PPI®

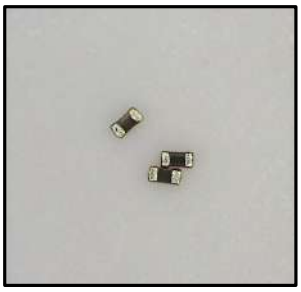
HIGH FREQUENCY COMPONENTS

- DC TO 67 GHZ
- CAPACITORS
- RESISTORS
- INDUCTORS
- SLC

Broadband Capacitors

Broadband Multi-Layer Capacitors

01005BB104MW4R0 (0.010” x 0.005”)



Product Features

• Typical Operating Frequency Range	16 kHz (-3dB point) to > 67 GHz
• Insertion Loss	< 1dB, typical
• Tape & Reel	40K pcs/reel; Lower quantities available in cut tape
• Capacitance	100nF, nom.
• Operating Temperature Range	-55°C to +85°C
• Temperature Coefficient of Capacitance (TCC)	(±15%, -55°C to +85°C)
• Rated Voltage	4 WVDC
• Dielectric Withstanding Voltage (DWV)	250% of rated WVDC for 5 seconds

Part Numbering

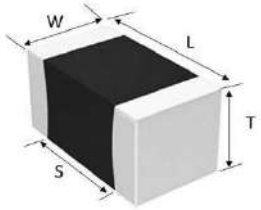
01005 BB 104 M W 4R0

RoHS

- **01005** — Case Size (0.010” x .0.005”)
- **BB** — BB: Broadband
- **104** — Cap Value 100=10x10^0=10pF, 104 = 10x10^4
- **M** — Tolerance M = ±20%
- **W** — Termination: *Tin Plated over Nickel Barrier*
- **4R0** — Voltage 4R0 = 4V

Capacitor Dimensions

Length	Width	Thickness	Gap
L	**W**	**T**	**S**
0.016 in ± 0.001 (0.40mm ± 0.02mm)	0.008 in ± 0.001 (0.20mm ±0.02mm)	0.008 in ± 0.001 (0.20mm ±0.02mm)	0.005 in min (0.13mm min)



Broadband Multi-Layer Capacitors

01005BB104MW4R0 (0.010” x 0.005”)

Performance Curves

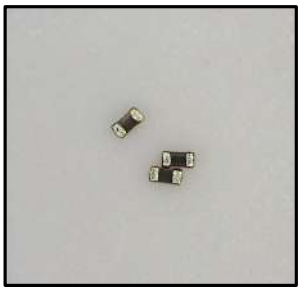
Test Conditions

Modelithics®

Typical responses for sample placed across a 6.0 mil (0.152 mm) gap between 10.5 mil (0.267 mm) wide, 6.5 mil (0.165 mm) long mounting pads on 4-mil Rogers RO4350B.
Presented data was de-embedded to the mounting pad edges using TRL calibration procedures.
Substrate/Pad Scalable Model available through Modelithics.

Broadband Multi-Layer Capacitors

01005BB104MW6R3 (0.010” x 0.005”)



Product Features

• Typical Operating Frequency Range	16 kHz (-3dB point) to > 67 GHz
• Insertion Loss	< 1dB, typical
• Tape & Reel	40K pcs/reel; Lower quantities available in cut tape
• Capacitance	100nF, nom.
• Operating Temperature Range	-55°C to +85°C
• Temperature Coefficient of Capacitance (TCC)	(±15%, -55°C to +85°C)
• Rated Voltage	6.3 WVDC
• Dielectric Withstanding Voltage (DWV)	250% of rated WVDC for 5 seconds

Part Numbering

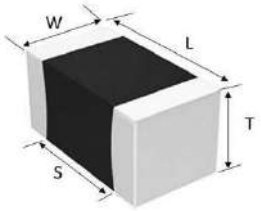
01005 BB 104 M W 6R3

RoHS

- **01005** — Case Size (0.010” x .0.005”)
- **BB** — BB: Broadband
- **104** — Cap Value 100=10x10^0=10pF, 104 = 10x10^4
- **M** — Tolerance M = ±20%
- **W** — Termination: *Tin Plated over Nickel Barrier*
- **6R3** — Voltage 6R3 = 6.3V

Capacitor Dimensions

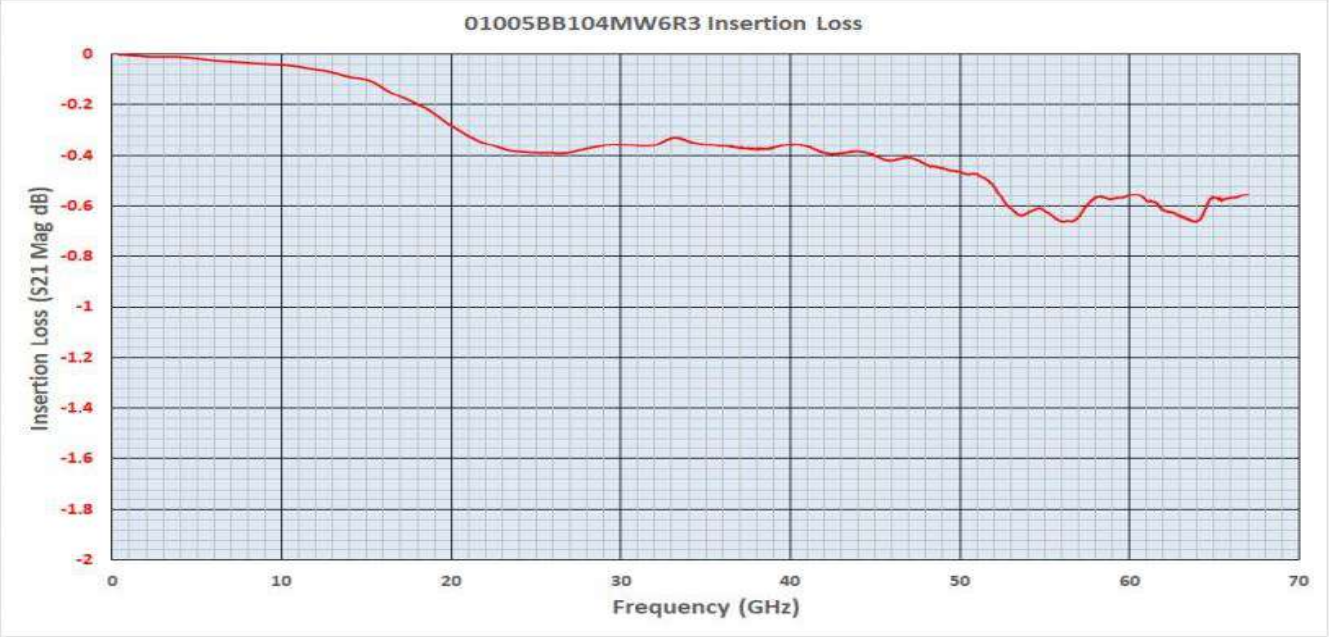
Length	Width	Thickness	Gap
L	**W**	**T**	**S**
0.016 in ± 0.001 (0.40mm ± 0.02mm)	0.008 in ± 0.001 (0.20mm ±0.02mm)	0.008 in ± 0.001 (0.20mm ±0.02mm)	0.005 in min (0.13mm min)

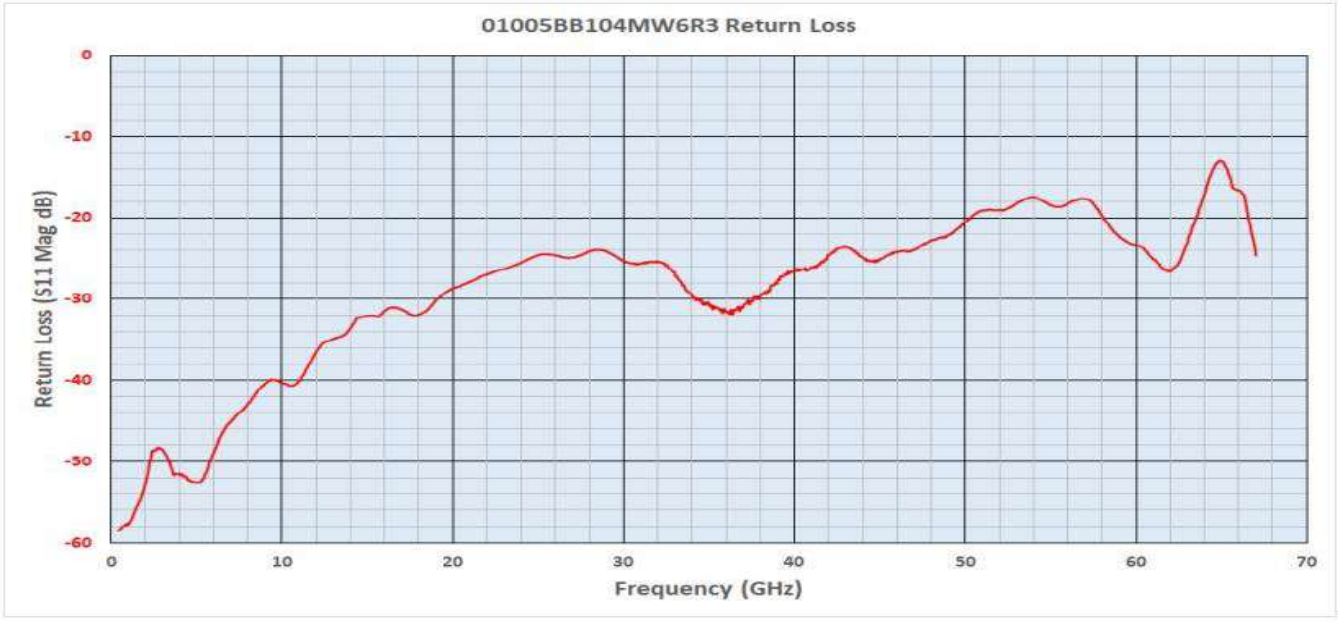


Broadband Multi-Layer Capacitors

01005BB104MW6R3 (0.010” x 0.005”)

Performance Curves





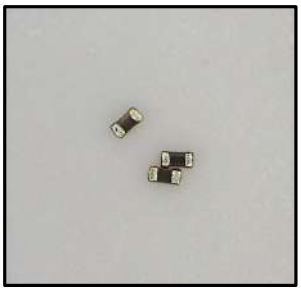
Test Conditions

Modelithics®

Typical responses for sample placed across a 5.0 mil (0.127 mm) gap between 11.4 mil (0.290 mm) wide, 8.5 mil (0.216 mm) long mounting pads on 4-mil Rogers RO4350B.
Presented data is de-embedded to the mounting pad edges using TRL calibration procedures.
Substrate/Pad Scalable Model available through Modelithics.

Broadband Multi-Layer Capacitors

01005BB104MW100 (0.010” x 0.005”)



Product Features

• Typical Operating Frequency Range	16 kHz (-3dB point) to > 67 GHz
• Insertion Loss	< 1dB, typical
• Tape & Reel	40K pcs/reel; Lower quantities available in cut tape
• Capacitance	100nF, nom.
• Operating Temperature Range	-55°C to +85°C
• Temperature Coefficient of Capacitance (TCC)	(±15%, -55°C to +85°C)
• Rated Voltage	10 WVDC
• Dielectric Withstanding Voltage (DWV)	250% of rated WVDC for 5 seconds

Part Numbering

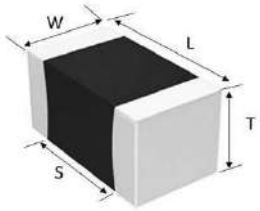
01005 BB 104 M W 100

RoHS

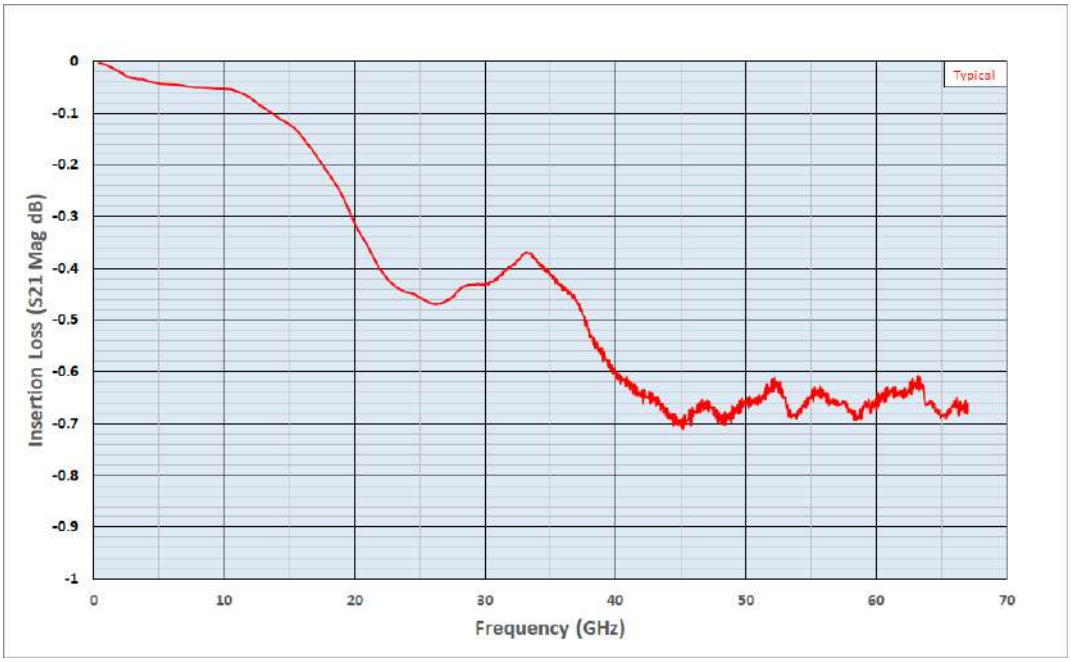
- **01005** — Case Size (0.010” x .0.005”)
- **BB** — BB: Broadband
- **104** — Cap Value 100=10x10^0=10pF, 104 = 10x10^4
- **M** — Tolerance M = ±20%
- **W** — Termination: *Tin Plated over Nickel Barrier*
- **100** — Voltage 100 = 10V

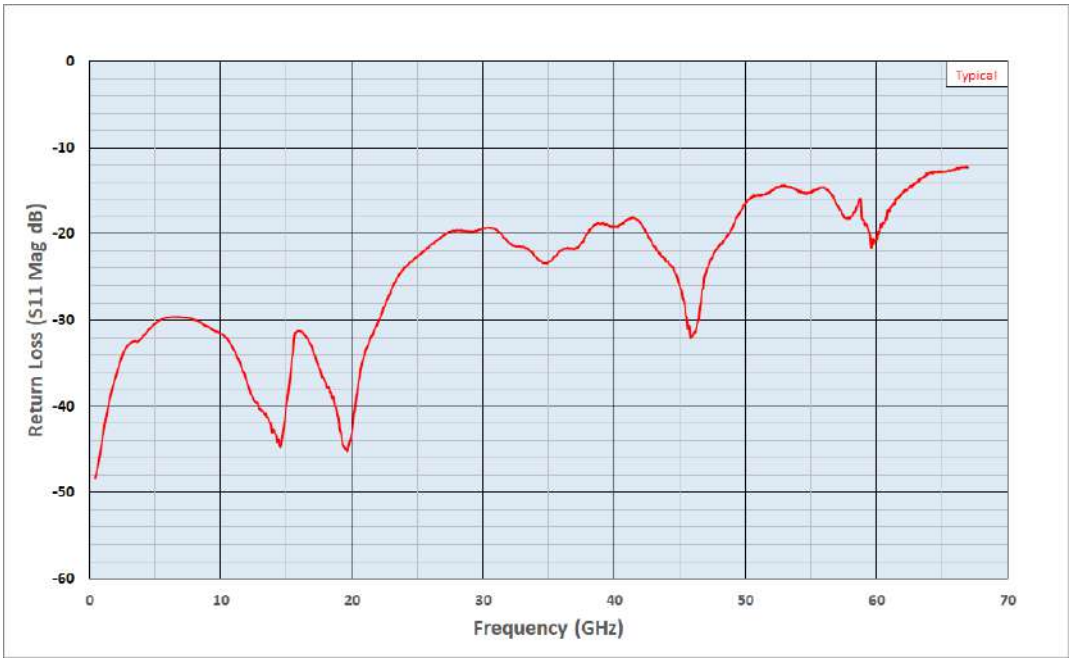
Capacitor Dimensions

Length	Width	Thickness	Gap
L	**W**	**T**	**S**
0.016 in ± 0.001 (0.40mm ± 0.02mm)	0.008 in ± 0.001 (0.20mm ±0.02mm)	0.008 in ± 0.001 (0.20mm ±0.02mm)	0.005 in min (0.13mm min)



Performance Curves





Test Conditions

Typical responses for sample placed across a 5.0 mil (0.127 mm) gap between 11.4 mil (0.290 mm) wide, 8.5 mil (0.216 mm) long mounting pads on 4-mil Rogers RO4350B.
Measured data was de-embedded to the mounting pad edges using TRL calibration procedures.

