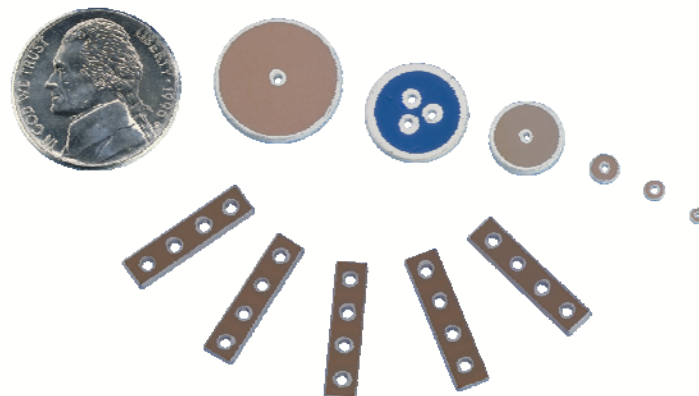
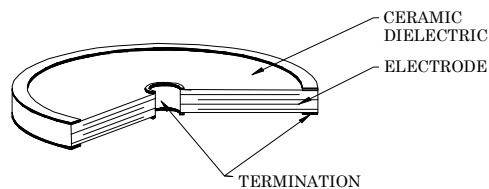


DISCOIDAL CERAMIC CAPACITORS AND CUSTOM CAPARRAYS

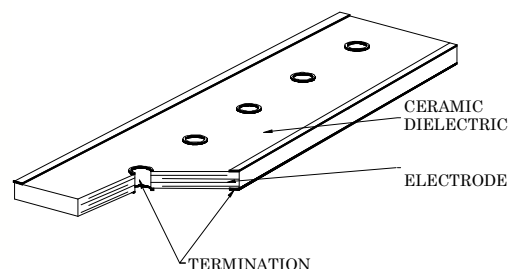
CROSS-SECTION OF A DISCOIDAL CAPACITOR



DISCOIDAL CERAMIC CAPACITORS & CUSTOM CAPARRAYS

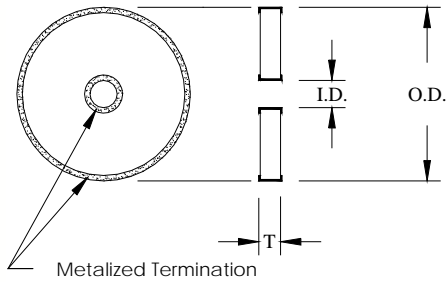
PA&E discoidal feed-thru capacitors are the basic element in ceramic EMI-RFI filters. They are available in NPO, BX, X7R, and Z5U temperature coefficients. Sizes range from .050" OD to 1.100" OD with capacitance values from 10 pF to 5 μF and voltage ratings of 50 VDC to 500 VDC are available as standard product. The Caparray is a custom designed line of multiple element feed-thru capacitors. Physical configurations are offered in an almost infinite number of possibilities. Consult our engineering staff for a customized solution to your packaging problems.

CROSS-SECTION OF A RECTANGULAR



Operation Temperature Range:	NPO and X7R -55°C to +125°C; Z5U +10°C to +85°C
Temperature Coefficient:	NPO 0 ± 30ppm/°C; X7R ± 15%; Z5U +22% -56%
Capacitance Values:	10pF to 8μF @ 1KHz and .1-1 VRMS, 25°C
Capacitance Tolerance:	J = ±5%; K = ±10%; M = ±20%; Z = -20% +80%; P = -0% +100%
Dissipation Factor @ 1 KHz, 1 VRMS:	NPO = .1% Max.; X7R = 2.5% Max.; Z5U = 4% Max.
Insulation Resistance @ 25°C, WVDC, 2 Minutes Max:	NPO and X7R = 100G Ohm or 1000M Ohm - μF whichever is less Z5U = lesser of 10G Ohm or 1000M Ohm -μF
Insulation Resistance @ 125°C, WVDC, 2 Minutes Max:	NPO and X7R = 10G Ohm or 100M Ohm - μF whichever is less Z5U = lesser of 1G Ohm or 100M Ohm -μF
Dielectric Withstanding Voltage @ 25°C, 5±1 Sec.and 50 mA Max Charging Current:	NPO and X7R = 2.5 x WVDC Z5U = 1 x WVDC
Mechanical Dimensions:	Per table at the back of this data sheet
Environmental Test Spec:	Mil-STD-202
Solderability:	Method 208
Burn-in and Life Test Conditions:	Method 108A Condition D NPO and X7R = 2 x WVDC @ + 125°C Z5U = 1.4 x WVDC @ + 85°C

