Metuchen Capacitors, Inc.
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"We Offer Quick Solutions to Noise Pollution"

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This Catalog contains only a sampling of the products we offer. We encourage you to call, fax or e-mail any capacitor or filter requirement you may have.

Specifications contained in this catalog are subject to change without notice.

How To Select a Capacitor For Your Application

Before the proper capacitor can be selected certain electrical and mechanical parameters required by the given application must be clearly specified, the most important of which are discussed below:

For DC applications

Working Voltage (WVDC); This is specified based on the maximum potential that the selected capacitor will see in operation. It is customary to use a safety factor of 2 for most applications; that is, specify WVDC to be twice the maximum voltage the unit will see in its circuit.

Temperature Characteristic/Coefficient of Capacitance (TC); This parameter describes the manner in which capacitance value varies with operating temperature. Capacitance can change either linearly or non-linearly with temperature. In the former case the relationship would be specified as a **temperature coefficient** and expressed in parts per million of capacitance change per degree C; e.g. P090 representing a capacitance change of plus 90 parts per million (equal to 0.009%) per degree C, N750 representing a capacitance change of minus 750 parts per million (equal to -0.075%) per degree C, NP0 (negative positive zero) representing an essentially unchanged capacitance over the operating temperature range. Class 1 ceramic dielectrics and polypropylene and polycarbonate plastic film capacitors are examples of capacitors whose value changes linearly with temperature. The temperature dependence of units whose capacitance values vary non-linearly with temperature is specified as a **temperature characteristic**, which is defined as the percent change from the 25 degrees C value at a given temperature; e.g. X7R denotes a maximum capacitance variation of plus or minus 15% from the 25 degree value over the temperature range of –55 to +125 degrees C (typical of ceramic and tantalum oxide dielectrics), Y5V denotes a maximum capacitance variation of +22/-82% over the range of –30 to + 85 degrees. For ceramic dielectrics, it is generally true that the more negative the TC is, the smaller a capacitor's physical size will be for a given capacitance value, because, in most cases the more negative the TC is, the higher will be the dielectric constant (K).

Dissipation Factor (DF) and Q; DF is a measure of loss due to heating, expressed as a decimal. It is a unitless quantity, dependant on dielectric loss (the loss caused by the motion of electrons within the dielectric) and series resistance (ESR) contributed to by electrodes, terminations, leads, etc. From an electrical standpoint, ideally, we would like a capacitor to have a 90 degree phase angle (pure reactance). However, in the real world, the aforementioned losses cause the angle to be somewhat less than the ideal 90 degrees. Mathematically, DF is the cotangent of the actual phase angle and Q is the tangent of this angle. Hence, Q = 1/DF. The range of Q's available runs from about 40 for Class II dielectrics to 10,000 or more for Class I materials. For most DC applications, a DF of .025 or lower is acceptable as there is minimal current passing through the device.

Capacitance and Tolerance; For many DC applications, such as bypass and blocking, it is important to have a minimum capacitance (C_{min}) throughout the operating voltage and temperature range of the application. Since this catalog specifies nominal 25 degrees (C_{nom}) values, the minimum C_{nom} to assure that the capacitance value will not fall below C_{min} under operating conditions must be calculated.

In general

$$C_{nom} = \frac{C_{min}}{0.8\,(1-T/100)\,(1-TN/100)}.$$

where

C_{nom} = the nominal value of the capacitor to be specified
C_{min} = the minimum acceptable capacitance under any given conditions in the device's operating environment
T is the negative tolerance of the device in %
e.g. T=10 for a +/-10% device, T=80 for a +10/-80% device and T=0 for a GMV device
TN is the specified maximum negative change of capacitance over the operating temperature range, expressed in percent
e.g. TN = 15 for X7R temperature characteristic, 56 for Z5U and 82 for Y5V
0.8 is a compensation factor to account for voltage coefficient, ageing, etc.

Example: Circuit design requires a capacitor with C_{min} of 1000 pf. Select a capacitor with the lowest TN and widest tolerance for which C_{nom} will meet the physical size requirement of the circuit.
Initially, select a device with Z5U temperature characteristic and +/-20% tolerance.

$$C_{nom} = \frac{1000}{0.8\,(1-20/100)(1-56/100)} = 3551 \text{ pf}$$

Check the catalog for the next highest standard value which would be 3900 pf. If this value is available in an acceptable size and voltage rating, choose it. If not, retry with the next lowest temperature characteristic and or tolerance. Repeat until a suitable unit is found.

For AC applications

Because in AC applications appreciable current can pass through the device there is significant heating, which must be kept to a minimum. This usually means using a Class I dielectric, which has inherently lower DF but also has much lower dielectric constant (K)[1], which usually dictates use of a larger chip. This is not all bad as the larger chip will be capable of dissipating more of the generated heat. The desired goal should be to limit the maximum temperature of the chip to 125 degrees C. In determining this, both the maximum ambient temperature the device will operate at and the temperature rise due to current (self heating) must be considered. Hence, if a temperature rise of 20 degrees is anticipated, the maximum ambient temperature should be limited to 105 degrees. However, if the maximum ambient is going to be 85 degrees, the temperature rise due to self-heating can be as high as 40 degrees. If necessary to meet the required conditions, heat sinking or even cooling must be considered.

How To Select a Capacitor For Your Application

The initial design approach is much the same as for DC applications, except that it is conventional to use a safety factor of 4 instead of 2. However, after calculation of C_{nom}, Power Dissipation must be evaluated:

$I = E/Z$	Ohm's Law for AC circuits	(1)
$Z = \text{Square root } (R^2 + x_c^2)$		(2)
$X_c = 1 / 2 \pi f c$	Definition	(3)
$R = d/2 \pi f c$		(4)
$Z = \text{Square root } (D^2 + 1)/ 2 \pi f c$	Substituting (3) & (4) into 2	(5)
$Z = 1/ 2 \pi f c$	Since D^2 is very small compared to 1	(6)
$I = 2 \pi f cE$	Substituting (6) into (1)	(7)
$P = I^2R$		(8)
$P = 2 \pi f c (E)^2 d$	Substituting (4) & (7) into (6)	(9)

Where
P = power, watts
E = voltage, volts
I = current, amps
Z = Impedance, ohms
R = ESR, ohms
X_c = capacitive reactance, ohms
f = frequency, hertz
c = capacitance, farad
d = dissipation factor

At a minimum, power thus calculated must be correlated with the manufacturer's data to assure that the chip selected will withstand the calculated power. However, it is much better practice to use this number as a starting point and also run the specified chip at its worst anticipated operating conditions in your circuit and measure the surface temperature of the unit with a thermocouple. If this exceeds 125 degrees C, plan to use a larger chip, provide heat sinking and/or cooling or use a special high operating temperature chip. If the application requires the chip to dissipate high current or power, be sure to supply the capacitor manufacturer with all the information he needs to know this, as the chip can be designed for maximum heat dissipation. For example, as metal will conduct heat out of the chip, the design could use more layers than that for a DC or low power application. Also, you can specify larger and/or thicker termination bands than those for standard chips as they will act as heat sinks. However, in so doing it is necessary to specify a minimum separation between bands. The **theoretical** minimum separation, in mils, is equal to the required dielectric withstanding voltage (DWV) divided by 25.

Examples: For a 100 WVDC part with a 250 VDC DWV requirement the theoretical minimum distance between bands would be 250/25 or 10 mils. For a 1000WVDC part with a 1400 VDC DWV requirement the theoretical minimum separation of bands would be 1400/25 or 56 mils. In actual practice, prudent design dictates addition of 50% to 100% to the minimums thus calculated.

Important: Power Dissipation is very dependent on the specific ceramic formulation and architecture of a part. Any change in the vendor that the part is procured from, or any vendor formulation or fabrication process change, usually means that the thermal verification process must be repeated. It is a good idea to specify that no changes are to be made in the vendor's formulation or process without approval of the user. It must also be noted that charging and discharging current should be limited to 50 ma maximum to avoid component failure due to thermal shock. This is true for DC as well as AC applications because the change in voltage on charging and discharging causes current flow which can bring about enough local heating to cause failure.

Note (1)

K is a property of the dielectric material. In general, the more polar and crystalline a material is, the higher will be its K.

$c = f (K, n, A, 1/t)$

Where c = capacitance
K = dielectric constant
n = number of layers or length of film
A = active electrode area
t = dielectric thickness

i.e. Capacitance is directly proportional to K, the number of dielectric layers in the chip or length of metallized film for plastic capacitors, and the area of the internal electrodes. It is inversely proportional to the thickness of each dielectric layer. Hence, it can be seen that to maintain a given capacitance using a lower K dielectric, one or more of the following must take place:

(A) increase number of layers
(B) increase active electrode area
(C) decrease dielectric thickness

Both options (A) and (B) will increase the size of the chip. (A) will result in an increase in thickness whereas (B) will cause length and/or width to increase. Option (C) is not a good choice for a high voltage/power chip as it increases the stress on the dielectric, increasing the probability of failure.

How To Select a Capacitor For Your Application

Typical K's and TC's for commonly used dielectrics are as follows:

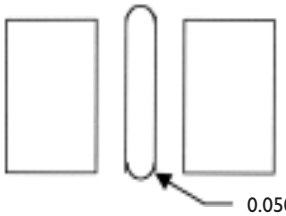
	K	TC
Polypropylene	2.5	N250 ppm/degree C
Polycarbonate	2.7	P150 ppm/degree C
Mylar polyester	3.3	+/- 3% (-25 to +85 degrees C)
High Q ceramic	6 to 16	P090 ppm/degree C
Alumina	8.4	P140 ppm/degree C
Tantalum Pentoxide	26	-10/+12% (-55 to +125 degrees C)
NP0 ceramic	30 to 90	0 +/- 30 ppm/degree C
X7R ceramic	1200 to 4000	+/- 15% (-55 to +125 degrees C)
Z5U ceramic	4000 to 8000	+22/-56% (+10 to +85 degreesC)
Y5V ceramic	8000 to 14000	+22/-82% (-30 to + 85 degrees C)

From this, it is easily seen that switching from X7R to NP0 or High Q, which is often required for high current/power applications, will result in a substantially larger chip.

ASSEMBLY NOTES

Printed Wiring Board Layout

Pad layout on the PWB should be per the EIA recommendations. However, the voltage creep must be analyzed to insure breakdown does not occur. The design goal maximum voltage stress along any dielectric interface should be less than 12.5 volts/mil, with the absolute maximum being 17.5. If the part is not coated and is surface mounted directly on the PWB, one technique to satisfy this requirement is to add a slot in the board between the pads. This places a surface discontinuity between the two voltage nodes to increase the resistance to creep.



0.050 slot between capacitor mounting pads

The 12.5 to 17.5 volts/mil maximum is also applicable from trace to trace.

Assembly Requirements

If possible, attachment to the circuit board should be achieved using solder paste and reflowing through a conveyor furnace with a controlled temperature profile to allow heating at a rate no greater than 30 degrees C per minute, to a temperature 40 to 50 degrees C above the melting point of the particular alloy in use.

When soldering the capacitor to the PWB with an iron, one with a controlled tip temperature should be used, with the temperature set to 50 degrees C above the solder's melting point. The capacitor and assembly to which it is being soldered to must be slowly elevated in temperature to the solder melting point prior to contact with the soldering iron to prevent catastrophic thermal shock to the ceramic structure.

Soldering must be done quickly, preferably with solder containing a small amount of silver as part of its formulation, to prevent leaching of the capacitor terminations. The assembly should be allowed to cool back to room temperature at its own rate.

After cooling, the assembly and circuit board surface must be thoroughly degreased to remove oils, flux, and other contaminants. This is best accomplished in a vapor degreaser. If one is not available at least two successive rinsings in a solvent(s) suggested by the flux manufacturer should do. In any event, inspect the parts for any sign of contamination.

Coatings

Voltage standoff over various environments can be improved by coating the mounted capacitor with an encapsulant or coating material. Two major factors influencing the effectiveness of a coating are its adhesion to the ceramic surface and the absence of air molecules trapped in or under the material. One material often used for this purpose is polyurethane. Various formulations of this material are available from suppliers such as Dexter-Hysol, 3M and Emerson & Cuming.

Follow the manufacturer's instructions for application and curing. It is a better to apply 2 or more thin coatings than 1 thick one.

REFERENCES

1. MIL-STD-275
2. High Voltage Design and Manufacturing Guide
   Bill Dunbar – AFWAL-TR-82-2057
   Wright Patterson Air Force Base

Advantages and Disadvantages Of Various Terminations On Multi Layer Capacitor Chips

TERMINATION	ADVANTAGES	DISADVANTAGES
Palladium-Silver	Least expensive. Non-magnetic.	May be harder to solder than others. May, if unprotected, under severe conditions, facilitate leaching of electrodes, resulting in loss of layers or catastrophic failure. User should use a silver saturated solder such as SN62 to connect to board.
Palladium-Silver Solder plated	Easier for user to solder in place. In critical applications solder plate adds less ESR than dipping due to thinner coating. Non-magnetic.	May, if unprotected, under severe conditions, permit leaching of electrodes,resulting in loss of layers or catastrophic failure. User should use a silver saturated solder such as SN62 to connect to board.
Palladium-Silver, Hot solder dipped	Solder can be silver saturated which minimizes chances of leaching. Easier for user to solder in place. Non-magnetic.	Solder dipping more costly than plating. Still may, if unprotected, permit leaching of electrodes, particularly if non-silver bearing solder is used.
Thick film Gold	Will not leach. Can be wire bonded. Non-magnetic.	Costs about $.02/chip for gold. Wire bonding tricky
Palladium-Silver, Nickel coated and hot solder dipped.	If manufactured properly will not leach.	Magnetic. Nickel plating adds some cost as does solder dipping.
Palladium-Silver, Nickel coated and solder plated.	If manufactured properly will not leach. Solder plating less costly than dipping. In critical applications solder plate adds less ESR than dipping due to thinner coating.	Magnetic. Nickel plating adds some cost.
Palladium-Silver, Copper coated and hot solder dipped.	If manufactured properly will not leach. In critical applications adds less ESR than nickel. Non magnetic	Copper plating add slightly more cost than nickel. Solder dipping more costly than plating.
Palladium-Silver, Copper coated and solder plated.	If manufactured properly will not leach. Solder plating less costly than dipping. In critical applications solder plate adds less ESR than dipping due to thinner coating. Non magnetic.	Copper plating add slightly more cost than nickel.
Palladium-Silver, Palladium plated and hot solder dipped	Best assurance against leaching. Non magnetic.	Pd adds $.01 to .02 per part. Solder dipping more costly than plating.
Palladium-Silver, Palladium plated and solder plated.	Best assurance against leaching. In critical applications solder plate adds less ESR than dipping due to thinner coating. Non magnetic.	Pd adds $.01 to .02 per part.
Palladium-Silver, Nickel and Gold plated.	Wire bondable; better than Thick film Gold. Will not leach.	Gold adds about $.02 per part. Magnetic
Palladium-Silver, Copper and Gold plated.	Wire bondable; better than Thick film Gold. Will not leach. In critical applications copper adds less ESR than nickel. Non magnetic.	Gold adds about $.02 per part.
Palladium-Silver, Palladium and Gold plated.	The Cadillac. Wire bondable Non leaching Non magnetic.	User must pay for the Cadillac.

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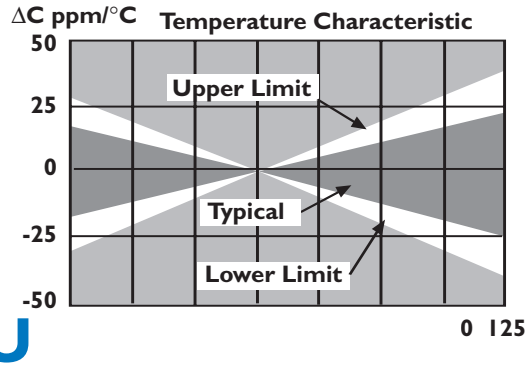
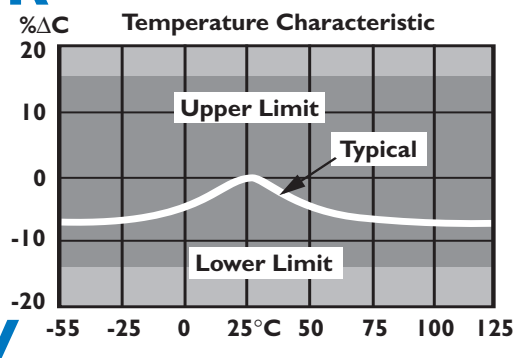
DIELECTRIC PROPERTIES OF CERAMIC CAPACITORS

Temperature Characteristic				
Ceramic Dielectric	**C0G/NP0**	**X7R**	**Z5U**	**Y5V**
Operating Temp Range, deg °C	-55 to + 125	-55 to + 125	+10 to +85	-30 to + 85
Max Cap Change w/o DC bias	0+/-30ppm/°C	+/- 15%	+22%/-56%	+22%/-82%
Max Cap Change @ WVDC	0+/-30ppm/°C	+15%/-40%		
Cap & DF Test Frequency	Cap = <1000 pF 1MHz Cap >1000pF 1 kHz	Cap = <100 pF 1MHz Cap >100pF 1 kHz	1 kHz	1 kHz
Cap & DF Test VRMS	1 VRMS	Cap = <10uF 1 VRMS Cap > 10 uF 0.5 VRMS	0.5 VRMS	0.5 VRMS
Max DF: 50-200 WVDC	0.001	.025	.04	.05
25 WVDC	0.001	.035	.04	.05
16 WVDC		.05		.07
6.3-10 WVDC		.05		.10
Insulation Resistance @ 25 °C in Megohms, Tested @ WVDC, = the lower of				
The number on this line divided by the capacitance in uF	1000	1000	100	100 = > 16 VDC 50 < 16 VDC
OR	100,000	100,000	10,000	10,000 = > 16 V 5000 < 16 VDC
Insulation Resistance @ 125°C in Megohms Tested @ WVDC	0.1 TIMES 25 °C VALUE	0.1 TIMES 25 °C VALUE		
Dielectric Withstanding VDC	=<200 WVDC, 2.5 x WVDC, 201-500 WVDC, 1.5 X WVDC, >500 WVDC, 1.2 X WVDC			
Typical Aging Rate, % / decade-hour	0	2	3	5

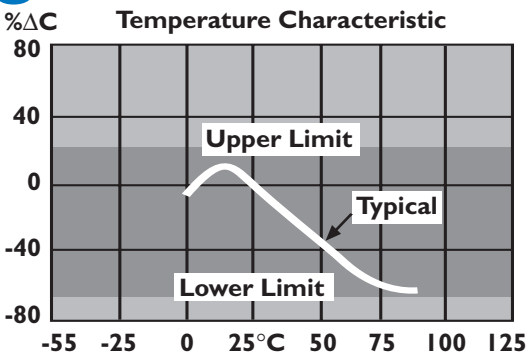
COG



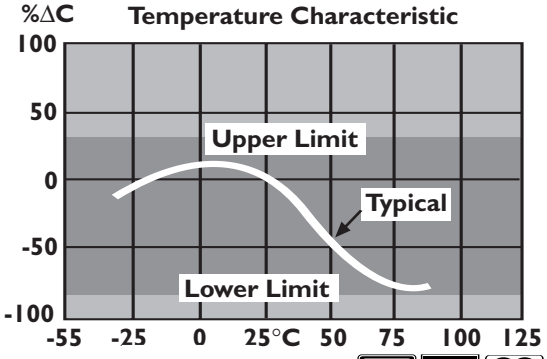
X7R



Z5U



Y5V



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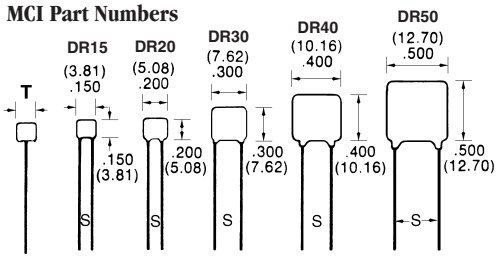
Ceramic Capacitors

MCI Part Numbers



How to Order

DR15 B CG 101 J

- **Size:**
- **WVDC:** (B = 50V)[1] (D = 100V) (F = 200V)
- **Characteristic:** (CG = NPO; BM = X7R; BN = Z5U)
- **Capacitance Code:** [2]
- **Tolerance:** [3]

1. **WVDC Available:** 50 VDC, 100 VDC, 200 VDC
2. 101 = 100 pF i.e., the third digit signifies number of zeroes
3. **Minimum Available Capacitance Tolerances:**
   B = ±.1 pF (10 pF and below)
   C = ±.25 pF (10 pF and below)
   D = ±.5 pF (10 pF and below)
   F = ±1% (10 pF and above)
   G = ±2% (10 pF and above)
   J = ±5% (10 pF and above)
   K = ±10% (5.6 pF and above)
   M = ±20% (2.7 pF and above)
   Z = +80%, –20% (all values)
   P = +100%, –0% (GMV — all values)

Maximum Physical Dimensions

MCI Part #	DR15	DR20	DR30	DR40	DR50
S ±.030	.100 (2.54)	.100 (2.54)	.200 (5.08)	.200 (5.08)	.400 (10.16)
D +.004 -.001	.020 (.508)	.020 (.508)	.020 (.508)	.020 (.508)	.025 (.635)
T Max	.100 (2.54)	.125 (3.18)	.150 (3.81)	.150 (3.81)	.200 (5.08)
AWG #	24	24	24	24	22

S = Lead spacing D = Lead size T = Body thickness
Dim. inches (mm)

Mechanical Specifications

Body Construction: Dipped epoxy

Lead Material: Solderable tinned copper

Marking: Parts will be marked with the following:
Trademark — Capacitance — Tolerance — Voltage Code (size permitting)

EIA specifications apply regarding Q, TC tol and CAP tol on all units 10 pF or less.

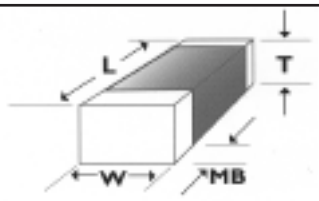
MCI offers a complete range of temperature coefficients.

DR SERIES AVAILABLE CAPACITANCE VALUES BY VOLTAGE & TC

CAP pF	CAP uF	Cap Code EIA 3-digit	DR15,17 NP0	DR15,17 X7R	DR15,17 Z5U	DR20, 22, 23 NP0	DR20, 22, 23 X7R	DR20, 22, 23 Z5U	DR30, 33 NP0	DR30, 33 X7R	DR30, 33 Z5U	DR40 NP0	DR40 X7R	DR40 Z5U	DR50 NP0	DR50 X7R	DR50 Z5U
1		1R0															
1.5		1R5															
2.2		2R2															
2.7		2R7															
3.3		3R3															
3.9		3R9															
4.7		4R7															
5.6		5R6															
6.8		6R8															
8.2		8R2	200 VDC														
10		100				200 VDC											
12		120															
15		150															
18		180															
22		220															
27		270															
33		330															
39		390															
47		470															
56		560															
68		680															
82		820															
100		101															
120		121															
150		151															
180		181	100														
220		221	200														
270		271	VDC	200													
330		331		VDC													
390		391															
470		471															
560		561															
680		681	50														
820		821	100														
1000		102	VDC														
1200		122		100		100											
1500		152		200	100	200	200										
1800		182		VDC	VDC	VDC	VDC										
2200		222															
2700		272								200							
3300		332															
3900		392		50		100											
4700		472		100		VDC											
5600		562		VDC			100			100							
6800		682			50		200			200							
8200		822			100		VDC			VDC							
10000	0.01	103			VDC												
	0.012	123					50	100									
	0.015	153		50			100	VDC									
	0.018	183		VDC			200						200				
	0.022	223					VDC		100				VDC				
	0.027	273							VDC	200			100				
	0.033	333								VDC			200				
	0.039	393			50		50						VDC			100	
	0.047	473			VDC		100	50								200	
	0.056	563					VDC	100					100			VDC	
	0.068	683						VDC					VDC				
	0.082	823								100						100	
	0.1	104								200						VDC	
	0.12	124								100							
	0.15	154					50						100				
	0.18	184					VDC						VDC				
	0.22	224								50							
	0.27	274						50		100						200	
	0.33	334						VDC		VDC						VDC	
	0.39	394															
	0.47	474											100				
	0.56	564											VDC				
	0.68	684								50	50			100		100	
	0.82	824								VDC	VDC			VDC		VDC	
	1	1004															100
	1.2	1204															VDC
	1.5	1504											50				
	1.8	1804											VDC				
	2.2	225														50	
	2.7	275												50		VDC	
	3.3	335												VDC			
	3.9	395															50
	4.7	475															VDC
	5.6	565															
	6.8	685															

Surface Mount Ceramic Chip Capacitors

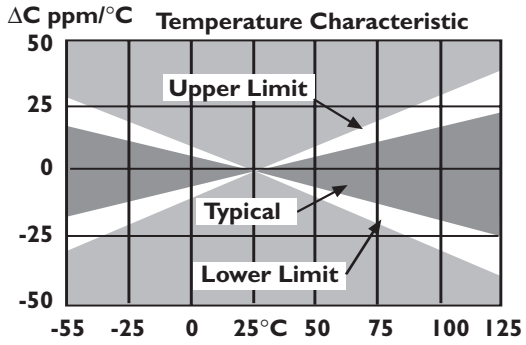
Dimensions and Characteristics



Inches (mm)

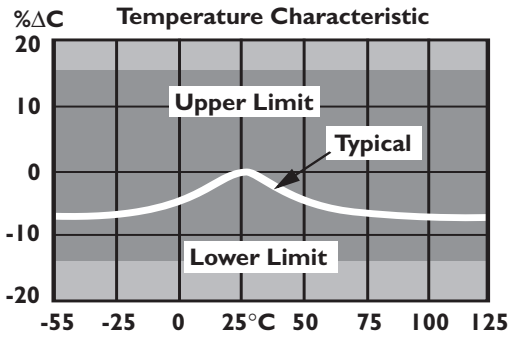
Size	0402	0603	0805	1206	1210	1812	1825	2225
Length (L)	.040(1.0)	.063(1.6)	.079(2.0)	.126(3.2)	.126(3.2)	.177(4.5)	.177(4.5)	.220(5.6)
Width (W)	.020(.5)	.032(.8)	.049(1.25)	.063(1.6)	.098(2.5)	.126(3.2)	.252(6.4)	.248(6.3)
Height (T)Max	.022(.55)	.035(.9)	.057(1.45)	.075(1.90)	.091(2.3)	.087(2.2)	.065(1.65)	.061(1.55)
MB Max.	.008(.2)	.014(.350)	.020(.500)	.020(.500)	.020(.500)	.024(.600)	.024(.600)	.024(.600)
L, W Tol.	±.002(.05)	±.006(.15)	±.008(.2)	±.008(.2)	±.008(.2)	±.012(.3)	±.016(.4)	±.016(.4)

COG



Size	0402	0603	0805	1206	1210	1812	1825	2225
Min Value	0R3	0R3	0R5	0R5	0R5	100	150	270
Voltage	Maximum Value							
16V	271	152	682	153	273	563	104	124
25V	221	122	562	123	223	563	104	124
50V	181	102	392	123	223	393	104	124
100V	181	102	392	103	183	273	683	823
200V	101	561	182	562	103	183	473	563
250V	560	331	152	392	822	153	393	473
300V	—	—	821	272	472	103	223	273
400V	—	—	821	182	472	103	223	273
500V	—	—	821	182	472	103	223	273

X7R

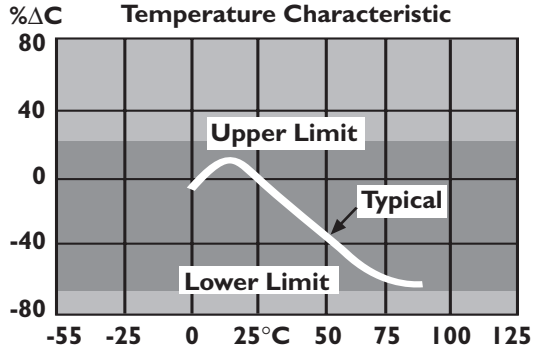


Size	0402	0603	0805	1206	1210	1812	1825	2225
Min Value	0R3	0R3	0R5	0R5	0R5	100	150	270
Voltage	Maximum Value							
16V	562	273	124	334	474	125	185	225
25V	472	223	104	274	474	105	155	185
50V	472	223	104	274	474	824	155	185
100V	472	223	683	184	334	684	125	155
200V	222	103	333	104	184	334	824	105
250V	152	682	273	683	124	224	684	824
300V	—	—	153	473	823	154	474	474
400V	—	—	123	273	563	104	334	394
500V	—	—	123	223	563	104	334	334

Surface Mount Ceramic Chip Capacitors (cont'd)

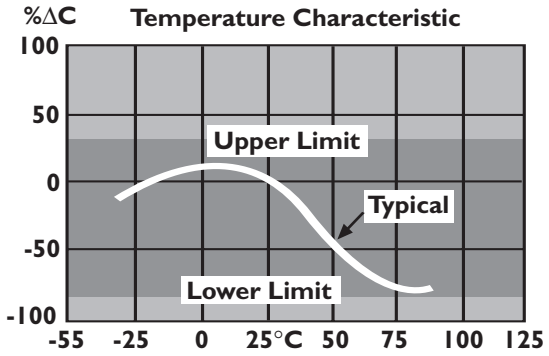
Dimensions and Characteristics

Z5U



Size	0402	0603	0805	1206	1210	1812	1825	2225
Min Value	121	121	471	681	681	332	103	103
Voltage	Maximum Value							
16V	563	334	125	225	475	106	226	226
25V	473	224	105	225	395	685	186	226
50V	333	154	684	185	335	565	156	186
100V	103	563	224	474	105	185	395	475
200V	682	153	563	154	334	564	155	185
250V	222	123	473	104	224	394	105	125

Y5V



Size	0402	0603	0805	1206	1210	1812	1825	2225
Min Value	121	121	471	681	681	332	103	103
Voltage	Maximum Value							
16V	393	184	824	185	395	685	125	186
25V	333	124	564	155	275	565	126	156
50V	223	823	394	125	225	475	106	126
100V	562	333	154	334	684	155	275	395
200V	182	682	393	104	224	474	105	155
250V	122	562	273	683	154	274	824	105

How To Order

MC 0402 Y5V 393 M 160 N T

Size

Dielectric
C= COG
X=X7R
Z = Z5U
Y= Y5V

Capacitance
Value in Picofarads two significant figures followed by number of zeros 102= 1000 pF.

