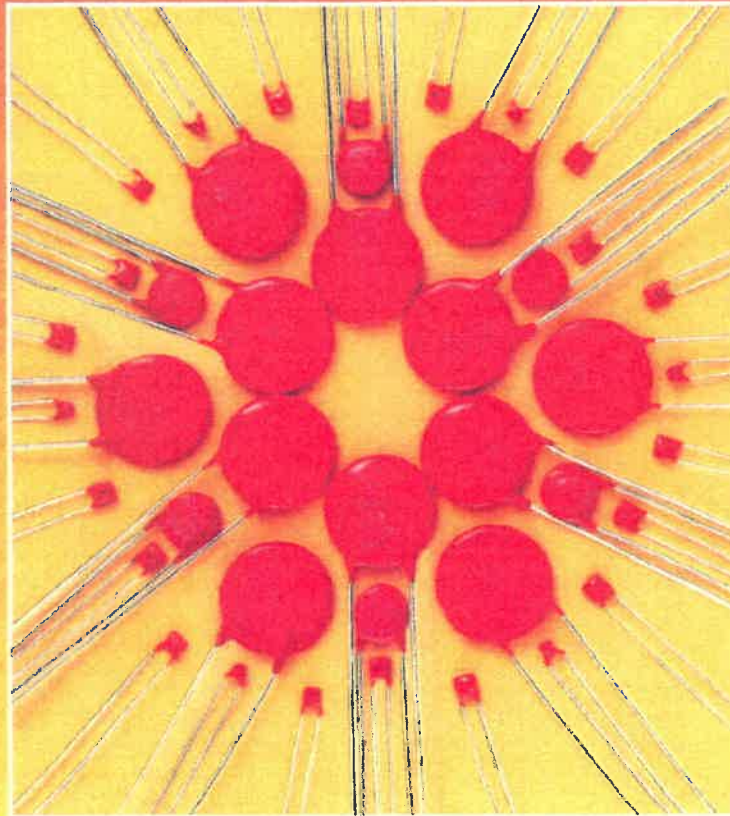


TUSONIX

Catalog 800



Ceramic Fixed Capacitors

TUSONIX

DISC CERAMIC CAPACITORS



Ceramic capacitors, because of their inherent reliability, small size, low cost and wide choice of electrical characteristics available, now outsell all other types combined. TUSONIX manufactures both fixed and variable ceramic capacitors in a broad range of capacitance values, shapes and sizes for the most complete selection in the industry. The most widely used of all are the ceramic disc capacitors which are described in this catalog.

The following pages describe the electrical properties and physical dimensions of TUSONIX's ceramic disc capacitors, capacitance values from 1pF to .06 μ F and D.C. voltage

ratings up to 6000 are included. Within each of the rated voltage classifications a variety of other electrical properties may be selected.

From the standpoint of use, the many ceramic disc capacitors made by TUSONIX can be broadly classified and characterized as follows:

1. **Temperature Compensating** — highest Q, minute capacitance change with temperature, more stable than glass or mica.
2. **Extended Temperature Compensating** — finite and repeatable capacitance change

with temperature, also high Q and stability second only to preceding.

3. **High Dielectric Constant** — high capacitance, low dissipation factor replaces paper, film, glass, mica in general purpose applications — biggest seller.

There is considerable overlap in the electrical characteristics of the above categories. This catalog lists the specifications for all significant electrical characteristics so that circuit designers may select the capacitor best suited for each specific application.

TO ORDER:

Specify TUSONIX style number, voltage, TC code, capacitance, tolerance, and any special instructions.

Example:

831-500V-Z5U-1000 pf \pm 20%
20 AWG outside kink leads,
.187 \pm .025" lead length.

Occasionally, to expedite delivery, TUSONIX will use a more stable Hi-K formulation than ordered.

NOTES:

1. Derate to 67% of rated voltage for +125°C operation.
2. Derate to 60% of rated voltage for +125°C operation.
3. For +85°C operation.

Metric dimensions are designated in this catalog in the following manner:

| | |
|--------------|-----------|
| inches mm | inches/mm |
|--------------|-----------|

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TUSONIX DISC CERAMIC CAPACITORS

APPLICATIONS AND FEATURES

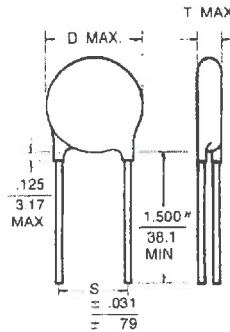
TUSONIX Ceramic Disc Capacitors offer high performance in a complete range of ratings, values and sizes. The complete line of voltage ratings offers the designer the convenience of selecting the exact capacitor rating required for his application. Where voltage rating is not critical, we recommend our standard 500 volt line.

Temperature Compensating Ceramic Capacitors (NPO thru N750) are ideal for applications requiring very precisely controlled capacitance change with temperature, high Q and very small capacitance tolerance.

Extended Temperature Compensating Disc Capacitors (N1500 thru N5600) are capacity sensitive to temperature in varying degrees, and are useful as temperature compensating elements for stabilization over a wide temperature range. They are also widely used in tuning and resonant circuits.

TUSONIX General Purpose or Hi-K Ceramic Disc Capacitors are available in a broad range of dielectric constants. This allows a wide selection of capacitance values.

PHYSICAL CHARACTERISTICS



1. For D, T & S dimensions, see individual charts.
2. See individual charts for standard wire gauge. All values up to and including 2 kV are available with 20, 22 and 24 AWG leads, except body sizes .655" max. and larger available with 20 or 22 AWG only. All values up to and including 6 kV are available with 20 or 22 AWG leads.
3. Body insulation — conformal coating.
4. Standard max. coating on leads is .125"; closer control is optional at extra cost.
5. Marking — Trademark, Cap, Tol., T.C., and Voltage (Voltage omitted on 500V).

