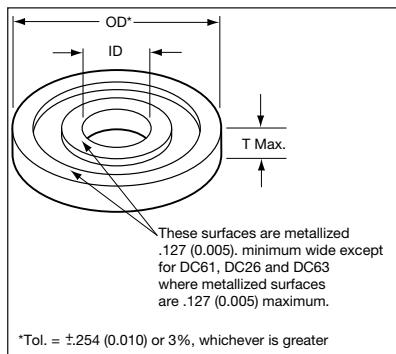
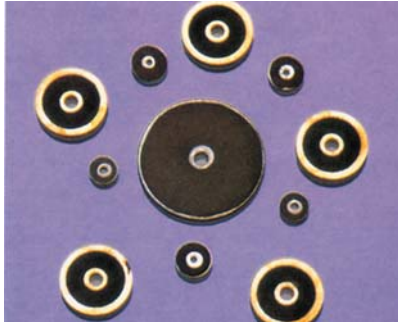


Discoidal MLC Feed-Through Capacitors and Filters



DC Style (US Preferred Sizes) / XB Style (European Preferred Sizes)
XF Style (Feed-Through Discoidal)

APPLICATION INFORMATION ON DISCOIDAL



LOWEST CAPACITANCE IMPEDANCES TO GROUND

A discoidal MLC capacitor has very low impedance associated with its ground path since the signal is presented with a multi-directional path. These electrode paths, which can be as many as 100, allow for low ESR and ESL which are the major elements in impedance at high frequencies.

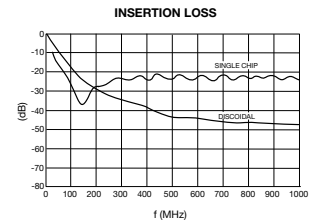
The assembled discoidal element or feed-thru allows signal to be fed in through a chassis or bulkhead, conditioned as it passes through the discoidal, and isolated by the chassis and discoidal from the original signal. An example of this application would be in an AFT circuit where the AC noise signal would be required to be stripped from the DC control signal. Other applications include single line EMI/RFI suppression, L-C filter construction, and coaxial shield bypass filtering.

The shape of the discoidal lends itself to filter construction. The short length allows compact construction where L-C construction is desired.

The size freedom associated with this element allows almost any inside/outside diameter combination. By allowing the inside diameter to equal the center insulator diameter of a coaxial signal line and special termination techniques, this device will allow bypass filtering of a floating shield to ground.

Discoidal capacitors are available in three temperature coefficients (C0G, X7R, Z5U) and a variety of sizes, the most standard of which appear in this catalog.

AVX's DC Series 50V, 100V, 200V, C0G and X7R parts are capable of meeting the requirements of MIL-PRF-31033.



ELECTRICAL SPECIFICATIONS

Temperature Coefficient

C0G: A Temperature Coefficient - 0 ±30 ppm/°C, -55° +125°C

X7R: C Temperature Coefficient - ±15%, -55° to +125°C

Z5U: E Temperature Coefficient - +22, -56%, +10° to +85°C

Capacitance Test (MIL-STD-202 Method 305)

C0G: 25°C, 1.0±0.2 Vrms at 1KHz, for ≤100 pF use 1 MHz

X7R: 25°C, 1.0±0.2 Vrms at 1KHz

Z5U: 25°C, 0.5 Vrms max at 1KHz

Dissipation Factor 25°C

C0G: 0.15% Max @ 25°C, 1.0±0.2 Vrms at 1KHz, for ≤100 pF use 1 MHz

X7R: 2.5% Max @ 25°C, 1.0±0.2 Vrms at 1KHz

Z5U: 3.0% Max @ 25°C, 0.5 Vrms max at 1KHz

Insulation Resistance 25°C (MIL-STD-202 Method 302)

C0G and X7R: 100K MΩ or 1000 MΩ-μF, whichever is less.

Z5U: 10K MΩ or 1000 MΩ-μF, whichever is less.

Insulation Resistance 125°C (MIL-STD-202 Method 302)

C0G and X7R: 10K MΩ or 100 MΩ-μF, whichever is less.

Z5U: 1K MΩ or 100 MΩ-μF, whichever is less.

Dielectric Withstanding Voltage 25°C (Flash Test)*

C0G and X7R: 250% rated voltage for 5 seconds with 50 mA max charging current. 500V rated units will be tested at 750 VDC

Z5U: 200% rated voltage for 5 seconds with 50 mA max charging current.

