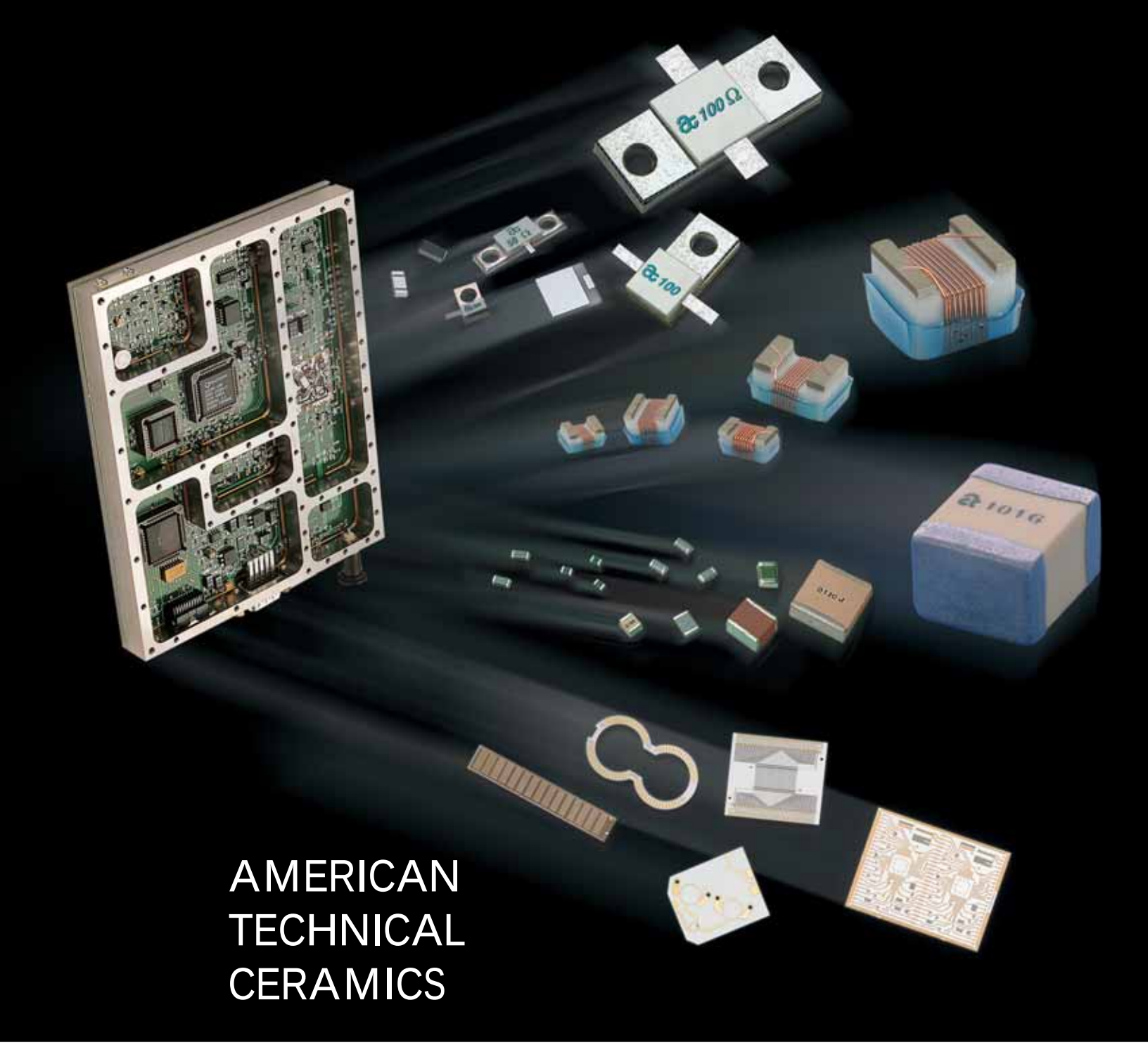

AMERICAN
TECHNICAL
CERAMICS

QUICK REFERENCE

PRODUCT SELECTION GUIDE

THE ENGINEERS' CHOICE™

RoHS Compliant

Corporate Profile

American Technical Ceramics Corp. (ATC) provides component and custom integrated packaging solutions for the RF, microwave and telecommunications industries. For over thirty-five years we have been "The Engineer's Choice®".

ATC designs, develops, manufactures and markets Multilayer Capacitors, Single Layer Capacitors, Resistor Products, Inductors, and Custom Thin Film Products for RF, microwave and millimeter-wave applications. Our products are primarily used in: wireless communications infrastructure, fiber optic, medical electronics, semiconductor manufacturing equipment, defense, aerospace, and satellite communications markets.

▲ *ATC's Jacksonville Facility occupies approximately 100,000 sq. ft.*

◀ *ATC's New York Facility occupies approximately 90,000 sq. ft.*

RLC Products

- Multilayer Ceramic Capacitors
- Capacitor Assemblies for Power Applications
- Single Layer Ceramic Capacitors
- Resistor Products
- Inductor Products

Process and Packaging

- Thin Film Custom Products: metalization and patterned substrates for a broad range of hybrid circuit requirements
- CCP Substrates and Packages

Markets Served

- Wireless Communications Infrastructure
- Fiber Optics
- Wireless Handsets
- Automotive Electronics
- LMDS/MMDS
- Semiconductor Manufacturing Equipment
- Medical Diagnostic Equipment
- Telecommunications
- Military and Aerospace

Facilities

- Huntington Station, New York – Sales, Applications Support, Manufacturing and Distribution Center
- Kungens Kurva, Sweden – European Operations Sales, Applications Support, and Distribution Center
- Jacksonville, Florida – Advanced Technology Center, Manufacturing Facility, Thin Film and CCP Products

ATC's Quick Reference Product Selection Guide is designed to help you navigate through our products and services. The following parameters, included in ATC's complete catalog, are highlights of each Product Series:

- Full electrical and mechanical specifications
- ESR, FSR, Q and TCC Performance Curves
- Power Handling Data
- Design Software
- Application Notes
- Thin Film Overview

Download complete pdf data sheets at

www.atceramics.com

ATC's website includes a complete listing of technical articles in pdf format, as well as new product updates and design support software. As an added convenience, ATC Multilayer Capacitor Kits and Inductor Design Kits may be purchased online.

NOTE: Contact ATC's Applications Engineers for further technical information at (631) 622-4700.
To receive a full catalog, contact any ATC representative or call the factory.

AMERICAN TECHNICAL CERAMICS

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+86-755-8366-4318 • sales@atceramics-asia.com

www.atceramics.com

ATC PRODUCTS BY FREQUENCY RANGE

▶ Frequency Range 1: Up to 30 MHz

Typical Applications	Capacitor Products	Power Capacitor Assemblies	Resistive Products	Inductor Products
Low Frequency Communication Systems, Switch Mode Power Supplies, AM Broadcast, Semiconductor Fabrication, HF Amplifiers, Medical (MRI)	▶ ATC 100 Series Porcelain MLCs ▶ ATC 700 Series NPO Porcelain and Ceramic MLCs ▶ ATC 200 Series BX Ceramic MLCs ▶ ATC 900 Series X7R Ceramic RF Power MLCs ▶ ATC 520 / 545 Series ▶ General Purpose ▶ CDR / QPL Approved MIL-PRF-55681 ▶ COTS	▶ Extended Capacitance Assemblies ▶ Extended Voltage & Current Assemblies ▶ Matched Sets ▶ Voltage Dividers	▶ Resistors ▶ Terminations: SMT Chip Leaded & Flanged ▶ Non-Magnetic Series CR, LR, FR	▶ WL Chip Inductors - EIA Sizes 0402 0603 0805 1008 1206

▶ Frequency Range 2: >30 MHz to 800 MHz

Typical Applications	Capacitor Products	Power Capacitor Assemblies	Resistive Products	Inductor Products
Medical (MRI), Aircraft, Marine, Public Safety, Military	▶ ATC 100 Series Porcelain MLCs ▶ ATC 700 Series NPO Porcelain and Ceramic MLCs ▶ ATC 200 Series BX Ceramic MLCs ▶ ATC 900 Series X7R Ceramic RF Power MLCs ▶ ATC 520 / 545 Series ▶ General Purpose ▶ CDR / QPL Approved MIL-PRF-55681 ▶ COTS	▶ Extended Capacitance Assemblies ▶ Extended Voltage & Current Assemblies ▶ Matched Sets ▶ Voltage Dividers	▶ Resistors ▶ Terminations: SMT Chip Leaded & Flanged ▶ Non-Magnetic Series CR, LR, FR	▶ WL Chip Inductors - EIA Sizes 0402 0603 0805 1008 1206

▶ Frequency Range 3: >800 MHz to 3.5 GHz

Typical Applications	Capacitor Products	Advanced Substrate Packaging	Resistive Products	Inductor Products
Wireless Infrastructure (Cellular / PCS / DCS / GPS / MMDS), Bluetooth, Wireless LAN (802.11)	▶ ATC 100 Series Porcelain MLCs ▶ ATC 700 Series NPO Porcelain and Ceramic MLCs ▶ ATC 200 Series BX Ceramic MLCs ▶ ATC 600 Series ▶ SLC ▶ ATC 500 / 520 / 545 Series ▶ General Purpose ▶ CDR / QPL Approved MIL-PRF-55681 ▶ COTS	▶ Thin Film Circuit Fabrication Services ▶ Co-fired Ceramic Products (CCP)	▶ Resistors ▶ Terminations: SMT Chip Leaded & Flanged ▶ Non-Magnetic Series CR, LR, FR	▶ WL Chip Inductors - EIA Sizes 0402 0603 0805 1008 1206

▶ Frequency Range 4: >3.5 GHz to 100 GHz

Typical Applications	Capacitor Products	Advanced Substrate Packaging	Resistive Products	Inductor Products
Satellite Communications, LMDS, Radar, High Speed Data	▶ ATC 100 Series Porcelain MLCs ▶ ATC 700 Series NPO Porcelain and Ceramic MLCs ▶ ATC 600 Series ▶ SLC ▶ ATC 500 / 520 / 545 Series ▶ CDR / QPL Approved MIL-PRF-55681 ▶ COTS	▶ Thin Film Circuit Fabrication Services ▶ Co-fired Ceramic Products (CCP)	▶ Resistors ▶ Terminations: SMT Chip Leaded & Flanged ▶ Non-Magnetic Series CR, LR, FR	▶ WL Chip Inductors - EIA Sizes 0402 0603 0805 1008 1206

▶ Frequency Range 1: Up to 30 MHz

RESISTORS *(page 10)*

ATC HIGH POWER RF RESISTIVE PRODUCTS

ATC's complete line of high power resistive products are designed and manufactured in our ISO-9001 registered facility. These products are manufactured with non-toxic, cost effective, aluminum nitride based substrates and qualified to Mil-PRF-55342, MIL-STD 202, and ANSI /J-STD-002 specifications.

ATC high power resistive products are suitable for many wireless and satellite communication applications including GSM, PCS, W-CDMA, 3G, WCS, ISM and Wireless LAN. Other applications include medical, industrial, military and aerospace. Typical circuit applications are splitter-combiner networks, power amplifiers, synthesizers, MRI coils, isolators and circulators.

DC and RF Specifications:

- Resistance value: 50 Ω and 100 Ω standard (10 Ω to 200 Ω available)
- Terminations: Typical VSWR from 1.05:1 to 1.20:1
- Resistors: Low parasitic capacitance (See catalog)
- Temperature Coefficient of Resistance (TCR) <150ppm/ °C typical
- Operating temperature range: -55°C to +150°C

Mechanical Specifications:

- Substrate – Aluminum Nitride; Resistive Film – Tantalum Nitride; Terminals – Silver
- Flangeless and Flanged tabs – 100% silver leads; Covers – Alumina
- Copper flanges – Nickel or Silver plated
- **Lead-Free, RoHS compliant**

Non-magnetic products available

ATC RESISTOR SERIES

ATC CR Chip Resistors
- Power handling: 5 watts to 250 watts

ATC CS and CW Surface Mount Resistors
- Power handling: 2 watts to 40 watts

ATC LR Leaded Chip Resistors
- Power handling: 30 watts to 250 watts

ATC FR Flanged Resistors
- Power handling: 15 watts to 250 watts

ATC TERMINATION SERIES

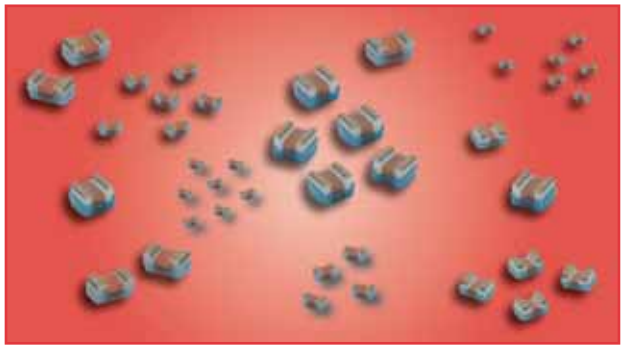
ATC CT Series Chip Terminations
- Power handling: 5 watts to 225 watts

ATC CZ Series Surface Mount Terminations
- Power handling: 10 watts to 40 watts

ATC LT Series Leaded Terminations
- Power handling: 12 watts to 225 watts

ATC FT Series Flanged Terminations
- Power handling: 15 watts to 225 watts

INDUCTORS *(page 11)*



ATC WL SERIES INDUCTOR PRODUCTS

ATC introduces its new family of RF surface mount inductor components, intended to complement its high frequency ultra low ESR capacitor products. The WL Series wire wound chip inductor products have been designed to provide excellent performance at competitive prices.

