

# Unitrode Ceramic Capacitors

www.33audio.com

date probably late 1980s. By 1992  
Unitrode was owned by AVX

## Features

### Reliability

- **Lead Pull & Torsion** per MIL-STD-202, Method 211, condition A & D.
- **Resistance to Soldering Heat** per MIL-STD-202, Method 210, condition B.
- **Hermeticity** per MIL-STD-202, Method 112, Condition C procedure III a. (Glass only.)
- **Vibration and Shock** per MIL-STD-202, Method 204, Condition O and Method 213, Condition I.
- **Thermal Shock** per MIL-STD-202, Method 107, Condition A (125°C).
- **Moisture Resistance** per MIL-STD-202, Method 106 (20 cycles).
- **Life** per MIL-C-39014.
- **Flammability**

### Automatic Insertion

Unitrode axial leaded MLCs can be automatically inserted in printed circuit boards at rates greater than 8000 per hour making them ideal devices for high volume bypass and decoupling applications. Their rugged construction makes them impervious to the mechanical stresses of insertion and the thermal stresses of the board soldering operation.

### Hermeticity (Glass Only)

The glass encapsulation assures an hermetic seal that protects the chip from becoming contaminated under the most severe environmental conditions.

### High Volume

The construction of both our conformal coated and glass encapsulated capacitors lends itself to highly automated production assuring the optimum combination of price, performance and service.

### Small Size

Unitrode's "A," "B," 17A, and 17B packages can be automatically inserted into holes spaced on .300 inch centers. This is the same spacing as for standard dual-in-line integrated circuit packages.

### Fail Safe (Glass Only)

Consult Engineering for detailed information.

### Lead/Chip, Contact (Glass Only)

The unique construction and manufacturing process utilized in forming the lead/chip connection makes a contact that is impervious to high temperature environments and operations.

## QUALITY

Unitrode's Quality Assurance system complies with MIL-Q-9858. Lot qualification using mechanical and electrical sampling techniques as well as 100% testing at key process steps assures that specifications and test limit integrity is maintained. Consistency of product flow and product performance is aided by use of Statistical Process Control and Statistical Quality Control methodology. Unitrode's Total Quality

Concept supports your Dock to Stock needs.

The following tests are conducted on all production lots.

**CAPACITANCE:** Capacitance is checked on 100% of each shipment lot with a final check on an AQL basis. Test conditions for NPO and X7R dielectrics are 1 VRMS ± .25 VRMS and .3 VRMS for the Z5U.

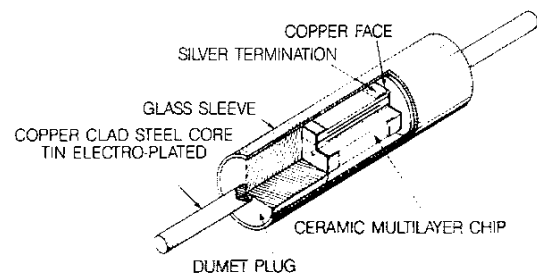
**DISSIPATION FACTOR:** This parameter is also checked on a 100% basis. The limits are .1% for NPO 2.5% for X7R and 3% for Z5U at stated test voltages.

**DIELECTRIC WITHSTANDING VOLTAGE:** All dielectrics are tested at 250% of rated voltage with charging current limited to 50mA maximum.

**INSULATION RESISTANCE:** Capacitors are tested to an AQL level at rated voltage for a maximum two minute charging time. All dielectrics are required to meet 100,000 megohms or 1000 megohm microfarads whichever is the lesser of the two.

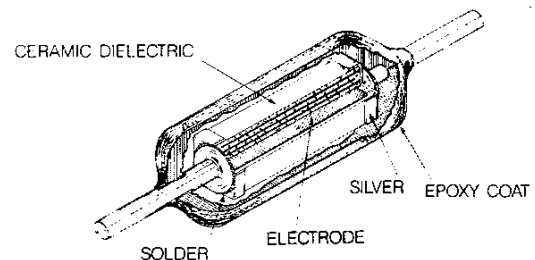
All above specifications are at room temperature and humidity.

### Schematic Diagrams of Package Construction



Unitrode Glass Axial-Leaded Capacitor

FIGURE 4



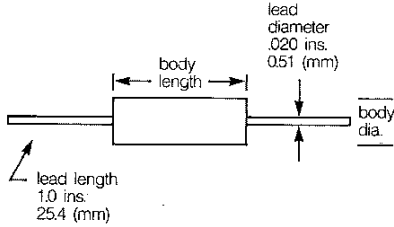
Unitrode Conformal Axial-Leaded Capacitor

FIGURE 5

# PRODUCT SPECIFICATIONS

## Glass Encapsulated

### NPO (COG) Characteristics



### Performance

#### MIL Specifications:

Meets or exceeds applicable portions of MIL-C-11015 and MIL-C-39014.

