



BREL PRECISION COMPONENTS
 1621 WEST UNIVERSITY PARKWAY
 SARASOTA, FLORIDA 34243

TOLL FREE: 1-800-237-4564
 PHONE: (941) 355-9791
 FAX: (941) 355-1530

Product Lines—Electronic Components

CAPACITORS

• Multilayer Ceramic Chip Capacitors

Available in a variety of sizes from 0403 to 3740, Temperature coefficients of NPO(COG), X7R, and Z5U, voltages from 25VDC to 500VDC, Palladium/Silver or Nickel-Barrier termination.

RESISTORS

• Thinfilm and Thickfilm Resistive Products

Sizes 0302 to 2512 chip resistors and resistor networks with tight tolerances of $\pm 0.05\%$ and TC as low as 15ppm. Resistance ranges from 0R10 Ω to 100G Ω . Temperature Sensor chips with TCR to +6000ppm and resistance of 0R25 Ω .

• Leaded Resistors

Micro and Subminiature leaded Carbon Film Resistors, with resistance ranges from 10R Ω to 47M Ω .

RKL-2 — Formerly The World's Smallest Resistor

LMR-0504 — The World's Smallest Resistor

HYBRID CIRCUITS

• Thickfilm Hybrid Circuits

We can design prototype and commercially produce any hybrid circuit utilizing thin or thickfilm technology. These circuits are especially suited for sensors in the medical field and automotive electronics as well as hearing aids and similar devices.

MANUFACTURERS REPRESENTATIVE

- **SRT Microceramique** — Ceramic Monolithic Multilayer Capacitors — Paris, France
- **SIEGERT Electronic** — Thickfilm Hybrid Circuits/LTCC — Cadolzburg, Germany
- **SIEGERT Thinfilm Technology** — Thinfilm Resistive Products — Hermsdorf, Germany



BREL INTERNATIONAL COMPONENTS
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Capacitors, Resistors, Potentiometers, Crystals, Jacks/Plugs, Cables/Connectors, Semiconductors and **SRT & SIEGERT** Products

- **Aluminum Electrolytic** — Standard, Subminiature, Low Leakage, Non-Polar, Low ESR (Axial or Radial)
- **Plastic Film** — Polyester, Polypropylene, Polystyrene, Polycarbonate (Dipped, Encased, Axial-Wrap & Fill)
- **Ceramic** — Single Layer-Axial / Radial; Multilayer-Chip (Surface Mount — 0403 to 1812), Epoxy Dip (Thru Hole)
- **Resistors** — Carbon Film (1/8W-2W) $\pm 2\%$, $\pm 5\%$; Metal Film (1/8W-2W) $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1\%$ (25, 50, 100 ppm); Metal Oxide Film; Power: Wirewound-Cement Encased or Tubular-Epoxy Coated
- **Thick Film Resistor Networks and Chip Resistors** — Size=0805 to 1206, Tol = $\pm 1\%$, $\pm 2\%$, $\pm 5\%$, TC=100-200ppm; SIP Networks — 5 to 12 Pins
- **Potentiometers** — Rotary, Slide, Trimmer, Conductive Plastic, Custom Design — Multi-Section, Switched
- **Crystal Products** — Crystals, Oscillators — VCXO, TCXO, Dual-Output, Trimode, CMOS, TTL; Crystal Filters
- **Switches** — DIP, Slide, Rocker, Toggle — Miniature Sizes
- **Jacks and Plugs** — DC Power, Earphone, Phono, DIN, Headphone Jacks, Stereo/Mono Plugs, DC Power Plugs
- **Cables and Connectors** — Line Cords, Computer Cables, RS-232, Centronics, Edge Card Connectors
- **Semiconductor Products** — Diodes, Rectifier, Small Signal, Zener, Schottkey & Rectifier Bridges
- **SRT** Microminiature Leaded Film Resistors (the World's Smallest) 0.05 Watt, Size: D=0.8mm x L=2.2mm
- **SRT** Thin Film Chip Resistors — Tol= $\pm 0.05\%$ to 1%, TC=5-25ppm, Silicon or Ceramic Substrate
- **SRT** Thin Film Networks — Tol= $\pm 0.02\%$ to 1%, TC=5-25ppm, Custom Design, Surface Mount/Leaded
- **SRT** Thick Film Chip Resistors — Size=0202 to 2512, Range=0.10 Ω to 10T Ω (10x10¹²), Trimming Style Available
- **SIEGERT** Thick Film Networks — Custom Circuit Design, Flexible Layout, Low Tracking TCR, Surface Mount/Leaded