DISCOIDAL CERAMIC CAPACITORS AND CUSTOM CAPARRAYS



In specifying the electrical performance, the designer need only define the performance of the ceramic dielectric. In most cases, the user specifies the expected capacitance of the device and the tolerance of change in capacitance from capacitor to capacitor and over the operating temperature range of the circuit. Variance among capacitors is related primarily to the consistency of the manufacturing process. Change in capacitance over the expected operating temperature range of the device is determined by the dielectric. Multilayer ceramic capacitors are generally available in three dielectrics : NPO (same as COG), X7R, and Z5U (sometimes Y5V). (These dielectric descriptions are specified by the Electronic Industries Association.).

PA&E Filter Division PART NUMBER (How to Order)

Part shall be identified by Base Configuration, Outer Diameter, Material, Capacitance, Voltage Rating, Inner Diameter, Thickness, and Reliability Level.

EXAMPLE:

FC	100	X	502	P	101-	036-	050-	PSA	
									RELIABILITY LEVEL
									C: COMMERCIAL
									B: HIGH RELIABILITY
									PSA: GROUP A PER MIL-PRF-31033 & MIL-PRF-28861
									PSB: GROUP B PER MIL-PRF-31033 & MIL-PRF-28861
									THICKNESS: EX .050* *
									INNER DIAMETER: EX .036**
									VOLTAGE RATING: EX 100 VDC*
									CAPACITANCE TOLERANCE
									J: ±5%
									K: ±10%
									M: ±20%
									V: VARIABLE—CUSTOMER SPECIFIED
									Z: +80%, -20%
									P: GUARANTEED MINIMUM VALUE
									CAPACITANCE: EX 5,000 Pf*
									MATERIAL
									X: X7R
									N: NPO
									Z: Z5U
									OUTER DIAMETER: EX .100**
									CONFIGURATION
									FC: FEEDTHRU CAPACITOR

* CAPACITANCE AND VOLTAGE CODES ARE AS FOLLOWS:
FIRST TWO DIGITS ARE SIGNIFICANT. THIRD IN MULTIPLIER

** SEE PAGE 52

CUSTOM SIZES AVAILABLE UPON REQUEST.

DISCOIDAL CERAMIC CAPACITORS AND CUSTOM CAPARRAYS

TYPE	FC50	FC70	FC80	FC100	FC140	FC200	FC240	FC290	FC330	FC370	FC640
OD (IN.) ± .010	.50	.70	.80	.100	.140	.200	.240	.290	.330	.370	.640
T (IN.) MAX	.040	.040	.050	.070	.090	.100	.110	.120	.150	.170	.200

EIA CODE	WVDC	MAXIMUM AVAILABLE CAPACITANCE									
NPO	50VDC	270 pF	400 pF	400 pF	1800 pF	4700 pF	18K pF	33K pF	47K pF	68K pF	80K pF
	100VDC	82 pF	200 pF	200 pF	950 pF	2700 pF	12K pF	18K pF	33K pF	47K pF	56K pF
	200VDC	-	-	-	330 pF	1200 pF	5.6K pF	12K pF	18K pF	22K pF	33K pF
	300VDC/115VAC	-	-	-	-	-	3.9K pF	6K pF	12K pF	15K pF	22K pF
	400VDC/240VAC	-	-	-	-	-	-	-	-	6.8K pF	8K pF
X7R	50VDC	6.8K pF	10K pF	10K pF	33K pF	.15 µF	.39 µF	.75 µF	1.2 µF	1.8 µF	2.2 µF
	100VDC	2.7K pF	5K pF	5K pF	18K pF	.1 µF	.27 µF	.4 µF	.68 µF	1.2 µF	1.4 µF
	200VDC	-	-	-	7K pF	.05 µF	.12 µF	.22 µF	.33 µF	.56 µF	.68 µF
	300VDC/115VAC	-	-	-	-	-	-	.1 µF	.22 µF	.33 µF	.4 µF
	400VDC/240VAC	-	-	-	-	-	-	-	-	.15 µF	.2 µF

