HIGH RELIABILITY, DEFENSE & SPACE APPLICATIONS

CERAMIC CAPACITORS | TANTALUM & POLYMER CAPACITORS | EMI FILTERS | THIN FILM CAPACITORS & INDUCTORS | ESTABLISHED RELIABILITY PRODUCTS
ABOUT AVX

High Reliability Products for Demanding Applications

AVX Corporation is a leading supplier of advanced components and interconnect solutions, offering the world’s broadest selection of passive components and connectors.

The company has over 30 years experience in producing industry-leading, high-reliability passive components, offering an expanding range of products for defense, aerospace, space, and other high reliability industries.

AVX currently has 11 factories in Europe and USA qualified to AS9100, IECQ-CECC, TS16949-2009 and ISO 9001-2008 standards. The company also has a number of products qualified to COTS+, ESCC, SRC, MIL and DSCC drawings, as well as optional custom screening and test service capabilities.

As a technology leader, AVX will continue to add to its product portfolio on a regular basis. Details of new devices being offered and their specifications will be shown on the AVX website, www.avx.com

## HIGH RELIABILITY PRODUCTS

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<tr>
<th>MIL-PRF &amp; T-Space Level</th>
<th>SMD Ceramic Capacitors • Leaded Ceramic Capacitors • SMPS Capacitors • SMD Tantalum • EMI Filters Wet Tantalum Capacitors</th>
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<tr>
<td>DSCC/DLA</td>
<td>SMD Ceramic Capacitors • Leaded Ceramic Capacitors • SMPS Capacitors • Wet Tantalum Capacitors Leaded Ceramic Capacitors Array (SIP) • SMD Tantalum • Thin Film Capacitors and Inductors</td>
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<td>NASA</td>
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<td>ESA/ESCC</td>
<td>SMD Ceramic Capacitors • Leaded Ceramic Capacitors • SMPS Capacitors • SMD Tantalum</td>
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<td>CECC</td>
<td>SMD Ceramic Capacitors • Leaded Ceramic Capacitors • SMD Tantalum • Tantalum Leded</td>
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<tr>
<td>COTS-Plus</td>
<td>SMD Ceramic Capacitors • Wet Tantalum Capacitors • SMD Tantalum • SMD Polymer</td>
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<tr>
<td>BS9100</td>
<td>Leaded Ceramic Capacitors • SMPS Capacitors • Wet Tantalum Capacitors • SMD Tantalum</td>
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</table>
CERAMIC CAPACITORS

SURFACE MOUNT CERAMIC CAPACITORS

NASA

- QPL BME technology available
- High CV technology enabling case size downsizing, PCB weight and size reduction
- FLEXITERM® for enhanced mechanical stress resistance available for BME
- SnPb termination for BME

Oper. Temp: -55°C to +125°C
Case: 0603 - 2220
Voltage: 16V - 100V
Capacitance: 2.2 nF - 8.2μF

NASA S-311-P-838

ESA ESCC QPL

- QPL BME and PME technologies available
- Low ESR / ESL compared to other technologies
- FLEXITERM® for enhanced mechanical stress resistance available for BME
- PdP/Ag or SnPb terminations for PME, SnPb termination for BME

Oper. Temp: -55°C to +125°C
Case: 0402 - 2220
Voltage: 16V - 3kV
Capacitance: 2.2nF - 22μF

ESCC 3009 • ESA 3009034
ESCC 3009041

CECC

- PME technology available
- NP0 and X7R technologies available
- Terminations; Hybrid, Ni/SnPb, Ni/Sn
- Burn in options available from 0/48/96/168 hours
- Capacitance Tolerance from 1% to 20% available

Oper. Temp: -55°C to +125°C
Case: Radial
Voltage: 25V – 500V
Capacitance: 4.7pF – 1.5μF

CECC 32101 • CECC 32100

MIL PRF 32535

- MIL-PRF and T-Space Levels available
- Higher CV capability for PCB weight/size reduction
- Flexiterm® technology for greater protection
- Max cap value 22μF
- Termination with SnPb

Oper. Temp: -55°C to +150°C
Case: 0402 – 2225
Voltage: 10V – 100V
Capacitance: 2.2nF – 22μF

MIL PRF 32535

HIGH TEMPERATURE AT RANGE

- Max Temperature Range 250°C
- Terminations Pd/Ag, Sn, Ni/Au
- Dielectrics: VHT (Class II) and C0G/NP0 (Class I)
- Uses PME and BME technologies for maximum capacitance ranges