Tolerance
COG <10pF
B=±.10pF C=±.25pF
D=±.50pF
COG >10pF
F=±1.0% G=±2.0%
J=±5.0%
X7R
J=±5% K=±10%
M=±20%
Z5U + Y5V
K=±10% M=±20%
Z=+80%,-20%
P=+100%,-0%

Packaging
T= Tape and Reel
B= Bulk

Termination
N= Nickel Barrier (STD)
(Consult factory for other options)

Voltages
160 = 16V
250= 25V
500= 50V
101= 100V
201= 200Volt
501= 500 Volt

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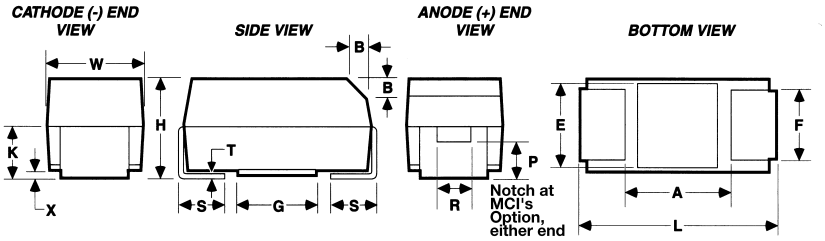
Features

- Meets or Exceeds EIA Standard 535BAAC
- Taped and Reeled per EIA 481-1
- Symmetrical, Compliant Terminations
- Optional Gold-plated Terminations
- Laser-Marked Case
- 100% Surge current test on C, D, U, V, X sizes
- Capacitance: 0.1 µF to 470 µF
- Tolerance: ±10%, ±20%
- Voltage: 3-50 VDC
- Extended Range Values
- New Low Profile Case Sizes

Capacitor Outline Drawing



Standard M91 Dimensions

Millimeters (Inches)

Case Size		Component													
	EIA/ IECQ	L*	W*	H*	K* ±0.20 ±(.008)	F* ±0.1 ±(.004)	S* ±0.3 ±(0.12)	B ±0.15 ±(.006) (Ref)	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Ref)	G (Ref)	E (Ref)
A	3216	3.2±0.2 (.126±.008)	1.6±0.2 (.063±.008)	1.6±0.2 (.063±.008)	0.9 (.035)	1.2 (0.47)	0.8 (.031)	0.4 (.016)	0.10±0.10 (.004±.004)	0.4 (0.16)	0.4 (0.16)	0.13 (.005)	0.8 (.031)	1.1 (.043)	1.3 (.051)
B	3528	3.5±0.2 (.138±.008)	2.8±0.2 (.110±.008)	1.9±0.2 (.075±.008)	1.1 (.043)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10±0.10 (.004±.004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	1.1 (.043)	1.8 (.071)	2.2 (.087)
C	6032	6.0±0.3 (.236±0.12)	3.2±0.3 (.126±.012)	2.5±0.3 (.098±.012)	1.4 (.055)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10±0.10 (.004±.004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	2.5 (.098)	2.8 (.110)	2.4 (.094)
D	7343	7.3±0.3 (.287±.012)	4.3±0.3 (.169±.012)	2.8±0.3 (.110±.012)	1.5 (.059)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10±0.10 (.004±.004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
X	7343H	7.3±0.3 (.287±0.12)	4.3±0.3 (.169±.012)	4.0±0.3 (.157±0.12)	2.3 (.091)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10±0.10 (.004±.004)	1.7 (.067)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5** (.138)	3.5** (.138)

Notes: 1. Metric dimensions govern.
2. (Ref) - Dimensions provided for reference only

* Mil-C-55365/8 Specified Dimensions
** Round Glue Pad: 2.9±0.1mm (0.114"±0.004")

Low Profile M91 Dimensions

Millimeters (Inches)

Case Size		Component										
	EIA/ IECQ	L	W	H Max.	K Min.	F ±0.1	S ±0.3	X (Ref)	T (Ref)	A (Ref)	G (Ref)	E (Ref)
S	3216L	3.2±0.2 (.126±.008)	1.6±0.2 (.063±.008)	1.2 (.047)	0.3 (.012)	1.2 (0.47)	0.8 (.031)	0.05 (.002)	0.13 (.005)	0.8 (.031)	1.1 (.043)	1.3 (.051)
T	3528L	3.5±0.2 (.138±.008)	2.8±0.2 (.110±.008)	1.2 (.047)	0.3 (.012)	2.2 (.087)	0.8 (.031)	0.05 (.031)	0.13 (.005)	1.1 (.043)	1.8 (.071)	2.2 (.087)
Q		6.0±0.3 (.236±0.12)	3.2±0.3 (.126±.012)	1.0 (0.039)	0.5 (0.020)	2.2 (.087)	1.3 (.051)	0.05 (.002)	0.13 (.005)	2.5 (.098)	2.8 (.110)	2.4 (.094)
U	6032L	6.0±0.3 (.287±.012)	3.2±0.3 (.126±.012)	1.5 (0.059)	0.5 (0.020)	2.2 (.087)	1.3 (.051)	0.05 (.002)	0.13 (.005)	2.5 (.098)	2.8 (.110)	2.4 (.094)
V	7343L	7.3±0.3 (.287±0.12)	4.3±0.3 (.169±.012)	2.0 (0.079)	1.1 (0.043)	2.4 (.094)	1.3 (.051)	.005 (.002)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: 1. Metric dimensions govern. 2. (Ref) - Dimensions provided for reference only
3. No dimensions provided for B, P or R because low profile cases do not have a bevel or notch.

How To Order

M 91 B 105 M 035 A S

Metuchen Tantalum

Series M91 - Precision Molded

Case Size A, B, C, D, Q, S, T, U, V, X

Capacitance Picofarad Code
First two digits represent significant figures. Third digit specifies number of zeros to follow.

Lead Material
S- Tin Plating
G-Gold Plated

Failure Rate
A- Not Applicable

Voltage

Capacitance Tolerance
M-±20% K±10%

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Surface Mount Tantalum Capacitors

Case Size by Capacitance and Voltage

Standard Capacitance Values

Capacitance		Rated Voltage @ +85°C							
µF	Code	4	6	10	16	20	25	35	50
0.10	104							A	A
0.15	154							A	B
0.22	224							A	B
0.33	334						A	A	B
0.47	474						A	B	C
0.68	684					A	A	B	C
1.0	105				A	A	B	B	C
1.5	155			A	A	A	B	C	D
2.2	225		A	A	A	A/B	C	C	D
3.3	335	A	A	A	A/B	B	C	C	D
4.7	475	A	A	A/B	B	B/C	C	D	D
6.8	685	A	A/B	B	B/C	C	C	D	
10.0	106	A/B	B	B/C/Q	C	C	D	D	
15.0	156	B	B/C/Q	C	C	D	D		
22.0	226	B/C/Q	C	C	D	D	D		
33.0	336	C	C	D	D	D			
47.0	476	C	D	D	D				
68.0	686	D	D	D					
100.0	107	D	D						
150.0	157	D							
220.0	227								
330.0	337								
470.0	477								

Extended Capacitance Values

Capacitance		Rated Voltage @ +85°C								
µF	Code	3	4	6	10	16	20	25	35	50
0.10	104									
0.15	154									A
0.22	224									
0.33	334									
0.47	474								A	B
0.68	684								A	B
1.0	105						S	A	A	
1.5	155						S	A	B	C
2.2	225					S		B	B	C
3.3	335				S		T/A	B		
4.7	475			S	S	T/A				
6.8	685		S	S	T/A		U/B		C	X
10.0	106		S	T/A	T/A	U/B	U/B	C		
15.0	156		T/A	T/A	U/B	U/B	C		D/X	
22.0	226		T/A	U/B/A	U/B	C	V/C		X	
33.0	336	A	U/B/A	U/B	U/V/C/B	C		X		
47.0	476		U/B	U/C/B	V/C	V	D			
68.0	686		U/C/B	C	V/C	D	X			
100.0	107		C	V/C	V/D	D/X	X			
150.0	157		V/C	V/D	D/X	X				
220.0	227		V	D/X	D/X					
330.0	337		D	D/X	X					
470.0	477		X	X						

Note that standard values are preferred. Extended values are available for use where size constraints exist. Note that standard values demonstrate inherently lower failure rates than extended values, especially in low impedance applications.

Other Tantalum Surface Mount Series Available.

1. Low ESR- M94
2. Low ESR, Surge Robust- M95
3. Fail-Safe Fused- M96
4. Ultra Low ESR - M10

Call for information on these devices.

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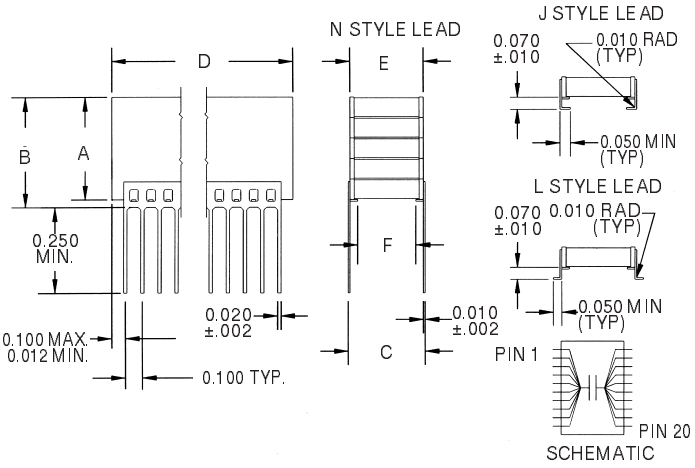
Switchmode Power Supply Capacitors

(SMPS) DSCC Dwg. 87106

The high frequency output filtering requirements of switch mode power supplies can be achieved by using SMPS Ceramic Capacitors which outperform both tantalum and electrolytic capacitors. The SMPS Ceramic Capacitor's extremely low equivalent series resistance (ESR) and equivalent series inductance (ESL) offer optimum performance at higher frequencies.



Dimension Chart

Case Code	Dim A Max	Dim B Max	Dim C ±0.25	Dim D Min	Dim D Max	Dim E Max	Dim F Min	Leads Per Side
1	.650	.715	.450	1.950	2.075	.500	.180	20
2	.650	.715	.800	1.450	1.535	.870	.530	15
3	.650	.715	.450	0.950	1.075	.500	.180	10
4	.650	.715	.400	0.350	0.425	.440	.180	4
5	.650	.715	.250	0.224	0.275	.300	.080	3
6	.650	.715	1.25Ω	1.950	2.075	1.350	.980	20

How To Order

M B 4 N I BX 475 K A

- **SMPS Capacitor Family**
- **Voltage**
- **Case Code** (see dimension chart)
- **Lead Style**
- **Coating**
- **Temperature Coefficient**
- **Capacitance** (expressed in pF) First two digits are significant, third digit is number of zeros
- **Tolerance**
- **Test Level**

Ordering Terminology

Voltage	
G	50V
B	100V
R	200V
S	500V

Lead Style	
N	Straight (thru hole)
J	Leads formed in
L	Leads formed out
W	Without Leads

Coating	
1	Uncoated
2	Coated

TC	
BX	BX
BR	BR
BG	X7R
BY	NPO

Tolerance	
J	±5%
K	±10%
M	±20%

Test Level	
A	Electrical screening only
B	DESC Dwg. 87106 Group A
C	DESC Dwg. 88011 Group A

Maximum Capacitance for each case code (all values are uF)

Case Code	1				2				3			
Voltage	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V
X7R	**100**	**56.0**	**27.0**	**12.0**	**150**	**82.0**	**39.0**	**18.0**	**47.0**	**27.0**	**12.0**	**5.6**
NPO	**4.7**	**3.3**	**1.8**	**0.82**	**5.6**	**4.7**	**2.7**	**1.2**	**2.2**	**1.8**	**1.0**	**0.39**
Dim A Max	0.650				0.650				0.650			
Leads per side	20				15				10			

Case Code	4				5				6			
Voltage	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V
X7R	**15.0**	**8.2**	**3.9**	**1.8**	**5.6**	**3.3**	**1.5**	**0.68**	**270**	**180**	**120**	**39.0**
NPO	**0.56**	**0.47**	**0.27**	**0.12**	**0.27**	**0.22**	**0.1**	**.047**	**15.0**	**12.0**	**5.6**	**2.2**
Dim A Max	0.650				0.650				0.650			
Leads per side	4				3				20			

How To Order for DESC Dwg. 87106

87106 XXX

- **Drawing Number**
- **Dash Number** (see chart)

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(SMPS) DSCC Dwg. 87106 Availability

Cap.	50V					100V				
(uf)	N Lead		J Lead		Size	N Lead		J Lead		Size
	±10%	±20%	±10%	±20%		±10%	±20%	±10%	±20%	
0.15	—	—	—	—	—	—	—	—	—	—
0.18	—	—	—	—	—	—	—	—	—	—
0.22	—	—	—	—	—	—	—	—	—	—
0.27	—	—	—	—	—	—	—	—	—	—
0.33	—	—	—	—	—	—	—	—	—	—
0.39	—	—	—	—	—	—	—	—	—	—
0.47	—	—	—	—	—	—	—	—	—	—
0.56	—	—	—	—	—	—	—	—	—	—
0.68	—	—	—	—	—	055	056	301	302	5
0.82	—	—	—	—	—	057	058	303	304	5
1.0	001	002	241	242	5	059	060	305	306	5
1.2	003	004	243	244	5	061	062	307	308	5
1.5	005	006	245	246	5	063	064	309	310	5
1.8	007	008	247	248	5	065	066	311	312	5
2.2	009	010	249	250	5	067	068	313	314	5
2.7	011	012	251	252	5	069	070	315	316	5
3.3	013	014	253	254	5	071	072	317	318	5
3.9	015	016	255	256	5	073	074	319	320	4
4.7	017	0.18	257	258	5	075	076	321	322	4
5.6	019	020	259	260	5	077	078	323	324	4
6.8	223	224	261	262	4	079	080	325	326	4
8.2	021	022	263	264	4	081	082	327	328	4
10	023	024	265	266	4	229	230	329	330	3
12	025	026	267	268	4	083	084	331	332	3
15	027	028	269	270	4	085	086	333	334	3
18	029	030	271	272	3	087	088	335	336	3
22	031	032	273	274	3	089	090	337	338	3
27	033	034	275	276	3	091	092	339	340	3
33	035	036	277	278	3	093	094	341	342	1
39	037	038	279	280	3	095	096	342	344	1
47	039	040	281	282	3	097	098	345	346	1
56	225	226	283	284	1	099	100	347	348	1
68	041	042	285	286	1	101	102	349	350	2
82	043	044	287	288	1	103	104	351	352	2
100	045	046	289	290	1	105	106	353	354	6
120	227	228	291	292	2	107	108	355	356	6
150	047	048	293	294	2	109	110	357	358	6
180	049	050	295	296	6	111	112	359	360	6
220	051	052	297	298	6	—	—	—	—	—
270	053	054	299	300	6	—	—	—	—	—

Cap.	200V					500V				
(uf)	N Lead		J Lead		Size	N Lead		J Lead		Size
	±10%	±20%	±10%	±20%		±10%	±20%	±10%	±20%	
0.15	—	—	—	—	—	173	174	421	422	5
0.18	—	—	—	—	—	175	176	423	424	5
0.22	—	—	—	—	—	177	178	425	426	5
0.27	—	—	—	—	—	179	180	427	428	5
0.33	—	—	—	—	—	181	182	429	430	5
0.39	—	—	—	—	—	183	184	431	432	5
0.47	113	114	361	362	5	185	186	433	434	5
0.56	115	116	363	364	5	187	188	435	436	5
0.68	117	118	365	366	5	189	190	437	438	5
0.82	119	120	367	368	5	231	232	439	440	4
1.0	121	122	369	370	5	191	192	441	442	4
1.2	123	124	371	372	5	193	194	443	444	4
1.5	125	126	373	374	5	195	196	445	446	4
1.8	127	128	375	376	4	197	198	447	448	4
2.2	129	130	377	378	4	233	234	449	450	3
2.7	131	132	379	380	4	199	200	451	452	3
3.3	133	134	381	382	4	201	202	453	454	3
3.9	135	136	383	384	4	203	204	455	456	3
4.7	137	138	385	386	3	205	206	457	458	3
5.6	139	140	387	388	3	207	208	459	460	3
6.8	141	142	389	390	3	235	236	461	462	1
8.2	143	144	391	392	3	209	210	463	464	1
10	145	146	393	394	3	211	212	465	466	1
12	147	148	395	396	3	213	214	467	468	1
15	149	150	397	398	1	237	238	469	470	2
18	151	152	399	400	1	215	216	471	472	2
22	153	154	401	402	1	239	240	473	474	6
27	155	156	403	404	1	217	218	475	476	6
33	157	158	405	406	2	219	220	477	478	6
39	159	160	407	408	2	221	222	479	480	6
47	161	162	409	410	6	—	—	—	—	—
56	163	164	411	412	6	—	—	—	—	—
68	165	166	413	414	6	—	—	—	—	—
82	167	168	415	416	6	—	—	—	—	—
100	169	170	417	418	6	—	—	—	—	—
120	171	172	419	420	6	—	—	—	—	—
150	—	—	—	—	—	—	—	—	—	—
180	—	—	—	—	—	—	—	—	—	—
220	—	—	—	—	—	—	—	—	—	—
270	—	—	—	—	—	—	—	—	—	—

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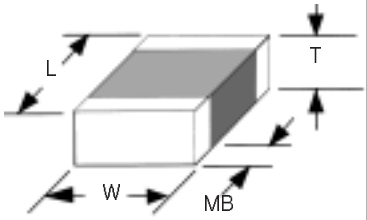
Dimensions and Characteristics



Size	1515	1808	1812	1825	2225	3333	4040	4540	5440	5550
Length L	.150 (3.81)	.180 (4.57)	.180 (4.57)	.180 (4.57)	.220 (5.59)	.330 (8.38)	.400 (10.2)	.450 (11.4)	.540 (13.7)	.550 (11.4)
Width W	.150 (3.81)	.080 (2.03)	.125 (3.18)	.250 (6.35)	.250 (6.35)	.330 (6.35)	.400 (10.2)	.400 (10.2)	.400 (10.2)	.500 (12.7)
T Max.	.130 (3.30)	.080 (2.03)	.100 (2.54)	.140 (3.56)	.150 (3.81)	.250 (6.35)	.300 (7.62)	.300 (7.62)	.300 (7.62)	.300 (7.62)
MB Max.	.040 (1.02)	.038 (.965)	.038 (.965)	.038 (.965)	.045 (1.14)	.050 (1.27)	.060 (1.52)	.060 (1.52)	.060 (1.52)	.060 (1.52)

Dimension Tolerances are ±5% or .015" (0.38mm) whichever is greater

Size	1515		1808		1812		1825		2225		3333		4040		4540		5440		5550	
Min Value	100		100		150		390		390		390		390		390		390		390	
	Three Digit Maximum Value																			
Voltage	COG	X7R	COG	X7R	COG	X7R	COG	X7R	COG	X7R	COG	X7R	COG	X7R	COG	X7R	COG	X7R	COG	X7R
500V	682	184	332	823	562	154	183	474	223	564	563	105	393	105	823	185	104	225	124	275
1000V	392	563	182	223	392	473	103	184	123	224	183	394	333	684	393	824	473	824	563	125
2000V	222	822	102	392	222	822	682	273	103	333	123	683	223	154	273	154	333	184	393	274
3000V	102	332	471	122	102	272	332	103	472	123	103	333	183	683	223	823	223	823	333	124
4000V	331	152	121	561	271	122	102	472	681	682	392	153	822	273	103	333	123	393	153	563
5000V	—	—	—	—	—	—	471	102	681	152	222	822	392	183	472	223	562	223	682	393
10000V	—	—	—	—	—	—	—	—	—	—	—	—	102	392	122	392	152	472	222	822

How To Order

202 C 1825 A 122 J P

Voltage
Two Significant Figures
Followed by Number of Zeros
i.e. 302 = 3000V

Metuchen Designator

Size

Dielectric
A= NPO
B = X7R

For other case sizes or options contact Metuchen Capacitors
Also available in leaded packages.

Termination
P= Palladium Silver
N=Nickel Barrier
Availability on termination may vary by size.

Tolerance
J= 5% K= 10% M= 20%

Capacitance in Picofarads
Two significant figures followed by number of zeros

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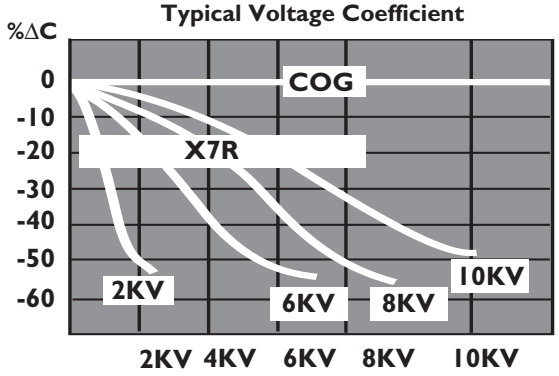
High Voltage Radial Leaded Capacitors

Now in Voltages up to 10KVDC!

Dimensions and Characteristics

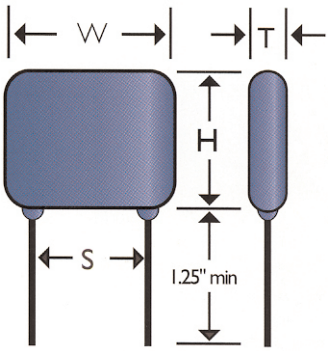
Size	2525	4035	5045	6055	7065	8075	9085
W Max	.250 (6.35)	.400 (10.2)	.500 (12.7)	.600 (15.2)	.700 (17.8)	.800 (20.3)	.900 (22.8)
H Max	.250 (6.35)	.350 (8.89)	.450 (11.4)	.550 (11.4)	.650 (16.5)	.750 (19.0)	.850 (21.6)
T Max	.200 (5.08)	.250 (6.35)	.350 (8.89)	.400 (10.2)	.400 (10.2)	.400 (10.2)	.400 (10.2)
S ±0.04	.170 (4.32)	.280 (7.10)	.380 (9.65)	.480 (12.2)	.580 (14.7)	.680 (17.3)	.780 (19.8)
D +004 -.001	.025 (0.64)	.025 (0.64)	.025 (0.64)	.025 (0.64)	.025 (0.64)	.025 (0.64)	.025 (0.64)

Typical Voltage Coefficient



MAX Capacitance vs. Dielectric & Voltage

Size	2525		4035		5045		6055		7065		8075		9085	
Dielectric	C0G	X7R	C0G	X7R	C0G	X7R	C0G	X7R	C0G	X7R	C0G	X7R	C0G	X7R
Min Cap	3R0	221	390	102	390	102	390	102			60	202	101	202
500V	822	154	393	684	683	105	124	185			74	335	334	475
600V	682	124	223	394	393	684	823	155			24	275	274	395
800V	682	823	183	274	333	394	683	824	124	155	184	225	224	275
1000V	562	563	123	184	273	334	563	684	104	105	154	155	184	225
2000V	272	822	562	273	153	683	333	184	473	274	683	394	104	474
3000V	122	332	272	123	103	273	223	683	333	124	473	184	683	224
4000V	681	122	152	472	562	153	123	333	183	473	273	823	393	104
5000V			102	272	332	103	822	183	123	333	183	473	223	563
6000V					182	562	392	123	562	223	103	333	123	393
7000V					122	472	272	822	472	153	682	223	822	273
8000V					102	332	222	682	332	123	562	153	682	223
9000V					821	272	182	472	272	103	392		472	183
10000V					681	182	152	392	222	682	332		392	123



22AWG Diameter

Contact M.C.I. For Values or Sizes Not Listed

How To Order

202 L 4035 A 562 J

- **Voltage** (Third digit is number of zeros)
- **Metuchen Designator**
- **Size**
- **Dielectric** A= NPO B = X7R
- **Capacitance in Picofarads** (Third digit is number of zeros)
- **Tolerance** F = ±1% J = ±5% M = ±20% G = ±2% K = ±10%

Dimensions in inches (mm)

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Mechanical Configurations

MCI SERIES	Case Size & Type	MCI Term Code	QPL MIL-C-11272C	QPL MIL-C-55681	Outlines	Body Dimensions Length	Body Dimensions Width	Body Dimensions Thickness	Lead & Termination Dimensions & Materials
200	A Solder Plate	W	—	CDR12BG	W/T is a Termination Surface	.055 ± .015 (1.4 ± .38)		.057 (1.45) max.	For low cost, high volume, tape & reel applications Nickel barrier, solder plated
800	A Solder Plate	W	—	CDR12BP	W/T is a Termination Surface	.055 ± .015 (1.4 ± .38)		.057 (1.45) max.	For low cost, high volume, tape & reel applications Nickel barrier, solder plated
200	B Solder Plate	W	—	CDR14BG	W/T is a Termination Surface	.110 ± .020 (2.79 ± .51)		.102 (2.6) max.	For low cost, high volume, tape & reel applications Nickel barrier, solder plated
800	B Solder Plate	W	—	CDR14BP	W/T is a Termination Surface	.110 ± .020 (2.79 ± .51)		.102 (2.6) max.	For low cost, high volume, tape & reel applications Nickel barrier, solder plated
275	B Solder Plate	W	—	—	W/T is a Termination Surface	.110 ± .020 (2.79 ± .51)		.102 (2.6) max.	For low cost, high volume, tape & reel applications Nickel barrier, solder plated
200	A Pellet	P	CY82	CDR12BG	W/T is a Termination Surface	.055 ± .025 (1.4 ± .64)	.055 ± .015 (1.4 ± .38)	.057 (1.45) max.	Pellets are solder-coated chips with nickel barrier over the termination. Solder melting temperature is 375°F, 179°C
800	A Pellet	P	—	CDR12BP	W/T is a Termination Surface	.055 ± .025 (1.4 ± .64)	.055 ± .015 (1.4 ± .38)	.057 (1.45) max.	Pellets are solder-coated chips with nickel barrier over the termination. Solder melting temperature is 375°F, 179°C
200	B Pellet	P	CY84	CDR14BG	W/T is a Termination Surface	.110+.035 -.020 (2.79 +.89 -.51)	110±.020 (2.79 ± .51	.102 (2.6) max.	Pellets are solder-coated chips with nickel barrier over the termination. Solder melting temperature is 375°F, 179°C
800	B Pellet	P	—	CDR14BP	W/T is a Termination Surface	.110+.035 -.020 (2.79 +.89 -.51)	110±.020 (2.79 ± .51	.102 (2.6) max.	Pellets are solder-coated chips with nickel barrier over the termination. Solder melting temperature is 375°F, 179°C
275	B Pellet	P	—	—	W/T is a Termination Surface	.110+.035 -.020 (2.79 +.89 -.51)	110±.020 (2.79 ± .51	.102 (2.6) max.	Pellets are solder-coated chips with nickel barrier over the termination. Solder melting temperature is 375°F, 179°C
200	A Chip	C	CY81**	CDR11BG	W/T is a Termination Surface	.055 ± .015 (1.4 ± .38)		.057 (1.45) max.	PALLADIUM SILVER TERMINATIONS
800	A Chip	C	—	CDR11BP	W/T is a Termination Surface	.055 ± .015 (1.4 ± .38)		.057 (1.45) max.	PALLADIUM SILVER TERMINATIONS
200	B Chip	C	CY83**	CDR13BG	W/T is a Termination Surface	.110 ± .020 (2.79 ± .51)		.102 (2.6) max.	PALLADIUM SILVER TERMINATIONS
800	B Chip	C	—	CDR13BP	W/T is a Termination Surface	.110 ± .020 (2.79 ± .51)		.102 (2.6) max.	PALLADIUM SILVER TERMINATIONS
275	B Chip	C	—	—	W/T is a Termination Surface	.110 ± .020 (2.79 ± .51)		.102 (2.6) max.	PALLADIUM SILVER TERMINATIONS
200	A Chip	CA	CY81**	CDR11BG	W/T is a Termination Surface	.055 ± .015 (1.4 ± .38)		.057 (1.45) max.	GOLD OVER NICKEL OVER SILVER (CA)
800	A Chip	CA	—	CDR11BP	W/T is a Termination Surface	.055 ± .015 (1.4 ± .38)		.057 (1.45) max.	GOLD OVER NICKEL OVER SILVER (CA)
200	B Chip	*CA	CY83**	CDR13BG	W/T is a Termination Surface	.110 ± .020 (2.79 ± .51)		.102 (2.6) max.	GOLD OVER NICKEL OVER SILVER (CA)
800	B Chip	*CA	—	CDR13BP	W/T is a Termination Surface	.110 ± .020 (2.79 ± .51)		.102 (2.6) max.	GOLD OVER NICKEL OVER SILVER (CA)
275	B Chip	*CA	—	—	W/T is a Termination Surface	.110 ± .020 (2.79 ± .51)		.102 (2.6) max.	GOLD OVER NICKEL OVER SILVER (CA)
200	B Microstrip	MS	CY85	CDR21BG		.120 (3.05) min. .150 (3.81) max.	.100 ±.015 (2.79 ± .38)	.100 (2.54) max.	Length: .250 (6.35) min. Width: .093±.005 (2.36±.13) Thickness: .004±.001 (.102±.025)
800	B Microstrip	MS	—	CDR21BP		.120 (3.05) min. .150 (3.81) max.	.100 ±.015 (2.79 ± .38)	.100 (2.54) max.	Length: .250 (6.35) min. Width: .093±.005 (2.36±.13) Thickness: .004±.001 (.102±.025)
275	B Microstrip	MS	—	—		.120 (3.05) min. .150 (3.81) max.	.100 ±.015 (2.79 ± .38)	.100 (2.54) max.	Length: .250 (6.35) min. Width: .093±.005 (2.36±.13) Thickness: .004±.001 (.102±.025)
200	B Axial Ribbon	AR	CY86	CDR22BG					
800	B Axial Ribbon	AR	—	CDR22BP					
200	B Radial Ribbon	RR	CY88	CDR24BG					
800	B Radial Ribbon	RR	—	CDR24BP					
200	B Radial Wire	RW	CY87	CDR23BG		.120 (3.05) min. .165 (4.19) max.	.100 ± .015 (2.79±.38)	.100 (2.54) max.	Length: .500 (12.7) min. #26 AWG., .016 (.375) dia. nominal
800	B Radial Wire	RW	—	CDR23BP		.120 (3.05) min. .165 (4.19) max.	.100 ± .015 (2.79±.38)	.100 (2.54) max.	Length: .500 (12.7) min. #26 AWG., .016 (.375) dia. nominal
200	B Axial Wire	AW	CY89	CDR25BG					
800	B Axial Wire	AW	—	CDR25BP					

*CA Termination includes Nickel Barrier

**CY81 and CY83 are Palladium Silver terminated Chips per MIL-C-11272 requirements. MIL-C-11272 IS FOR REFERENCE ONLY! ADDITIONAL LEAD STYLES AVAILABLE. CONSULT FACTORY. Radial wire and axial wire are silver plated copper. All other leads are high purity silver and are attached with high temperature solder.

