Your Partner in Smart Solutions®

CTS EMI Filters

Product Brochure

www.ctscorp.com

Electro-Magnetic Compatibility Solutions

Today, our world incorporates technology in all aspects of life, from cell phones, to our vehicles, all the way to defense and medical devices. All these electronics cross signals and create a type of static interfierence called electromagnetic interference or EMI. Though modern technology naturally creates this interferance, it is also affected by it as well. EMI can cause critical failure in electronic applications that cause cannot afford to be disrupted.

Companies mitigate EMI and Radio Frequency Interference (RFI) in their systems, through grounding, shielding and filtering. CTS enables those companies to mitigate EMI and RFI with a comprehensive offering of filters. We offer diverse product lines of standard as well as custom filters thereby providing customers with a wide range of electro-magnetic compatibility (EMC) solutions.With a focus on quality, reliability, and precision engineering, our EMC products empower businesses to thrive in today's interconnected world.

cts Your Partner in Smart Solutions

CTS® Your Partner in Smart Solutions®

About US

CTS is a leading designer and manufacturer of products that Sense, Connect, and Move. We manufacture sensors, actuators, and electronic components in North America, Europe, and Asia, and provide solutions to OEMs in the aerospace & defense, medical, industrial, communications, information technology, and transportation industries.

Our Markets

- Aerospace & Defence
- Automotive & Electric Solutions
- Industrial & Connectivity
- Medical & Healthcare

Custom Product Designs

As technology continues to move forward, we've been right alongside engineering intelligent ways to meet people's ever-changing needs. Contact us to work on custom product solutions for a varity of complex systems. Our teams of highly intellegent professionals are equipped to develop seamless solutions even under highly constringent conditions.

www.ctscorp.com

Table of Contents

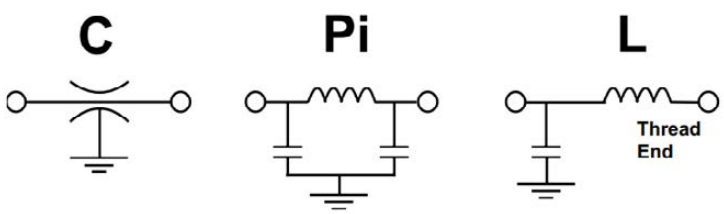
How to Use This Catalog

Part numbers are listed in sections by mounting style and filter type.
(Solder Mount, Press-In, or Bushing Mount) and (Filter or Feed-Thru Capacitor)

EIA/CTS tolerance codes are provided on pages 5, 14, & 28

This Catalog identifies standard parts produced by CTS, more configurations and details are available upon request.

Our Common Circuits



More circuits and options available on request

Our EMC Products

Solder-in & Press-in Feedthrough Filters

CTS miniature EMI ceramic filters and capacitors are designed to suppress unwanted EMI in applications where small size is critical. CTS filters cover a variety of voltage, attenuation, and capacitance ranges in both solder and bushing mount styles. We have QPL approvals to MIL-15733.

Thread Mount Feedthrough Filters

The CTS threaded bushing feed-throughs is one of the broadest in the industry and offers a wide range of rejection options supporting Pi-Type, L-Type, and C-Type filter feed-thrus providing 5pF to 1.4µF, support for up to 1000Vdc working voltages, up to 25A of current, and able to provide up to 70dB of rejection at 100MHz and 1GHz.

Filtered Terminal Blocks

CTS filtered terminal blocks are specifically designed to save time and money for EMI Filtering applications. By combining a filtering component with an industry-standard terminal block, CTS has created an effective barrier to EMI noise. The CTS filtered terminal blocks allow the engineer to eliminate EMI using an existing mechanical design element combined with the excellent performance of a pi filter.

Filter Assemblies

The CTS line of filtered assembly plates provides ease of installation and line customization of standard-size plates. Filter plates are an efficient and cost-effective solution for filtering multiple lines into or between different system compartments. For higher frequency applications (<50 MHz), filter plates can be more effective than typical surface mount solutions.

Surface Mount Filters

These CTS filters were used where cost and space savings have priority and improved insertion loss is required. The filter's unique design makes it suitable for common production soldering processes.

CTS® Your Partner in Smart Solutions®

Solder Mount Feed-Thru Capacitors

Feedthrough capacitors are electronic components designed to pass a conductor through a metal housing or a printed circuit board (PCB) while filtering out high-frequency noise. They combine the functionality of a capacitor with a feedthrough mechanism, providing both electrical connectivity and electromagnetic interference (EMI) suppression to eliminate noise and interfirence.

Features

- Standard and Custom Designs
- Variety of Lead Sizes and Configurations
- Wide Range of Electrical Characteristics
- Designed to be Soldered into a Bracket, Bulkhead or Package
- RoHS Compliant Available

Applications

- Telecommunication
- CATV
- Telemetry
- Radar
- Amplifiers
- Commercial & Hi-Rel Applications

Series	Temp range	Working Voltage (DC)	MAX. CAP. Nominal (pF)
2404	Z5, Y5, X5	500	7000
	X7	250	7000
2482	Z5, Y5, X5	300	4000
	X7	150	4000
2450	Z5, Y5, X5	500	1800
	X7	250	1800
2461	Z5, Y5, X5	200	1000
	X7	100	1000
2463	Z5, Y5, X5	200	2000
	X7	100	2000
2470	Z5, Y5, X5	250AC	2000
	--	--	--

CTS Solder Mount Feed-Thru Capacitors

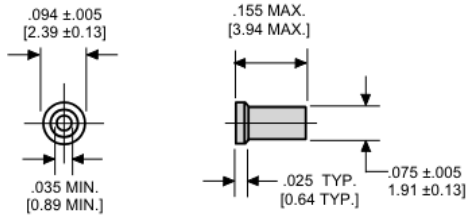
Series	Circuit Type	Working Voltage (DC)		Capacitance (PF)	Capacitance Tolerance	Current (A)	Typical No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
2404-000-X7R0-471M	C	-	250	470	±20%	20	-	-	12	27	27	11
2404-000-X5U0-102P	C	500	-	1000	+100-0%	20	-	3	20	35	40	11
2404-000-X5W0-502Z	C	500	-	5000	+80-20%	20	-	15	30	45	50	11
2404-007-X5W0-502Z	C	500	-	5000	+80-20%	15	-	15	30	45	50	10
2404-014-X5U0-102P	C	500	-	1000	+100-0%	--	-	3	20	35	40	12
2404-014-X5W0-502M	C	500	-	5000	±20%	--	-	15	30	45	50	12
2450-001-X5R0-101K	C	500	-	100	±10%	20	-	-	3	20	28	13
2450-001-X5R0-471M	C	500	-	470	±20%	20	-	-	12	27	27	13
2450-001-X5U0-102P	C	500	-	1000	+100-0%	20	-	3	20	35	40	13
2461-000-X7V0-102P	C	-	100	1000	+100-0%	--	-	3	20	35	40	5
2461-001-X7V0-102AA	C	-	100	1000	GMV	20	-	3	20	35	40	6
2461-002-X7V0-102M	C	-	100	1000	±20%	20	-	3	20	35	40	7
2463-000-X7U0-152P	C	-	100	1500	+100-0%	--	-	5	22	35	40	1
2463-001-X5S0-471M	C	200	-	470	±20%	--	-	-	12	27	27	2
2463-002-X5S0-471M	C	200	-	470	±20%	10	-	-	12	27	27	3
2463-002-X5U0-152P	C	200	-	1500	+100-0%	10	-	5	22	35	40	3
2463-003-X5U0-471P	C	200	-	470	+100-0%	10	-	-	12	27	27	4
2463-003-X5U0-152P	C	200	-	1500	+100-0%	10	-	5	22	35	40	4
2482-001-X5U0-471M	C	300	-	470	±20%	20	-	-	12	27	27	9
2482-001-X5U0-102M	C	300	-	1000	±20%	20	-	3	20	35	40	9
2482-012-X5U0-102M	C	300	-	1000	±20%	--	-	3	20	35	40	8
2470-500 ●	C	250AC	-	1000	+100-0%	10	-	3	20	35	40	14
2470-501 ●	C	250AC	-	1000	+100-0%	10	-	3	20	35	40	15

● UL Recognized to UL standard 1283; UL File No. E201344

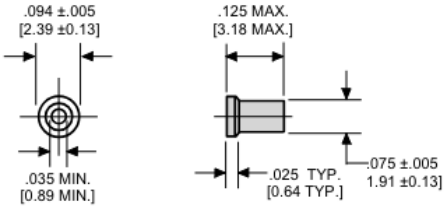
Diagrams & EIA/Tolerance Codes on page 5

Body Types

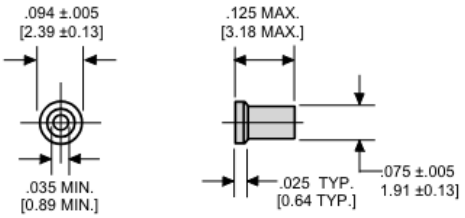
Style 1



Style 2



Style 3



EIA/CTS Tolerance Codes

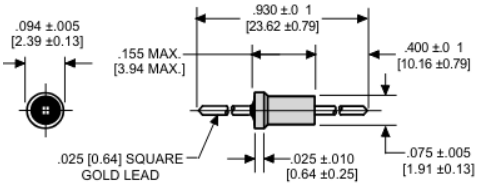
Maximum Capacitance for each part number is determined by the required operating temperature range and maximum capacitance change.

Temperature Characteristics	
EIA Code	**Temperature Range**
Z5	+10°C to +85°C
Y5	-30°C to +85°C
X5	-55°C to +85°C
X7	-55°C to +125°C
EIA Code	**Maximum Capacitor Change**
D	± 3.3%
E	± 4.7%
F	± 7.5%
P	± 10%
R	± 15%
S	± 22%
T	+ 22% -33%
U	+ 22% -56%
V	+ 22% -82%
W	+ 22% -90%

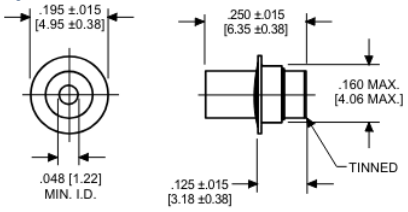
Capacitance Tolerance		
Nominal apacitance 10pF or Less	**Code**	**Nominal apacitance over 10pF**
GMV ◆	AA	GMV ◆
	A	+50% -20%
± 0.1 pF	B	± 0.10%
± 0.25 pF	C	± 0.25%
± 0.5 pF	D	± 0.50%
± 0.3 pF	E	+70% -30%
± 1 pF	F	± 1%
± 2 pF	G	± 2%
± 3%	H	± 3%
	I	+60% -40%
± 5%	J	± 5%
± 10%	K	± 10%
± 2%	L	+100% -40%
± 20%	M	± 20%
± 0.4 pF	N	± 30%
	P	+100% -0%
± 0.2 pF	Q	± 15%
	R	± 2.5%
	S	+50% -15%
	T	+30% -20%
	U	+80% -0%
	V	± 7%
	W	+50% -30%
MAX	X	+40% -10%
	Y	+50% -0%
	Z	+80% -20%

◆GMV: CTS Code: Guarantied Minimum Value

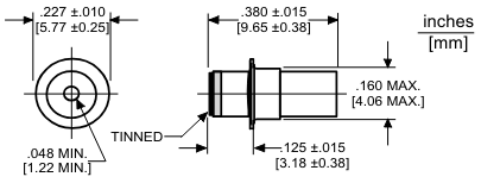
Style 4



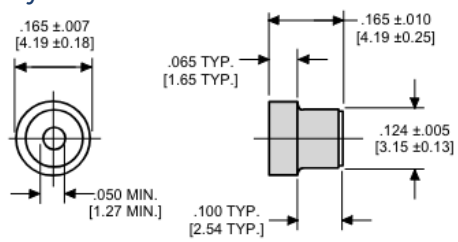
Style 8



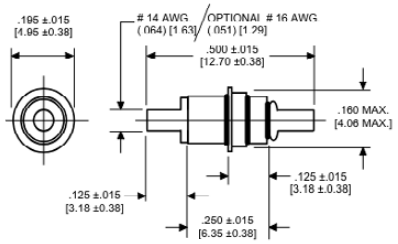
Style 12



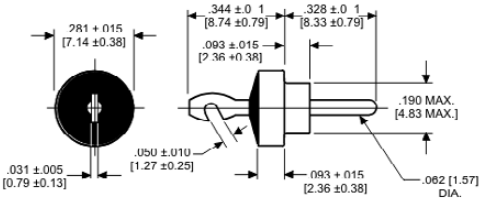
Style 5



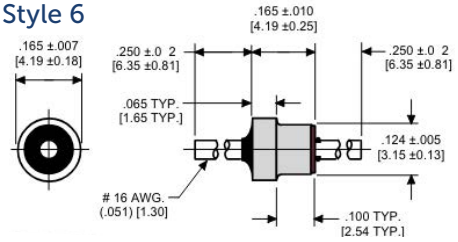
Style 9



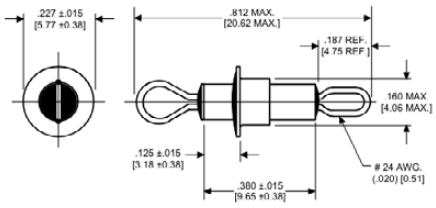
Style 13



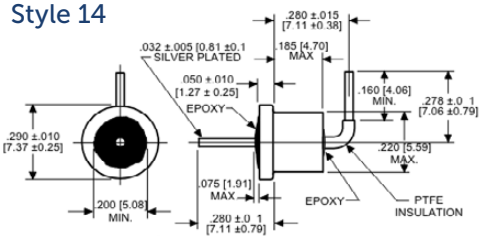
Style 6



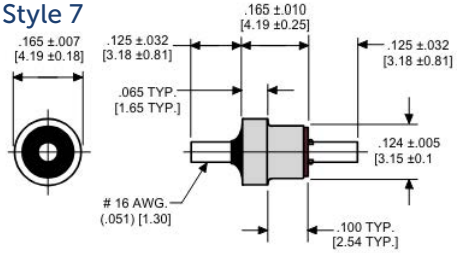
Style 10



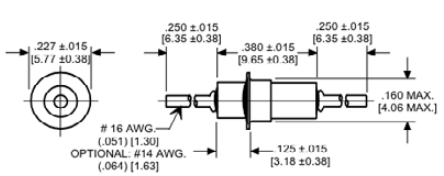
Style 14



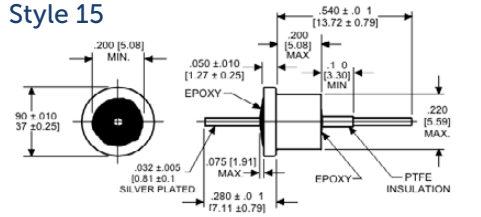
Style 7



Style 11



Style 15



Drawings not to scale

cts Your Partner in Smart Solutions

Solder Mount Filters

Solder Mount Filters are ideal for compact designs where traditional mounting isn't possible. They offer high performance in small sizes and can be glass-sealed for compartmental sealing. Gold-plated leads ensure excellent conductivity and compatibility with standard bonding methods. Their compact form and diverse electrical characteristics make them versatile for microwave applications.