This Series includes the most widely used traditional EIA case sizes – 0402, 0603, 0805, 1008, and 1206. With an inductance range of 1 nH to 15,000 nH, these products have an operating temperature of -40°C to +125°C and a temperature coefficient of inductance (TCL) of +25 to +125 ppm/°C typical from -40°C to +125°C.

The WL inductor product line is intended for RF and microwave applications and features high self-resonant frequencies (SRF), high Q, and low DC resistance. These products are manufactured on a rugged core made of high quality ceramic material that exhibits high Q at high operating frequencies.

The WL Series is especially attractive for all 800 MHz to 3.4 GHz wireless applications where cost and performance are major factors. These applications include but are not limited to: cellular base stations, broadband wireless services, point-to-point and point-to-multipoint radio as well as other RF and microwave telecommunications systems.

All WL Series inductor products are supplied in tape and reel (2000 to 4000 parts per reel depending on case size) as standard, making them ideal for automated pick and place manufacturing applications. The terminations consist of a barrier layer with a lead-free tin-plated finish that exhibits excellent solderability for trouble-free attachments.

ATC WL (size = 0402)
- Inductance Range: 1.0 nH @ 250 MHz to 56 nH @ 250 MHz
- Tolerances: J (±5%), K (±10%)

ATC WL (size = 0603)
- Inductance Range: 1.6 nH @ 250 MHz to 390 nH @ 100 MHz
- Tolerances: G (±2%), J (±5%), K (±10%)

ATC WL (size = 0805)
- Inductance Range: 3.3 nH @ 250 MHz to 2700 nH @ 25 MHz
- Tolerances: G (±2%), J (±5%), K (±10%)

ATC WL (size = 1008)
- Inductance Range: 4.7 nH @ 50 MHz to 15,000 nH @ 7.9 MHz
- Tolerances: G (±2%), J (±5%), K (±10%)

ATC WL (size = 1206)
- Inductance Range: 6.8 nH @ 100 MHz to 1200 nH @ 35 MHz
- Tolerances: J (±5%), K (±10%)

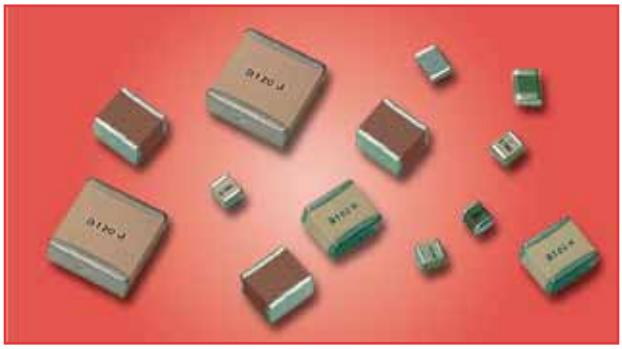
ATC MILLIMETER-WAVE / BROADBAND / ULTRA-BROADBAND SURFACE MOUNT CAPACITORS

ATC 520 L Series Broadband Capacitors
- 160 KHz to 16 GHz

ATC 545 L Series UBC™ Ultra-Broadband Capacitors
- 16 KHz to 40+ GHz

▶ Frequency Range 1: Up to 30 MHz

CAPACITORS *(page 12, 13,14)*



ATC 100 SERIES PORCELAIN SUPERCHIP® MLCS

These capacitors feature High Q, low ESR / ESL, ultra-stable performance, low noise, high self-resonance and established reliability (QPL.).

Non-magnetic products available
RoHS compliant terminations are standard.
Refer to data sheets for other styles.

ATC 100 B (size = .110" x .110")
- Capacitance Range 0.1 pF to 1000 pF
- Available with encapsulation option for leaded styles only

ATC 100 C (size = .250" x .250")
- Capacitance Range 1 pF to 2700 pF
- High RF Current/Voltage

ATC 100 E (size = .380" x .380")
- Capacitance Range 1 pF to 5100 pF
- High RF Power
- Extended WVDC up to 7200 VDC
- High RF Current/Voltage
- High Reliability

ATC 200 SERIES BX CERAMIC MLCS

This series features low ESR / ESL, rugged construction and high reliability.

ATC 200 A (size = .055" x .055")
- Capacitance Range 510 pF to 0.01 µF

ATC 200 B BX Ceramic MLCs (size = .110" x .110")
- Capacitance Range 5000 pF to 0.1 µF
- Available with encapsulation option for leaded styles only

ATC 700 SERIES NPO PORCELAIN AND CERAMIC MLCS

This series features low ESR / ESL, low noise, ultra-stable NPO performance, high self-resonance and rugged construction. They meet established reliability standards. These capacitors are available with encapsulation option for leaded styles only.

ATC 700 B (size = .110" x .110")
- Capacitance Range 0.1 pF to 5100 pF

ATC 700 C (size = .250" x .250")
- Capacitance Range 1 pF to 2700 pF

ATC 700 E (size = .380" x .380")
- Capacitance Range 1 pF to 2200 pF

ATC 900 SERIES X7R CERAMIC RF POWER MLCS

This series features low ESR/ESL, rugged construction, a mid-K, X7R dielectric, and high reliability.

ATC 900 C (size = .250" x .250")
- Capacitance Range 0.01 µF to 1 µF
- Available with encapsulation option for leaded styles only

ATC GENERAL PURPOSE MLC CAPACITORS FOR SURFACE MOUNT APPLICATIONS

ATC provides low cost general purpose capacitors which are not intended for precision designs but are suitable for many applications including DC blocking, coupling, bypassing, and filtering. Available in standard EIA case sizes.

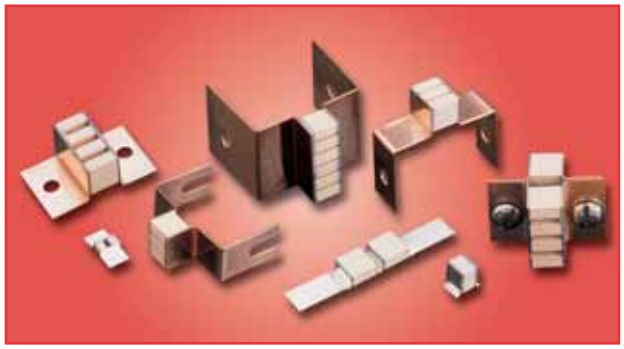
ATC MILITARY (CDR) PRODUCTS

ATC is a QPL approved supplier for MIL-PRF-55681/4 and /5 fixed, multilayer, unencapsulated, monolithic porcelain and ceramic dielectric capacitors.

ATC COTS (COMMERCIAL OFF THE SHELF) PRODUCTS

Cost-effective upscreening of standard products for enhanced reliability applications.

POWER CAPACITOR ASSEMBLIES *(page 15)*



ATC POWER CAPACITOR ASSEMBLIES

ATC power capacitor assemblies are manufactured to customer specifications using ATC's proven standard products. Benefits include:

Reduced Assembly Steps / Handling Costs: Combinations of capacitors pre-packaged in manageable mechanical configurations for customer specific "drop-in" applications.

Enhanced Reliability: Overall elements and assemblies are 100% pre-tested to customer's electrical requirements: – Capacitance – Q – IR – DWV (to 10kV max). Elements are 100% ESR tested.

Reduced Purchasing Logistics: Reduced inventory requirements in matched assemblies. This eliminates excess, wasted parts.

Reduced Technical Labor: Alleviate need for engineering and technician resources in selecting electrically matched elements.

Guaranteed Performance: ATC guarantees electrical / mechanical performance on an assembly level every time.

Achieve Non-Standard Values and Ultra-Tight Tolerances: ATC will "mix and match" values from our extensive inventory via computer matching programs to achieve any capacitor value specified by the designer.

Non-magnetic products available

ATC Parallel Assemblies: Extended capacitance

Standard Designs	B Case	C Case	E Case
No. of caps	2	2 - 6	2 - 8
Lead Type	L Bracket	L Bracket	L Bracket
Lead Material	Silver	Silver	Silver or Copper
Lead Thickness	.004 or .010 (0.10 or 0.25)*	.004 or .010 (0.10 or 0.25)*	.010 or .020 (0.25 or 0.51)*
Lead Length (max.)	0.5 (12.7)*	0.75 (19.1)*	2.0 (50.8)*
No. of holes (max.)	None	1 per lead	1 per lead
Mtg. Configuration	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Capacitor Spacer (typ.)	.050 or .070 (1.27 or 1.78)*	.050 or .070 (1.27 or 1.78)*	.090 (2.29)*

**inches (mm)*

ATC Series Assemblies: Extended voltage

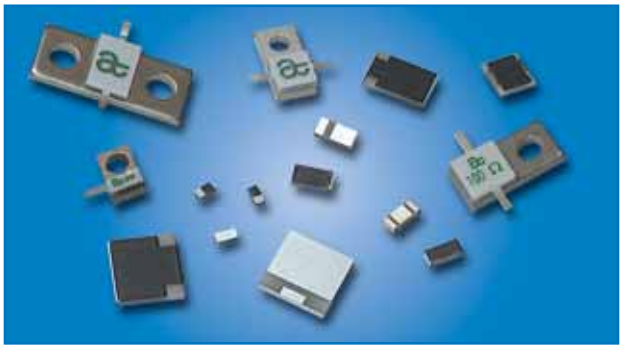
Standard Designs	C Case	E Case
No. of caps	2 - 3	2 - 3
Lead Type	L Bracket	L Bracket
Lead Material	Silver	Silver
Lead Thickness	.010*	.010*
Lead Length (max.)	0.75 (19.1)*	1.0 (25.4)*
No. of holes (max.)	1 per lead	1 per lead
Mtg. Configuration	Horizontal	Horizontal
Capacitor Spacer (typ.)	.050 (1.27)*	.050 (1.27)*

**inches (mm)*

Matched Sets: Series or Parallel configurations for non-standard values or very close tolerance capacitance values.

Voltage Dividers: based on capacitive reactance, provided to customers' specific capacitance ratio.

RESISTORS *(page 10)*



ATC HIGH POWER RF RESISTIVE PRODUCTS

ATC's complete line of high power resistive products are designed and manufactured in our ISO-9001 registered facility. These products are manufactured with non-toxic, cost effective, aluminum nitride base substrates and qualified to Mil-PRF-55342, MIL-STD 202, and ANSI /J-STD-002 specifications.

ATC high power resistive products are suitable for many wireless and satellite communication applications including GSM, PCS, W-CDMA, 3G, WCS, ISM and Wireless LAN. Other applications include medical, industrial, military and aerospace. Typical circuit applications are splitter-combiner networks, power amplifiers, synthesizers, MRI coils, isolators and circulators.