SPECIALS

Special disc products are available from TUSONIX upon request. Details on TUSONIX's approval for U.L. line by-pass capacitors and approval to Mil-C-20 and Mil-C-11015 can be found elsewhere in this catalog.

Special physical requirements are also available. This includes the lead types shown on page 13. Special lead spacing requirements are optional upon request, in addition to the standard nominal lead spacings shown in the capacitance charts.

TUSONIX has an excellent background in High Reliability products, and is well known throughout the industry for quality and reliability. TUSONIX's Engineering Department is at your disposal to answer questions and make recommendations concerning any type of special testing and manufacturing required. We are proud of our years of experience and vast accumulation of data, which we encourage you to use.

TUSONIX

LOW VOLTAGE DISC CERAMIC CAPACITORS

200 Vdc or Less

| TUSONIX STYLE NUMBER | 865 | 835 | 805 | 855 | 875 | 815 | 845 | 825 |
|----------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|
| MAXIMUM DIAMETER (D) | 225/5.71 | 275/6.99 | 344/8.74 | 420/10.67 | 475/12.07 | 575/14.81 | 655/16.64 | 720/18.29 |
| LEAD SPACING (S) | 200/5.08 | 250/6.35 | 250/6.35 | 250/6.35 | 250/6.35 | 375/9.52 | 375/9.52 | 375/9.52 |
| WIRE GAUGE (AWG) | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |

| GENERAL PURPOSE (HI-K) | TEMP. CHAR. CODE | NOTE | MIN CAP TOL (%) | MIN TC TOL | MAX DF (%) | MIN Q | MAXIMUM NOMINAL CAPACITANCE (pF) | | | | | | | |
|---------------------------|------------------------|------|--------------------------|------------------|------------------|----------|----------------------------------|------|-------|-------|-------|-------|-------|-------|
| | | | | | | | THICKNESS .125" MAX. | | | | | | | |
| | Z50 Y5E X5F X7F | | ±5 | | 2 | | 150 | 240 | 420 | 650 | 870 | 1000 | 1300 | 1400 |
| | Z50 Y5E X5F X7R | 1 | ±5 | | 2 | | 500 | 800 | 1400 | 2100 | 2900 | 3400 | 4600 | 5000 |
| | Z5F Y5F X5F X7P | 1 | ±10 | | 2 | | 700 | 1500 | 2400 | 3700 | 4500 | 5000 | 7000 | 7500 |
| | Z5F Y5F X5F X7S | 2 | ±10 | | 2 | | 1000 | 2000 | 3400 | 5000 | 6000 | 7000 | 9500 | 10500 |
| | Z5U Y5U X5U X7V | 2 | ±20 | | 2 | | 2000 | 3300 | 5700 | 8700 | 11000 | 13000 | 18000 | 20000 |
| | Z5V Y5V X5W X7W | 2 | ±20 | | 3 | | 2500 | 5100 | 10000 | 13000 | 18000 | 21000 | 26000 | 30000 |

| TEMPERATURE COMPENSATING EXTENDED TEMPERATURE COMPENSATING | NPO | CODE ¹ | | ±1 | ±30 | | 1000 | 20 | 1-40 | 70 | 110 | 150 | 170 | 240 | 250 |
|---|-------|-------------------|---|----|-------|--|------|-----|--------|------|------|------|------|------|------|
| | | | | | | | | | | | | | | | |
| | N080 | U16 | 1 | ±1 | ±30 | | 1000 | 12 | 1.8-30 | 50 | 80 | 90 | 100 | 140 | 150 |
| | N158 | P26 | 1 | ±1 | ±30 | | 1000 | 14 | 1.9-35 | 60 | 90 | 100 | 120 | 160 | 170 |
| | N220 | R26 | 1 | ±1 | ±30 | | 1000 | 15 | 2-36 | 65 | 100 | 110 | 130 | 180 | 190 |
| | N330 | S2K | 1 | ±1 | ±60 | | 1000 | 19 | 2.2-40 | 70 | 110 | 120 | 140 | 200 | 210 |
| | N470 | T2H | 2 | ±1 | ±60 | | 1000 | 20 | 2.6-50 | 90 | 130 | 150 | 170 | 240 | 250 |
| | N750 | U2J | | ±2 | ±120 | | 1000 | 40 | 3.5-80 | 130 | 210 | 280 | 340 | 460 | 490 |
| | N1500 | P3K | 1 | ±2 | ±250 | | 1000 | 48 | 6-120 | 210 | 320 | 350 | 410 | 560 | 580 |
| | N2200 | R3A | 2 | ±2 | ±400 | | 500 | 55 | 7-140 | 240 | 370 | 400 | 470 | 640 | 670 |
| | N3300 | S3B | 3 | ±5 | ±650 | | 500 | 95 | 12-240 | 420 | 640 | 700 | 820 | 1000 | 1100 |
| | N4200 | E3C | 3 | ±5 | ±850 | | 500 | 190 | 23-350 | 600 | 920 | 1200 | 1400 | 2000 | 2100 |
| | N4700 | T3D | 3 | ±5 | ±900 | | 200 | 200 | 25-420 | 720 | 1100 | 1500 | 1700 | 2400 | 2500 |
| | N5600 | R3M | 3 | ±5 | ±1000 | | 200 | 310 | 40-630 | 1000 | 1600 | 2200 | 2600 | 3600 | 3700 |

¹ See Page 1 for Notes.
² See Page B for additional design specifications.