Inspection of Product for Delivery	
C	<p>Manufacture per PA&E internal commercial standards</p> <p>CAPACITANCE per MIL-STD-202, Method 305: 1 KHz and 0.1-1.0 Vrms, 25°C</p> <p>DISSIPATION FACTOR per MIL-STD-202, Method 305: 1 KHz and 0.1-1.0 Vrms, 25°C</p> <p>INSULATION RESISTANCE per MIL-STD-202, Method 302: Rated Voltage, 25°C</p> <p>DIELECTRIC WITHSTANDING VOLTAGE per MIL-STD-202, Method 301: 2.5X Rated DC Voltage, 5 ±1 SECONDS, 50 mA maximum charge current, 25°C</p> <p>VISUAL/MECHANICAL per QCTP 5002: Sample</p>
B	<p>Design and Manufacture per MIL-PRF 31033 for class B devices</p> <p>CAPACITANCE per MIL-STD-202, Method 305: 1 KHz and 0.1-1.0 Vrms, 25°C</p> <p>DISSIPATION FACTOR per MIL-STD-202, Method 305: 1 KHz and 0.1-1.0 Vrms, 25°C</p> <p>INSULATION RESISTANCE per MIL-STD-202, Method 302: Rated Voltage, 25°C</p> <p>DIELECTRIC WITHSTANDING VOLTAGE per MIL-STD-202, Method 301: 2.5X Rated DC Voltage, 5 ±1 SECONDS, 50 mA maximum charge current, 25°C</p> <p>VISUAL/MECHANICAL per MIL-PRF-31033 para 4.7.2: 100% Visual / Sample Mechanical</p> <p>DPA per MIL-PRF-31033 para 4.7.8: Sample size per Table VII</p>
PSA	<p>Design and Manufacture per MIL-PRF 31033 for class S devices</p> <p>CAPACITANCE per MIL-STD-202, Method 305: 1 KHz and 0.1-1.0 Vrms, 25°C</p> <p>DISSIPATION FACTOR per MIL-STD-202, Method 305: 1 KHz and 0.1-1.0 Vrms, 25°C</p> <p>INSULATION RESISTANCE per MIL-STD-202, Method 302: Rated Voltage, 25°C</p> <p>DIELECTRIC WITHSTANDING VOLTAGE per MIL-STD-202, Method 301: 2.5X Rated DC Voltage, 5 ±1 SECONDS, 50 mA maximum charge current, 25°C</p> <p>VISUAL/MECHANICAL per MIL-PRF-31033 para 4.7.2: 100% Visual / Sample Mechanical</p> <p>IN-PROCESS INSPECTION per MIL-PRF-31033 (Table IV)</p> <p>N-RAY per para 4.7.1: 100%</p> <p>VISUAL EXAMINATION per para 4.7.2: 100%</p> <p>DIELECTRIC VOLTAGE BREAKDOWN per para 4.7.14: Sample size per Table IX, column B</p> <p>GROUP A per MIL-PRF-31033 (Table V)</p> <p>Subgroup 1</p> <p>Thermal Shock and voltage conditioning per para 4.7.3: 100%</p> <p>Dielectric Withstanding Voltage per para 4.7.6: 100%</p> <p>Insulation Resistance @ 25°C per para 4.7.7: 100%</p> <p>Insulation Resistance @ 125°C per para 4.7.7: 100%</p> <p>Capacitance per para 4.7.4: 100%</p> <p>Dissipation Factor per para 4.7.5: 100%</p> <p>Subgroup 2</p> <p>Visual and Mechanical Examination per para 4.7.2: Sample size per Table IX, column A</p> <p>Subgroup 3</p> <p>DPA per MIL-PRF-31033 para 4.7.8: Sample size per Table VII</p>
PSB	<p>Applicable to capacitors that have passed the requirements of PSA</p> <p>GROUP B per MIL-PRF-31033 (Table VI, except Life)</p> <p>Subgroup 1</p> <p>Humidity, steady state, low voltage per para 4.7.12: Sample size 12</p> <p>Subgroup 2</p> <p>Voltage/Temperature Limits per para 4.7.11: Sample size 12</p> <p>Subgroup 3</p> <p>Solderability per para 4.7.9: Sample size 12</p> <p>Resistance to soldering heat per para 4.7.10: sample size 12}</p>