DC and RF Specifications:

- Resistance value: 50 Ω and 100 Ω standard (10 Ω to 200 Ω available)
- Terminations: Typical VSWR from 1.05:1 to 1.20:1
- Resistors: Low parasitic capacitance (See catalog)
- Temperature Coefficient of Resistance (TCR) <150ppm/ °C typical
- Operating temperature range: -55°C to +150°C

Mechanical Specifications:

- Substrate – Aluminum Nitride; Resistive Film – Tantalum Nitride; Terminals – Silver
- Flangeless and Flanged tabs – 100% silver leads; Covers – Alumina
- Copper flanges – Nickel or Silver plated
- **Lead-Free, RoHS compliant**

Non-magnetic products available

ATC RESISTOR SERIES

ATC CR Chip Resistors
- Power handling: 5 watts to 250 watts

ATC CS and CW Surface Mount Resistors
- Power handling: 2 watts to 40 watts

ATC LR Leaded Chip Resistors
- Power handling: 30 watts to 250 watts

ATC FR Flanged Resistors
- Power handling: 15 watts to 250 watts

ATC TERMINATION SERIES

ATC CT Series Chip Terminations
- Power handling: 5 watts to 225 watts

ATC CZ Series Surface Mount Terminations
- Power handling: 10 watts to 40 watts

ATC LT Series Leaded Terminations
- Power handling: 12 watts to 225 watts

ATC FT Series Flanged Terminations
- Power handling: 15 watts to 225 watts

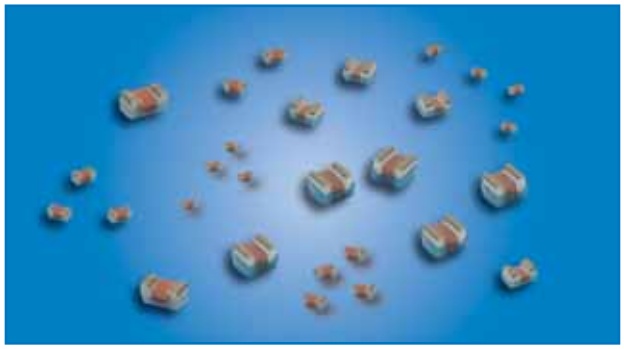
ATC ATTENUATOR SERIES

ATC CA Series Chip Attenuators
- Power handling: up to 100 watts

ATC LA Series Leaded Attenuators
- Power handling: up to 100 watts

ATC FA Series Flanged Attenuators
- Power handling: up to 100 watts

INDUCTORS *(page 11)*



ATC WL SERIES INDUCTOR PRODUCTS

ATC introduces its new family of RF surface mount inductor components, intended to complement its high frequency ultra low ESR capacitors products. The WL Series wire wound chip inductor products have been designed to provide excellent performance at competitive prices.

This Series includes the most widely used traditional EIA case sizes – 0402, 0603, 0805, 1008, and 1206. With an inductance range of 1 nH to 15,000 nH, these products have an operating temperature of -40°C to +125°C and a temperature coefficient of inductance (TCL) of +25 to +125 ppm/°C typical from -40°C to +125°C.

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ATC WL (size = 0402)
- Inductance Range: 1.0 nH @ 250 MHz to 56 nH @ 250 MHz
- Tolerances: J (±5%), K (±10%)

ATC WL (size = 0603)
- Inductance Range: 1.6 nH @ 250 MHz to 390 nH @ 100 MHz
- Tolerances: G (±2%), J (±5%), K (±10%)

ATC WL (size = 0805)
- Inductance Range: 3.3 nH @ 250 MHz to 2700 nH @ 25 MHz
- Tolerances: G (±2%), J (±5%), K (±10%)

ATC WL (size = 1008)
- Inductance Range: 4.7 nH @ 50 MHz to 15,000 nH @ 7.9 MHz
- Tolerances: G (±2%), J (±5%), K (±10%)

ATC WL (size = 1206)
- Inductance Range: 6.8 nH @ 100 MHz to 1200 nH @ 35 MHz
- Tolerances: J (±5%), K (±10%)

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ATC 520 L Series Broadband Capacitors
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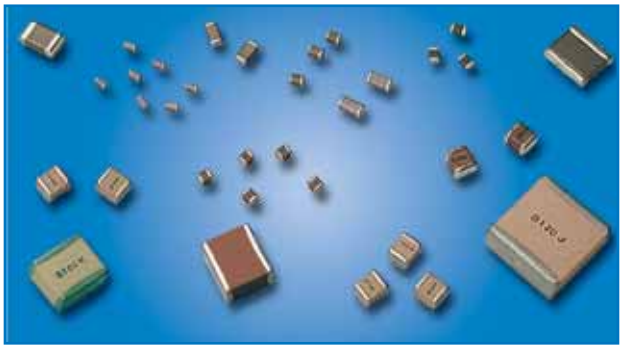
▶ Frequency Range 2: >30 MHz to 800 MHz

CAPACITORS *(page 12, 13,14)*



ATC 100 SERIES PORCELAIN SUPERCHIP® MLCS

These capacitors feature High Q, low ESR / ESL and ultra-stable performance. They are available with an encapsulation option as noted below.

Non-magnetic products available
RoHS compliant terminations are standard.
Refer to data sheets for other styles.

ATC 100 B (size = .110" x .110")
- Capacitance Range 0.1 pF to 1000 pF
- Available with encapsulation option for leaded styles only

ATC 100 C (size = .250" x .250")
- Capacitance Range 1 pF to 2700 pF
- High RF Current/Voltage

ATC 100 E (size = .380" x .380")
- Capacitance Range 1 pF to 5100 pF
- High RF Power
- Extended WVDC up to 7200 VDC
- High RF Current/Voltage
- High Reliability

ATC 200 SERIES BX CERAMIC MLCS

This series features low ESR / ESL, rugged construction and high reliability.

ATC 200 A (size = .055" x .055")
- Capacitance Range 510 pF to 0.01 µF

ATC 200 B BX Ceramic MLCs (size = .110" x .110")
- Capacitance Range 5000 pF to 0.1 µF
- Available with encapsulation option for leaded styles only

ATC 700 SERIES NPO PORCELAIN AND CERAMIC MLCS

This series features low ESR / ESL, low noise, ultra-stable NPO performance, high self-resonance and rugged construction. They meet established reliability standards. These capacitors are available with encapsulation option for leaded styles only.

ATC 700 B (size = .110" x .110")
- Capacitance Range 0.1 pF to 5100 pF

ATC 700 C (size = .250" x .250")
- Capacitance Range 1 pF to 2700 pF

ATC 700 E (size = .380" x .380")
- Capacitance Range 1 pF to 2200 pF

ATC 900 SERIES X7R CERAMIC RF POWER MLCS

This series features low ESR/ESL, rugged construction, a mid-K, X7R dielectric, and high reliability.

ATC 900 C (size = .250" x .250")
- Capacitance Range 0.01 µF to 1 µF
- Available with encapsulation option for leaded styles only

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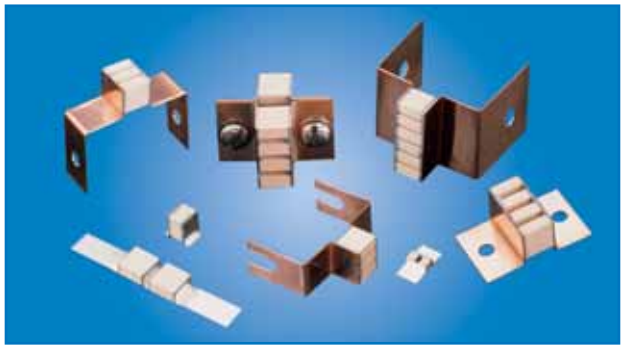
POWER CAPACITOR ASSEMBLIES *(page 15)*



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Reduced Purchasing Logistics: Reduced inventory requirements in matched assemblies. This eliminates excess, wasted parts.

Reduced Technical Labor: Alleviate need for engineering and technician resources in selecting electrically matched elements.

Guaranteed Performance: ATC guarantees electrical / mechanical performance on an assembly level every time.

Achieve Non-Standard Values and Ultra-Tight Tolerances: ATC will "mix and match" values from our extensive inventory via computer matching programs to achieve any capacitor value specified by the designer.

Non-magnetic products available

ATC Parallel Assemblies: Extended capacitance

Standard Designs	B Case	C Case	E Case
No. of caps	2	2 - 6	2 - 8
Lead Type	L Bracket	L Bracket	L Bracket
Lead Material	Silver	Silver	Silver or Copper
Lead Thickness	.004 or .010 (0.10 or 0.25)*	.004 or .010 (0.10 or 0.25)*	.010 or .020 (0.25 or 0.51)*
Lead Length (max.)	0.5 (12.7)*	0.75 (19.1)*	2.0 (50.8)*
No. of holes (max.)	None	1 per lead	1 per lead
Mtg. Configuration	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Capacitor Spacer (typ.)	.050 or .070 (1.27 or 1.78)*	.050 or .070 (1.27 or 1.78)*	.090 (2.29)*

**inches (mm)*

ATC Series Assemblies: Extended voltage

Standard Designs	C Case	E Case
No. of caps	2 - 3	2 - 3
Lead Type	L Bracket	L Bracket
Lead Material	Silver	Silver
Lead Thickness	.010*	.010*
Lead Length (max.)	0.75 (19.1)*	1.0 (25.4)*
No. of holes (max.)	1 per lead	1 per lead
Mtg. Configuration	Horizontal	Horizontal
Capacitor Spacer (typ.)	.050 (1.27)*	.050 (1.27)*

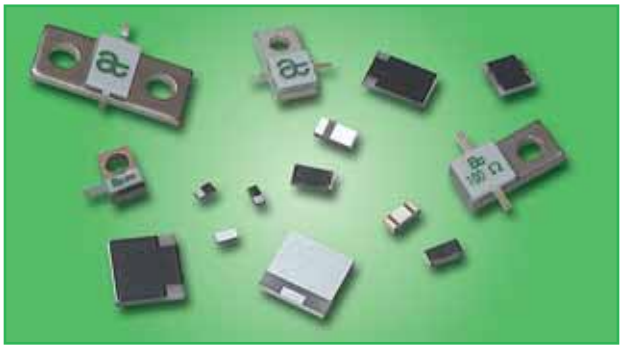
**inches (mm)*

Matched Sets: Series or Parallel configurations for non-standard values or very close tolerance capacitance values.

Voltage Dividers: based on capacitive reactance, provided to customers' specific capacitance ratio.

▶ Frequency Range 3: >800 MHz to 3.5 GHz

RESISTORS *(page 10)*



ATC HIGH POWER RF RESISTIVE PRODUCTS

ATC's complete line of high power resistive products are designed and manufactured in our ISO-9001 registered facility. These products are manufactured with non-toxic, cost effective, aluminum nitride base substrates and qualified to Mil-PRF-55342, MIL-STD 202, and ANSI /J-STD-002 specifications.

ATC high power resistive products are suitable for many wireless and satellite communication applications including GSM, PCS, W-CDMA, 3G, WCS, ISM and Wireless LAN. Other applications include medical, industrial, military and aerospace. Typical circuit applications are splitter-combiner networks, power amplifiers, synthesizers, MRI coils, isolators and circulators.

DC and RF Specifications:

- Resistance value: 50 Ω and 100 Ω standard (10 Ω to 200 Ω available)
- Terminations: Typical VSWR from 1.05:1 to 1.20:1
- Resistors: Low parasitic capacitance (See catalog)
- Temperature Coefficient of Resistance (TCR) <150ppm/ °C typical
- Operating temperature range: -55°C to +150°C

Mechanical Specifications:

- Substrate – Aluminum Nitride; Resistive Film – Tantalum Nitride; Terminals – Silver
- Flangeless and Flanged tabs – 100% silver leads; Covers – Alumina
- Copper flanges – Nickel or Silver plated
- **Lead-Free, RoHS compliant**

Non-magnetic products available

ATC RESISTOR SERIES

ATC CR Chip Resistors
- Power handling: 5 watts to 250 watts

ATC CS and CW Surface Mount Resistors
- Power handling: 2 watts to 40 watts

ATC LR Leaded Chip Resistors
- Power handling: 30 watts to 250 watts

ATC FR Flanged Resistors
- Power handling: 15 watts to 250 watts

ATC TERMINATION SERIES

ATC CT Series Chip Terminations
- Power handling: 5 watts to 225 watts

ATC CZ Series Surface Mount Terminations
- Power handling: 10 watts to 40 watts

ATC LT Series Leaded Terminations
- Power handling: 12 watts to 225 watts

ATC FT Series Flanged Terminations
- Power handling: 15 watts to 225 watts

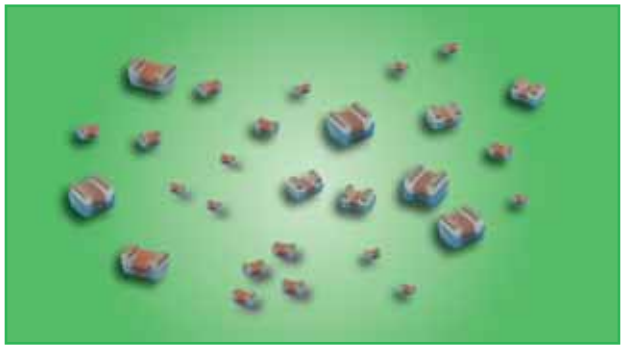
ATC ATTENUATOR SERIES

ATC CA Series Chip Attenuators
- Power handling: up to 100 watts

ATC LA Series Leaded Attenuators
- Power handling: up to 100 watts

ATC FA Series Flanged Attenuators
- Power handling: up to 100 watts

INDUCTORS *(page 11)*



ATC WL SERIES INDUCTOR PRODUCTS

ATC introduces its new family of RF surface mount inductor components, intended to complement its high frequency ultra low ESR capacitor products. The WL Series wire wound chip inductor products have been designed to provide excellent performance at competitive prices.