TUSONIX

DISC CERAMIC CAPACITORS

500 VOLT

| TUSONIX STYLE NUMBER | 861 | 831 | 801 | 851 | 871 | 811 | 841 | 821 | 3841 | 3851 | 3871 | 3881 |
|----------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| MAXIMUM DIAMETER (D) | 235/5.96 | 290/7.37 | 360/9.14 | 437/12.45 | 490/12.45 | 593/15.06 | 675/17.15 | 750/19.05 | 800/20.32 | 857/22.23 | 937/23.80 | 1100/27.94 |
| LEAD SPACING (S) | 200/5.08 | 250/6.35 | 250/6.35 | 250/6.35 | 250/6.35 | 375/9.52 | 375/9.52 | 375/9.52 | 375/9.52 | 375/9.52 | 375/9.52 | 375/9.52 |
| WIRE GAUGE (AWG) | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |

| GENERAL PURPOSE (HI-K) | TEMP. CHAR. CODE | NOTE | MIN CAP TOL (%) | MIN TC TOL | MAX DF (%) | MIN Q | MAXIMUM NOMINAL CAPACITANCE (pF) | | | | | | | | | | | |
|------------------------|------------------|------|-----------------|------------|------------|-------|----------------------------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | | | | | THICKNESS .156" MAX. | | | | | | | | | | | |
| | Z5D Y5E X5F X7F | | ±5 | | 2 | | 120 | 200 | 350 | 500 | 720 | 1000 | 1300 | 1400 | 1450 | 1500 | 1600 | 1700 |
| | Z5D Y5E X5F X7R | 1 | ±5 | | 2 | | 400 | 680 | 1100 | 1800 | 2400 | 3400 | 4600 | 4700 | 4800 | 5300 | 5400 | 5600 |
| | Z5F Y5F X5F X7P | 1 | ±10 | | 2 | | 600 | 900 | 1500 | 2500 | 3500 | 5000 | 6500 | 7000 | 7400 | 8000 | 8200 | 8500 |
| | Z5F Y5F X5F X7S | 2 | ±10 | | 2 | | 800 | 1300 | 2300 | 3500 | 4700 | 7000 | 9000 | 10000 | 10300 | 11000 | 11500 | 12000 |
| | Z5U Y5U X5U X7V | 2 | ±20 | | 2 | | 1600 | 2000 | 3500 | 5400 | 7300 | 12000 | 16000 | 18000 | 19000 | 20000 | 21000 | 22000 |
| | Z5W Y5W X5W X7W | 2 | ±20 | | 3 | | 2400 | 3300 | 5600 | 8600 | 11000 | 20000 | 22000 | 25000 | 30000 | 32000 | 34000 | 35000 |

| TEMPERATURE COMPENSATING EXTENDED TEMPERATURE COMPENSATING | NPO | CODE † | | ±1 | ±30 | | 1000 | 20 | 1-30 | 60 | 90 | 120 | 150 | 210 | 240 | 250 | 270 | 280 | 290 |
|---|-------|--------|---|----|-------|--|------|-----|--------|-----|-----|------|------|------|------|------|------|------|------|
| | | | | | | | | | | | | | | | | | | | |
| | N000 | U16 | 1 | ±1 | ±30 | | 1000 | 10 | 1.8-21 | 36 | 55 | 75 | 95 | 120 | 135 | 150 | 155 | 160 | 180 |
| | N150 | P26 | 1 | ±1 | ±30 | | 1000 | 11 | 1.9-24 | 40 | 60 | 85 | 100 | 140 | 155 | 170 | 175 | 180 | 200 |
| | N220 | R26 | 1 | ±1 | ±30 | | 1000 | 12 | 2-26 | 45 | 65 | 90 | 110 | 160 | 175 | 190 | 195 | 200 | 220 |
| | N330 | S2H | 1 | ±1 | ±60 | | 1000 | 14 | 2.2-29 | 50 | 75 | 100 | 130 | 170 | 185 | 200 | 220 | 230 | 240 |
| | N470 | T2N | 2 | ±1 | ±60 | | 1000 | 20 | 2.6-35 | 60 | 90 | 125 | 150 | 210 | 230 | 250 | 260 | 270 | 290 |
| | N750 | U2J | | ±2 | ±120 | | 1000 | 40 | 3.5-60 | 110 | 170 | 230 | 340 | 450 | 470 | 480 | 520 | 540 | 560 |
| | N1500 | P3K | 1 | ±2 | ±250 | | 1000 | 40 | 6-82 | 140 | 210 | 290 | 360 | 490 | 550 | 580 | 600 | 640 | 690 |
| | N2200 | R3A | 2 | ±2 | ±400 | | 500 | 45 | 7-90 | 160 | 240 | 330 | 410 | 560 | 630 | 670 | 700 | 730 | 790 |
| | N3300 | S3B | 3 | ±5 | ±650 | | 500 | 80 | 12-160 | 280 | 430 | 580 | 720 | 990 | 1050 | 1100 | 1200 | 1300 | 1400 |
| | N4200 | G3C | 3 | ±5 | ±850 | | 500 | 86 | 23-170 | 300 | 460 | 620 | 1000 | 1400 | 1600 | 2000 | 2200 | 2300 | 2500 |
| | N4700 | T3D | 3 | ±5 | ±900 | | 200 | 100 | 25-210 | 360 | 550 | 750 | 1200 | 1600 | 2000 | 2500 | 2700 | 2800 | 3000 |
| | N5600 | N3M | 3 | ±5 | ±1000 | | 200 | 150 | 40-310 | 540 | 830 | 1100 | 1800 | 2500 | 3000 | 3700 | 3900 | 4100 | 4500 |

* See Page 1 for Notes
 † See Page 8 for additional design specifications.