ALL DIMENSIONS ARE IN INCHES EXCEPT THOSE IN PARENTHESES WHICH ARE IN MILLIMETERS.

TAPE AND REEL PACKAGING for automated surface mounting available upon request. W Termination is Recommended.

How To Order

MCI200 B 91 0 J P 500 X

- **Series:** MCI200
- **Case Size:** B
- **Capacitance Code:** 91 — First 2 significant digits for capacity; R = Decimal Point
- **Indicates number of zeros following digits of capacitance in picofarads:** 0
- **Capacitance Tolerance:** J
- **Termination Code:** P
- **WVDC:** 500
- **Laser marking:** X

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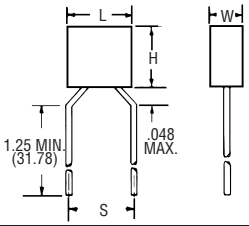
"We Offer Quick Solutions to Noise Pollution"

NPO Ceramic Capacitors Qualified to MIL-C-20

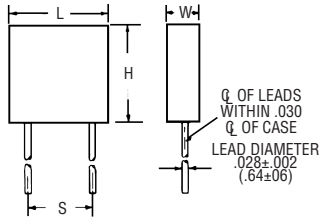
- 0±30ppm/°C Per MIL-C-20
- .1 to 100,000 Pf -55°C +125°C
- Low Dissipation Factor
- Tight Tolerances

Radial Lead Capacitors

CCR05



CCR06, 07, 08 & 09

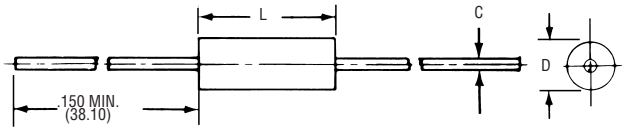


Mil. Equiv.	H & L	W	S
CCR05	.190±.010	.090±0.10	.200±.015
CCR09	.190±.010	.090±.010	.100±.015
CCR06	.290±.010	.090±.010	.200±.015
CCR07	.480±.020	.140±.010	.400±.020
CCR08	.480±.020	.240±.010	.400±.020

ER	Slash Sheet	Volt	Cap. Range pF
CCR05		200	1-330
CCR09	35	100	360-1800
		50	2200-3300
		200	360-1800
CCR06	36	100	2000-4700
		50	5100-18,000
		200	2200-4700
CCR07	37	100	5600-12,000
		50	15,000-100,000
		200	3900-4700
CCR08	38	100	15,000-18,000
		50	56,000-68,000

Axial Lead Capacitors

CCR75, 76, 77, 78 & 79



Mil. Equiv.	L	D	Lead Size
CCR75	.160±.010	.090±0.10	.016
CCR76	.250±.010	.090±.010	.016
CCR77	.390±.010	.140±.010	.025
CCR78	.500±.020	.250±.015	.025
CCR79	.690±.020	.350±.015	.025

ER	Slash Sheet	Volt	Cap. Range pF
CCR75	27	200	.1-75
		100	82-240
		50	270-680
CCR76	28	200	82-130
		100	270-680
		50	750-1000
CCR77	29	200	150-680
		100	750-2200
		50	2400-5600
CCR78	30	200	820-3300
		100	3900-12,000
		50	15,000-27,000
CCR79	31	200	3900-10,000
		100	15,000-39,000
		50	47,000-82,000

All dimensions shown in inches.

Fixed Capacitors, Ceramic Dielectric (Temperature Compensating), Established Reliability

ER **CCR05** **CG** **102** **G** **R**

Style
05 = Radial .190x.190 75 = Axial .160x.090
09 = Radial .190x.190 76 = Axial .250x.090
06 = Radial .290x.290 77 = Axial .390x.140
07 = Radial .480x.480 78 = Axial .500x.250
08 = Radial .480x.480 79 = Axial .690x.350

Capacitance
Nominal capacitance expressed in picofarads (uF) by three-digit number, first two digits represent significant figures, last digit specifies number of zeros to follow. When the nominal value is less than 10pF, the letter 'R' indicates the decimal point and the succeeding digit(s) represent significant figures(s). For example: IRO indicates 1.0pF; R75 indicates 0.75pF and OR5 indicates 0.5pF.

Failure Rate Level
M = 1.0%
P = 0.1%
R = 0.01%
S = 0.001%
Expressed in % per 1000 hours

Capacitance Tolerance
C = ±.25pF
D = ±.5pF
F = ±1%
G = ±2%
J = ±5%
K = ±10%

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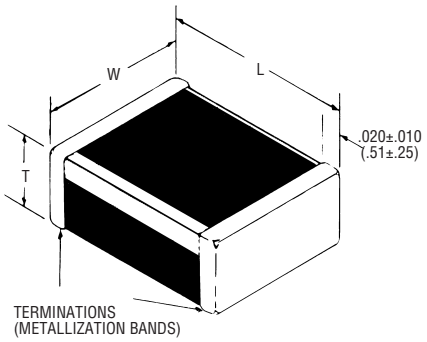
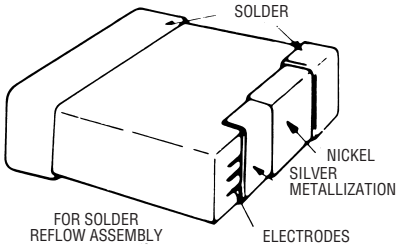
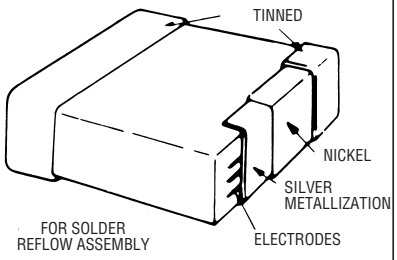


"SOLDERGUARD" I



MILITARY DESIGNATION "S" OR "U"

"SOLDERGUARD" II



MILITARY DESIGNATION "W" OR "Y"

Dimensions—Millimeters & (Inches)

Style	Size Code	L	W	T	
				Min.	Max.
CDR01	C0805	2.03±.38 (.080±.015)	1.27±.38 (.050±.015)	.51 (.020)	1.40 (.055)
CDR02	C1805	4.57±.38 (.180±.015)	1.27±.38 (.050±.015)	.51 (.020)	1.40 (.055)
CDR03	C1808	4.57±.38(.180±.015)	2.03±.38 (.080±.015)	.51 (.020)	.203 (.080)
CDR04	C1812	4.57±.38 (.180±.015)	3.18±.38 (1.25±.015)	.51 (.020)	2.03 (.080)
CDR05	C1825	4.57+.51 (1.80+.020) -.38 (-.015)	6.35+.51 (.250+.020) -.38 (-.015)	.51 (.020)	2.03 (.080)
CDR06	C2225	5.72±.51 (.225±.020)	6.35±.51 (.250±.020)	.51 (.020)	2.03 (.080)
CDR31	C0805	2.00±.20 (.078±.008)	1.25±.20 (.049±.008)	.50±.20 (.020±.008)	1.30±.20 (0.51±.008)
CDR32	C1206	3.20±.20 (.125±.008)	1.60±.20 (.062±.008)	.50±.20 (.020±.008)	1.30±.20 (0.51±.008)
CDR33	C1210	3.20±.25 (.125±.010)	2.50.±.25 (.098±.010)	.50±.25 (.020±.010)	1.50±.25 (.059±.010)
CDR34	C1812	4.50±.25 (.176±.010)	3.20±.25 (.125±.010)	.50±.25 (.020±.010)	1.50±.25 (.059±.010)
CDR35	C1825	4.50±.30 (.176±.012)	6.40±.30 (.250±.012)	.50±.30 (.020±.012)	1.50±.30 (.059±0.12)

Ordering Information

CDR01 B P 101 B K S M

Style & Size Code
Style
C — Ceramic
D — Dielectric, fixed Chip
R — Established Reliability

Rated Temperature
-55°C to +125°C

Dielectrics
P — 0±30ppm/°C
X — ±15% from -55°C to +125°C with 0VDC Bias
+15%/-25% from -55°C to +125°C with WVDC Bias

Capacitance
Expressed in picofarads (pF)
First 2 digits represent significant figures and the last digit specifies the number of zeros to follow. Example: 103 — 10,000 picofarads. When nominal value is less than 10pF, the letter "R" is used to indicate the decimal point. Example: 1R0 — 1.0pF; R75—0.75pF; 0R5—0.5pF.

Rated Voltage
A—50; B—100

Capacitance Tolerance

B	C	D	F	J	K	M
±.1pF	±.25pF	±.5pF	±1%	±5%	±10%	±20%

Termination Finish
S — Solder Coated, Final (SolderGuard I)
U— Base Metallization Barrier Metal—Solder Coated (SolderGuard I)
W— Base Metallization—Barrier Metal—Tinned (Tin or Tin/Lead Alloy) (SolderGuard II)
Y— Base Metallization Barrier Metal—100% tin coated (SolderGuard II)

Failure Rate Level
M = 1.0% (%/1000hrs.)
P = 0.1
R = 0.01
S = 0.001

Ceramic Chip/MIL-C-55681 Established Reliability

Ratings & Part Number Reference

Characteristic	Cap pF	Avail. Tol.	MIL-C-55681 Part Number
100 VOLT — C0805 SIZE (MILITARY CDR01)			
BP	10	J,K	CDR01BP100B(3)W(4)
	12	J	CDR01BP120BJW(4)
	15	J,K	CDR01BP150B(3)W(4)
	18	J	CDR01BP180BJW(4)
	22	J,K	CDR01BP220B(3)W(4)
	27	J	CDR01BP270BJW(4)
	33	J,K	CDR01BP330B(3)W(4)
	39	J	CDR01BP390BJW(4)
	47	J,K	CDR01BP470B(3)W(4)
	56	J	CDR01BP560BJW(4)
	68	J,K	CDR01BP680B(3)W(4)
	82	J	CDR01BP820BJW(4)
	100	J,K	CDR01BP101B(3)W(4)
BP or BX	120	J,K	CDR01B(1)121B(3)W(4)
	150	J,K	CDR01B(1)151BJW(4)
	180	J,K	CDR01B(1)181B(3)W(4)
BX	220	K,M	CDR01BX221B(3)W(4)
	270	K	CDR01BX271BJW(4)
	330	K,M	CDR01BX331B(3)W(4)
	390	K	CDR01BX391BJW(4)
	470	K,M	CDR01BX471B(3)W(4)
	560	K	CDR01BX561BJW(4)
	680	K,M	CDR01BX681B(3)W(4)
	820	K	CDR01BX821BJW(4)
	1,000	K,M	CDR01BX102B(3)W(4)
	1,200	K	CDR01BX122BJW(4)
	1,500	K,M	CDR01BX152B(3)W(4)
	1,800	K	CDR01BX182BJW(4)
	2,200	K,M	CDR01BX222B(3)W(4)
	2,700	K	CDR01BX272BJW(4)
	3,300	K,M	CDR01BX332B(3)W(4)
50 VOLT — C0805 SIZE (MILITARY CDR01)			
BX	3,900	K	CDR01BX392AKW(4)
	4,700	K,M	CDR01BX472A(3)W(4)
100 VOLT — C1805 SIZE (MILITARY CDR02)			
BP	220	J,K	CDR02BP221B(3)W(4)
	270	J	CDR02BP271BJW(4)
BX	3,900	K	CDR02BX392BKW(4)
	4,700	K,M	CDR02BX472B(3)W(4)
	5,600	K	CDR02BX562BKW(4)
	6,800	K,M	CDR02BX682B(3)W(4)
	8,200	K	CDR02BX822BKW(4)
	10,000	K,M	CDR02BX103B(3)W(4)
50 VOLT — C1805 SIZE (MILITARY CDR02)			
BX	12,000	K	CDR02BX123AKW(4)
	15,000	K,M	CDR02BX153A(3)W(4)
	18,000	K	CDR02BX183AKW(4)
	22,000	K,M	CDR02BX223A(3)W(4)
100 VOLT — C1808 SIZE (MILITARY CDR03)			
BP	330	J,K	CDR03BP331B(3)W(4)
	390	J	CDR03BP391BJW(4)
	470	J,K	CDR03BP471B(3)W(4)

Characteristic	Cap pF	Avail. Tol.	MIL-C-55681 Part Number
100 VOLT — C1808 SIZE (MILITARY CDR03) (cont'd)			
BP	560	J	CDR03BP561BJW(4)
	680	J,K	CDR03BP681B(3)W(4)
	820	J	CDR03BP821BJW(4)
	1,000	J,K	CDR03BP102B(3)W(4)
BP	12,000	K	CDR03BX123BKW(4)
	15,000	K,M	CDR03BX153B(3)W(4)
	18,000	K	CDR03BX183BKW(4)
	22,000	K,M	CDR03BX223B(3)W(4)
	27,000	K	CDR03BX273BKW(4)
	33,000	K,M	CDR03BX333B(3)W(4)
50 VOLT — C1808 SIZE (MILITARY CDR03)			
BX	39,000	K	CDR03BX393BKW(4)
	47,000	K,M	CDR03BX473B(3)W(4)
	56,000	K	CDR03BX563BKW(4)
	68,000	K,M	CDR03BX683B(3)W(4)
100 VOLT — C1812 SIZE (MILITARY CDR04)			
BP	1,200	J	CDR04BP122BJW(4)
	1,500	J,K	CDR04BP152B(3)W(4)
	1,800	J	CDR04BP182BJW(4)
	2,200	J,K	CDR04BP222B(3)W(4)
	2,700	J	CDR04BP272BJW(4)
	3,300	J,K	CDR04BP332B(3)W(4)
BX	39,000	K	CDR04BX393BKW(4)
	47,000	K,M	CDR04BX473B(3)W(4)
	56,000	K	CDR04BX563BKW(4)
50 VOLT — C1812 SIZE (MILITARY CDR04)			
BX	82,000	K	CDR04BX823AKW(4)
	100,000	K,M	CDR04BX104A(3)W(4)
	120,000	K	CDR04BX124AKW(4)
	150,000	K,M	CDR04BX154A(3)W(4)
	180,000	K	CDR04BX184AKW(4)
100 VOLT — C1825 SIZE (MILITARY CDR05)			
BP	3,900	J,K	CDR05BP392B(3)W(4)
	4,700	J,K	CDR05BP472B(3)W(4)
	5,600	J,K	CDR05BP562B(3)W(4)
BX	68,000	K,M	CDR05BX683B(3)W(4)
	82,000	K	CDR05BX823BKW(4)
	100,000	K,M	CDR05BX104B(3)W(4)
	120,000	K	CDR05BX124BKW(4)
	150,000	K,M	CDR05BX154B(3)W(4)
50 VOLT — C1825 SIZE (MILITARY CDR05)			
BX	220,000	K,M	CDR05BX224A(3)W(4)
	270,000	K	CDR05BX274AKW(4)
	330,000	K,M	CDR05BX334A(3)W(4)
100 VOLT — C2225 SIZE (MILITARY CDR06)			
BP	6,800	J,K	CDR06BP682B(3)W(4)
	8,200	J,K	CDR06BP822B(3)W(4)
	10,000	J,K	CDR06BP103B(3)W(4)
50 VOLT — C2225 SIZE (MILITARY CDR06)			
BX	390,000	K	CDR06BX394AKW(4)
	470,000	K,M	CDR06BX474A(3)W(4)

(1) To complete Part Number for Dielectric, insert P or X symbol – as defined by Military specification.
(2) To complete Part Number for Dielectric, insert G or X symbol. ("G" for Military "BP", or "X" for Military "BX".)
(3) To complete Part Number, insert Capacitance Tolerance Symbol (when applicable) as available in MIL-C-55681: B-±0.1 pF, C-±0.25 pF, D-±0.5 pF, F-±1%, J-±5%, K-±10%, M-±20%. NOTE: Available tolerances are listed in columns above.
(4) To complete Part Number, insert Failure Rate Symbol: M—1.0%; P—0.1%; R—0.01%; S—.001%.

Ceramic Chip/MIL-C-55681 Established Reliability

Ratings & Part Number Reference

Cap pF	Avail. Tol.	MIL-C-55681 Part Number
100 VOLT — BP — C0805 SIZE (MILITARY CDR31)		
1.0	B,C	CDR31BP1R0B(3)W(4)
1.1	B,C	CDR31BP1R1B(3)W(4)
1.2	B,C	CDR31BP1R2B(3)W(4)
1.3	B,C	CDR31BP1R3B(3)W(4)
1.5	B,C	CDR31BP1R5B(3)W(4)
1.6	B,C	CDR31BP1R6B(3)W(4)
1.8	B,C	CDR31BP1R8B(3)W(4)
2.0	B,C	CDR31BP2R0B(3)W(4)
2.2	B,C	CDR31BP2R2B(3)W(4)
2.4	B,C	CDR31BP2R4B(3)W(4)
2.7	B,C,D	CDR31BP2R7B(3)W(4)
3.0	B,C,D	CDR31BP3R0B(3)W(4)
3.3	B,C,D	CDR31BP3R3B(3)W(4)
3.6	B,C,D	CDR31BP3R6B(3)W(4)
3.9	B,C,D	CDR31BP3R9B(3)W(4)
4.3	B,C,D	CDR31BP4R3B(3)W(4)
4.7	B,C,D	CDR31BP4R7B(3)W(4)
5.1	B,C,D	CDR31BP5R1B(3)W(4)
5.6	B,C,D	CDR31BP5R6B(3)W(4)
6.2	B,C,D	CDR31BP6R2B(3)W(4)
6.8	B,C,D	CDR31BP6R8B(3)W(4)
7.5	B,C,D	CDR31BP7R5B(3)W(4)
8.2	B,C,D	CDR31BP8R2B(3)W(4)
9.1	B,C,D	CDR31BP9R1B(3)W(4)
10	F,J,K	CDR31BP100B(3)W(4)
11	F,J,K	CDR31BP110B(3)W(4)
12	F,J,K	CDR31BP120B(3)W(4)
13	F,J,K	CDR31BP130B(3)W(4)
15	F,J,K	CDR31BP150B(3)W(4)
16	F,J,K	CDR31BP160B(3)W(4)
18	F,J,K	CDR31BP180B(3)W(4)
20	F,J,K	CDR31BP200B(3)W(4)
22	F,J,K	CDR31BP220B(3)W(4)
24	F,J,K	CDR31BP240B(3)W(4)
27	F,J,K	CDR31BP270B(3)W(4)
30	F,J,K	CDR31BP300B(3)W(4)
33	F,J,K	CDR31BP330B(3)W(4)
36	F,J,K	CDR31BP360B(3)W(4)
39	F,J,K	CDR31BP390B(3)W(4)
43	F,J,K	CDR31BP430B(3)W(4)
47	F,J,K	CDR31BP470B(3)W(4)
51	F,J,K	CDR31BP510B(3)W(4)
56	F,J,K	CDR31BP560B(3)W(4)
62	F,J,K	CDR31BP620B(3)W(4)
68	F,J,K	CDR31BP680B(3)W(4)
75	F,J,K	CDR31BP750B(3)W(4)
82	F,J,K	CDR31BP820B(3)W(4)
91	F,J,K	CDR31BP910B(3)W(4)
100	F,J,K	CDR31BP101B(3)W(4)
110	F,J,K	CDR31BP111B(3)W(4)
120	F,J,K	CDR31BP121B(3)W(4)
130	F,J,K	CDR31BP131B(3)W(4)
150	F,J,K	CDR31BP151B(3)W(4)
160	F,J,K	CDR31BP161B(3)W(4)
180	F,J,K	CDR31BP181B(3)W(4)
200	F,J,K	CDR31BP201B(3)W(4)
220	F,J,K	CDR31BP221B(3)W(4)
240	F,J,K	CDR31BP241B(3)W(4)
270	F,J,K	CDR31BP271B(3)W(4)
300	F,J,K	CDR31BP301B(3)W(4)
330	F,J,K	CDR31BP331B(3)W(4)
360	F,J,K	CDR31BP361B(3)W(4)
390	F,J,K	CDR31BP391B(3)W(4)
430	F,J,K	CDR31BP431B(3)W(4)
470	F,J,K	CDR31BP471B(3)W(4)
50 VOLT — BP — C0805 SIZE (MILITARY CDR31)		
510	F,J,K	CDR31BP511B(3)W(4)
560	F,J,K	CDR31BP561B(3)W(4)
620	F,J,K	CDR31BP621B(3)W(4)
680	F,J,K	CDR31BP681B(3)W(4)
100 VOLT — BX — C0805 SIZE (MILITARY CDR31)		
470	K,M	CDR31BX471B(3)W(4)
560	K,M	CDR31BX561B(3)W(4)
680	K,M	CDR31BX681B(3)W(4)
820	K,M	CDR31BX821B(3)W(4)
1,000	K,M	CDR31BX102B(3)W(4)
1,200	K,M	CDR31BX122B(3)W(4)
1,500	K,M	CDR31BX152B(3)W(4)
1,800	K,M	CDR31BX182B(3)W(4)
2,200	K,M	CDR31BX222B(3)W(4)
2,700	K,M	CDR31BX272B(3)W(4)
3,300	K,M	CDR31BX332B(3)W(4)
3,900	K,M	CDR31BX392B(3)W(4)
4,700	K,M	CDR31BX472B(3)W(4)
50 VOLT — BX — C0805 SIZE (MILITARY CDR31)		
5,600	K,M	CDR31BX562A(3)W(4)
6,800	K,M	CDR31BX682A(3)W(4)
8,200	K,M	CDR31BX822A(3)W(4)
10,000	K,M	CDR31BX103A(3)W(4)
12,000	K,M	CDR31BX123A(3)W(4)
15,000	K,M	CDR31BX153A(3)W(4)
18,000	K,M	CDR31BX183A(3)W(4)

(1) To complete Part Number for Dielectric, insert P or X symbol – as defined by Military specification.
(2) To complete Part Number for Dielectric, insert G or X symbol. ("G" for Military "BP", or "X" for Military "BX".)
(3) To complete Part Number, insert Capacitance Tolerance Symbol (when applicable) as available in MIL-C-55681: B-±0.1 pF, C-±0.25 pF, D-±0.5 pF, F-±1%, J-±5%, K-±10%, M-±20%. NOTE: Available tolerances are listed in columns above.
(4) To complete Part Number, insert Failure Rate Symbol: M—1.0%; P—0.1%; R—0.01%; S—.001%.

Dimensions in inches (mm)

Ceramic Chip/MIL-C-55681 Established Reliability

Ratings & Part Number Reference

Cap pF	Avail. Tol.	MIL-C-55681 Part Number
100 VOLT — BP — C1206 SIZE (MILITARY CDR32)		
1.0	B,C	CDR32BP1R0B(3)W(4)
1.1	B,C	CDR32BP1R1B(3)W(4)
1.2	B,C	CDR32BP1R2B(3)W(4)
1.3	B,C	CDR32BP1R3B(3)W(4)
1.5	B,C	CDR32BP1R5B(3)W(4)
1.6	B,C	CDR32BP1R6B(3)W(4)
1.8	B,C	CDR32BP1R8B(3)W(4)
2.0	B,C	CDR32BP2R0B(3)W(4)
2.2	B,C	CDR32BP2R2B(3)W(4)
2.4	B,C	CDR32BP2R4B(3)W(4)
2.7	B,C,D	CDR32BP2R7B(3)W(4)
3.0	B,C,D	CDR32BP3R0B(3)W(4)
3.3	B,C,D	CDR32BP3R3B(3)W(4)
3.6	B,C,D	CDR32BP3R6B(3)W(4)
3.9	B,C,D	CDR32BP3R9B(3)W(4)
4.3	B,C,D	CDR32BP4R3B(3)W(4)
4.7	B,C,D	CDR32BP4R7B(3)W(4)
5.1	B,C,D	CDR32BP5R1B(3)W(4)
5.6	B,C,D	CDR32BP5R6B(3)W(4)
6.2	B,C,D	CDR32BP6R2B(3)W(4)
6.8	B,C,D	CDR32BP6R8B(3)W(4)
7.5	B,C,D	CDR32BP7R5B(3)W(4)
8.2	B,C,D	CDR32BP8R2B(3)W(4)
9.1	B,C,D	CDR32BP9R1B(3)W(4)
10	F,J,K	CDR32BP100B(3)W(4)
11	F,J,K	CDR32BP110B(3)W(4)
12	F,J,K	CDR32BP120B(3)W(4)
13	F,J,K	CDR32BP130B(3)W(4)
15	F,J,K	CDR32BP150B(3)W(4)
16	F,J,K	CDR32BP160B(3)W(4)
18	F,J,K	CDR32BP180B(3)W(4)
20	F,J,K	CDR32BP200B(3)W(4)
22	F,J,K	CDR32BP220B(3)W(4)
24	F,J,K	CDR32BP240B(3)W(4)
27	F,J,K	CDR32BP270B(3)W(4)
30	F,J,K	CDR32BP300B(3)W(4)
33	F,J,K	CDR32BP330B(3)W(4)
36	F,J,K	CDR32BP360B(3)W(4)
39	F,J,K	CDR32BP390B(3)W(4)
43	F,J,K	CDR32BP430B(3)W(4)
47	F,J,K	CDR32BP470B(3)W(4)
51	F,J,K	CDR32BP510B(3)W(4)
56	F,J,K	CDR32BP560B(3)W(4)
62	F,J,K	CDR32BP620B(3)W(4)
68	F,J,K	CDR32BP680B(3)W(4)
75	F,J,K	CDR32BP750B(3)W(4)
82	F,J,K	CDR32BP820B(3)W(4)
91	F,J,K	CDR32BP910B(3)W(4)
100	F,J,K	CDR32BP101B(3)W(4)

Cap pF	Avail. Tol.	MIL-C-55681 Part Number
100 VOLT — BP — C1206 SIZE (MILITARY CDR32) (Cont'd)		
110	F,J,K	CDR32BP111B(3)W(4)
120	F,J,K	CDR32BP121B(3)W(4)
130	F,J,K	CDR32BP131B(3)W(4)
150	F,J,K	CDR32BP151B(3)W(4)
160	F,J,K	CDR32BP161B(3)W(4)
180	F,J,K	CDR32BP181B(3)W(4)
200	F,J,K	CDR32BP201B(3)W(4)
220	F,J,K	CDR32BP221B(3)W(4)
240	F,J,K	CDR32BP241B(3)W(4)
270	F,J,K	CDR32BP271B(3)W(4)
300	F,J,K	CDR32BP301B(3)W(4)
330	F,J,K	CDR32BP331B(3)W(4)
360	F,J,K	CDR32BP361B(3)W(4)
390	F,J,K	CDR32BP391B(3)W(4)
430	F,J,K	CDR32BP431B(3)W(4)
470	F,J,K	CDR32BP471B(3)W(4)
510	F,J,K	CDR32BP511B(3)W(4)
560	F,J,K	CDR32BP561B(3)W(4)
620	F,J,K	CDR32BP621B(3)W(4)
680	F,J,K	CDR32BP681B(3)W(4)
750	F,J,K	CDR32BP751B(3)W(4)
820	F,J,K	CDR32BP821B(3)W(4)
910	F,J,K	CDR32BP911B(3)W(4)
1,000	F,J,K	CDR32BP102B(3)W(4)
50 VOLT — BP — C1206 SIZE (MILITARY CDR32)		
1,100	F,J,K	CDR32BP112A(3)W(4)
1,200	F,J,K	CDR32BP122A(3)W(4)
1,300	F,J,K	CDR32BP132A(3)W(4)
1,500	F,J,K	CDR32BP152A(3)W(4)
1,600	F,J,K	CDR32BP162A(3)W(4)
1,800	F,J,K	CDR32BP182A(3)W(4)
2,000	F,J,K	CDR32BP202A(3)W(4)
2,200	F,J,K	CDR32BP222A(3)W(4)
100 VOLT — BX — C1206 SIZE (MILITARY CDR32)		
4,700	K,M	CDR32BX472B(3)W(4)
5,600	K,M	CDR32BX562B(3)W(4)
6,800	K,M	CDR32BX682B(3)W(4)
8,200	K,M	CDR32BX822B(3)W(4)
10,000	K,M	CDR32BX103B(3)W(4)
12,000	K,M	CDR32BX123B(3)W(4)
15,000	K,M	CDR32BX153B(3)W(4)
50 VOLT — BX — C1206 SIZE (MILITARY CDR32)		
18,000	K,M	CDR32BX183A(3)W(4)
22,000	K,M	CDR32BX223A(3)W(4)
27,000	K,M	CDR32BX273A(3)W(4)
33,000	K,M	CDR32BX333A(3)W(4)
39,000	K,M	CDR32BX393A(3)W(4)

(1) To complete Part Number for Dielectric, insert P or X symbol – as defined by Military specification.
(2) To complete Part Number for Dielectric, insert G or X symbol. ("G" for Military "BP", or "X" for Military "BX".)
(3) To complete Part Number, insert Capacitance Tolerance Symbol (when applicable) as available in MIL-C-55681: B-±0.1 pF, C-±0.25 pF, D-±0.5 pF, F-±1%, J-±5%, K-±10%, M-±20%. NOTE: Available tolerances are listed in columns above.
(4) To complete Part Number, insert Failure Rate Symbol: M—1.0%; P—0.1%; R—0.01%; S—.001%.