This Series includes the most widely used traditional EIA case sizes – 0402, 0603, 0805, 1008, and 1206. With an inductance range of 1 nH to 15,000 nH, these products have an operating temperature of -40°C to +125°C and a temperature coefficient of inductance (TCL) of +25 to +125 ppm/°C typical from -40°C to +125°C.

The WL inductor product line is intended for RF and microwave applications and features high self-resonant frequencies (SRF), high Q, and low DC resistance. These products are manufactured on a rugged core made of high quality ceramic material that exhibits high Q at high operating frequencies.

The WL Series is especially attractive for all 800 MHz to 3.4 GHz wireless applications where cost and performance are major factors. These applications include but are not limited to: cellular base stations, broadband wireless services, point-to-point and point-to-multipoint radio as well as other RF and microwave telecommunications systems.

All WL Series inductor products are supplied in tape and reel (2000 to 4000 parts per reel depending on case size) as standard, making them ideal for automated pick and place manufacturing applications. The terminations consist of a barrier layer with a lead-free tin-plated finish that exhibits excellent solderability for trouble-free attachments.

ATC WL (size = 0402)
- Inductance Range: 1.0 nH @ 250 MHz to 56 nH @ 250 MHz
- Tolerances: J (±5%), K (±10%)

ATC WL (size = 0603)
- Inductance Range: 1.6 nH @ 250 MHz to 390 nH @ 100 MHz
- Tolerances: G (±2%), J (±5%), K (±10%)

ATC WL (size = 0805)
- Inductance Range: 3.3 nH @ 250 MHz to 2700 nH @ 25 MHz
- Tolerances: G (±2%), J (±5%), K (±10%)

ATC WL (size = 1008)
- Inductance Range: 4.7 nH @ 50 MHz to 15,000 nH @ 7.9 MHz
- Tolerances: G (±2%), J (±5%), K (±10%)

ATC WL (size = 1206)
- Inductance Range: 6.8 nH @ 100 MHz to 1200 nH @ 35 MHz
- Tolerances: J (±5%), K (±10%)

ATC MILLIMETER-WAVE / BROADBAND / ULTRA-BROADBAND SURFACE MOUNT CAPACITORS

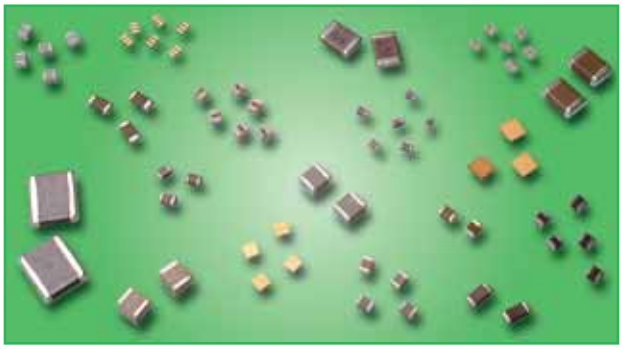
ATC 500 S Series Millimeter-Wave Capacitors
- Low insertion loss and ultra-high self resonance surface mount millimeter-wave capacitors

ATC 520 L Series Broadband Capacitors
- 160 KHz to 16 GHz

ATC 545 L Series UBC™ Ultra-Broadband Capacitors
- 16 KHz to 40+ GHz

▶ Frequency Range 3: >800 MHz to 3.5 GHz

CAPACITORS *(page 12, 13, 14)*



ATC 100 SERIES PORCELAIN SUPERCHIP® MLCS

These capacitors feature High Q, low ESR / ESL, ultra-stable performance, low noise, high self-resonance and established reliability (QPL.).

Non-magnetic products available
RoHS compliant terminations are standard.
Refer to data sheets for other styles.

ATC 100 A (size = .055" x .055")
- Capacitance Range 0.1 pF to 100 pF

ATC 100 B (size = .110" x .110")
- Capacitance Range 0.1 pF to 1000 pF
- Available with encapsulation option for leaded styles only

ATC 600 SERIES ULTRA-LOW ESR HIGH Q MICROWAVE CAPACITORS

Feature ultra-low ESR and high self-resonance. Environmentally safe terminations meet or exceed MIL-PRF-55681. Operating temperature is -55°C to +125°C

ATC 600 L (size = 0402)
- Capacitance Range 0.1 pF to 27 pF
- Voltage Rating: 200 WVDC

ATC 600 S (size = 0603)
- Capacitance Range 0.1 pF to 100 pF
- Voltage Rating: 250 WVDC

ATC 600 F (size = 0805)
- Capacitance Range 0.1 pF to 240 pF
- Voltage Rating: 250 WVDC

ATC 700 SERIES NPO PORCELAIN AND CERAMIC MLCS

This series features low ESR / ESL, low noise, ultra-stable NPO performance, high self-resonance and rugged construction. They meet established reliability standards.

ATC 700 A (size = .055" X .055")
- Capacitance Range 0.1 pF to 1000 pF

ATC 700 B (size =.110" X .110")
- Capacitance Range 0.1 pF to 5100 pF
- Available with encapsulation option for leaded styles only

ATC SINGLE LAYER CAPACITORS

For applications with operating frequencies up to 100 GHz Capacitance range 0.04 pF to 10,000 pF, case sizes from 10 mils to 90 mils. "Design your own" option (custom sizes.)

ATC GENERAL PURPOSE MLC SURFACE MOUNT CAPACITORS

Low cost general purpose capacitors, not intended for precision designs but suitable for many applications including DC blocking, coupling, bypassing, and filtering. This offering consists of a variety of dielectric types from the most stable NPO to high K versions for maximum capacitance. Available in standard EIA case sizes.

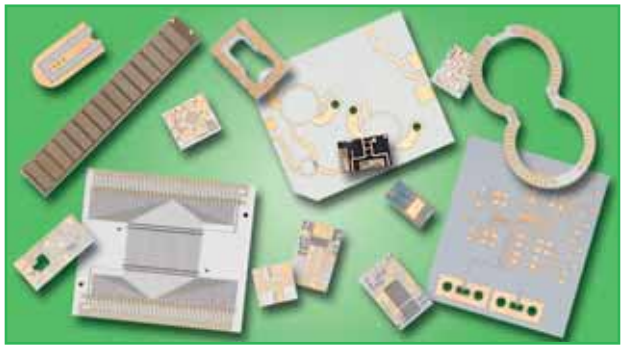
ATC MILITARY (CDR) PRODUCTS

ATC is a QPL approved supplier for MIL-PRF-55681/4 and /5 fixed, multilayer, unencapsulated, monolithic porcelain and ceramic dielectric capacitors.

ATC COTS (COMMERCIAL OFF THE SHELF) PRODUCTS

Cost-effective upscreening of standard products for enhanced reliability applications.

THIN FILM / CCP *(page 16, 17, 18, 19)*



ATC CUSTOM THIN FILM PRODUCTS

ATC Custom Thin Film Products are manufactured to customer requirements for applications that include microwave/millimeter-wave, fiber optics and high-rel.

ATC brings a new standard of responsiveness and quality to thin film technology products. Custom metalization and patterned substrates are offered to address a broad spectrum of deposition and hybrid circuit fabrication requirements.

Custom metalization consists of sputtered and electroplated coatings made to specifications. Products may include via holes and odd shaped substrates in a wide choice of ceramics and dielectric materials. Three target, batch sputtering systems with load-locks are utilized for producing the most consistent film quality.

- Full in-house capability to support prototyping to large scale production
- Photolithography Sputtering, Electroplating, Laser Trimming, Laser Machining
- Custom metalization and patterned substrates
- Conductors, Resistors, Via Holes, Air Bridges, Crossovers, Wraparounds, Solder Dams

Typical Hybrid Circuit Applications

CIRCUIT TYPE	APPLICATION	SUBSTRATE
Conductor	High Density Interconnection Laser Diode Mount Power Supply	Alumina Beryllia
Resistor	D/A-A/D Converter Power Supply Resistor Network	Alumina Beryllia
Microwave	Attenuator Filter Amplifier Power Divider Capacitor Antenna	Alumina Beryllia Ferrite Quartz Other Dielectrics

ATC CO-FIRED CERAMIC PRODUCTS (CCP)

ATC provides CCP solutions for multilayer ceramic substrates and packages suitable for high frequency and opto-electronic applications for prototype and production runs. ATC is unique in being the only merchant market substrate and package manufacturer with in-house thin film, thick film, capacitor and resistor manufacturing technologies.

In addition to our foundry services, ATC provides design assistance from program inception to help you develop the most cost-efficient, best performing products possible. Our varied materials and process experience allows us to integrate buried passive components and incorporate the best characteristics of several manufacturing techniques to create one-of-a-kind solutions for your specific design needs. We also develop our own proprietary material sets with custom dielectric constants to address customer design needs.

Our unique capabilities allow the designer to create high performance electronic packages and substrates with confidence. ATC promises the quickest turn around in the market.

▶ Frequency Range 4: >3.5 GHz to 100 GHz

RESISTORS *(page 10)*

ATC HIGH POWER RF RESISTIVE PRODUCTS

ATC's complete line of high power resistive products are designed and manufactured in our ISO-9001 registered facility. These products are manufactured with non-toxic, cost effective, aluminum nitride base substrates and qualified to Mil-PRF-55342, MIL-STD 202, and ANSI /J-STD-002 specifications.

ATC high power resistive products are suitable for many wireless and satellite communication applications including GSM, PCS, W-CDMA, 3G, WCS, ISM and Wireless LAN. Other aplications include medical, industrial, military and aerospace applications. Typical circuit applications are splitter-combiner networks, power amplifiers, synthesizers, MRI coils, isolators and circulators.

DC and RF Specifications:

- Resistance value: 50 Ω and 100 Ω standard (10 Ω to 200 Ω available)
- Terminations: Typical VSWR from 1.05:1 to 1.20:1
- Resistors: Low parasitic capacitance (See catalog)
- Temperature Coefficient of Resistance (TCR) <150ppm/ °C typical
- Operating temperature range: -55°C to +150°C

Mechanical Specifications:

- Substrate – Aluminum Nitride; Resistive Film – Tantalum Nitride; Terminals – Silver
- Flangeless and Flanged tabs – 100% silver leads; Covers – Alumina
- Copper flanges – Nickel or Silver plated
- **Lead-Free, RoHS compliant**

Non-magnetic products available

ATC RESISTOR SERIES

ATC CR Chip Resistors
- Power handling: 5 watts to 250 watts

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INDUCTORS *(page 11)*

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The WL inductor product line is intended for RF and microwave applications and features high self-resonant frequencies (SRF), high Q, and low DC resistance. These products are manufactured on a rugged core made of high quality ceramic material that exhibits high Q at high operating frequencies.

The WL Series is especially attractive for all 800 MHz to 3.4 GHz wireless applications where cost and performance are major factors. These applications include but are not limited to: cellular base stations, broadband wireless services, point-to-point and point-to-multipoint radio as well as other RF and microwave telecommunications systems.

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- Tolerances: J (±5%), K (±10%)

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CAPACITORS *(page 12, 13, 14)*

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These capacitors feature High Q, low ESR / ESL and ultra-stable performance. They are available with an encapsulation option as noted below.

ATC 100 A (size = .055" x .055")

- Capacitance Range 0.1 pF to 100 pF

Non-magnetic products available
RoHS compliant terminations are standard.
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For applications with operating frequencies up to 100 GHz Capacitance range 0.03 pF to 6200 pF, case sizes from 10 mils to 90 mils. "Design your own" option (custom sizes.)

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Typical Hybrid Circuit Applications

CIRCUIT TYPE	APPLICATION	SUBSTRATE
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Microwave	Attenuator Filter Amplifier Power Divider Capacitor Antenna	Alumina Beryllia Ferrite Quartz Other Dielectrics

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Our unique capabilities allow the designer to create high performance electronic packages and substrates with confidence. ATC promises the quickest turn around in the market.

ATC High Power RF Resistive Products

ATC's complete line of high powered resistive products are designed and manufactured in our ISO-9001 facility using non-toxic, cost effective, Aluminum Nitride base substrates. All products are manufactured and qualified to Mil-PRF-55342, MIL-STD 202, and ANSI /J-STD-002 specifications. Leaded and flanged devices are available. Non-Magnetic styles are available in CR, LR and FR Series. Please consult factory.