TUSONIX

DISC CERAMIC CAPACITORS

1 and 2kV

| TUSONIX STYLE NUMBER | 868 | 838 | 808 | 858 | 878 | 818 | 848 | 828 | 3848 | 3858 | 3878 | 3888 |
|----------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| MAXIMUM DIAMETER (D) | 200/5.08 | 300/7.62 | 370/9.40 | 447/11.35 | 500/12.70 | 603/15.32 | 685/17.40 | 760/19.30 | 810/20.60 | 885/22.48 | 947/24.05 | 1110/28.20 |
| LEAD SPACING (S) | 250/6.35 | 250/6.35 | 250/6.35 | 250/6.35 | 250/6.35 | 375/9.52 | 375/9.52 | 375/9.52 | 375/9.52 | 375/9.52 | 375/9.52 | 375/9.52 |
| WIRE GAUGE (AWG) | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 20 | 20 | 20 | 20 |

| GENERAL PURPOSE H. K. | TEMP. CHAR. CODE | NOTE | MIN CAP TOL (%) | MIN TC TOL | MAX DF (%) | MIN Q | 1kV — MAXIMUM NOMINAL CAPACITANCE (pF) | | | | | | | | | | | |
|---|------------------|-------|-----------------|------------|------------|-------|--|--------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| | | | | | | | THICKNESS .156" MAX. | | | | | | | | | | | |
| GENERAL PURPOSE | Z5B Y5E X5F X7F | | ±5 | | 2 | | 100 | 140 | 245 | 380 | 540 | 900 | 1200 | 1400 | 1450 | 1500 | 1600 | 1700 |
| | Z5B Y5E X5F X7B | 1 | ±5 | | 2 | | 300 | 470 | 820 | 1200 | 1700 | 3000 | 4000 | 4700 | 4800 | 5300 | 5400 | 5600 |
| | Z5F Y5F X5F X7P | 1 | ±10 | | 2 | | 375 | 700 | 1200 | 1900 | 2500 | 4500 | 6000 | 7000 | 7400 | 8000 | 8200 | 8500 |
| | Z5F Y5F X5B X7S | 2 | ±10 | | 2 | | 500 | 950 | 1700 | 2700 | 3800 | 6400 | 8500 | 10000 | 10300 | 11000 | 11500 | 12000 |
| | Z5U Y5U X5U X7V | 2 | ±20 | | 2 | | 1000 | 1200 | 2000 | 3200 | 4500 | 7500 | 10500 | 12000 | 15000 | 19000 | 21000 | 22000 |
| | Z5V Y5V X5V X7W | 2 | ±20 | | | 3 | | 1500 | 2000 | 3500 | 5400 | 7400 | 12000 | 16000 | 20000 | 25000 | 30000 | 34000 |
| TEMPERATURE COMPENSATING EXTENDED TEMPERATURE COMPENSATING | NPQ | C0G † | ±1 | ±30 | | 1000 | 20 | 1-27 | 45 | 70 | 95 | 120 | 150 | 210 | 250 | 270 | 280 | 290 |
| | N033 | B16 | 1 | ±1 | ±30 | 1000 | 5 | 1.3-11 | 20 | 30 | 40 | 65 | 90 | 100 | 130 | 135 | 140 | 150 |
| | N080 | U16 | 1 | ±1 | ±30 | 1000 | 6 | 1.8-12 | 21 | 33 | 45 | 75 | 100 | 120 | 150 | 155 | 160 | 170 |
| | N150 | P26 | 1 | ±1 | ±30 | 1000 | 7 | 2.0-14 | 24 | 38 | 50 | 85 | 110 | 140 | 170 | 175 | 180 | 200 |
| | N220 | B26 | 1 | ±1 | ±30 | 1000 | 7 | 2.1-15 | 27 | 41 | 55 | 95 | 130 | 150 | 190 | 195 | 200 | 220 |
| | N330 | B2N | 1 | ±1 | ±60 | 1000 | 8 | 2.3-17 | 30 | 46 | 60 | 100 | 140 | 170 | 200 | 220 | 230 | 250 |
| | N470 | T2N | 2 | ±1 | ±60 | 1000 | 13 | 2.6-27 | 46 | 70 | 100 | 160 | 200 | 225 | 250 | 260 | 270 | 290 |
| | N750 | U2J | | ±2 | ±120 | 1000 | 25 | 3.5-50 | 80 | 120 | 170 | 280 | 380 | 460 | 480 | 520 | 540 | 560 |
| | N1500 | P3K | 1 | ±2 | ±250 | 1000 | 24 | 6-50 | 85 | 130 | 175 | 290 | 390 | 470 | 590 | 600 | 640 | 690 |
| | N2200 | B3A | 2 | ±2 | ±400 | 500 | 27 | 7-56 | 95 | 150 | 200 | 330 | 450 | 540 | 670 | 700 | 730 | 790 |
| | N3300 | B3D | 3 | ±5 | ±650 | 500 | 48 | 12-100 | 170 | 260 | 350 | 580 | 780 | 930 | 1100 | 1150 | 1200 | 1400 |
| | N4200 | B3C | 3 | ±5 | ±850 | 500 | 55 | 22-110 | 180 | 290 | 390 | 640 | 870 | 1000 | 1300 | 1600 | 1800 | 2500 |
| | N4700 | T3D | 3 | ±5 | ±900 | 200 | 65 | 25-130 | 220 | 340 | 460 | 770 | 1000 | 1200 | 1500 | 1900 | 2100 | 2900 |
| | N5800 | B3M | 3 | ±5 | ±1000 | 200 | 100 | 38-200 | 340 | 520 | 700 | 1100 | 1500 | 1800 | 2300 | 2800 | 3300 | 4400 |