Dimensions in inches (mm)

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"We Offer Quick Solutions to Noise Pollution"

Ceramic Chip/MIL-C-55681 Established Reliability

Ratings & Part Number Reference

Cap pF	Avail. Tol.	MIL-C-55681 Part Number
100 VOLT — BP — C1210 SIZE (MILITARY CDR33)		
1,000	F, J, K	CDR33BP102B(3)W(4)
1,100	F, J, K	CDR33BP112A(3)W(4)
1,200	F, J, K	CDR33BP122A(3)W(4)
1,300	F, J, K	CDR33BP132A(3)W(4)
1,500	F, J, K	CDR33BP152A(3)W(4)
1,600	F, J, K	CDR33BP162A(3)W(4)
1,800	F, J, K	CDR33BP182A(3)W(4)
2,000	F, J, K	CDR33BP202A(3)W(4)
2,200	F, J, K	CDR33BP222A(3)W(4)
50 VOLT — BP — C1210 SIZE (MILITARY CDR33)		
2,400	F, J, K	CDR33BP242B(3)W(4)
2,700	F, J, K	CDR33BP272B(3)W(4)
3,000	F, J, K	CDR33BP302B(3)W(4)
3,300	F, J, K	CDR33BP332B(3)W(4)
100 VOLT — BX — C1210 SIZE (MILITARY CDR33)		
1,500	K,M	CDR33BX153B(3)W(4)
18,000	K,M	CDR33BX183B(3)W(4)
22,000	K,M	CDR33BX223B(3)W(4)
27,000	K,M	CDR33BX273B(3)W(4)
50 VOLT — BX — C1210 SIZE (MILITARY CDR33)		
39,000	K,M	CDR33BX393A(3)W(4)
47,000	K,M	CDR33BX473A(3)W(4)
56,000	K,M	CDR33BX563A(3)W(4)
68,000	K,M	CDR33BX683A(3)W(4)
82,000	K,M	CDR33BX823A(3)W(4)
100,000	K,M	CDR33BX104A(3)W(4)
100 VOLT — BP — C1812 SIZE (MILITARY CDR34)		
2,200	F, J, K	CDR34BP222B(3)W(4)
2,400	F, J, K	CDR34BP242B(3)W(4)
2,700	F, J, K	CDR34BP272B(3)W(4)
3,000	F, J, K	CDR34BP302B(3)W(4)
3,300	F, J, K	CDR34BP332B(3)W(4)
3,600	F, J, K	CDR34BP362B(3)W(4)
3,900	F, J, K	CDR34BP392B(3)W(4)
4,300	F, J, K	CDR34BP432B(3)W(4)
4,700	F, J, K	CDR34BP472B(3)W(4)
50 VOLT — BP — C1812 SIZE (MILITARY CDR34)		
5,100	F, J, K	CDR34BP512B(3)W(4)
5,600	F, J, K	CDR34BP562B(3)W(4)
6,200	F, J, K	CDR34BP622B(3)W(4)
6,800	F, J, K	CDR34BP682B(3)W(4)
7,500	F, J, K	CDR34BP752B(3)W(4)
8,200	F, J, K	CDR34BP822B(3)W(4)
9,100	F, J, K	CDR34BP912B(3)W(4)
10,000	F, J, K	CDR34BP103B(3)W(4)

Cap pF	Avail. Tol.	MIL-C-55681 Part Number
100 VOLT — BX — C1812 SIZE (MILITARY CDR34)		
27,000	K,M	CDR34BX273B(3)W(4)
33,000	K,M	CDR34BX333B(3)W(4)
39,000	K,M	CDR34BX393B(3)W(4)
47,000	K,M	CDR34BX473B(3)W(4)
56,000	K,M	CDR34BX563B(3)W(4)
50 VOLT — BX — C1812 SIZE (MILITARY CDR34)		
100,000	K,M	CDR34BX104A(3)W(4)
120,000	K,M	CDR34BX124A(3)W(4)
150,000	K,M	CDR34BX154A(3)W(4)
180,000	K,M	CDR34BX184A(3)W(4)
100 VOLT — BP — C1825 SIZE (MILITARY CDR35)		
4,700	F, J, K	CDR35BP472B(3)W(4)
5,100	F, J, K	CDR35BP512B(3)W(4)
5,600	F, J, K	CDR35BP562B(3)W(4)
6,200	F, J, K	CDR35BP622B(3)W(4)
6,800	F, J, K	CDR35BP682B(3)W(4)
7,500	F, J, K	CDR35BP752B(3)W(4)
8,200	F, J, K	CDR35BP822B(3)W(4)
9,100	F, J, K	CDR35BP912B(3)W(4)
10,000	F, J, K	CDR35BP103B(3)W(4)
50 VOLT — BP — C1825 SIZE (MILITARY CDR35)		
11,000	F, J, K	CDR35BP113A(3)W(4)
12,000	F, J, K	CDR35BP123A(3)W(4)
13,000	F, J, K	CDR35BP133A(3)W(4)
15,000	F, J, K	CDR35BP153A(3)W(4)
16,000	F, J, K	CDR35BP163A(3)W(4)
18,000	F, J, K	CDR35BP183A(3)W(4)
20,000	F, J, K	CDR35BP203A(3)W(4)
22,000	F, J, K	CDR35BP223A(3)W(4)
100 VOLT — BX — C1825 SIZE (MILITARY CDR35)		
56,000	K,M	CDR35BX563B(3)W(4)
68,000	K,M	CDR35BX683B(3)W(4)
82,000	K,M	CDR35BX823B(3)W(4)
100,000	K,M	CDR35BX104B(3)W(4)
120,000	K,M	CDR35BX124B(3)W(4)
150,000	K,M	CDR35BX154B(3)W(4)
50 VOLT — BX — C1825 SIZE (MILITARY CDR35)		
180,000	K,M	CDR35BX184A(3)W(4)
220,000	K,M	CDR35BX224A(3)W(4)
270,000	K,M	CDR35BX274A(3)W(4)
330,000	K,M	CDR35BX334A(3)W(4)
390,000	K,M	CDR35BX394A(3)W(4)
470,000	K,M	CDR35BX474A(3)W(4)

(1) To complete Part Number for Dielectric, insert P or X symbol – as defined by Military specification.
(2) To complete Part Number for Dielectric, insert G or X symbol. ("G" for Military "BP", or "X" for Military "BX".)
(3) To complete Part Number, insert Capacitance Tolerance Symbol (when applicable) as available in MIL-C-55681: B-±0.1 pF, C-±0.25 pF, D-±0.5 pF, F-±1%, J-±5%, K-±10%, M-±20%. NOTE: Available tolerances are listed in columns above.
(4) To complete Part Number, insert Failure Rate Symbol: M—1.0%; P—0.1%; R—0.01%; S—.001%.

Dimensions in inches (mm)

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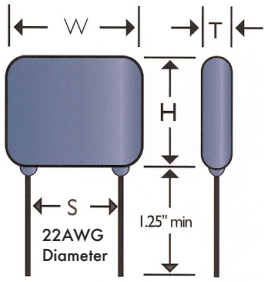
200°C Resin Coated Radial Leaded Capacitors

Now in C0G & Class II Dielectrics & Voltages up to 4KVDC!

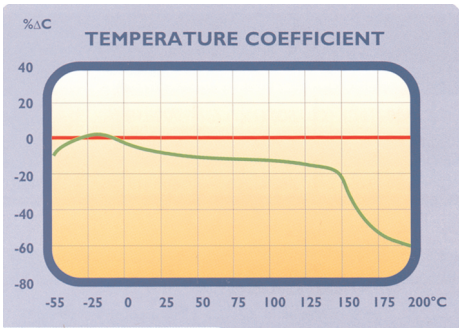
Dimensions and Characteristics

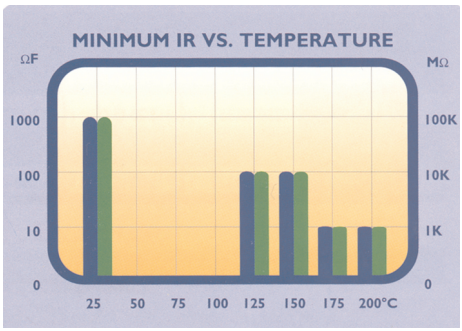
Size	2525	3020	3730	4740	5750	7772	8777
W Max	.250 (6.35)	.300 (7.62)	.370 (9.40)	.470 (11.9)	.570 (14.5)	.770 (19.6)	.870 (22.1)
H Max	.250 (6.35)	.200 (5.08)	.300 (7.62)	.400 (10.2)	.500 (12.7)	.720 (18.3)	.770 (19.6)
T Max	.190 (4.83)	.160 (4.06)	.240 (6.10)	.310 (7.87)	.360 (9.14)	.360 (9.14)	.360 (9.14)
S ±0.03	.170 (4.32)	.200 (5.08)	.280 (7.11)	.380 (9.65)	.480 (12.2)	.680 (17.3)	.780 (19.8)
D +004 -.001	.025 (0.64)	.025 (0.64)	.025 (0.64)	.025 (0.64)	.025 (0.64)	.025 (0.64)	.025 (0.64)



MCI manufactures chip capacitors designed and tested to operate from -55°C up to 200°C. Product is available in COG(NP0) a Class I dielectric and in a Class II dielectric operating up to 200°C. Product applications include harsh environments such as oil exploration and Automotive/Avionics engine compartment circuitry. Product is available as epoxy coated devices for environmental protection with 22 AWG tinned copper leads, in sizes 2525 to 8777. Consult MCI if your specific requirements exceed our catalog maximums (size, cap. value, and voltage).

MAX Capacitance vs. Dielectric & Voltage														
Size	2525		3020		3730		4740		5750		7772		8777	
Dielectric	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II
Min Cap	3R0	221	390	102	390	102	390	102	390	102	560	202	101	202
25V	822	154	393	684	683	105	124	185	184	225	274	335	334	475
50V	682	124	223	394	393	684	823	155	154	225	224	275	274	395
100V	682	823	183	274	333	394	683	824	124	155	184	225	224	275
250V	562	563	123	184	273	334	563	684	104	105	154	155	184	225
500V	272	822	562	273	153	683	333	184	473	274	683	394	104	474
1000V	122	332	272	123	103	273	223	683	333	124	473	184	683	224
2000V	681	122	152	472	562	153	123	333	183	473	273	823	393	104
5000V			102	272	332	103	822	183	123	333	183	473	223	563
3000V					182	562	392	123	562	223	103	333	123	393
4000V					122	472	272	822	472	153	682	223	822	273





200°C Dielectric Characteristics		
Characteristics	"D" C0G Dielectric	"E" Class II Dielectric
Operating Temperature Range:	-55°C to 200°C	-55°C to 200°C
Temperature Coefficient up to 200°C:	0 +/- 30 ppm/°C	+15 65% ΔC Max
Dissipation Factor @ 25°C:	.001 (0.1%) Max	.025 (2.5%) Max
Insulation Resistance, 25°C 200°C	>100 Gohms or >1000 ohms F > 1 Gohms or > 10 ohms F	>100 Gohms or >1000 ohms F > 1 Gohms or > 10 ohms F
Dielectric Withstanding Voltage: ** Whichever is greater	<200V, 250% 201-500V, 150% or 500V** >500V, 120%, or 750V**	<200V, 250% 201-500V, 150% or 500V** >500V, 120%, or 750V**
Aging Rate:	0% per decade	2% per decade
Test Parameters:	1KHz, 1.0 +/- 0.2 VRMS, 25°C 1MHz for Capacitance <100pF	1KHz, 1.0 +/- 0.2 VRMS, 25°C

How To Order

250 HT 2525 D 562 J

Voltage
(Third digit is number of zeros)

Metuchen Designator

Size

Tolerance
*F = ±1% J = ±5% M = ±20%
*G = ±2% K = ±10%
*=C0G only

Capacitance in Picofarads
(Third digit is number of zeros)

Dielectric
D= C0G E = +15/-65%

Dimensions in inches (mm)

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ISO 9001

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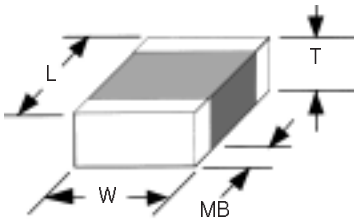
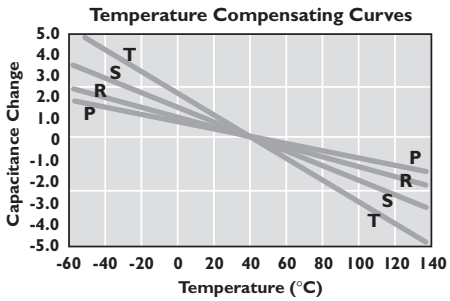
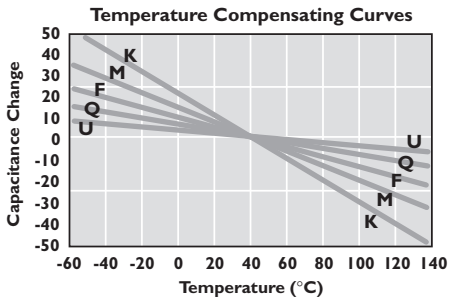






Size	0504	0805	1206	1210
Length L	.05 ± .01	.08 ± .01	.12 ± .01	.12 ± .01
Width W	.04 ± .01	.05 ± .01	.06 ± .01	.10 ± .01
T Max.	.06	.06	.06	.06
MB Min.	.005	.010	.010	.010
MB Max.	.015	.030	.030	.030

Capacitance ranges from .5pf to 2200pf.
Check with Metuchen for availability and Mins on all T.C. chips.

Ordering Information

MC 0805 P 100 J 500 N T

Size Code

Dielectric TC, ppm/°C
A=P090±30
P=N150±60
R=N220±60
S=N330±90
T=N470±90
U=N750±120
Q=N1500±250
F=N2200±450
Z=N3300±650
K=N4700±1000
Y=N5600±1400

Capacitance
Value in Picofarads two significant figures followed by number of zeros, i.e 102= 1000 pF.

Tolerance
Less than 10pF only
B=±.10pF C=±.25pF D=±.50pF
10pF and greater
F=±1.0% G=±2.0% J=±5.0% K=±10%

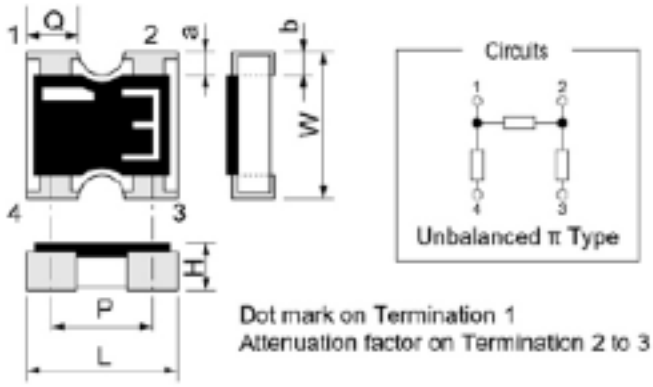
Voltage
500= 50V
101= 100V

Termination
N = Nickel Barrier
P = Pd Ag

Packaging
B= Bulk
T= Tape and Reel

Chip Attenuators

Dimensions and Circuits



Unit: mm

Style	L	W	H	Q ※	a	d	P※
RAC10 1A	1.0 ± 0.1	1.0 ± 0.1	0.35 ± 0.05	0.33	0.15 ± 0.10	0.25 $^{+0.05}_{-0.10}$	0.65

※ Value for reference

Ratings

Style	RAC10 1A				
Characteristics Impedance [Ohms]	50				
Rated Input Power	100mW / Package				
Frequency Range	DC t 3GHz				
Attenuation Factor [dB]	0.5	1 to 5	6 to 10	11 to 16	20
Attenuation Factor Tolerance[dB]	±0.1	±0.3	±0.4	±0.8	±2.5
Voltage Standing Wave Ratio	1.1 MAX	DC ≦ f ≦ 1.5GHz		1.2 MAX	1.3 MAX
		1.5GHz < f ≦ 3.0GHz		1.3 MAX	
Operating Temperature Range [°C]	-40 to +125				

Part Number System

EXAMPLE **RAC 10 1 A 1 030 C TH**

Product Type — RAC

Size (Width)
10 — 1.0 mm

Characteristic Impedance
1 — 50 Ohms Ω

Circuit
A — Unbalanced π type

Attenuation Factor

X 0.5dB	1 1dB	2 2dB	3 3dB	4 4dB	5 5dB	6 6dB	7 7dB	8 8dB	9 9dB	A 10dB
B 11dB	C 12dB	D 13dB	E 14dB	F 15dB	G 16dB	L 20dB				

Attenuation Factor Tolerance
010 — ±0.1dB
030 — ±0.3dB
040 — ±0.4dB
080 — ±0.8dB
250 — ±2.5dB

Termination Style
A — Convex without corner
C — Convex with corner
B — Concave type

Packaging
B — Bulk (Loose Package)
TH — Paper Tape

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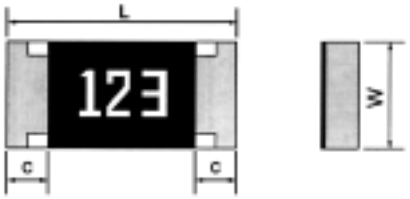
Fixed Thick Film Chip Resistors RMC 1/20, 1/16S, 1/10, 1/8, 1/4, 1/2, 1

Dimensions and Structure



Style	Metric	Inch	L	W	H	c	d	*Unit weight/pc.
RMC1/20	0603	0201	0.6±0.03	0.3±0.03	0.23±0.03	0.1±0.05	0.15±0.05	0.16 mg
RMC1/16S	1005	0402	1.0±0.05	0.5±0.05	0.35±0.05	0.2±0.1	0.25 $^{+0.15}_{-0.05}$	0.6 mg
RMC1/16	1608	0603	1.6±0.1	0.8 $^{+0.15}_{-0.05}$	0.45±0.10	0.3±0.1	0.3±0.1	2 mg
RMC1/10	2012	0805	2.0±0.1	1.25±0.10	0.55±0.10	0.4±0.2	0.4±0.2	5 mg
RMC1/8	3216	1206	3.2±0.15	1.6±0.15	0.55±0.10	0.5±0.25	0.5±0.25	9 mg
RMC1/4	3225	1210	3.2±0.15	2.5±0.15	0.55±0.15	0.5±0.25	0.5±0.25	16 mg
RMC1/2	5025	2010	5.0±0.15	2.5±0.15	0.55±0.15	0.6±0.2	0.6±0.2	25 mg
RMC1	6332	2512	6.3±0.15	3.2±0.15	0.55±0.15	0.6±0.2	0.6±0.2	40 mg

Resistance is marked with 3-digits on the over coating except RMC1/16S & RMC1/20 type. 4-digit marking is available for F&G tolerance except RMC 1/16. RMC 1/16S & RMC 1/20 type.

*Values for reference.

Product Classification

RMC 1/10 K 103 F TP

Product Type

Rated Dissipation & Size				
Code	Rated Dissipation (Jumper's Rated Current)		Size Metric	Size Inch
1/20	0.05W	(1A)	0603	0201
1/16S	0.063W	(1A)	1005	0402
1/16	0.1W	(1A)	1608	0603
1/10	0.125W	(2A)	2016	0805
1/8	0.25W	(2A)	3216	1206
1/4	0.25W	(2A)	3225	1210
1/2	0.5W	(2A)	5025	2010
1	1.0W	(2A)	6332	2512

Temperature Coefficient of Resistance		
Code	Temperature Coefficient of Resistance	Application
—	Standard	Resistor
K	±100 x 10^{-6}/°C	
None	———	Jumper

Rated Resistance		
Rated Resistance		Application
E24 Series e.g.: 2R2=2.2 ohm 103=10k ohm	3Digit	Resistor
E96 Series e.g.: 10R2=10.2 ohm 1002=10k ohm	4Digit	
JP		Jumper

Tolerance on Rated Resistance		
Code	Temperature on Rated Resistance	Application
F	± 1%	Resistor
G	± 2 %	
J	± 5%	
K	± 10%	
None	———	Jumper

Packaging		
Code	Packaging	Application
B	Bulk (Loose Package)	All Styles
TP	Paper Tape	RMC1/16 RMC1/10 RMC1/8
TE	Embossed Tape	RMC1/4 RMC1/2 RMC1
TH	Paper Tape (2mm pitch)	RMC1/20 RMC1/16S RMC1/16
PA	Press-Poket Paper-Taping	RMC1/20
BA	Bulk Case	RMC1/16 RMC1/10 RMC1/8

Ratings

Style	Rated Dissipation at 70° W	Rated Current of Jumper A	Limiting Element Voltage V	Temperature Coefficient of Resistance 10^{-6}/°C	Combinations of Resistance Range and Tolerance F(±1%) E96 Series E24 Series	G(±2%) E24 Series	J(±5%) E24 Series	K(±10%) E12 Series	Isolation Voltage V	Category Temperature Range °C
RMC1/20	0.05	1.0	25	±200	100ohm-1Mohm	100ohm-1Mohm	100ohm-1Mohm	–	50	-55-+125
				±300	10ohm-97.6ohm	10ohm-91ohm	10ohm-91ohm			
RMC1/16S	0.1		50	±100	100ohm-1Mohm	–	–		100	
				±200	10ohm-5.6Mohm	10ohm-2.2Mohm	10ohm-10Mohm			
				±500	1ohm-9.76ohm	–	1ohm-9.1ohm			
RMC1/16				±100	100ohm-1Mohm		–			
				±200	10ohm-4.7Mohm	10ohm-2.2Mohm	10ohm-2.2Mohm			
				+500—200	1ohm-9.76ohm	1ohm-9.1ohm	1ohm-9.1ohm			
				+1000-+300	–	–	–	0.47ohm-0.91ohm		
RMC1/10	0.125	2.0	150	±100	10ohm-2.2Mohm			–	500	
				±200	10ohm-10Mohm	10ohm-10Mohm	10ohm-22Mohm			
				+500—200	1ohm-9.76ohm	1ohm-9.1ohm	1ohm-9.1ohm			
				+1000-+300	–	–	–	0.27ohm-0.91ohm		
RMC1/8	0.25		200	±100	100ohm-1Mohm			–		
				±200	10ohm-10Mohm	10ohm-2.2Mohm	10ohm-2.2Mohm			
				+500—200	1ohm-9.76ohm	1ohm-9.1ohm	1ohm-9.1ohm			
				+1000-+300	–	–	–	0.22ohm-0.91ohm		
RMC1/4				±100	100ohm-1Mohm			–		
				±200	10ohm-10Mohm	10ohm-10Mohm	10ohm-22Mohm			
				+500—200	1ohm-9.76ohm	–	1ohm-9.1ohm			
				+1000-+300	–		–	0.2ohm-0.91ohm		
RMC1/2	0.5			±100	10ohm-1Mohm			–		
				±200	10ohm-1Mohm	10ohm-1Mohm	10ohm-22Mohm			
				+500—200	1ohm-9.76ohm	–	1ohm-9.1ohm			
				+1000-+300	–		–	0.33ohm-0.91ohm		
RMC1	1.0			±100	100ohm-1Mohm			–		
				±200	10ohm-1Mohm	10ohm-1Mohm	10ohm-22Mohm			
				+500—200	1ohm-9.76ohm	–	1ohm-9.1ohm			
				+1000-+300	–		–	0.33ohm-0.91ohm		

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Barrier Strip Filtered Terminal Blocks

The barrier strip filtered terminal block is designed to provide excellent EMI/RFI filtering of AC and DC power lines and control lines. This terminal block is available in various sizes, with terminals for soldering, spade lugs or wire pigtails. Application examples include filtering power supplies in telecommunications equipment, metering, industrial controls, instrumentation and EDP equipment.

Specifications *(Pi Schematic)*

ELECTRICAL

Operating Temperature:	-55°C to 105°C
Working Voltage:	100VDC
Capacitance:	2,500 pF + 100% -0%
Dielectric withstanding voltage:	1700VDC
Current rating:	20A
D.C. resistance:	.01 ohms max.

MECHANICAL *(Pi Schematic)*

Center Spacing:	.438" (11.1 mm)
Wire size:	AWG #12 max for 20A
Screw size:	20A - #6-32, zinc-plated philslot screws
Molded material:	Black, UL rated 94VO thermoplastic
Tightening torque:	9 in.- lbs. max.
Terminal:	Brass, tin-plated

Features

- UL recognized and CSA approved for DC voltages.
- E133076, UL 1059
- LR92537, CSA STD 22.2 N°158-1987 and ECN584B
- Filter element provides high insertion loss for EMI/RFI filtering of AC and DC power and control lines.
- Rugged construction provides protection to filtering element; especially useful for repeated changes in wiring or field connections.
- 2 to 6 terminals available (combine if larger number of terminals needed.)
- Cost-effective solution for industrial interconnection EMI filtering problems.
- Termination options available: straight lead, male or female disconnects, pigtail (12 AWG-22 AWG).

Typical Insertion Loss — dB: In 50 Ohm Circuit

30 MHz.....22	300 MHz.....70
50 MHz.....32	500 MHz.....75
100 MHz.....48	1000 MHz.....75

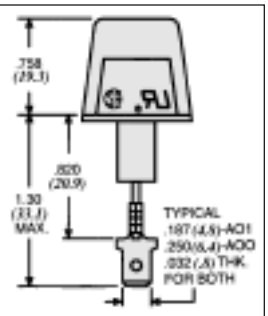
How To Order

52 160 006 A A00

Barrier Strip Terminal Block
160 - Front panel mount
188 - Rear panel mount

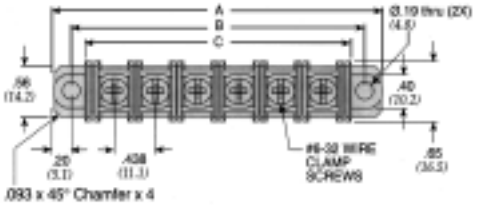
Number of Terminals
002 - 2 terminals through
006 - 6 terminals

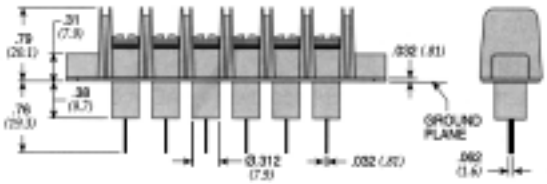
Current Rating
A - 20 Amps



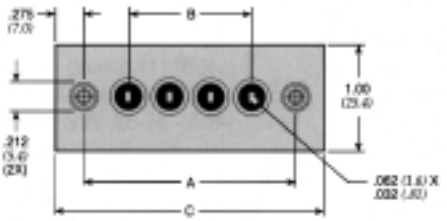
Special Terminations Code
Note: Leave blank if ordering standard product
Male quick disconnects directly on terminal block
A01 . . . . . .187 (4.8)
A00 . . . . .250 (6.4)

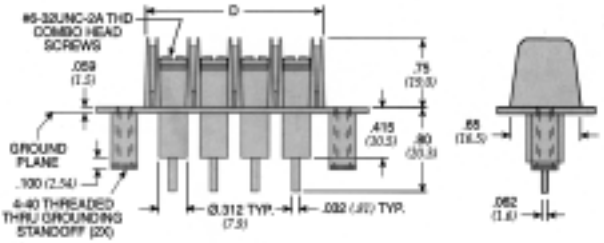
Front Panel Mount





Rear Panel Mount





20 Amps Front Panel Mount

MCI Part No.	Number of Circuits	A in.	A (mm)	B in.	B (mm)	C in.	C (mm)
52-160-002-A	2	1.71	(43.4)	1.31	(33.3)	1.02	(25.9)
52-160-003-A	3	2.15	(54.6)	1.75	(44.5)	1.46	(37.1)
52-160-004-A	4	2.59	(65.8)	2.19	(55.6)	1.90	(48.3)
52-160-005-A	5	3.02	(76.7)	2.62	(66.5)	2.32	(58.9)
52-160-006-A	6	3.46	(87.9)	3.06	(77.7)	2.77	(70.4)

20 Amps Rear Panel Mount

MCI Part No.	Number of Circuits	A in.	A (mm)	B in.	B (mm)	C in.	C (mm)	D in.	D (mm)
52-188-002-A	2	1.31	(33.3)	.438	(11.1)	1.86	(47.3)	1.02	(25.9)
52-188-003-A	3	1.75	(44.4)	.875	(22.2)	2.30	(58.4)	1.46	(37.1)
52-188-004-A	4	2.19	(55.6)	1.313	(33.3)	2.74	(69.5)	1.90	(48.3)
52-188-005-A	5	2.62	(66.6)	1.750	(44.4)	3.17	(80.6)	2.32	(58.9)
52-188-006-A	6	3.06	(77.7)	2.188	(55.6)	3.61	(91.7)	2.77	(70.4)

Dimensions in inches (mm)

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AS 9100
ISO 9001

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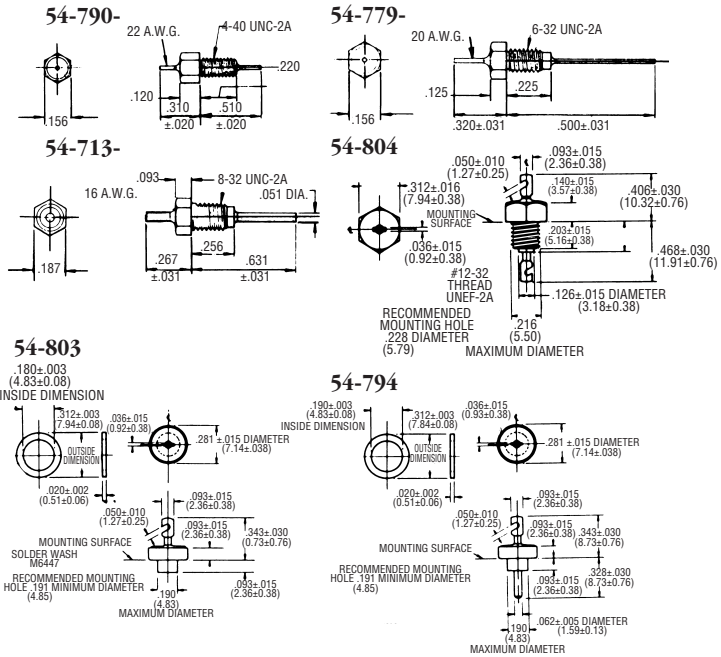
Feed-Thru Ceramic Capacitors

Working Voltage +85°C	Working Voltage +125°C	Cap. pF	Ordering Number
200 WVDC	100 WVDC	10	54-713-001-100M
200 WVDC	100 WVDC	100	54-713-001-101M
200 WVDC	100 WVDC	1000	54-713-001-102Z
200 WVDC	100 WVDC	5000	54-713-001-502P
200 WVDC	100 WVDC	10	54-779-001-100M
200 WVDC	100 WVDC	100	54-779-001-101M
200 WVDC	100 WVDC	500	54-779-001-501P
200 WVDC	100 WVDC	1000	54-779-001-102P
200 WVDC	100 WVDC	22,000	54-779-001-223Z
200 WVDC	100 WVDC	10	54-790-001-100M
200 WVDC	100 WVDC	100	54-790-001-101M
200 WVDC	100 WVDC	500	54-790-001-501Z
200 WVDC	100 WVDC	1000	54-790-001-102P
200 WVDC	100 WVDC	22,000	54-790-001-223Z

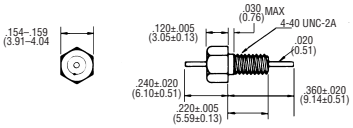


Ordering Number	Type	Tolerance %	Capacitance pF
54-794-002-101M	54-794	20	100
54-794-002-471M		20	470
54-794-002-102P		GMV	1000
54-803-004-101M	54-803	20	100
54-803-004-471M		20	470
54-803-004-102P		GMV	1000
54-804-002-101M	54-804	20	100
54-804-002-471M		20	470
54-804-002-102P		GMV	1000

Series	SCI 910X	DC 911X	SCI 912X
Voltage	50 WVDC	100 WVDC	200 WVDC 115 VAC 60 Hz
DC Amps Max	10	10	10
Capacitance (GMV)	100 pF 1000 5000	100 pF 1000 5000	100 pF 1000 5000
	.01 µF .027 .05	.01 µF .027 .05	.01 µF

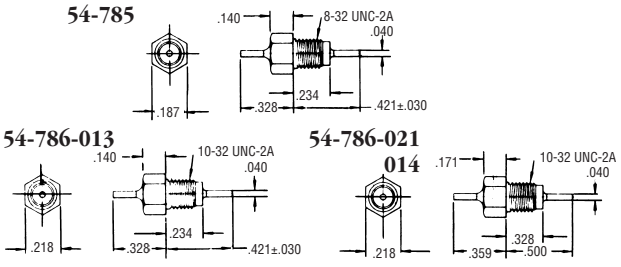
SCI 910X/911X/912X

* For 24 gauge tinned copper leads, replace "X" with "0"; for 26 gauge tinned steel leads (.016 Dia.) replace "X" with "2". When steel lead is used, maximum DC current is 5 amps.