#### Insulation Resistance:

Minimum 100,000 megohms or 1,000 megohm microfarads, whichever is less, with rated voltage applied, @ 25°C (see curve for other temperatures).

#### Dielectric Strength:

2.5 x WVDC

#### Life Test:

2 x WVDC @ 125°C, 1000 hours.

#### Temperature Range:

-55°C to +125°C

#### Temperature Coefficient:

0 ± 30 PPM/°C

#### Dissipation Factor:

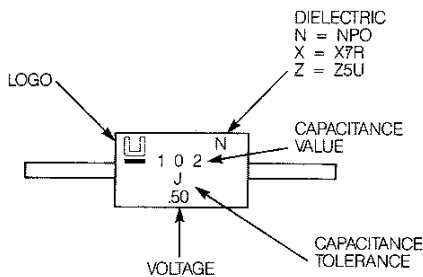
0.1% max. at 1 MHz @ 1 VRMS (≤100pF)  
1 KHz @ 1 VRMS (≤100pF)

#### Capacitance Tolerance:

C (± .25pF), D (± .5pF),  
F (± 1%), G (± 2%), J (± 5%),  
K (± 10%), M (± 20%)

PACKAGE	B	D	E	F	EIA Capacitance Code
Body Length (max.)	.170 ins. 4.32 (mm)	.260 ins. 6.60 (mm)	.300 ins. 7.62 (mm)	.400 ins. 10.16 (mm)	
Body Dia. (max.)	.100 ins. 2.54 (mm)	.100 ins. 2.54 (mm)	.110 ins. 2.79 (mm)	.150 ins. 3.81 (mm)	
Capacitance pF	Voltage 50 100	Voltage 50 100	Voltage 50 100	Voltage 50 100	
10					100
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
220					221
270					271
330					331
390					391
470					471
560					561
680					681
820					821
1000					102
1200					122
1500					152
1800					182
2200					222
2700					272
3300					332
3900					392
4700					472
5600					562
6800					682
8200					822
.01μF					103

### Marking:

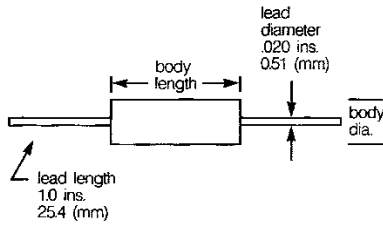


### How to Order

STYLE	PACKAGE	EIA CAPACITANCE CODE	TOLERANCE	VOLTAGE	TEMPERATURE CHARACTERISTIC
CG	B 170 x 100 D 260 x 100 E 300 x 110 F .400 x 150	Capacitance Value in pF	C ±.25pF D ±.5pF F ±1% G ±2% J ±5% K ±10% M ±20%	C 25V D 50V E 100V F 200V	N NPO

**Glass Encapsulated**

**X7R (BX) Characteristics**



**Performance**

**MIL Specifications:**

Meets or exceeds applicable portions of MIL-C-11015 and MIL-C-39014.

**Insulation Resistance:**

Minimum 100,000 megohms or 1,000 megohm microfarads, whichever is less, with rated voltage applied, @ 25°C (see curve for other temperatures).

**Dielectric Strength:**

2.5 x WVDC

**Life Test:**

2 x WVDC @ 125°C, 1000 hours.

