: 18, 26, 30, 48, 60 volts (DC). Case sizes: 1206, 1210, 1812, 2220. Energy ratings 0.9 to 1.5 joules.

**Bidirectional Transient Voltage Suppressors for Load Dump & Jump Start Auto Applications (Medium Power Automotive Series)**
Medium power, bidirectional transient voltage suppressor. Available in operating voltages of: 16 and 34 volts (DC). Case sizes: 1206, 1210, 1812, 2220. Energy ratings 0.6 to 12 joules. Load dump and jump start rated.

**Bidirectional Transient Voltage Suppressors for Telecom Applications (Medium Power MLV for Telecom)**
Medium power, bidirectional transient voltage suppressor. Available in operating voltages of: 60 and 90 Vrms in 1812 case size. Energy ratings of 5 and 6 joules. CCITT 10x700µs 2kV capable.

**Leaded Negative Temperature Coefficient Thermistors**
Negative temperature coefficient thermistors high accuracy NTCs from 2k ohm to 100k ohm, general purpose NTCs from 10 ohms to 1 meg ohm, inrush current limiters from 1 ohm to 120 ohms. Stud mounted NTCs from 10 ohms to 330 k ohms.

**SMT Negative Temperature Coefficient Thermistors**
Surface mount negative temperature coefficient thermistor in 0402, 0603, 0805 and 1206 case sizes.

**General Purpose Radial Leaded Power MOV (Metal Oxide Varistors)**
Radial Metal Oxide varistors 11 Vrms to 625 Vrms. Energy ratings to >500 J. Peak current ratings to 10,000 A.

**NORTH AMERICA**
Tel: +1 864-967-2150

**ASIA**
Tel: +65 6286-7555

**CENTRAL AMERICA**
Tel: +55 11-46881960

**EUROPE**
Tel: +44 1276-697000

**JAPAN**
Tel: +81 740-321250



WWW.KYOCERA-AVX.COM