Broadband Multi-Layer Capacitors

0201BB103KW250 (0.020” x 0.010”)

Product Features

• Typical Operating Frequency Range	160 kHz (-3dB point) to > 32 GHz
• Insertion Loss	< 1dB, typical
• Tape & Reel	15K pcs/reel; Lower quantities available in cut tape
• Capacitance	10nF
• Operating Temperature Range	-55°C to +125°C
• Temperature Coefficient of Capacitance (TCC)	(±15%, -55°C to +125°C)
• Rated Voltage	25 WVDC
• Dielectric Withstanding Voltage (DWV)	250% of rated WVDC for 5 seconds

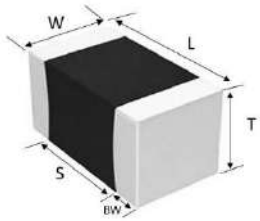
Part Numbering

0201 BB 103 K W 250

- 0201 — Case Size (0.020” x .0.010”)
- BB — BB: Broadband
- 103 — Cap Value 100=10x10^0=10pF, 103 = 10x10^3
- K — Tolerance K = ±10%
- W — Termination: *See Table*
- 250 — Voltage 250 = 25V

Capacitor Dimensions

Length	Width	Thickness	Gap
L	**W**	**T**	**S**
0.023 in. ± 0.002 (0.58mm ± 0.06mm)	0.012 in. ± 0.002 (0.30mm ±0.06mm)	0.013 in. Typ. (0.33mm)	0.008 in. Typ. (0.20 min)

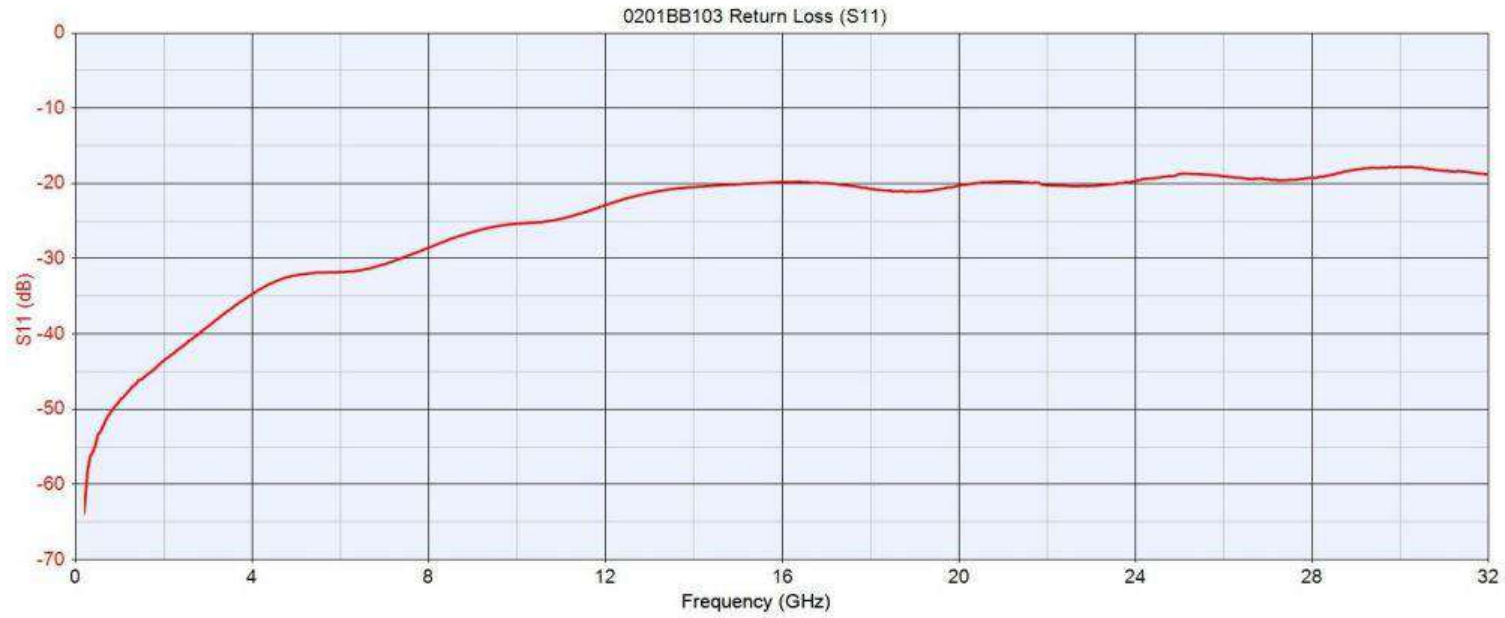


Terminations

W	G	L
Tin Plated over Nickel Barrier (RoHS Compliant)	Gold Epoxy Mount Only	Tin/Lead (90%Sn/10%Pb)

0201BB103KW250
(0.020” x 0.010”)

Performance Curves



Test Conditions

Typical responses for sample placed across a 3 mil (0.076 mm) gap between 13.0 mil (0.330 mm) wide, 8.5 mil (0.216 mm) long mounting pads on 6.6-mil Rogers RO4350B.
Measured data was de-embedded to the mounting pad edges using TRL calibration procedures.

Broadband Multi-Layer Capacitors

0201BB104KW160
(0.020” x 0.010”)

Product Features

• Typical Operating Frequency Range	16 kHz (-3dB point) to > 40 GHz
• Insertion Loss	< 1dB, typical
• Tape & Reel	15K pcs/reel; Lower quantities available in cut tape
• Capacitance	100nF
• Operating Temperature Range	-55°C to +125°C
• Temperature Coefficient of Capacitance (TCC)	(±15%, -55°C to +125°C)
• Rated Voltage	16 WVDC
• Dielectric Withstanding Voltage (DWV)	250% of rated WVDC for 5 seconds

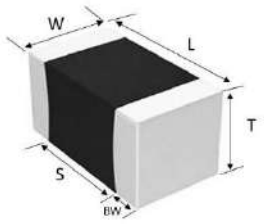
Part Numbering

0201 BB 104 K W 160

- 0201 — Case Size (0.020” x .0.010”)
- BB — BB: Broadband
- 104 — Cap Value 100=10x10⁰=10pF, 104 = 10x10⁴
- K — Tolerance K = ±10%
- W — Termination: *See Table*
- 160 — Voltage 160 = 16V

Capacitor Dimensions

Length	Width	Thickness	Gap
L	**W**	**T**	**S**
0.023 in. ± 0.002 (0.58mm ± 0.06mm)	0.012 in. ± 0.002 (0.30mm ±0.06mm)	0.013 in. Typ. (0.33mm)	0.008 in. Typ. (0.20 min)

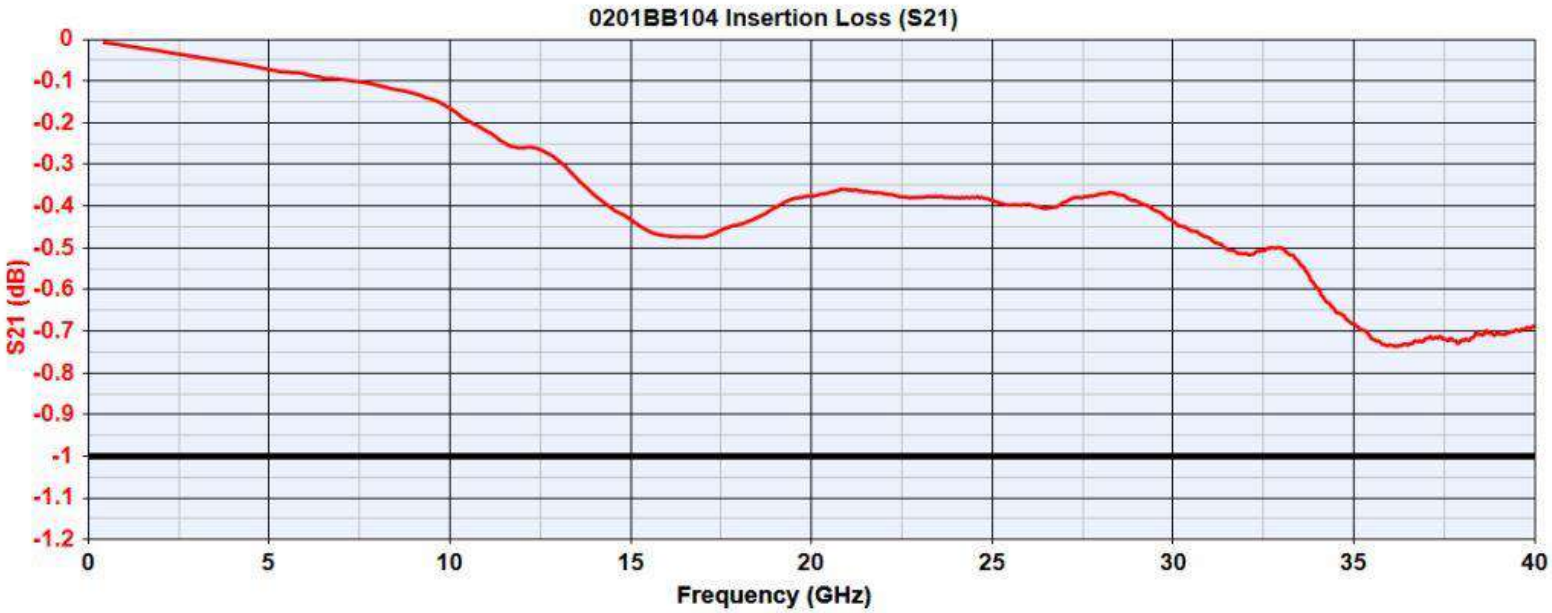


Terminations

W	G	L
Tin Plated over Nickel Barrier (RoHS Compliant)	Gold Epoxy Mount Only	Tin/Lead (90%Sn/10%Pb)

0201BB104KW160
(0.020” x 0.010”)

Performance Curves



Test Conditions

Modelithics®

Typical responses for sample placed across a 5 mil (0.127 mm) gap between 13.8 mil (0.351 mm) wide, 8.5 mil (0.216 mm) long mounting pads on 6.6-mil Rogers RO4350B.
Measured data was de-embedded to the mounting pad edges using TRL calibration procedures.
Substrate/Pad Scalable Model available through Modelithics.

Broadband Multi-Layer Capacitors

0402BB103KW500 (0.040” x 0.020”)

Product Features

• Typical Operating Frequency Range	160 kHz (-3dB point) to > 40 GHz
• Insertion Loss	< 1dB, typical
• Tape & Reel	10K pcs/reel; Lower quantities available in cut tape
• Capacitance	10nF
• Operating Temperature Range	-55°C to +125°C
• Temperature Coefficient of Capacitance (TCC)	(±15%, -55°C to +125°C)
• Rated Voltage	50 WVDC
• Dielectric Withstanding Voltage (DWV)	250% of rated WVDC for 5 seconds

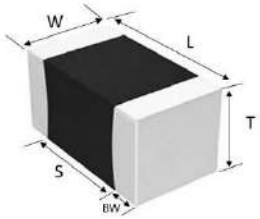
Part Numbering

0402 BB 103 K W 500

- 0402 — Case Size (0.040” x .0.020”)
- BB — BB: Broadband
- 103 — Cap Value 100=10x10^0=10pF, 103 = 10x10^3
- K — Tolerance K = ±10%
- W — Termination: *See Table*
- 500 — Voltage 500 = 50V

Capacitor Dimensions

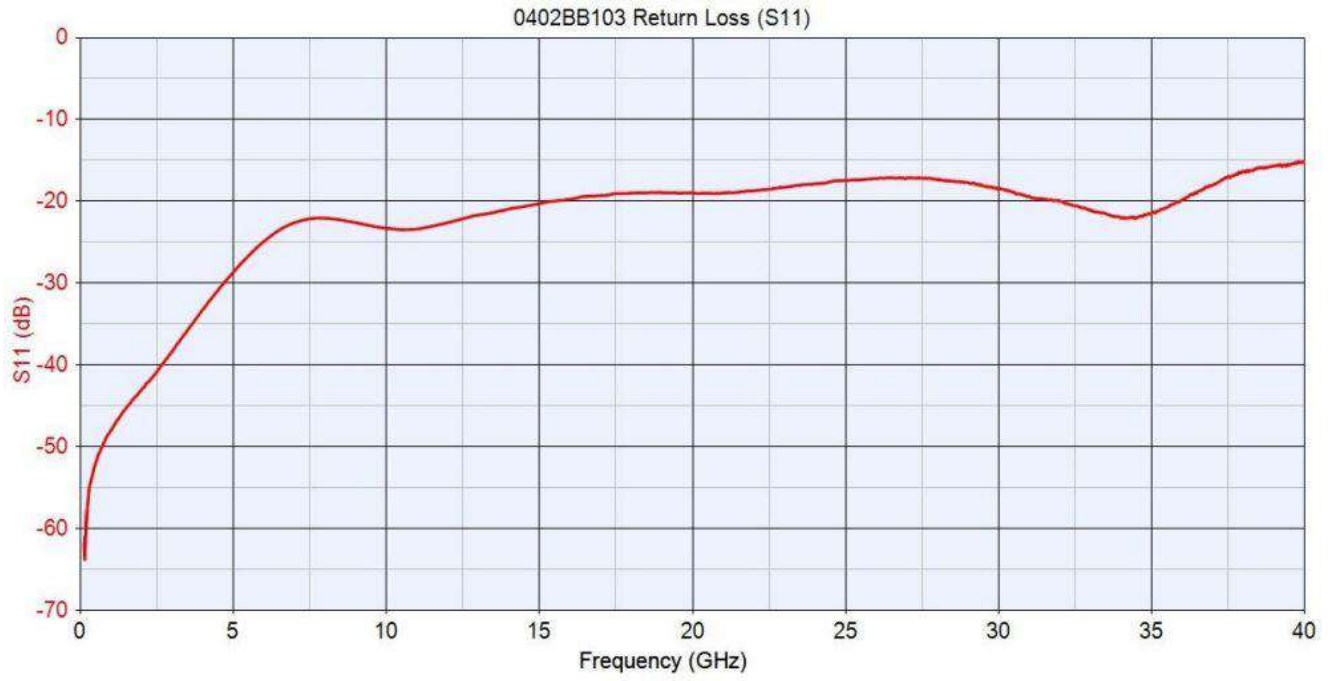
Length	Width	Thickness	Gap
L	**W**	**T**	**S**
0.040 in. ± 0.004 (1.016mm ± 0.102mm)	0.020 in. ± 0.004 (0.508mm ±0.102mm)	0.024 in. MAX (0.610mm MAX)	0.016 in. MIN (0.406 min MIN)



Terminations

W	G	L
Tin Plated over Nickel Barrier (RoHS Compliant)	Gold Epoxy Mount Only	Tin/Lead (90%Sn/10%Pb)

Performance Curves



Test Conditions

Typical responses for sample placed across a 15.5 mil (0.393 mm) gap between 21.0 mil (0.533 mm) wide, 12.3 mil (0.312 mm) long mounting pads on 10-mil Rogers RO4350B. Measured data was de-embedded using TRL calibration procedures.

Broadband Multi-Layer Capacitors

0402BB104KW500 (0.040” x 0.020”)

Product Features

• Typical Operating Frequency Range	16 kHz (-3dB point) to > 50 GHz
• Insertion Loss	< 1.2dB, typical
• Tape & Reel	10K pcs/reel; Lower quantities available in cut tape
• Capacitance	100nF
• Operating Temperature Range	-55°C to +125°C
• Temperature Coefficient of Capacitance (TCC)	(±15%, -55°C to +125°C)
• Rated Voltage	50 WVDC
• Dielectric Withstanding Voltage (DWV)	250% of rated WVDC for 5 seconds

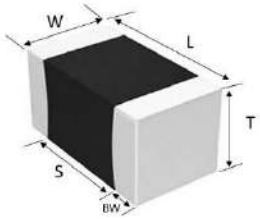
Part Numbering

0402 BB 104 K W 500

- 0402 — Case Size (0.040” x .0.020”)
- BB — BB: Broadband
- 104 — Cap Value 100=10x10⁰=10pF, 104 = 10x10⁴
- K — Tolerance K = ±10%
- W — Termination: *See Table*
- 500 — Voltage 500 = 50V

Capacitor Dimensions

Length	Width	Thickness	Gap
L	**W**	**T**	**S**
0.040 in. ± 0.004 (1.016mm ± 0.102mm)	0.020 in. ± 0.004 (0.508mm ±0.102mm)	0.024 in. MAX (0.610mm MAX)	0.016 in. MIN (0.406 min MIN)



Terminations

W	G	L
Tin Plated over Nickel Barrier (RoHS Compliant)	Gold Epoxy Mount Only	Tin/Lead (90%Sn/10%Pb)

Performance Curves

Test Conditions

Typical responses for sample placed across a 15.5 mil (0.393 mm) gap between 21.0 mil (0.533 mm) wide, 12.3 mil (0.312 mm) long mounting pads on 10-mil Rogers RO4350B. Measured data was de-embedded using TRL calibration procedures.

Broadband Multi-Layer Capacitors

0603BB104KW101 (0.060” x 0.030”)

Product Features

• Typical Operating Frequency Range	16 kHz (-3dB point) to > 20 GHz
• Insertion Loss	< 1.2dB, typical
• Tape & Reel	10K pcs/reel; Lower quantities available in cut tape
• Capacitance	100nF
• Operating Temperature Range	-55°C to +125°C
• Temperature Coefficient of Capacitance (TCC)	(±15%, -55°C to +125°C)
• Rated Voltage	100 WVDC
• Dielectric Withstanding Voltage (DWV)	250% of rated WVDC for 5 seconds

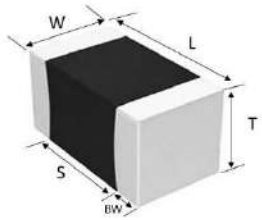
Part Numbering

0603 BB 104 K W 101

- 0603 — Case Size (0.060” x .0.030”)
- BB — BB: Broadband
- 104 — Cap Value 100=10x10⁰=10pF, 104 = 10x10⁴
- K — Tolerance K = ±10%
- W — Termination: *See Table*
- 101 — Voltage 101 = 100V

Capacitor Dimensions

Length	Width	Thickness	Gap
L	**W**	**T**	**S**
0.060 in. ± 0.006 (1.52mm ± 0.15mm)	0.030 in. ± 0.006 (0.76mm ±0.15mm)	0.035 in. MAX (0.890 mm MAX)	0.020 in. MIN (0.510 min MIN)



Terminations

W	G	L
Tin Plated over Nickel Barrier (RoHS Compliant)	Gold Epoxy Mount Only	Tin/Lead (90%Sn/10%Pb)

Performance Curves

Test Conditions

Typical responses for sample placed across a 36 mil (0.914 mm) gap between 29.0 mil (0.737 mm) wide trace on 13.3-mil Rogers RO4350B.
Measured data was de-embedded using TRL calibration procedures.