High Capacity Multi-layer Feed Thru Capacitors

Working Voltage @ 125°C	Cap. µF	Ordering Number
100 WVDC	.05	54-785-005-503P
100 WVDC	.3	54-786-013-304Z
50 WVDC	.5	54-786-021-504Z
50 WVDC	1.0	54-786-014-105Z



Dimensions in inches (mm)

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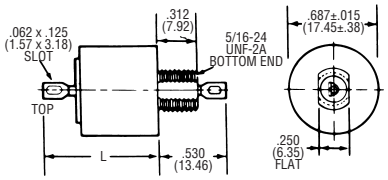
EMI/RFI Suppression Filters

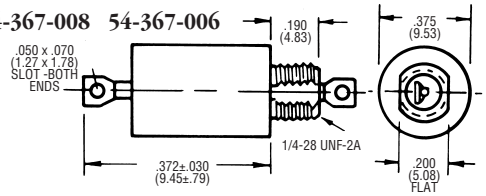
Part Number	Rated DC Current	Working Voltage 85°C	Working Voltage 125°C	Elec. CKT.	Length "L" ±.030 (.76)	Minimum Insertion Loss (dB) Per MIL-STD-220 75 KHz	150 KHz	300 KHz	1 MHz	10 MHz	1 GHz
51-320-028	5 amp	450VDC	240VAC* 400VDC	L Top	.875 (22.23)	6	19	24	37	70	70
51-321-318	3 amp	450VDC	240VAC* 400VDC	Pi	1.170 (29.72)	6	31	55	70	70	70
51-321-610	1 amp	450VDC	240VAC* 400VDC	T	1.170 (29.72)	25	49	60	70	70	70



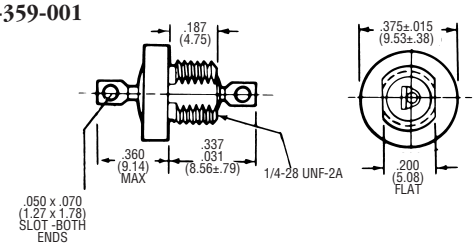
Hermetic Seal— Feed Through Capacitors

Part Number	Rated DC Current	Working Voltage 85°C	Working Voltage 125°C	Capacitance And/Or Tolerance	Minimum Insertion Loss (dB) Per MIL-STD-220 75 KHz	150 KHz	300 KHz	1 MHz	10 MHz	1 GHz
54-367-008	15 amp	100VDC	50VDC	1.4µF	20	28	33	44	60	70
54-367-006	15 amp	125VAC*	125VAC*	.25µF	9	14	19	30	50	70
51-359-001	15 amp	80VDC	50VDC	1.4µREF	18	28	33	44	60	70

54-367-008 54-367-006

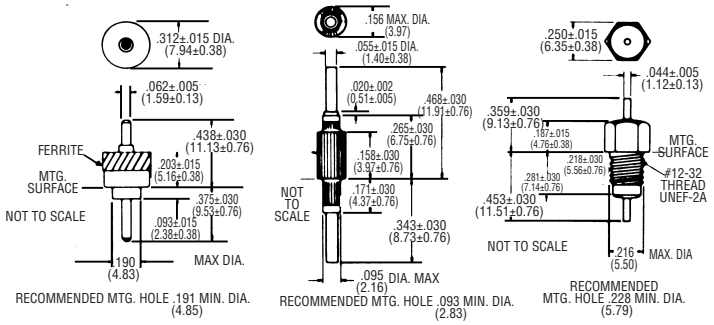


51-359-001



Economical Resin Seal Thread Bushing

Ordering Number	Rated DC Current	Working Voltage (VDC) 85°C	Working Voltage (VDC) 125°C	Capacitance And/Or Tolerance	Elec. Ckt.	Minimum Insertion Loss (dB) Per MIL-STD-200 10 MHz	30 KMHz	100 MHz	300 MHz	1 GHz
51-719-011	10 amp	500	500	3000pF	Pi	12	20	45	60	60
51-719-021	10 amp	200	200	5500pF	Pi	14	30	50	65	65
51-722-002	25A	500	250	1000pF	L	4	12	25	35	50
51-723-302	10A	200	100	5500pF	Pi	14	30	55	65	65
51-723-304	10A	300	200	1300pF	Pi	5	15	30	45	65

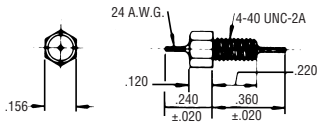


51-722-002 **51-723-302 51-723-304** **51-719-011 51-719-021**

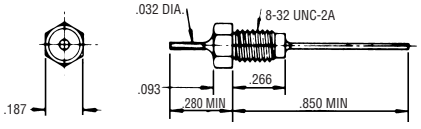
Includes Solder Mounting Washer — Includes Nuts & Lockwasher

Resin Seal EMI/RFI Suppression Filters

51-729



51-712



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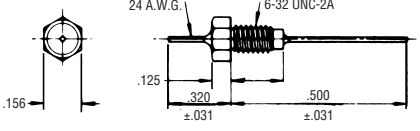
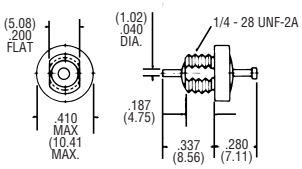


Part Number	Rated IDC in Amps	Working Volts +85°C	Working Volts +125°C	DCR Max.	Capacitance Reference Only µF	Insertion Loss (dB) 1 MHz	10 MHz	100 MHz	200 MHz	1 GHz
51-712-001	10	200	100	.01	.0015	—	5	42	50	70
51-712-003	10	200	100	.01	.022	7	27	43	50	60
51-726-001	3	200	100	.01	.0015	—	5	43	50	70

Part Number	Rated IDC in Amps	Working Volts +85°C	Working Volts +125°C	DCR Max.	Capacitance Reference Only µF	Insertion Loss (dB) 1 MHz	10 MHz	100 MHz	200 MHz	1 GHz
51-726-002	10	200	100	.01	.022	7	27	43	50	60
51-729-303	10	200	100	.01	.0015	—	5	42	60	70
51-729-304	10	200	100	.01	.022	7	27	43	50	55

51-717



100 VDC +85°C L Sections 125VAC +125°C

Part Number	Rated IDC	Working Volts +85°C	Working Volts +125°C	DCR Max.	Capacitance Reference Only	Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	1 GHz
51-717-001	15 amps	100VDC	50VDC	.01	1.4MFD	15	28	33	44	60	70
51-717-007	15 amps	125VAC*	125VAC*	.01	0.015MFD	—	—	—	6	25	50

*0-400 Hz

Dimensions in inches (mm)

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Miniature Solder-in Filters

These barriers are ideal for microwave applications such attenuators and oscillators, and perform well in high impedance circuits where large capacitance values are not practical.

Features

- Miniature size to allow effective use of space
- Standard capacitance values from 5pF to .030µF
- Voltage ratings to 200 VDC/115 VAC 0-400 Hz
- Hermetically sealed on one end allows for thru-hole sealing between compartments
- High temperature construction meets MIL-F-28861 solderability and resistance to soldering heat requirements
- Gold plating compatible with gold bonding techniques

Marking

Color dot standard as follows:

- 101 Green – 100pF
- 272 Red – 2700pF
- 501 Brown – 500pF
- 502 Blue – 5000pF
- 102 Purple – 1000pF
- 153 Pink – 15000pF
- 122 White – 1200pF
- 000 None – 10pF max

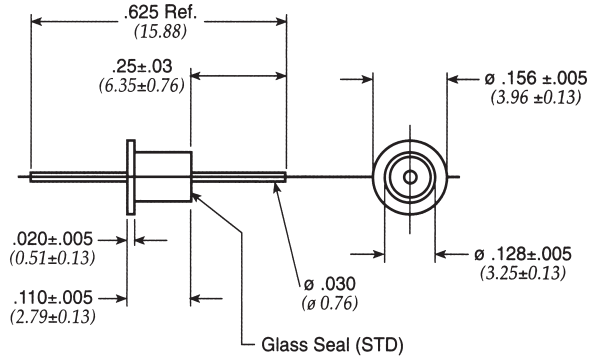

Figure 1

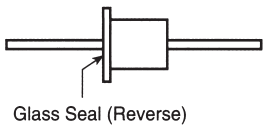

Figure 1 (Reverse)

Miniature Solder-in C Circuit

MCI Part No.	Figure	Rated Voltage 125°C		1 Amp	Min Cap.	Minimum Insertion Loss (dB)						
		DC	AC			1 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
SCI-9900-153	1	50		5	0.015µF	7	25	30	40	40	60	60
SCI-9900-303	1	50		5	0.030µF	10	30	35	45	50	55	55
SCI-9910-272	1	100		5	2700pF	–	10	18	25	33	40	50
SCI-9910-502	1	100		5	5000pF	–	15	20	30	35	45	55
SCI-9900-000	1	200		5	10pF max.	–	–	–	–	–	10	10
SCI-9920-101	1	200	115	5	100pF	–	–	–	3	10	20	28
SCI-9920-501	1	200	115	5	500pF	–	–	–	15	22	35	40
SCI-9920-122	1	200	115	5	1200pF	–	5	10	20	28	35	45

* For reverse glass seal add an "R" at end (SCI-9900-153R).

Dimensions in inches (mm)

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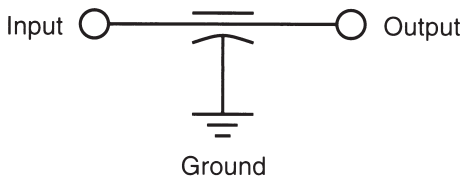
Spec-Mini Press 9900 Series

This new knurled filter is designed to be pressed into place and create a reliable mechanical bond. This feature makes it an excellent selection for applications where soldering is undesirable. Suitable plating is available that allows gold bonding to the terminals.

Circuit Schematic

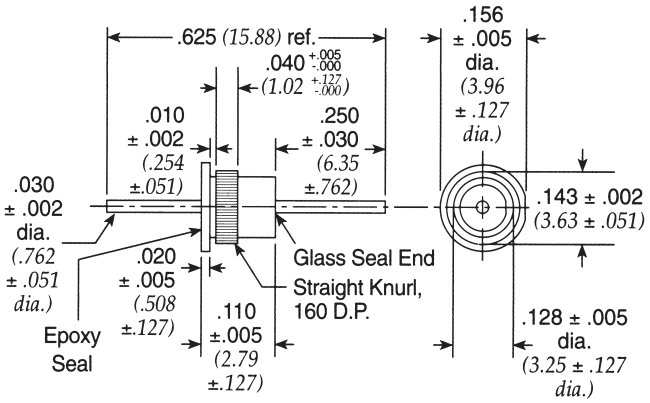


Applications

These filters are ideal for microwave and RF applications such attenuators, synthesizers, and oscillators. They perform well in high impedance circuits where large capacitance values are not practical.

Installation

- .136" to .137" diameter hole
- Hole must be free of all insulating materials.
- Installation tool must have a hole of sufficient depth and diameter to accept the terminal of the filter.
- Installation force must be applied gradually and smoothly until the flange of the filter is seated against the receiving part (request installation instructions).



Built and tested in accordance with MIL-F-15733.

Figure 1

Mechanical Specifications

Installation . . . . . .Press-in

Plating . . . . . .Gold

Seal . . . . . .Glass sealed on one end, resin sealed on the other end

Termination Options . . . . . .Plating suitable for gold bonding

Operating Temperature . . . .-55°C to +125°C

MCI Part No.	Figure	Rated Voltage 125°C DC	1 Amp	Cap.	Minimum Insertion Loss (dB)						
					1 MHz	10 MHz	30 MHz	100 MHz	300 MHz	1 GHz	10 GHz
SCI-9925-153	1	50	5	0.015µF + 100%/-0%	7	25	30	40	40	60	60
SCI-9925-303	1	50	5	0.030µF + 100%/-0%	10	30	35	45	50	55	55
SCI-9925-502	1	100	5	5000pF + 100%/-0%	–	15	20	30	35	45	55
SCI-9925-000	1	200	5	10pF max.	–	–	–	–	–	10	10
SCI-9925-101	1	200	5	100pF + 100%/-0%	–	–	–	3	10	20	28
SCI-9925-501	1	200	5	500pF + 100%/-0%	–	–	–	15	22	35	40
SCI-9925-122	1	200	5	1200pF + 100%/-0%	–	5	10	20	28	35	45

Dimensions in inches (mm)

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Features

- Popular .375", .410" and .690" case diameters
- Voltage ratings from 50 VDC to 400 VDC/240 VAC, 400 Hz
- Filter configurations available: C, L, Pi, T and double T
- MIL-F-15733 and MIL-F-28861 QPL filters available

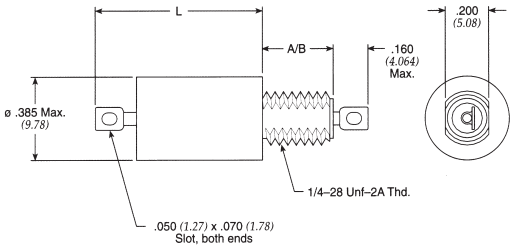

Figure 1

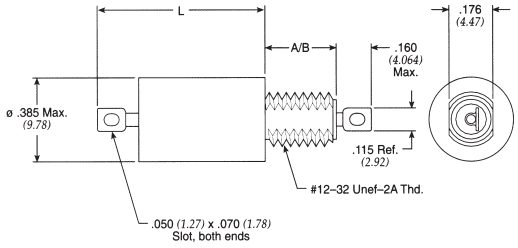

Figure 2

Thread length: A - 0.187 (4.76) B - 0.312 (7.92)

Note: ø .410 Max. for M28861 parts

.375 ø C Circuit Standard

MCI Part No.	MIL No	See Pg. 54 for Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
54-367-008	–	1	80	–	50	–	15	1.400	0.005	0.387	(9.830)	A	15	28	33	44	60	70	70
54-370-007	–	1	80	–	50	–	15	2.800	0.005	0.576	(14.630)	A	20	34	39	50	60	70	70
54-371-001	–	1	80	–	50	–	15	4.000	0.005	0.688	(17.475)	A	26	40	46	55	60	70	70
54-367-005	–	1	150	–	100	–	15	0.450	0.005	0.387	(9.830)	A	6	19	25	36	55	70	70
9920-100-6002	–	1	200	–	150	125	15	0.150	0.005	0.387	(9.830)	A	–	6	15	26	42	55	70
54-367-007	–	1	250	–	200	125	15	0.015	0.005	0.387	(9.830)	A	–	–	–	6	25	45	50
54-367-006	–	1	250	–	200	125	15	0.250	0.005	0.387	(9.830)	A	–	14	19	30	50	65	70
54-370-006	–	1	250	–	200	125	15	0.500	0.005	0.630	(16.002)	A	7	20	28	39	55	70	70
9923-100-6004	–	1	400	–	400	240	15	0.060	0.005	0.415	(10.541)	A	–	5	10	18	38	55	70

.375 ø C Circuit MIL Qualified

MCI Part No.	M15733 M28861◊ MIL No	See Pg. 54 for Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
54-367-054	1-012◊	1	–	–	50	–	15	1.200	0.008	0.410	(10.414)	B	15	28	33	40	40	70	70
54-367-049	1-002◊	1	–	–	50	–	15	1.200	0.008	0.410	(10.414)	A	15	28	33	40	40	70	70
54-370-032	49-0008	1	–	–	50	–	15	2.100	0.010	0.576	(14.630)	A	20	33	40	50	65	70	70
54-367-055	1-014◊	1	–	–	70	–	15	0.700	0.008	0.410	(10.414)	B	10	24	30	40	40	64	70
54-370-030	34-0035	2	–	–	100	–	10	0.300	0.004	0.474	(12.040)	A	7	19	25	35	55	70	70
54-367-051	1-006◊	1	–	–	100	–	15	0.450	0.008	0.410	(10.414)	A	6	19	25	36	40	60	70
54-367-056	1-016◊	1	–	–	100	–	15	0.450	0.008	0.410	(10.414)	B	6	19	25	36	40	60	70
54-367-057	1-018◊	1	–	–	150	–	15	0.250	0.008	0.410	(10.414)	B	–	14	20	31	40	56	70
54-367-053	1-010◊	1	–	–	200	125	15	0.150	0.008	0.410	(10.414)	A	–	10	16	26	40	52	70
54-367-058	1-020◊	1	–	–	200	125	15	0.150	0.008	0.410	(10.414)	B	–	10	16	26	40	52	70
54-370-034	49-0010	1	–	–	330	–	15	0.062	0.004	0.680	(17.272)	A	–	2	7	17	37	55	70

Dimensions in inches (mm)

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.375ø L Circuit

Thread length: A - 0.187 (4.76) B - 0.312 (7.92)

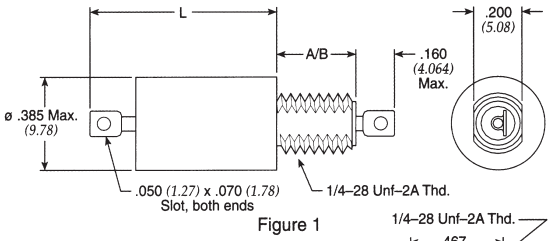


Figure 1

Note: ø .410 Max. for M28861 parts

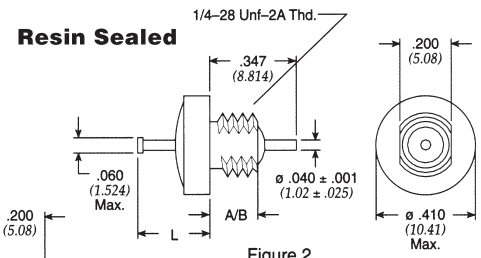


Figure 2

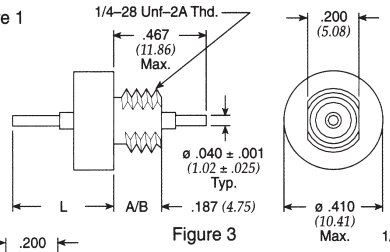


Figure 3

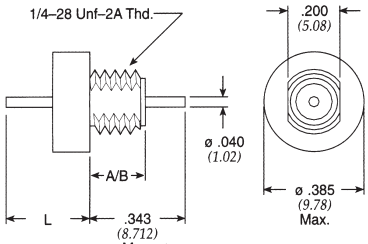


Figure 4

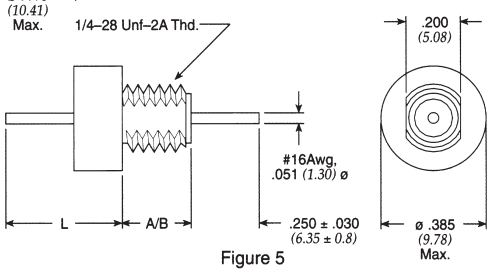
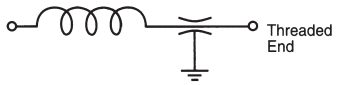
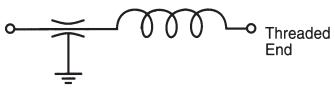


Figure 5

L-C Filter LT



L-C Filter LB



.375 ø L Standard Low Profile

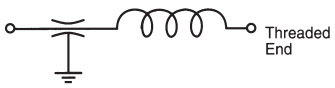
MCI Part No.	MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
9051-100-0000	–	1	80	–	50	–	15	1.200	0.005	LB	0.370	(9.398)	A	15	25	34	44	60	70	70
51-359-001	–	1	80	–	50	–	15	1.400	0.010	LB	0.370	(9.398)	A	15	28	33	44	60	70	70
SCI-1021-000	–	2	80	–	50	–	15	1.400	0.003	LB	0.280	(7.112)	A	15	28	33	44	60	70	70
9053-100-0001	–	1	80	–	50	–	15	1.400	0.005	LB	0.370	(9.398)	A	15	25	34	44	60	70	70
51-717-001	–	2	80	–	50	–	15	1.400	0.010	LB	0.325	(8.255)	A	15	28	33	44	60	70	70
51-344-006	–	4	80	–	50	–	15	1.400	0.010	LB	0.330	(8.382)	A	15	28	33	44	60	70	70
SCI-1020-000	–	1	80	–	50	–	15	1.400	0.003	LB	0.370	(9.398)	A	15	28	33	44	60	70	70
SCI-1021-020	–	2	80	–	50	–	15	1.400	0.003	LB	0.280	(7.112)	B	15	28	33	44	60	70	70
SCI-1020-020	–	1	80	–	50	–	15	1.400	0.003	LB	0.370	(9.398)	B	15	28	33	44	60	70	70
SCI-1150-000	–	1	80	–	50	–	15	2.800	0.003	LB	0.450	(11.430)	A	20	34	40	49	60	70	70
SCI-1150-001	–	1	80	–	50	–	15	2.800	0.003	LB	0.450	(11.430)	B	20	34	40	49	60	70	70
9051-101-0018	–	5	80	–	50	–	25	1.400	0.001	LB	0.450	(11.430)	A	15	25	34	44	60	70	70
9053-100-0008	–	1	100	–	70	–	15	0.700	0.005	LB	0.370	(9.398)	A	9	20	29	39	52	70	70

Dimensions in inches (mm)

Hermetically Sealed Threaded Case Filters

L-C Filter LT

L-C Filter LB



.375 ø L Standard Low Profile *continued*

MCI Part No.	MIL No	Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
9050-100-0008	–	2	100	–	70	–	15	0.750	0.005	LB	0.325	(8.255)	A	9	20	29	39	52	70	70
9053-100-0002	–	1	150	–	100	–	15	0.500	0.005	LB	0.370	(9.398)	A	4	12	21	31	48	70	70
SCI-1250-001	–	1	150	–	100	–	15	0.500	0.003	LB	0.450	(11.430)	B	8	20	25	34	50	64	70
SCI-2150-000	–	1	150	–	100	–	15	1.000	0.003	LB	0.450	(11.430)	A	10	25	30	41	56	70	70
SCI-2150-001	–	1	150	–	100	–	15	1.000	0.003	LB	0.450	(11.430)	B	10	25	30	41	56	70	70
51-717-007	–	2	250	125	200	125	15	0.015	0.010	LB	0.325	(8.255)	A	–	–	–	6	25	38	45
51-359-007	–	1	250	125	200	125	15	0.015	0.010	LB	0.370	(9.398)	A	–	–	–	6	25	38	50
9050-100-0011	–	2	250	125	200	125	15	0.150	0.008	LB	0.325	(8.255)	A	–	10	15	25	40	52	60
SCI-2350-000	–	1	300	125	300	125	15	0.250	0.003	LB	0.450	(11.430)	A	4	15	21	31	50	70	70
SCI-2350-001	–	1	300	125	300	125	15	0.250	0.003	LB	0.450	(11.430)	B	4	15	21	31	50	70	70

.375 ø L Circuit MIL Qualified Low Profile

MCI Part No.	M15733 M28861◊ MIL No	Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-359-021	38-0004	1	–	–	50	–	10	1.400	0.008	LB	0.370	(9.398)	A	15	28	33	44	60	70	70
51-359-024	38-0005	1	80	–	50	–	10	1.400	0.008	LB	0.370	(9.398)	A	15	28	33	44	60	70	70
51-359-051	58-0001	1	80	–	50	–	10	1.400	0.008	LB	0.545	(13.843)	A	15	28	33	44	60	70	70
51-359-105	58-0004	1	80	–	50	–	10	1.400	0.008	LT	0.545	(13.843)	B	15	28	33	44	60	70	70
51-359-044	49-0006	1	100	–	50	–	15	1.200	0.010	LB	0.370	(9.398)	A	15	28	33	44	60	70	70
51-359-055	49-0007	3	100	–	50	–	15	1.200	0.010	LB	0.450	(11.43)	A	15	28	33	44	60	70	70
51-359-081	1-001◊	1	–	–	50	–	15	1.400	0.008	LB	0.410	(10.414)	A	15	28	33	40	40	70	70
51-359-086	1-011◊	1	–	–	50	–	15	1.400	0.008	LB	0.410	(10.414)	B	15	28	33	40	40	70	70
51-359-053	49-0001	4	100	–	50	–	15	0.680	0.010	LB	0.319	(8.103)	A	8	20	28	38	55	70	70
51-359-082	1-003◊	1	–	–	70	–	15	0.700	0.008	LB	0.410	(10.414)	A	10	24	30	40	40	64	70
51-359-083	1-005◊	1	–	–	100	–	15	0.450	0.008	LB	0.410	(10.414)	A	6	19	25	36	40	60	70
51-359-088	1-015◊	1	–	–	100	–	15	0.450	0.008	LB	0.410	(10.414)	B	6	19	25	36	40	60	70
51-359-084	1-007◊	1	–	–	150	–	15	0.250	0.008	LB	0.410	(10.414)	A	–	14	20	31	40	56	70
51-359-050	38-0008	1	–	–	200	125	15	0.030	0.008	LB	0.370	(9.398)	A	–	–	–	6	25	42	60
51-359-085	1-009◊	1	–	–	200	125	15	0.150	0.008	LB	0.410	(10.414)	A	–	10	16	26	40	52	70
51-359-090	1-019◊	1	–	–	200	125	15	0.150	0.008	LB	0.410	(10.414)	B	–	10	16	26	40	52	70

Dimensions in inches (mm)

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.375 ø L Circuit

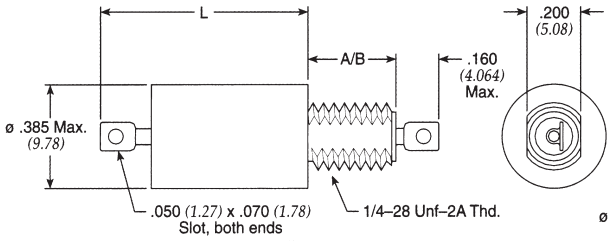


Figure 1

Thread length:
A - 0.187 (4.76)
B - 0.312 (7.92)

Note: ø .410 Max. for M28861 parts

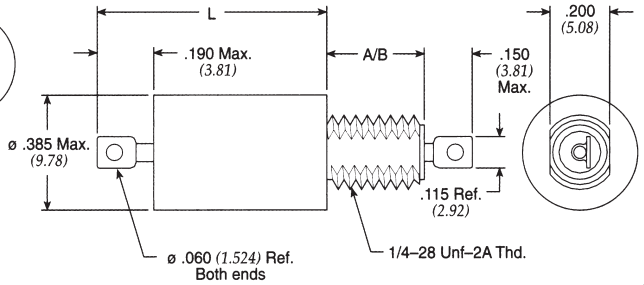
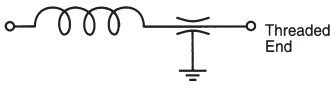
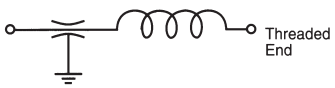


