

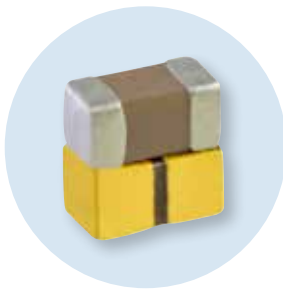
Opti-Cap®

Discover the advantages of broadband blocking capacitors from Knowles Precision Devices.

Product Overview

Knowles Precision Devices features our Opti-Cap® solution, which is designed to deliver reliable, ultra-low loss operation across a variety of applications including test equipment, fiber optic modules and broadband microwave/millimeter systems. Explore options that offer low frequency stability over extreme temperatures, space-saving footprints and more.

OPTI-CAP



FEATURES

- X7R temperature and voltage stability
- Resonance free DC blocking to >40GHz
- SMT by solder or epoxy bonding
- Low frequency stability over temperature
- Very low series inductance
- 0201, 0402 and 0602 footprints

FUNCTIONAL APPLICATIONS

- Test Equipment, Photonics, SONET, TOSA/ROSA, High-Speed Data
- Broadband Microwave/Millimeter Wave
- Transimpedance Amplifiers

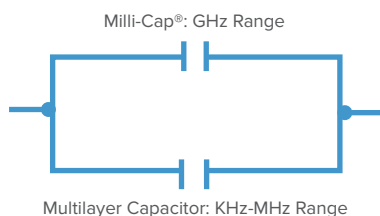
BENEFITS

- Eliminates wire bonding
- Coplanar waveguide
- Low insertion loss

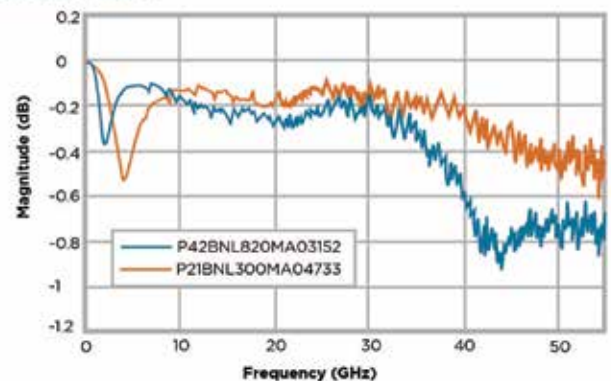
SPECIFICATIONS — OPTI-CAP®

Electrical

Temperature Coefficient of Capacitance	X5R: -55°C to +85°C (TCC ± 15%) X7R: -55°C to +125°C (TCC ± 15%)
Capacitance Range	1.5nF to 220nF
Maximum Assembly Process Temperature	250°C



INSERTION LOSS



ELECTRICAL CHARACTERISTICS — OPTI-CAP®

Part Number	Capacitance		Voltage Rating	TCC	DF (MAX)	IR (MIN)	Frequency Range
	MLC	Milli-Cap®					
P21BNL300MA04733	100nF	30pF	10V	X5R	3.5%	>10 ² MΩ	16KHz - >40GHz
P21BNL300MA04282	22nF	30pF					
P21BNL300MA03976	10nF	30pF					
P21BNL300MA04678	1.5nF	30pF	25V	X7R			
P42BNL820MA03152	220nF	82pF	10V	X5R			
P42BNL820MA04679	22nF	82pF	50V	X7R			
P62BNL820MA02636	100nF	82pF	25V	X7R			

DIMENSIONAL SPECIFICATIONS — OPTI-CAP®

Case Size	Opti-Cap®			MLC		
	Length	Width	Thickness	Length	Width	Thickness
P21 (0201)	0.020" ± 0.004"	0.012" ± 0.002"	0.010" ± 0.002"	0.022" ± 0.002"	0.010" ± 0.001"	0.010" ± 0.002"
P42 (0402)	0.038" ± 0.004"	0.020" ± 0.002"	0.020" ± 0.002"	0.040" ± 0.002"	0.020" ± 0.002"	0.020" ± 0.002"
P62 (0602)	0.058" ± 0.004"	0.020" ± 0.002"	0.020" ± 0.002"	0.067" ± 0.004"	0.031" ± 0.004"	0.031" ± 0.005"

ATTACHMENT METHODS — OPTI-CAP®

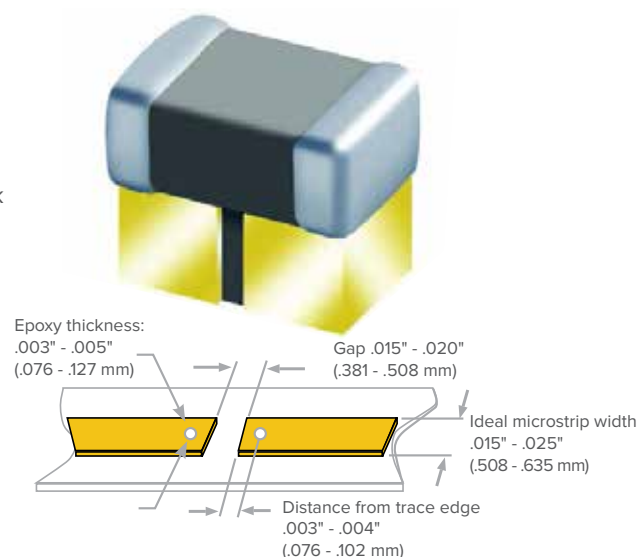
Recommended attachment to soft or hard substrate using Conductive Epoxy