| GENERAL PURPOSE H. K. | TEMP. CHAR. CODE | NOTE | MIN CAP TOL (%) | MIN TC TOL | MAX DF (%) | MIN Q | 2kV — MAXIMUM NOMINAL CAPACITANCE (pF) | | | | | | | | | | |
|---|------------------|-------|-----------------|------------|------------|-------|--|------|------|------|------|------|------|-------|-------|-------|-------|
| | | | | | | | THICKNESS .187" MAX. | | | | | | | | | | |
| GENERAL PURPOSE | Z5B Y5E X5F X7F | | ±5 | | 2 | | 70 | 120 | 190 | 270 | 450 | 610 | 750 | 910 | 1100 | 1270 | 1700 |
| | Z5B Y5E X5F X7B | 1 | ±5 | | 2 | | 240 | 420 | 660 | 910 | 1500 | 2000 | 2500 | 3000 | 3700 | 4200 | 5600 |
| | Z5F Y5F X5F X7P | 1 | ±10 | | 2 | | 350 | 600 | 960 | 1300 | 2200 | 3100 | 3800 | 4600 | 5600 | 6400 | 8500 |
| | Z5F Y5F X5B X7S | 2 | ±10 | | 2 | | 490 | 860 | 1300 | 1900 | 3200 | 4300 | 5300 | 6400 | 7900 | 9000 | 12000 |
| | Z5U Y5U X5U X7V | 2 | ±20 | | 2 | | 610 | 1000 | 1600 | 2300 | 3900 | 5300 | 6400 | 7900 | 9600 | 11000 | 14500 |
| | Z5V Y5V X5V X7W | 2 | ±20 | | | 3 | | 1000 | 1800 | 2700 | 3700 | 6100 | 8300 | 10000 | 12000 | 15000 | 17000 |
| TEMPERATURE COMPENSATING EXTENDED TEMPERATURE COMPENSATING | NPQ | C0G † | ±1 | ±30 | | 1000 | 1-10 | 20 | 30 | 40 | 70 | 100 | 120 | 150 | 190 | 220 | 250 |
| | N033 | B16 | 1 | ±1 | ±30 | 1000 | 1.5-5.4 | 9.3 | 14 | 19 | 32 | 45 | 50 | 65 | 75 | 90 | 120 |
| | N080 | U16 | 1 | ±1 | ±30 | 1000 | 1.8-6.3 | 10 | 16 | 22 | 37 | 50 | 60 | 76 | 90 | 100 | 140 |
| | N150 | P26 | 1 | ±1 | ±30 | 1000 | 2.0-7.2 | 12 | 19 | 25 | 42 | 55 | 70 | 85 | 100 | 120 | 160 |
| | N220 | B26 | 1 | ±1 | ±30 | 1000 | 2.0-7.9 | 13 | 20 | 28 | 46 | 65 | 75 | 95 | 115 | 130 | 175 |
| | N330 | B2N | 1 | ±1 | ±60 | 1000 | 2.4-8.8 | 15 | 23 | 31 | 50 | 70 | 85 | 100 | 120 | 140 | 200 |
| | N470 | T2N | 2 | ±1 | ±60 | 1000 | 2.8-13 | 22 | 34 | 46 | 75 | 110 | 130 | 160 | 190 | 220 | 285 |
| | N750 | U2J | | ±2 | ±120 | 1000 | 3.8-20 | 40 | 60 | 85 | 130 | 190 | 220 | 280 | 340 | 380 | 500 |
| | N1500 | P3K | 1 | ±2 | ±250 | 1000 | 4.6-24 | 42 | 65 | 95 | 140 | 200 | 230 | 290 | 350 | 400 | 560 |
| | N2200 | B3A | 2 | ±2 | ±400 | 500 | 7.2-28 | 48 | 75 | 100 | 150 | 220 | 270 | 330 | 400 | 460 | 630 |
| | N3300 | B3D | 3 | ±5 | ±650 | 500 | 12-50 | 85 | 100 | 130 | 170 | 290 | 390 | 470 | 700 | 590 | 1100 |
| | N4200 | B3C | 3 | ±5 | ±850 | 500 | 22-55 | 95 | 140 | 190 | 320 | 440 | 530 | 660 | 810 | 910 | 1200 |
| | N4700 | T3D | 3 | ±5 | ±900 | 200 | 25-67 | 110 | 170 | 230 | 390 | 530 | 630 | 790 | 970 | 1100 | 1500 |
| | N5800 | B3M | 3 | ±5 | ±1000 | 200 | 38-100 | 170 | 260 | 360 | 590 | 800 | 950 | 1200 | 1400 | 1600 | 2200 |

† See Page 1 for Notes
‡ See Page 5 for additional design specifications

TUSONIX

DISC CERAMIC CAPACITORS

3 and 4kV

| TUSONIX STYLE NUMBER | 858 | 878 | 818 | 848 | 828 | 3848 | 3858 | 3878 | 3888 |
|----------------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
| MAXIMUM DIAMETER (D) | .457/11.61 | .510/12.95 | .613/15.57 | .695/17.65 | .770/19.56 | .820/20.83 | .895/22.73 | .957/24.31 | 1.120/28.45 |
| LEAD SPACING (S) | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 |
| WIRE GAUGE (AWG) | 22 | 22 | 22 | 22 | 22 | 20 | 20 | 20 | 20 |