Broadband Multi-Layer Capacitors

0805BB103KW101
(0.080” x 0.050”)

Product Features

• Typical Operating Frequency Range	160 kHz (-3dB point) to > 3 GHz
• Insertion Loss	< 0.25dB, typical
• Tape & Reel	4K pcs/reel; Lower quantities available in cut tape
• Capacitance	10nF
• Operating Temperature Range	-55°C to +125°C
• Temperature Coefficient of Capacitance (TCC)	(±15%, -55°C to +125°C)
• Rated Voltage	100 WVDC
• Dielectric Withstanding Voltage (DWV)	250% of rated WVDC for 5 seconds

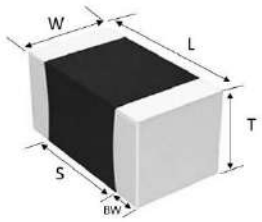
Part Numbering

0805 BB 103 K W 101

- 0805 — Case Size (0.080” x .0.050”)
- BB — BB: Broadband
- 103 — Cap Value 100=10x10^0=10pF, 103 = 10x10^3
- K — Tolerance K = ±10%
- W — Termination: *See Table*
- 101 — Voltage 101 = 100V

Capacitor Dimensions

Length	Width	Thickness	Gap
L	**W**	**T**	**S**
0.080 in. ± 0.006 (2.03mm ± 0.15mm)	0.050 in. ± 0.006 (1.27mm ±0.15mm)	0.040 in. MAX (1.02mm MAX)	0.044 in. MIN (1.12 min MIN)



Terminations

W	G	L
Tin Plated over Nickel Barrier (RoHS Compliant)	Gold Epoxy Mount Only	Tin/Lead (90%Sn/10%Pb)

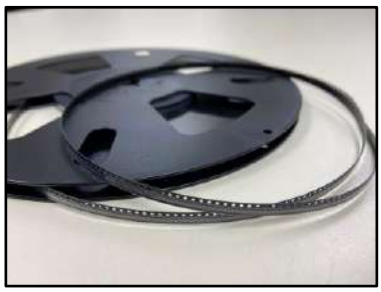
Performance Curves

Test Conditions

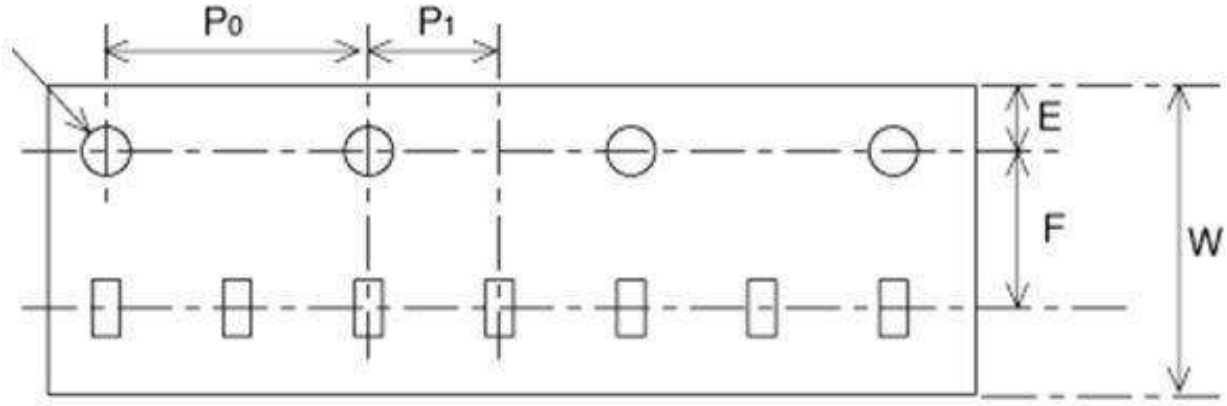
Typical responses for a horizontally oriented sample (electrodes parallel to plane of substrate) placed across a 25.5 mil (0.648 mm) gap across a 42.5 mil (1.08 mm) wide trace on 20-mil Rogers 4003C. Measurements are de-embedded to sample edge using TRL calibration procedures.

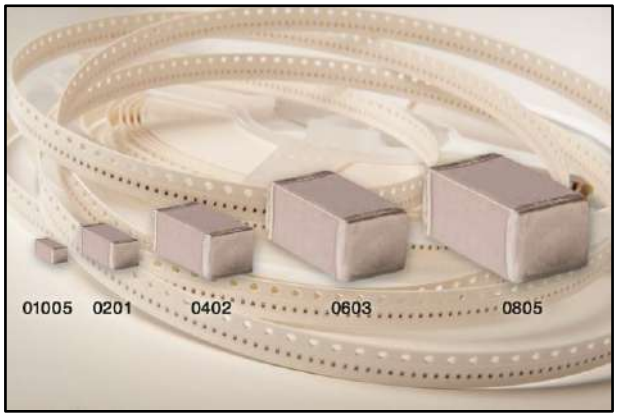
Broadband Capacitors - Tape & Reel Specifications

01005BB Broadband Tape & Reel Specifications



Case Size	W	P0	P1	E	F	Type	Tape Material	Tape Size	Quantity per Reel
01005BB	4.0	2.0	1.0	0.9	1.8	W4P1 Embossed Taping	Plastic	4mm	40,000

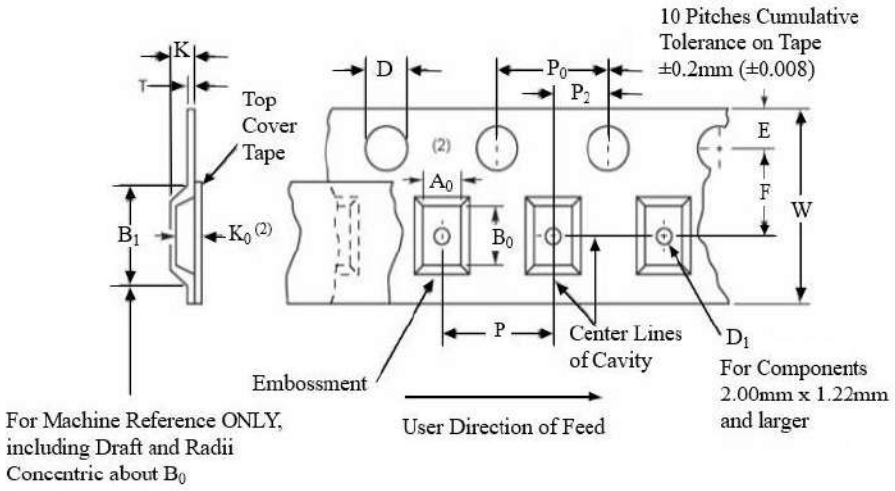




0201BB – 0805BB Broadband Tape & Reel Specifications

Case Size	Tape Material	Tape Size	Quantity per Reel
0201BB	Paper	8mm	15,000
0402BB	Paper	8mm	10,000
0603BB	Paper	8mm	4,000
0805BB	Paper	8mm	2,000- 4,000

B_1 Max	0.165 (4.20mm)
D_1 Min	0.039 (1.00mm)
F	0.138 ± 0.002 (3.50 ± 0.050mm)
K Max	0.094 (2.40mm)
P_2	0.079 ± 0.002 (2.00 ± 0.050mm)
R Min	0.984 (25mm)
W	0.315 ± 0.012 (8.00 ± 0.30mm)
D	0.059 + 0.004, -0.00 (1.5 + 0.10, -0.00mm)
E	0.069 ± 0.004 (1.75 ± 0.10mm)
P_0	0.157 ± 0.004 (4.00 ± 0.10mm)
t Max	0.016 (0.400mm)



A_0 B_0 K_0

- Determined by component size. Typical clearance between the cavity and the component is:
  .05 (.002) min to .50 (.020) max for 8mm tape
- The component cannot rotate more than 20° within the determined cavity.

High Frequency Resistors

High Frequency Resistors

R35-1209BB50R00FxxQC

Product Features

Case Size	Std. Resistance
1209	50Ω

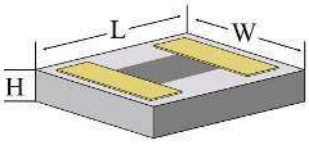
Mechanical Dimensions

L = 0.012” ± 0.001” (0.305mm ± 0.051mm)

W = 0.009” ± 0.001” (0.229mm ± 0.051mm)

H = 0.005” ± 0.001” (0.127mm ± 0.025mm)

Style: 1 Recessed Pad

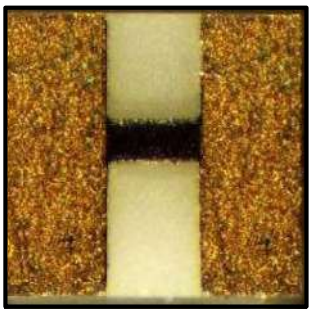


1% standard tolerance (other tolerances available)

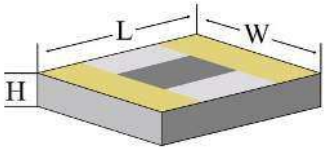
Specifications

Operating Frequency	DC to 67 GHz
Operating Temperature Range	-55°C to +150°C
Resistive Material	Tantalum Nitride (TaN)
Temperature Coefficient	±150 ppm/°C standard
Resistance Tolerance	±1% standard
Substrate	Alumina (Al_2O_3) other substrates available
Metallization	A = Tantalum/Palladium/Gold (TaN/Pd/Au) R = Titanium/Platinum/Gold (Ti/Pt/Au)
Power Derating *See Chart at Right*	Full power up to 70°C Derated linearly to zero power at 150°C

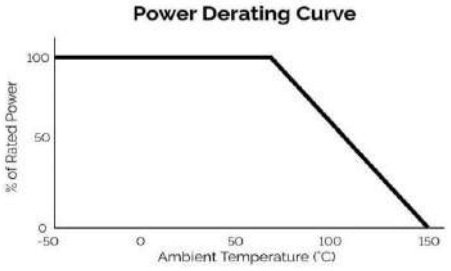
**All PPI Thin Film parts are Non-Magnetic*



Style: 2 Full Pad



1% tolerance only



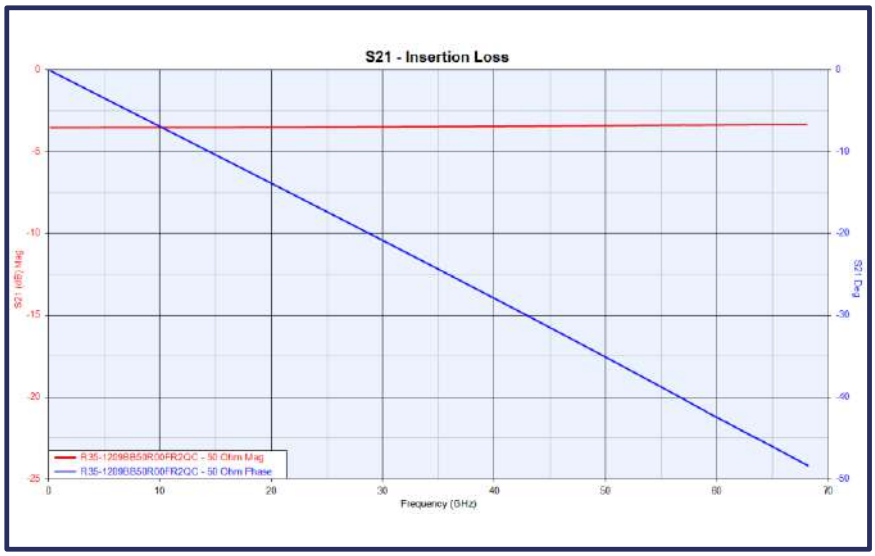
Part Numbering

R 35 - 1209BB 50R00 F R 1 Q C

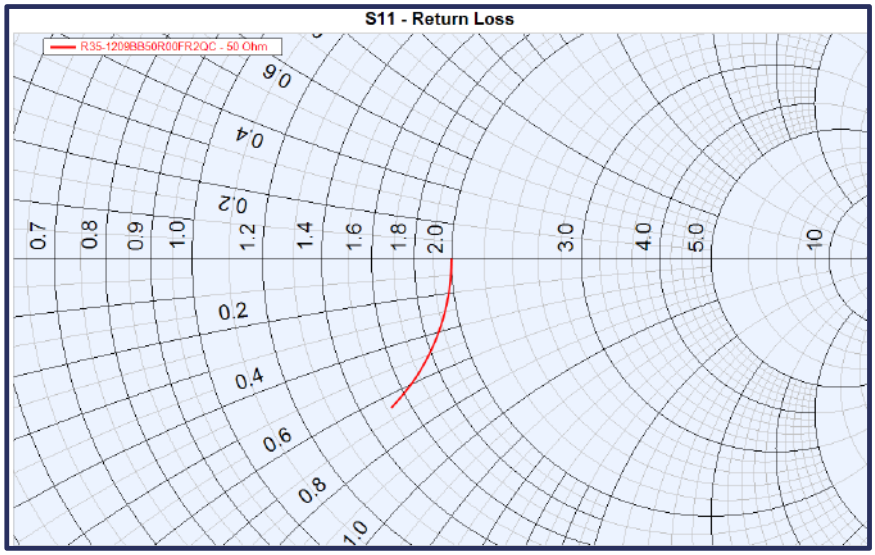
- **R** — Resistor
- **35** — Material: 35 = Alumina
- **1209BB** — Case Size (0.012” x .0.009”)
- **50R00** — Resistance Value: 50Ω = 50R00
  Digits 1-4 are significant; Digit 5 is number of zeros to follow
- **F** — Tolerance: F = ±1%
- **R** — Metallization: **R** = For Soldering; **A** = For wirebonding
- **1** — Style: 1 or 2
  Both styles Flip Chip Configuration compatible
- **Q** — TCR: Q = ±150ppm/°C
- **C** — Power Handling: C = 50mW

Performance Curves - Insertion and Return Loss Charts

12 x 09 50 Ω Insertion Loss



12 x 09 50 Ω Return Loss



Simulated Test Conditions / Pad Dimensions / Dielectric

Modelithics calculated data for 50 Ohm and 100 Ohm resistors from 0.1 to 67.0 GHz on 4 mil Rogers 4350B, Dielectric constant = 4.15. The pad dimensions used to develop the datasheet plots were: Length = 4.0 (0.102), Width = 10.0 (0.254), Gap = 5.0 (0.127). Units in mil (mm). Reference planes were at the pad edges.

Packaging

Parts are delivered in Waffle Packs.
Contact PPI for additional packaging options.

High Frequency Resistors

R35-1209BB100R0FxxQC

Product Features

Case Size	Std. Resistance
1209	100Ω

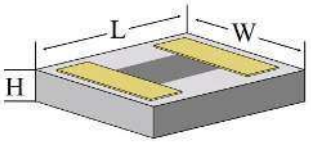
Mechanical Dimensions

L = 0.012” ± 0.001” (0.305mm ± 0.051mm)

W = 0.009” ± 0.001” (0.229mm ± 0.051mm)

H = 0.005” ± 0.001” (0.127mm ± 0.025mm)

Style: 1 Recessed Pad

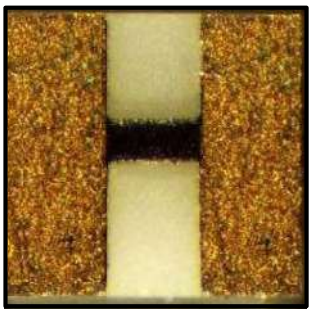


1% standard tolerance (other tolerances available)

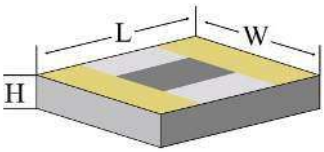
Specifications

Operating Frequency	DC to 67 GHz
Operating Temperature Range	-55°C to +150°C
Resistive Material	Tantalum Nitride (TaN)
Temperature Coefficient	±150 ppm/°C standard
Resistance Tolerance	±1% standard
Substrate	Alumina (Al_2O_3) other substrates available
Metallization	A = Tantalum/Palladium/Gold (TaN/Pd/Au) R = Titanium/Platinum/Gold (Ti/Pt/Au)
Power Derating *See Chart at Right*	Full power up to 70°C Derated linearly to zero power at 150°C

**All PPI Thin Film parts are Non-Magnetic*



Style: 2 Full Pad



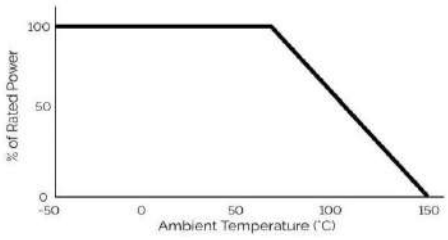
1% tolerance only

Part Numbering

R 35 - 1209BB 100R0 F R 1 Q C

- **R** — Resistor
- **35** — Material: 35 = Alumina
- **1209BB** — Case Size (0.012” x .0.009”)
- **100R0** — Resistance Value: 100Ω = 100R0
  Digits 1-4 are significant; Digit 5 is number of zeros to follow
- **F** — Tolerance: F = ±1%
- **R** — Metallization: **R** = For Soldering; **A** = For wirebonding
- **1** — Style: 1 or 2
  Both styles Flip Chip Configuration compatible
- **Q** — TCR: Q = ±150ppm/°C
- **C** — Power Handling: C = 50mW

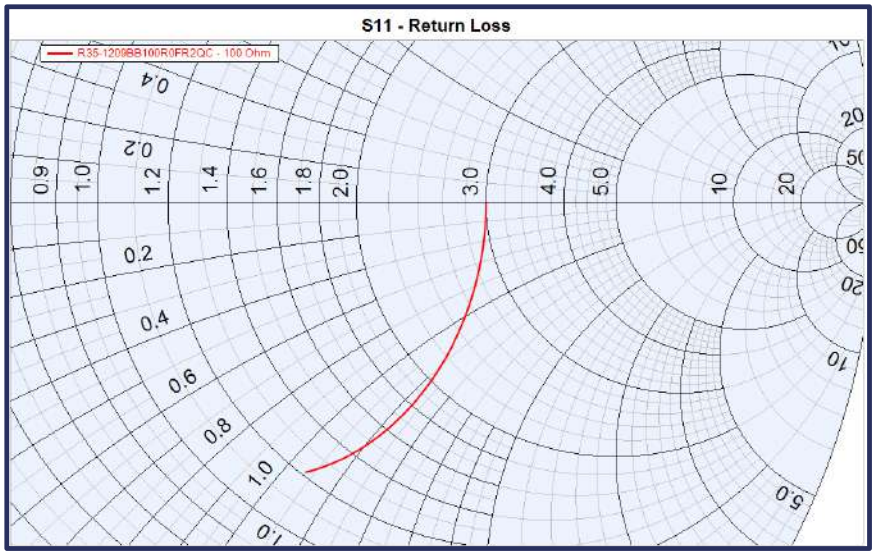
Power Derating Curve



Performance Curves - Insertion and Return Loss Charts

12 x 09 100 Ω Insertion Loss

12 x 09 100 Ω Return Loss



Simulated Test Conditions / Pad Dimensions / Dielectric

Modelithics calculated data for 50 Ohm and 100 Ohm resistors from 0.1 to 67.0 GHz on 4 mil Rogers 4350B, Dielectric constant = 4.15. The pad dimensions used to develop the datasheet plots were: Length = 4.0 (0.102), Width = 10.0 (0.254), Gap = 5.0 (0.127). Units in mil (mm). Reference planes were at the pad edges.