Figure 2

L-C Filter LT



L-C Filter LB



.375 ø L Circuit Standard Product

MCI Part No.	MIL No	Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-353-007	–	1	80	–	50	–	0.06	1.400	70.000	LB	0.770	(19.558)	A	44	70	70	70	70	70	70
51-353-095	–	1	80	–	50	–	0.15	1.400	12.000	LT	0.960	(24.384)	A	21	52	64	70	70	70	70
51-353-003	–	1	80	–	50	–	0.45	1.400	1.200	LB	0.770	(19.558)	A	16	31	37	55	70	70	70
51-353-099	–	1	80	–	50	–	1.00	1.400	0.250	LT	0.770	(19.558)	A	16	33	44	70	70	70	70
51-353-100	–	1	80	–	50	–	5.00	1.400	0.015	LT	0.770	(19.558)	A	15	28	33	46	70	70	70
9200-300-0025	–	1	80	–	50	–	10.00	1.200	0.010	LB	0.450	(11.430)	A	15	28	33	44	60	70	70
9200-303-0095	–	1	80	–	50	–	10.00	1.200	0.010	LB	0.450	(11.430)	B	15	28	33	44	60	70	70
51-353-101	–	1	80	–	50	–	10.00	1.400	0.010	LT	0.450	(11.430)	A	14	28	33	44	60	70	70
51-353-109	–	1	80	–	50	–	10.00	1.400	0.010	LT	0.450	(11.430)	B	15	28	33	44	60	70	70
51-353-120	–	1	150	–	100	–	1.00	0.450	0.250	LB	0.758	(19.253)	A	9	27	36	57	70	70	70
9000-103-0019	–	1	150	–	100	–	5.00	0.450	0.015	LT	0.758	(19.253)	B	6	20	26	37	68	70	70
SCI-2120-014	–	1	150	–	100	–	10.00	1.000	0.003	LB	0.450	(11.430)	B	14	28	34	44	52	70	70
51-353-110	–	1	250	–	200	125	1.00	0.250	0.250	LT	0.758	(19.253)	A	–	17	29	50	70	70	70
51-353-111	–	1	250	–	200	125	1.00	0.250	0.250	LB	0.758	(19.253)	A	–	17	29	50	70	70	70
51-353-112	–	1	250	–	200	125	3.00	0.250	0.050	LT	0.758	(19.253)	A	–	13	20	35	70	70	70
51-353-113	–	1	250	–	200	125	3.00	0.250	0.050	LB	0.758	(19.253)	A	–	13	20	35	70	70	70
51-353-114	–	1	250	–	200	125	5.00	0.250	0.015	LT	0.758	(19.253)	A	–	12	20	30	62	70	70
51-353-116	–	1	250	–	200	125	10.00	0.250	0.010	LT	0.450	(11.430)	A	–	15	20	30	50	70	70
SCI-2320-010	–	1	300	–	300	125	0.50	0.150	1.000	LB	0.758	(19.253)	B	–	23	35	56	70	70	70
SCI-2320-004	–	1	300	–	300	125	1.00	0.150	0.250	LB	0.758	(19.253)	A	–	10	21	41	70	70	70
SCI-2320-005	–	1	300	–	300	125	2.00	0.150	0.063	LB	0.758	(19.253)	A	–	8	14	30	70	70	70
SCI-2320-006	–	1	300	–	300	125	3.00	0.150	0.027	LB	0.758	(19.253)	A	–	8	14	26	64	70	70
SCI-2320-007	–	1	300	–	300	125	10.00	0.150	0.003	LB	0.450	(11.430)	A	–	8	14	25	45	52	70
SCI-2320-014	–	1	300	–	300	125	10.00	0.150	0.003	LB	0.450	(11.430)	B	–	8	14	25	45	52	70

Dimensions in inches (mm)

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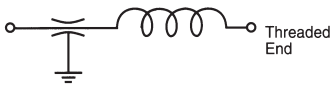
L-C Filter LT

L-C Filter LB



.375 ø L Circuit MIL Qualified Profile

MCI Part No.	M15733 MIL No	Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	CKT	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-390-018	23-0026	1	–	–	50	–	0.50	1.400	0.360	LB	0.630	*(16.002)*	A	12	36	48	69	70	70	70
51-390-026	23-0038	1	–	–	50	–	1.00	1.400	0.140	LB	0.630	*(16.002)*	A	11	26	36	55	70	70	70
51-390-034	23-0050	1	–	–	50	–	2.00	1.400	0.070	LB	0.630	*(16.002)*	A	10	24	32	48	70	70	70
51-353-067	24-0006	1	80	–	50	–	10.00	1.400	0.010	LB	0.760	*(19.304)*	B	15	28	31	42	56	70	70
51-353-207	34-0007	1	–	–	50	–	10.00	1.400	0.010	LB	0.760	*(19.304)*	A	15	28	31	42	56	70	70
51-444-072	58-0002	1	80	–	50	–	10.00	1.400	0.008	LT	0.545	*(13.843)*	A	15	28	33	44	60	70	70
51-353-066	24-0005	1	80	–	50	–	10.00	1.400	0.010	LB	0.760	*(19.304)*	A	15	28	31	42	56	70	70
51-353-287	39-0014	1	–	–	50	–	10.00	1.400	0.003	LT	0.760	*(19.304)*	B	14	28	34	44	52	70	70
51-444-060	24-0008	1	80	–	50	–	10.00	1.400	0.010	LT	0.740	*(18.796)*	B	15	28	31	42	56	70	70
51-343-028	38-0002	1	–	–	50	–	15.00	1.400	0.008	LB	0.481	*(12.217)*	A	15	28	33	44	64	70	70
51-343-034	38-0006	1	–	–	50	–	15.00	1.400	0.008	LB	0.481	*(12.217)*	B	15	28	33	44	64	70	70
51-353-053	25-0003	1	–	–	100	–	1.00	0.450	0.250	LB	0.738	*(18.745)*	A	6	23	34	55	70	70	70
51-353-054	25-0005	1	–	–	100	–	5.00	0.450	0.015	LT	0.758	*(19.253)*	A	6	17	23	35	69	70	70
51-353-055	25-0008	1	–	–	100	–	5.00	0.450	0.015	LB	0.738	*(18.745)*	A	6	17	23	35	69	70	70
51-353-155	39-0008	1	–	–	100	–	5.00	0.450	0.015	LB	0.760	*(19.304)*	A	6	20	26	35	60	60	70
51-444-039	25-0017	1	–	–	100	–	5.00	0.450	0.015	LT	0.758	*(19.253)*	B	6	17	23	35	69	70	70
51-444-040	25-0020	1	–	–	100	–	5.00	0.450	0.015	LB	0.738	*(18.745)*	B	6	17	23	35	69	70	70
51-353-156	39-0009	1	–	–	100	–	10.00	0.450	0.003	LT	0.760	*(19.304)*	A	6	20	26	35	56	60	70
51-353-157	39-0010	1	–	–	100	–	10.00	0.450	0.003	LB	0.760	*(19.304)*	A	6	20	26	35	56	60	70
51-353-076	26-0001	1	–	–	150	125	1.00	0.250	0.250	LT	0.758	*(19.253)*	A	–	13	24	45	80	70	70
51-353-077	26-0003	1	–	–	150	125	1.00	0.250	0.250	LB	0.738	*(18.745)*	A	–	13	24	45	80	70	70
51-444-043	26-0013	1	–	–	150	125	1.00	0.250	0.250	LT	0.758	*(19.253)*	B	–	13	24	45	80	70	70
51-444-044	26-0015	1	–	–	150	125	1.00	0.250	0.250	LB	0.738	*(18.745)*	B	–	13	24	45	80	70	70
51-390-040	23-0058	1	–	–	150	–	2.00	0.250	0.070	LT	0.630	*(16.002)*	A	3	15	23	38	60	70	60
51-390-039	23-0057	1	–	–	150	–	2.00	0.250	0.070	LT	0.630	*(16.002)*	B	3	15	23	38	60	70	60
51-444-005	34-0015	1	–	–	150	125	3.00	0.150	0.050	LT	0.758	*(19.253)*	B	–	8	15	30	68	70	70
51-353-078	26-0004	1	–	–	150	125	3.00	0.250	0.050	LT	0.758	*(19.253)*	A	–	8	15	30	68	70	70
51-353-079	26-0006	1	–	–	150	125	3.00	0.250	0.050	LB	0.738	*(18.745)*	A	–	8	15	30	68	70	70
51-444-046	26-0018	1	–	–	150	125	3.00	0.250	0.050	LB	0.738	*(18.745)*	B	–	8	15	30	68	70	70
51-444-047	26-0019	1	–	–	150	125	5.00	0.250	0.015	LT	0.758	*(19.253)*	B	–	8	14	25	58	70	70
51-353-080	26-0007	1	–	–	150	125	5.00	0.250	0.015	LT	0.758	*(19.253)*	A	–	8	14	25	58	70	70
51-353-081	26-0010	1	–	–	150	125	5.00	0.250	0.015	LB	0.738	*(18.745)*	A	–	8	14	25	58	70	70
51-444-027	34-0030	1	–	–	200	125	5.00	0.250	0.150	LB	0.900	*(22.860)*	A	2	15	21	32	60	70	70
51-444-117	54-0018	2	–	–	300	125	1.00	0.150	0.250	LB	0.740	*(18.796)*	A	–	10	21	41	70	70	70

Dimensions in inches (mm)

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.375 ø Pi Circuit

Thread length: A - 0.187 (4.76) B - 0.312 (7.92)

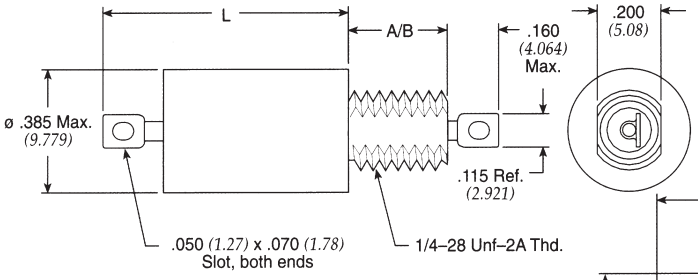

Figure 1

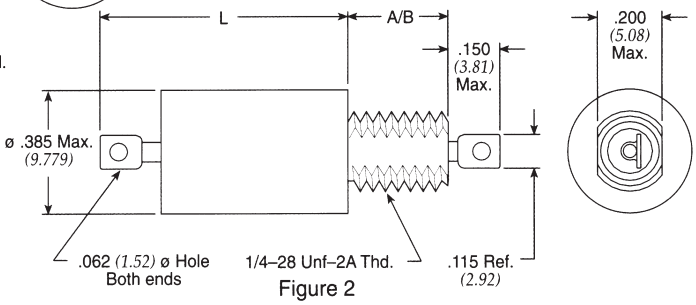

Figure 2

Dimensions in inches (mm)

.375 ø Pi Circuit Standard Product

MCI Part No.	MIL No	Figure	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
SCI-2030-010	–	2	80	–	50	–	0.50	1.500	1.000	0.758	(19.253)	B	24	66	70	70	70	70	70
SCI-2030-004	–	2	80	–	50	–	1.00	1.500	0.250	0.758	(19.253)	A	15	54	70	70	70	70	70
SCI-2030-005	–	2	80	–	50	–	2.00	1.500	0.063	0.758	(19.253)	A	–	45	62	70	70	70	70
SCI-2030-006	–	2	80	–	50	–	3.00	1.500	0.027	0.758	(19.253)	A	–	35	55	70	70	70	70
SCI-2030-013	–	2	80	–	50	–	3.00	1.500	0.027	0.758	(19.253)	B	–	35	55	70	70	70	70
9001-100-1080	–	1	80	–	50	–	5.00	2.800	0.015	0.758	(19.253)	A	–	18	60	70	70	70	70
9001-100-1081	–	1	80	–	50	–	10.0	2.800	0.005	0.758	(19.253)	A	21	32	40	35	68	70	70
SCI-2130-009	–	1	150	–	100	–	0.25	1.000	4.000	0.758	(19.253)	B	28	70	70	70	70	70	70
51-311-319	–	1	150	–	100	–	0.50	1.000	0.600	0.758	(19.253)	A	–	51	69	70	70	70	70
9001-100-1010	–	1	150	–	100	–	0.50	1.000	0.600	0.758	(19.253)	A	6	39	68	70	70	70	70
51-311-320	–	1	150	–	100	–	1.00	1.000	0.250	0.758	(19.253)	A	–	41	60	70	70	70	70
9001-100-1013	–	1	150	–	100	–	1.00	1.000	0.250	0.758	(19.253)	A	–	28	59	70	70	70	70
51-311-321	–	1	150	–	100	–	3.00	1.000	0.060	0.758	(19.253)	A	–	16	41	70	70	70	70
51-311-322	–	1	150	–	100	–	5.00	1.000	0.015	0.758	(19.253)	A	–	–	28	65	70	70	70
SCI-2130-007	–	1	150	–	100	–	10.0	1.000	0.003	0.758	(19.253)	A	9	24	29	40	70	70	70
SCI-2130-014	–	1	150	–	100	–	10.0	1.000	0.005	0.758	(19.253)	B	9	24	29	40	70	70	70
51-311-316	–	1	250	125	200	125	1.00	0.300	0.250	0.758	(19.253)	A	–	20	40	70	70	70	70
51-311-317	–	1	250	125	200	125	3.00	0.300	0.050	0.758	(19.253)	A	–	–	20	55	70	70	70
9001-100-1025	–	1	250	125	200	125	5.00	0.300	0.015	0.758	(19.253)	A	–	–	12	50	70	70	80
SCI-2330-009	–	1	300	125	300	125	0.25	0.300	4.000	0.758	(19.253)	B	8	50	66	70	70	70	70
SCI-2330-010	–	1	300	125	300	125	0.50	0.300	1.000	0.758	(19.253)	B	–	40	56	70	70	70	70
SCI-2330-012	–	1	300	125	300	125	2.00	0.300	0.063	0.758	(19.253)	B	–	18	33	63	70	70	70
SCI-2330-007	–	1	300	125	300	125	10.0	0.300	0.003	0.758	(19.253)	A	–	14	20	30	70	70	70

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MCI Part No.	M15733 MIL No	Fig.	Rated Voltage 85°C DC	85°C AC	125°C DC	125°C AC	I Amp	Min Cap µF	DCR Max Ohms	Max L In	Max L (mm)	Thd Lgth	Minimum Insertion Loss (dB) 30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
51-390-305	23-0017	1	–	–	50	–	0.30	2.800	0.770	0.730	(18.542)	B	29	73	80	80	80	80	80
51-390-314	23-0042	1	–	–	50	–	1.00	2.800	0.140	0.730	(18.542)	A	8	52	71	80	80	80	80
51-390-318	23-0054	1	–	–	50	–	2.00	1.500	0.070	0.730	(18.542)	A	–	46	65	80	80	80	80
51-390-317	23-0053	1	–	–	50	–	2.00	1.500	0.070	0.730	(18.542)	B	–	46	65	80	80	80	80
51-311-311	25-0010	1	–	–	100	–	0.25	0.900	1.500	0.793	(20.142)	A	–	48	66	80	80	80	70
51-311-308	25-0002	1	–	–	100	–	1.00	0.500	0.250	0.793	(20.142)	A	–	33	52	80	80	80	70
51-311-309	25-0004	1	–	–	100	–	3.00	0.660	0.050	0.793	(20.142)	A	–	17	34	68	80	80	70
51-311-310	25-0006	1	–	–	100	–	5.00	0.900	0.015	0.793	(20.142)	A	–	–	17	57	80	80	70
51-353-344	39-0011	1	–	–	100	–	10.0	0.990	0.003	0.760	(19.304)	A	9	24	29	40	70	70	70
51-353-345	39-0012	1	–	–	100	–	10.0	0.990	0.003	0.760	(19.304)	A	9	24	29	40	70	70	70
51-311-314	26-0011	1	–	–	150	125	0.25	0.300	1.500	0.793	(20.142)	A	–	29	47	70	80	80	70
51-390-312	23-0036	1	–	–	150	–	0.50	0.500	0.360	0.730	(18.542)	A	–	48	66	70	70	70	70
51-390-311	23-0035	1	–	–	150	–	0.50	0.500	0.360	0.730	(18.542)	B	–	48	66	70	70	70	70
51-353-336	26-0002	1	–	–	150	125	1.00	0.300	0.250	0.793	(20.142)	A	–	11	32	63	80	80	70
51-390-315	23-0047	1	–	–	150	–	1.00	0.500	0.140	0.730	(18.542)	B	–	32	51	70	70	70	70
51-311-312	26-0005	1	–	–	150	125	3.00	0.300	0.050	0.793	(20.142)	A	–	5	6	47	80	80	70
51-311-408	54-0005	2	–	–	300	115	1.00	0.300	0.250	0.761	(19.329)	A	–	23	43	70	70	70	70

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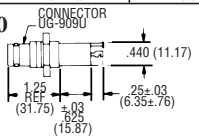
Spectrum Part Number	Fig.	Rated DC Current	Working Voltage 125°C	Pass Band	Load and Source Impedance	Minimum Insertion Loss (db) No Load Per MIL-STD-220			
						20 MHz	50 MHz	100 MHz	1GHz
52-706-301	1	30 ma	100 VDC	DC-10MHz<30dB	50	12	30	48	70
52-706-306	1	30 ma	100 VDC	DC-1MHz<3dB	50	70	70	70	70
52-706-309	1	50 ma	100 VDC	DC-2.5MHz<3dB	50	50	70	70	70
52-706-310	1	30 ma	100 VDC	DC-33MHz<3dB	75	–	—	8	70
52-706-304	2	30 ma	100 VDC	DC-30MHz<3db	50	—	10	30	60
52-713-301	3	30 ma	100 VDC	DC-100KHz<3db	600	70	70	70	70
52-713-302	1	10 ma	200 VDC	DC-1MHz<3db	600	—	—	43	70

52-706-301, 306, 309, 310
52-713-302



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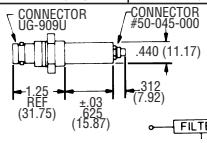
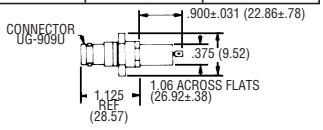


52-713-301



GROUNDED TO CASE

*All mating connectors available from stock

Dual Line BNC Filters

Spectrum Part Number	Fig.	Rated DC Current	Working Voltage 125°C	Pass Band	Load and Source Impedance	Minimum Insertion Loss (db) No Load Per MIL-STD-220			
						20 MHz	50 MHz	100 MHz	1GHz
52-792-001	1	150 ma	100 VDC	DC-8 KHz <3db	93	10	30	50	70
52-792-003	2	150 ma	100 VDC	60K-8M<3db	93	10	30	50	70
52-793-003	3	150 ma	100 VDC	DC-10MHz<3db	93	—	10	25	60

Note: Pass band measured in design impedance attenuation characteristics measured per MIL-STD-220

52-792-001

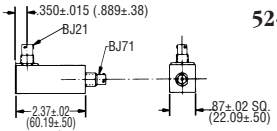


Fig. 1

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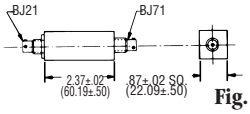

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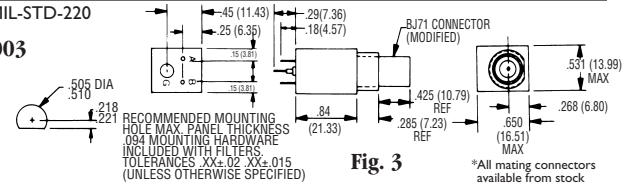


Fig. 2

Fig. 3

*All mating connectors available from stock

Power Line Filters

Spectrum Part Number	Current Rating	Voltage Rating	Temperature Range	DCR Max (Ohms)	Leakage Current Max	Minimum Insertion Loss (db) No Load						
						50 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
52-378-001	3 amps	240 VAC 60 Hz Line to Line	-55°C to 85°C	.3	50 MA	40	70	80	80	80	70	60
52-378-002	5 amps	240 VAC 60 Hz Line to Line	-55°C to 85°C	.2	50 MA	24	60	0	80	80	70	80
52-387-010	10 amps	240 VAC 60 Hz Line to Line	-55°C to 85°C	.2	50 MA	24	60	70	80	80	70	70
52-409-001	14 amps	240 VAC 60 HZ Line to Line	-55°C to 85°C	.04	50 MA	14	30	45	80	80	70	60

52-378-001 & 002

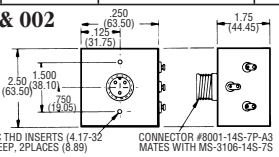


Fig. 1

52-378-010

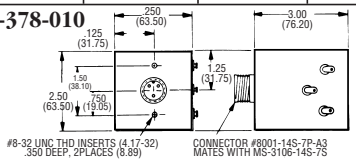


Fig. 2

52-409-001

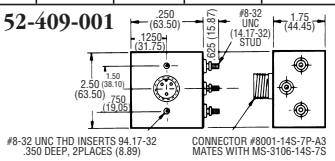


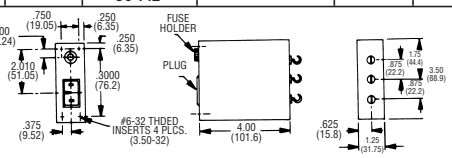
Fig. 3

Power Line Filters

Spectrum Part Number	Fig	Current Rating	Voltage Rating	Temperature Rating	DCR Max (Ohms)	Leakage Current (MAX)	Mode	Minimum Insertion Loss (db) Per MIL-STD-220							Gasket Supplied
								50K	150K	300K	1M	10M	100M	1G	
52-523-002	1	5A	120/240 VAC 60 Hz	-40°C to+65°C	.25	1 ma	COMM	—	55	60	80	80	70	60	572047-00532-03*
							DIFF	—	50	60	80	80	—	—	572016-00456-10**
52-600-001	2	5A	120/240 VAC 60 Hz	-40°C to +65°C	.20	1 ma	COMM	33	65	80	80	80	—	—	572047-00525-03*
							DIFF	37	65	80	80	80	—	—	572016-00457-10**
52-600-002	2	10A	120/240VAC 60 Hz	-40°C to +65°C	.05	1 ma	COMM	—	50	70	80	80	70	60	
							DIFF	25	50	75	80	80	—	—	

52-523-002

Fig. 1



52-600-001 & 002

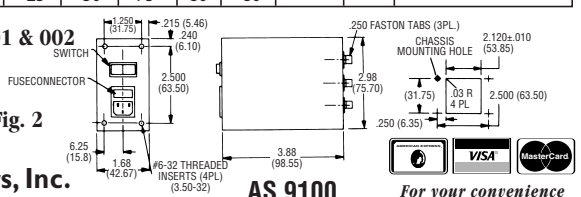


Fig. 2

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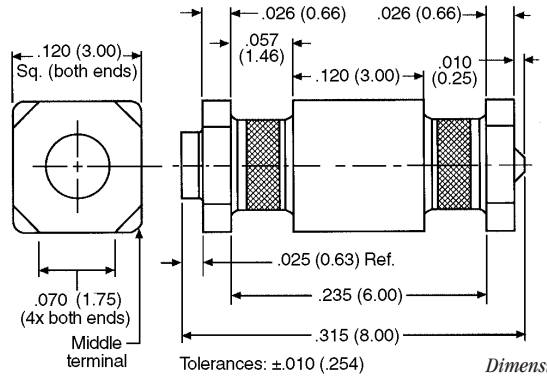
High Current Surface Mount Filter

Ordering Information

EXAMPLE: PSM4-402Z-20T

The part number shown represents a power surface mount feed-thru filter with a capacitance value of 4000 pF and capacitance tolerance of +80/-20%. The current rating of the part is 20 Amps and the packaging is tape and reel.



Dimensions in inches (mm)

How To Order

PSM 4 - 402Z - 20 T

Power Surface Mount

Circuit Configuration
1 - Pi
4 - Feed-thru

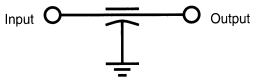
Capacitance

Code	Value*	Tolerance
680M	68 pF	±20%
101M	100 pF	±20%
131P	130 pF	+100/-0%
471P	470 pF	+100/-0%
821M	820 pF	±20%
102M	1000 pF	±20%
152M	1500 pF	±20%
252P	2500 pF	+100/-0%
402Z	4000 pF	+80/-20%
103Z**	.01 uF	+80/-20%

Packaging
T - Tape and reel packaging (500 per reel)
B - Bulk packaging

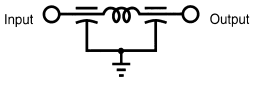
Current Rating**
02 - 2 Amps **15 -** 15 Amps
05 - 5 Amps **20 -** 20 Amps
10 - 10 Amps
*** Maximum current rating for Pi configuration parts is 10 Amps*

Feed-thru



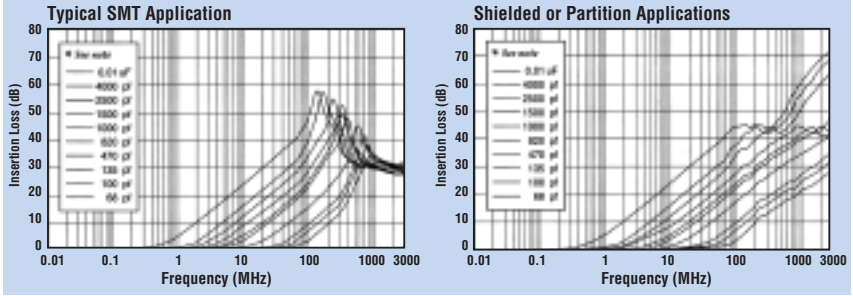
- **Voltage Rating** ..... 200 VDC @ -55°C to +125°C
- **DWV** ..... 700 VDC
- **Current Rating** . .2, 5, 10, 15 or 20 Amps
- **Surge Current Capabilities** .....100 A for 1 second
- **Insulation Resistance** .....1.0 Gohms @ 25°C
- **Dissipation Factor** . . . . .4.0% maximum
- **D.C.R.** . . . . . .Max. .0005Ω, typ. .0002Ω

Pi

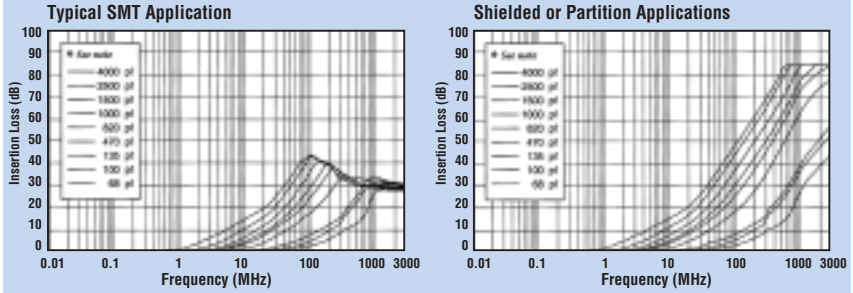


- **Voltage Rating** ..... 200 VDC @ -55°C to +125°C
- **DWV** ..... 700 VDC
- **Current Rating** . . . . . .2, 5 or 10 Amps
- **Surge Current Capabilities** .....50 A for 1 second
- **Insulation Resistance** .....1.0 Gohms @ 25°C
- **Dissipation Factor** . . . . .4.0% maximum
- **D.C.R.** . . . . . .Max. .0005Ω, typ. .0002Ω

Feed-thru Insertion Loss



Pi Insertion Loss



** Capacitance values for insertion loss curves are displayed left to right in the order shown.*

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Series 700 High Performance Filtered Connectors

Filter Selection

MCI Series 700 connectors offer the highest performance filtering for all types of professional applications.

Features

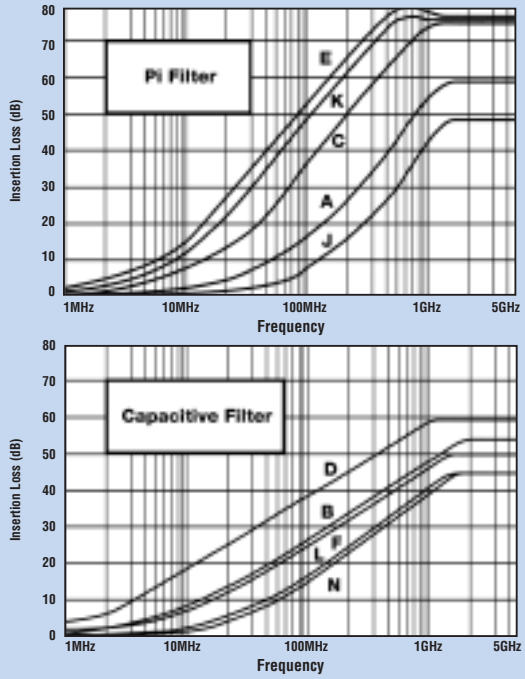
- Available in 9, 15, 25, 37 and 50 shell sizes
- Variety of termination configurations including right angle and straight PCB for both pin and socket contact and as an adapter
- Capacitive and Pi type filters in a full range of capacitance values

The catalog data for this series is presented in order of shell size, and grouped by pin and socket contacts. Part numbers must be selected from the tables within the series section.

These curves represent application of proper grounding fundamentals, for assistance consult with Metuchen Capacitors, Inc.

Insertion loss measured per MIL-STD-220, no load, 50ohm source and load.

Typical Insertion Loss



Electrical Specifications: Series 700 Standard High Performance Connectors

Filter Designation	Filter Circuits	Capacitance		3 dB Cut-off Frequency Max. (MHz)	Dielectric With-Standing Voltage	Working Voltage DC -55°C to +125°C	Minimum Insertion Loss - Decibels (dB)									
		Value	Tol.				5 MHz	10 MHz	20 MHz	50 MHz	100 MHz	200 MHz	500 MHz	1 GHz	2 GHz	5 GHz
J	Pi	100 pF	+100 -0%	32	300V	100V	–	–	–	2	6	11	27	40	43	40
A	Pi	310 pF	±20%	17	300V	100V	–	–	3	7	13	21	36	43	50	45
C	Pi	1000 pF	+100 -0%	3.2	300V	100V	–	5	9	19	30	43	62	70	68	63
K	Pi	2500 pF	+100 -0%	1.3	150V	50V	8	13	18	33	45	58	73	78	70	65
E	Pi	4000 pF	+100 -0%	0.8	150V	50V	8	13	20	35	48	61	76	80	70	65
N	C	375 pF	±20%	14	600V	200V	–	–	2	7	13	20	29	35	30	29
L	C	500 pF	±20%	10.6	600V	200V	–	–	3	10	15	22	31	37	33	31
F	C	830 pF	±20%	6.4	600V	200V	–	4	9	16	22	28	35	39	38	36
B	C	1000 pF	+100 -0%	3.2	600V	200V	–	5	10	17	23	30	37	43	44	42
D	C	5000 pF	+100 -0%	0.64	300V	100V	10	16	22	30	35	41	50	52	52	50

Filter designation "G" for grounded contacts "I" for insulation (not filtered) contacts
Filter designation "O" for omitted contacts and no hole in ground plane.