Life Test (1000 hrs)

C0G and X7R: 200% rated voltage at +125°C (500 Volt units @ 600 VDC)

Z5U: 150% rated voltage at +85°C

Moisture Resistance (MIL-STD-202 Method 106)

C0G, X7R, Z5U: Ten cycles with no voltage applied.

Thermal Shock (MIL-STD-202 Method 107, Condition A)

Immersion Cycling (MIL-STD-202 Method 104, Condition B)

HOW TO ORDER

DC61	5	A	561	K	A	5	1	06
AVX Style	Voltage	Temperature Coefficient	Capacitance Code	Capacitance Tolerance	Test Level	Termination	Inside Diameter	Maximum Thickness
See Pages 101-102	50V = 5 100V = 1 200V = 2 500V = 7	C0G = A X7R = C Z5U = E	(2 significant digits + no. of zeros) Examples: 10 pF = 100 100 pF = 101 1,000 pF = 102 22,000 pF = 223 220,000 pF = 224 1 μF = 105	C0G: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z5U: M = ±20% Z = +80 -20% P = GMV	A = Standard	5 = Silver (AVX Standard)	See Pages 102-104	06 = 1.52 (0.060) 10 = 2.54 (0.100)

For dimensions, voltages or values not specified, please consult factory.



Discoidal MLC Feed-Through Capacitors and Filters



DC Style

SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: millimeters (inches)

EIA Characteristic		COG																		
AVX Style	DC61	DC26	DC63	DC04	DC65	DC66	DC67	DC69	DC32	DC70	DC02	DC71	DC05	DC73	DC72					
Outside Diameter (OD)*	2.54 (0.100)	3.43 (0.135)	3.81 (0.150)	4.83 (0.190)	5.33 (0.210)	5.97 (0.235)	6.73 (0.265)	8.13 (0.320)	8.51 (0.335)	8.89 (0.350)	9.40 (0.370)	9.78 (0.385)	12.70 (0.500)	15.24 (0.600)	16.26 (0.640)					
Thickness Maximum (T)	1.52 (0.060)	1.52 (0.060)	1.52 (0.060)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)					
Inside Diameter No. (ID)	1,2	1,2,3	1,2,3,4	1,2,3	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4					
Voltage	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50					
cap. in pF	10 12 15	18 22 27	33 39 47	56 68 82	100 120 150	180 220 270	330 390 470	560 680 820	1000 1200 1500	1800 2200 2700	3300 3900 4700	5600 6800 8200	10,000 12,000 15,000	18,000 22,000 27,000	33,000 39,000 47,000	56,000 68,000 82,000	100,000 120,000 150,000	180,000 220,000 270,000	330,000 390,000 470,000	560,000 680,000

*Outside Diameter:
Tolerance is ±0.254 (0.010) or 3%
whichever is greater

*Outside Diameter:			Inside Diameter:		
1 = .635 ^{+.127} _{-.051}	(.025 ^{+.005} _{-.002})		3 = .914 ^{+.127} _{-.051}	(.036 ^{+.005} _{-.002})	5 = 1.27±.127 (0.050±.005)
2 = .762 ^{+.127} _{-.051}	(.030 ^{+.005} _{-.002})		4 = 1.07 ^{+.127} _{-.051}	(.042 ^{+.005} _{-.002})	6 = 1.52±.127 (0.060±.005)
					7 = 1.73±.127 (0.068±.005)



Discoidal MLC Feed-Through Capacitors and Filters



DC Style

SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: millimeters (inches)