**Temperature Range:**

-55°C to +125°C

**Temperature Coefficient:**

± 15%

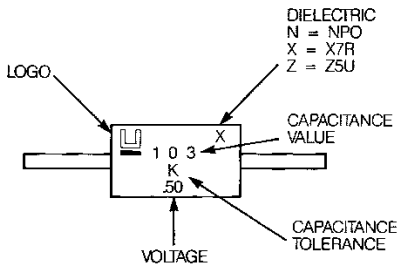
**Dissipation Factor:**

2.5% @ 1 KHz @ 1 VRMS

**Capacitance Tolerance:**

K (± 10%), M (± 20%) Consult Factory for J (± 5%) Tolerance

**Marking:**



PACKAGE	A	B	D	E	F	EIA Capacitance Code
Body Length (max.)	.170 ins. 4.32 (mm)	.170 ins. 4.32 (mm)	.260 ins. 6.60 (mm)	.300 ins. 7.62 (mm)	.400 ins. 10.16 (mm)	
Body Dia (max.)	.075 ins. 1.91 (mm)	.100 ins. 2.54 (mm)	.100 ins. 2.54 (mm)	.110 ins. 2.79 (mm)	.150 ins. 3.81 (mm)	
Capacitance pF	Voltage 50 100	Voltage 50 100	Voltage 50 100	Voltage 50 100	Voltage 50 100	
100						101
120						121
150						151
180						181
220						221
270						271
330						331
390						391
470						471
560						561
680						681
820						821
1000						102
1200						122
1500						152
1800						182
2200						222
2700						272
3300						332
3900						392
4700						472
5600						562
6800						682
8200						822
.01µF						103
.012						123
.015						153
.018						183
.022						223
.027						273
.033						333
.039						393
.047						473
.056						563
.068						683
.082						823
.10						104
.12						124
.15						154
.18						184
.22						224

**How to Order**

STYLE	PACKAGE	EIA CAPACITANCE CODE	TOLERANCE	VOLTAGE	TEMPERATURE CHARACTERISTIC
CG	A 170 x .075 B 170 x 100 D 260 x 100 E 300 x 110 F 400 x 150	Capacitance Value in pF	J ± 5% K ± 10% M ± 20%	C 25V D 50V E 100V F 200V	X X7R

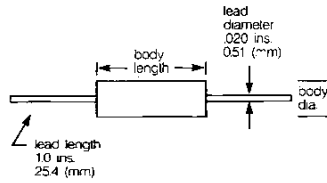
# Unitrode Axial Capacitors Catalog CAP400 date?

www.33Audio.com

## Glass Encapsulated

### Z5U Characteristics (General Purpose)

#### Z5U Characteristics (General Purpose)



### Performance

**Insulation Resistance:**  
 Minimum 100,000 megohms or 1,000 megohm microfarads, whichever is less, with rated voltage applied, @ 25°C (see curve for other temperatures).

**Dielectric Strength:**  
 2.5 x WVDC below .5 mfd;  
 2.0 x WVDC .5 mfd and above.

**Life Test:**  
 1.5 x WVDC @ 85°C, 1000 hours.

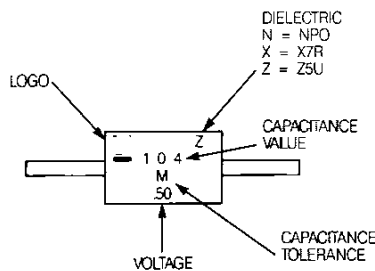
**Temperature Range:**  
 +10°C to +85°C

**Temperature Coefficient:**  
 +22, -56%

**Dissipation Factor:**  
 3.0% max. at 1 KHz, 25°C,  
 @ .3 VRMS

**Capacitance Tolerance:**  
 M (±20%), Z (+80%, -20%),  
 GMV (+100%, -0%).

### Marking:



Package	A	B	D	E	F	EIA Capacitance Code
Body Length (max.)	.170 ins. 4.32 (mm)	.170 ins. 4.32 (mm)	.260 ins. 6.60 (mm)	.300 ins. 7.62 (mm)	.400 ins. 10.16 (mm)	
Body Dia. (max.)	.075 ins. 1.91 (mm)	.100 ins. 2.54 (mm)	.100 ins. 2.54 (mm)	.110 ins. 2.79 (mm)	.150 ins. 3.81 (mm)	
Capacitance pF	Voltage 50 100	Voltage 50 100	Voltage 50 100	Voltage 50 100	Voltage 50 100	
1000						102
1200						122
1500						152
1800						182
2200						222
2700						272
3300						332
3900						392
4700						472
5600						562
6800						682
8200						822
.01µF						103
.012						123
.015						153
.018						183
.022						223
.027						273
.033						333
.039						393
.047						473
.056						563
.068						683
.082						823
.10						104
.12						124
.15						154
.18						184
.22						224
.27						274
.33						334
.39						394
.47						474
.56						564
.68						684
.82						824
1.0						105

### How to Order

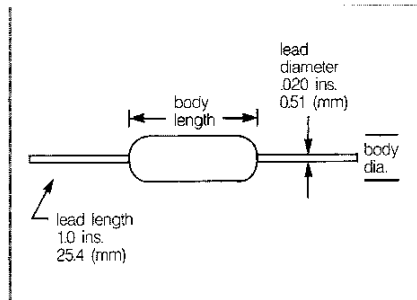
STYLE	PACKAGE	EIA CAPACITANCE CODE	TOLERANCE	VOLTAGE	TEMPERATURE CHARACTERISTIC
CG	A 170 x 075 B 170 x 100 D 260 x 100 E 300 x 110 F 400 x 150	Capacitance Value in pF	M ±20% Z +80%, -20% V GMV	C 25V D 50V E 100V F 200V	Z Z5U

Unitrode Axial Ceramic  
 date circa 1987

www.33Audio.com

**Conformal Coated**

**NPO (COG) Characteristics**



**Performance**

**MIL Specifications:**

Meets or exceeds applicable portions of MIL-C-11015 and MIL-C-39014.