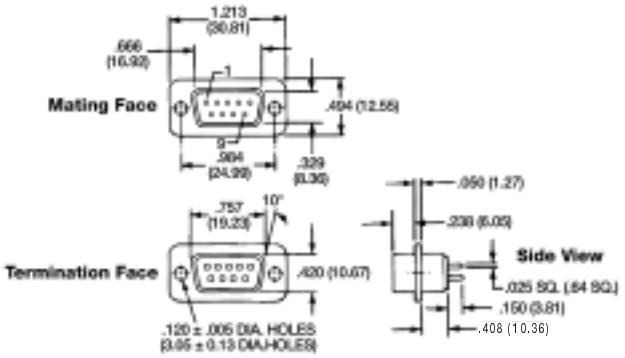
Above data represents guaranteed minimum.

9 Shell Size Pin & Socket Contact

Pin Contact

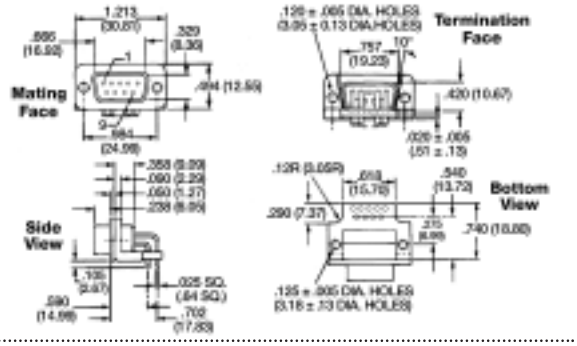
Printed Circuit Board Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-701-001	A	310 pF Pi
56-701-002	B	1000 pF C
56-701-003	C	1000 pF Pi
56-701-004	D	5000 pF C
56-701-005	E	4000 pF Pi
56-701-028	F	830 pF C
56-701-029	J	100 pF Pi
56-701-030	K	2500 pF Pi
56-701-047	N	375 pF C
56-701-086	L	500 pF C



Printed Circuit Board Right Angle Mount

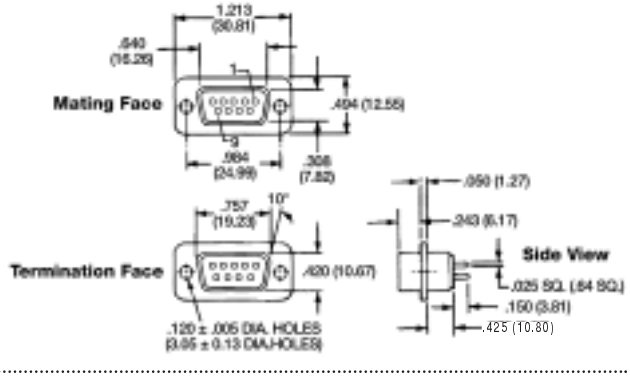
MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-702-001	A	310 pF Pi
56-702-002	B	1000 pF C
56-702-003	C	1000 pF Pi
56-702-004	D	5000 pF C
56-702-005	E	4000 pF Pi
56-702-007	F	830 pF C
56-702-008	J	100 pF Pi
56-702-009	K	2500 pF Pi
56-702-013	N	375 pF C
56-702-033	L	500 pF C



Socket Contact

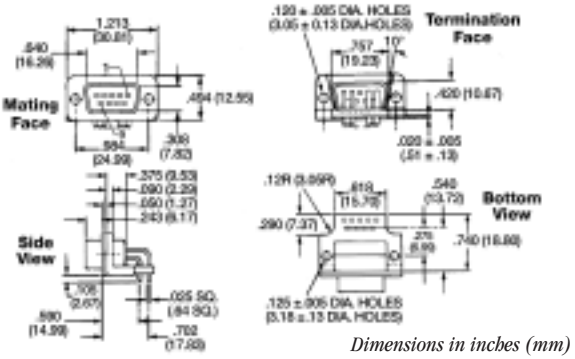
Printed Circuit Board Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-703-001	A	310 pF Pi
56-703-002	B	1000 pF C
56-703-003	C	1000 pF Pi
56-703-004	D	5000 pF C
56-703-005	E	4000 pF Pi
56-703-022	F	830 pF C
56-703-023	J	100 pF Pi
56-703-024	K	2500 pF Pi
56-703-036	N	375 pF C
56-703-047	L	500 pF C



Printed Circuit Board Right Angle Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-704-001	A	310 pF Pi
56-704-002	B	1000 pF C
56-704-003	C	1000 pF Pi
56-704-004	D	5000 pF C
56-704-005	E	4000 pF Pi
56-704-007	F	830 pF C
56-704-008	J	100 pF Pi
56-704-009	K	2500 pF Pi
56-704-018	N	375 pF C
56-704-035	L	500 pF C



Dimensions in inches (mm)

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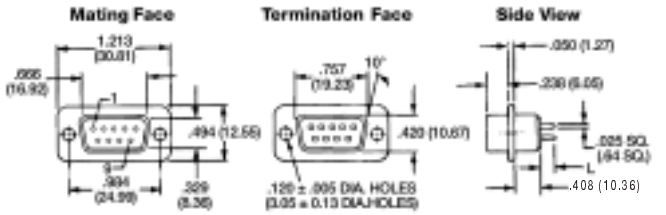
Shell Size Pin Contact

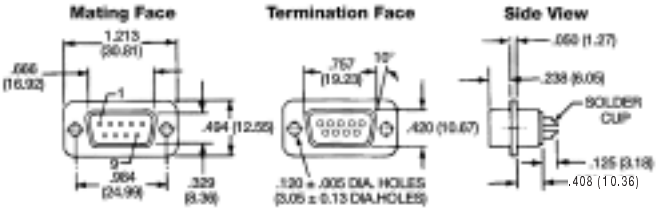
Solderless Wire Wrap

MCI Part Number *Select one*				EMI Filter	
	L .500	L .375	L .225	Filter Designation	Cap. Value
56-701	-006	-022	-017	A	310 pF Pi
56-701	-007	-023	-018	B	1000 pF C
56-701	-008	-024	-019	C	1000 pF Pi
56-701	-009	-025	-020	D	5000 pF C
56-701	-010	-026	-021	E	4000 pF Pi
56-701	-037	-034	-031	F	830 pF C
56-701	-038	-035	-032	J	100 pF Pi
56-701	-039	-036	-033	K	2500 pF Pi
56-701	-050	-049	-048	N	375 pF C



Solder Cup Termination

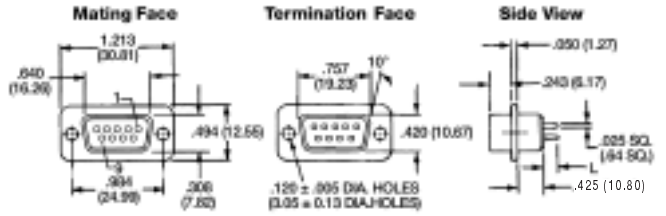
MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-701-011	A	310 pF Pi
56-701-012	B	1000 pF C
56-701-013	C	1000 pF Pi
56-701-014	D	5000 pF C
56-701-015	E	4000 pF Pi
56-701-040	F	830 pF C
56-701-041	J	100 pF Pi
56-701-042	K	2500 pF Pi
56-701-081	N	375 pF C
56-701-087	L	500 pF C



Socket Contact & Pin/Socket Adapter

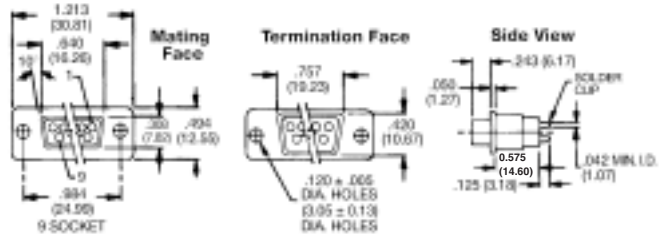
Solderless Wire Wrap

MCI Part Number *Select one*				EMI Filter	
	L .500	L .375	L .250	Filter Designation	Cap. Value
56-703	-006	-016	-011	A	310 pF Pi
56-703	-007	-017	-012	B	1000 pF C
56-703	-008	-018	-013	C	1000 pF Pi
56-703	-009	-019	-014	D	5000 pF C
56-703	-010	-020	-015	E	4000 pF Pi
56-703	-031	-028	-025	F	830 pF C
56-703	-032	-029	-026	J	100 pF Pi
56-703	-033	-030	-027	K	2500 pF Pi
56-703	-039	-038	-037	N	375 pF C



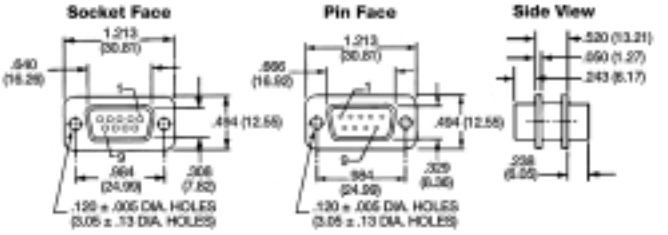
Solder Cup Termination

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-706-001	A	310 pF Pi
56-706-002	B	1000 pF C
56-706-003	C	1000 pF Pi
56-706-004	D	5000 pF C
56-706-005	E	4000 pF Pi
56-706-006	F	830 pF C
56-706-007	J	100 pF Pi
56-706-008	K	2500 pF Pi
56-706-009	N	375 pF C
56-706-017	L	500 pF C



Pin/Socket Adapter

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-705-001	A	310 pF Pi
56-705-002	B	1000 pF C
56-705-003	C	1000 pF Pi
56-705-004	D	5000 pF C
56-705-005	E	4000 pF Pi
56-705-008	F	830 pF C
56-705-009	J	100 pF Pi
56-705-010	K	2500 pF Pi
56-705-026	N	375 pF C
56-705-049	L	500 pF C

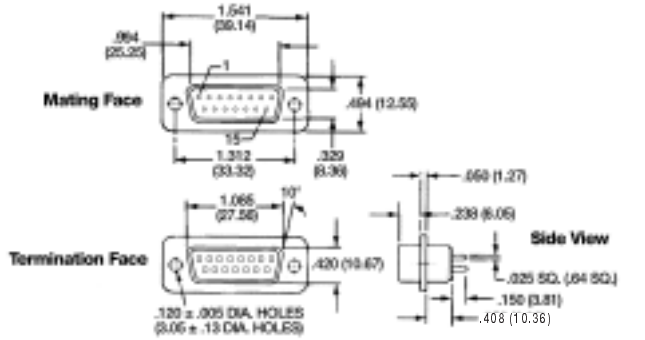


Dimensions in inches (mm)

15 Shell Size Pin Contact

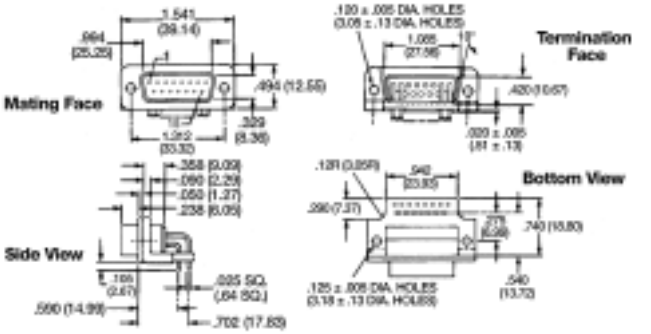
Printed Circuit Board Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-711-001	A	310 pF Pi
56-711-002	B	1000 pF C
56-711-003	C	1000 pF Pi
56-711-004	D	5000 pF C
56-711-005	E	4000 pF Pi
56-711-028	F	830 pF C
56-711-029	J	100 pF Pi
56-711-030	K	2500 pF Pi
56-711-048	N	375 pF C
56-711-088	L	500 pF C



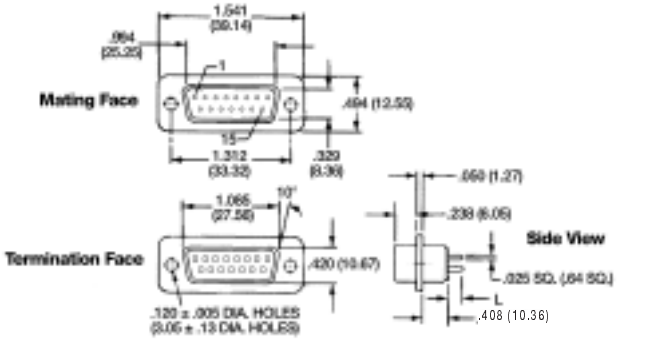
Printed Circuit Board Right Angle Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-712-001	A	310 pF Pi
56-712-002	B	1000 pF C
56-712-003	C	1000 pF Pi
56-712-004	D	5000 pF C
56-712-005	E	4000 pF Pi
56-712-007	F	830 pF C
56-712-008	J	100 pF Pi
56-712-009	K	2500 pF Pi
56-712-017	N	375 pF C
56-712-039	L	500 pF C



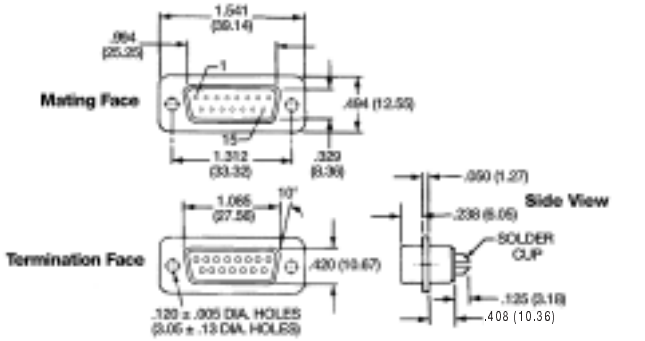
Solder Wire Wrap

MCI Part Number *Select one*				EMI Filter	
	L .500	L .375	L .225	Filter Designation	Cap. Value
56-711	-006	-023	-018	A	310 pF Pi
56-711	-007	-024	-019	B	1000 pF C
56-711	-008	-025	-020	C	1000 pF Pi
56-711	-009	-026	-021	D	5000 pF C
56-711	-010	-027	-022	E	4000 pF Pi
56-711	-037	-034	-031	F	830 pF C
56-711	-038	-035	-032	J	100 pF Pi
56-711	-039	-036	-033	K	2500 pF Pi
56-711	-051	-050	-049	N	375 pF C



Solder Cup Termination

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-711-011	A	310 pF Pi
56-711-012	B	1000 pF C
56-711-013	C	1000 pF Pi
56-711-014	D	5000 pF C
56-711-015	E	4000 pF Pi
56-711-040	F	830 pF C
56-711-041	J	100 pF Pi
56-711-042	K	2500 pF Pi
56-711-085	N	375 pF C
56-711-086	L	500 pF C

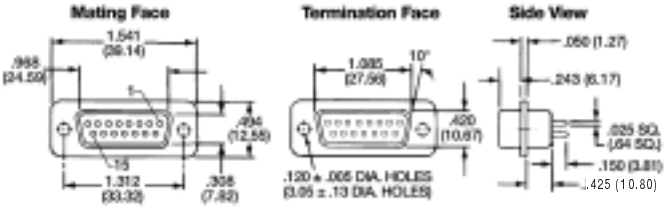


Dimensions in inches (mm)

15 Shell Size Socket Contact

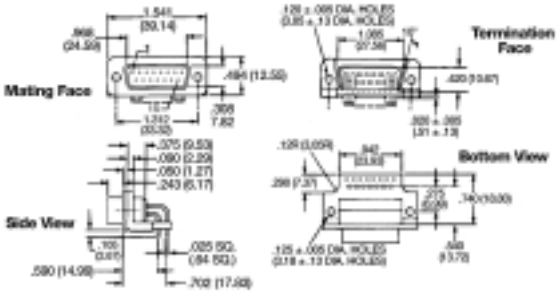
Printed Circuit Board Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-713-001	A	310 pF Pi
56-713-002	B	1000 pF C
56-713-003	C	1000 pF Pi
56-713-004	D	5000 pF C
56-713-005	E	4000 pF Pi
56-713-021	F	830 pF C
56-713-022	J	100 pF Pi
56-713-023	K	2500 pF Pi
56-713-037	N	375 pF C
56-713-045	L	500 pF C



Printed Circuit Board Right Angle Mount

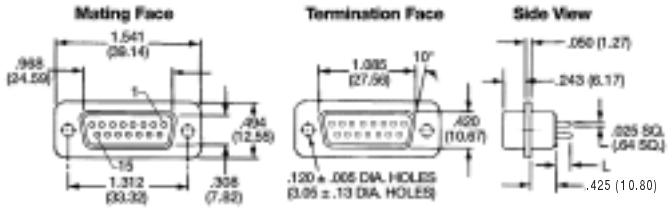
MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-714-001	A	310 pF Pi
56-714-002	B	1000 pF C
56-714-003	C	1000 pF Pi
56-714-004	D	5000 pF C
56-714-005	E	4000 pF Pi
56-714-006	F	830 pF C
56-714-007	J	100 pF Pi
56-714-008	K	2500 pF Pi
56-714-017	N	375 pF C
56-714-031	L	500 pF C



Socket Contact & Pin/Socket Adapter

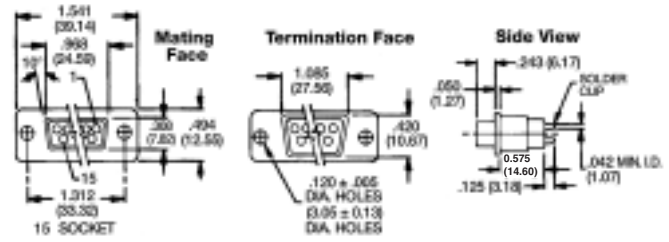
Solderless Wire Wrap

	MCI Part Number *Select one*			EMI Filter	
	L .500	L .375	L .250	Filter Designation	Cap. Value
56-713	-006	-016	-011	A	310 pF Pi
56-713	-007	-017	-012	B	1000 pF C
56-713	-008	-018	-013	C	1000 pF Pi
56-713	-009	-019	-014	D	5000 pF C
56-713	-010	-020	-015	E	4000 pF Pi
56-713	-030	-027	-024	F	830 pF C
56-713	-031	-028	-025	J	100 pF Pi
56-713	-032	-029	-026	K	2500 pF Pi
56-713	-040	-039	-038	N	375 pF C



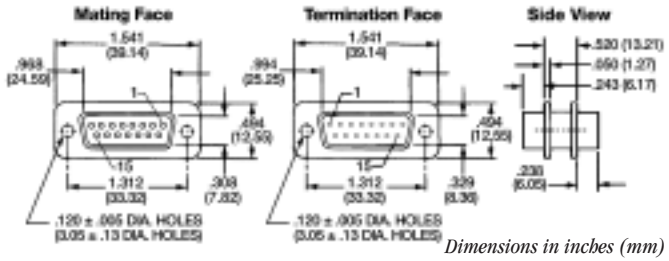
Solder Cup Termination

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-716-001	A	310 pF Pi
56-716-002	B	1000 pF C
56-716-003	C	1000 pF Pi
56-716-004	D	5000 pF C
56-716-005	E	4000 pF Pi
56-716-006	F	830 pF C
56-716-007	J	100 pF Pi
56-716-008	K	2500 pF Pi
56-716-009	N	375 pF C
56-716-013	L	500 pF C



Pin/Socket Adapter

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-715-001	A	310 pF Pi
56-715-002	B	1000 pF C
56-715-003	C	1000 pF Pi
56-715-004	D	5000 pF C
56-715-005	E	4000 pF Pi
56-715-007	F	830 pF C
56-715-008	J	100 pF Pi
56-715-009	K	2500 pF Pi
56-715-015	N	375 pF C
56-715-040	L	500 pF C



Dimensions in inches (mm)

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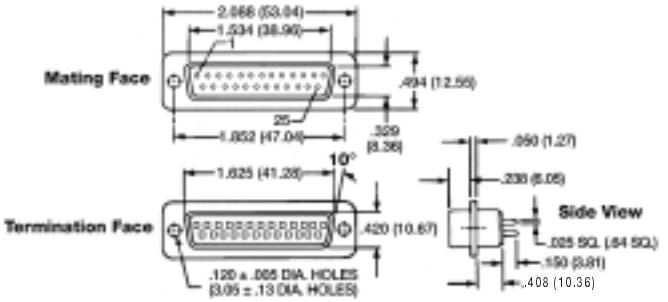
25 Shell Size Pin Contact

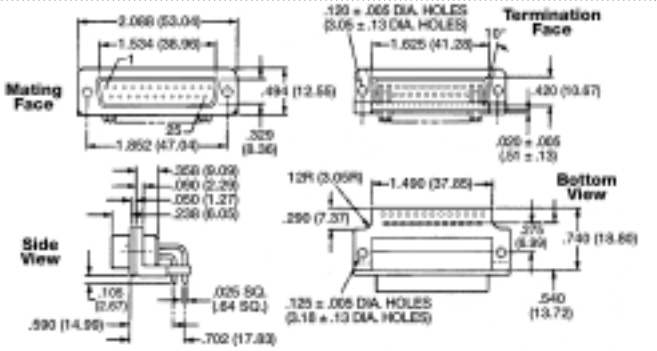
Printed Circuit Board Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-721-001	A	310 pF Pi
56-721-002	B	1000 pF C
56-721-003	C	1000 pF Pi
56-721-004	D	5000 pF C
56-721-005	E	4000 pF Pi
56-721-033	F	830 pF C
56-721-034	J	100 pF Pi
56-721-035	K	2500 pF Pi
56-721-063	N	375 pF C
56-721-111	L	500 pF C



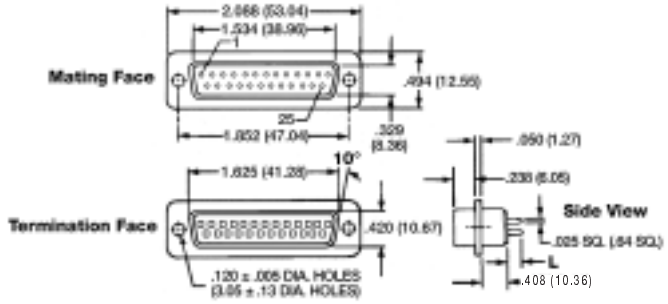
Printed Circuit Board Right Angle Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-722-001	A	310 pF Pi
56-722-002	B	1000 pF C
56-722-003	C	1000 pF Pi
56-722-004	D	5000 pF C
56-722-005	E	4000 pF Pi
56-722-008	F	830 pF C
56-722-009	J	100 pF Pi
56-722-010	K	2500 pF Pi
56-722-027	N	375 pF C
56-722-060	L	500 pF C



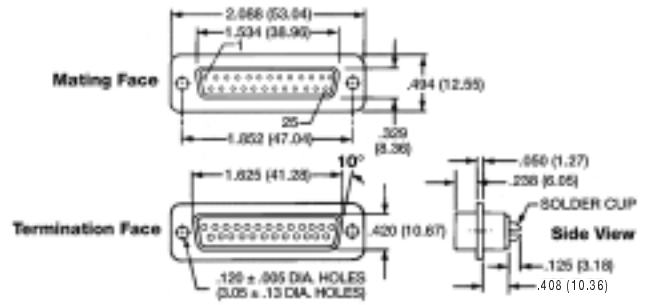
Solder Wire Wrap

	MCI Part Number *Select one*			EMI Filter	
	L .500	L .375	L .225	Filter Designation	Cap. Value
56-721	-006	-028	-024	A	310 pF Pi
56-721	-007	-029	-025	B	1000 pF C
56-721	-008	-030	-026	C	1000 pF Pi
56-721	-009	-031	-022	D	5000 pF C
56-721	-010	-032	-027	E	4000 pF Pi
56-721	-042	-039	-036	F	830 pF C
56-721	-043	-040	-037	J	100 pF Pi
56-721	-044	-041	-038	K	2500 pF Pi
56-721	-066	-065	-064	N	375 pF C



Solder Cup Termination

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-721-011	A	310 pF Pi
56-721-012	B	1000 pF C
56-721-013	C	1000 pF Pi
56-721-014	D	5000 pF C
56-721-015	E	4000 pF Pi
56-721-045	F	830 pF C
56-721-046	J	100 pF Pi
56-721-047	K	2500 pF Pi
56-721-070	N	375 pF C
56-721-112	L	500 pF C



Dimensions in inches (mm)

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25 Shell Size Socket Contact

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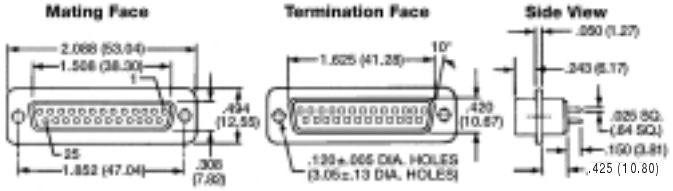
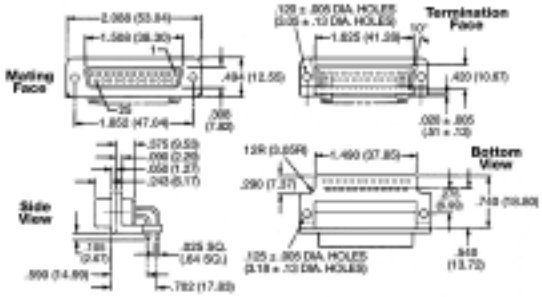
MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-723-001	A	310 pF Pi
56-723-002	B	1000 pF C
56-723-003	C	1000 pF Pi
56-723-004	D	5000 pF C
56-723-005	E	4000 pF Pi
56-723-023	F	830 pF C
56-723-024	J	100 pF Pi
56-723-025	K	2500 pF Pi
56-723-045	N	375 pF C
56-723-069	L	500 pF C



Printed Circuit Board Right Angle Mount

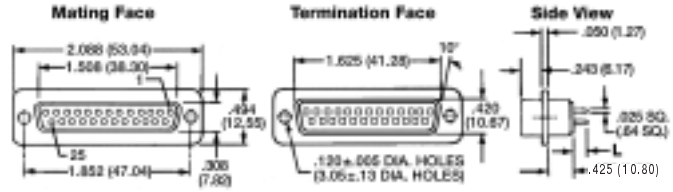
MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-724-001	A	310 pF Pi
56-724-002	B	1000 pF C
56-724-003	C	1000 pF Pi
56-724-004	D	5000 pF C
56-724-005	E	4000 pF Pi
56-724-008	F	830 pF C
56-724-009	J	100 pF Pi
56-724-010	K	2500 pF Pi
56-724-021	N	375 pF C
56-724-046	L	500 pF C



Socket Contact & Pin/Socket Adapter

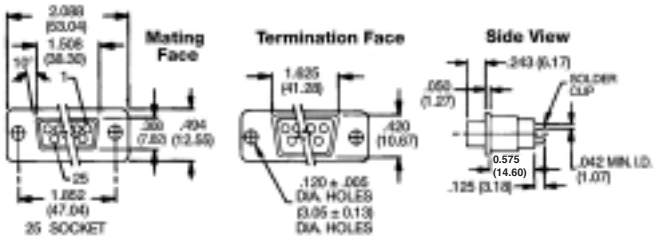
Solderless Wire Wrap

	MCI Part Number *Select one*			EMI Filter	
	L .500	L .375	L .250	Filter Designation	Cap. Value
56-723	-006	-017	-012	A	310 pF Pi
56-723	-007	-018	-013	B	1000 pF C
56-723	-008	-019	-014	C	1000 pF Pi
56-723	-009	-020	-015	D	5000 pF C
56-723	-010	-021	-016	E	4000 pF Pi
56-723	-032	-029	-026	F	830 pF C
56-723	-033	-030	-027	J	100 pF Pi
56-723	-034	-031	-028	K	2500 pF Pi
56-723	-048	-047	-046	N	375 pF C



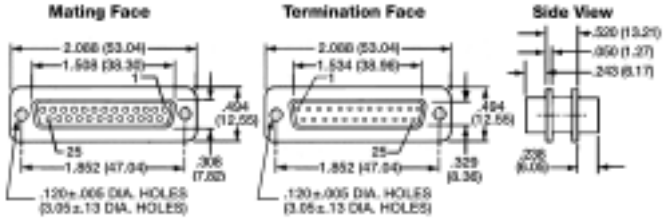
Solder Cup Termination

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-726-001	A	310 pF Pi
56-726-002	B	1000 pF C
56-726-003	C	1000 pF Pi
56-726-004	D	5000 pF C
56-726-005	E	4000 pF Pi
56-726-006	F	830 pF C
56-726-007	J	100 pF Pi
56-726-008	K	2500 pF Pi
56-726-009	N	375 pF C
56-726-021	L	500 pF C



Pin/Socket Adapter

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-725-001	A	310 pF Pi
56-725-002	B	1000 pF C
56-725-003	C	1000 pF Pi
56-725-004	D	5000 pF C
56-725-005	E	4000 pF Pi
56-725-019	F	830 pF C
56-725-020	J	100 pF Pi
56-725-021	K	2500 pF Pi
56-725-064	N	375 pF C
56-725-073	L	500 pF C



Dimensions in inches (mm)

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37 Shell Size Pin Contact

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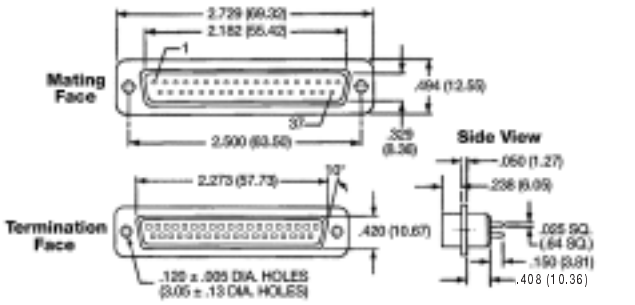
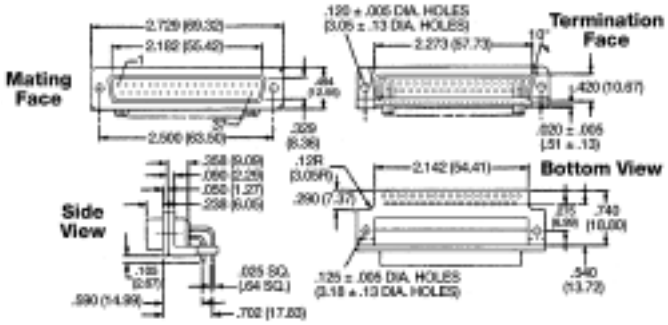
MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-731-001	A	310 pF Pi
56-731-002	B	1000 pF C
56-731-003	C	1000 pF Pi
56-731-004	D	5000 pF C
56-731-005	E	4000 pF Pi
56-731-028	F	830 pF C
56-731-029	J	100 pF Pi
56-731-030	K	2500 pF Pi
56-731-048	N	375 pF C
56-731-076	L	500 pF C