ATC High powered resistive products are used in all wireless & satellite communication applications. Communication bands include GSM, PCS, W-CDMA, 3G, WCS, ISM Wireless LAN. They are also used in medical, industrial, military and aerospace applications. Typical applications include splitter/combiner networks, power amplifiers, feed forward amplifiers, RF Generators, MRI devices, isolators & circulators.

DC and RF Specifications:

- Resistance value: 50 Ω and 100 Ω standard (10 Ω to 200 Ω available)
- Terminations: Typical VSWR (Voltage Standard Wave Ratio) 1.05:1 to 1.20:1
- Resistors: Low parasitic capacitance
- Temperature Coefficient of Resistance TCR Typical <150 ppm/°C
- Operating temperature range: -55° to +150°C
- Frequency Range: DC to 18 GHz

Mechanical Specifications:

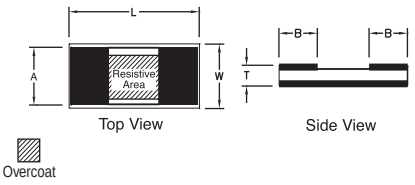
- Substrate – Aluminum Nitride
- Resistive Film – Tantalum Nitride
- Terminals – Silver
- Flangeless and Flanged tabs–100% silver leads Covers – Alumina
- Copper flanges – Nickel or Silver plated
- **Lead-Free, RoHS compliant**

Visit ATC's website for Leaded and Flanged devices.

Order Resistive Product Design Kits Online at www.atceramics.com

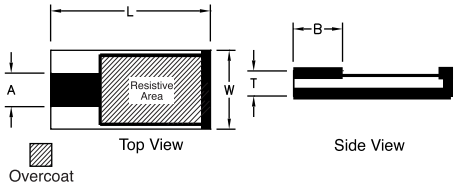
ATC CR Chip Resistors

ATC Part Number	W ±.010	L ±.010	T ±.005	A ±.005	B ±.005	Capacitance (pF)	Power Max (Watts)
CR11005T0100J	.050	.100	.025	.045	.025	.75	5
CR11206T0100J	.060	.120	.025	.055	.025	.90	15
CR12010T0100J	.100	.200	.040	.090	.025	1.0	30
CR12525T0100J	.245	.245	.040	.130	.025	2.0	60
CR13725T0100J	.250	.375	.040	.198	.025	4.15	150
CR13737T0100J	.370	.370	.040	.330	.035	6.0	250



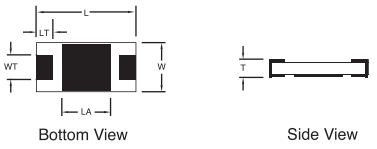
ATC CT Chip Terminations

ATC Part Number	W ±.010	L ±.010	T ±.005	A ±.010	B ±.007	Frequency Range (GHz)	VSWR (Typ.)	Power Max (W)
CT11020T0050J	.200	.100	.025	.034	.020	DC to 18.0	1.25:1	20
CT12010T0050J	.100	.200	.040	.050	.020	DC to 4.0	1.20:1	30
CT12525T0050J	.245	.245	.040	.090	.020	DC to 4.0	1.15:1	60
CT12525T0050J01	.245	.245	.040	.050	.020	DC to 2.5	1.15:1	100
CT12335T0050J	.350	.230	.040	.100	.020	DC to 4.0	1.15:1	100
CT13725T0050J	.250	.375	.040	.090	.025	DC to 4.0	1.20:1	125
CT13725T0050J01	.250	.375	.040	.050	.025	DC to 1.1	1.20:1	150
CT13737T0050J	.370	.370	.040	.120	.025	DC to 2.0	1.25:1	150
CT13737T0050J01	.370	.370	.040	.130	.025	DC to 1.0	1.30:1	250



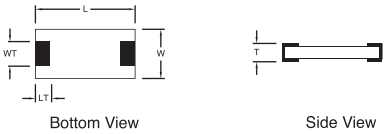
ATC CS Surface Mount Chip Resistors

ATC Part Number	W ±.010	L ±.010	T ±.005	WT ±.005	LT ±.005	LA ±.005	Capacitance (pF)	Power Max (Watts)
CS12010T0100G	.100	.200	.040	.090	.030	.095	.95 pF	10
CS12525T0100G	.245	.245	.040	.120	.040	.110	1.85 pF	20
CS13725T0100G	.250	.375	.040	.120	.050	.195	3.0 pF	30
CS13737T0100G	.370	.370	.040	.360	.050	.195	3.5 pF	40



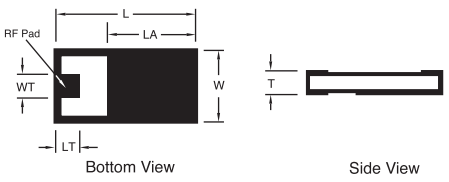
ATC CW Surface Mount Chip Resistors

ATC Part Number	W ±.010	L ±.010	T ±.005	WT ±.005	LT ±.005	Power Max* (Watts)
CW12010T0100G	.100	.200	.040	.090	.030	4
CW12525T0100G	.245	.245	.040	.120	.040	6
CW13725T0100G	.250	.375	.040	.120	.050	8
CW13737T0100G	.370	.370	.040	.360	.050	10



ATC CZ Surface Mount Chip Terminations

ATC Part Number	W ±.010	L ±.010	T ±.005	LT ±.005	WT ±.005	LA ±.005	Frequency Range (GHz)	VSWR (Typ.)	Power Max (W)
CZ12010T0050G	.100	.200	.040	.040	.090	.115	DC to 3.0	1.20:1	10
CZ12010T0050G02	.100	.200	.040	.020	.090	.140	DC to 3.0	1.20:1	10
CZ12525T0050G	.245	.245	.040	.030	.125	.170	DC to 4.0	1.25:1	20
CZ13725T0050G	.250	.375	.040	.050	.125	.260	DC to 2.2	1.20:1	30
CZ13725T0050G01	.250	.375	.040	.050	.050	.260	DC to 2.2	1.20:1	30
CZ13737T0050G	.370	.370	.040	.050	.125	.275	DC to 3.0	1.25:1	40



ATC WL Series
Wire Wound Chip Inductors

ATC's family of RF surface mount inductor components is intended to complement their high frequency ultra-low ESR capacitor products. The WL Series wire wound chip inductor products have been designed to provide excellent performance at competitive prices.

This Series includes the most widely used traditional EIA case sizes – 0402, 0603, 0805, 1008 and 1206. With an inductance range of 1 nH to 15,000 nH, these products have an operating temperature of -40°C to +125°C and a temperature coefficient of inductance (TCL) of +25 to +125 ppm/°C typical from -40°C to +125°C.

The WL inductor product line is intended for RF and microwave applications and features high self-resonant frequencies (SRF), high Q, and low DC resistance. These products are manufactured on a rugged core made of high quality ceramic material that exhibits high Q at high operating frequencies.

The WL Series is especially attractive for all 800 MHz to 3.4 GHz wireless applications where cost and performance are major factors. These applications include but are not limited to: cellular base stations, broadband wireless services, point-to-point and point-to-multipoint radio as well as other RF and microwave telecommunications systems.

All WL Series inductor products are supplied in tape and reel (2000 to 4000 parts per reel depending on case size) as standard, making them ideal for automated pick and place manufacturing applications. The terminations consist of a barrier layer with a lead-free, tin-plated finish that exhibits excellent solderability for trouble-free attachments.

Inductor Product Overview

Case Size Code	Inductance Value Range (nH)	Tolerance Code	Q min. Range	SRF (MHz) typ.	RDC (Ohms) max.	IDC (mA)
0402	1.0 @ 250 MHz to 56 @ 250 MHZ	J, K	16 to 25	>6000	0.045	1360
				2100	0.830	150
0603	1.6 @ 250 MHz to 5.6 @ 250 MHz	J, K	16 to 40	12,500	0.040	700
				5800	0.170	700
	6.8 @ 250 MHz to 390 @ 100 MHz	G, J, K		5800	0.110	700
				900	4.350	100
0805	2.8 @ 250 MHz to 8.2 @ 250 MHz	J, K	18 to 65	7900	0.060	800
				4700	0.120	600
	10 @ 250 MHz to 2700 @ 25 MHz	G, J, K		4200	0.100	600
				50	2.950	150
1008	10 @ 50 MHZ to 27 @ 50 MHZ	J, K	20 to 65	4100	0.08	1000
				1600	0.13	1000
	33 @ 50 MHz to 15,000 @ 7.9 MHz	G, J, K		1600	0.14	1000
				15	11.5	120

Visit our website for individual values and specifications.

Order Inductor Design Kits Online at www.atceramics.com

ATC Multilayer High Q RF Capacitors

ATC 100 Series Porcelain Superchip® Multilayer Capacitors have been the industry standard for over 35 years, featuring one of the highest Qs in the industry, rugged porcelain construction, TCC of ±90 ppm / °C, and solderable SMT chip and leaded style terminations. **RoHS compliant terminations are standard. Refer to data sheets for other styles.** Order Design Kits online at www.atceramics.com

ATC Series	Case Size Footprint in. (mm)	Cap Value Range (pF)*	Working Voltage WVDC (volts) max.	Dielectric Material	TCC -55°/+125°C (ppm/°C)	
100A	.055 x .055 (1.40 x 1.40)	0.1 to 100	150	Porcelain (P90)	+90 ± 20	
100B	.110 x .110 (2.79 x 2.79)	0.1 to 1000	500	Porcelain (P90)	+90 ± 20	
100C	.230 x .250 (5.84 x 6.35)	1 to 2700	2500	Porcelain (P90)	+90 ± 30	
100E	.380 x .380 (9.65 x 9.65)	1 to 5100	7200	Porcelain (P90)	+90 ± 30	
700A	.055 x .055 (1.40 x 1.40)	0.1 to 1000	150	Porcelain and Ceramic (NPO)	0 ± 30	
700B	.110 x .110 (2.79 x 2.79)	0.1 to 5100	500	Porcelain and Ceramic (NPO)	0 ± 30	
700C	.230 x .250 (5.84 x 6.35)	1 to 2700	2500	Porcelain (NPO)	0 ± 30	
700E	.380 x .380 (9.65 x 9.65)	1 to 2200	7200	Porcelain (NPO)	0 ± 30	
600L	.040 x .020 (1.02 x .51)	0.1 to 27	200	Ultra-Low ESR, High Q (NPO)	0 ± 30	
600S	.063 x .032 (1.60 x 0.81)	0.1 to 100	250	Ultra-Low ESR, High Q (NPO)	0 ± 30	
600F	.079 x .049 (2.00 x 1.25)	0.1 to 240	250	Ultra-Low ESR, High Q (NPO)	0 ± 30	
200A	.055 x .055 (1.40 x 1.40)	510 to 10,000	50	BX Ceramic	± 15%	
200B	.110 x .110 (2.79 x 2.79)	5000 to 100,000	50	BX Ceramic	± 15%	
900C	.230 x .250 (5.84 x 6.35)	.01µF to 1µF	300	X7R Ceramic	± 15%	

ATC Series	Typical ESR (Ohms) Cap (pF)					Series Resonance (MHz)
	Cap (pF)	30 MHz	150 MHz	500 MHz	1000 MHz	
100A	1	–	0.170	0.280	0.390	9110
	10	–	0.067	0.119	0.168	3020
	100	–	0.028	0.051	0.072	1000
100B	10	–	0.047	0.082	0.115	2030
	100	–	0.033	0.060	0.085	680
	1000	–	0.015	0.027	–	230
100C	10	0.072	0.139	0.251	0.355	1457
	100	0.026	0.057	0.103	–	475
	1000	0.010	0.023	–	–	155
	2700	0.007	0.016	–	–	95
100E	10	0.076	0.147	0.266	0.376	1110
	100	0.030	0.065	0.119	–	365
	1000	0.018	0.040	–	–	120
	5100	0.010	0.022	–	–	55
700A	1	–	0.186	0.308	0.429	9110
	10	–	0.073	0.130	0.184	3020
	100	–	0.031	0.056	0.080	1000
	1000	–	0.035	0.064	–	330
700B	10	–	0.051	0.090	0.126	1840
	100	–	0.036	0.066	0.093	620
	1000	–	0.038	0.069	–	210
	5100	0.011	0.025	–	–	100
700C	10	0.072	0.139	0.251	0.355	1457
	100	0.026	0.057	0.103	–	475
	1000	0.010	0.023	–	–	155
	2700	0.007	0.016	–	–	95
700E	10	0.076	0.147	0.266	0.376	1110
	100	0.030	0.065	0.119	–	365
	1000	0.018	0.040	0.073	–	120
	2200	0.014	0.030	0.055	—	82
600L	1	–	–	–	–	–
	10	–	–	–	–	–
	27	–	–	–	–	–
600S	1	–	–	0.120	0.117	10,500
	10	–	–	0.058	0.070	5150
	100	–	0.034	0.043	0.070	1200
600F	1	–	–	0.070	0.084	9050
	10	–	–	0.062	0.078	3910
	100	–	–	0.055	0.078	2010
	240	–	–	–	–	–
200A	510	1.010	2.238	–	–	341
	1000	0.553	1.226	–	–	247
	10,000	0.071	0.157	–	–	82
200B	5000	0.202	0.450	–	–	89
	10,000	0.133	0.296	–	–	63
	100,000	0.033	–	–	–	20
900C	10,000	0.059	–	–	–	50
	100,000	0.034	–	–	–	16
	1µF	0.020	–	–	–	5