Also Available: **SIEGERT** Thick Film & LTCC (Low Temperature Cofired Ceramic) Hybrids, **AB Electronics** Conductive Plastic & Polymer Potentiometers

Capacitor/Resistor Products

- **Aluminum Electrolytic** – Standard, Subminiature, Low Leakage, Non-Polar, Low ESR (Axial or Radial)
- **Plastic Film** – Polyester, Polypropylene, Polystyrene, Polycarbonate (Dipped, Encased, Axial-Wrap & Fill)
- **Ceramic** – Single Layer-Axial/Radial; Multilayer-Chip (Surface Mount – 0402 to 1812), Epoxy Dip (Thru Hole)
- **Resistors** – Carbon Film (1/8W-2W) $\pm 2\%$, $\pm 5\%$; Metal Film (1/8W-2W) $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1\%$ (25, 50, 100 ppm); Metal Oxide Film; Power: Wirewound-Cement Encased or Tubular-Epoxy Coated
- **Chip Resistors and Thick Film Resistor Networks** – Size=0402 to 2512, Tol= $\pm 1\%$, $\pm 2\%$, $\pm 5\%$, TC=100-200ppm; SIP Network – 5 to 12 Pins
- **Potentiometers** – Rotary, Slide, Trimmer, Conductive Plastic, Custom Design – Multi-Section, Switched
- **Crystal Products** – Crystals, Oscillators – VCXO, TCXO, Dual-Output, Trimode, CMOS, TTL; Crystal Filters
- **Switches** – DIP, Slide, Rocker, Toggle – Miniature Sizes
- **Jacks and Plugs** – DC Power, Earphone, Phono, DIN, Headphone Jacks, Stereo/Mono Plugs, DC Power Plugs
- **Cables and Connectors** – Line Cords, Computer Cables, RS-232, Centronics, Edge Card Connectors
- **Semiconductor Products** – Diodes, Rectifier, Small Signal, Zener, Schottky & Rectifier Bridges

Specialized Products

LCR-Capacitors, Vogt AG – Stamped Metal Products, AB Electronic, Lairton Semiconductors, Potentiometers

BREL International Components

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E-Mail: sales@brelintl.com • Website: www.brelintl.com

SRT Resistor Technology

- **Microminiature Leaded Film Resistors and Leaded Chip Resistors (the World's Smallest)** – RKL-2, 50mW, Cylindrical, D=0.8mm x L=2.2mm LMR, 125 to 350mW, Chip Resistor Substrate Size=0504, 0805 or 1206 with Wire Leads
- **Thin Film Chip Resistors** – Tol= $\pm 0.05\%$ to 1%, TC=5-25ppm, Silicon or Ceramic Substrate
- **Thin Film Networks** – Tol= $\pm 0.02\%$ to 1%, TC=5-25ppm, Custom Design, Surface Mount/Leaded
- **Thick Film Chip Resistors** – Size=0202 to 2512, Range=0.10 Ω to 100G Ω , Trimming Style Available
- **Thick Film Networks** – Custom Circuit Design, Flexible Layout, Low Tracking TCR, Surface Mount/Leaded
- **Miniature SMT Coils** – Size=0603 to 1206 Range=1.8nH to 1200nH Tol= $\pm 5\%$ to $\pm 20\%$
- **Temperature Sensor Chips** – Size=0402-1206, Range=1R00 Ω to 10K0 Ω Tol= $\pm 0.5\%$ to 20% TC=+1500ppm to +4000ppm
- **Precision Pressure Sensors in Thinfilm** – Measuring Range= 10bar to 2000bar Bridge Resistance=10K Ω $\pm 15\%$ TC= ± 50 ppm/K
- **Thinfilm Substrates for Flip Chip Technique** – SnPb Bumps, Bump Height= 40NM to 50NM Combines Flip Chip Technique, US and TS-Wire Bonding Technique, and SMD Solder Technique in One Circuit

Capacitor Products

- **Ceramic Monolithic Chip Capacitors** – Size 0402-2225, Palladium/Silver or Nickel Barrier/Solder Coat Termination
- **Tantalum Capacitors** – Radial, Axial, Molded Case SMD, Hermetically Sealed Case