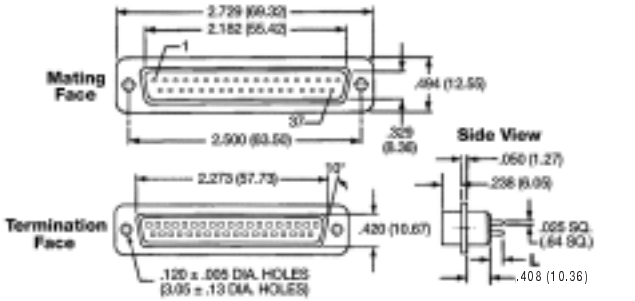
Printed Circuit Board Right Angle Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-732-001	A	310 pF Pi
56-732-002	B	1000 pF C
56-732-003	C	1000 pF Pi
56-732-004	D	5000 pF C
56-732-005	E	4000 pF Pi
56-732-006	F	830 pF C
56-732-007	J	100 pF Pi
56-732-008	K	2500 pF Pi
56-732-009	N	375 pF C
56-732-023	L	500 pF C



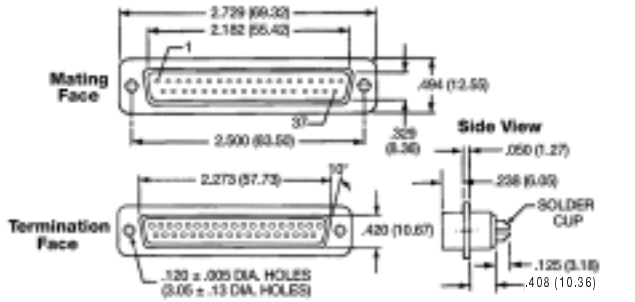
Solder Wire Wrap

MCI Part Number *Select one*				EMI Filter	
	L .500	L .375	L .225	Filter Designation	Cap. Value
56-731	-006	-023	-018	A	310 pF Pi
56-731	-007	-024	-019	B	1000 pF C
56-731	-008	-025	-020	C	1000 pF Pi
56-731	-009	-026	-021	D	5000 pF C
56-731	-010	-027	-022	E	4000 pF Pi
56-731	-037	-034	-031	F	830 pF C
56-731	-038	-035	-032	J	100 pF Pi
56-731	-039	-036	-033	K	2500 pF Pi
56-731	-051	-050	-049	N	375 pF C



Solder Cup Termination

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-731-011	A	310 pF Pi
56-731-012	B	1000 pF C
56-731-013	C	1000 pF Pi
56-731-014	D	5000 pF C
56-731-015	E	4000 pF Pi
56-731-040	F	830 pF C
56-731-041	J	100 pF Pi
56-731-042	K	2500 pF Pi
56-731-060	N	375 pF C
56-731-077	L	500 pF C



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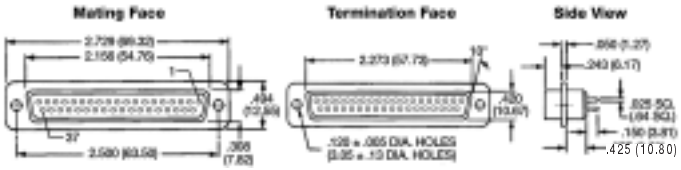
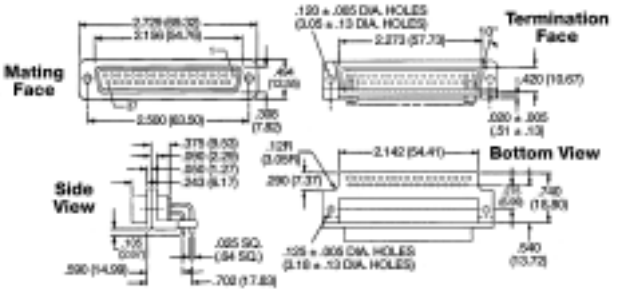
MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-733-001	A	310 pF Pi
56-733-002	B	1000 pF C
56-733-003	C	1000 pF Pi
56-733-004	D	5000 pF C
56-733-005	E	4000 pF Pi
56-733-021	F	830 pF C
56-733-022	J	100 pF Pi
56-733-023	K	2500 pF Pi
56-733-035	N	375 pF C
56-733-046	L	500 pF C



Printed Circuit Board Right Angle Mount

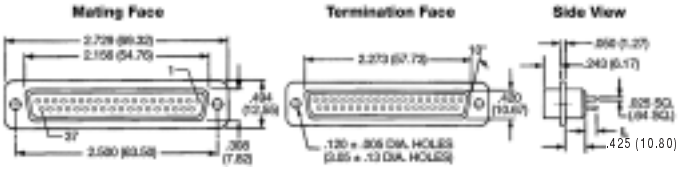
MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-734-001	A	310 pF Pi
56-734-002	B	1000 pF C
56-734-003	C	1000 pF Pi
56-734-004	D	5000 pF C
56-734-005	E	4000 pF Pi
56-734-006	F	830 pF C
56-734-007	J	100 pF Pi
56-734-008	K	2500 pF Pi
56-734-012	N	375 pF C
56-734-021	L	500 pF C



Socket Contact & Pin/Socket Adapter

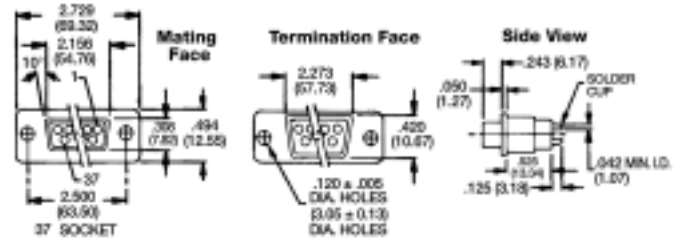
Solderless Wire Wrap

	MCI Part Number *Select one*			EMI Filter	
	L .500	L .375	L .250	Filter Designation	Cap. Value
56-733	-006	-016	-011	A	310 pF Pi
56-733	-007	-017	-012	B	1000 pF C
56-733	-008	-018	-013	C	1000 pF Pi
56-733	-009	-019	-014	D	5000 pF C
56-733	-010	-020	-015	E	4000 pF Pi
56-733	-030	-027	-024	F	830 pF C
56-733	-031	-028	-025	J	100 pF Pi
56-733	-032	-029	-026	K	2500 pF Pi
56-733	-038	-037	-036	N	375 pF C



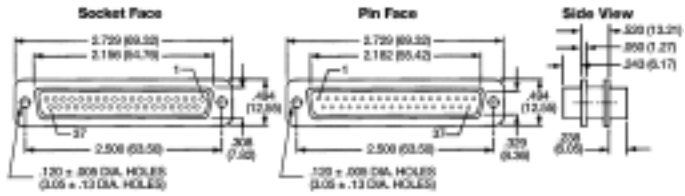
Solder Cup Termination

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-736-001	A	310 pF Pi
56-736-002	B	1000 pF C
56-736-003	C	1000 pF Pi
56-736-004	D	5000 pF C
56-736-005	E	4000 pF Pi
56-736-006	F	830 pF C
56-736-007	J	100 pF Pi
56-736-008	K	2500 pF Pi
56-736-009	N	375 pF C
56-736-015	L	500 pF C



Pin/Socket Adapter

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-735-001	A	310 pF Pi
56-735-002	B	1000 pF C
56-735-003	C	1000 pF Pi
56-735-004	D	5000 pF C
56-735-005	E	4000 pF Pi
56-735-008	F	830 pF C
56-735-009	J	100 pF Pi
56-735-010	K	2500 pF Pi
56-735-025	N	375 pF C
56-735-034	L	500 pF C



Dimensions in inches (mm)

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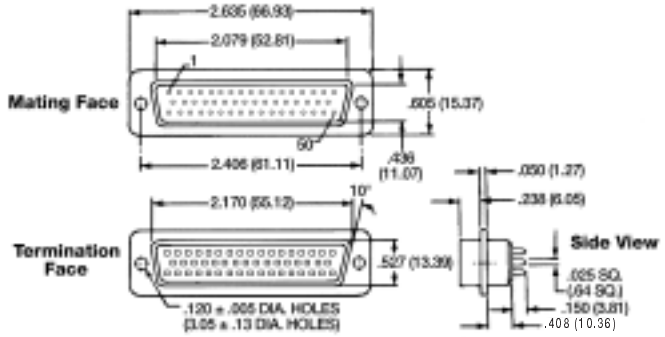
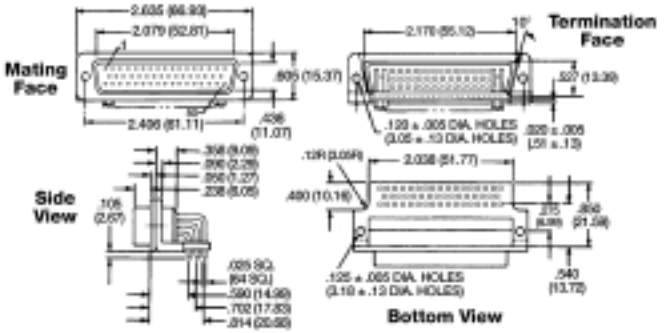
MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-741-001	A	310 pF Pi
56-741-002	B	1000 pF C
56-741-003	C	1000 pF Pi
56-741-004	D	5000 pF C
56-741-005	E	4000 pF Pi
56-741-027	F	830 pF C
56-741-028	J	100 pF Pi
56-741-029	K	2500 pF Pi
56-741-042	N	375 pF C
56-741-066	L	500 pF C



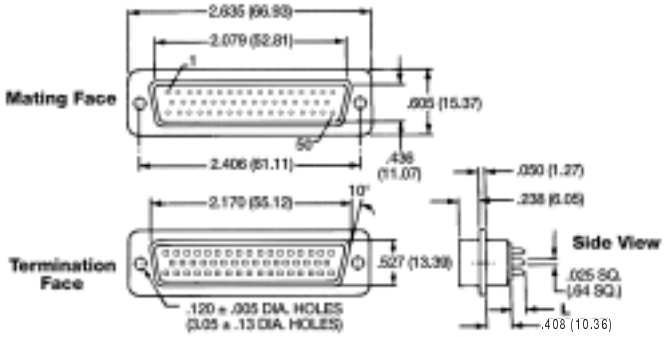
Printed Circuit Board Right Angle Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-742-001	A	310 pF Pi
56-742-002	B	1000 pF C
56-742-003	C	1000 pF Pi
56-742-004	D	5000 pF C
56-742-005	E	4000 pF Pi
56-742-006	F	830 pF C
56-742-007	J	100 pF Pi
56-742-008	K	2500 pF Pi
56-742-009	N	375 pF C
56-742-022	L	500 pF C



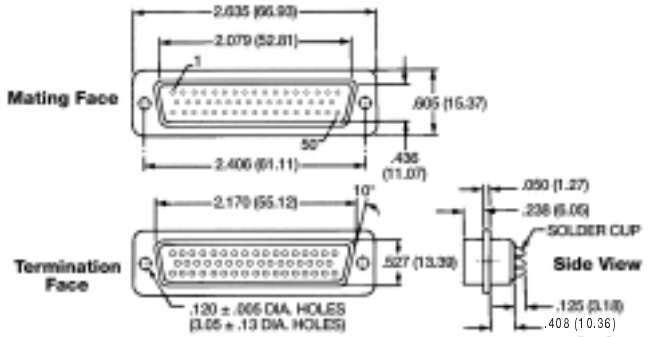
Solder Wire Wrap

MCI Part Number *Select one*				EMI Filter	
	L .500	L .375	L .225	Filter Designation	Cap. Value
56-741	-006	-022	-017	A	310 pF Pi
56-741	-007	-023	-018	B	1000 pF C
56-741	-008	-024	-019	C	1000 pF Pi
56-741	-009	-025	-020	D	5000 pF C
56-741	-010	-026	-021	E	4000 pF Pi
56-741	-036	-033	-030	F	830 pF C
56-741	-037	-034	-031	J	100 pF Pi
56-741	-038	-035	-032	K	2500 pF Pi
56-741	-045	-044	-043	N	375 pF C



Solder Cup Termination

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-741-011	A	310 pF Pi
56-741-012	B	1000 pF C
56-741-013	C	1000 pF Pi
56-741-014	D	5000 pF C
56-741-015	E	4000 pF Pi
56-741-039	F	830 pF C
56-741-040	J	100 pF Pi
56-741-041	K	2500 pF Pi
56-741-063	N	375 pF C
56-741-067	L	500 pF C



Dimensions in inches (mm)

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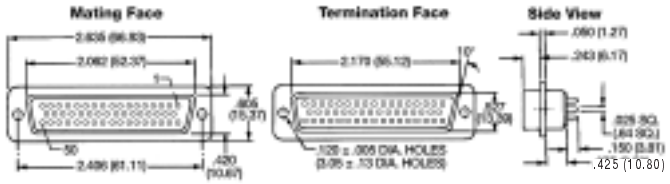
50 Shell Size Socket Contact

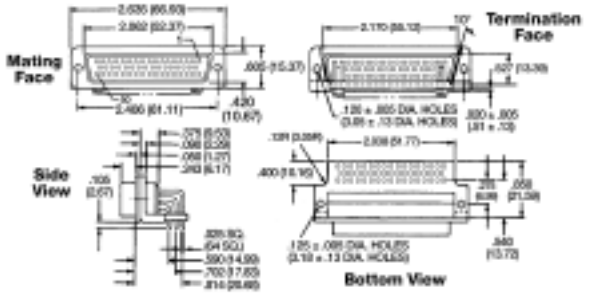
Printed Circuit Board Mount

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-743-001	A	310 pF Pi
56-743-002	B	1000 pF C
56-743-003	C	1000 pF Pi
56-743-004	D	5000 pF C
56-743-005	E	4000 pF Pi
56-743-021	F	830 pF C
56-743-022	J	100 pF Pi
56-743-023	K	2500 pF Pi
56-743-033	N	375 pF C
56-743-043	L	500 pF C



Printed Circuit Board Right Angle Mount

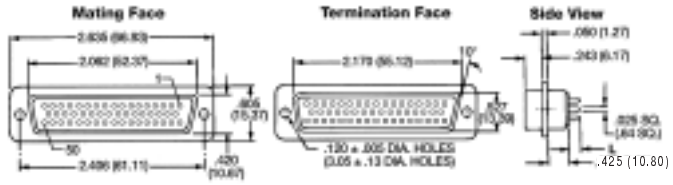
MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-744-001	A	310 pF Pi
56-744-002	B	1000 pF C
56-744-003	C	1000 pF Pi
56-744-004	D	5000 pF C
56-744-005	E	4000 pF Pi
56-744-006	F	830 pF C
56-744-007	J	100 pF Pi
56-744-008	K	2500 pF Pi
56-744-009	N	375 pF C
56-744-012	L	500 pF C



Socket Contact & Pin/Socket Adapter

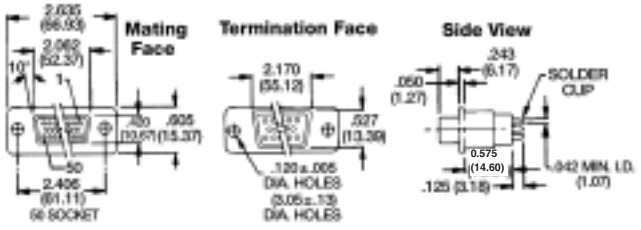
Solderless Wire Wrap

	MCI Part Number *Select one*			EMI Filter	
	L .500	L .375	L .250	Filter Designation	Cap. Value
56-743	-006	-016	-011	A	310 pF Pi
56-743	-007	-017	-012	B	1000 pF C
56-743	-008	-018	-013	C	1000 pF Pi
56-743	-009	-019	-014	D	5000 pF C
56-743	-010	-020	-015	E	4000 pF Pi
56-743	-030	-027	-024	F	830 pF C
56-743	-031	-028	-025	J	100 pF Pi
56-743	-032	-029	-026	K	2500 pF Pi
56-743	-036	-035	-034	N	375 pF C



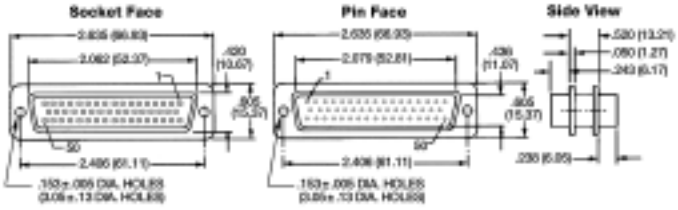
Solder Cup Termination

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-746-001	A	310 pF Pi
56-746-002	B	1000 pF C
56-746-003	C	1000 pF Pi
56-746-004	D	5000 pF C
56-746-005	E	4000 pF Pi
56-746-006	F	830 pF C
56-746-007	J	100 pF Pi
56-746-008	K	2500 pF Pi
56-746-009	N	375 pF C
56-746-018	L	500 pF C



Pin/Socket Adapter

MCI Part Number	EMI Filter	
	Filter Designation	Cap. Value
56-745-001	A	310 pF Pi
56-745-002	B	1000 pF C
56-745-003	C	1000 pF Pi
56-745-004	D	5000 pF C
56-745-005	E	4000 pF Pi
56-745-006	F	830 pF C
56-745-007	J	100 pF Pi
56-745-008	K	2500 pF Pi
56-745-019	N	375 pF C
56-745-027	L	500 pF C



Dimensions in inches (mm)

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ISO 9001

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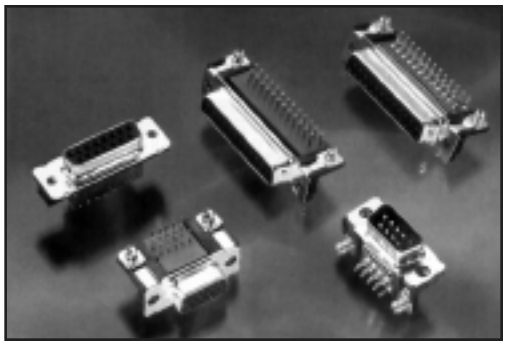
Chip-on-Board Filtered Connectors

These versatile and widely used PCB connectors are an inexpensive filtering method that eliminates the problem of conductive electromagnetic interference (EMI).

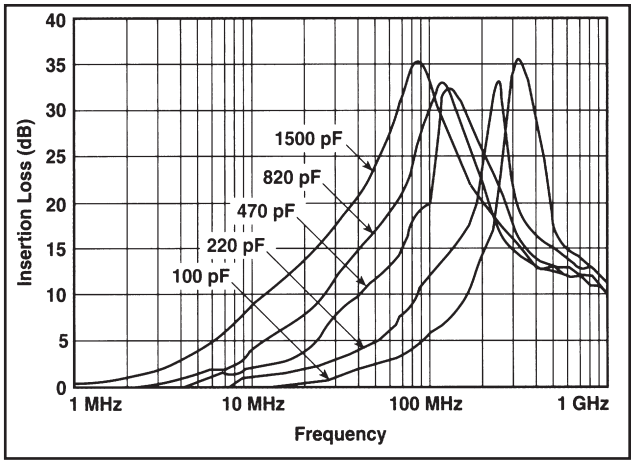
Chip-on-board plug and receptacles are available in 9, 15 and 25 positions. These connectors are "drop-in" replacements for non-filtered subminiature D connectors with matched PCB footprints. Housings are made of high temperature UL-94V-0 rated thermoplastic material. Low cost front metal shells are compatible with full metal-shell threaded insert mating hardware and integral boardlocks to secure posted connectors to the PC board, prior to soldering.



Features

- Offer economical EMI/RFI protection
- Matched PCB footprints mean "Drop-in" replacement for non-filtered connectors
- Chip capacitors on a PC board
- Connectors have industry standard interface
- Connector housing made of UL 94V-0 rated high temperature, thermoplastic
- Connector body is recognized under the Component Program of Underwriters Laboratories, Inc.
- Connector body is certified by the Canadian Standards Association

Typical Insertion Loss



Mechanical Specifications

Front Shell . . . . . Steel, tin plated

Housing . . . . . 94V-0 rated thermoplastic, black

Eyelets . . . . . Brass, tin plated

Threaded Inserts . . . . . Zinc

Boardlocks . . . . . Copper alloy, tin-lead plated

Pin Contacts (Posted) . . . . . Brass, duplex plated as follows: .000030 (0.00076) gold on mating end, with entire contact .000050 (0.00127) (min.) nickel underplated.

Performance Specifications

Current Rating . . . . . 5 Amps

Contact Resistance . . . . . 8 Milliohms max.

Capacitance . . . . . 100, 220, 470, 820 and 1,500 pF ± 30%

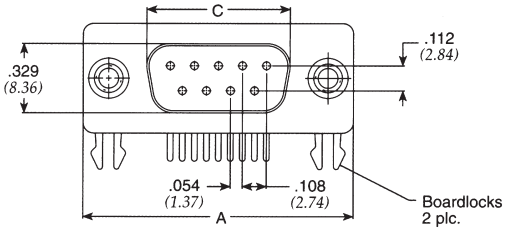
Dielectric Withstanding Voltage . . . . . 1,000 VAC min. for 1 minute

Insulator Resistance . . . . . 5,000 Megaohms min.

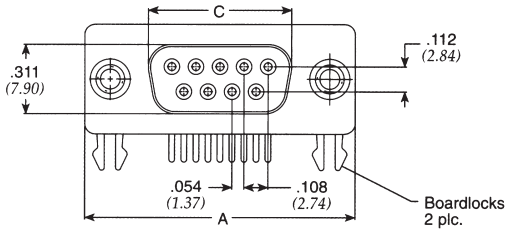
Dimensions in inches (mm)

Chip-on-Board Filtered Connectors

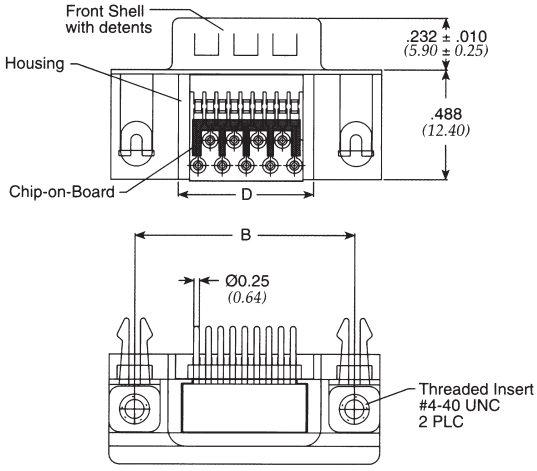
Pin Contact

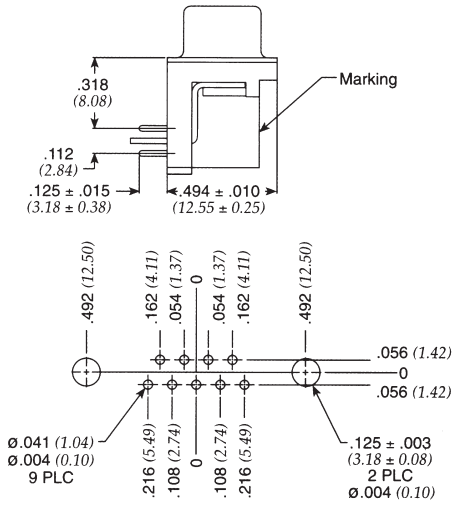


Socket Contact



Common to Pin and Socket Contact





P.C. Board Mounting Dimensions

Pin Contact Part Number	Socket Contact Part Number	Capacitance pF	Shell Size	Number of Positions	Dimensions A	B	C (Pin)	C (Socket)	D
56-102-006	56-104-006	1500	1	9	1.213 ± .015 (30.81 ± 0.38)	.984 (25.00)	.666 ± .010 (16.92 ± 0.25)	.643 ± .010 (16.33 ± 0.25)	.606 (15.40)
56-102-005	56-104-005	820							
56-102-004	56-104-004	470							
56-102-003	56-104-003	220							
56-102-002	56-104-002	100							
56-112-006	56-114-006	1500	2	15	1.541 ± .015 (39.14 ± 0.38)	1.312 (33.32)	.994 ± .010 (25.25 ± 0.25)	.971 ± .010 (24.66 ± 0.25)	.929 (23.60)
56-112-005	56-114-005	820							
56-112-004	56-114-004	470							
56-112-003	56-114-003	220							
56-112-002	56-114-002	100							
56-122-006	56-124-006	1500	3	25	2.088 ± .015 (53.04 ± 0.38)	1.852 (47.04)	1.534 ± .010 (38.96 ± 0.25)	1.511 ± .010 (38.38 ± 0.25)	1.476 (37.50)
56-122-005	56-124-005	820							
56-122-004	56-124-004	470							
56-122-003	56-124-003	220							
56-122-002	56-124-002	100							

Dimensions in inches (mm)

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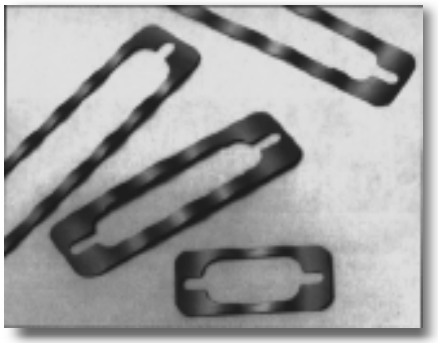
Waved Metal Gaskets For D-Subminiature

MCI's Line of Waved Metal Gaskets for Maximum EMI Filter Performance

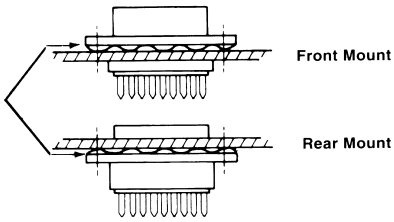
Proper mounting of an EMI filter is critical to achieving optimum filtering performance. For applications requiring very high attenuation, it is necessary to fill the gaps at the mounting surface-to-connector interface. The length of any gap must be short, relative to the wave-length of the signal to be attenuated. MCI supplies a line of "waved" gaskets. This design ensures the maximum "gap length" will not exceed the wave pitch, .200" (5.08 mm), even on surfaces with poor flatness. This ensures maximum filter performance to 1 GHz and beyond.

Specifications

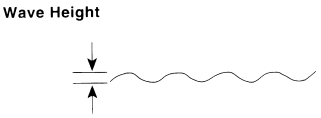
- **Material** . . . . . .Beryllium Copper, CA 172 (per QQ-C-533)
- **Finish** . . . . . .Electro tin plate, 100 micro inches (per MIL-T-10727)
- **Material Thickness** . . . . . .0.005" (.13mm) compressed
- **Wave Height** . . . . . .0.030" +.020/-.015 (.76 +.51/-.38mm)
- **Length increase when flattened** .0.008" (.20mm) per inch



Waved Metal Grounding / Shielding Gasket (shown in free state)



Wave Height



How To Order

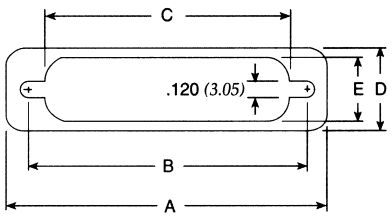
572019-00XXX-70

Select part number by filling in "xxx" (ie: 572019-00xxx-70) referring to the tables at right.

Mounting (Front mounted pin or socket connector, rear mounted pin connector)

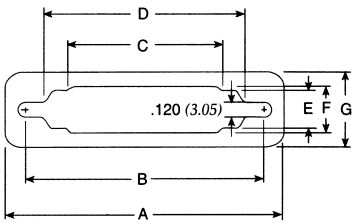
Shell Size	A ±.020" (0.51)	B ±.020" (0.51)	C ±.020" (0.51)	D ±.020" (0.51)	E ±.005" (0.13)	"XXX"
9	1.213 (30.81)	0.984 (24.99)	0.777 (19.74)	0.600 (15.24)	0.440 (11.18)	100
15	1.541 (39.14)	1.312 (33.32)	1.105 (28.07)	0.600 (15.24)	0.440 (11.18)	101
25	2.088 (53.04)	1.852 (47.04)	1.645 (41.78)	0.600 (15.24)	0.400 (11.18)	102
37	2.729 (69.32)	2.500 (63.50)	2.293 (58.24)	0.600 (15.24)	0.440 (11.18)	103
50	2.635 (66.93)	2.406 (61.11)	2.190 (55.63)	.710 (18.03)	.550 (13.97)	104

Dimensions in inches (mm).



Mounting (Rear mounted socket connectors only)

Shell Size	A ±.020" (0.51)	B ±.020" (0.51)	C ±.020" (0.51)	D ±.020" (0.51)	E ±.005" (0.13)	F ±.005" (0.13)	G ±.020" (0.51)	"XXX"
9	1.213 (30.81)	0.984 (24.99)	0.450 (11.43)	0.660 (16.76)	0.324 (8.23)	0.360 (9.14)	0.600 (15.24)	105
15	1.541 (39.14)	1.312 (33.32)	0.670 (17.02)	0.988 (25.10)	0.324 (8.23)	0.360 (9.14)	0.600 (15.24)	106
25	2.088 (53.04)	1.852 (47.04)	1.110 (28.19)	1.528 (38.81)	0.324 (8.23)	0.360 (9.14)	0.600 (15.24)	107
37	2.729 (69.32)	2.500 (63.50)	1.550 (39.37)	2.176 (55.27)	0.324 (8.23)	0.360 (9.14)	0.600 (15.24)	108
50	2.635 (66.93)	2.406 (61.11)	1.550 (39.37)	2.082 (52.88)	0.436 (11.07)	0.470 (11.94)	0.710 (18.03)	109



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