Packaging

Parts are delivered in Waffle Packs.
Contact PPI for additional packaging options.

High Frequency Resistors

R35-2010BB50R00Fx1QE

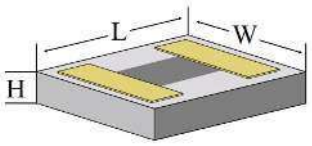
Product Features

Case Size	Std. Resistance
2010	50Ω

Mechanical Dimensions

L = 0.020" ± 0.002" (0.508mm ± 0.051mm)
W = 0.010" ± 0.001" (0.254mm ± 0.051mm)
H = 0.010" ± 0.001" (0.254mm ± 0.025mm)

Style: 1 Recessed Pad



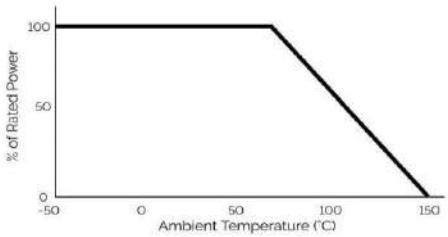
1% standard tolerance (other tolerances available)

Specifications

Operating Frequency	DC to 67 GHz
Operating Temperature Range	-55°C to +150°C
Resistive Material	Tantalum Nitride (TaN)
Temperature Coefficient	±150 ppm/°C standard
Resistance Tolerance	±1% standard
Substrate	Alumina (Al_2O_3) other substrates available
Metallization	A = Tantalum/Palladium/Gold (TaN/Pd/Au) R = Titanium/Platinum/Gold (Ti/Pt/Au)
Power Derating *See Chart at Right*	Full power up to 70°C Derated linearly to zero power at 150°C

**All PPI Thin Film parts are Non-Magnetic*

Power Derating Curve



Part Numbering

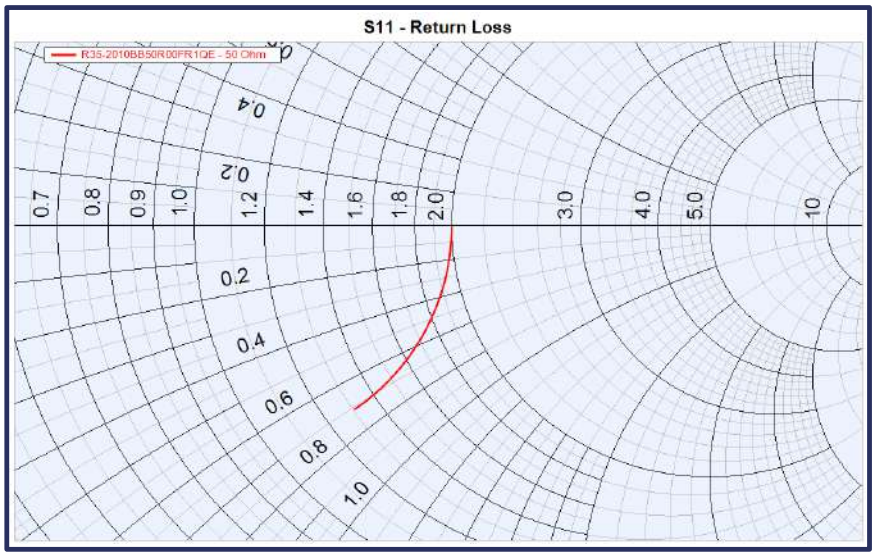
R 35 - 2010BB 50R00 F R 1 Q E

- **R** — Resistor
- **35** — Material: 35 = Alumina
- **2010BB** — Case Size (0.020" x 0.010")
- **50R00** — Resistance Value: 50Ω = 50R00. *Digits 1-4 are significant; Digit 5 is number of zeros to follow*
- **F** — Tolerance: F = ±1%
- **R** — Metallization: **R** = For Soldering; **A** = For wirebonding
- **1** — Style: 1. *Best for wire bonding or surface mount applications Flip Chip Configuration compatible*
- **Q** — TCR: Q = ±150ppm/°C
- **E** — Power Handling: E =100mW

Performance Curves - Insertion and Return Loss Charts

20 x 10 50 Ω Insertion Loss

20 x 10 50 Ω Return Loss



Simulated Test Conditions / Pad Dimensions / Dielectric

Modelithics calculated data for 50 Ohm and 100 Ohm resistors from 0.1 to 67.0 GHz on 4 mil Rogers 4350B, Dielectric constant = 4.15. The pad dimensions used to develop the datasheet plots were: Length = 4.0 (0.102), Width = 10.0 (0.254), Gap = 13.0 (0.330). Units in mil (mm). Reference planes were at the pad edges.

Packaging

Parts are available in Waffle Packs and Tape & Reel. Contact PPI for additional packaging options.

High Frequency Resistors

R35-2010BB100R0Fx1QG

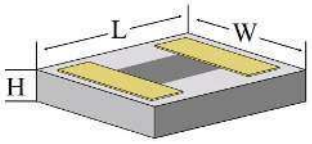
Product Features

Case Size	Std. Resistance
2010	100Ω

Mechanical Dimensions

L = 0.020” ± 0.002” (0.508mm ± 0.051mm)
W = 0.010” ± 0.001” (0.254mm ± 0.051mm)
H = 0.010” ± 0.001” (0.254mm ± 0.025mm)

Style: 1 Recessed Pad



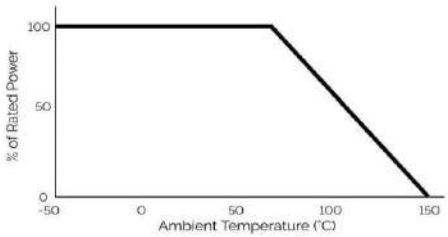
1% standard tolerance (other tolerances available)

Specifications

Operating Frequency	DC to 67 GHz
Operating Temperature Range	-55°C to +150°C
Resistive Material	Tantalum Nitride (TaN)
Temperature Coefficient	±150 ppm/°C standard
Resistance Tolerance	±1% standard
Substrate	Alumina (Al_2O_3) other substrates available
Metallization	A = Tantalum/Palladium/Gold (TaN/Pd/Au) R = Titanium/Platinum/Gold (Ti/Pt/Au)
Power Derating *See Chart at Right*	Full power up to 70°C Derated linearly to zero power at 150°C

**All PPI Thin Film parts are Non-Magnetic*

Power Derating Curve



Part Numbering

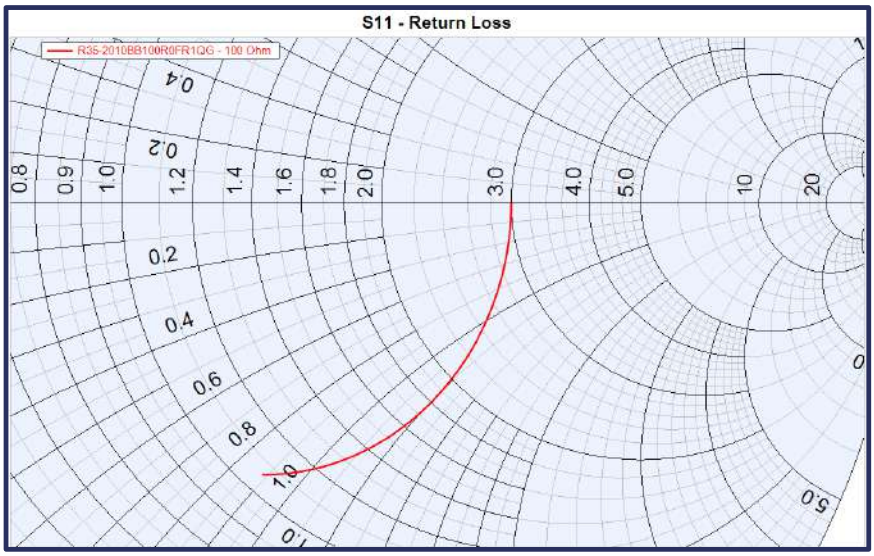
R 35 - 2010BB 100R0 F R 1 Q G

- **Resistor**
- **Material** 35 = Alumina
- **Case Size** (0.020” x 0.010”)
- **Resistance Value** 100Ω = 100R0
  Digits 1-4 are significant; Digit 5 is number of zeros to follow
- **Tolerance** F = ±1%
- **Metallization** **R** = For Soldering; **A** = For wirebonding
- **Style** 1
  Best for wire bonding or surface mount applications Flip Chip Configuration compatible
- **TCR** Q = ±150ppm/°C
- **Power Handling** G =250mW

Performance Curves - Insertion and Return Loss Charts

20 x 10 100 Ω Insertion Loss

20 x 10 100 Ω Return Loss



Simulated Test Conditions / Pad Dimensions / Dielectric

Modelithics calculated data for 50 Ohm and 100 Ohm resistors from 0.1 to 67.0 GHz on 4 mil Rogers 4350B, Dielectric constant = 4.15. The pad dimensions used to develop the datasheet plots were: Length = 4.0 (0.102), Width = 10.0 (0.254), Gap = 13.0 (0.330). Units in mil (mm). Reference planes were at the pad edges.

Packaging

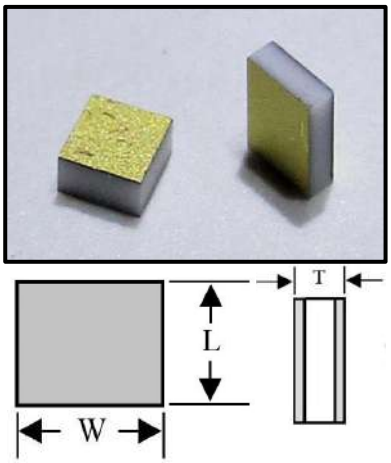
Parts are available in Waffle Packs and Tape & Reel. Contact PPI for additional packaging options.

Single Layer Capacitors

Single Layer Capacitors

Standard Edge to Edge

Product Features



PPI offers Standard Edge to Edge SLC with tight tolerances to the required size, shape and value. Thicknesses of up to 25+ mils are available utilizing temperature-stable low-loss materials and special terminations to improve the all solder process. Chip size, shape and electrical properties may be determined from the dielectric material.

- Capacitance: 0.04 to 10,000pF
- Square or rectangle, length or width .005" and up

Part Numbering

PP S – AS7 – 10×10 × 6 – D4 – 1R0 – K – 3 W

RoHS

PP	S	AS7	10×10	6	D4	1R0	K	3	W
PP = Passive Plus	Capacitor Style	Dielectric Code *See Table*	Length & Width (mils)	Thickness (mils)	Metallization *See Table*	Capacitance Value *See Table*	Tolerance *See Table*	Voltage *See Table*	Packaging W = Waffle Pack *Standard*

Thicknesses (mils)

Length & Width	L or W Tolerance	Margin Nominal	Thickness
≤ 10	± 2	1	± 1.5
11 - 29	± 2	2	
≥ 30	± 3	2	

Capacitance Codes

Value	Code
<10pF	1R0 = 1.0pF
>10pF	101 = 100pF

Metallization Codes

Code	Description
D4	Ti/Pt/Au - Titanium/Platinum/Gold **(70 µin Gold)**
D5	Ti/NiV/Au - Titanium/Nickel Vanadium/Gold **(70 µin Gold)**
S7	Ti/Pt/Ag - Titanium/Platinum/Silver **(20 µin Silver)**
K2	Ta/Pd/Au - Tantalum/Palladium/Gold **(75 µin Gold)**
L3	Ta/Pd/Au - Tantalum/Palladium/Gold **(100 µin Gold)**

Contact PPI for available metallizations.

Single Layer Capacitors

Standard Edge to Edge

Substrates

Substrates can be supplied as follows:

- **Bare**

• **Metallized:**	• Gold over Platinum, Palladium, or Nickel • Silver over Platinum • Custom schemes and patterns to Customer specifications
Thickness Range	3 mils +
Length and Width	Up to 4” depending on material

Standard Electrode Metallizations

Gold (D4)	This metallization consists of a minimum of 70 micro-inches of Gold over Platinum or Nickel which is ideal for all wirebonding methodologies.
Silver (S7)	This metallization consists of 20 micro-inches of Silver over Platinum which is ideal for all solder applications whenever the use of Gold is unacceptable.

Capacitance Tolerance & Dimensional Tolerances Codes

Class I Dielectrics: AS1 - KS2

Tolerance	Code	Tolerance	Code
± .50pF	D	± 20%	M
± .25pF	C	± 15%	L
±.10pF	B	± 10%	K
± .05pF	A	± 5%	J
± .01pF	P	± 3%	H
		± 2%	G

Material	L or W Dimension	Tolerance
AS1 - ZS1	< 20 mils	±15%
	≥ 20 mils	±10%

Class II Dielectrics: MS1 - ZS4

Tolerance	Code	Tolerance	Code
-10% thru +40%	Y	± 20%	M
-20% thru +80%	Z	± 15%	L
0% thru +100%	V	± 10%	K
Guaranteed Min. Value	GMV	± 5%	J

Material	L or W Dimension	Tolerance
ZS4 - ZS6	≤ 15 mils	± 2 mils
	> 15 mils; ≤ 30 mils	± 3 mils
	> 30 mils	± 5 mils

Rated Voltage Codes

Code	Voltage	Dielectric Thickness
2	50V	≤5 mils
3	100V	≥6 mils

Packaging

PPI SLCs are available in Waffle Packs (Standard). Other packaging options may be available. Please contact PPI.

Dielectric Materials – Class I

Dielectrics below consist of material exhibiting very low losses, extremely low or closely controlled temperature coefficients, negligible voltage and frequency coefficients, negligible aging effects and high insultation and dielectric breakdown.

Type	IR Min. @ 25°C Ω	Temperature Coefficient PPM°C -55 to +125°C	Dissipation Factor (@ 10GHz)	Dielectric Constant (K)	Material
AS1	10^{12}	Negligible	0.0001	3.8	Quartz
AS6	10^{12}	P120 ± 25	0.0001	8.7	AlN
AS7	10^{12}	P180 ± 50	0.0006	9.6	Alumina 96
AS8	10^{12}	P180 ± 50	0.0006	9.8	Alumina 99.6
BS2	10^{12}	NP0 0 ± 30	0.0001	12.6	Titanate
CS1	10^{12}	0 ± 30	0.0010	20	Titanate
ES1	10^{12}	0 ± 30	0.0020	40	Titanate
FS1	10^{12}	0 ± 30	0.0050	50	Titanate
IS2	10^{4}	N750 ± 200	0.0050	85	Alumina
JS2	10^{6}	0 ± 30	0.0050	93	Titanate
KS3	10^{6}	N1500 ± 500	0.0025	160	Titanate

Dielectric Materials – Class II

Dielectrics below are characterized by high dielectric constants, increased losses and higher temperature coefficients. These properties are inherent with this class of material but the high dielectric constants permit the use of smaller size to achieve low series inductance and meet dimensional requirements. Capacitors made with these materials are often used for coupling of microstrip line circuits where a small chip is necessary. Used as a bypass capacitor, the small size provides low series inductance and dielectric losses are typically of little concern.

Type	IR Min. @ 25°C Ω	Temperature Coefficient % -55 to +125°C	Dissipation Factor (@ 1MHz)	Aging (%) HR/Decade	Dielectric Constant (K)
MS1	10^{11}	-10 to 5	0.010	2.0	300
PS1	10^{4}	-10 to 10	0.025	3.0	700
RS2	10^{4}	-10 to 10	0.025	3.0	1250
SS3	10^{11}	-10 to 3	0.015	3.5	2200
US1	10^{5}	-35 to 0	0.020	3.0	4000
US3	10^{11}	-15 to 15	0.030	3.0	4500
ZS1	10^{11}	-80 to 0	0.025	3.0	11000
ZS4	*	-15 to 15	0.035	3.0	25000
ZS6	*	-15 to 15	0.035	3.0	35000

Other dielectric materials available depending on application requirements

Single Layer Capacitors

Standard Edge to Edge

Capacitance, Case Size & Dielectric Availability - Class I Dielectrics

Cap (pF)	Size mils (mm)																	
	10x10 (.254 x .254)		12x12 (.305 x .305)		15x15 (.381 x .381)		20x20 (.508 x .508)		25x25 (.635 x .635)		30x30 (.762 x .762)		35x35 (.889 x .889)		40x40 (1.016 x 1.016)		50x50 (1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
0.04	AS7	5	AS7	6	AS7	10												
0.06	AS7	4	AS7	5	AS7	8	AS2	5	AS2	10								
0.08	ES1	10	AS7	4	AS7	6	AS7	10	AS2	7	AS2	9						
0.1	ES1	8	ES1	11	AS7	5	AS7	9	AS2	5	AS2	7	AS2	10				
0.2	ES1	5	ES1	7	ES1	10	AS7	4	AS7	7	AS7	10	AS2	5	AS2	7	AS2	10
0.3	IS1	6	ES1	4	ES1	6	ES1	11	AS7	4	AS7	7	AS7	9	AS2	5	AS2	7
0.4	IS1	5	IS1	7	ES1	5	ES1	9	ES1	15	AS7	5	AS7	7	AS7	9	AS2	5
0.5	IS1	4	IS1	5	ES1	4	ES1	7	ES1	11	AS7	5	AS7	5	AS7	7	AS2	4
0.6	KS2	6	IS1	5	IS1	7	ES1	6	ES1	10	ES1	15	AS7	4	AS7	6	AS7	9
0.8	MS1	8	KS2	6	IS1	5	ES1	5	ES1	7	ES1	10	ES1	15	AS7	4	AS7	7
1.0	MS1	7	KS2	5	IS1	4	IS1	7	ES1	6	ES1	8	ES1	10	AS7	4	AS7	5
1.2	MS1	6	KS2	4	IS1	4	IS1	6	ES1	5	ES1	7	ES1	9	AS7	3	AS7	5
1.5	MS1	5	MS1	7	KS2	5	IS1	5	ES1	4	ES1	6	ES1	7	ES1	10	AS7	4
1.8	MS1	4	MS1	5	KS2	4	IS1	4	IS1	6	ES1	5	ES1	6	ES1	8	ES1	11
2.0	MS1	4	MS1	5	KS2	4	KS2	7	IS1	6	ES1	4	ES1	5	ES1	7	ES1	11
2.2	RS1	4	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7	ES1	5	ES1	7	ES1	10
2.7	RS1	8	MS1	4	MS1	6	KS2	5	IS1	4	IS1	6	ES1	4	ES1	5	ES1	8
3.3	RS1	7	RS1	10	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7	ES1	4	ES1	7
3.9	RS1	6	RS1	9	MS1	4	MS1	7	KS2	5	IS1	4	IS1	6	IS1	8	ES1	6
4.7	RS1	5	RS1	7	RS1	11	MS1	6	KS2	4	KS2	6	IS1	5	IS1	6	ES1	5
5.6	RS1	4	RS1	6	RS1	10	MS1	5	MS1	7	KS2	5	IS1	4	IS1	5	ES1	4
6.8	RS1	4	RS1	5	RS1	8	MS1	4	MS1	6	KS2	5	KS2	6	IS1	4	IS1	7
8.2	SS3	6	RS1	4	RS1	7	MS1	4	MS1	5	KS2	4	KS2	5	KS2	7	KS2	10
10	SS3	5	RS1	4	RS1	5	RS1	9	MS1	4	MS1	6	KS2	4	KS2	5	KS2	8
12	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	5	MS1	7	KS2	4	KS2	7
15	US1	6	SS3	5	RS1	4	RS1	6	RS1	10	MS1	4	MS1	6	MS1	7	KS2	6
18	US1	5	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	4	MS1	6	KS2	5
20	US1	5	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	4	MS1	5	KS2	4
22	US1	4	US1	6	SS3	5	RS1	4	RS1	7	RS1	9	MS1	4	MS1	5	KS2	4