ATC's products are supported by fully certified in-house RF and QA Labs with test capability from DC to Millimeter-wave Frequencies

Standard Electrical Testing:

- ► Capacitors: Capacitance, Dissipation Factor, Dielectric Withstanding Voltage, Insulation Resistance
- ► Inductors: Inductance, Q, SRF, RDC, IDC
- ► Resistors: Resistance, RF Power, VSWR, Shunt Capacitance

Hi-Reliability Testing (MIL-PRF-55681, MIL-PRF-123) and COTS Upscreening Program:

- ► Full Burn In and Life Test Capability
- ► Electrical, Environmental and Mechanical (MIL-STD-202, MIL-STD-883)

Specialized RF Power Testing:

- ► High RF Power: CW and pulsed
- ► Thermal Characterization
- ► High RF Voltage: Corona, Internal and external breakdown, Partial discharge
- ► Specialized test fixtures designed in-house to support a full range of customer requirements

Frequency Range: 2 MHz to 1 GHz

POPULAR TEST FREQUENCIES:	APPLICATIONS:
13.56 MHz	Semiconductor Manufacturing
64 MHz	1.5 Tesla MRI Systems
128 MHz	3 Tesla MRI Systems
1 GHz	Telecommunications & Cellular Systems
ISM	Unlicensed Wireless Devices

Small Signal RF Testing:

- ► Equivalent Series Resistance (ESR) from 10 MHz to 2 GHz
- ► Impedance vs. Frequency: 1 MHz to 1.8 GHz
- ► S-Parameters: Four-receiver architecture, full two-port TRL calibration to 40 GHz

Design Support For Capacitor, Inductor, & Resistive Products:

- ► Comprehensive electrical, mechanical and environmental data available
- ► S-Parameters
- ► Tech-Select™ RF Design Software
- ► Applications Support Team of Experienced RF Engineers

ATC Single Layer Capacitor Products

ATC's extensive line of Single Layer Capacitor (SLC) products offers solutions to the most demanding microwave and millimeter wave requirements. Broadband applications with operating frequencies up to 100 GHz are achievable with ATC's SLC products.

- Capacitance Range: 0.04 to 10,000 pF
- Wide selection of dielectrics with K's of 14 to 16,000
- Ultra-high Q
- 100 WVDC rating
- Standard case sizes from 10 mils.
- "Design Your Own" option
- Manufacturing facilities certified to ISO 9001
- Custom Design Kits available online at www.atceramics.com

Stable K Dielectrics	Dielectric Code	Dielectric Const. (K)	TCC (-55°C to +125°C)	Cap. Range (pF)	Min. Q @ 1 MHz	Max. DF @ 1 MHz (%)	Q @ Freq.
	A	14	+90 ±30 PPM/°C	0.04 to 5.6	10,000	0.01	11,000 @ 6.4 GHz
	BB	31	0 ±30 PPM/°C	0.06 to 13	660	0.15	950 @ 4.5 GHz
	CA	60	0 ±30 PPM/°C	0.1 to 27	660	0.15	770@ 5 GHz

Mid-K Dielectrics	Dielectric Code	Dielectric Const. (K)	TCC (-55°C to +125°C)	Cap. Range (pF)	Min. Q @ 1 MHz	Max. DF @ 1 MHz (%)	Q @ Freq.
	CC	130	-750 ±220 PPM/°C	0.3 to 56	660	0.15	2310 @ 5 GHz
	DA	165	-1500 ±500 PPM/°C	0.4 to 68	400	n/a / 0.25*	500 @ 1.8 GHz
	DB	200	±7.5% max. change (non-linear)	0.5 to 82	400	n/a / 0.25*	29 @ 5 GHz
	HC	390	-2000 ±750 PPM/°C	0.8 to 150	200	0.3	n/a
	EA	650	-4700 ±1500 PPM/°C	1.5 to 270	400	0.3	n/a

High-K Dielectrics	Dielectric Code	Dielectric Const. (K)	TCC (-55°C to +125°C)	Cap. Range (pF)	Min. Q @ 1 MHz	Max. DF (%)* @ 1 KHz	Max. DF (%)* @ 1 MHz
	EC	650	±10% max. change (non-linear)	1.5 to 270	65	1.5	n/a
	J	1100	±5% to -15% max. change (non-linear)	2.4 to 470	40	2.0	n/a
	F	2000	±15% max. change (non-linear)	4.3 to 820	40	2.0	n/a
	GA	4500	±15%	10 to 1800	33	2.0	3.0

Ultra High-K Dielectrics	Dielectric Code	Dielectric Const. (K)	TCC (+10°C to +85°C)	Cap. Range (pF)	Min. Q @ 1 MHz	Max. DF (%)* @ 1 KHz	Max. DF (%)* @ 1 MHz
	G	6000	±10% to -75% max. change (non-linear)	13 to 2400	40	2.0	2.5
	K	9000	0% to -92% max. change (non-linear)	20 to 3300	25	2.0	4.0
	L	16,000	+0/-92%	33 to 6200	25	2.0	4.0

*Capacitance and DF are measured at 1MHz for capacitance values ≤ 1,000 pF and 1 KHz for capacitance values > 1,000 pF.

ATC 545L UBC™ Ultra-Broadband Capacitors

RoHS Compliant

ATC's new 545L Series Ultra-Broadband Capacitor (UBC™) is a unique component that provides ultra-low insertion loss, flat frequency response and an excellent match over multiple octaves of frequency spectrum in a one piece configuration.

Features:

- EIA 0402 Case Size
- Capacitance: 100 nF
- Operating Frequency: 16 KHz to 40+ GHz*
- Insertion Loss < 0.5 dB typical
- Orientation Insensitive
- One Piece Construction
- Voltage Ratings: 10 and 16 WVDC
- TCC: ±15% (-55°C to +125°C)
- RoHS Compliant Terminations
- Gold Terminations Available

Advantages:

- Ultra-Broadband Performance
- Ultra-low Insertion Loss
- Flat Frequency Response
- Excellent Return Loss
- Unit-to-Unit Performance Repeatability
- Rugged X7R Ceramic Construction

Typical Applications:

- Optical Communication Networks (SONET)
- Broadband Wireless Communications
- Satellite Systems
- Broadband Test Equipment
- High Speed Internet Routers

ATC 520L Broadband Capacitors

ATC's 520L is a Broadband Multilayer Capacitor that exhibits low insertion loss over a frequency range of 160 KHz to 16 GHz. It is supplied as an X7R dielectric, in an EIA 0402 case size with a voltage rating of 16 WVDC. The 520L is compatible with high speed automated pick and place SMT manufacturing.

ATC 500S Millimeter Wave Surface Mount Capacitors

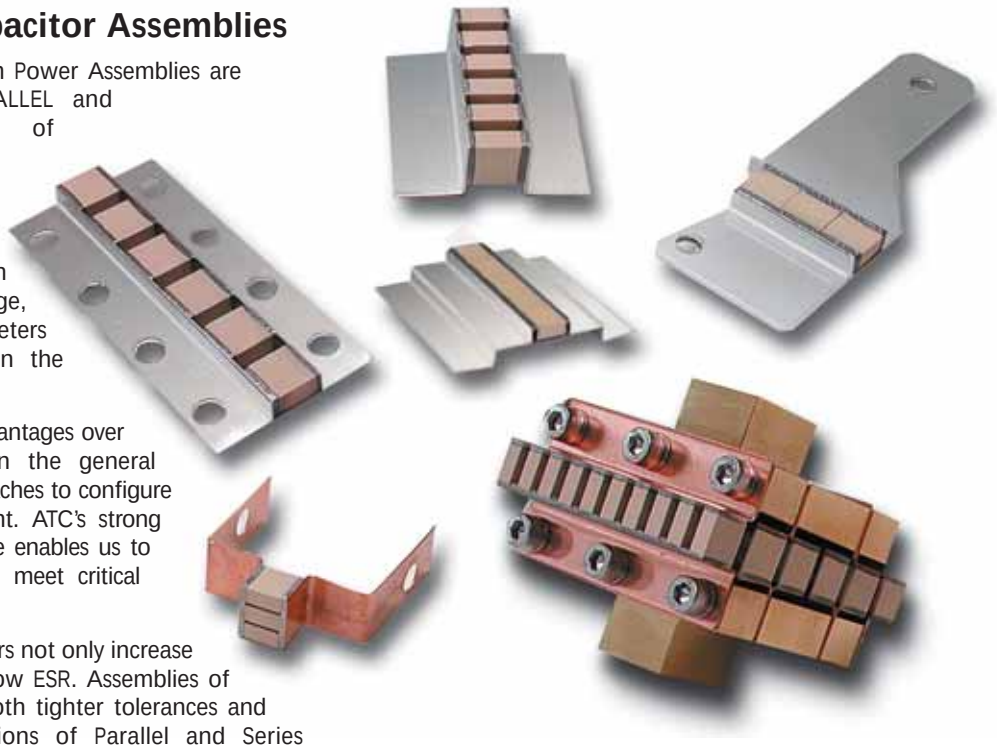
ATC's 500 Series Broadband Microwave Capacitor (BMC) is a unique, patented component which greatly exceeds both MLC and SLC performance. It delivers extremely low insertion loss with ultra-high self resonance performance, in a rugged, laser-marked package compatible with automatic SMT manufacturing.

ATC Series	Cap Value Range (pF)*	Working Voltage WVDC (volts)	TCC –55° to +125°C (ppm/°C)	Typical Resonance Cap (pF)	Series	Parallel	IR@ 25°C (m)	Case Size Footprint in. (mm)
500S	0.1 to 10 pF	100V	0±30 for C ≤ 2.2 pF 0±60 for C ≥ 2.4 pF	0.1 1 10	28 GHz 15 GHz 7.8 GHz	40 GHz 32 GHz 20 GHz	10^5	.060 x .030 (1.52 x .762)

*Additional capacitor values are available upon request

ATC Power Capacitor Assemblies

ATC standard & custom Power Assemblies are fabricated from PARALLEL and SERIES combinations of industry-respected ATC catalog products. Customer requirements are addressed by a variety of computer matching and assembly techniques which have en-abled ATC to extend voltage, current, ESR, Q, and tolerance parameters beyond what is normally available in the industry.



ATC Power Assemblies offer distinct advantages over purchasing standard components "in the general ballpark" and trying "hit & miss" approaches to configure & match these in a circuit environment. ATC's strong tradition of quality and customer service enables us to work closely with design engineers to meet critical specifications.

Assemblies of parallel grouped capacitors not only increase the capacitance but will exhibit ultra-low ESR. Assemblies of series grouped capacitors will allow both tighter tolerances and higher working voltages. Combinations of Parallel and Series assemblies can realize an increase in both capacitance and voltage rating. Assemblies can be composed of multiple capacitors in horizontal, vertical or multi-level mounting configurations.