Features

- Standard and Custom Designs
- Miniature Sizes Where High Performance and Small Space are Critical
- Large Range of Electrical Characteristics
- Gold Plating on Lead Offers Excellent Wire Bonding
- RoHS Compliant Available
- Hi-Rel Versions Available
- Commercial & Mil Standard Parts
- Saves Bulkhead Space
- Circuits C and Pi

Applications

- Telecommunication
- CATV
- Telemetry
- Radar
- Amplifiers
- Commercial & Hi-Rel Applications
- Attenuators & Oscillators
- Low Noise Amplifiers
- Microwave Filters
- Synthesizers
- Combiners

4300 Series - Miniature EMI Filters

Glass Sealed Top (flange)/ Epoxy Sealed Bottom

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Color Code
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4300-025	C	70	50	10,000	GMV	5	4	21	35	50	60	2	Black
4300-065	C	70	50	10,000	±20%	5	4	21	35	50	60	2	Blk-gold
4300-026	C	70	50	15,000	GMV	5	7	20	35	55	60	2	Orange
4300-031	C	70	50	27,000	GMV	5	10	28	42	65	65	2	Red-red
4300-034	C	50	50	50,000	GMV	5	15	35	45	70	--	2	Blu-blu
4300-023	C	150	100	2700	GMV	5	--	10	25	40	50	2	Red
4300-063	C	150	100	2700	±20%	5	--	10	25	40	50	2	Red-gold
4300-024	C	150	100	5000	GMV	5	--	15	30	45	55	2	Yellow
4300-064	C	150	100	5000	±20%	5	--	15	30	45	55	2	Yel-gold
4300-681	C	300	200	5	MAX	5	--	--	--	--	--	2	Blk-blk
4300-028	C	300	200	10	GMV	5	--	--	--	5	20	2	Violet
4300-029	C	300	200	25	GMV	5	--	--	--	10	25	2	Blue
4300-020	C	300	200	100	GMV	5	--	--	3	20	28	2	Green
4300-060	C	300	200	100	±20%	5	--	--	3	20	28	2	Grn-gold
4300-021	C	300	200	500	GMV	5	--	--	15	35	40	2	Brown
4300-027	C	300	200	1000	GMV	5	--	5	20	35	45	2	Gray
4300-022	C	300	200	1200	GMV	5	--	5	20	35	45	2	White
4300-062	C	300	200	1200	±20%	5	--	5	20	35	45	2	Wht-gold

Epoxy Sealed Top (flange)/ Epoxy Sealed Bottom

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Color Code
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	1GHz		
4302-005	C	70	50	10,000	GMV	10	4	21	35	50	60	3	black
4302-006	C	70	50	15,000	GMV	10	7	20	35	55	60	3	orange
4302-013	C	70	50	27,000	GMV	10	10	28	42	65	65	3	red-red
4302-014	C	50	50	50,000	GMV	10	15	35	45	70	--	3	blu-blu
4302-003	C	150	100	2700	GMV	10	--	10	25	40	50	3	red
4302-004	C	150	100	5000	GMV	10	--	15	30	45	55	3	yellow
4302-680	C	300	200	5	MAX	10	--	--	--	--	--	3	blk-blk
4302-009	C	300	200	25	GMV	10	--	--	--	10	25	3	blue
4302-000	C	300	200	100	GMV	10	--	--	3	20	28	3	green
4302-001	C	300	200	500	GMV	10	--	--	15	35	40	3	brown
4302-007	C	300	200	1000	GMV	10	--	5	20	35	45	3	gray
4302-002	C	300	200	1200	GMV	10	--	5	20	35	45	3	white

Diagrams on page 7

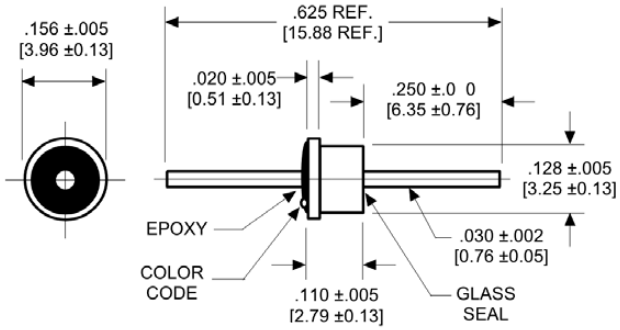
4300 Series - Miniature EMI Solder Mount Filters (continued)

Epoxy Sealed Top (flange)/ Glass Sealed Bottom

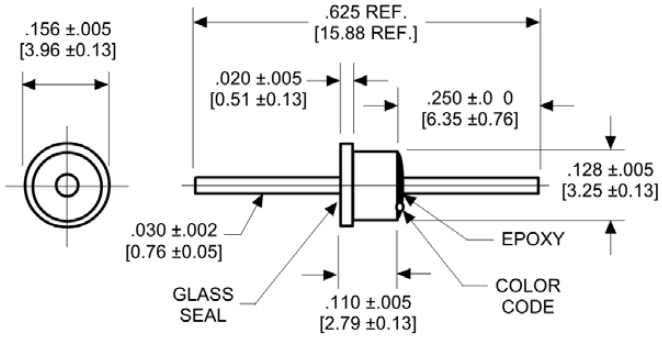
Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Color Code
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4300-005	C	70	50	10,000	GMV	5	4	21	35	50	60	1	black
4300-006	C	70	50	15,000	GMV	5	7	20	35	55	60	1	orange
4300-013	C	70	50	27,000	GMV	5	10	28	42	65	65	1	red-red
4300-014	C	50	50	50,000	GMV	5	15	35	45	70	--	1	blu-blu
4300-003	C	150	100	2700	GMV	5	--	10	25	40	50	1	red
4300-053	C	150	100	2700	±20%	5	--	10	25	40	50	1	red-gold
4300-004	C	150	100	5000	GMV	5	--	15	30	45	55	1	yellow
4300-680	C	300	200	5	MAX	5	--	--	--	--	--	1	blk-blk
4300-008	C	300	200	10	GMV	5	--	--	--	5	20	1	violet
4300-009	C	300	200	25	GMV	5	--	--	--	10	25	1	blue
4300-000	C	300	200	100	GMV	5	--	--	3	20	28	1	green
4300-050	C	300	200	100	±20%	5	--	--	3	20	28	1	grn-gold
4300-001	C	300	200	500	GMV	5	--	--	15	35	40	1	brown
4300-007	C	300	200	1000	GMV	5	--	5	20	35	45	1	gray
4300-002	C	300	200	1200	GMV	5	--	5	20	35	45	1	white

Body Types

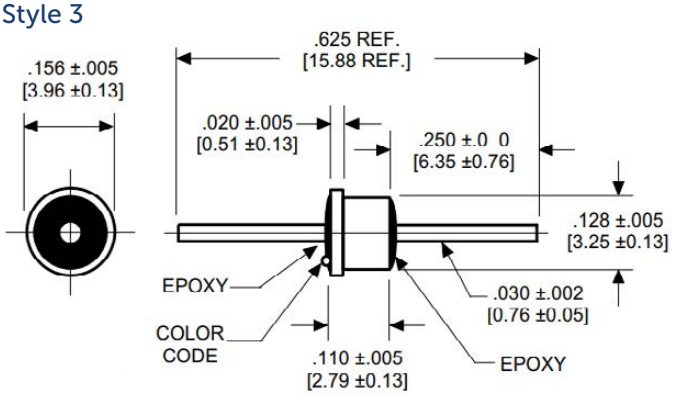
Style 1



Style 2



Style 3



Your Partner in Smart Solutions®

Drawings not to scale

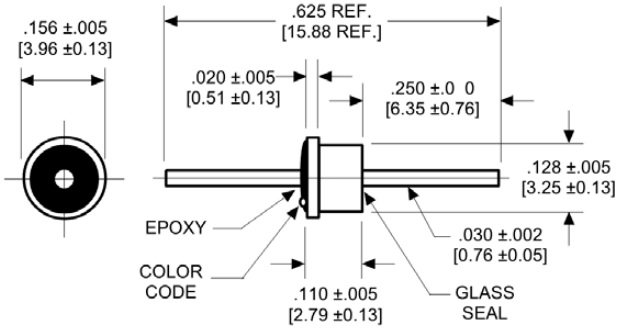
4305 Series - Extra Mini Solder Mount EMI Filters

Epoxy Sealed Top (flange)/ Glass Sealed Bottom

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Color Code
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4305-000	C	300	200	50	+100-0%	5	--	--	--	10	25	1	brwn-brown
4305-001	C	300	200	100	+100-0%	5	--	--	3	20	28	1	green
4305-002	C	300	200	500	+100-0%	5	--	--	--	35	40	1	brown
4305-003	C	150	100	2700	+100-0%	5	--	10	25	40	50	1	red
4305-004	C	150	100	5000	+100-0%	5	--	15	25	45	55	1	yellow
4305-005	C	300	200	10	+100-0%	5	--	--	--	5	20	1	violet
4305-006	C	300	200	25	+100-0%	5	--	--	--	10	25	1	blue
4305-007	C	300	200	250	+100-0%	5	--	--	5	22	30	1	yel-yellow
4305-008	C	300	200	1000	+100-0%	5	--	5	20	35	45	1	gray
4305-009	C	300	200	1500	+100-0%	5	--	5	22	35	45	1	green-green
4305-010	C	70	50	10,000	+100-0%	5	4	21	35	50	60	1	black
4305-011	C	70	50	27,000	+100-0%	5	10	28	45	65	70	1	red-red
4305-012	C	300	200	5	+100-0%	5	--	--	--	--	5	1	blue-blue
4305-680	C	300	200	5	MAX	5	--	--	--	--	--	1	black-black

Body Types

Style 1



Part numbers are listed in sections by mounting style and filter type.
(Solder Mount, Press-In, or Bushing Mount) and (Filter or Feed-Thru Capacitor)

This Catalog identifies standard parts produced by CTS, more configurations and details are available upon request.

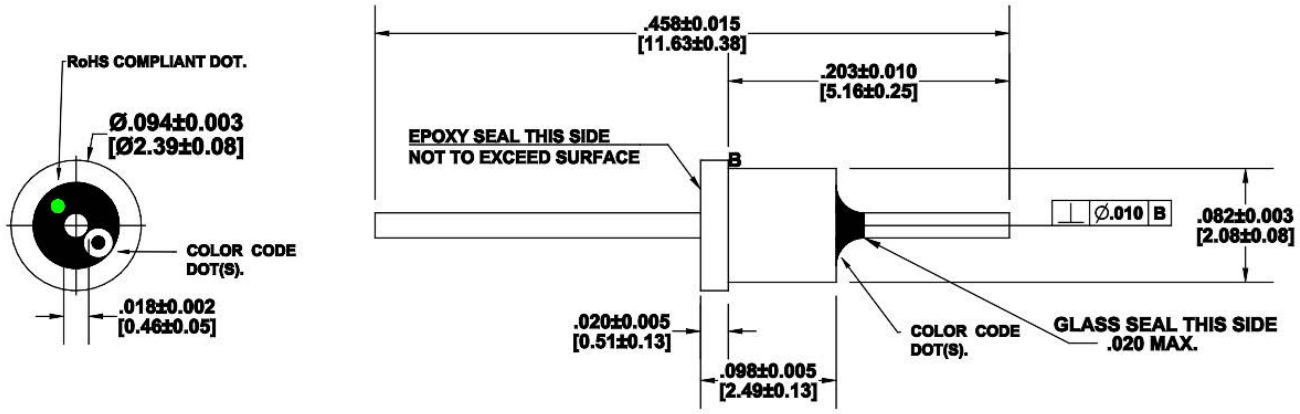
CTS Solder Mount Pi Filters (continued)

Epoxy Sealed Top (flange)/ Glass Sealed Bottom

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Color Code
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4311-001	C	150	100	10	GMV	1	--	--	--	5	20	1	Violet
4311-002	C	150	100	50	+100-0%	1	--	--	--	10	25	1	Brown-Brown
4311-003	C	300	200	100	+100-0%	1	--	--	3	20	28	1	Green
4311-004	C	150	100	250	+100-0%	1	--	--	5	22	40	1	Yellow-Yellow
4311-005	C	150	100	500	+100-0%	1	--	--	15	35	45	1	Brown
4311-006	C	150	100	1000	+100-0%	1	--	5	20	35	45	1	Gray
4311-007	C	150	100	1500	+100-0%	1	--	5	22	35	45	1	Green-Green
4311-008	C	150	100	2700	+100-0%	1	--	10	25	40	50	1	Red
4311-009	C	150	100	5000	+100-0%	1	--	15	30	45	55	1	Yellow
4311-010	C	150	100	10000	+100-0%	1	4	21	35	50	60	1	Black

Body Types

Style 1



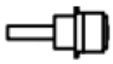
Drawings not to scale

CTS Solder Mount Pi Filters

Epoxy Sealed Top (flange)/ Glass Sealed Bottom

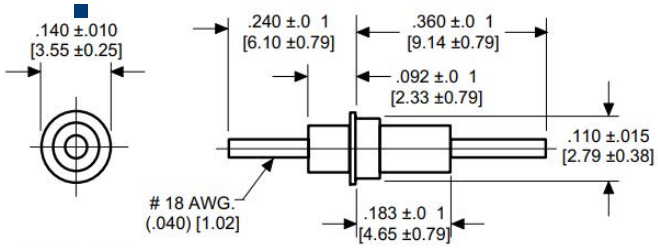
Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	MIL-PRF-15733 Number
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4100-003	Pi	125	50	3000	GMV	15	--	7	50	65	60	1	--
4101-505	Pi	--	70	1500	GMV	10	--	--	50	65	65	13	/62-0003
4100-000	Pi	250	125	1500	GMV	10	--	6	45	60	60	7	--
4101-000	Pi	250	125	1750	GMV	10	--	5	35	50	50	20	--
4101-002	Pi	250	125	1750	GMV	10	--	5	50	60	60	2	--
4101-003	Pi	250	125	1750	GMV	10	--	5	50	60	60	4	--
4101-004	Pi	250	125	1750	GMV	10	--	5	50	60	60	6	--
4101-502	Pi	--	125	1750	GMV	10	--	--	50	60	60	16	/33-0001
4101-503	Pi	--	125	1750	GMV	10	--	--	50	60	60	16	/33-0002
4101-500	Pi	--	125	1750	GMV	10	--	5	35	50	50	8	/66-0001
4100-002	Pi	350	200	1500	GMV	15	--	5	25	60	60	1	--
4101-001	Pi	350	200	1500	GMV	10	--	3	45	70	70	17	--
4101-501	Pi	--	200	1500	GMV	10	--	3	45	70	70	17	/62-0001
4100-500 ■	Pi	--	200	1500	GMV	10	--	5	45	70	--	18	/62-0002
4100-057	Pi	250ac	200dc	1500	GMV	10	--	5	45	70	--	9	--
4102-000	Pi	350	200	3000	GMV	10	--	8	55	65	65	10	--
4100-053	Pi	250ac	200dc	5000	GMV	10	--	18	60	70	--	9	--
4101-504	Pi	200	--	5500	GMV	10	--	15	55	70	70	19	/51-0001
4106-000	Pi	500dc 350ac	500dc 350ac	3000	GMV	25	--	--	50	50	50	11	--
4106-001	Pi	1000	500	4500	GMV	25	--	8	50	70	70	11	--