Other dielectric materials available depending on application requirements

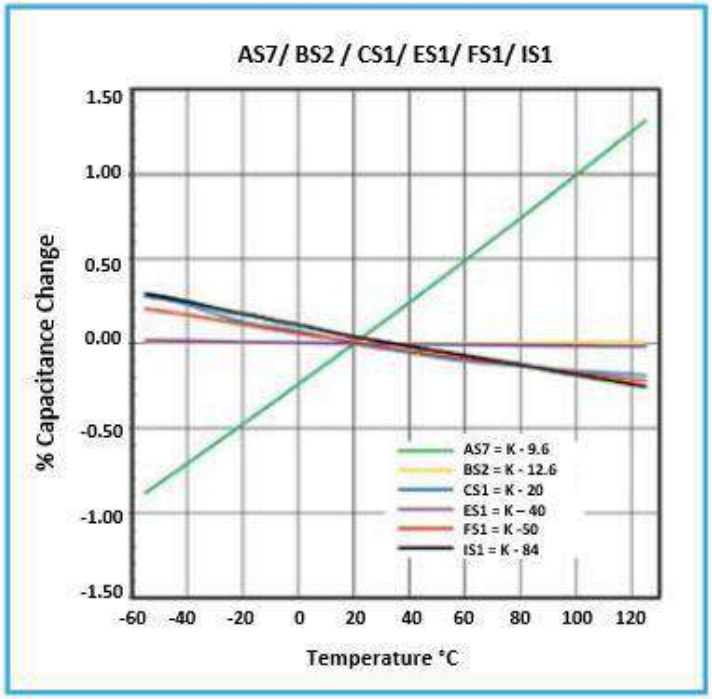
Shaded cells indicate Class II Dielectrics

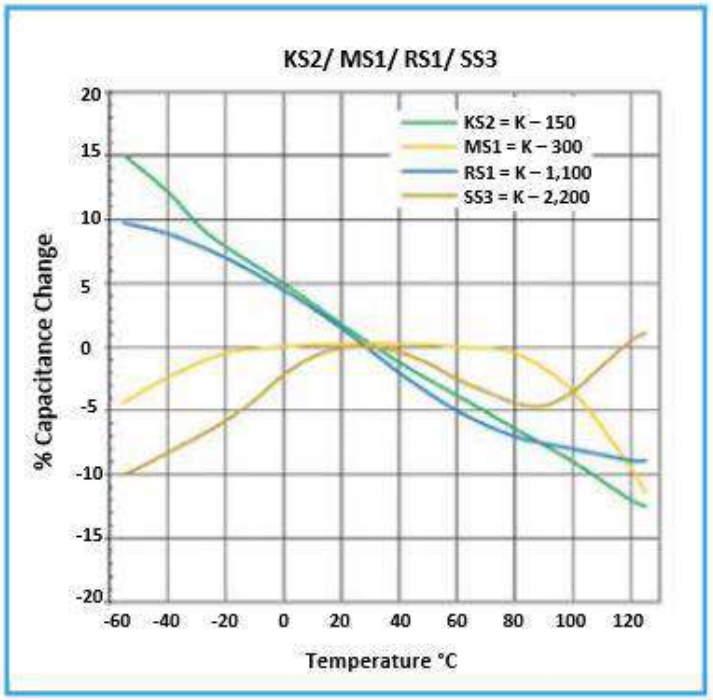
Capacitance, Case Size & Dielectric Availability – Class II Dielectrics

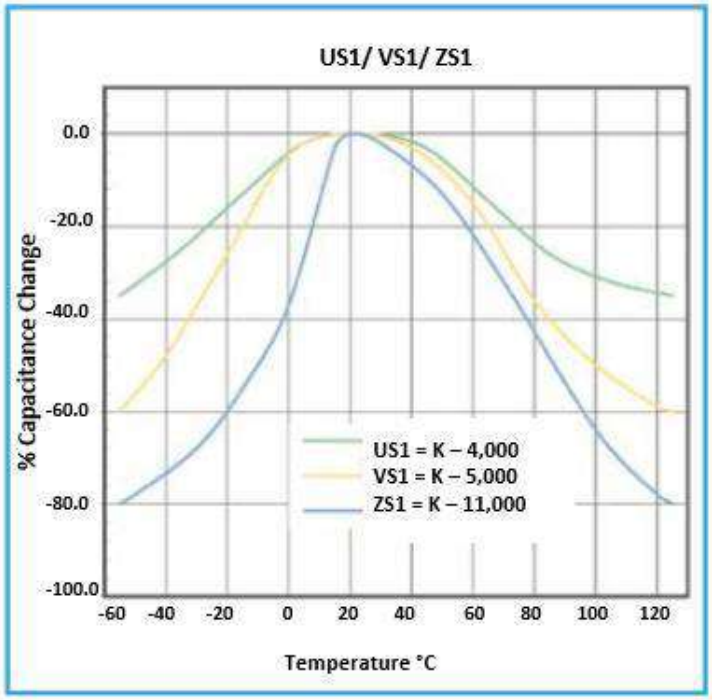
Cap (pF)	Size mils (mm)																	
	10x10 (.254 x .254)		12x12 (.305 x .305)		15x15 (.381 x .381)		20x20 (.508 x .508)		25x25 (.635 x .635)		30x30 (.762 x .762)		35x35 (.889 x .889)		40x40 (1.016 x 1.016)		50x50 (1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
27	US1	4	US1	5	SS3	4	RS1	4	RS1	6	RS1	8	MS1	3	MS1	4	MS1	6
33	VS1	4	US1	4	US1	6	SS3	6	RS1	5	RS1	6	RS1	11	MS1	4	MS1	5
39	ZS1	6	US1	4	US1	5	SS3	5	RS1	4	RS1	5	RS1	7	RS1	10	MS1	4
47	ZS1	5	ZS1	7	US1	5	SS3	4	SS3	6	RS1	5	RS1	6	RS1	8	MS1	4
56	ZS1	4	ZS1	6	VS1	5	US1	7	SS3	5	RS1	4	RS1	5	RS1	7	RS1	10
68	ZS1	4	ZS1	5	VS1	4	US1	6	SS3	5	SS3	6	RS1	4	RS1	6	RS1	9
82	ZS4	7	ZS1	4	ZS1	7	VS1	6	SS3	4	SS3	5	SS3	7	SS3	10	RS1	7
100	ZS4	6	ZS4	8	ZS1	6	VS1	5	US1	6	SS3	5	SS3	6	SS3	8	RS1	6
120	ZS4	5	ZS4	7	ZS1	5	ZS1	8	VS1	6	SS3	4	SS3	5	SS3	7	RS1	5
150	ZS4	4	ZS4	5	ZS1	4	ZS1	7	VS1	5	VS1	7	SS3	4	SS3	5	RS1	4
180	ZS6	4	ZS4	5	ZS4	7	ZS1	6	VS1	4	VS1	6	VS1	8	US1	8	SS3	7
200	ZS6	4	ZS4	4	ZS4	6	ZS1	5	ZS1	8	VS1	5	VS1	7	US1	7	SS3	6
220	ZS6	4	ZS6	5	ZS4	6	ZS1	4	ZS1	7	VS1	5	VS1	6	US1	6	SS3	6
270			ZS6	4	ZS4	5	ZS4	8	ZS1	6	VS1	4	VS1	5	US1	5	SS3	5
330					ZS4	4	ZS4	7	ZS1	5	ZS1	7	VS1	4	US1	4	US1	7
390					ZS6	4	ZS4	6	ZS1	4	ZS1	6	ZS1	7	ZS1	10	US1	6
470					ZS6	4	ZS4	5	ZS4	7	ZS1	5	ZS1	6	ZS1	8	US1	5
560							ZS4	4	ZS4	6	ZS1	4	ZS1	5	ZS1	7	US1	4
680							ZS6	5	ZS4	5	ZS4	8	ZS1	5	ZS1	6	VS1	4
820							ZS6	4	ZS6	6	ZS4	6	ZS1	4	ZS1	5	ZS1	7
1000									ZS6	5	ZS4	5	ZS4	7	ZS1	4	ZS1	6
1200									ZS6	4	ZS4	4	ZS4	6	ZS4	7	ZS1	5
1500											ZS6	5	ZS4	5	ZS4	6	ZS1	4
1800											ZS6	4	ZS6	6	ZS4	5	ZS4	8
2200													ZS6	5	ZS4	4	ZS4	6
2700													ZS6	4	ZS6	5	ZS4	5
3300																	ZS6	6

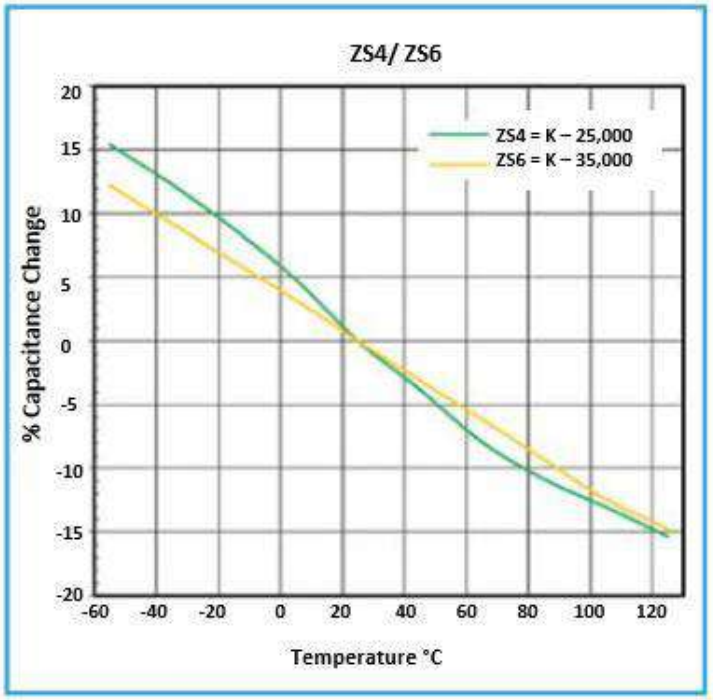
Other dielectric materials available depending on application requirements

Typical Temperature Characteristics









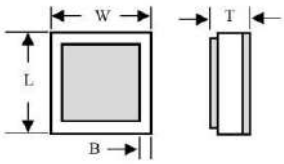
Single Layer Capacitors

Border Cap

Product Features

Border Caps have the topside electrode withdrawn from the edges in order to increase the distance between electrodes and dramatically decrease the possibilities of shorting when epoxy die-mounting. This style is also widely used for optical recognition-based assembly.

Increased margin sizes and special terminations are available for high power LC filter applications. Border Caps can be customized to any sized square or rectangle. Contact PPI for more information.



- Capacitance: 0.04 to 3300pF

Part Numbering

PP B – FS1 – 29×19 × 6 – D4 – 1R0 – K – 3 W

RoHS

PP = Passive Plus	Capacitor Style *B = Border*	Dielectric Code *See Table*	Length & Width (mils)	Thickness (mils)	Metallization *See Table*	Capacitance Value *See Table*	Tolerance *See Table*	Voltage *See Table*	Packaging W = Waffle Pack *Standard*

Thicknesses (mils)

Length & Width	L or W Tolerance	Margin Nominal	Thickness
≤ 10	± 2	1	± 1.5
11 - 29	± 2	2	
≥ 30	± 3	2	

Capacitance Codes

Value	Code
<10pF	1R0 = 1.0pF
>10pF	101 = 100pF

Metallization Codes

Code	Description
D4	Ti/Pt/Au - Titanium/Platinum/Gold **(70 µin Gold)**
D5	Ti/NiV/Au - Titanium/Nickel Vanadium/Gold **(70 µin Gold)**
S7	Ti/Pt/Ag - Titanium/Platinum/Silver **(20 µin Silver)**
K2	Ta/Pd/Au - Tantalum/Palladium/Gold **(75 µin Gold)**
L3	Ta/Pd/Au - Tantalum/Palladium/Gold **(100 µin Gold)**

Contact PPI for available metallizations.

Single Layer Capacitors

Border Cap

Substrates

Substrates can be supplied as follows:

• **Bare**	
• **Metallized:**	• Gold over Platinum, Palladium, or Nickel • Silver over Platinum • Custom schemes and patterns to Customer specifications
Thickness Range	3 mils +
Length and Width	Up to 4” depending on material

Standard Electrode Metallizations

Gold (D4) This metallization consists of a minimum of 70 micro-inches of Gold over Platinum or Nickel which is ideal for all wirebonding methodologies.

Silver (S7) This metallization consists of 20 micro-inches of Silver over Platinum which is ideal for all solder applications whenever the use of Gold is unacceptable.

Capacitance Tolerance & Dimensional Tolerances Codes

Class I Dielectrics: AS1 - KS2			
Tolerance	**Code**	**Tolerance**	**Code**
± .50pF	D	± 20%	M
± .25pF	C	± 15%	L
±.10pF	B	± 10%	K
± .05pF	A	± 5%	J
± .01pF	P	± 3%	H
		± 2%	G

Material	L or W Dimension	Tolerance
AS1 - ZS1	< 20 mils	±15%
	≥ 20 mils	±10%

Class II Dielectrics: MS1 - ZS4			
Tolerance	**Code**	**Tolerance**	**Code**
-10% thru +40%	Y	± 20%	M
-20% thru +80%	Z	± 15%	L
0% thru +100%	V	± 10%	K
Guaranteed Min. Value	GMV	± 5%	J

Material	L or W Dimension	Tolerance
ZS4 - ZS6	≤ 15 mils	± 2 mils
	> 15 mils; ≤ 30 mils	± 3 mils
	> 30 mils	± 5 mils

Rated Voltage Codes

Code	Voltage	Dielectric Thickness
2	50V	≤5 mils
3	100V	≥6 mils

Packaging

PPI SLCs are available in Waffle Packs (Standard). Other packaging options may be available. Please contact PPI.

Dielectric Materials – Class I

Dielectrics below consist of material exhibiting very low losses, extremely low or closely controlled temperature coefficients, negligible voltage and frequency coefficients, negligible aging effects and high insultation and dielectric breakdown.

Type	IR Min. @ 25°C Ω	Temperature Coefficient PPM°C -55 to +125°C	Dissipation Factor (@ 10GHz)	Dielectric Constant (K)	Material
AS1	10^{12}	Negligible	0.0001	3.8	Quartz
AS6	10^{12}	P120 ± 25	0.0001	8.7	AlN
AS7	10^{12}	P180 ± 50	0.0006	9.6	Alumina 96
AS8	10^{12}	P180 ± 50	0.0006	9.8	Alumina 99.6
BS2	10^{12}	NP0 0 ± 30	0.0001	12.6	Titanate
CS1	10^{12}	0 ± 30	0.0010	20	Titanate
ES1	10^{12}	0 ± 30	0.0020	40	Titanate
FS1	10^{12}	0 ± 30	0.0050	50	Titanate
IS2	10^{4}	N750 ± 200	0.0050	85	Alumina
JS2	10^{6}	0 ± 30	0.0050	93	Titanate
KS3	10^{6}	N1500 ± 500	0.0025	160	Titanate

Dielectric Materials – Class II

Dielectrics below are characterized by high dielectric constants, increased losses and higher temperature coefficients. These properties are inherent with this class of material but the high dielectric constants permit the use of smaller size to achieve low series inductance and meet dimensional requirements. Capacitors made with these materials are often used for coupling of microstrip line circuits where a small chip is necessary. Used as a bypass capacitor, the small size provides low series inductance and dielectric losses are typically of little concern.