| GENERAL PURPOSE | TEMP. CHAR. CODE | NOTE | MIN CAP TOL (%) | MIN TC TOL | MAX DF (%) | MIN Q | 3kV — MAXIMUM NOMINAL CAPACITANCE (pF) | | | | | | | | | |
|---|------------------|------|-----------------|------------|------------|-------|--|-------|------|------|------|------|------|-------|-------|------|
| | | | | | | | THICKNESS .187" MAX. | | | | | | | | | |
| GENERAL PURPOSE H-K | 750 Y5F X5F X7F | | ±5 | | 2 | | 100 | 150 | 260 | 360 | 450 | 550 | 680 | 780 | 1000 | |
| | 250 Y5E X5F X7F | 1 | ±5 | | 2 | | 370 | 540 | 920 | 1270 | 1570 | 1900 | 2300 | 2700 | 3600 | |
| | 25 Y5L X5F X7F | 1 | ±10 | | 2 | | 540 | 790 | 1300 | 1800 | 2200 | 2700 | 3400 | 3900 | 5200 | |
| | 25 Y5F X5R X7S | 2 | ±10 | | 2 | | 760 | 1100 | 1900 | 2500 | 3200 | 3900 | 4800 | 5500 | 7300 | |
| | 250 Y5U X5U X7V | 2 | ±20 | | 2 | | 900 | 1300 | 2200 | 3000 | 3800 | 4600 | 5700 | 6500 | 8700 | |
| | 250 Y5V X5V X7W | 2 | ±20 | | 3 | | 1400 | 2000 | 3500 | 4800 | 5900 | 7200 | 8900 | 10000 | 13000 | |
| TEMPERATURE COMPENSATING EXTENDED TEMPERATURE COMPENSATING | NF0 | COG | ±1 | ±30 | | 1000 | 1.0-18 | 27 | 45 | 60 | 75 | 90 | 110 | 130 | 170 | |
| | N030 | S1G | ±1 | ±30 | | 1000 | 1.3-9.1 | 12 | 20 | 27 | 32 | 41 | 48 | 55 | 75 | |
| | N080 | U1G | ±1 | ±30 | | 1000 | 1.5-10 | 14 | 23 | 32 | 38 | 47 | 55 | 65 | 90 | |
| | N150 | P2G | ±1 | ±30 | | 1000 | 1.7-12 | 16 | 27 | 36 | 43 | 55 | 60 | 75 | 100 | |
| | N220 | R2G | ±1 | ±30 | | 1000 | 1.9-13 | 17 | 29 | 40 | 47 | 60 | 69 | 80 | 110 | |
| | N330 | S2H | ±1 | ±60 | | 1000 | 2.1-14 | 19 | 32 | 44 | 53 | 66 | 75 | 90 | 120 | |
| | N470 | T2H | ±1 | ±60 | | 1000 | 2.5-22 | 30 | 50 | 65 | 80 | 100 | 110 | 130 | 190 | |
| | N750 | U2J | ±2 | ±120 | | 1000 | 3.5-35 | 50 | 85 | 110 | 135 | 170 | 200 | 240 | 340 | |
| | N1500 | P3K | ±2 | ±250 | | 1000 | 4.3-41 | 55 | 90 | 120 | 140 | 180 | 210 | 250 | 350 | |
| | N2200 | R3A | ±2 | ±400 | | 500 | 6.9-47 | 63 | 100 | 140 | 160 | 210 | 240 | 290 | 400 | |
| | N3300 | S3B | ±3 | ±650 | | 500 | 12-82 | 110 | 180 | 240 | 290 | 370 | 430 | 510 | 700 | |
| | N4200 | G3C | 3.4 | ±5 | ±850 | | 500 | 21-90 | 120 | 200 | 280 | 330 | 410 | 480 | 570 | 790 |
| | N4700 | T3D | 3.4 | ±5 | ±900 | | 200 | 110 | 150 | 210 | 330 | 400 | 500 | 580 | 690 | 850 |
| | N5600 | H3M | 3.4 | ±5 | ±1000 | | 200 | 185 | 225 | 370 | 500 | 600 | 750 | 880 | 1030 | 1430 |

| TUSONIX STYLE NUMBER | 858 | 878 | 818 | 848 | 828 | 3848 | 3858 | 3878 | 3888 |
|----------------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|
| MAXIMUM DIAMETER (D) | .457/11.61 | .510/12.95 | .613/15.57 | .695/17.65 | .770/19.56 | .820/20.83 | .895/22.73 | .957/24.31 | 1.120/28.45 |
| LEAD SPACING (S) | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 | .375/9.52 |
| WIRE GAUGE (AWG) | 22 | 22 | 22 | 22 | 22 | 20 | 20 | 20 | 20 |