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Conversion Table (mm - inches)

mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm	inches
0.5	0.01968	17.5	0.68897	34.5	1.35826	51.5	2.02755	68.5	2.69685	85.5	3.36614
1.0	0.03937	18.0	0.70866	35.0	1.37795	52.0	2.04724	69.0	2.71653	86.0	3.38582
1.5	0.05905	18.5	0.72834	35.5	1.39763	52.5	2.06692	69.5	2.73622	86.5	3.40551
2.0	0.07874	19.0	0.74803	36.0	1.41732	53.0	2.08661	70.0	2.75590	87.0	3.42519
2.5	0.09842	19.5	0.76771	36.5	1.43700	53.5	2.10629	70.5	2.77559	87.5	3.44488
3.0	0.11811	20.0	0.78740	37.0	1.45669	54.0	2.12598	71.0	2.79527	88.0	3.46456
3.5	0.13779	20.5	0.80708	37.5	1.47637	54.5	2.14566	71.5	2.81496	88.5	3.48425
4.0	0.15748	21.0	0.82677	38.0	1.49606	55.0	2.16535	72.0	2.83464	89.0	3.50393
4.5	0.17716	21.5	0.84645	38.5	1.51574	55.5	2.18503	72.5	2.85433	89.5	3.52362
5.0	0.19685	22.0	0.86614	39.0	1.53543	56.0	2.20472	73.0	2.87401	90.0	3.54330
5.5	0.21653	22.5	0.88582	39.5	1.55511	56.5	2.22440	73.5	2.89370	90.5	3.56299
6.0	0.23622	23.0	0.90551	40.0	1.57480	57.0	2.24409	74.0	2.91338	91.0	3.58267
6.5	0.25590	23.5	0.92519	40.5	1.59448	57.5	2.26377	74.5	2.93307	91.5	3.60236
7.0	0.27559	24.0	0.94488	41.0	1.61417	58.0	2.28346	75.0	2.95275	92.0	3.62204
7.5	0.29527	24.5	0.96456	41.5	1.63385	58.5	2.30314	75.5	2.97244	92.5	3.64173
8.0	0.31496	25.0	0.98425	42.0	1.65354	59.0	2.32283	76.0	2.99212	93.0	3.66141
8.5	0.33464	25.5	1.00393	42.5	1.67322	59.5	2.34251	76.5	3.01181	93.5	3.68110
9.0	0.35433	26.0	1.02362	43.0	1.69291	60.0	2.36220	77.0	3.03149	94.0	3.70078
9.5	0.37401	26.5	1.04330	43.5	1.71259	60.5	2.38188	77.5	3.05118	94.5	3.72047
10.0	0.39370	27.0	1.06299	44.0	1.73228	61.0	2.40157	78.0	3.07086	95.0	3.74015
10.5	0.41338	27.5	1.08267	44.5	1.75196	61.5	2.42125	78.5	3.09055	95.5	3.75984
11.0	0.43307	28.0	1.10236	45.0	1.77165	62.0	2.44094	79.0	3.11023	96.0	3.77952
11.5	0.45275	28.5	1.12204	45.5	1.79133	62.5	2.46062	79.5	3.12992	96.5	3.79921
12.0	0.47244	29.0	1.14173	46.0	1.81102	63.0	2.48031	80.0	3.14960	97.0	3.81889
12.5	0.49212	29.5	1.16141	46.5	1.83070	63.5	2.49999	80.5	3.16929	97.5	3.83858
13.0	0.51181	30.0	1.18110	47.0	1.85039	64.0	2.51968	81.0	3.18897	98.0	3.85826
13.5	0.53149	30.5	1.20078	47.5	1.87007	64.5	2.53937	81.5	3.20866	98.5	3.87795
14.0	0.55118	31.0	1.22047	48.0	1.88976	65.0	2.55905	82.0	3.22834	99.0	3.89763
14.5	0.57086	31.5	1.24015	48.5	1.90944	65.5	2.57874	82.5	3.24803	99.5	3.91732
15.0	0.59055	32.0	1.25984	49.0	1.92913	66.0	2.59842	83.0	3.26771	100.0	3.93700
15.5	0.61023	32.5	1.27952	49.5	1.94881	66.5	2.61811	83.5	3.28740		
16.0	0.62992	33.0	1.29921	50.0	1.96850	67.0	2.63779	84.0	3.30708		
16.5	0.64960	33.5	1.31889	50.5	1.98818	67.5	2.65748	84.5	3.32677		
17.0	0.66929	34.0	1.33858	51.0	2.00787	68.0	2.67716	85.0	3.34645		