Oper. Temp: -55°C to +250°C
Case: 0603 – 2225
Voltage: 10V – 50V
Capacitance: 2.2nF – 1μF

MIL STD 202

MIL / DSCC / DLA / COTS-PLUS

- MIL/DSCC dielectrics BP, BG and where wider variation can be accepted, BX, BR
- APS COTS Plus dielectrics NP0, X7R, X8R/L
- Low ESR / ESL compared to other technologies
- Au, PdAg, Tin Lead or Pure Tin terminations available
- APS COTS Plus X7R available with Flexiterm®

Oper. Temp: -55°C to +150°C
Case: 0402 – 2225
Voltage: 10V – 500V
Capacitance: 0.1pF – 22uF

MIL PRF 123 • MIL PRF 55681 (CDR)
APS COTS + DSCC 03029 (0402)
DSCC 03028 (0603) • DSCC 05006 (0805)
DSCC 05007 (1206)

LEADED CERAMIC CAPACITORS

MIL / DSCC / DLA / BS9100

- Excellent reliability and low ESR / ESL compared to other capacitor technologies
- Radial & Axial epoxy encapsulated for harsh environment
- High voltage range 1-5kV also available

Oper. Temp: -55°C to +125°C
Case: Radial, Axial
Voltage: 50V – 5000V
Capacitance: 1pF – 2μF

MIL PRF 20 • MIL PRF 123 • MIL PRF 11015
MIL PRF 39014 • DSCC 87046 • DSCC 87114
DSCC 87081 • DSCC 87043 • DSCC 87047
DSCC 87040 • DSCC 87076 • DSCC 87077
DSCC 89044 • DSCC 87070 • BS9100

ESA ESCC / CECC

- QPL PME technologies available
- Excellent reliability and low ESR / ESL compared to other capacitor technologies
- High voltage range 1-5kV also available
- A range of lead types: Loaded Radial (Epoxy coated, Polyurethane Varnish), Straight Dual in Line, L Dual in Line

Oper. Temp: -55°C to +125°C
Case: Radial
Voltage: 50V – 5000V
Capacitance: 820pF – 180μF

ESCC 3001030 • ESA 3001034
CECC 30701

MIL PRF 32535

Oper. Temp: -55°C to +125°C
Case: 0603 - 2220
Voltage: 16V - 100V
Capacitance: 2.2 nF - 8.2μF

MIL / DSCC / DLA / BS9100

- Excellent reliability and low ESR / ESL compared to other capacitor technologies
- Radial & Axial epoxy encapsulated for harsh environment
- High voltage range 1-5kV also available

Oper. Temp: -55°C to +125°C
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Voltage: 50V – 5000V
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MIL PRF 39014 • DSCC 87046 • DSCC 87114
DSCC 87081 • DSCC 87043 • DSCC 87047
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- QPL PME technologies available
- Excellent reliability and low ESR / ESL compared to other capacitor technologies
- High voltage range 1-5kV also available
- A range of lead types: Loaded Radial (Epoxy coated, Polyurethane Varnish), Straight Dual in Line, L Dual in Line

Oper. Temp: -55°C to +125°C
Case: Radial
Voltage: 50V – 5000V
Capacitance: 820pF – 180μF

ESCC 3001030 • ESA 3001034
CECC 30701
RF SURFACE MOUNT CERAMIC CAPACITOR

MIL / DSSC / DLA / COTS-PLUS

- High Q ultra low ESR
- High current handling
- High self resonance
- BG and BP dielectrics
- Tight tolerances from ±0.01pF
- Au, PdAg, Tin Lead or Pure Tin terminations

Oper. Temp: -55°C to +125°C
Case: 01005 – 1210
Voltage: 50V – 500V
Capacitance: 0.1pF – 5100pF
MIL PRF 55681 (CDR)
MIL PRF 123 • DSSC 06019 (0605)
DSSC 06022 (1210)

SWITCH MODE POWER SUPPLY CAPACITORS (SMPS)

MIL / DSSC / BS9100

- Designed for programs requiring high reliability performance in harsh environment
- Suitable for high current, high power & high temperature applications
- Low ESR / ESL & excellent high frequency performance compared to other technologies

Oper. Temp: -55°C to +200°C
Case: Stacked
Voltage: 50V – 500V
Capacitance: 0.15µF – 270µF
MIL-PRF-49470 • BS9100
DSSC 87106/88011