■ Straight Lead

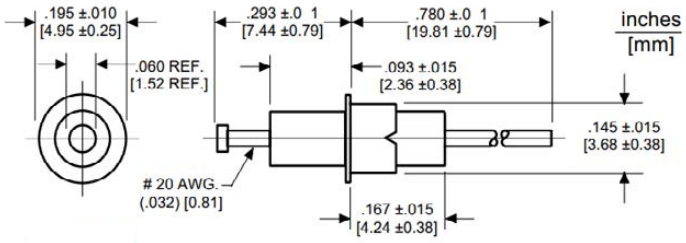


Body Types

Style 1



Style 2



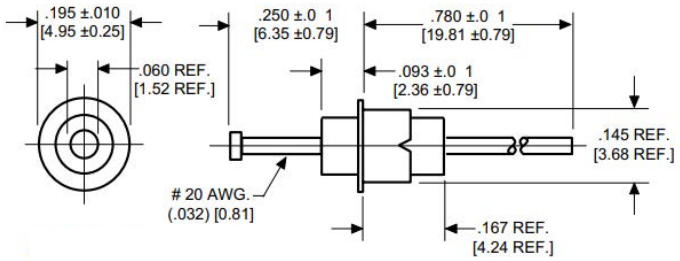
More diagrams on pages 10 & 11
Drawings not to scale

CTS Solder Mount Pi Filters (continued)

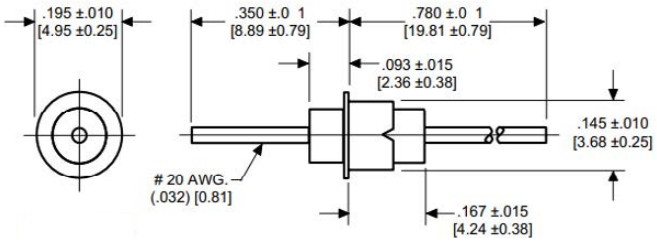
Epoxy Sealed Top (flange)/ Glass Sealed Bottom

Body Types (continued)

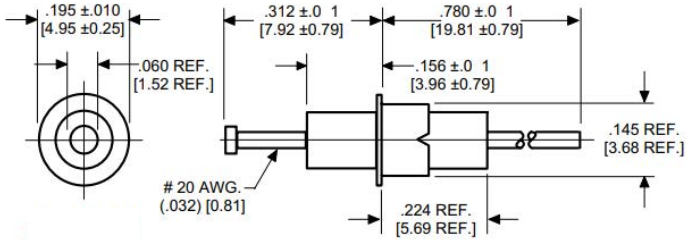
Style 3



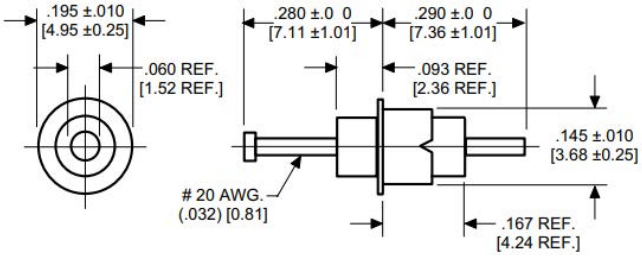
Style 4



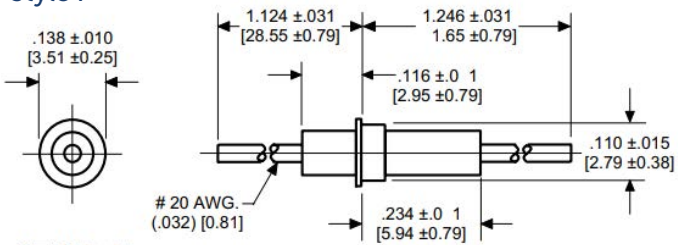
Style 5



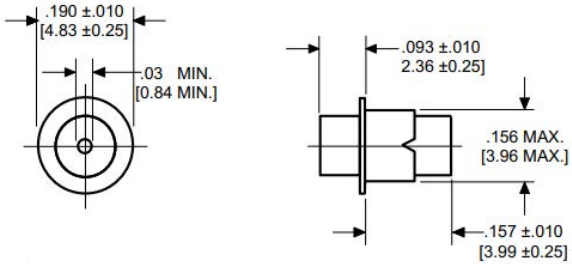
Style 6



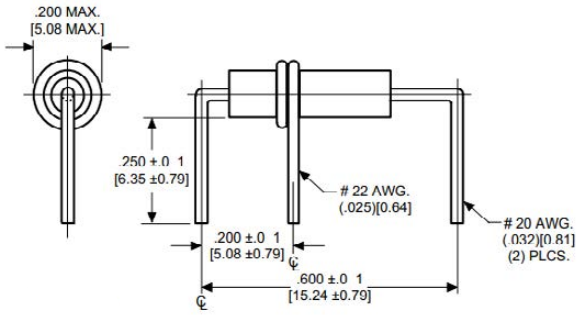
Style 7



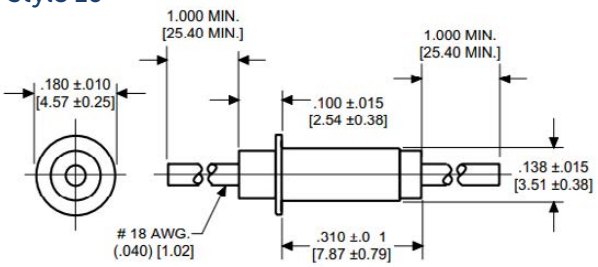
Style 8



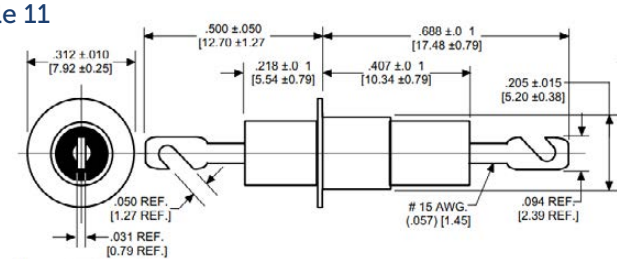
Style 9



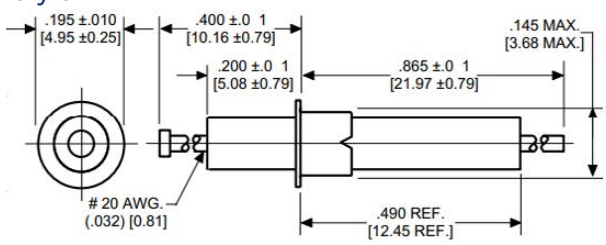
Style 10



Style 11



Style 12



More diagrams on page 11

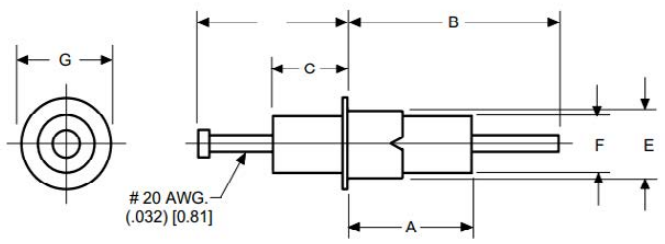
Drawings not to scale

CTS Solder Mount Pi Filters (continued)

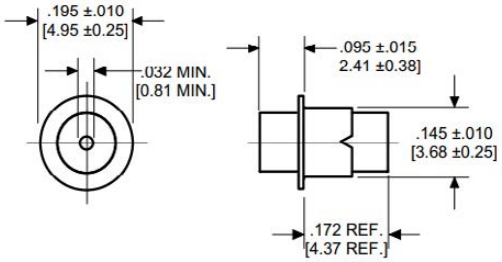
Epoxy Sealed Top (flange)/ Glass Sealed Bottom

Body Types (continued)

Style 13 - 19



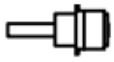
Style 20



Styles 13 - 19 Dimensions

Body Type	MIL-PRF-15733	Dim. A	Dim. B	Dim. C	Dim. D	Dim. E	Dim. F	Dim. G
13	/62-0003	.272 ± .025 [6.91 ± 0.64]	.438 ± .062 [11.13 ± 1.57]	.156 ± .015 [3.96 ± 0.38]	.312 ± .031 [7.92 ± 0.79]	.145 ± .015 [3.68 ± 0.38]	--	.190 ± .015 [4.83 ± 0.38]
14	/62-0004	.151 ± .031 [3.84 ± 0.79]	.780 ± .031 [19.81 ± 0.79]	.093 ± .031 [2.36 ± 0.79]	.273 ± .031 [6.93 ± 0.79]	.145 ± .015 [3.68 ± 0.38]	--	.196 ± .007 [4.98 ± 0.18]
15	/51-0002	.226 ± .022 [5.74 ± 0.56]	.780 ± .031 [19.81 ± 0.79]	.164 ± .022 [4.16 ± 0.56]	.312 ± .031 [7.92 ± 0.79]	.145 ± .015 [3.68 ± 0.38]	--	.203 ± .015 [5.16 ± 0.38]
16	/33-0001 /33-0002 ■	.170 ± .027 [4.32 ± 0.69]	.780 ± .031 [19.81 ± 0.79]	.093 ± .015 [2.36 ± 0.38]	.288 ± .015 [7.32 ± 0.38]	--	.125 MAX [3.18 MAX]	.190 ± .015 [4.83 ± 0.38]
16	/62-0001	.250 ± .031 [6.35 ± 0.79]	.406 ± .031 [10.31 ± 0.79]	.156 ± .031 [3.96 ± 0.79]	.312 ± .031 [7.92 ± 0.79]	.145 ± .015 [3.68 ± 0.38]	.125 ± .015 [3.18 ± 0.38]	.190 ± .015 [4.83 ± 0.38]
18	/62-0002 ■	.231± .046 [5.87 ± 1.17]	1.231± .077 [31.27 ± 1.96]	.109± .031 [2.77 ± 0.79]	1.109 ± .062 [28.17 ± 1.57]	.110 ± .015 [2.79 ± 0.38]	--	.143 ± .010 [3.63 ± 0.25]
19	/51-0001	.250 ± .031 [6.35 ± 0.79]	.406 ± .031 [10.31 ± 0.79]	.156 ± .031 [3.96 ± 0.79]	.312 ± .031 [7.92 ± 0.79]	.142 ± .007 [3.61 ± 0.18]	.122 ± .017 [3.10 ± 0.43]	.195 ± .010 [4.95 ± 0.25]

■ Straight Lead

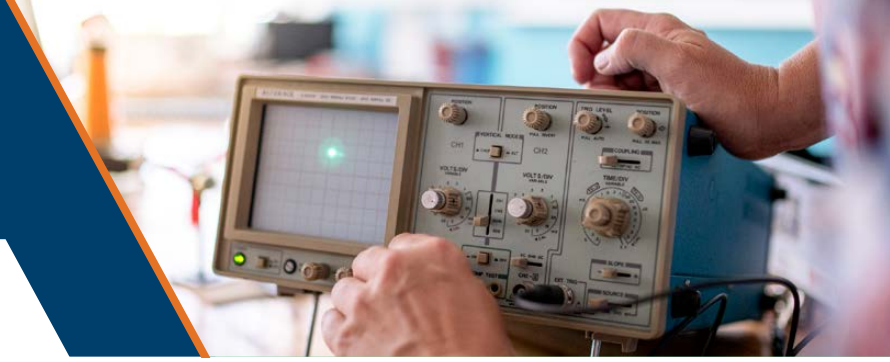


Part numbers are listed in sections by mounting style and filter type.
(Solder Mount, Press-In, or Bushing Mount) and (Filter or Feed-Thru Capacitor)

This Catalog identifies standard parts produced by CTS, more configurations and details are available upon request.

Your Partner in Smart Solutions®

Drawings not to scale



Press-In Filters

Press-In Ceramic EMI filters suppress unwanted EMI and allow a fast, mechanical bonding that is free from soldering. And, by offering an excellent alternative to the traditional soldering installation, these finely designed, knurled filters significantly reduce assembly costs. These EMI filters cover a variety of voltage, attenuation and capacitance ranges in a press-in mounting style.

Features

- Standard and Custom Designs
- Miniature Sizes Where High Performance and Small Space are Critical
- Wide Range of Electrical Characteristics
- No Solder, Allows Fast Mechanical Bonding
- RoHS Complaint Available
- Saves Time & Labor
- Reduces Cost

Applications

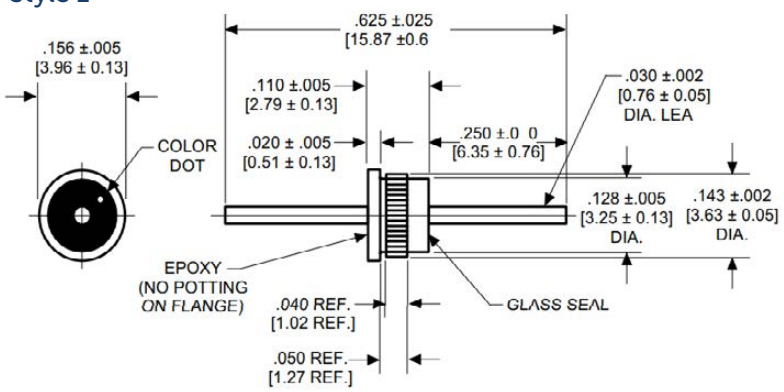
- Telecommunications
- CATV
- Telemetry
- Radar
- Amplifiers
- Attenuators
- Oscillators
- Synthesizers
- Combiners

4304 Series - Press-In C Filters

Epoxy Sealed Top (flange)/ Glass Sealed Bottom

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Color Code
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4304-000	C	300	200	10	+100-0%	5	--	--	--	5	20	1	violet
4304-002	C	300	200	500	+100-0%	5	--	--	15	35	40	1	brown
4304-003	C	300	200	100	+100-0%	5	--	--	3	20	28	1	green
4304-004	C	300	200	1000	+100-0%	5	--	5	20	35	45	1	gray
4304-005	C	300	200	1200	+100-0%	5	--	5	20	35	45	1	white
4304-007	C	150	100	5000	+100-0%	5	--	15	25	45	55	1	yellow
4304-008	C	70	50	10000	+100-0%	5	4	21	35	50	60	1	black
4304-009	C	70	50	15000	+100-0%	5	7	20	35	55	60	1	orange
4304-010	C	70	50	27000	+100-0%	5	10	28	45	65	65	1	red-red
4304-011	C	50	50	50000	+100-0%	5	15	35	45	70	--	1	blue-blue
4304-680	C	300	200	5	MAX	5	--	--	--	--	--	1	black-black

Body Type
Style 1



Product Installation Recommendations

Tool Part No.	Filter Type
R066363	4304

Product installation recommendations PIR4717-9 are provided with parts to prevent damage to the component during installation.