| GENERAL PURPOSE | TEMP. CHAR. CODE | NOTE | MIN CAP TOL (%) | MIN TC TOL | MAX DF (%) | MIN Q | 4kV — MAXIMUM NOMINAL CAPACITANCE (pF) | | | | | | | | | |
|------------------------|---|------|-----------------|------------|------------|-------|--|--------|------|------|------|------|------|------|-------|------|
| | | | | | | | THICKNESS .218" MAX. | | | | | | | | | |
| GENERAL PURPOSE H-K | 250 Y5E X5F X7F | | ±5 | | 2 | | 80 | 120 | 210 | 290 | 360 | 440 | 540 | 620 | 830 | |
| | 250 Y5E X5F X7R | 1 | ±5 | | 2 | | 290 | 430 | 730 | 1000 | 1200 | 1500 | 1800 | 2100 | 2800 | |
| | 25 Y5L X5F X7F | 1 | ±10 | | 2 | | 430 | 620 | 1000 | 1400 | 1800 | 2200 | 2700 | 3100 | 4100 | |
| | 25 Y5F X5R X7S | 2 | ±10 | | 2 | | 600 | 880 | 1500 | 2000 | 2500 | 3100 | 3800 | 4300 | 5800 | |
| | 250 Y5U X5U X7V | 2 | ±20 | | 3 | | 1100 | 1600 | 2800 | 3800 | 4700 | 5800 | 7100 | 8200 | 11000 | |
| | TEMPERATURE COMPENSATING EXTENDED TEMPERATURE COMPENSATING | NPC | COG | ±1 | ±30 | | 1000 | 1.0-14 | 20 | 35 | 45 | 60 | 75 | 90 | 100 | 140 |
| N030 | | S1G | ±1 | ±30 | | 1000 | 1.4-7.1 | 9.6 | 16 | 21 | 25 | 32 | 37 | 44 | 60 | |
| N080 | | U1G | ±1 | ±30 | | 1000 | 1.5-8.3 | 11 | 18 | 25 | 30 | 37 | 44 | 50 | 70 | |
| N150 | | P2G | ±1 | ±30 | | 1000 | 1.8-9.5 | 12 | 21 | 28 | 34 | 43 | 50 | 59 | 81 | |
| N220 | | R2G | ±1 | ±30 | | 1000 | 2.0-10 | 14 | 23 | 31 | 37 | 47 | 55 | 64 | 85 | |
| N330 | | S2H | ±1 | ±60 | | 1000 | 2.2-11 | 15 | 25 | 35 | 40 | 50 | 60 | 70 | 100 | |
| N470 | | T2H | ±1 | ±60 | | 1000 | 2.5-14 | 18 | 30 | 40 | 50 | 60 | 73 | 85 | 110 | |
| N750 | | U2J | ±2 | ±120 | | 1000 | 3.6-25 | 40 | 65 | 90 | 105 | 135 | 160 | 195 | 265 | |
| N1500 | | P3K | ±2 | ±250 | | 1000 | 6-32 | 43 | 70 | 95 | 110 | 140 | 170 | 200 | 270 | |
| N2200 | | R3A | ±2 | ±400 | | 500 | 7-37 | 50 | 80 | 110 | 130 | 160 | 195 | 230 | 310 | |
| N3300 | | S3B | ±3 | ±650 | | 500 | 12-65 | 87 | 140 | 190 | 230 | 290 | 340 | 400 | 550 | |
| N4200 | | G3C | 3.5 | ±5 | ±850 | | 500 | 13-70 | 100 | 160 | 220 | 280 | 330 | 390 | 460 | 630 |
| N4700 | | T3D | 3.5 | ±5 | ±900 | | 200 | 10-85 | 120 | 190 | 270 | 320 | 400 | 460 | 550 | 750 |
| N5600 | | H3M | 3.5 | ±5 | ±1000 | | 200 | 24-130 | 180 | 290 | 400 | 480 | 600 | 700 | 820 | 1100 |

TUSONIX DISC CERAMIC CAPACITORS

5 and 6kV

| TUSONIX STYLE NUMBER | 818 | 848 | 828 | 3848 | 3858 | 3878 | 3888 |
|----------------------|------------|------------|------------|------------|------------|------------|-------------|
| MAXIMUM DIAMETER (D) | .618/15.70 | .700/17.78 | .775/19.69 | .825/20.96 | .900/22.86 | .962/24.43 | 1.125/28.58 |
| LEAD SPACING (S) | .500/12.70 | .500/12.70 | .500/12.70 | .500/12.70 | .500/12.70 | .500/12.70 | .500/12.70 |
| WIRE GAUGE (AWG) | 20 | 20 | 20 | 20 | 20 | 20 | 20 |

| GENERAL PURPOSE HHK | TEMP. CHAR. CODE | NOTE | MIN CAP TOL (%) | MIN TC TOL | MAX DF (%) | MIN Q | 5kV — MAXIMUM NOMINAL CAPACITANCE (pF) THICKNESS .265" MAX. | | | | | | |
|---|------------------|-------|-----------------|------------|------------|-------|--|------|------|------|------|------|------|
| | | | | | | | 150 | 210 | 260 | 320 | 400 | 460 | 620 |
| GENERAL PURPOSE HHK | Z5C Y5E X5F | | ±5 | | 2 | | 150 | 210 | 260 | 320 | 400 | 460 | 620 |
| | Z5D Y5E X5F X7R | 1 | ±5 | | 2 | | 500 | 700 | 880 | 1080 | 1340 | 1530 | 2070 |
| | Z5F Y5E X5F | 1 | ±10 | | 2 | | 760 | 1000 | 1300 | 1600 | 2000 | 2300 | 3100 |
| | Z5F Y5F X5R X7S | 2 | ±10 | | 2 | | 1000 | 1500 | 1800 | 2300 | 2800 | 3200 | 4400 |
| | Z5U Y5V X5W X7W | 2 | ±20 | | 3 | | 2000 | 2800 | 3500 | 4300 | 5400 | 6200 | 8400 |
| TEMPERATURE COMPENSATING EXTENDED TEMPERATURE COMPENSATING | NPO | COG † | ±1 | ±30 | | 1000 | 4.6-20 | 30 | 40 | 50 | 65 | 75 | 100 |
| | N033 | S1G | 1 | ±1 | ±30 | 1000 | 4.6-12 | 17 | 20 | 26 | 28 | 35 | 48 |
| | N080 | U1G | 1 | ±1 | ±30 | 1000 | 5.3-14 | 20 | 24 | 30 | 33 | 40 | 56 |
| | N150 | P2G | 1 | ±1 | ±30 | 1000 | 6-17 | 23 | 27 | 34 | 37 | 47 | 65 |
| | N220 | R2G | 1 | ±1 | ±30 | 1000 | 7-18 | 25 | 30 | 37 | 41 | 50 | 70 |
| | N330 | S2H | 1 | ±1 | ±60 | 1000 | 8-20 | 28 | 33 | 40 | 46 | 56 | 75 |
| | N470 | T2H | 2 | ±1 | ±60 | 1000 | 9-24 | 33 | 40 | 50 | 60 | 65 | 95 |
| | N750 | U2J | | ±2 | ±120 | 1000 | 12-45 | 70 | 85 | 100 | 130 | 140 | 200 |
| | N1500 | P3K | 1 | ±2 | ±250 | 1000 | 20-58 | 78 | 90 | 110 | 125 | 150 | 220 |
| | N2200 | R3A | 2 | ±2 | ±400 | 500 | 23-65 | 85 | 100 | 130 | 145 | 180 | 250 |
| | N3300 | S3B | 3 | ±5 | ±650 | 500 | 40-110 | 150 | 180 | 230 | 255 | 310 | 430 |