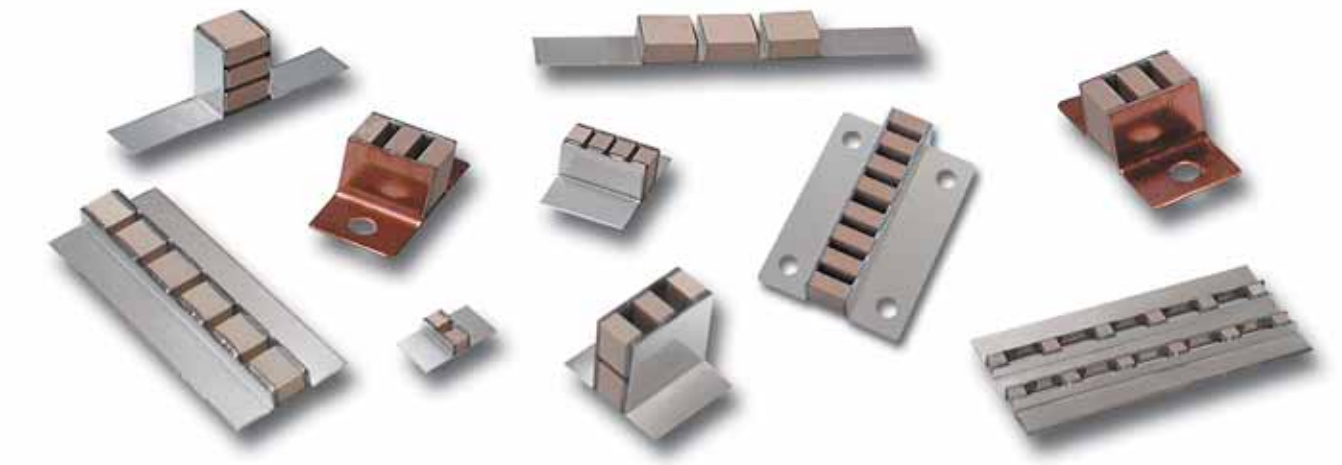
MATCHED SETS: SERIES OR PARALLEL CONFIGURATIONS
For customers requiring non-standard values or very close tolerance capacitance values, ATC can select a set of capacitors (2 or more) to achieve the desired results. Available tolerances appear in table at right.

VOLTAGE DIVIDERS: Voltage dividers based on capacitive reactance can be provided to customers' specific capacitance ratio. Ratios can be provided within 1.0%.

Series	Capacitance Range	Tolerance
100A/700A	1 pF to 6.2 pF 6.8 pF to 1000 pF	0.1 pF 0.5%
100B/700B	0.1 pF to 6.2 pF 6.8 pF to 5100 pF	0.1 pF 0.5%
100C	1 pF to 2700 pF	0.5%
100E	1 pF to 5100 pF	0.5%

ASSEMBLIES ARE DESIGNED TO MEET CUSTOMER NEEDS. ATC OFFERS THE FOLLOWING OPTIONS:

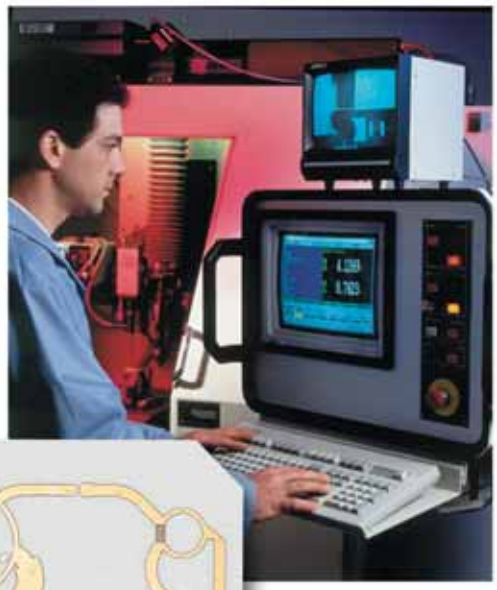
- Lead designs to customer specifications
- Non-magnetic assemblies for MRI applications
- Coatings to enhance high voltage operation
- Marking: Assemblies can be marked with ATC or customer part numbers
- Special Test Options (enhanced screening) for high reliability requirements: (a) Accelerated Life Testing and Voltage Conditioning: Individual parts are tested for 100 hours at elevated voltages and at 125° C. (b) Burn-in at elevated temperatures and voltages to insure reliability

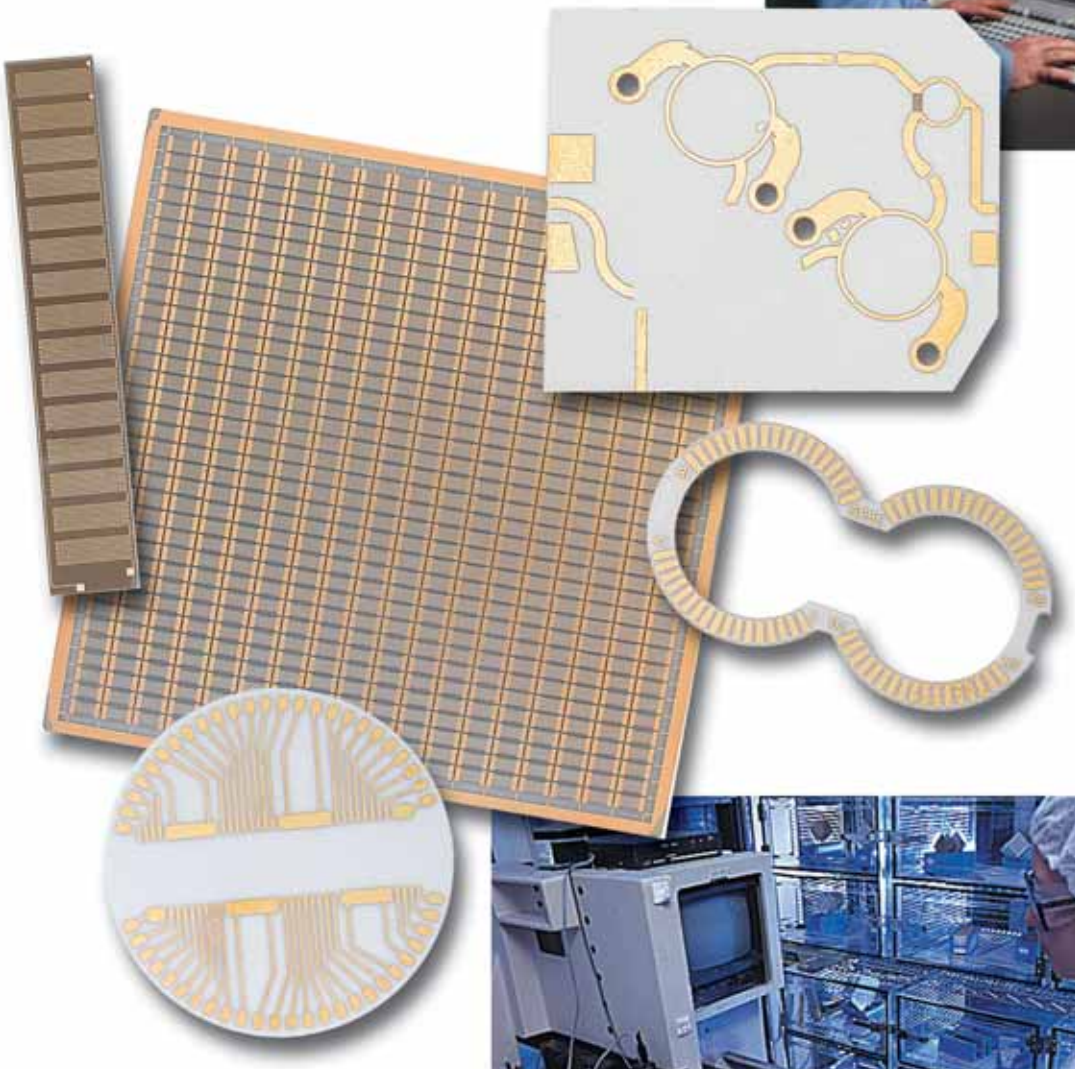


ATC Custom Thin Film Circuits and Components

ATC brings a new standard of responsiveness and quality to thin film technology products. Custom metalization and patterned substrates are offered to address a broad spectrum of deposition and hybrid circuit fabrication requirements.

Custom metalization consists of sputtered and electroplated coatings made to specifications. Products may include via holes and odd shaped substrates in a wide choice of ceramics and dielectric materials. Three target, batch sputtering systems with load-locks are utilized for producing the most consistent film quality.





Typical Metalizations	Application	Attachment Method	Metalization/ Resistor Layers	Typical value
1. TaN –TiW – Au	RF/Microwave circuits: attenuators, loads and DC biasing networks. Hybrids with resistors and spiral inductors. End products: Power supplies, couplers, splitters, filters, amplifiers, SAW devices, laser diode mounts and others.	Pb/In, Au/Si, Au/Ge – Eutectic Epoxy Wire Bonding	TaN 25 to 100 ohms/sq. TiW 300 to 500 Å Au 20 to 300 µ"	50 300 150
2. TiW – Au	Same as 1. – without resistors		TiW 300 to 500 Å Au 20 to 300 µ"	300 150
3. TaN –TiW – Au – Ni – Au	Same as 1. – When repeated soldering is required for repairs	Pb/Sn, Au/Sn soldering Pb/Sn Eutectic Epoxy Wire Bonding	TaN 25 to 100 ohms/sq. TiW 300 to 500 Å Au 20 to 300 µ" Ni 35 to 75 µ" Au 20 to 100 µ"	50 300 20 min. 35 min. 150
4. TiW – Cu – Ni* – Au	High Power/Low Loss RF and Power Supply	Pb/Sn, Au/Sn soldering Epoxy Wire Bonding	TiW 300 to 500 Å Cu 50 to 2000 µ" Ni 35 to 75 µ" Au 20 to 100 µ"	300 500 35 min. 40 min.
5. TaN – TiW – Au Cu – Ni* – Au	High Power/Low Loss RF and Power Supply with Resistors	Pb/Sn soldering Epoxy Wire Bonding	TaN 25 to 100 ohms/sq. TiW 300 to 500 Å Au 3000 to 5000 Å Cu 50 to 2000 µ" Ni 40 to 120 µ" Au 20 to 100 µ"	50 300 3000 min. 500 35 min. 40 min.

** Optional*

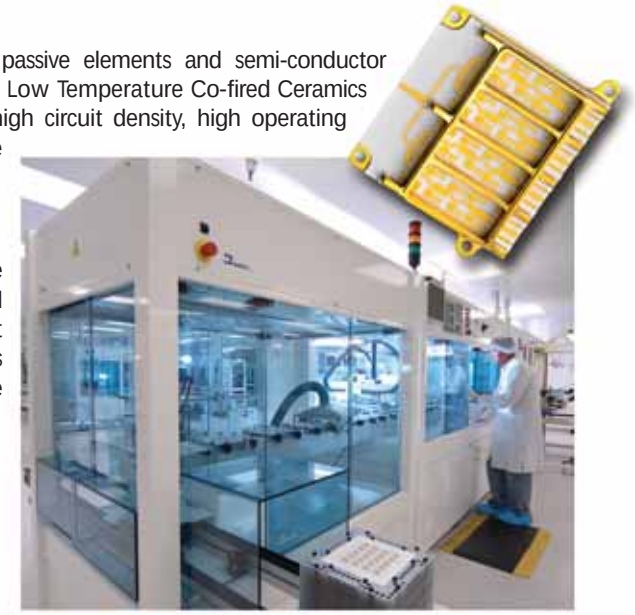
For direct inquiries, technical information and quotations, please contact ATC's Custom Thin Film Product Group at 904-726-3426, or tfsales@atceramics.com

ATC Low Temperature Co-Fired Ceramic Products (LTCC)

LTCC Multilayer Circuits, Modules, Packages and Components

Low Temperature Co-fired Ceramics (LTCC) is an enabling technology, now recognized globally as one of the most advanced and valuable solutions to miniaturization of electronics packaging. In both military and commercial applications, lower weight and smaller size requirements necessitate increasing density in electronics packaging.

LTCC is used to create three-dimensional circuits, bringing together passive elements and semi-conductor components into one high density and highly versatile electronic module. Low Temperature Co-fired Ceramics (LTCC) technology is ideally suited to modular applications requiring high circuit density, high operating temperature and high power dissipation, for low cost high volume manufacturing.