Ordering Example for 4304 filter tool: R066363

Drawings not to scale

4306 Series - Press-In C Filters

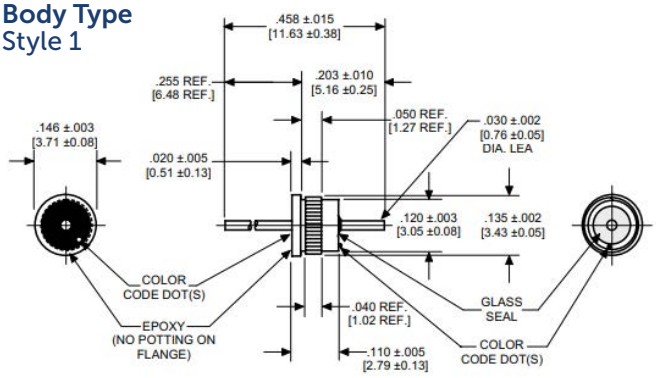
Epoxy Sealed Top (flange)/ Glass Sealed Bottom

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Color Code
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4306-010	C	70	50	10000	+100-0%	5	10	21	35	50	60	1	black
4306-011	C	70	50	27000	+100-0%	5	--	28	45	65	70	1	red-red
4306-030	C	150	100	2700	+100-0%	5	--	10	25	40	50	1	red
4306-004	C	150	100	5000	+100-0%	5	--	15	25	45	55	1	yellow
4306-012	C	300	200	5	+100-0%	5	--	--	--	--	5	1	blue-blue
4306-680	C	300	200	5	MAX	5	--	--	--	--	--	1	black-black
4306-028	C	300	200	10	+100-0%	5	--	--	--	5	20	1	violet
4306-006	C	300	200	25	+100-0%	5	--	--	--	10	25	1	blue
4306-005	C	300	200	50	+100-0%	5	--	--	--	10	25	1	brown-brown
4306-029	C	300	200	100	+100-0%	5	--	--	3	20	28	1	green
4306-007	C	300	200	250	+100-0%	5	--	--	5	22	30	1	yellow-yellow
4306-003	C	300	200	500	+100-0%	5	--	--	--	35	40	1	brown
4306-008	C	300	200	1000	+100-0%	5	--	5	20	35	45	1	gray
4306-009	C	300	200	1500	+100-0%	5	4	5	22	35	45	1	green-green

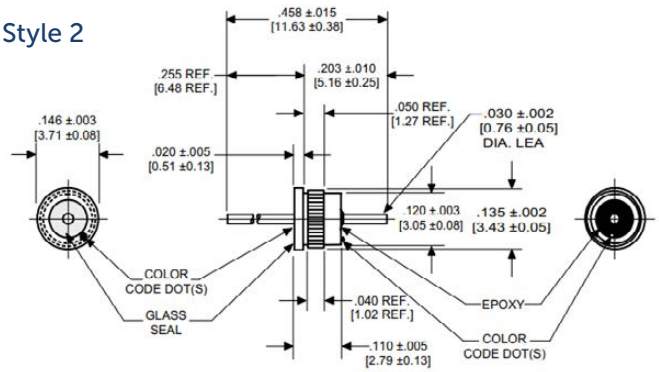
Glass Sealed Top (flange)/ Epoxy Sealed Bottom

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Typical No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Color Code
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4306-023	C	70	50	10000	+100-0%	5	4	21	35	50	60	2	black
4306-024	C	70	50	27000	+100-0%	5	10	28	45	65	70	2	red-red
4306-015	C	150	100	2700	+100-0%	5	--	10	25	40	50	2	red
4306-017	C	150	100	5000	+100-0%	5	--	15	25	45	55	2	yellow
4306-025	C	300	200	5	+100-0%	5	--	--	--	--	5	2	blue-blue
4306-681	C	300	200	5	MAX	5	--	--	--	--	--	2	black-black
4306-013	C	300	200	10	+100-0%	5	--	--	--	5	20	2	violet
4306-019	C	300	200	25	+100-0%	5	--	--	--	10	25	2	blue
4306-018	C	300	200	50	+100-0%	5	--	--	--	10	25	2	brown-brown
4306-014	C	300	200	100	+100-0%	5	--	--	3	20	28	2	green
4306-020	C	300	200	250	+100-0%	5	--	--	5	22	30	2	yellow-yellow
4306-016	C	300	200	500	+100-0%	5	--	--	--	35	40	2	brown
4306-021	C	300	200	1000	+100-0%	5	--	5	20	35	45	2	gray
4306-022	C	300	200	1500	+100-0%	5	--	6	22	35	45	2	green-green

Body Type
Style 1



Style 2



Product Installation Recommendations

Tool Part No.	Filter Type
R066364	4306

Product installation recommendations PIR4717-9 are provided with parts to prevent damage to the component during installation.

Ordering Example for 4306 filter tool: R066364

CTS Your Partner in Smart Solutions®

Drawings not to scale

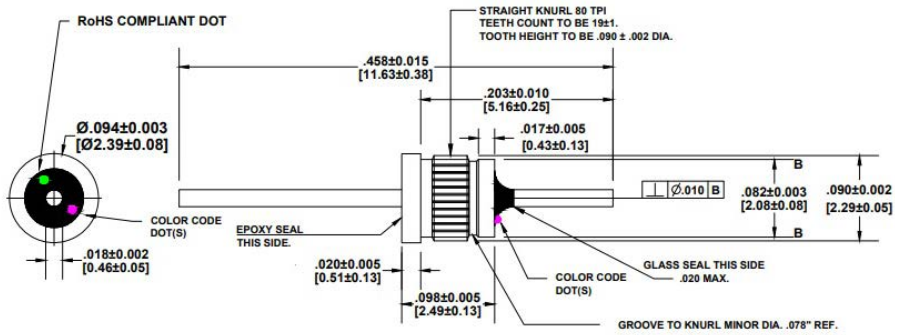
4310 Series - Press-In C Filters

Epoxy Sealed Top (flange)/ Glass Sealed Bottom

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Color Code
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4310-010	C	150	100	2700	+100-0%	1	--	10	25	40	50	1	Red
4310-011	C	150	100	10	GMV	1	--	--	--	5	20	1	Violet
4310-012	C	150	100	100	+100-0%	1	--	--	3	20	28	1	Green
4310-013	C	150	100	3	MAX	1	--	--	--	--	--	1	Black-Black
4310-014	C	150	100	50	+100-0%	1	--	--	--	10	25	1	Brown-Brown
4310-015	C	150	100	250	+100-0%	1	--	--	5	22	30	1	Yellow-Yellow
4310-016	C	150	100	500	+100-0%	1	--	--	15	35	40	1	Brown
4310-017	C	150	100	1000	+100-0%	1	--	5	20	35	45	1	Gray
4310-018	C	150	100	1500	+100-0%	1	--	5	22	35	45	1	Green-Green
4310-019	C	150	100	5000	+100-0%	1	--	15	30	45	55	1	Yellow
4310-020	C	150	100	10000	+100-0%	1	4	21	35	50	60	1	Black

Body Type

Style 1



Product Installation Recommendations

Tool Part No.	Filter Type
R066527	4310

Product installation recommendations PIR4717-9 are provided with parts to prevent damage to the component during installation.

Ordering Example for 4310 filter tool: R066527

Your Partner in Smart Solutions®

Drawings not to scale

Bushing Mount Feed-Thru Capacitors

Feedthrough capacitors are electronic components designed to filter out high-frequency noise while allowing a conductor to pass through a metal housing or printed circuit board (PCB). Adding a threaded bushing allows for an ideal mounting option for applications where small size and high performance are critical. All bushing-style filters come with a hex nut and lock washer unless specified otherwise.

Features

- Standard and Custom Designs
- Wide Range of Products & Electrical Characteristics
- High Performance
- Hi-Rel Versions Available
- Wide Range Threads Sizes Available
- Competitively Priced
- Small Size Saves Bulkhead Space
- Reduced Cost

Applications

- Telecommunications
- CATV
- Telemetry
- Radar
- Amplifiers
- Microwave
- RF Switches

Series	Temp range	Voltage (DC)	MAX. CAP. Nominal (pF)
2430	Z5, Y5, X5	200	1500
	X7	100	1500
2425	Z5, Y5, X5	200	10,000
	X7	100	10,000
2499	Z5, Y5, X5	500	10,000
	X7	250	10,000
357	Z5, Y5, X5	500	10,000
	X7	250	10,000
2452	Z5, Y5, X5	500	1800
	X7	250	1800
327	Z5, Y5, X5	500	10,000
	X7	250	10,000
2432	Z5, Y5, X5	2000	7,000
	X7	1000	7,000
2499	Z5, Y5, X5	500	5000
	X7	250	5000

Product tables on page 15
Diagrams on page 16

EIA/CTS Tolerance Codes

Maximum Capacitance for each part number is determined by the required operating temperature range and maximum capacitance change.

Temperature Characteristics	
EIA Code	**Temperature Range**
Z5	+10°C to +85°C
Y5	-30°C to +85°C
X5	-55°C to +85°C
X7	-55°C to +125°C
EIA Code	**Maximum Capacitor Change**
D	± 3.3%
E	± 4.7%
F	± 7.5%
P	± 10%
R	± 15%
S	± 22%
T	+ 22% -33%
U	+ 22% -56%
V	+ 22% -82%
W	+ 22% -90%

Capacitance Tolerance		
Nominal apacitance 10pF or Less	**Code**	**Nominal apacitance over 10pF**
GMV ◆	AA	GMV ◆
	A	+50% -20%
± 0.1 pF	B	± 0.10%
± 0.25 pF	C	± 0.25%
± 0.5 pF	D	± 0.50%
± 0.3 pF	E	+70% -30%
± 1 pF	F	± 1%
± 2 pF	G	± 2%
± 3%	H	± 3%
	I	+60% -40%
± 5%	J	± 5%
± 10%	K	± 10%
± 2%	L	+100% -40%
± 20%	M	± 20%
± 0.4 pF	N	± 30%
	P	+100% -0%
± 0.2 pF	Q	± 15%
	R	± 2.5%
	S	+50% -15%
	T	+30% -20%
	U	+80% -0%
	V	± 7%
	W	+50% -30%
MAX	X	+40% -10%
	Y	+50% -0%
	Z	+80% -20%

◆ GMV: CTS Code: Guarantied Minimum Value

#6-32 UNC-2A Feed-Thru Capacitors

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Typical No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
2430-003-X5F0-101M	C	200	100	100	±20%	5	--	--	3	20	28	1
2430-003-X5F0-102Z	C	200	100	1000	+80-20%	5	--	3	20	35	40	1

#8-32 UNC-2A Feed-Thru Capacitors

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Typical No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
2425-018-X5U0-101M ▲	C	200	100	100	±20%	20	--	--	3	20	28	11
2425-544-X7R0-101M	C	200	100	100	±20%	20	--	--	3	20	28	11
2425-018-X5U0-102M ▲	C	200	100	1000	±20%	20	--	3	20	35	40	11
2425-544-X7R0-102P	C	200	100	1000	+100 -0%	20	--	3	20	35	40	11
2425-018-X5W0-502M ▲	C	200	100	5000	±20%	20	--	15	30	45	50	11
2425-601-X5W0-103Z	C	200	100	10,000	+80-20%	20	--	20	35	50	55	14

▲ Turret Lead 

#8-36 UNF-2A and #12-28 UNF-2A Feed-Thru Capacitors

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Typical No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
2499-003-X5U0-102P	C	500	250	1000	+100-0%	20	--	3	20	35	40	4
2499-003-X5W0-502P	C	500	250	5000	+100-0%	20	--	15	30	45	50	4
2499-003-X5W0-103Z	C	500	250	10,000	+80-20%	20	--	20	35	50	55	4
357-001-X5W0-103Z	C	500	250	10,000	+80-20%	20	--	20	35	50	55	5

#12-32 UNEF-2A Feed-Thru Capacitors

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Typical No-Load Insertion Loss (dB) at 25°C per MIL-Std-220				Body Type
		85°C	125°C				10MHz	100MHz	1GHz	10GHz	
2452-000-X7R0-101M	C	500	250	100	±20%	20	--	3	20	28	7
2452-000-X5U0-102P	C	500	250	1000	+100-0%	20	3	20	35	40	7

1/4-28 and 5/16-24 UNF-2A and 5/16-32 UNEF-2A Feed-Thru Capacitors

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Typical No-Load Insertion Loss (dB) at 25°C per MIL-Std-220				Body Type
		85°C	125°C				10MHz	100MHz	1GHz	10GHz	
327-010-X5U0-102M	C	500	250	1000	±20%	20	3	20	35	40	2
327-010-X5U0-152M	C	500	250	1500	±20%	20	5	22	35	40	2
327-010-X5U0-502P	C	500	250	5000	+100-0%	20	15	30	45	50	2
2432-002-X5R0-101M	C	2000	1000	100	±20%	20	--	3	20	27	6
2432-002-X5U0-502M	C	2000	1000	5000	±20%	20	15	30	45	50	6
2432-002-X5W0-752Z	C	2000	1000	7500	+80-20%	20	15	30	45	50	6

Metric Bushing Feed-Thru Capacitors

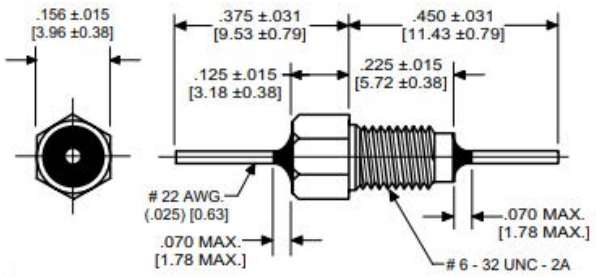
M5 Thread

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Typical No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
2499-523-Y5R0-102P	C	500	250	1000	+100-0%	20	--	3	20	35	40	3

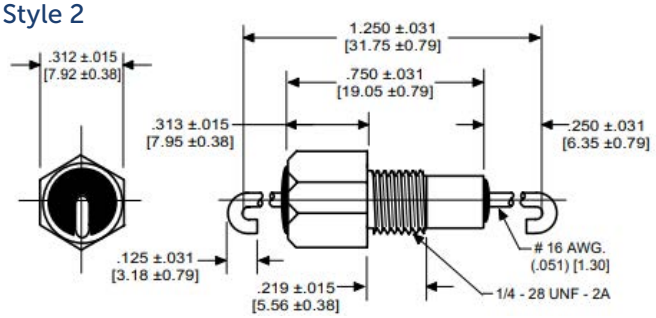
Diagrams on page 16
EIA/CTS Tolerance Codes on page 14
All bushing style filters include hex nut and lock washer unless otherwise noted