EIA Characteristic	X7R															
	DC61	DC26	DC63	DC04	DC65	DC66	DC67	DC69	DC32	DC70	DC02	DC71	DC05	DC73	DC72	
AVX Style	DC61	DC26	DC63	DC04	DC65	DC66	DC67	DC69	DC32	DC70	DC02	DC71	DC05	DC73	DC72	
Outside Diameter (OD)*	2.54 (0.100)	3.43 (0.135)	3.81 (0.150)	4.83 (0.190)	5.33 (0.210)	5.97 (0.235)	6.73 (0.265)	8.13 (0.320)	8.51 (0.335)	8.89 (0.350)	9.40 (0.370)	9.78 (0.385)	12.70 (0.500)	15.24 (0.600)	16.26 (0.640)	
Thickness Maximum (T)	1.52 (0.060)	1.52 (0.060)	1.52 (0.060)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	
Inside Diameter No. (ID)	1,2	1,2,3	1,2,3,4	1,2,3	5,6,7	5,6,7	5,6,7	5,6,7	5,6,7	5,6,7	5,6,7	5,6,7	5,6,7	5,6,7	5,6,7	
Voltage	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	
cap. in pF	56	68	82	100	120	150	180	220	270	330	390	470	560	680	820	
	1000	1200	1500	1800	2200	2700	3300	3900	4700	5600	6800	8200	10,000	12,000	15,000	
	18,000	22,000	27,000	33,000	39,000	47,000	56,000	68,000	82,000	100,000	120,000	150,000	180,000	220,000	270,000	
	330,000	390,000	470,000	560,000	680,000	820,000	1,000,000	1,200,000	1,500,000	1,800,000	2,200,000	2,700,000	3,300,000	3,900,000	4,700,000	
	5,600,000	6,800,000	8,200,000	10,000,000	12,000,000	15,000,000	18,000,000	22,000,000	27,000,000	33,000,000	39,000,000	47,000,000	56,000,000	68,000,000	82,000,000	
	1.0 μF	1.2 μF	1.5 μF	1.8 μF	2.2 μF	2.7 μF	3.3 μF	3.9 μF	4.7 μF	5.6 μF	6.8 μF	8.2 μF	10 μF	12 μF	15 μF	

*Outside Diameter:
Tolerance is ±0.254 (0.010) or 3%
whichever is greater

Inside Diameter:		
1 = .635 ^{+.127} _{-.051} (.025 ^{+.005} _{-.002})	3 = .914 ^{+.127} _{-.051} (.036 ^{+.005} _{-.002})	5 = 1.27±.127 (0.050±.005)
2 = .762 ^{+.127} _{-.051} (.030 ^{+.005} _{-.002})	4 = 1.07 ^{+.127} _{-.051} (.042 ^{+.005} _{-.002})	6 = 1.52±.127 (0.060±.005)
		7 = 1.73±.127 (0.068±.005)



Discoidal MLC Feed-Through Capacitors and Filters



DC Style

SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: millimeters (inches)

EIA Characteristic		Z5U														
AVX Style	DC61	DC26	DC63	DC04	DC65	DC66	DC67	DC69	DC32	DC70	DC02	DC71	DC05	DC73	DC72	
Outside Diameter (OD)*	2.54 (0.100)	3.43 (0.135)	3.81 (0.150)	4.83 (0.190)	5.33 (0.210)	5.97 (0.235)	6.73 (0.265)	8.13 (0.320)	8.51 (0.335)	8.89 (0.350)	9.40 (0.370)	9.78 (0.385)	12.70 (0.500)	15.24 (0.600)	16.26 (0.640)	
Thickness Maximum (T)	1.52 (0.060)	1.52 (0.060)	1.52 (0.060)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	
Inside Diameter No. (ID)	1,2	1,2,3	1,2,3,4	1,2,3	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	
Voltage	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	200 100 50	
cap. in pF	1800	2200	2700													
	3300	3900	4700													
	5600	6800	8200													
	10,000	12,000	15,000													
	18,000	22,000	27,000													
	33,000	39,000	47,000													
	56,000	68,000	82,000													
	100,000	120,000	150,000													
	180,000	220,000	270,000													
	330,000	390,000	470,000													
	560,000	680,000	820,000													
	1.0 μF	1.2 μF	1.5 μF													
	1.8 μF	2.2 μF	2.7 μF													
	3.3 μF	3.9 μF	4.7 μF													
	5.6 μF	6.8 μF	8.2 μF													
	10.0 μF	12.0 μF	15.0 μF													

*Outside Diameter:
Tolerance is ±0.254 (0.010) or 3%
whichever is greater

Inside Diameter:		
1 = .635 ^{+.127} _{-.051} (.025 ^{+.005} _{-.002})	3 = .914 ^{+.127} _{-.051} (.036 ^{+.005} _{-.002})	5 = 1.27±.127 (0.050±.005)
2 = .762 ^{+.127} _{-.051} (.030 ^{+.005} _{-.002})	4 = 1.07 ^{+.127} _{-.051} (.042 ^{+.005} _{-.002})	6 = 1.52±.127 (0.060±.005)
		7 = 1.73±.127 (0.068±.005)