1. Place a single drop of conductive epoxy onto each microstrip as illustrated; the edge of the epoxy shall be at least .003"-.004" back from the edge of the trace to prevent filling the gap with epoxy.
2. Centering the termination gap of the capacitor within the gap in the microstrip, press with careful, even pressure onto the microstrip ensuring the terminations make good contact with the epoxy drops.
3. Cure according to the epoxy manufacturer's preferred schedule, typically 125°C to 150°C max.
4. After curing, inspect joint for epoxy shorts across the termination and microstrip gaps that would cause a short across the cap.

Isopropanol and Methanol are both safe to use to pre-clean Opti-Caps®, Isopropanol, and Methanol are not to be used after mounting with conductive epoxy as they act as a solvent!

Recommended attachment to soft or hard substrate using Solder

1. Place a single drop of solder paste onto each microstrip as illustrated; the edge of the solder shall be at least .001"-.002" back from the edge of the trace to prevent filling the gap with solder.
2. Centering the termination gap of the capacitor within the gap in the microstrip, press with careful, even pressure onto the microstrip ensuring the terminations make good contact with the drops of solder paste.



3. Reflow according to the solder manufacturer's preferred profile, ensuring the reflow temperature does not exceed 250°C.
4. After the reflow step is completed, inspect joint for voids or excess flux and non-reflowed solder balls that can degrade performance or cause shorts across the gaps. Proper cleaning after the reflow process is crucial to avoiding performance degradation and discovering poor solder joints.

Isopropanol and Methanol are both safe to use with soldered Opti-Caps®.

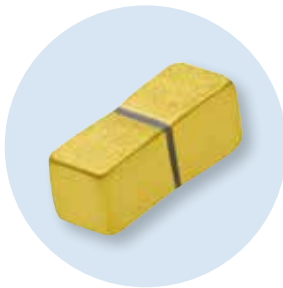
Milli-Cap®

Discover the advantages of broadband blocking capacitors from Knowles Precision Devices.

Product Overview

Knowles Precision Devices features our Milli-Cap® solution, which is designed to deliver reliable, ultra-low loss operation across a variety of applications including test equipment, fiber optic modules and broadband microwave/millimeter systems. Explore options that offer low frequency stability over extreme temperatures, space-saving footprints and more.

MILLI-CAP®



FEATURES

- 0201, 0402 and 0602 Footprints
- Low Loss High Q parts
- Very Low Series Inductance
- Ultra-High Series Resonance
- Matches Typical 50Ω Line Widths
- Behaves Like an Ideal Capacitor
- Single-Piece Construction
- Orientation Insensitive

FUNCTIONAL APPLICATIONS

- Test Equipment, Photonics, SONET, TOSA/ROSA, High-Speed Data
- Broadband Microwave/Millimeter Wave
- Transimpedance Amplifiers