Type	IR Min. @ 25°C Ω	Temperature Coefficient % -55 to +125°C	Dissipation Factor (@ 1MHz)	Aging (%) HR/Decade	Dielectric Constant (K)
MS1	10^{11}	-10 to 5	0.010	2.0	300
PS1	10^{4}	-10 to 10	0.025	3.0	700
RS2	10^{4}	-10 to 10	0.025	3.0	1250
SS3	10^{11}	-10 to 3	0.015	3.5	2200
US1	10^{5}	-35 to 0	0.020	3.0	4000
US3	10^{11}	-15 to 15	0.030	3.0	4500
ZS1	10^{11}	-80 to 0	0.025	3.0	11000
ZS4	*	-15 to 15	0.035	3.0	25000
ZS6	*	-15 to 15	0.035	3.0	35000

Other dielectric materials available depending on application requirements

Single Layer Capacitors

Border Cap

Capacitance, Case Size & Dielectric Availability - Class I Dielectrics

Cap (pF)	Size mils (mm)																	
	10x10 (.254 x .254)		12x12 (.305 x .305)		15x15 (.381 x .381)		20x20 (.508 x .508)		25x25 (.635 x .635)		30x30 (.762 x .762)		35x35 (.889 x .889)		40x40 (1.016 x 1.016)		50x50 (1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
0.04	AS7	4	AS7	4	AS7	5	AS1	5										
0.06	ES1	10	AS7	4	AS7	6	AS1	5	AS1	8	AS1	10						
0.08	ES1	7	ES1	10	AS7	5	AS7	10	AS1	6	AS1	8	AS1	11				
0.1	ES1	6	ES1	9	AS7	4	AS7	7	AS1	5	AS1	7	AS1	10				
0.2	IS1	4	ES1	4	ES1	5	AS7	4	AS7	5	AS7	7	AS1	4	AS1	5	AS1	10
0.3	KS2	6	IS1	5	ES1	4	ES1	8	AS7	4	AS7	5	AS7	7	AS1	4	AS1	6
0.4	KS2	4	IS1	4	IS1	6	ES1	6	ES1	10	AS7	4	AS7	5	AS7	7	AS1	5
0.5	MS1	5	KS2	4	IS1	5	ES1	4	ES1	7	ES1	10	AS7	4	AS7	6	AS7	10
0.6	MS1	5	KS2	5	IS1	4	ES1	4	ES1	6	ES1	10	AS7	4	AS7	5	AS7	7
0.8	MS1	5	MS1	5	KS2	5	IS1	6	ES1	5	ES1	7	ES1	10	AS7	4	AS7	6
1.0	MS1	4	MS1	5	KS2	4	IS1	5	ES1	4	ES1	6	ES1	8	ES1	10	AS7	5
1.2	RS1	6	MS1	5	MS1	7	IS1	4	IS1	7	ES1	5	ES1	7	ES1	10	AS7	4
1.5	RS1	7	MS1	4	MS1	6	KS2	6	IS1	6	IS1	8	ES1	6	ES1	7	ES1	15
1.8	RS1	6	MS1	4	MS1	5	KS2	5	IS1	5	IS1	7	ES1	5	ES1	7	ES1	10
2.0	RS1	6	RS1	8	MS1	4	KS2	5	IS1	5	IS1	6	ES1	4	ES1	6	ES1	10
2.2	RS1	5	RS1	7	MS1	4	MS1	7	KS2	7	IS1	6	ES1	4	ES1	5	ES1	10
2.7	RS1	5	RS1	6	MS1	4	MS1	6	KS2	6	IS1	6	IS1	8	ES1	5	ES1	8
3.3	SS3	6	RS1	6	RS1	8	MS1	5	KS2	5	IS1	4	IS1	6	IS1	7	ES1	6
3.9	SS3	5	RS1	5	RS1	7	MS1	4	KS2	4	KS2	6	IS1	5	IS1	6	ES1	5
4.7	SS3	5	RS1	5	RS1	7	MS1	4	MS1	6	KS2	5	IS1	4	IS1	5	IS1	8
5.6	SS3	5	SS3	6	RS1	5	MS1	4	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7
6.8	US1	5	SS3	6	RS1	5	RS1	8	MS1	5	MS1	7	KS2	5	KS2	7	IS1	6
8.2	US1	4	SS3	5	RS1	4	RS1	7	MS1	4	MS1	6	KS2	4	KS2	5	IS1	5
10	US1	5	SS3	4	SS3	6	RS1	6	MS1	4	MS1	5	MS1	6	KS2	5	IS1	4
12	US1	5	US1	6	SS3	5	RS1	5	RS1	8	MS1	4	MS1	6	KS2	4	KS2	6
15	US1	4	US1	5	SS3	5	RS1	5	RS1	7	MS1	4	MS1	5	MS1	6	KS2	5
18	VS1	4	VS1	6	US1	7	SS3	7	RS1	5	RS1	9	MS1	4	MS1	5	KS2	4
20	ZS1	5	VS1	5	US1	6	SS3	6	RS1	5	RS1	8	MS1	4	MS1	5	KS2	4

Class I Dielectrics

Other dielectric materials available depending on application requirements

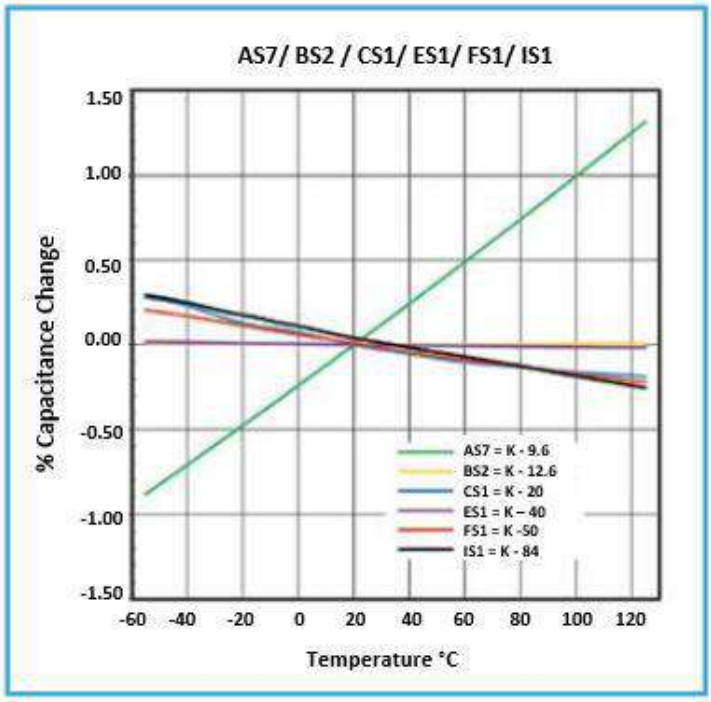
Shaded cells indicate Class II Dielectrics

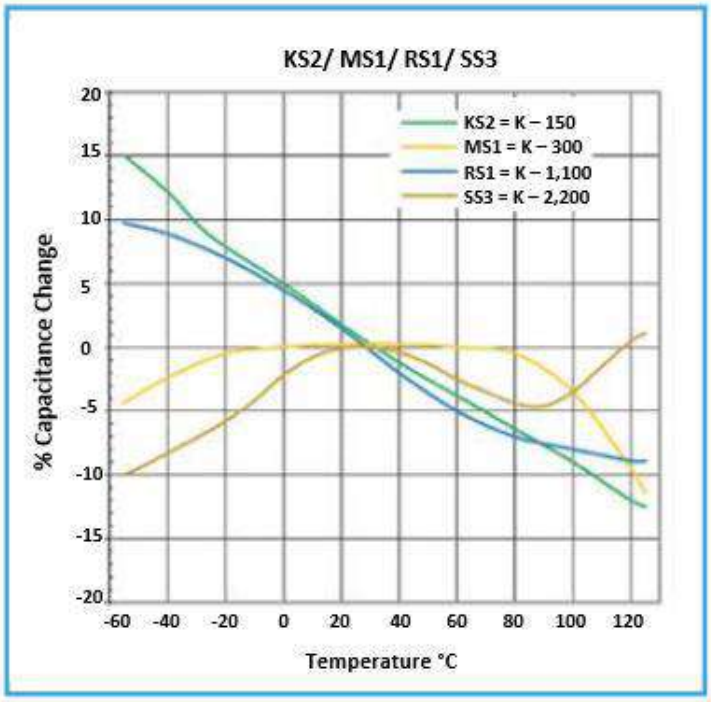
Capacitance, Case Size & Dielectric Availability – Class II Dielectrics

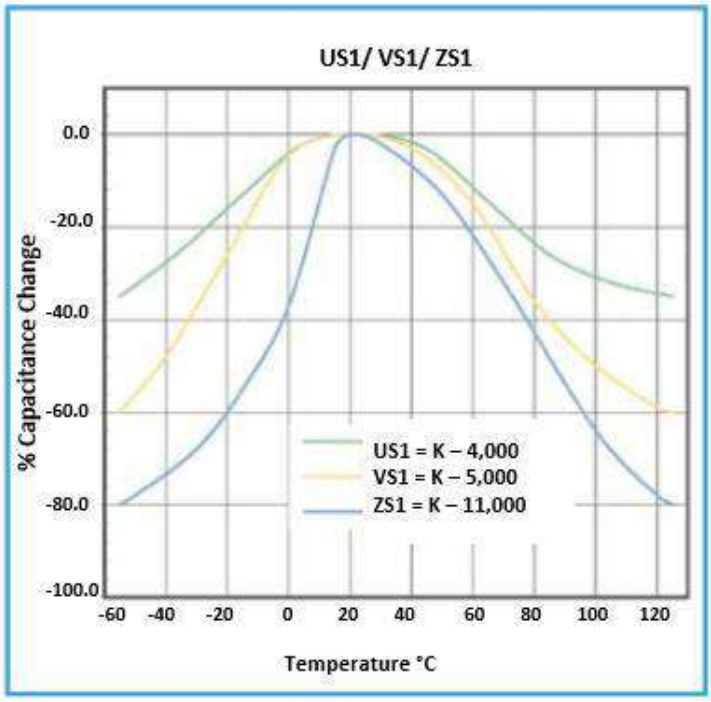
Cap (pF)	Size mils (mm)																	
	10x10 (.254 x .254)		12x12 (.305 x .305)		15x15 (.381 x .381)		20x20 (.508 x .508)		25x25 (.635 x .635)		30x30 (.762 x .762)		35x35 (.889 x .889)		40x40 (1.016 x 1.016)		50x50 (1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
22	ZS1	7	VS1	4	US1	5	SS3	6	RS1	5	RS1	7	RS1	10	MS1	4	MS1	6
27	ZS1	6	VS1	4	VS1	5	SS3	5	RS1	4	RS1	6	RS1	8	MS1	4	MS1	5
33	ZS1	5	ZS1	6	VS1	4	SS3	4	SS3	6	RS1	5	RS1	7	RS1	9	MS1	5
39	ZS1	4	ZS1	5	VS1	4	US1	6	SS3	6	RS1	4	RS1	6	RS1	8	MS1	4
47	ZS4	8	ZS1	5	ZS1	6	US1	5	SS3	5	SS3	7	RS1	5	RS1	7	RS1	11
56	ZS4	6	ZS1	4	ZS1	5	VS1	5	SS3	4	SS3	6	RS1	4	RS1	6	RS1	9
68	ZS4	5	ZS4	8	ZS1	5	VS1	4	US1	6	SS3	5	RS1	4	RS1	5	RS1	7
82	ZS6	6	ZS4	6	ZS1	4	VS1	4	US1	5	SS3	4	SS3	6	RS1	4	RS1	6
100	ZS6	5	ZS4	6	ZS1	4	ZS1	6	VS1	5	US1	6	SS3	5	SS3	7	RS1	5
120			ZS4	5	ZS4	6	ZS1	5	VS1	4	VS1	6	SS3	4	SS3	5	RS1	4
150			ZS4	6	ZS4	6	ZS1	4	ZS1	7	VS1	5	VS1	7	SS3	4	SS3	7
180			ZS6	5	ZS4	5	ZS1	4	ZS1	6	VS1	4	VS1	6	SS3	4	SS3	6
200					ZS6	5	ZS1	4	ZS1	6	VS1	4	VS1	5	US1	6	SS3	5
220					ZS6	5	ZS4	8	ZS1	5	VS1	4	VS1	5	US1	5	SS3	5
270					ZS6	5	ZS4	6	ZS1	4	ZS1	7	VS1	4	VS1	6	SS3	4
330							ZS4	5	ZS1	4	ZS1	5	ZS1	7	VS1	5	US1	6
390							ZS4	5	ZS4	6	ZS1	5	ZS1	6	VS1	4	US1	5
470							ZS4	4	ZS4	6	ZS1	4	ZS1	5	ZS1	7	VS1	5
560							ZS6	5	ZS6	6	ZS1	4	ZS1	5	ZS1	6	VS1	4
680									ZS6	6	ZS4	6	ZS1	4	ZS1	5	ZS1	8
820									ZS6	5	ZS4	5	ZS4	8	ZS1	4	ZS1	7
1000											ZS6	6	ZS4	6	ZS4	8	ZS1	6
1200											ZS6	5	ZS4	5	ZS4	7	ZS1	5
1500													ZS6	6	ZS4	5	ZS1	4
1800													ZS6	5	ZS6	6	ZS4	7
2200															ZS6	5	ZS4	6
2700															ZS6	5	ZS4	5
3300																	ZS6	5

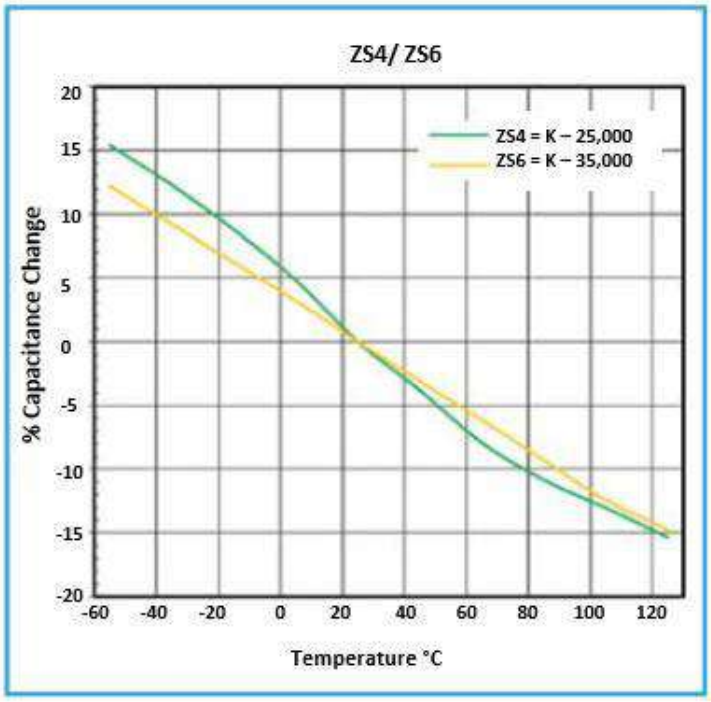
Other dielectric materials available depending on application requirements

Typical Temperature Characteristics









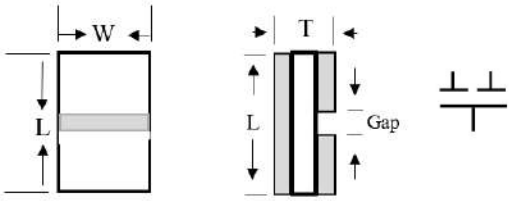
Single Layer Capacitors

Twin Cap

Product Features

A single full electrode is provided on one side of the capacitor and split electrodes on the other side. This is a three-terminal capacitor which can be used as a two capacitor with a common electrode or as serially connected capacitors so that connections may be made on one side of the chip only (surface mount). This design is often used in microstrip coupling to eliminate lead inductance and raise the self resonant frequency.

Product Characteristics



Capacitance: 0.06 picofarads and up
Chip shape: Twin pads with gap
Gap widths: 5, 10, 15, 20 mil or custom

Standard dimensional tolerance for length and width is ±15% up to 20 mils. For dimensions greater than 20 mils, standard tolerance is ±10%. In cases where dimension cannot be exceeded, insert "M" to signify a maximum dimension. The thickness tolerance is ± 1.5 mils.

Part Numbering

PP T – US3 – 20×10 × 4 – D4 – 100 – K – 2 W

RoHS

PP = Passive Plus	Capacitor Style *T = Twin*	Dielectric Code *See Table*	Length & Width (mils)	Thickness (mils)	Metallization *See Table*	Capacitance Value *See Table*	Tolerance *See Table*	Voltage *See Table*	Packaging W = Waffle Pack *Standard*

Thicknesses (mils)

Length & Width	L or W Tolerance	Margin Nominal	Thickness
≤ 10	± 2	1	± 1.5
11 - 29	± 2	2	
≥ 30	± 3	2	

Capacitance Codes

Value	Code
<10pF	1R0 = 1.0pF
>10pF	101 = 100pF

Metallization Codes

Code	Description
D4	Ti/Pt/Au - Titanium/Platinum/Gold **(70 µin Gold)**
S7	Ti/Pt/Ag - Titanium/Platinum/Silver **(20 µin Silver)**
K2	Ta/Pd/Au - Tantalum/Palladium/Gold **(75 µin Gold)**
L3	Ta/Pd/Au - Tantalum/Palladium/Gold **(100 µin Gold)**

Contact PPI for available metallizations.

Substrates

Substrates can be supplied as follows:

• **Bare**	
• **Metallized:**	• Gold over Platinum, Palladium, or Nickel • Silver over Platinum • Custom schemes and patterns to Customer specifications
Thickness Range	3 mils +

Standard Electrode Metallizations

Gold (D4) This metallization consists of a minimum of 70 micro-inches of Gold over Platinum or Nickel which is ideal for all wirebonding methodologies.

Silver (S7) This metallization consists of 20 micro-inches of Silver over Platinum which is ideal for all solder applications whenever the use of Gold is unacceptable.

Capacitance Tolerance & Dimensional Tolerances Codes

Class I Dielectrics: AS1 - KS2			
Tolerance	**Code**	**Tolerance**	**Code**
± .50pF	D	± 20%	M
± .25pF	C	± 15%	L
±.10pF	B	± 10%	K
± .05pF	A	± 5%	J
± .01pF	P	± 3%	H
		± 2%	G

Material	L or W Dimension	Tolerance
AS1 - ZS1	< 20 mils	±15%
	≥ 20 mils	±10%

Class II Dielectrics: MS1 - ZS4			
Tolerance	**Code**	**Tolerance**	**Code**
-10% thru +40%	Y	± 20%	M
-20% thru +80%	Z	± 15%	L
0% thru +100%	V	± 10%	K
Guaranteed Min. Value	GMV	± 5%	J

Material	L or W Dimension	Tolerance
ZS4 - ZS6	≤ 15 mils	± 2 mils
	> 15 mils; ≤ 30 mils	± 3 mils
	> 30 mils	± 5 mils

Rated Voltage Codes

Code	Voltage	Dielectric Thickness
2	50V	4 mils
3	100V	6 mils

Packaging

PPI SLCs are available in Waffle Packs (Standard).
Other packaging options may be available.
Please contact PPI.

Twin Caps are available in a wide range of size configurations, dielectric and termination materials to fit your application. Please contact PPI for designs not listed in this catalog.

Dielectric Materials – Class I

Dielectrics below consist of material exhibiting very low losses, extremely low or closely controlled temperature coefficients, negligible voltage and frequency coefficients, negligible aging effects and high insultation and dielectric breakdown.