Body Type

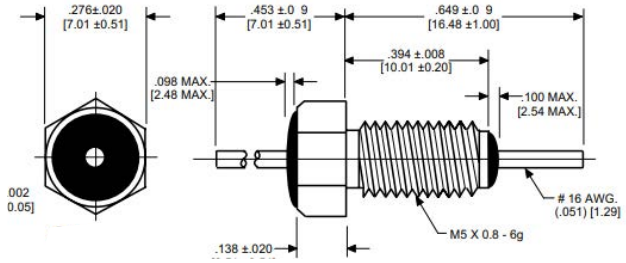
Style 1



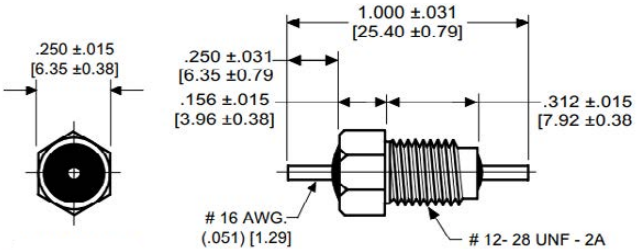
Style 2



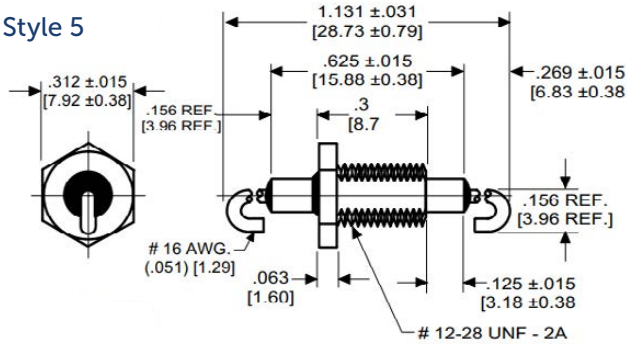
Style 3



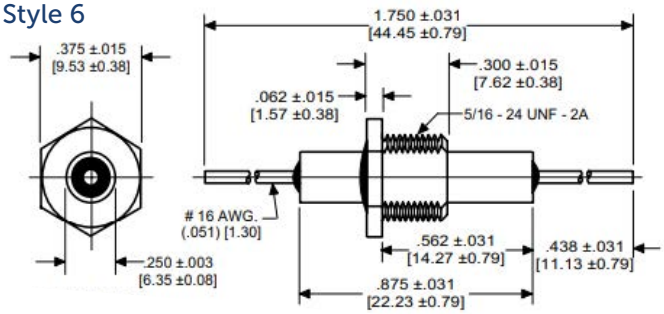
Style 4



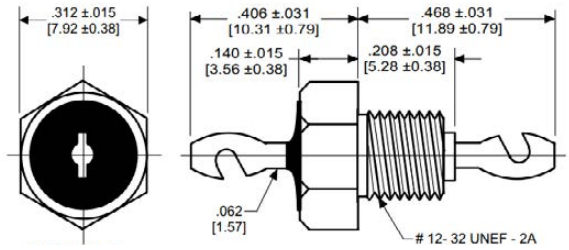
Style 5



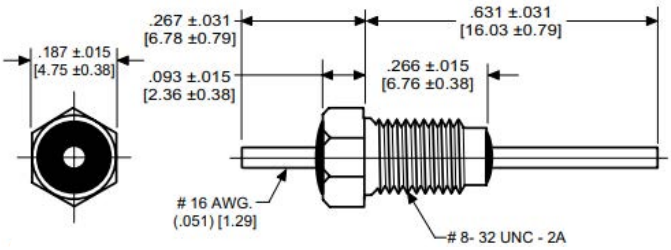
Style 6



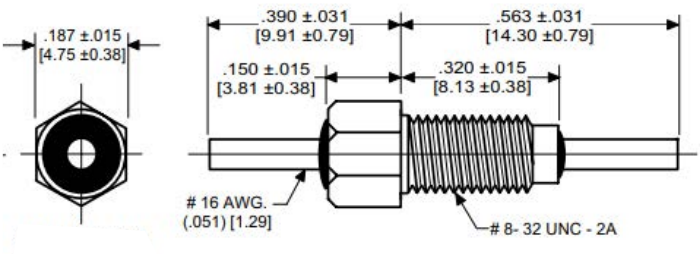
Style 7



Style 11



Style 14



EIA/CTS Tolerance Codes on page 14
Product Table on page 15

Part numbers are listed in sections by mounting style and filter type. (Solder Mount, Press-In, or Bushing Mount) and (Filter or Feed-Through Capacitor)

This Catalog identifies standard parts produced by CTS, more configurations and details are available upon request.

Drawings not to scale

Bushing Mount Filters

Threaded bushing filters offer a diverse range of standard and custom filters to suppress EMI/RFI thereby providing customers with a wide variety of EMC solutions. These filters are ideal for applications where small size and high performance are critical and a US threaded mounting technique is desired. All bushing style filters include hex nut and lock washer unless otherwise noted.

Features

- Standard and Custom Designs
- Wide Range of Products & Electrical Characteristics
- High Performance
- Hi-Rel Versions Available
- Wide Range Threads Sizes Available
- Competitively Priced
- Small Size Saves Bulkhead Space
- Multiple Circuit Configurations: Pi, C & L

Applications

- Telecommunications
- CATV
- Telemetry
- Radar
- Amplifiers
- RF & Microwave
- RF Switches

#4-40 UNC-2A

Pi Configurations

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Lead Dia.
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4261-001	Pi	--	50	5500	GMV	3	--	14	55	70	--	1	.018 [.46]
4200-012	Pi	--	200	1500	-0,+100%	3	--	5	42	70	--	1	.018 [.46]

L Configurations

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Lead Dia.
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4400-055	L	70	50	10,000	GMV	10	4	21	35	55	70	1	.020 [.51]
4400-056	L	70	50	15,000	GMV	10	7	25	40	60	60	1	.020 [.51]
4400-060	L	70	50	27,000	GMV	10	10	28	45	65	70	1	.020 [.51]
4400-057	L	50	50	50,000	GMV	10	15	35	52	70	--	1	.020 [.51]
4400-053	L	150	100	2700	GMV	10	--	10	25	40	55	1	.020 [.51]
4400-054	L	150	100	5000	GMV	10	--	15	30	45	60	1	.020 [.51]
4400-050	L	300	200	100	GMV	10	--	--	3	20	33	1	.020 [.51]
4400-052	L	300	200	1200	GMV	10	--	5	20	35	50	1	.020 [.51]

Diagrams on page 18

All bushing style filters include hex nut and lock washer unless otherwise noted

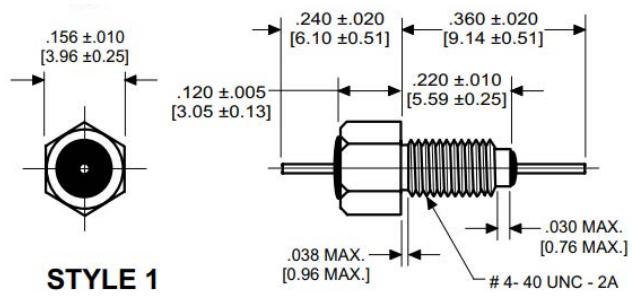
#4-40 UNC-2A (Continued)

C Configurations

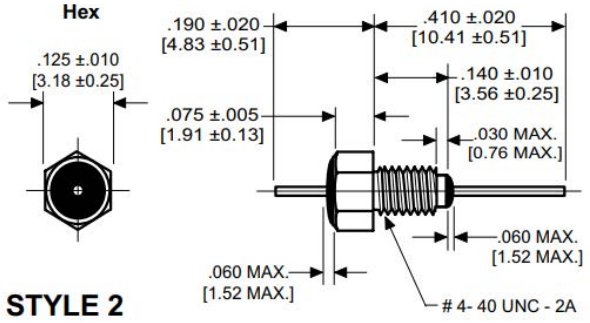
Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type	Lead Dia.
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz		
4403-035	C	70	50	10,000	GMV	10	4	20	35	50	50	2	.030 [.76]
4400-005	C	70	50	10,000	GMV	10	4	20	35	50	50	1	.020 [.51]
4400-035	C	70	50	10,000	GMV	10	4	20	35	50	50	1	.030 [.76]
4403-005	C	70	50	10,000	GMV	10	4	20	35	50	50	2	.020 [.51]
4400-006	C	70	50	15,000	GMV	10	7	20	35	50	60	1	.020 [.51]
4400-036	C	70	50	15,000	GMV	10	7	20	35	50	60	1	.030 [.76]
4403-036	C	70	50	15,000	GMV	10	7	20	35	50	60	2	.030 [.76]
4400-010	C	70	50	27,000	GMV	10	10	28	42	65	65	1	.020 [.51]
4400-040	C	70	50	27,000	GMV	10	10	28	42	65	65	1	.030 [.76]
4403-010	C	70	50	27,000	GMV	10	10	28	42	65	65	2	.020 [.51]
4403-040	C	70	50	27,000	GMV	10	10	28	42	65	65	2	.030 [.76]
4400-016	C	50	50	50,000	GMV	10	15	35	45	70	--	1	.020 [.51]
4400-041	C	50	50	50,000	GMV	10	15	35	45	70	--	1	.030 [.76]
4400-003	C	150	100	2700	GMV	10	--	10	25	40	50	1	.020 [.51]
4400-033	C	150	100	2700	GMV	10	--	10	25	40	50	1	.030 [.76]
4403-003	C	150	100	2700	GMV	10	--	10	25	40	50	2	.020 [.51]
4403-033	C	150	100	2700	GMV	10	--	10	25	40	50	2	.030 [.76]
4400-004	C	150	100	5000	GMV	10	--	15	30	45	55	1	.020 [.51]
4400-034	C	150	100	5000	GMV	10	--	15	30	45	55	1	.030 [.76]
4403-004	C	150	100	5000	GMV	10	--	15	30	45	55	2	.020 [.51]
4403-034	C	150	100	5000	GMV	10	--	15	30	45	55	2	.030 [.76]
4400-680	C	300	200	5	MAX	10	--	--	--	--	--	1	.030 [.76]
4403-680	C	300	200	5	MAX	10	--	--	--	--	--	2	.030 [.76]
4400-008	C	300	200	10	GMV	10	--	--	--	5	20	1	.020 [51]
4400-038	C	300	200	10	GMV	10	--	--	--	5	20	1	.030 [.76]
4403-008	C	300	200	10	GMV	10	--	--	--	5	20	2	.020 [.51]
4403-038	C	300	200	10	GMV	10	--	--	--	5	20	2	.030 [.76]
4400-009	C	300	200	25	GMV	10	--	--	--	10	25	1	020 [.51]
4400-039	C	300	200	25	GMV	10	--	--	--	10	25	1	.030 [.76]
4403-039	C	300	200	25	GMV	10	--	--	--	10	25	2	.030 [.76]
4400-000	C	300	200	100	GMV	10	--	--	3	20	28	1	.020 [.51]
4400-030	C	300	200	100	GMV	10	--	--	3	20	28	1	.030 [.76]
4403-000	C	300	200	100	GMV	10	--	--	3	20	28	2	.020 [.51]
4403-030	C	300	200	100	GMV	10	--	--	3	20	28	2	.030 [.76]
4400-001	C	300	200	500	GMV	10	--	--	15	35	40	1	.020 [.51]
4400-031	C	300	200	500	GMV	10	--	--	15	35	40	1	.030 [.76]
4403-031	C	300	200	500	GMV	10	--	--	15	35	40	2	.030 [.76]
4400-007	C	300	200	1000	GMV	10	--	5	20	35	45	1	.020 [.51]
4400-037	C	300	200	1000	GMV	10	--	5	20	35	45	1	.030 [.76]
4403-007	C	300	200	1000	GMV	10	--	5	20	35	45	2	.020 [.51]
4403-037	C	300	200	1000	GMV	10	--	5	20	35	45	2	.030 [.76]
4400-002	C	300	200	1200	GMV	10	--	5	20	35	45	1	.020 [.51]
4400-032	C	300	200	1200	GMV	10	--	5	20	35	45	1	.030 [.76]
4403-002	C	300	200	1200	GMV	10	--	5	20	35	45	2	.020 [.51]
4403-032	C	300	200	1200	GMV	10	--	5	20	35	45	2	.030 [.76]

Body Type

Style 1 - Hex Large



Style 2 - Hex Small



All bushing style filters include hex nut and lock washer unless otherwise noted
Drawings not to scale

#6-32 UNC-2A Filters

C Configurations

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
4402-016	C	50	50	50,000	GMV	10	15	35	45	70	--	2
4402-005	C	100	100	10,000	GMV	10	4	21	35	50	--	2
4402-018	C	50	50	100,000	GMV	10	22	40	47	65	65	2
4402-680 ⬣	C	300	200	5	MAX	10	--	--	--	--	--	5

⬣ No hex nut or lock washer

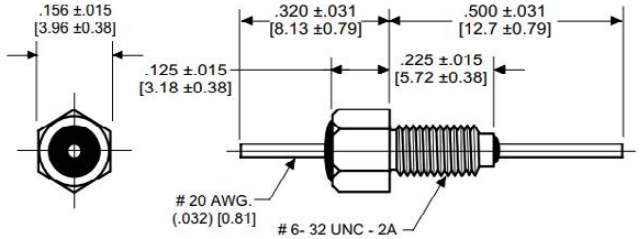
L Configurations

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
4402-063 ⬣	L	200	100	4700	+80-20	10	--	15	30	45	55	5
4402-060	L	100	100	27,000	GMV	10	10	28	45	65	--	4

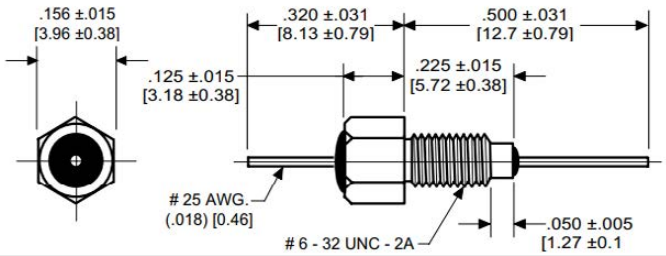
⬣ No hex nut or lock washer

Body Type

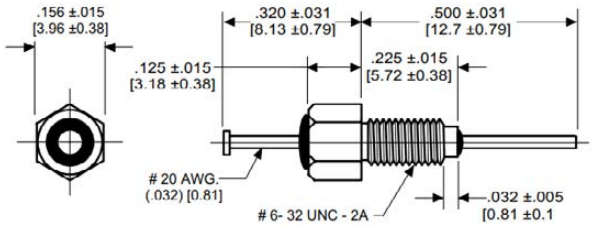
Style 2



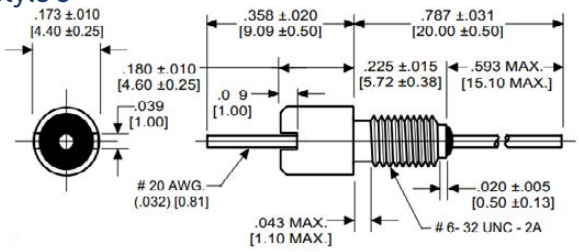
Style 3



Style 4



Style 5



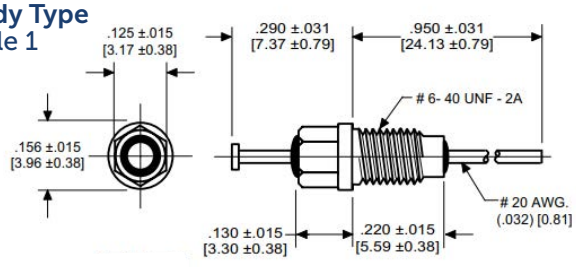
#6-40 UNF-2A EMI Pi Filters

Pi Configurations

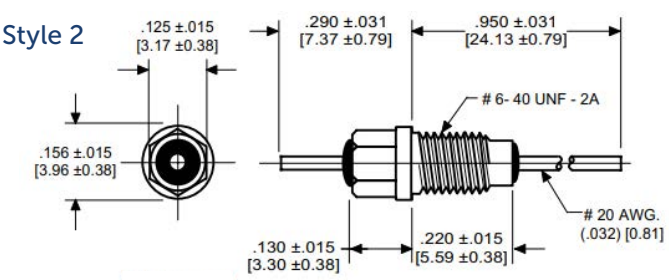
Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220				Body Type
		85°C	125°C				10MHz	100MHz	1GHz	10GHz	
4200-000	Pi	300	200	1500	GMV	10	5	40	60	60	1
4200-002	Pi	300	200	1500	GMV	10	5	40	60	60	2
4200-005	Pi	300	200	3000	GMV	10	8	50	70	70	1