ESA ESCC / CECC

- Designed for space based programs requiring ultra-high reliability performance
- Designed for high current, high power applications
- Low ESR / ESL and excellent high frequency performance
- A range of lead types: Leaded Radial (Epoxy coated, Polyurethane Varnish), Straight Dual in Line

Oper. Temp: -55°C to +125°C
Case: Stacked, Radial
Voltage: 50V – 5000V
Capacitance: 820pF – 180µF
ESCC 3001030 • ESCC 3001034
CECC 30701
ESCC 3012 (in preparation)

TANTALUM & POLYMER CAPACITORS

SURFACE MOUNT TANTALUM & POLYMER

MIL / DSSC / DLA / SRC / COTS-PLUS

- TAZ (CWR), TBJ, TBM, TCS, TCP, TCB Series
- Available with MnO2, or polymer cathode in SMD chip case size
- Polymer offers low ESR & higher inrush current robustness
- MnO2, chips & multianodes offer excellent reliability & are qualified to the highest MIL/Space reliability levels

Oper. Temp: -55°C to +105/125°C
Case: SMD
Voltage: 2V – 50V
Capacitance: 0.1µF – 1500µF
MIL-PRF-55365 (CWR)
MIL PRF 55365 (T Level) • SRC9000
DSSC 07016 • DSSC 95158
DSSC 09009 • COTS-Plus

ESA ESCC / CECC

- TES, TAJ, TAJ ESCC
- Long term stability, high capacitance in small case sizes
- Manufactured in EU, ESA qualified plant
- TCS – polymer multianode – ongoing ESA qualification

Oper. Temp: -55°C to +125°C
Case: 3216 – 7343
Voltage: 4V – 50V
Capacitance: 0.1µF – 470µF
ESCC 3012/004 • ESCC 3012/001
CECC 30801-01 • CECC 30801-005

MIL / SRC / COTS-PLUS

- TBC (CWR) microchip
- Available in standard MnO2, SMD chip with case sizes down to 0603
- MnO2, chips offer excellent reliability and parameters stability over temperature, voltage, and time
- Qualified to the highest MIL/Space reliability levels

Oper. Temp: -55°C to +125°C
Case: 0603, 0805, 1206
Voltage: 4V - 20V
Capacitance: 0.47µF - 68µF
COTS-Plus • SRC9000
MIL-PRF-55365/12 (CRW)

ESA EPPL2 (under preparation)

- TCH Low ESR Hermetic Series
- Designed for Aerospace & Hi-Rel applications
- Endurance minimum up to 10,000 hrs. on selected codes
- Excellent stability under humidity and ambient conditions due to ceramic case hermetic packaging
- Effective up-screen testing for high reliability

Oper. Temp: -55°C to +125°C
Case: (CTC-21D)
Voltage: 10V – 100V
Capacitance: 22µF – 330µF
ESCC 3012 (in preparation)
TANTALUM & POLYMER CAPACITORS

WET ELECTROLYTIC TANTALUM

<table>
<thead>
<tr>
<th>SRW / MIL / DSCC / DLA / COTS-PLUS</th>
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<tbody>
<tr>
<td><strong>Oper. Temp:</strong> -55°C to +200/230°C</td>
</tr>
<tr>
<td><strong>Case:</strong> T1, T2, T3, T4, TWM module</td>
</tr>
<tr>
<td><strong>Voltage:</strong> 6V – 125V</td>
</tr>
<tr>
<td><strong>Capacitance:</strong> 2.5μF – 50mF</td>
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<tr>
<td>DSCC 93026 • SRW9000</td>
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<tr>
<td>MIL-PRF-39006 • COTS-Plus</td>
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LEADED TANTALUM

<table>
<thead>
<tr>
<th>CECC</th>
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<tbody>
<tr>
<td><strong>Oper. Temp:</strong> -55°C to +125°C</td>
</tr>
<tr>
<td><strong>Case:</strong> Radial</td>
</tr>
<tr>
<td><strong>Voltage:</strong> 6.3V – 50V</td>
</tr>
<tr>
<td><strong>Capacitance:</strong> 0.1μF – 330μF</td>
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<tr>
<td>CECC 30201-032</td>
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THIN FILM PRODUCTS

RF THIN FILM CAPACITORS

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<th>DLA</th>
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<td><strong>Oper. Temp:</strong> -55°C to +125°C</td>
</tr>
<tr>
<td><strong>Case:</strong> 0402 – 1210</td>
</tr>
<tr>
<td><strong>Capacitance:</strong> 0.06 pF – 68 pF</td>
</tr>
<tr>
<td><strong>Tolerances:</strong> from ±0.01 pF</td>
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<tr>
<td>DLA 09024 (0402)</td>
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<tr>
<td>DLA 09025 (0603)</td>
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<tr>
<td>DLA 09026 (0805)</td>
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<tr>
<td>DLA 09027 (1210)</td>
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RF THIN FILM INDUCTORS