Type	IR Min. @ 25°C Ω	Temperature Coefficient PPM°C -55 to +125°C	Dissipation Factor (@ 10GHz)	Dielectric Constant (K)	Material
AS1	10^{12}	Negligible	0.0001	3.8	Quartz
AS6	10^{12}	P120 ± 25	0.0001	8.7	AlN
AS7	10^{12}	P180 ± 50	0.0006	9.6	Alumina 96
AS8	10^{12}	P180 ± 50	0.0006	9.8	Alumina 99.6
BS2	10^{12}	NP0 0 ± 30	0.0001	12.6	Titanate
CS1	10^{12}	0 ± 30	0.0010	20	Titanate
ES1	10^{12}	0 ± 30	0.0020	40	Titanate
FS1	10^{12}	0 ± 30	0.0050	50	Titanate
IS2	10^{4}	N750 ± 200	0.0050	85	Alumina
JS2	10^{6}	0 ± 30	0.0050	93	Titanate
KS3	10^{6}	N1500 ± 500	0.0025	160	Titanate

Dielectric Materials – Class II

Dielectrics below are characterized by high dielectric constants, increased losses and higher temperature coefficients. These properties are inherent with this class of material but the high dielectric constants permit the use of smaller size to achieve low series inductance and meet dimensional requirements. Capacitors made with these materials are often used for coupling of microstrip line circuits where a small chip is necessary. Used as a bypass capacitor, the small size provides low series inductance and dielectric losses are typically of little concern.

Type	IR Min. @ 25°C Ω	Temperature Coefficient % -55 to +125°C	Dissipation Factor (@ 1MHz)	Aging (%) HR/Decade	Dielectric Constant (K)
MS1	10^{11}	-10 to 5	0.010	2.0	300
PS1	10^{4}	-10 to 10	0.025	3.0	700
RS2	10^{4}	-10 to 10	0.025	3.0	1250
SS3	10^{11}	-10 to 3	0.015	3.5	2200
US1	10^{5}	-35 to 0	0.020	3.0	4000
US3	10^{11}	-15 to 15	0.030	3.0	4500
ZS1	10^{11}	-80 to 0	0.025	3.0	11000
ZS4	*	-15 to 15	0.035	3.0	25000
ZS6	*	-15 to 15	0.035	3.0	35000

Other dielectric materials available depending on application requirements

Capacitance, Case Size & Dielectric Availability

This component functions as two capacitors operating in series, each of which is twice the desired equivalent capacitance. Allow us to custom design for your application.

Capacitance (pF)	Case Size *Mils* *(mm)*							
	20x10 (.508 x .254)		40x20 (1.016 x .508)		60x30 (1.524 x .762)		80x40 (2.032 x 1.016)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
	Class I Dielectrics							
0.06	ES1	6	AS7	6	AS1	6	AS1	8
0.08	ES1	4	AS7	4	AS1	4	AS1	7
0.1	IS1	7	ES1	15	AS7	8	AS1	5
0.2	KS3	6	ES1	7	AS7	4	AS7	7
0.3	MS1	8	ES1	5	ES1	10	AS7	4
0.4	MS1	6	IS1	7	ES1	8	ES1	15
0.5	MS1	5	IS1	6	ES1	7	ES1	10
0.6	MS1	4	IS1	5	ES1	6	ES1	9
0.8	PS1	11	KS3	6	IS1	4	ES1	7
1	PS1	9	KS3	5	IS1	7	ES1	6
1.2	PS1	7	KS3	4	IS1	6	ES1	5
1.5	PS1	6	MS1	7	IS1	5	IS1	8
1.8	PS1	5	MS1	6	IS1	4	IS1	6
2	PS1	4	MS1	5	IS1	4	IS1	6
2.2	PS1	4	MS1	5	KS3	6	IS1	5
2.7	SS3	7	MS1	4	KS3	5	IS1	4
3.3	SS3	6	PS1	11	KS3	4	KS3	6
3.9	SS3	5	PS1	9	MS1	7	KS3	5
4.7	SS3	4	PS1	8	MS1	5	KS3	4
5.6	US1	6	PS1	6	MS1	5	MS1	7
6.8	US1	5	PS1	5	MS1	4	MS1	6
8.2	US3	5	PS1	4	PS1	11	MS1	5
10	US3	4	SS3	7	PS1	9	MS1	4
12	ZS1	8	SS3	6	PS1	7	PS1	11

Other dielectric materials available depending on application requirements

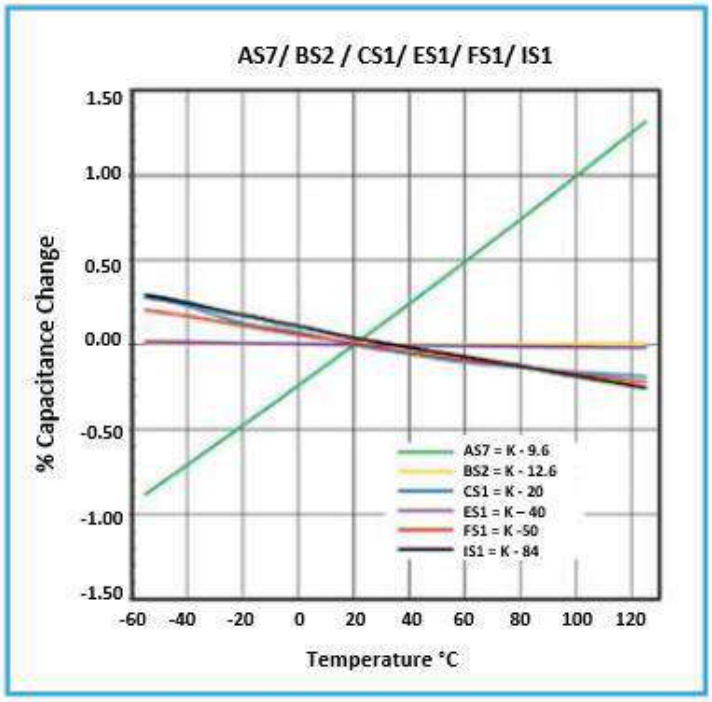
Shaded cells indicate Class II Dielectrics

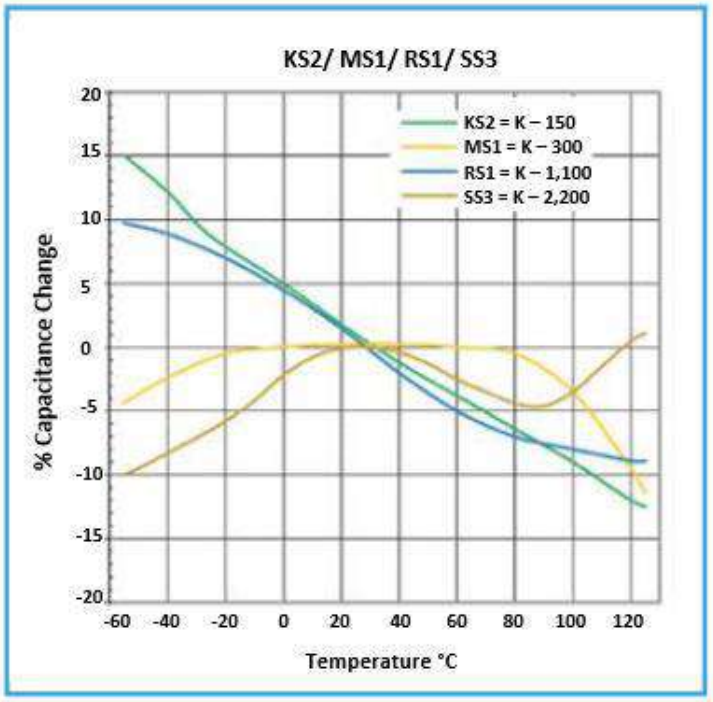
Capacitance, Case Size & Dielectric Availability - continued

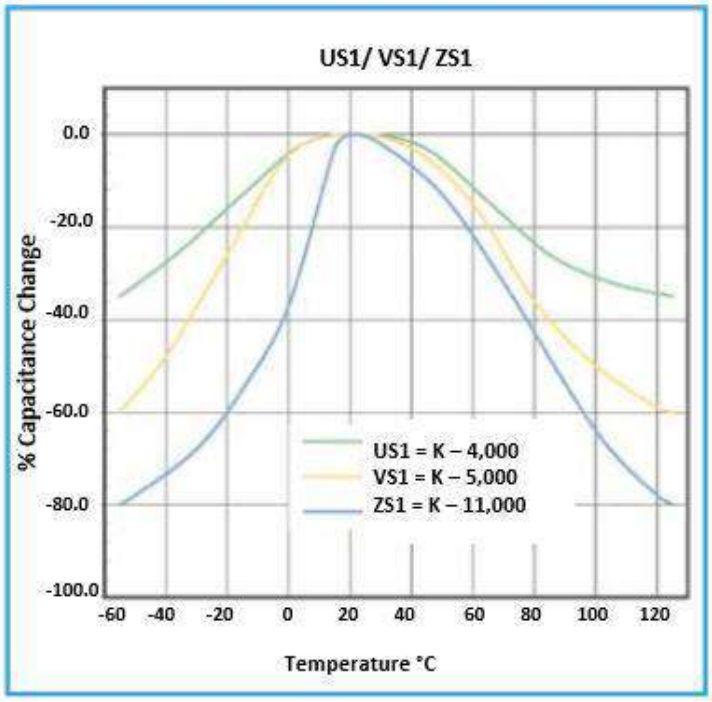
15	ZS1	6	SS3	5	PS1	6	PS1	9
18	ZS1	5	SS3	4	PS1	5	PS1	8
20	ZS1	5	US1	7	PS1	4	PS1	7
22	ZS1	4	US1	6	PS1	4	PS1	6
27	ZS4	8	US1	5	SS3	7	PS1	5
33	ZS4	6	US3	5	SS3	6	SS3	9
39	ZS4	5	US3	4	SS3	5	SS3	8
47	US3	6	ZS1	8	SS3	4	SS3	6
56	US3	5	ZS1	7	US1	6	SS3	5
68	US3	4	ZS1	5	US1	5	US1	8
82			ZS1	4	US3	5	US3	8
100			ZS4	8	US3	4	US3	7
120			ZS4	7	ZS1	8	US3	6
150			ZS4	5	ZS1	6	US3	5
180			ZS4	5	ZS1	5	ZS1	8
200			ZS6	6	ZS1	5	ZS1	7
220			ZS6	5	ZS4	9	ZS1	7
270			ZS6	4	ZS4	8	ZS1	6
330					ZS4	6	ZS1	5
390					ZS4	5	ZS4	9
470					ZS6	6	ZS4	7
560					ZS6	5	ZS4	6
680					ZS6	4	ZS4	5
820							ZS6	6
1000							ZS6	5
1200							ZS6	4
	Class II Dielectrics							

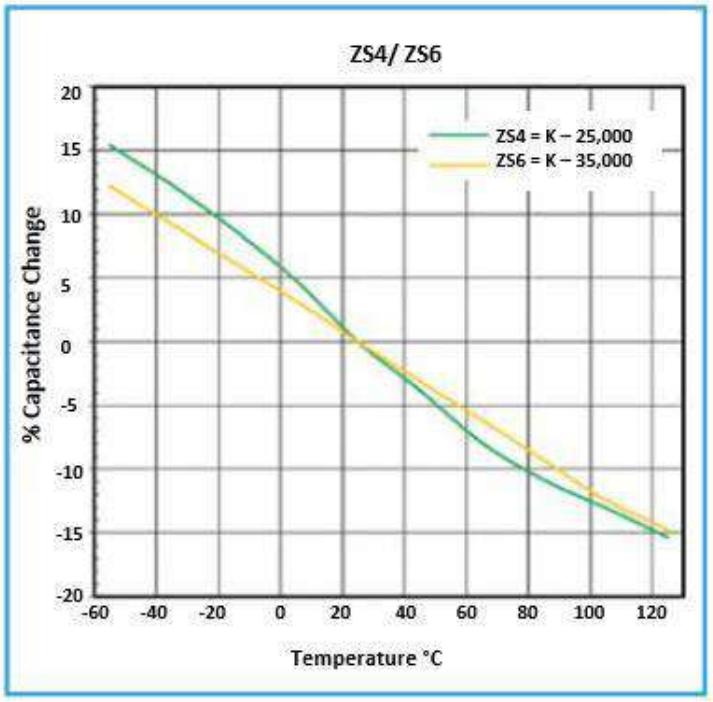
Other dielectric materials available depending on application requirements

Typical Temperature Characteristics





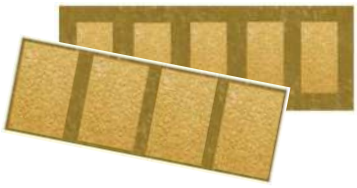




Single Layer Capacitors

Array Cap

Product Features

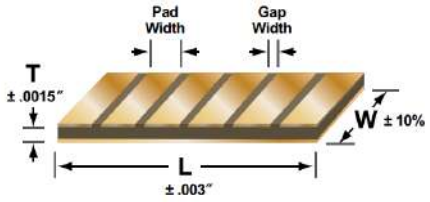


Array Caps are used where arrays of capacitors are needed, usually for decoupling or bypass of GaAs integrated circuits. Standard arrays can contain up to 10 capacitors starting at 0.04pF. Typical overall dimensions range start at 20x10 mils. Array Caps can be fully customized to meet Customer's application requirements.

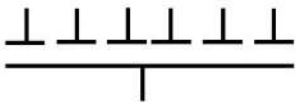
Array Caps are available with (B) or without borders (A) surrounding the edges to help prevent epoxy shorts and aid optical recognition systems.

The stated capacitance value for the Array Caps is for the value of each individual pad.

Dimensions and Electrode Configuration



Standard border is 2 mils and the gap is between 4 – 6 mills depending on the capacitance required.



Part Numbering

PP AB – FS1 – 4 – 105×25 × 4 D4 – 101 – K – 2 – W

PP = Passive Plus	Style Code *AA=Array-No Border AB=Array-Border*	Dielectric Code *See Table*	Number of Capacitors	Length & Width (mils)	Thickness (mils)	Metallization *See Table*	Capacitance Value *See Table*	Tolerance *See Table*	Voltage *See Table*	Packaging W = Waffle Pack *Standard*

Thicknesses (mils)

Length & Width	L or W Tolerance	Margin Nominal	Thickness
≤ 10	± 2	1	± 1.5
11 - 29	± 2	2	
≥ 30	± 3	2	

Capacitance Codes

Value	Code
<10pF	1R0 = 1.0pF
>10pF	101 = 100pF

Metallization Codes

Code	Description
D4	Ti/Pt/Au - Titanium/Platinum/Gold **(70 µin Gold)**
S7	Ti/Pt/Ag - Titanium/Platinum/Silver **(20 µin Silver)**
K2	Ta/Pd/Au - Tantalum/Palladium/Gold **(75 µin Gold)**
L3	Ta/Pd/Au - Tantalum/Palladium/Gold **(100 µin Gold)**

Contact PPI for available metallizations.

Substrates

Substrates can be supplied as follows:

• **Bare**	
• **Metallized:**	• Gold over Platinum, Palladium, or Nickel • Silver over Platinum • Custom schemes and patterns to Customer specifications
Thickness Range	3 mils +

Standard Electrode Metallizations

Gold (D4) This metallization consists of a minimum of 70 micro-inches of Gold over Platinum or Nickel which is ideal for all wirebonding methodologies.

Silver (S7) This metallization consists of 20 micro-inches of Silver over Platinum which is ideal for all solder applications whenever the use of Gold is unacceptable.

Capacitance Tolerance & Dimensional Tolerances Codes

Class I Dielectrics: AS1 - KS2			
Tolerance	**Code**	**Tolerance**	**Code**
± .50pF	D	± 20%	M
± .25pF	C	± 15%	L
±.10pF	B	± 10%	K
± .05pF	A	± 5%	J
± .01pF	P	± 3%	H
		± 2%	G

Material	L or W Dimension	Tolerance
AS1 - ZS1	< 20 mils	±15%
	≥ 20 mils	±10%

Class II Dielectrics: MS1 - ZS4			
Tolerance	**Code**	**Tolerance**	**Code**
-10% thru +40%	Y	± 20%	M
-20% thru +80%	Z	± 15%	L
0% thru +100%	V	± 10%	K
Guaranteed Min. Value	GMV	± 5%	J

Material	L or W Dimension	Tolerance
ZS4 - ZS6	≤ 15 mils	± 2 mils
	> 15 mils; ≤ 30 mils	± 3 mils
	> 30 mils	± 5 mils

Rated Voltage Codes

Code	Voltage	Dielectric Thickness
2	50V	≤5 mils
3	100V	≥6 mils

Packaging

PPI SLCs are available in Waffle Packs (Standard).
Other packaging options may be available.
Please contact PPI.

Dielectric Materials – Class I

Dielectrics below consist of material exhibiting very low losses, extremely low or closely controlled temperature coefficients, negligible voltage and frequency coefficients, negligible aging effects and high insultation and dielectric breakdown.

Type	IR Min. @ 25°C Ω	Temperature Coefficient PPM°C -55 to +125°C	Dissipation Factor (@ 10GHz)	Dielectric Constant (K)	Material
AS1	10^{12}	Negligible	0.0001	3.8	Quartz
AS6	10^{12}	P120 ± 25	0.0001	8.7	AlN
AS7	10^{12}	P180 ± 50	0.0006	9.6	Alumina 96
AS8	10^{12}	P180 ± 50	0.0006	9.8	Alumina 99.6
BS2	10^{12}	NP0 0 ± 30	0.0001	12.6	Titanate
CS1	10^{12}	0 ± 30	0.0010	20	Titanate
ES1	10^{12}	0 ± 30	0.0020	40	Titanate
FS1	10^{12}	0 ± 30	0.0050	50	Titanate
IS2	10^{4}	N750 ± 200	0.0050	85	Alumina
JS2	10^{6}	0 ± 30	0.0050	93	Titanate
KS3	10^{6}	N1500 ± 500	0.0025	160	Titanate

Dielectric Materials – Class II

Dielectrics below are characterized by high dielectric constants, increased losses and higher temperature coefficients. These properties are inherent with this class of material but the high dielectric constants permit the use of smaller size to achieve low series inductance and meet dimensional requirements. Capacitors made with these materials are often used for coupling of microstrip line circuits where a small chip is necessary. Used as a bypass capacitor, the small size provides low series inductance and dielectric losses are typically of little concern.

Type	IR Min. @ 25°C Ω	Temperature Coefficient % -55 to +125°C	Dissipation Factor (@ 1MHz)	Aging (%) HR/Decade	Dielectric Constant (K)
MS1	10^{11}	-10 to 5	0.010	2.0	300
PS1	10^{4}	-10 to 10	0.025	3.0	700
RS2	10^{4}	-10 to 10	0.025	3.0	1250
SS3	10^{11}	-10 to 3	0.015	3.5	2200
US1	10^{5}	-35 to 0	0.020	3.0	4000
US3	10^{11}	-15 to 15	0.030	3.0	4500
ZS1	10^{11}	-80 to 0	0.025	3.0	11000
ZS4	*	-15 to 15	0.035	3.0	25000
ZS6	*	-15 to 15	0.035	3.0	35000

Other dielectric materials available depending on application requirements

Capacitance, Case Size & Dielectric Availability - Class I Dielectrics

Selection Chart is for guidance only. The square area and capacitance parameters are for a single pad. All PPI parts are built to specific customer requirements.