Body Type

Style 1



Style 2



All bushing style filters include hex nut and lock washer unless otherwise noted
Drawings not to scale

#8-32 UNC-2A Filters

Pi Configurations

Series	Circuit Type	Working Voltage (DC) 85°C	Working Voltage (DC) 125°C	Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220 1MHz	10MHz	100MHz	1GHz	10GHz	Body Type	MIL-PERF 15733 Number
4251-001	Pi	--	50	15,000	GMV	10	5	18	65	70	--	8	--
4201-048	Pi	200	100	100	GMV	15	--	--	5	32	--	16	--
4201-047	Pi	200	100	1000	GMV	15	--	4	37	60	--	16	--
4201-502	Pi	--	100	1000	GMV	10	--	--	65	70	70	5	/61-0008
4201-000	Pi	200	100	1500	GMV	10	--	5	45	65	70	1	--
4201-001▲	Pi	200	100	1500	GMV	10	--	5	45	65	70	1	--
4201-004▮	Pi	200	100	1500	GMV	15	--	5	38	63	70	1	--
4201-006▮▲	Pi	200	100	1500	GMV	15	--	5	38	63	70	1	--
4201-501▲	Pi	--	100	1500	GMV	10	--	--	45	60	60	1	/28-0001
4201-503	Pi	--	100	1500	GMV	10	--	--	45	60	60	4	/28-0002
4201-003	Pi	200	100	2000	GMV	15	--	5	38	63	70	2	--
4201-050	Pi	200	100	5500	GMV	10	--	14	55	70	70	1	--
4201-051▲	Pi	200	100	5500	GMV	10	--	14	55	70	70	1	--
4201-053▮▲	Pi	200	100	5500	GMV	15	--	14	55	65	65	1	--
4201-083	Pi	200	100	10,000	+80-20%	10	--	18	65	70	70	9	--
4251-004	Pi	100	100	28,000	GMV	10	10	38	75	75	75	9	--
4205-002	Pi	250	125	65	+100 -0%	15	--	--	3	16	45	3	--
4205-018	Pi	250	125	65	+100 -0%	15	--	--	3	16	45	6	--
4205-017	Pi	250	125	1500	GMV	15	--	5	35	60	60	6	--
4205-001	Pi	250	125	1500	GMV	15	--	5	35	60	60	15	--
4251-000	Pi	185	125	3000	+100 -0%	15	--	10	30	65	65	7	--
4251-002	Pi	200	125	12,000	GMV	10	5	28	65	70	70	9	--

▮#18 AWG Lead 0.040 Dia. ▲Turret Lead

C Configurations

Series	Circuit Type	Working Voltage (DC) 85°C	Working Voltage (DC) 125°C	Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220 1MHz	10MHz	100MHz	1GHz	10GHz	Body Type
4404-001▲	C	100	100	27,000	GMV	10	10	30	45	55	--	1
4404-002	C	140	100	50,000	GMV	10	15	34	45	60	--	12
4404-003	C	--	100	100,000	GMV	10	20	38	47	65	--	10

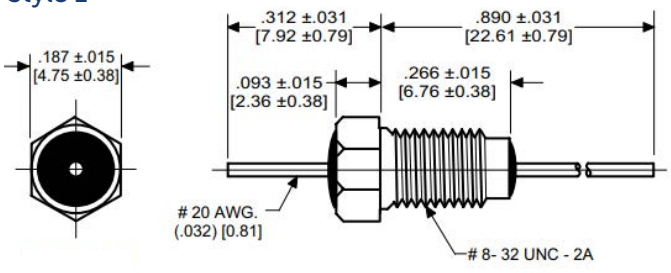
▲Turret Lead

L Configurations

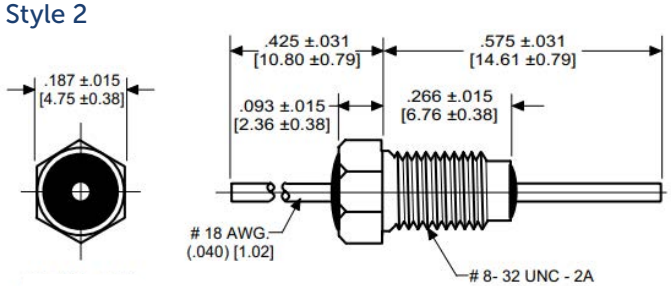
Series	Circuit Type	Working Voltage (DC) 85°C	Working Voltage (DC) 125°C	Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220 1MHz	10MHz	100MHz	1GHz	10GHz	Body Type
4404-050	L	--	100	22,000	GMV	10	7	27	43	60	--	13

Body Type

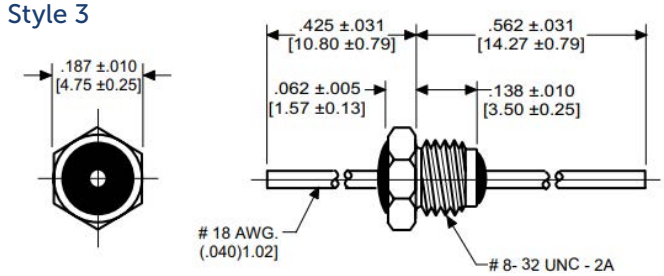
Style 1



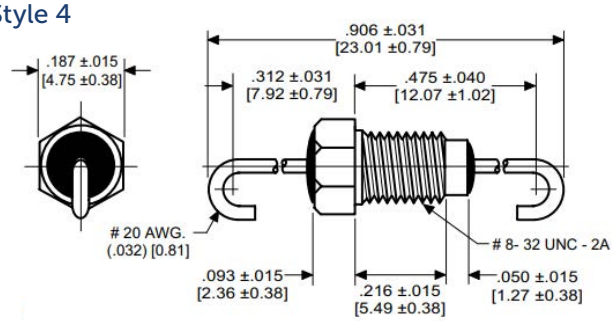
Style 2



Style 3



Style 4



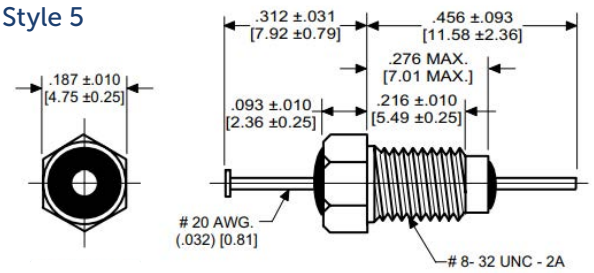
All bushing style filters include hex nut and lock washer unless otherwise noted
Drawings not to scale

CTS Your Partner in Smart Solutions®

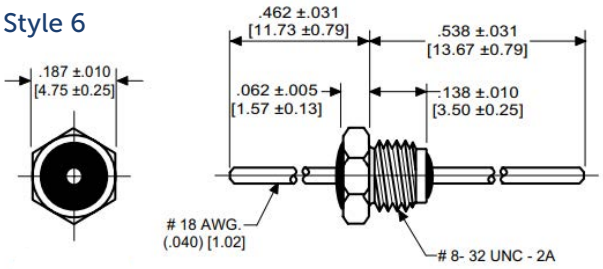
#8-32 UNC-2A Filters (continued)

Body Type

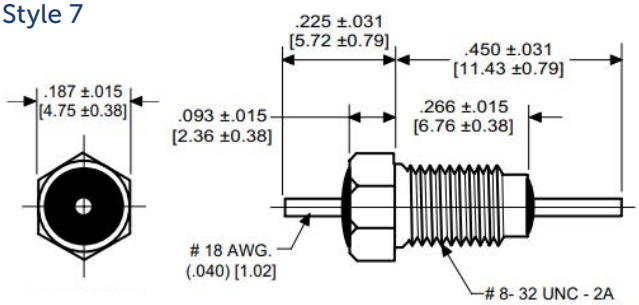
Style 5



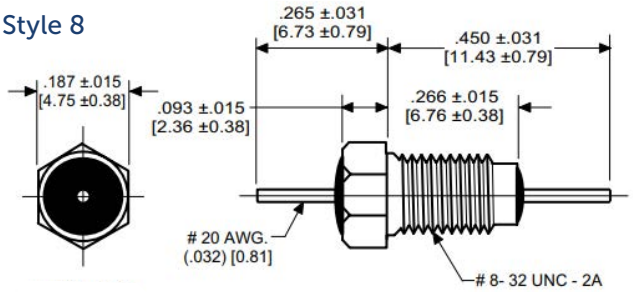
Style 6



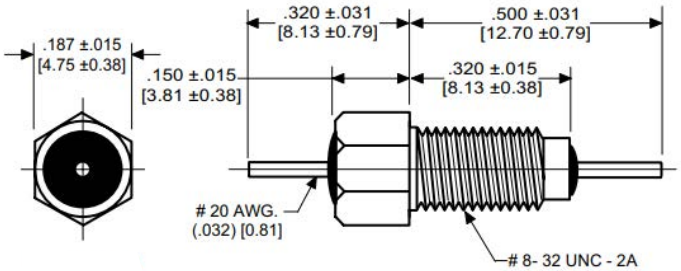
Style 7



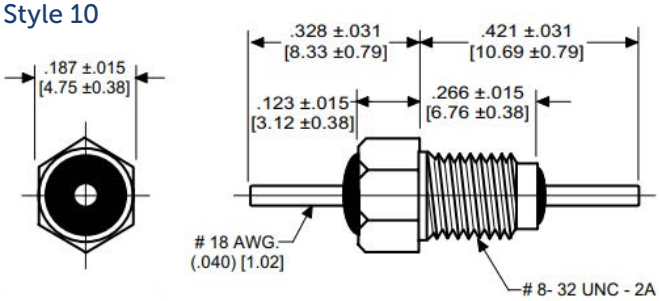
Style 8



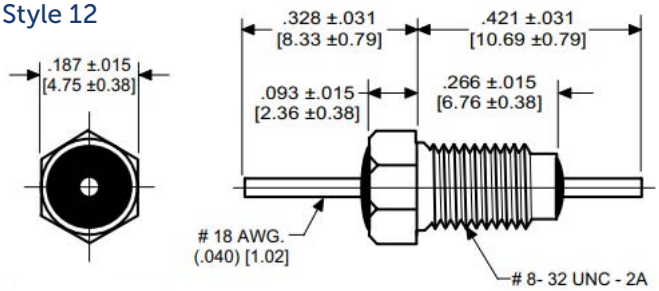
Style 9



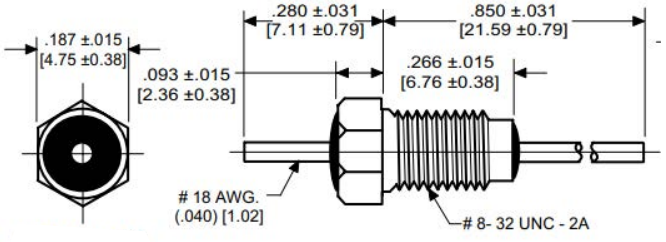
Style 10



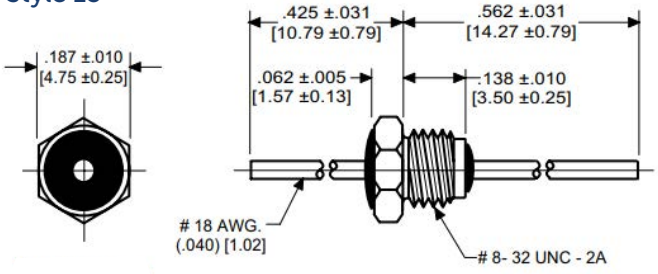
Style 12



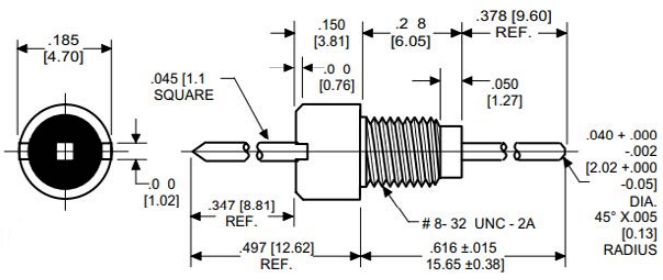
Style 13



Style 15



Style 16



Your Partner in Smart Solutions®

Drawings not to scale

#8-36 UNF-2A and #12-28 UNF-2A Filters

Pi Configurations

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
4202-053	Pi	200	100	5000	GMV	10	--	20	65	70	70	3
4204-050	Pi	200	100	5000	GMV	10	--	20	65	70	70	1
4204-051	Pi	200	100	5000	GMV	10	--	20	65	70	70	1
4202-021 ▲	Pi	350	200	1500	GMV	10	--	5	45	70	70	3
4204-000	Pi	350	200	1500	GMV	10	--	5	45	70	70	1
4204-001 ▲	Pi	350	200	1500	GMV	10	--	5	45	70	70	1
4204-500	Pi	--	200dc 140ac	1500	GMV	10ac	--	--	45	70	70	1
4204-501 ▲	Pi	--	200dc 140ac	1500	GMV	10ac	--	--	--	45	45	1

▲Turret Lead

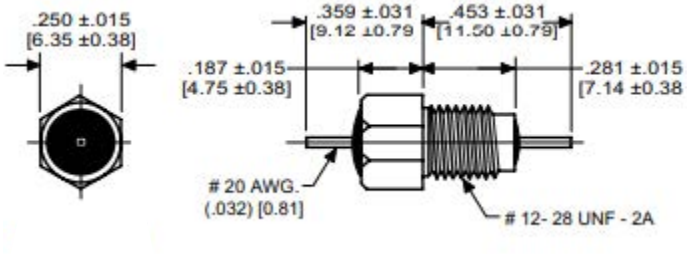
C Configurations

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
4401-005 ⬢	C	70	50	10,000	GMV	10	4	21	35	50	60	2
4401-006 ⬢	C	70	50	15,000	GMV	10	7	20	35	55	60	2
4401-010 ⬢	C	70	50	27,000	GMV	10	10	28	42	65	65	2
4401-011 ⬢	C	50	50	50,000	GMV	10	15	35	45	70	--	2
4401-003 ⬢	C	150	100	2700	GMV	10	--	10	25	40	50	2
4401-004 ⬢	C	150	100	5000	GMV	10	--	15	30	45	55	2
4401-680 ⬢	C	300	200	5	MAX	10	--	--	--	--	--	2
4401-000 ⬢	C	300	200	100	GMV	10	--	--	3	20	28	2
4401-001 ⬢	C	300	200	500	GMV	10	--	--	15	35	40	2
4401-007 ⬢	C	300	200	1000	GMV	10	--	5	20	35	45	2
4401-002 ⬢	C	300	200	1200	GMV	10	--	5	20	35	45	2