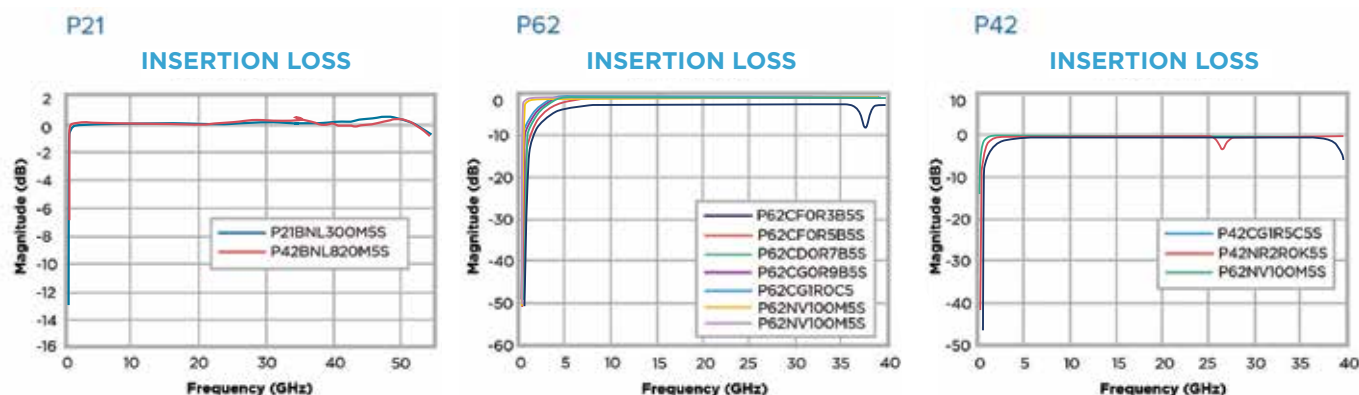
BENEFITS

- Very Low Series Inductance
- Ultra-High Series Resonance
- Low Loss High Q

ELECTRICAL CHARACTERISTICS — MILLI-CAP®

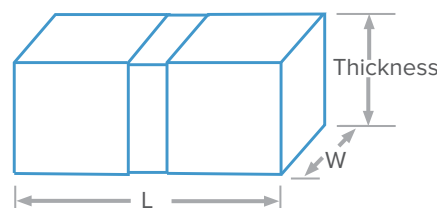
Part Number	Value (pF)	Voltage Rating	TCC	Dissipation Factor (Max)	Insulation Resistance (Min)	Frequency Range
P21BNL300M5S	30	50	± 15%	3.5%	10 ⁵ MΩ	20MHz – 50GHz
P42BNL820M5S	82	50	± 15%	3.5%	10 ⁵ MΩ	20MHz – 50GHz
P42NR2R0K5S	2	50	N1500 ± 500ppm/°C	0.25%	10 ⁶ MΩ	4GHz – 20GHz
P42CG1R5C5S	1.5	50	0 ± 30ppm/°C	0.7%	10 ⁶ MΩ	8GHz – 32GHz
P62BNL820M5S	82	50	± 15%	3.5%	10 ⁵ MΩ	20MHz – 50GHz
P62NV100M5S	10	50	N4700 ± 1000ppm/°C	1.2%	10 ⁶ MΩ	4GHz – 20GHz
P62CG1R0C5S	1	50	0 ± 30ppm/°C	0.7%	10 ⁶ MΩ	18GHz – 40GHz
P62CD0R7B5S	0.7	50	N20 ± 15ppm/°C	0.15%	10 ⁶ MΩ	20GHz – 40GHz
P62CF0R5B5S	0.5	50	0 ± 15 ppm/°C	0.6%	10 ⁶ MΩ	28GHz – 40GHz

Metallization - 7.5μ" Au over 50μ" Ni



DIMENSIONAL SPECIFICATIONS — MILLI-CAP®

Case Size	Length	Milli-Cap® Width	Thickness
P21 (0201)	0.020" ± 0.004"	0.012" ± 0.002"	0.010" ± 0.002
P42 (0402)	0.038" ± 0.004"	0.020" ± 0.002"	0.020" ± 0.002"
P62 (0602)	0.058" ± 0.004"	0.020" ± 0.002"	0.020" ± 0.002"



ATTACHMENT METHODS — MILLI-CAP®

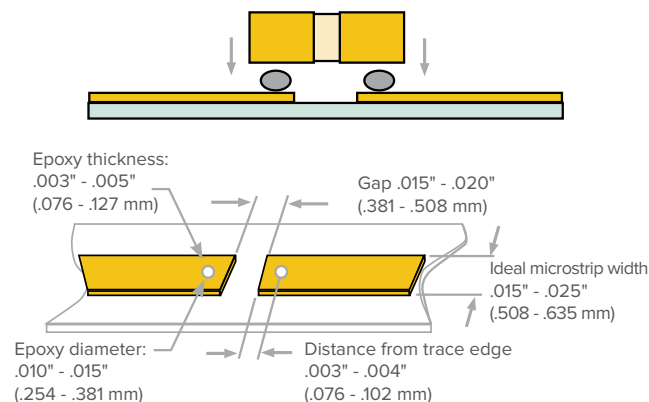
Recommended attachment to soft or hard substrate using Conductive Epoxy

- Place a single drop of conductive epoxy onto each microstrip as illustrated; the edge of the epoxy shall be at least .003"-.004" back from the edge of the trace to prevent filling the gap with epoxy.
- Centering the termination gap of the capacitor within the gap in the microstrip, press with careful, even pressure onto the microstrip ensuring the terminations make good contact with the epoxy drops.
- Cure according to the epoxy manufacturer's preferred schedule, typically 125°C to 150°C max.
- After curing, inspect joint for epoxy shorts across the termination and microstrip gaps that would cause a short across the cap.

Isopropanol and Methanol are both safe to use to pre-clean Milli-Caps®. Isopropanol and Methanol are not to be used after mounting with conductive epoxy as they act as a solvent.

Recommended attachment to soft or hard substrate using Solder

- Place a single drop of solder paste onto each micro strip as illustrated; the edge of the solder shall be at least .001"-.002" back from the edge of the trace to prevent filling the gap with solder.
- Centering the termination gap of the capacitor within the gap in the microstrip, press with careful, even pressure onto the microstrip ensuring the terminations make good contact with the drops of solder paste.



- Reflow according to the solder manufacturer's preferred profile, ensuring the reflow temperature does not exceed 250°C.
- After the reflow step is completed, inspect joint for voids or excess flux and non-reflowed solder balls that can degrade performance or cause shorts across the gaps. Proper cleaning after the reflow process is crucial to avoiding performance degradation and discovering poor solder joints.

Isopropanol and Methanol are both safe to use with soldered Milli-Caps®.