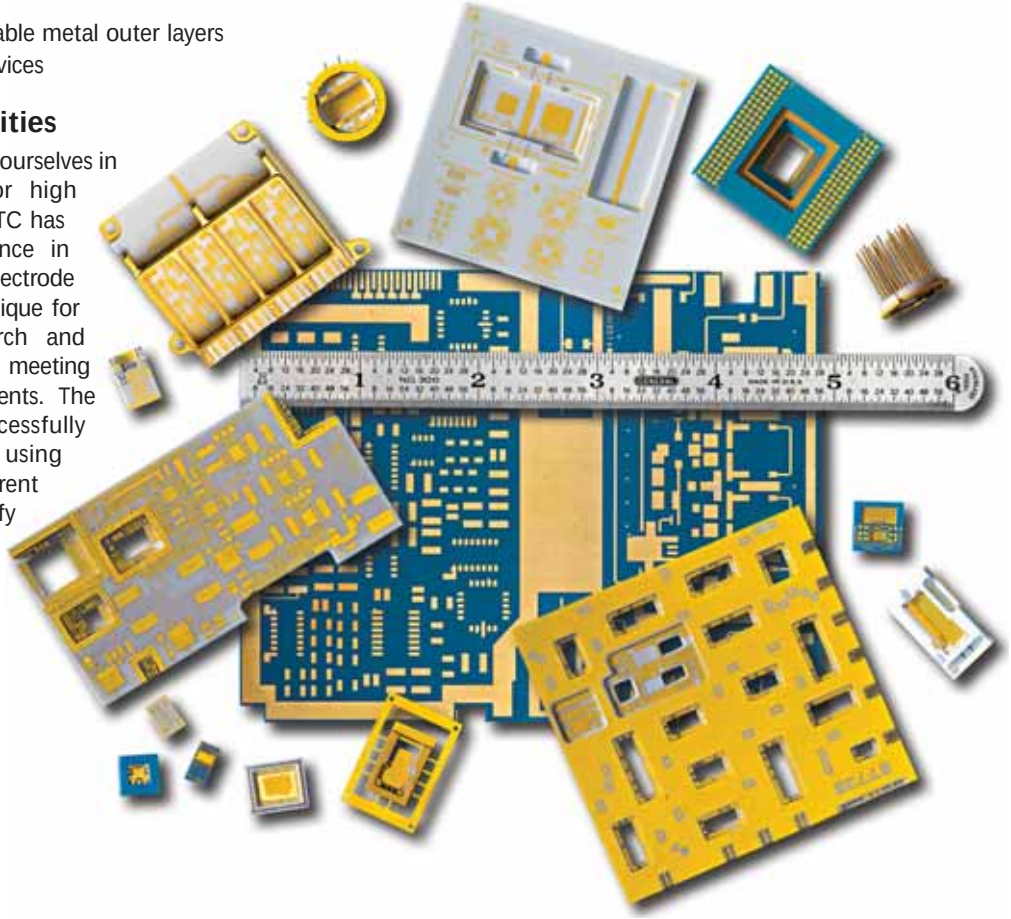
Turn Key Production Capabilities

ATC's LTCC division is a world–class producer of ceramic packages. We have the ability to produce a variety of LTCC substrates, packages and structures from engineering prototypes to MIL-STD-883 compliant hardware. ATC offers extensive expertise using standard ceramic tapes such as Ferro and Du-Pont as well as our own ATC proprietary tape system. Our on-site capabilities include:

- Board sizes up to 6.5"x 6.5" with simple or complex part shapes
- Auto alignment and 100% inspection
- Up to 40 tape layers achievable
- Surface and buried passive components (capacitors, resistors and inductors)
- Surface thin film metalization
- Co-fired and post-fired solderable metal outer layers
- Design, assembly and test services

Advanced Material Abilities

At ATC's LTCC division we pride ourselves in customizing ceramic tape for high volume product applications. ATC has more than 40 years experience in formulating ceramic tape and electrode ink systems. The Company is unique for its full time materials research and development team, capable of meeting the most challenging requirements. The LTCC division has successfully manufactured products using combinations of tape with different dielectric constants. We satisfy the needs of engineers seeking:

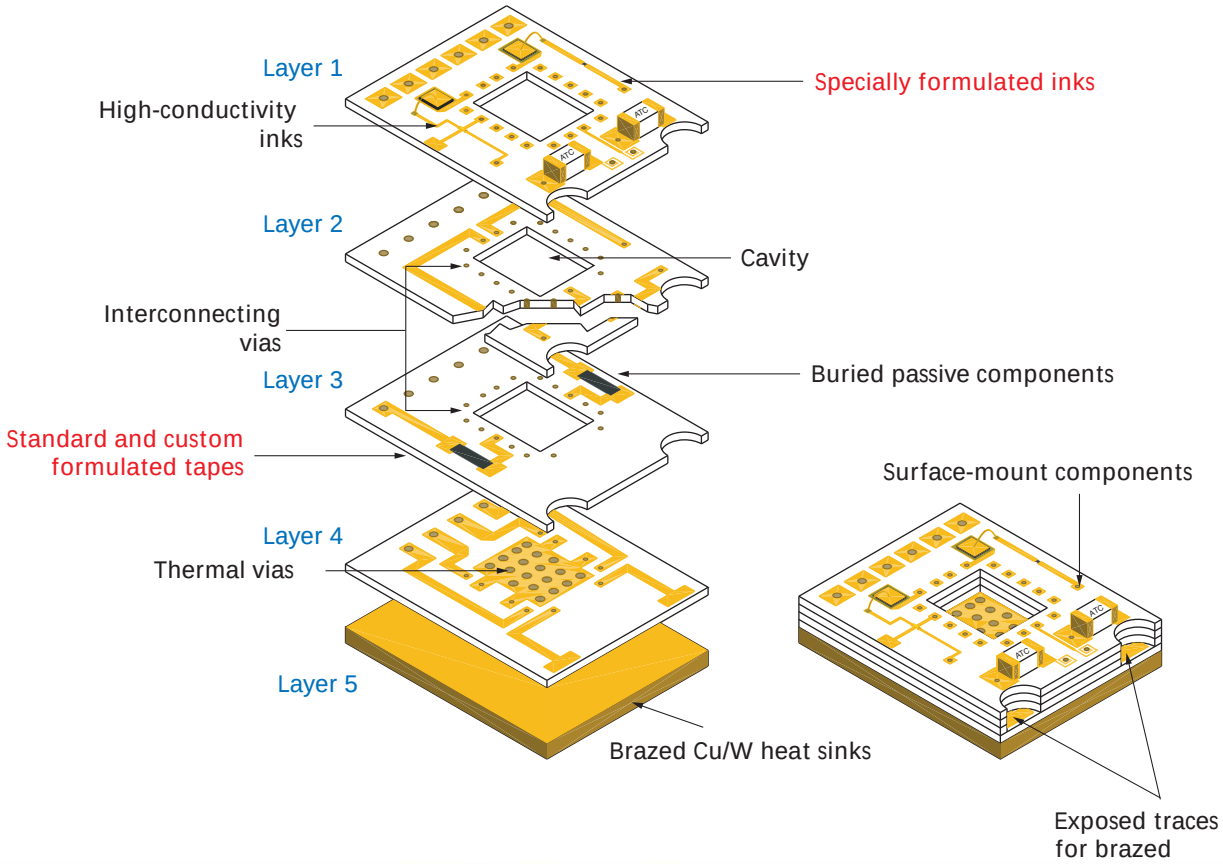


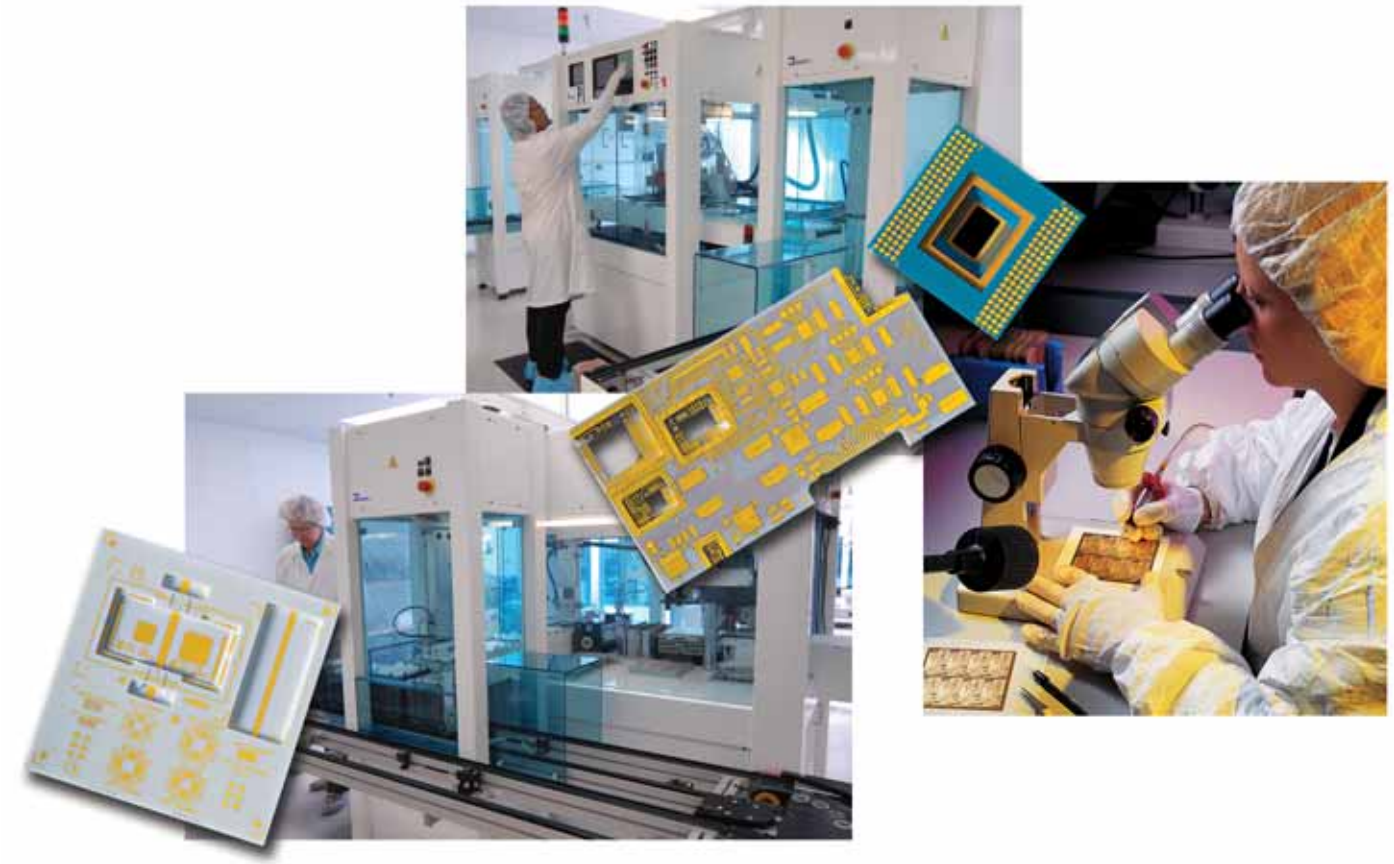
- Superior reliability
- Multiple component modules
- Low developmental costs
- High density packaging
- High volume and prototype manufacturing lines
- Consistent high quality
- A robust solution

ATC'S Focus on Quality

Quality is the hallmark of every product shipped by ATC. ATC is ISO 9001:2000 registered. ATC's LTCC Division utilizes Statistical Process Control methodologies to ensure reliable product quality.

Available Product Features





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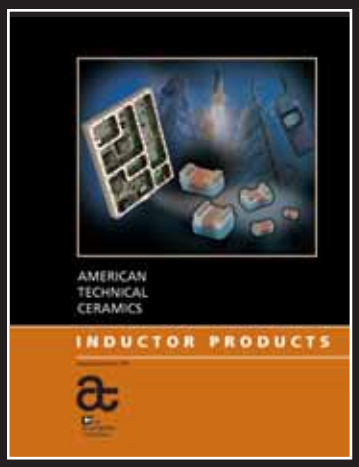
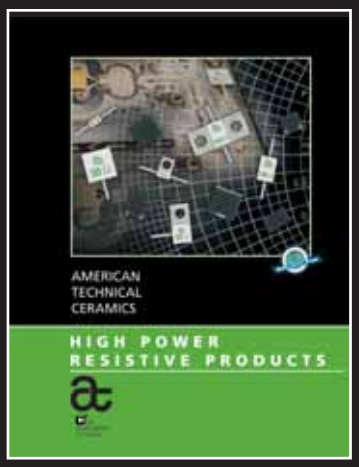
ATC # 001-908; Rev N, 2/07

Other ATC Product Catalogs

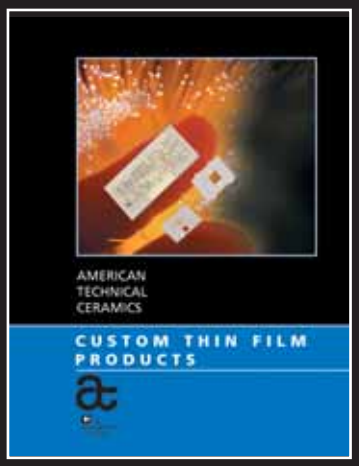
Multilayer Capacitors
& Power Assemblies



Inductor
Products



High Power
Resistive Products



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