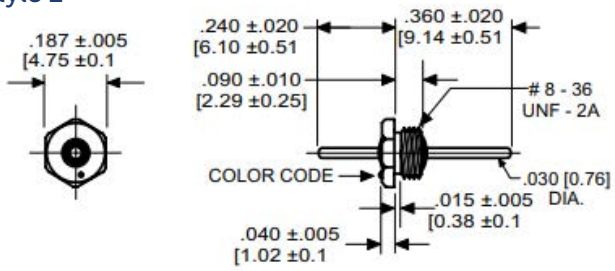
⬢ No hex nut or lock washer

Body Type

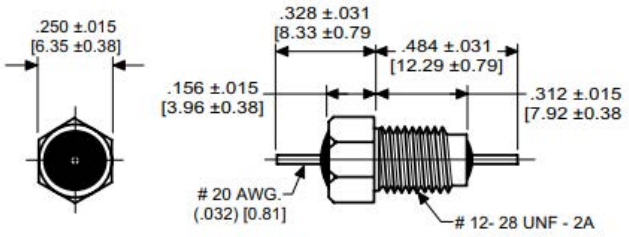
Style 1



Style 2



Style 3



All bushing style filters include hex nut and lock washer unless otherwise noted
Drawings not to scale

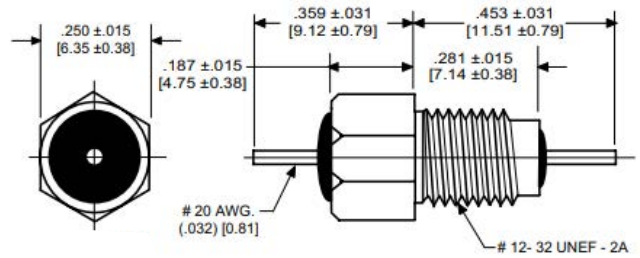
#12-32 UNEF-2A Filters
Pi Configurations

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220				Body Type	Style 2 Dim. inch [mm] (A/B)	MIL-PRF-15733 Number
		85°C	125°C				10MHz	100MHz	1GHz	10GHz			
4207-003	Pi	100	70	12,000	GMV	10	45	70	70	70	3	--	--
4253-002	Pi	100	70	50,000	GMV	10	60	75	75	75	3	--	--
4202-050	Pi	200	100	5000	GMV	10	20	65	70	70	1	--	--
4202-051▲	Pi	200	100	5000	GMV	10	20	65	70	70	1	--	--
4203-050	Pi	200	100	5000	GMV	10	20	65	70	70	2	--	--
4203-051▲	Pi	200	100	5000	GMV	10	20	65	70	70	2	--	--
4203-053▲	Pi	200	100	5000	GMV	10	20	65	70	70	2	.250 ± .015 [6.35 ± 0.38]	--
4203-551▲	Pi	--	100dc 70ac	5000	GMV	10ac	--	65	70	70	2	.235 ± .015 [5.97 ± 0.38]	/61-0011
4203-553▲	Pi	--	100dc 70ac	5000	GMV	10ac	--	65	70	70	2	.250 ± .015 [6.35 ± 0.38]	/61-0010
4253-001▲	Pi	--	100	25,000	GMV	10	30	65	70	70	2	--	--
4253-000	Pi	--	140	22,000	GMV	10	45	75	75	75	3	--	--
4202-000	Pi	350	200	1500	GMV	10	5	45	70	70	1	--	--
4203-000	Pi	350	200	1500	GMV	10	5	45	70	70	2	--	--
4202-001▲	Pi	350	200	1500	GMV	10	5	45	70	70	1	--	--
4202-501▲	Pi	--	200dc 140ac	1500	GMV	10ac	--	45	70	70	1	--	/61-0002
4203-003▲	Pi	350	200	1500	GMV	10	5	45	70	70	2	.250 ± .015 [6.35 ± 0.38]	--
4203-501▲	Pi	--	200dc 140ac	1500	GMV	10ac	--	45	70	70	2	.235 ± .015 [5.97 ± 0.38]	/61-0006
4203-552▲	Pi	--	100dc 70ac	5000	GMV	10ac	--	65	70	70	2	.250 ± .015 [6.35 ± 0.38]	/61-0007
4207-000	Pi	500	300	1200	GMV	10	5	43	55	55	5	--	--
4207-001	Pi	500	300	4000	GMV	10	15	55	60	60	5	--	--
4202-004▮	Pi	500	350	2500	GMV	15	5	50	70	70	1	--	--

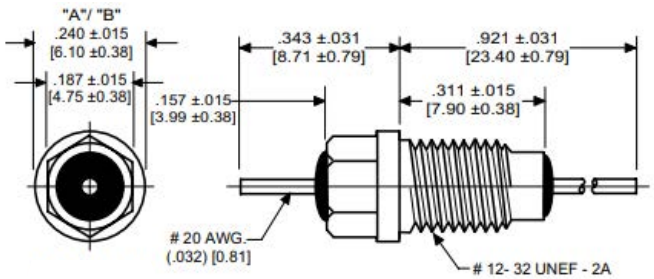
▮#18 AWG Lead 0.040 Dia. ▲Turret Lead

Body Type

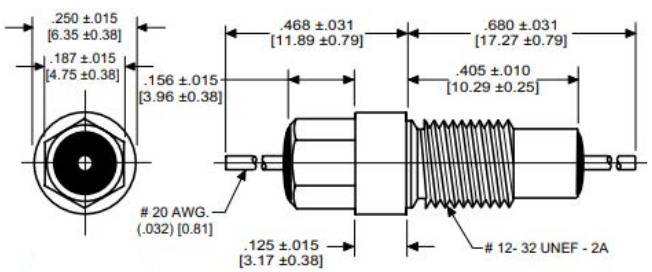
Style 1



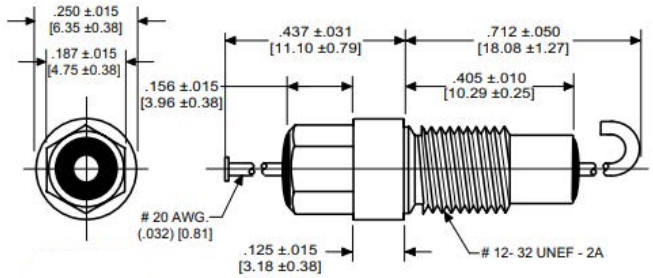
Style 2



Style 3



Style 5



All bushing style filters include hex nut and lock washer unless otherwise noted
Drawings not to scale

1/4-28 and 5/16-24 UNF-2A and 5/16-32 UNEF-2A Filters

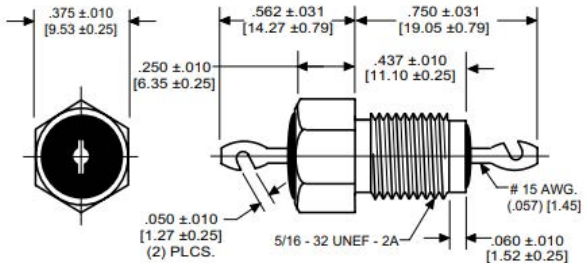
Pi Configurations

Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220				Body Type	MIL-PRF-15733 Number
		85°C	125°C				10MHz	100MHz	1GHz	10GHz		
4206-016	Pi	1000	--	1000	GMV	25	3	35	65	65	1	--
4206-501	Pi	--	500dc 350ac	2000	GMV	25ac	--	55	70	70	4	/61-0004
4206-502▼	Pi	--	500dc 350ac	2000	GMV	25ac	--	55	70	70	4	/61-0003
4206-006	Pi	1000	500	3000	GMV	25	10	55	70	70	1	--

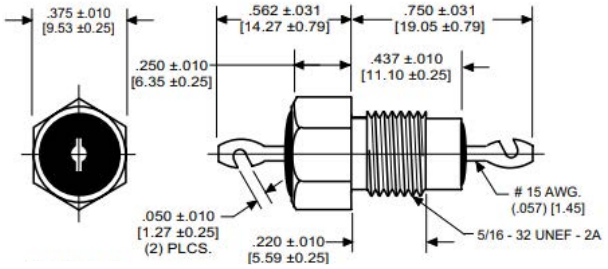
▼ 5/16-24 UNF-2A Thread

Body Type

Style 1



Style 4



Metric Bushing Filters

M5 Thread - Pi Configurations

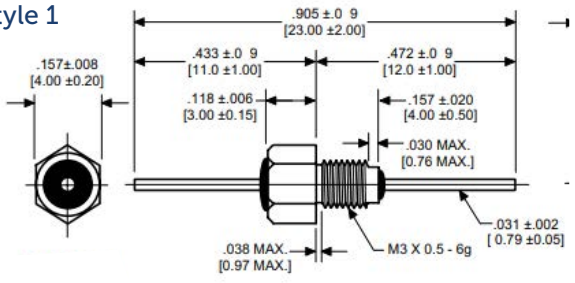
Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
4209-053	Pi	350	100	5500	GMV	10	--	20	65	70	70	2
4209-003	Pi	350	200	1500	GMV	10	--	5	45	70	70	2

M3 Thread - C Configurations

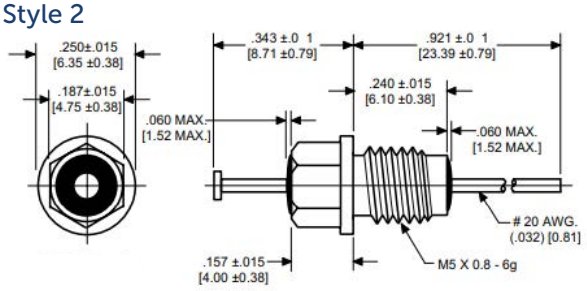
Series	Circuit Type	Working Voltage (DC)		Capacitance (pF)	Capacitance Tolerance	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220					Body Type
		85°C	125°C				1MHz	10MHz	100MHz	1GHz	10GHz	
4400-093	C	70	50	10,000	+80-20%	10	4	20	35	50	50	1
4400-098	C	70	50	27,000	GMV	10	10	28	42	55	60	1
4400-099	C	50	50	50,000	GMV	10	15	35	45	70	--	1
4400-094	C	150	100	4700	GMV	10	--	15	30	45	55	1
4400-095	C	300	200	1000	GMV	10	--	5	20	35	45	1
4400-683	C	300	200	5	MAX	10	--	--	--	--	--	1
4400-076	C	300	200	100	GMV	10	--	--	3	20	28	1
4400-096	C	300	200	470	GMV	10	--	--	15	35	40	1
4400-097	C	150	100	2700	GMV	10	--	10	25	40	50	1

Body Type

Style 1



Style 2



All bushing style filters include hex nut and lock washer unless otherwise noted
Drawings not to scale

Coaxial Broadband Filter 1/4-28 UNF-2A

C Configurations - X7W Temperature Characteristic

Series	Circuit Type	Dim. A inch [mm]	Dim. B inch [mm]	Working Voltage (DC)		Capacitance (pF)	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220						Body Type
				85°C	125°C			30KHz	100KHz	300KHz	1MHz	10MHz	1GHz	
4601-009	C	187 [4.75]	350 [8.89]	100	70	10pF Max	15	--	--	--	--	--	--	2
4600-005	C	.187 [4.75]	.367 [9.32]	100	70	0.7 µF	15	9	20	29	39	52	70	1
4600-006	C	.312 [7.93]	.492 [12.50]	100	70	0.7 µF	15	9	20	29	39	52	70	1
4600-000	C	.187 [4.75]	.367 [9.32]	100	70	1.4 µF	15	15	25	34	44	60	70	1
4600-002	C	.312 [7.93]	.492 [12.50]	100	70	1.4 µF	15	15	25	34	44	60	70	1
4601-000	C	.187 [4.75]	.350 [8.89]	100	70	1.4 µF	15	15	25	34	44	60	70	2

C Configurations - X7R Temperature Characteristic

Series	Circuit Type	Dim. A inch [mm]	Dim. B inch [mm]	Working Voltage (DC)		Capacitance (pF)	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220						Body Type
				85°C	125°C			30KHz	100KHz	300KHz	1MHz	10MHz	1GHz	
4601-007	C	.187 [4.75]	.350 [8.89]	100	70	0.7 µF	15	9	20	29	39	52	70	2
4600-003	C	.187 [4.75]	.367 [9.32]	100	50	1.4 µF	15	15	25	34	44	60	70	1
4601-003	C	.187 [4.75]	.350 [8.89]	100	50	1.4 µF	15	15	25	34	44	60	70	2
4601-004	C	.312 [7.93]	.475 [12.07]	100	50	1.4 µF	15	15	25	34	44	60	70	2
4600-009	C	.187 [4.75]	.367 [9.32]	280	200dc 125ac	.15 µF	15	--	7	15	25	40	60	1
4601-010	C	.187 [4.75]	.350 [8.89]	280	200dc 125ac	.15 µF	15	--	7	15	25	40	60	2

L Configurations - X7W Temperature Characteristic

Series	Circuit Type	Dim. A inch [mm]	Dim. B inch [mm]	Working Voltage (DC)		Capacitance (pF)	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220						Body Type
				85°C	125°C			30KHz	100KHz	300KHz	1MHz	10MHz	1GHz	
4601-055	L	.187 [4.75]	.350 [8.89]	100	70	0.7 µF	15	9	20	29	39	52	70	2
4600-050	L	.187 [4.75]	.367 [9.32]	100	70	1.4 µF	15	15	25	34	44	60	70	1
4600-052	L	.312 [7.93]	.492 [12.50]	100	70	1.4 µF	15	15	25	34	44	60	70	1
4601-050	L	.187 [4.75]	.350 [8.89]	100	70	1.4 µF	15	15	25	34	44	60	70	2
4601-052	L	.312 [7.93]	.475 [12.07]	100	70	1.4 µF	15	15	25	34	44	60	70	2

L Configurations - X7R Temperature Characteristic

Series	Circuit Type	Dim. A inch [mm]	Dim. B inch [mm]	Working Voltage (DC)		Capacitance (pF)	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220						Body Type
				85°C	125°C			30KHz	100KHz	300KHz	1MHz	10MHz	1GHz	
4600-057	L	.187 [4.75]	.367 [9.32]	100	70	0.7 µF	15	9	20	29	39	52	70	1
4601-057	L	.187 [4.75]	.350 [8.89]	100	70	0.7 µF	15	9	20	29	39	52	70	2
4601-058	L	.312 [7.93]	.475 [12.07]	100	70	0.7 µF	15	9	20	29	39	52	70	2
4600-053	L	.187 [4.75]	.367 [9.32]	100	50	1.4 µF	15	15	25	34	44	60	70	1
4600-054	L	.312 [7.93]	.492 [12.50]	100	50	1.4 µF	15	15	25	34	44	60	70	1
4601-053	L	.187 [4.75]	.350 [8.89]	100	50	1.4 µF	15	15	25	34	44	60	70	2
4601-054	L	.312 [7.93]	.475 [12.07]	100	50	1.4 µF	15	15	25	34	44	60	70	2
4600-059	L	.187 [4.75]	.367 [9.32]	280	200dc 125ac	.15 µF	15	--	7	15	25	40	60	1
4601-059	L	.187 [4.75]	.350 [8.89]	280	200dc 125ac	.15 µF	15	--	7	15	25	40	60	2

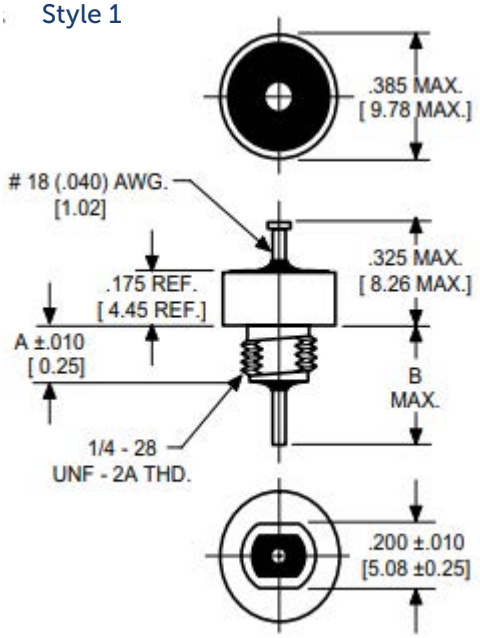
L Configurations - X7R Temperature Characteristic

Series	Circuit Type	Dim. A inch [mm]	Dim. B inch [mm]	Working Voltage (DC)		Capacitance (pF)	Current (A)	Minimum No-Load Insertion Loss (dB) at 25°C per MIL-Std-220						Body Type
				85°C	125°C			30KHz	100KHz	300KHz	1MHz	10MHz	1GHz	
4600-067◀	L	--	--	100	70	1.2 µF	30	15	25	34	44	52	70	3
4600-071	L	--	--	100	50	1.4 µF	20	15	25	34	44	60	70	3
4600-072	L	--	--	280	200dc 125ac	.15 µF	20	--	7	15	25	60	60	3

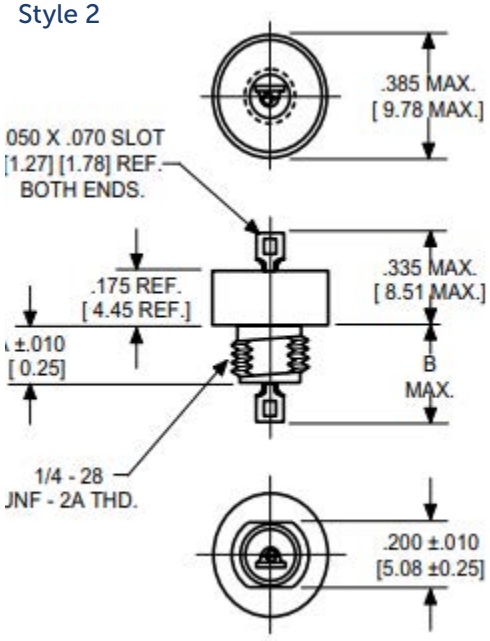
◀ 12 AWG .081[2.06] Lead and X7W Temp.