Cap (pF)	Size mils (mm)																	
	10x10 (.254 x .254)		12x12 (.305 x .305)		15x15 (.381 x .381)		20x20 (.508 x .508)		25x25 (.635 x .635)		30x30 (.762 x .762)		35x35 (.889 x .889)		40x40 (1.016 x 1.016)		50x50 (1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
0.04	AS7	5	AS7	6	AS7	10												
0.06	AS7	4	AS7	5	AS7	8	AS2	5	AS2	10								
0.08	ES1	10	AS7	4	AS7	6	AS7	10	AS2	7	AS2	9						
0.1	ES1	8	ES1	11	AS7	5	AS7	9	AS2	5	AS2	7	AS2	10				
0.2	ES1	5	ES1	7	ES1	10	AS7	4	AS7	7	AS7	10	AS2	5	AS2	7	AS2	10
0.3	IS1	6	ES1	4	ES1	6	ES1	11	AS7	4	AS7	7	AS7	9	AS2	5	AS2	7
0.4	IS1	5	IS1	7	ES1	5	ES1	9	ES1	15	AS7	5	AS7	7	AS7	9	AS2	5
0.5	IS1	4	IS1	5	ES1	4	ES1	7	ES1	11	AS7	5	AS7	5	AS7	7	AS2	4
0.6	KS2	6	IS1	5	IS1	7	ES1	6	ES1	10	ES1	15	AS7	4	AS7	6	AS7	9
0.8	MS1	8	KS2	6	IS1	5	ES1	5	ES1	7	ES1	10	ES1	15	AS7	4	AS7	7
1.0	MS1	7	KS2	5	IS1	4	IS1	7	ES1	6	ES1	8	ES1	10	AS7	4	AS7	5
1.2	MS1	6	KS2	4	IS1	4	IS1	6	ES1	5	ES1	7	ES1	9	AS7	3	AS7	5
1.5	MS1	5	MS1	7	KS2	5	IS1	5	ES1	4	ES1	6	ES1	7	ES1	10	AS7	4
1.8	MS1	4	MS1	5	KS2	4	IS1	4	IS1	6	ES1	5	ES1	6	ES1	8	ES1	11
2.0	MS1	4	MS1	5	KS2	4	KS2	7	IS1	6	ES1	4	ES1	5	ES1	7	ES1	11
2.2	RS1	4	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7	ES1	5	ES1	7	ES1	10
2.7	RS1	8	MS1	4	MS1	6	KS2	5	IS1	4	IS1	6	ES1	4	ES1	5	ES1	8
3.3	RS1	7	RS1	10	MS1	5	KS2	4	KS2	6	IS1	5	IS1	7	ES1	4	ES1	7
3.9	RS1	6	RS1	9	MS1	4	MS1	7	KS2	5	IS1	4	IS1	6	IS1	8	ES1	6
4.7	RS1	5	RS1	7	RS1	11	MS1	6	KS2	4	KS2	6	IS1	5	IS1	6	ES1	5
5.6	RS1	4	RS1	6	RS1	10	MS1	5	MS1	7	KS2	5	IS1	4	IS1	5	ES1	4
6.8	RS1	4	RS1	5	RS1	8	MS1	4	MS1	6	KS2	5	KS2	6	IS1	4	IS1	7
8.2	SS3	6	RS1	4	RS1	7	MS1	4	MS1	5	KS2	4	KS2	5	KS2	7	KS2	10
10	SS3	5	RS1	4	RS1	5	RS1	9	MS1	4	MS1	6	KS2	4	KS2	5	KS2	8
12	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	5	MS1	7	KS2	4	KS2	7
15	US1	6	SS3	5	RS1	4	RS1	6	RS1	10	MS1	4	MS1	6	MS1	7	KS2	6
18	US1	5	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	4	MS1	6	KS2	5
20	US1	5	SS3	4	SS3	6	RS1	5	RS1	8	RS1	11	MS1	4	MS1	5	KS2	4
22	US1	4	US1	6	SS3	5	RS1	4	RS1	7	RS1	9	MS1	4	MS1	5	KS2	4

Other dielectric materials available depending on application requirements

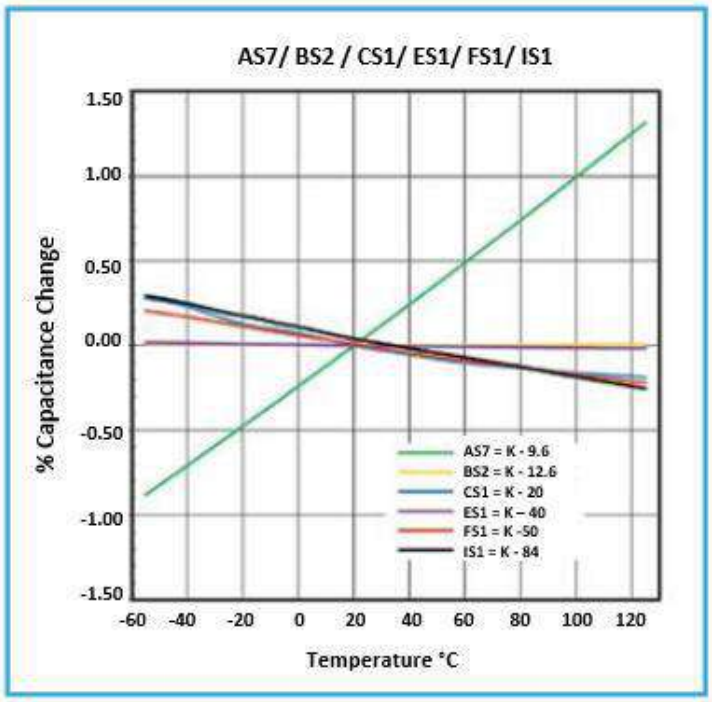
Shaded cells indicate Class II Dielectrics

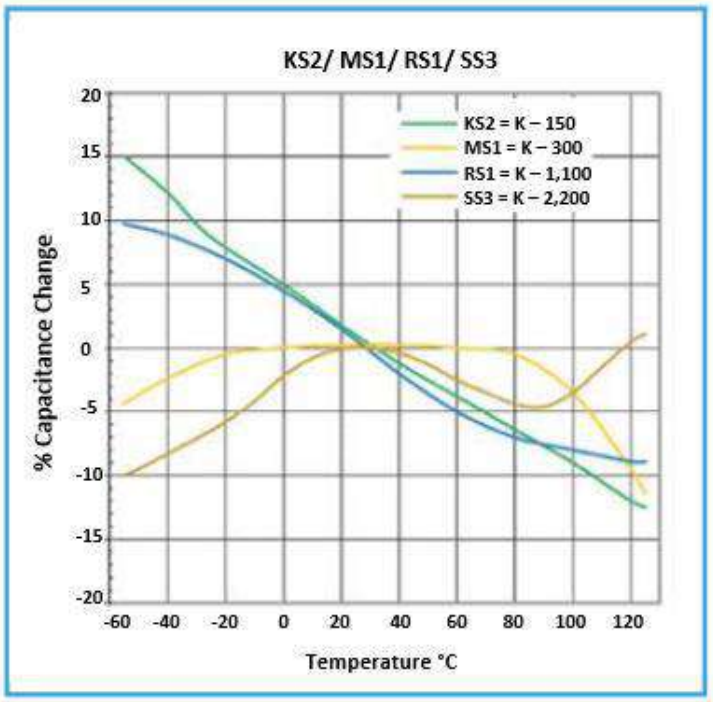
Capacitance, Case Size & Dielectric Availability – Class II Dielectrics

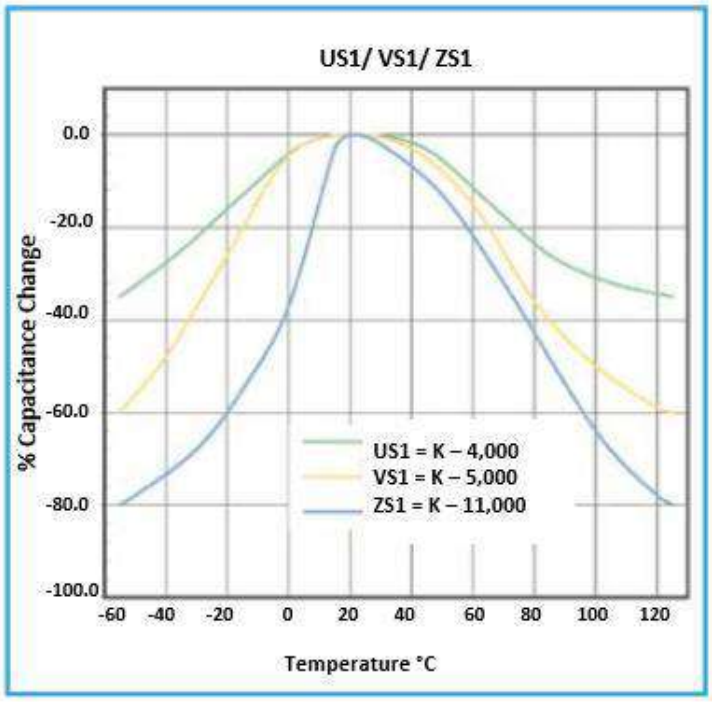
Cap (pF)	Size mils (mm)																	
	10x10 (.254 x .254)		12x12 (.305 x .305)		15x15 (.381 x .381)		20x20 (.508 x .508)		25x25 (.635 x .635)		30x30 (.762 x .762)		35x35 (.889 x .889)		40x40 (1.016 x 1.016)		50x50 (1.270 x 1.270)	
	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness	Dielectric	Thickness
27	US1	4	US1	5	SS3	4	RS1	4	RS1	6	RS1	8	MS1	3	MS1	4	MS1	6
33	VS1	4	US1	4	US1	6	SS3	6	RS1	5	RS1	6	RS1	11	MS1	4	MS1	5
39	ZS1	6	US1	4	US1	5	SS3	5	RS1	4	RS1	5	RS1	7	RS1	10	MS1	4
47	ZS1	5	ZS1	7	US1	5	SS3	4	SS3	6	RS1	5	RS1	6	RS1	8	MS1	4
56	ZS1	4	ZS1	6	VS1	5	US1	7	SS3	5	RS1	4	RS1	5	RS1	7	RS1	10
68	ZS1	4	ZS1	5	VS1	4	US1	6	SS3	5	SS3	6	RS1	4	RS1	6	RS1	9
82	ZS4	7	ZS1	4	ZS1	7	VS1	6	SS3	4	SS3	5	SS3	7	SS3	10	RS1	7
100	ZS4	6	ZS4	8	ZS1	6	VS1	5	US1	6	SS3	5	SS3	6	SS3	8	RS1	6
120	ZS4	5	ZS4	7	ZS1	5	ZS1	8	VS1	6	SS3	4	SS3	5	SS3	7	RS1	5
150	ZS4	4	ZS4	5	ZS1	4	ZS1	7	VS1	5	VS1	7	SS3	4	SS3	5	RS1	4
180	ZS6	4	ZS4	5	ZS4	7	ZS1	6	VS1	4	VS1	6	VS1	8	US1	8	SS3	7
200	ZS6	4	ZS4	4	ZS4	6	ZS1	5	ZS1	8	VS1	5	VS1	7	US1	7	SS3	6
220	ZS6	4	ZS6	5	ZS4	6	ZS1	4	ZS1	7	VS1	5	VS1	6	US1	6	SS3	6
270			ZS6	4	ZS4	5	ZS4	8	ZS1	6	VS1	4	VS1	5	US1	5	SS3	5
330					ZS4	4	ZS4	7	ZS1	5	ZS1	7	VS1	4	US1	4	US1	7
390					ZS6	4	ZS4	6	ZS1	4	ZS1	6	ZS1	7	ZS1	10	US1	6
470					ZS6	4	ZS4	5	ZS4	7	ZS1	5	ZS1	6	ZS1	8	US1	5
560							ZS4	4	ZS4	6	ZS1	4	ZS1	5	ZS1	7	US1	4
680							ZS6	5	ZS4	5	ZS4	8	ZS1	5	ZS1	6	VS1	4
820							ZS6	4	ZS6	6	ZS4	6	ZS1	4	ZS1	5	ZS1	7
1000									ZS6	5	ZS4	5	ZS4	7	ZS1	4	ZS1	6
1200									ZS6	4	ZS4	4	ZS4	6	ZS4	7	ZS1	5
1500											ZS6	5	ZS4	5	ZS4	6	ZS1	4
1800											ZS6	4	ZS6	6	ZS4	5	ZS4	8
2200													ZS6	5	ZS4	4	ZS4	6
2700													ZS6	4	ZS6	5	ZS4	5
3300																	ZS6	6

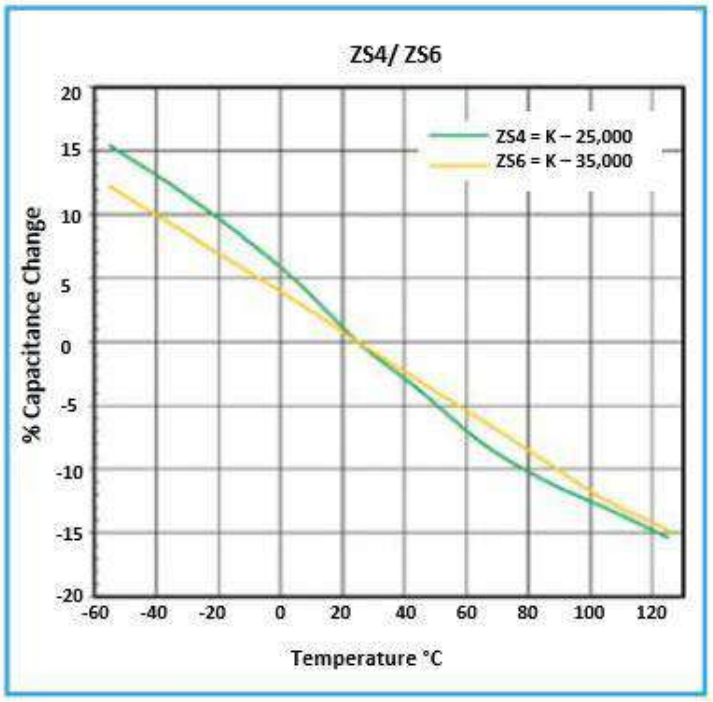
Other dielectric materials available depending on application requirements

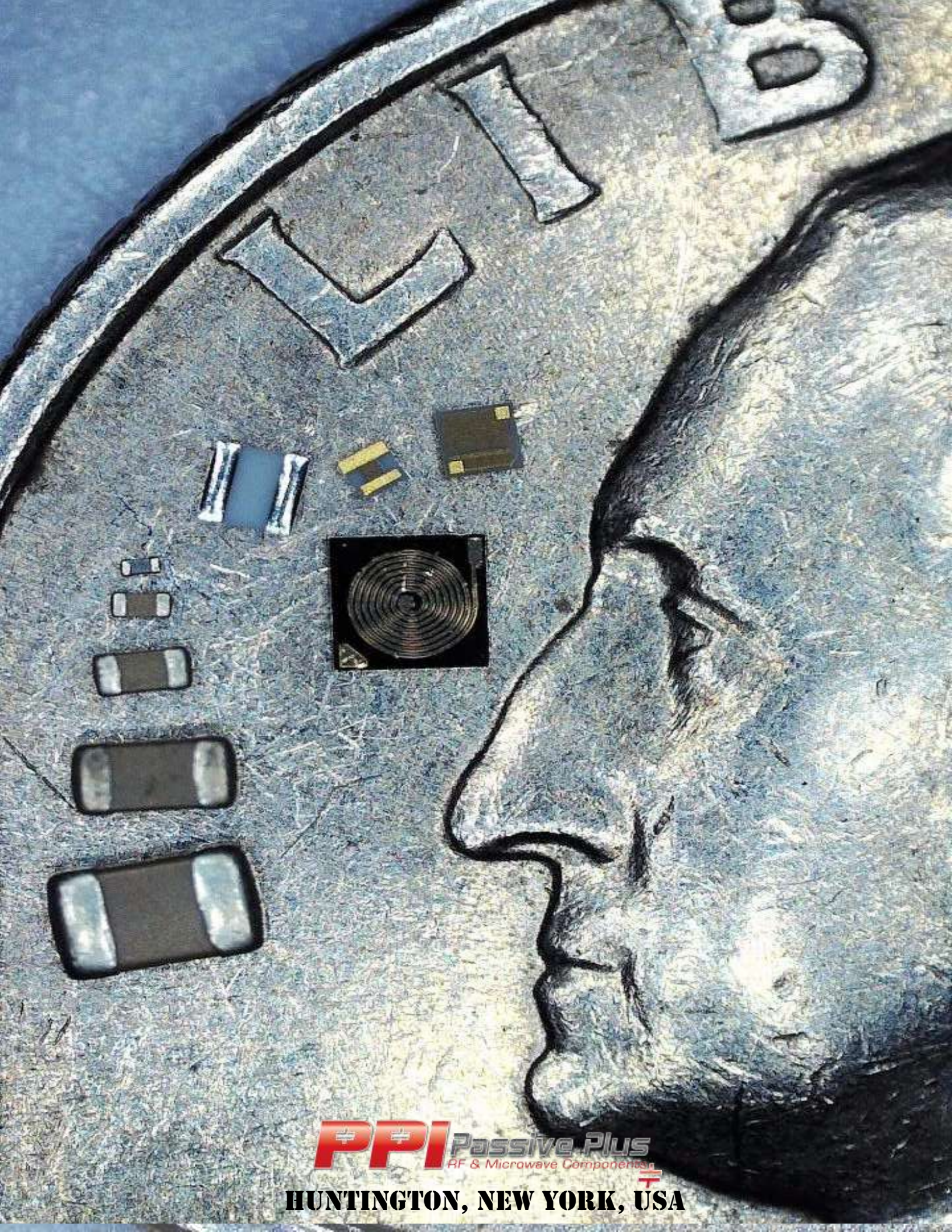
Typical Temperature Characteristics







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