Discoidal MLC Feed-Through Capacitors and Filters



Discoidal XB / Feed-through XF – C0G

HOW TO ORDER

XB	06	Z	G	0104	K	--
AVX Style XB XF	Size 03 04 06 07 08 09 10 14 15	Class C = NPO Z = X7R	Voltage D = 63 E = 100 F = 160 G = 250 I = 400 J = 500 (optional)	Capacitance EIA code on 3 or 4 digits	Tolerance J = 5% K = 10% M = 20%	Packaging -- : bulk

REFERENCES

Type	Terminations	Reference	Mechanical Characteristics
	Silver palladium	XB..C•....• --	CECC 30600 MIL 11015 D Conformance to CK12 TYPE
	Tinned silver palladium	XB..C•....• MB	
	Silver palladium	XF.C•....• --	
	Tinned silver palladium	XF.C•....• MB	

DIMENSIONS

Size	OD		ID		bm min	Ø (XF)	e	
	XB/XF	XB/XF..MB	XB	XB..MB			min	max
03	3.8 ± 0.3 (0.150 ± 0.012)	4.1 ± 0.4 (0.161 ± 0.016)	0.7 ± 0.15 (0.028 ± 0.006)	> 0.4 (> 0.016)	0.1 (0.004)	0.5 (0.020)	1	See table
04	3.8 ± 0.3 (0.150 ± 0.012)	—	1.2 ± 0.15 (0.047 ± 0.006)	—	0.1 (0.004)	—	1	on page
08	7.9 ± 0.3 (0.311 ± 0.012)	8.2 ± 0.4 (0.323 ± 0.016)	0.8 ± 0.15 (0.031 ± 0.006)	> 0.5 (> 0.020)	0.2 (0.008)	0.6 (0.024)	1	105

ELECTRICAL CHARACTERISTICS

Dielectric Class	C0G
Temperature Coefficient	0 ± 30 ppm/°C
Climatic Category	-55 / 125 / 56
Operating Temperature	-55 +125°C
Rated Voltage (U _R)	50 to 400V
Test Voltage (U _e)	2.5 U _R
Tangent of Loss Angle C < 50 pF	tg δ < 1.5 (150/C _R + 7)10 ⁻⁴
C ≥ 50 pF	tg δ < 15(10 ⁻⁴)
Insulation Resistance	R _i ≥ 100 GΩ

Discoidal MLC Feed-Through Capacitors and Filters



Discoidal XB / Feed-through XF – C0G

RATED VOLTAGE – RATED CAPACITANCES

Capacitance C_R	Size		
	03	04	08
	Rated Voltage - U_R (V)/Ur code		
	50/63	50/63	160
	D	D	F
10 pF			
15 pF			
22 pF			
33 pF			
47 pF			
68 pF			
100 pF			
150 pF			
220 pF			
330 pF			
470 pF			
680 pF			
1000 pF			
1500 pF			
2200 pF			
3300 pF			
4700 pF			
6800 pF			
10 nF			
15 nF			
22 nF			
33 nF			
47 nF			
68 nF			
100 nF			
Thickness e_{max} mm (inches)	1.4 (0.055)	1.4 (0.055)	1.8 (0.071)

- other values, please contact us
- for tinned types, add 0.5 (0.020) to e_{max}

Discoidal MLC Feed-Through Capacitors and Filters



Discoidal XB / Feed-through XF – X7R

REFERENCES

Type	Terminations	Reference	Mechanical Characteristics
	Silver palladium	XB..Z•....• --	CECC 30700 MIL 11015 D Conformance to CK12, CK13, CK14 TYPES
	Tinned silver palladium	XB..Z•....• MB	
	Silver palladium	XF..Z•....• --	
	Tinned silver palladium	XF..Z•....• MB	