Body Type

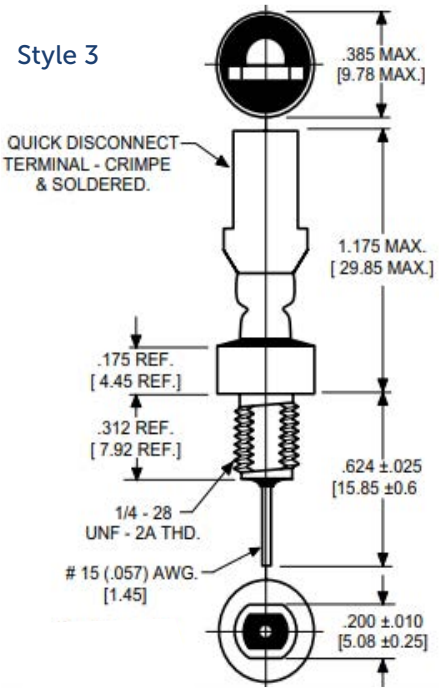
Style 1



Style 2



Style 3



Military Cross Reference

MIL Parts Cross Reference		
MIL-PRF-15733	**Series Number**	**Details**
/28-0001	4201-501	Page 20
/28-0002	4201-503	Page 20
/28-0003	4251-503	Contact CTS
/33-0001	4101-502	Page 9
/33-0002	4101-503	Page 9
/38-0004	4601-503	Contact CTS
/38-0005	4601-504	Contact CTS
/43-0001	4204-501	Page 22
/43-0002	4201-506	Contact CTS
/44-0001	4251-500	Contact CTS
/44-0002	4205-500	Contact CTS
/44-0003	4205-501	Contact CTS
/46-0001	4207-500	Contact CTS
/49-0001	4601-502	Contact CTS
/49-0006	4601-501	Contact CTS
/49-0007	4601-500	Contact CTS
/51-0001	4101-504	Page 9
/61-0001	4204-500	Page 22
/61-0002	4202-501	Page 23
/61-0003	4206-502	Page 24
/61-0004	4206-501	Page 24
/61-0005	4203-502	Contact CTS
/61-0006	4203-501	Page 23
/61-0007	4203-552	Page 23
/61-0008	4201-502	Page 20
/61-0009	4253-500	Contact CTS
/61-0010	4203-553	Page 23
/61-0011	4203-551	Page 23
/61-0012	4253-501	Contact CTS
/61-0013	4251-502	Contact CTS
/61-0014	4251-501	Contact CTS
/62-0001	4101-501	Page 9
/62-0002	4100-500	Page 9
/62-0003	4101-505	Page 9

EIA/CTS Tolerance Codes

Maximum Capacitance for each part number is determined by the required operating temperature range and maximum capacitance change.

Capacitance Tolerance		
Nominal apacitance 10pF or Less	**Code**	**Nominal apacitance over 10pF**
GMV ◆	AA	GMV ◆
	A	+50% -20%
± 0.1 pF	B	± 0.10%
± 0.25 pF	C	± 0.25%
± 0.5 pF	D	± 0.50%
± 0.3 pF	E	+70% -30%
± 1 pF	F	± 1%
± 2 pF	G	± 2%
± 3%	H	± 3%
	I	+60% -40%
± 5%	J	± 5%
± 10%	K	± 10%
± 2%	L	+100% -40%
± 20%	M	± 20%
± 0.4 pF	N	± 30%
	P	+100% -0%
± 0.2 pF	Q	± 15%
	R	± 2.5%
	S	+50% -15%
	T	+30% -20%
	U	+80% -0%
	V	± 7%
	W	+50% -30%
MAX	X	+40% -10%
	Y	+50% -0%
	Z	+80% -20%

Temperature Characteristics	
EIA Code	**Temperature Range**
Z5	+10°C to +85°C
Y5	-30°C to +85°C
X5	-55°C to +85°C
X7	-55°C to +125°C
EIA Code	**Maximum Capacitor Change**
D	± 3.3%
E	± 4.7%
F	± 7.5%
P	± 10%
R	± 15%
S	± 22%
T	+ 22% -33%
U	+ 22% -56%
V	+ 22% -82%
W	+ 22% -90%

◆GMV: CTS Code: Guarantied Minimum Value

All bushing style filters include hex nut and lock washer unless otherwise noted
Drawings not to scale

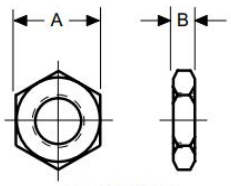
Hardware, Testing & Product Reccomendations

Standard Hardware Dimensions

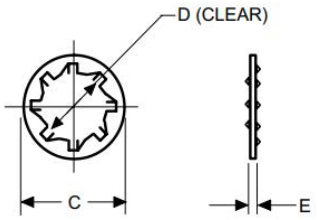
Hex Nut			
Nut Thread Size	**Mounting Torque Limits**	**A**	**B**
4-40 UNC	2 lb.in. [.226 N-m]	.187 [4.75]	.062 [1.57]
6-32 UNC	2 lb.in. [.226 N-m]	.187 [4.75]	.062 [1.57]
6-40 UNF	3 lb.in. [.339 N-m]	.187 [4.75]	.062 [1.57]
8-32 UNC	5 lb.in. [.565 N-m]	.250 [6.35]	.075 [1.91]
8-36 UNF	1lb.in. [.113 N-m]	--	--
12-28 UNF	8 lb.in. [.904 N-m]	.250 [6.35] .250 [6.35]	075 [1.91] .100 [2.54]
12-32 UNEF	8 lb.in. [.904 N-m]	.250 [6.35]	.075 [1.91]
1/4-28 UNF	8 lb.in. [.904 N-m]	.313 ± .015 [7.95 ± 0.38]	125 ± .015 [3.18 ± 0.38]
5/16-24 UNF	9 lb.in. [1.02 N-m]	.375 ± .010 [9.53 ± 0.25]	090 [2.29]
5/16-32 UNEF	9 lb.in. [1.02 N-m]	.375 ± .010 [9.53 ± 0.25]	090 [2.29]
3/8-32 UNEF	9 lb.in. [1.02 N-m]	.500 ± .010 [12.7 ± 0.25]	090 [2.29]
M3 X 0.5	2 lb.in. [.226 N-m]	.187 ± .010 [4.75 ± 0.25]	.062 [1.57]
M5 X 0.8 6g	7 lb.in. [.790 N-m]	.250 [6.35]	.075 [1.91]

Lock Washer			
Type	**C**	**D**	**E**
I	.220 [5.59]	120 [3.05]	015 [0.38]
I	.283 [7.19]	.146 [3.71]	.017 [0.43]
I	.283 [7.19]	.146 [3.71]	.017 [0.43]
I	.283 [7.19]	.167 [4.24]	.018 [0.46]
I	.283 [7.19]	.167 [4.24]	.015 [0.38]
I	.387 [9.83]	.220 [5.59]	.022 [0.56]
I	.387 [9.83]	.220 [5.59]	.022 [0.56]
I	.387 [9.83]	.220 [5.59]	.022 [0.56]
I	.420 [10.6]	.262 [6.65]	.025 [0.63]
I	.430[10.92]	.318 [8.08]	.022 [0.56]
I	.430 [10.92]	.318 [8.08]	.022 [0.56]
I	.500 [12.70]	.384 [9.75]	.022 [0.56]
S	.192 [4.88]	.118 [2.99]	.025 [0.63]
S	.277 [7.04]	.172 [4.37]	.034 [0.86]
S	.361 [9.17]	.225 [5.72]	.050 [1.27]

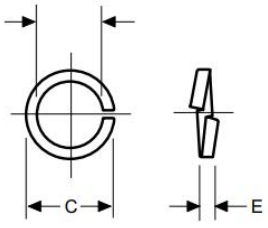
Hex Nut



Type I



Type S



Dimensions: Inches [metric]
Dimensional Tolerance:
± .005 [0.13], thread tolerance class 2.
Standard finish: Silver
Nut material: Brass
Washer material: Phosphor Bronze

When mounting filter without hardware, into tapped hole, the mounting torque applied to the filter body must be no more than 1/2 the torque limits listed on the chart above.

Product Installation Reccomendations

The components in this catalog are manufactured with ceramic dielectrics. To minimize possible damage to the components during installation, the recommendations below should be followed. For information concerning other installation requirements and/or component modifications, contact us.

General Recommendations

Handling:

Excessive force or direct impact to the component may result in breakage. Lead bending or cutting, if necessary, should be done with a support for the lead to prevent mechanical stress to the component. Components with required lead modifications are available.

Lead Soldering:

Use a temperature controlled soldering iron with SN60 or SN63 RMA Flux core wire. Maximum soldering temperature to be 500°F(260°C) with a dwell time of 3 seconds maximum. The use of a heat sink between the component body and the solder joint is highly recommended.

Flux Removal:

Optimum flux removal can be achieved by vapor degreasing the components immediately after the soldering operation. Total immersion of the components is not recommended.

Solder Mount Recommendations

Mounting:

Use a convection or infrared oven and SN60 or SN63 solder paste, or solder preforms, with RMA Flux. The oven profile should slowly heat the entire assembly to a reflow temperature of 430°F (221°C), with a rate of change not to exceed 5°F,3°C/Sec. and a dwell time as short as possible.

Internal Electrode Soldering:

Use a temperature controlled soldering iron with SN62 silver bearing (2%) RMA Flux core solder wire. The components should be preheated to 300°F (150°C), then soldered with a maximum temperature of 500°F (260°C) and a dwell of 3 seconds maximum.

Bushing Mount Recommendations

EIA/CTS Tolerance Codes

Maximum Capacitance for each part number is determined by the required operating temperature range and maximum capacitance change.

Temperature Characteristics	
EIA Code	**Temperature Range**
Z5	+10°C to +85°C
Y5	-30°C to +85°C
X5	-55°C to +85°C
X7	-55°C to +125°C
EIA Code	**Maximum Capacitor Change**
D	± 3.3%
E	± 4.7%
F	± 7.5%
P	± 10%
R	± 15%
S	± 22%
T	+ 22% -33%
U	+ 22% -56%
V	+ 22% -82%
W	+ 22% -90%

Capacitance Tolerance		
Nominal apacitance 10pF or Less	**Code**	**Nominal apacitance over 10pF**
GMV ◆	AA	GMV ◆
	A	+50% -20%
± 0.1 pF	B	± 0.10%
± 0.25 pF	C	± 0.25%
± 0.5 pF	D	± 0.50%
± 0.3 pF	E	+70% -30%
± 1 pF	F	± 1%
± 2 pF	G	± 2%
± 3%	H	± 3%
	I	+60% -40%
± 5%	J	± 5%
± 10%	K	± 10%
± 2%	L	+100% -40%
± 20%	M	± 20%
± 0.4 pF	N	± 30%
	P	+100% -0%
± 0.2 pF	Q	± 15%
	R	± 2.5%
	S	+50% -15%
	T	+30% -20%
	U	+80% -0%
	V	± 7%
	W	+50% -30%
MAX	X	+40% -10%
	Y	+50% -0%
	Z	+80% -20%

◆ GMV: CTS Code: Guarantied Minimum Value

Please note: Maximum Capacitance for each part number is determined by the required operating temperature range and maximum capacitance change

General Test Specifications

The Components shown in this catalog have been designed and subjected to the following test plan, as is applicable for the individual components. The information shown can be used as a basis for component specifications. For additional information, please contact CTS. Filters governed by MIL-PRF-15733 shall be inspected and tested to the requirements of the specification and the applicable specification (slash) sheet.

LOT ACCEPTANCE INSPECTION:		
PECTION OR TEST	TEST METHOD PER MIL-STD-202 EXCEPT AS NOTED POST	TEST REQUIREMENTS
Visual and Mechanical		In accordance with applicable requirements
Materials, Design, Construction and Workmanship		
Physical Dimensions & Marking		
Seal (4601 Style Only)	Method 112, condition A	No leaks
Capacitance	Method 305, 1KHz, 1±0.2 VRMS max. +25°C	Within specified tolerance
Dissipation Factor (1/Q)	Method 306, 1KHz, 1±0.2 VRMS max. +25°C	4.0% max
Dielectric Withstanding Voltage	Method 301, 2 seconds, 50 mA max. surge current, 2 times WVDC.	No evidence of damage or break down.
Insulation Resistance	Method 302, 50 mA max. charging current, 100VDC, 2 minutes or as specified by individual variation	Greater than 10,000 Megohms or 100 Ohm-Farads, whichever is less.
Insertion Loss	MIL-STD-220, 50 Ohms, +25°C, no load	Per application requirements.
DC Resistance (4601 Style Only)	MIL-PRF-15733	0.01 Ohms max.
Solderability (5pcs)	Method 208	Per applicable requirements.

Periodic Quality Conformance Inspection

A periodic quality conformance inspection program consisting of environmental and reliability testing is in place to ensure that product integrity is consistently maintained.

Contact Information

CTS Corporation
4925 Indiana Avenue
Lisle, IL 60532, USA
sales@ctscorp.com
www.ctscorp.com

Sales Inquiries: www.ctscorp.com/Contact-Us/Where-to-Buy
Technical Inquiries: www.ctscorp.com/Contact-Us

Your Partner in Smart Solutions®

2021.06 - ALP