**Insulation Resistance:**

Minimum 100,000 megohms or 1,000 megohm microfarads, whichever is less, with rated voltage applied, @ 25°C (see curve for other temperatures).

**Dielectric Strength:**

2.5 x WVDC

**Life Test:**

2 x WVDC @ 125°C, 1000 hours.

**Temperature Range:**

-55°C to +125°C

**Temperature Coefficient:**

0 ± 30 PPM/°C

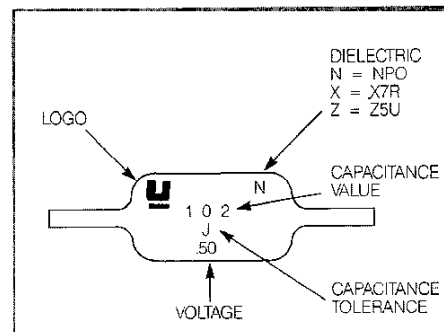
**Dissipation Factor:**

0.1% max. at 1 MHz @ 1 VRMS (≤ 100pF)  
 1 KHz @ 1 VRMS (> 100pF)

**Capacitance Tolerance:**

C (± .25pF), D (± .5pF), F (± 1%), G (± 2%), J (± 5%), K (± 10%), M (± 20%)

**Marking:**



Package	CA17A	CA17B	CA26B	CA40C	EIA Capacitance Code
Body Length (max.)	.170 ins. 4.32 (mm)	.170 ins. 4.32 (mm)	.260 ins. 6.60 (mm)	.400 ins. 10.16 (mm)	
Body Dia (max.)	.100 ins. 2.54 (mm)	.125 ins. 3.13 (mm)	.125 ins. 3.13 (mm)	.150 ins. 3.81 (mm)	
Capacitance pF	Voltage 50 100	Voltage 50 100	Voltage 50 100	Voltage 50 100	
10					100
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
220					221
270					271
330					331
390					391
470					471
560					561
680					681
820					821
1000					102
1200					122
1500					152
1800					182
2200					222
2700					272
3300					332
3900					392
4700					472
5600					562
6800					682
8200					822
.01µF					103
.012µF					123

**How to Order**

STYLE	PACKAGE	EIA CAPACITANCE CODE	TOLERANCE	VOLTAGE	TEMPERATURE CHARACTERISTIC
CA	17A .170 × .100 17B .170 × .125 26B .260 × .125 40C .400 × .150	Capacitance Value in pF	C ±.25pF D ±.5pF F ±1% G ±2% J ±5% K ±10%	D 50V E 100V	N NPO

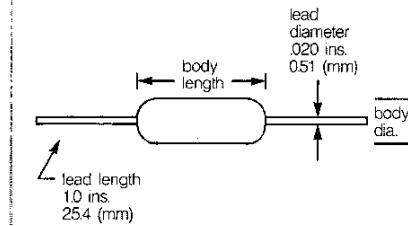
Unitrode Axial  
 Ceramic

www.33audio.com

**Conformal Coated**

**X7R (BX) Characteristics**

**X7R (BX) Characteristics**



**Performance**

**MIL Specifications:**

Meets or exceeds applicable portions of MIL-C-11015 and MIL-C-39014.

**Insulation Resistance:**

Minimum 100,000 megohms or 1,000 megohm microfarads, whichever is less, with rated voltage applied, @ 25°C (see curve for other temperatures).

**Dielectric Strength:**

2.5 x WVDC

**Life Test:**

2 x WVDC @ 125°C, 1000 hours.