DIMENSIONS

Size	millimeters (inches)							e	
	XB/XF OD	XB/XF...MB	XB ID	XB...MB	bm min	Ø (XF)	e		
							min	max	
03	3.8 ± 0.3 (0.150 ± 0.012)	4.1 ± 0.4 (0.161 ± 0.016)	0.7 ± 0.15 (0.028 ± 0.006)	> 0.4 (> 0.016)	0.1 (0.004)	0.5 (0.020)	1.0 (0.039)	See table on page 107	
04	3.8 ± 0.3 (0.150 ± 0.012)	—	1.2 ± 0.15 (0.047 ± 0.006)	—	0.1 (0.004)	—	1.0 (0.039)		
06	6.4 ± 0.3 (0.252 ± 0.012)	6.7 ± 0.4 (0.264 ± 0.016)	1.7 ± 0.15 (0.067 ± 0.006)	> 0.5 (> 0.020)	0.2 (0.008)	0.6 (0.024)	1.0 (0.039)		
07	7.3 ± 0.3 (0.287 ± 0.012)	7.6 ± 0.4 (0.299 ± 0.016)	1.7 ± 0.15 (0.067 ± 0.006)	> 0.5 (> 0.020)	0.2 (0.008)	0.6 (0.024)	1.0 (0.039)		
08	7.9 ± 0.3 (0.311 ± 0.012)	8.2 ± 0.4 (0.323 ± 0.016)	0.8 ± 0.15 (0.031 ± 0.006)	> 0.5 (> 0.020)	0.2 (0.008)	0.6 (0.024)	1.0 (0.039)		
09	8.4 ± 0.4 (0.331 ± 0.016)	8.7 ± 0.5 (0.343 ± 0.020)	1.6 ± 0.3 (0.063 ± 0.012)	> 0.5 (> 0.020)	0.2 (0.008)	0.6 (0.024)	1.0 (0.039)		
10	9.6 ± 0.4 (0.378 ± 0.016)	9.9 ± 0.5 (0.390 ± 0.020)	1.2 ± 0.15 (0.047 ± 0.006)	> 0.9 (> 0.035)	0.2 (0.008)	1.0 (0.039)	1.0 (0.039)		
14	14.0 ± 0.5 (0.551 ± 0.020)	14.3 ± 0.6 (0.563 ± 0.024)	1.7 ± 0.3 (0.067 ± 0.012)	> 0.9 (> 0.035)	0.2 (0.008)	1.0 (0.039)	1.0 (0.039)		
15	15.0 ± 0.5 (0.591 ± 0.020)	15.3 ± 0.6 (0.602 ± 0.024)	2.3 ± 0.3 (0.091 ± 0.012)	> 0.9 (> 0.035)	0.2 (0.008)	1.0 (0.039)	1.0 (0.039)		

ELECTRICAL CHARACTERISTICS

Dielectric Class	X7R
Temperature Coefficient	$\Delta C/C \leq \pm 15\%$ (-55 +125°C)
Climatic Category	-55 / 125 / 56
Operating Temperature	-55 +125°C
Rated Voltage (U_R)	50 to 400V
Test Voltage (U_e)	2.5 U_R
Tangent of Loss Angle	$\text{tg } \delta \leq 250(10^{-4})$
Insulation Resistance	
C ≤ 10 nF	$R_i \geq 100 \text{ G}\Omega$
C > 10 nF	$R_i \times C \geq 1000\text{s}$

Discoidal MLC Feed-Through Capacitors and Filters



Discoidal XB / Feed-through XF – X7R

RATED VOLTAGE – RATED CAPACITANCES

Capacitance C_R	Size																													
	03-04		06			07					08-09					10					14-15									
	U _R (V)/Code U _R																													
	50/63	50/63	100	160	250	50/63	100	160	250	400	50/63	100	160	250	400	50/63	100	160	250	400	50/63	100	160	250	400					
D	D	E	F	G	D	E	F	G	I	D	E	F	G	I	D	E	F	G	I	D	E	F	G	I						
100 pF																														
150 pF																														
220 pF																														
330 pF																														
470 pF																														
680 pF																														
1000 pF																														
1500 pF																														
2200 pF																														
3300 pF																														
4700 pF																														
6800 pF																														
10 nF																														
15 nF																														
22 nF																														
33 nF																														
47 nF																														
68 nF																														
100 nF																														
150 nF																														
220 nF																														
330 nF																														
470 nF																														
680 nF																														
1 μF																														
1.5 μF																														
2.2 μF																														
3.3 μF																														
4.7 μF																														
e _{max} mm (inches)	1.4 (0.055)	2 (0.079)	2 (0.079)	2 (0.079)	2 (0.079)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	1.8 (0.071)	3 (0.118)	1.8 (0.071)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	3 (0.118)	3.5 (0.138)	3.5 (0.138)	3.5 (0.138)	3.5 (0.138)	3.5 (0.138)

- other values, please contact us
- for tinned types, add 0.5 (0.020) to e_{max}