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<th>DLA</th>
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<tbody>
<tr>
<td><strong>Oper. Temp:</strong> -55°C to +125°C</td>
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<tr>
<td><strong>Case:</strong> 0402 – 0805</td>
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<td><strong>Inductance:</strong> 0.56nH – 22nH</td>
</tr>
<tr>
<td><strong>Tolerances:</strong> from ±0.05nH</td>
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<tr>
<td>DLA 11017 (0402)</td>
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<tr>
<td>DLA 11018 (0603)</td>
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<tr>
<td>DLA 11019 (0805)</td>
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EMI FILTERS

<table>
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<th>MIL</th>
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<tr>
<td><strong>Oper. Temp:</strong> -55°C to +125°C</td>
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<tr>
<td><strong>Case:</strong> Axial</td>
</tr>
<tr>
<td><strong>Voltage:</strong> 25V to 400V</td>
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<tr>
<td><strong>Capacitance:</strong> 10pF - 1.2nF</td>
</tr>
<tr>
<td>MIL-PRF-28861 • MIL-PRF-31033</td>
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<td>MIL-STD-202</td>
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ESTABLISHED RELIABILITY PRODUCTS

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<th>Tantalum Capacitors</th>
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<tr>
<td>THH 230°C Hermetically Sealed</td>
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<tr>
<td>Niobium Oxide</td>
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<tr>
<th>Film Capacitors</th>
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<td>High Power</td>
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<td>Medium Power</td>
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<td>DC Film</td>
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<tr>
<th>Antennas</th>
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<tr>
<td>Omni-direction Transceiver Antennas</td>
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<tr>
<th>Multilayer Varistors</th>
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<tr>
<td>DSCC AA556682 (Industrial Grade)</td>
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<th>NTC Thermistors</th>
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<tr>
<td>SMT and Leaded</td>
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<tr>
<th>Varicon • Rack and Panel</th>
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<tr>
<td>MIL-E-5400, MIL-E-8189, MIL-T-21200, MIL-C-21097, MIL-C-28731, MIL-C-55302 Compliant</td>
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</table>
These products have been designed for the most demanding applications, such as space, aerospace, defense industry, and other high reliability programs.

**HIGH RELIABILITY APPLICATIONS**

These products have been designed for the most demanding applications, such as space, aerospace, defense industry, and other high reliability programs.

**AVIONICS**
- FADEC
- Lighting
- Control Surfaces
- UAV
- Instrumentation/Comms
- Guidance
- Sensor (FLIR, SARS)
- Engine Controls
- Flap and Brake Controls
- Transducer
- Jet Ignition
- Radar Antenna Arrays
- Power Supplies

**SPACE/SATELLITE**
- GEO / LEO
- GPS / DGPS
- Scientific
- Telemetry
- Launch Vehicle
- Exploration
- Rovers
- Communication
- Power Supplies

**DEFENSE**
- Air / Sea / Land / Space
- Munitions
- Radars
- Communication
- JTRS
- SINCGARS
- Surveillance
- Navigation
- Night Vision
- Target Acquisition
- Countermeasures
- Sonars

**HIGH RELIABILITY TESTING CAPABILITY**

As a matter of course, AVX maintains a level of quality control that is sufficient to guarantee whatever reliability specifications are needed. However, AVX goes further and in addition to testing the components to the defined high reliability standards, AVX also has the capability to perform a wide range of custom-specific testing. The abbreviated list indicates the breadth and thoroughness of available quality control services at AVX.

For further specific test capabilities or details, please contact AVX.

- DPA
- X-Ray Analysis
- Ultrasonic Scan
- Termination Pull Testing
- Terminal Strength
- Solderability
- Thermal Shock
- Load/Humidity Life Testing
- Moisture Sensitivity
- Temperature Cycling
- Failure Analysis
- First Article Verification
- Sorting and Matching to Spec. Limits
- Bondability Testing
- Immersion Cycling
- Voltage Conditioning
- Pre-encapsulation Inspection
- Shock and Vibration
- RF Characterization
- Weibull Testing
- Lot Validation Testing
- Burn-in
- Group A/B/C
- LAT 1/2/3

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