**Temperature Range:**

-55°C to +125°C

**Temperature Coefficient:**

± 15%

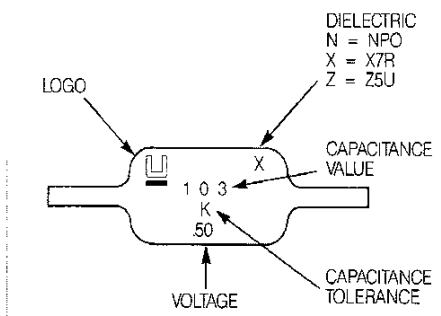
**Dissipation Factor:**

2.5% @ 1 KHz @ 1 VRMS

**Capacitance Tolerance:**

K (± 10%), M (± 20%) Consult Factory for J (± 5%) Tolerance

**Marking:**



Package	CA17A	CA17B	CA26B	CA40C	EIA Capacitance Code
Body Length (max.)	.170 ins. 4.32 (mm)	.170 ins. 4.32 (mm)	.260 ins. 6.60 (mm)	.400 ins. 10.16 (mm)	
Body Dia (max.)	.100 ins. 2.54 (mm)	.125 ins. 3.18 (mm)	.125 ins. 3.18 (mm)	.150 ins. 3.81 (mm)	
Capacitance pF	Voltage 50 100	Voltage 50	Voltage 50 100	Voltage 50 100	
100					101
120					121
150					151
180					181
220					221
270					271
330					331
390					391
470					471
560					561
680					681
820					821
1000					102
1200					122
1500					152
1800					182
2200					222
2700					272
3300					332
3900					392
4700					472
5600					562
6800					682
8200					822
.01µF					103
.012					123
.015					153
.018					183
.022					223
.027					273
.033					333
.039					393
.047					473
.056					563
.068					683
.082					823
.10					104
.12					124
.15					154
.18					184
.22					224
.27					274
.33					334
.39					394
.47					474

**How to Order**

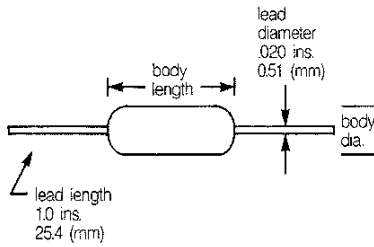
STYLE	PACKAGE	EIA CAPACITANCE CODE	TOLERANCE	VOLTAGE	TEMPERATURE CHARACTERISTIC
CA	17A .170 x .100 17B .170 x .125 26B .260 x .125 40C .400 x .150	Capacitance Value in pF	J ±5% K ±10% M ±20%	D 50V E 100V	X X7R

Unitrode Axial Ceramic

www.33audio.com

**Conformal Coated**

**Z5U Characteristics (General Purpose)**



**Performance**

**Insulation Resistance:**

Minimum 100,000 megohms or 1,000 megohm microfarads, whichever is less, with rated voltage applied, @ 25°C (see curve for other temperatures).

**Dielectric Strength:**

2.5 x WVDC below .5 mfd;  
2.0 x WVDC .5 mfd and above.

**Life Test:**

1.5 x WVDC @ 85°C, 1000 hours.

**Temperature Range:**

+10°C to +85°C

**Temperature Coefficient:**

+22, -56%

**Dissipation Factor:**

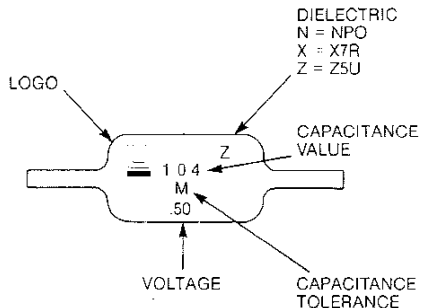
3.0% max. at 1 KHz, 25°C,  
@ .3 VRMS

**Capacitance Tolerance:**

M (±20%), Z (+80%, -20%),  
GMV (+100%, -0%).

Package	CA17A	CA17B	CA26B	CA40C	EIA Capacitance Code
Body Length (max.)	.170 ins. 4.32 (mm)	.170 ins. 4.32 (mm)	.260 ins. 6.60 (mm)	.400 ins. 10.16 (mm)	
Body Dia. (max.)	.100 ins. 2.54 (mm)	.125 ins. 3.18 (mm)	.125 ins. 3.18 (mm)	.150 ins. 3.81 (mm)	
Capacitance pF	Voltage 50 100	Voltage 50	Voltage 50 100	Voltage 50 100	
1000					102
1200					122
1500					152
1800					182
2200					222
2700					272
3300					332
3900					392
4700					472
5600					562
6800					682
8200					822
.01µF					103
.012					123
.015					153
.018					183
.022					223
.027					273
.033					333
.039					393
.047					473
.056					563
.068					683
.082					823
.10					104
.12					124
.15					154
.18					184
.22					224
.27					274
.33					334
.39					394
.47					474
.56					564
.68					684
.82					824
1.0					105

**Marking:**



**How to Order**

STYLE	PACKAGE	EIA CAPACITANCE CODE	TOLERANCE	VOLTAGE	TEMPERATURE CHARACTERISTIC
CA	17A .170 × .100 17B .170 × .125 26B .260 × .125 40C .400 × .125	Capacitance Value in pF	M ±20% Z +80%, -20% V GMV	D 50V E 100V	Z Z5U