| TUSONIX STYLE NUMBER | 818 | 848 | 828 | 3848 | 3858 | 3878 | 3888 |
|----------------------|------------|------------|------------|------------|------------|------------|-------------|
| MAXIMUM DIAMETER (D) | .618/15.70 | .700/17.78 | .775/19.69 | .825/20.96 | .900/22.86 | .962/24.43 | 1.125/28.58 |
| LEAD SPACING (S) | .500/12.70 | .500/12.70 | .500/12.70 | .500/12.70 | .500/12.70 | .500/12.70 | .500/12.70 |
| WIRE GAUGE (AWG) | 20 | 20 | 20 | 20 | 20 | 20 | 20 |

| GENERAL PURPOSE HHK | TEMP. CHAR. CODE | NOTE | MIN CAP TOL (%) | MIN TC TOL | MAX DF (%) | MIN Q | 6kV — MAXIMUM NOMINAL CAPACITANCE (pF) THICKNESS .265" MAX. | | | | | | |
|------------------------|---|------|-----------------|------------|------------|-------|--|--------|------|------|------|------|------|
| | | | | | | | 120 | 170 | 210 | 260 | 320 | 370 | 500 |
| GENERAL PURPOSE HHK | Z50 Y5E X5F | | ±5 | | 2 | | 120 | 170 | 210 | 260 | 320 | 370 | 500 |
| | Z5D Y5E X5F X7R | 1 | ±5 | | 2 | | 400 | 560 | 700 | 860 | 1000 | 1200 | 1600 |
| | Z5F Y5E X5F | 1 | ±10 | | 2 | | 610 | 850 | 1000 | 1300 | 1600 | 1800 | 2500 |
| | Z5F Y5F X5R X7S | 2 | ±10 | | 2 | | 860 | 1200 | 1500 | 1800 | 2200 | 2600 | 3500 |
| | TEMPERATURE COMPENSATING EXTENDED TEMPERATURE COMPENSATING | NPO | COG † | ±1 | ±30 | | 1000 | 4.5-15 | 25 | 30 | 40 | 50 | 60 |
| N033 | | S1G | 1 | ±1 | ±30 | 1000 | 4.6-10 | 13 | 15 | 19 | 22 | 27 | 38 |
| N080 | | U1G | 1 | ±1 | ±30 | 1000 | 5.4-12 | 15 | 18 | 23 | 26 | 32 | 43 |
| N150 | | P2G | 1 | ±1 | ±30 | 1000 | 6-13 | 17 | 21 | 26 | 30 | 36 | 50 |
| N220 | | R2G | 1 | ±1 | ±30 | 1000 | 7-14 | 19 | 23 | 29 | 33 | 40 | 50 |
| N330 | | S2H | 1 | ±1 | ±60 | 1000 | 8-15 | 21 | 25 | 32 | 37 | 45 | 55 |
| N470 | | T2H | 2 | ±1 | ±60 | 1000 | 9-18 | 26 | 30 | 38 | 44 | 53 | 75 |
| N750 | | U2J | | ±2 | ±120 | 1000 | 12-35 | 50 | 65 | 85 | 90 | 105 | 150 |
| N1500 | | P3K | 1 | ±2 | ±250 | 1000 | 20-40 | 60 | 70 | 95 | 100 | 110 | 160 |
| N2200 | | R3A | 2 | ±2 | ±400 | 500 | 35-50 | 70 | 80 | 100 | 115 | 130 | 190 |
| N3300 | | S3B | 3 | ±5 | ±650 | 500 | 40-90 | 110 | 130 | 170 | 200 | 240 | 330 |

See Page 1 for Notes.
† See Page 8 for additional design specifications.

TUSONIX DESIGN SPECIFICATIONS

AGING

All hi-dielectric constant barium titanate based ceramics have a predictable capacitance aging effect. The effect is a loss of capacitance with time. The loss is an inverse logarithmic function and is based on the capacitance value obtained at a given time after the last heat exposure. By the time the user receives the parts, almost all the aging effects are gone, but from time to time it is possible to get "fresh" parts where the aging rate is still taking place fast enough to be noticeable. It's also possible to start the aging over again if the user subjects the part to prolonged temperatures above 100°C (such as during a potting cure cycle; during high temperature environmental tests, etc.).

HiK TEMPERATURE CHARACTERISTICS

| EIA Code | Temperature Range |
|----------|-------------------|
| Z5 | -10 C to +85 C |
| Y5 | 30 C to +85 C |
| X5 | 55 C to +85 C |
| *X7 | 55 C to +125 C |

| EIA Code | Maximum Cap. Change |
|----------|---------------------|
| D | -3.3% |
| E | -4.7% |
| F | -7.5% |
| P | -10% |
| R | -15% |
| S | -22% |
| T | -22% 33% |
| U | -22% 56% |
| V | -22% 82% |
| W | -22% 90% |

*Formerly designated TUSONIX-W5

TEMPERATURE COEFFICIENTS (Temperature Characteristic)

The TUSONIX catalog lists the various temperature characteristics using standard EIA code symbols. The Hi-K characteristics are treated as maximums and parts supplied as a particular type will drift less than the maximum listed. The T.C. characteristic for temperature compensating types is the nominal capacitance change between 25°C and 85°C in parts per million per degree centigrade. The maximum departure (plus or minus) from this nominal is listed in the catalog for values exceeding 10 pF. The table below shows T.C. tolerances for values below 10 pF.

| Temperature Coefficient | .4 to 2 pF | Capacitance 2.1 to 3.9 pF | 4 thru 9.9 pF |
|-------------------------|----------------------------|---------------------------|---------------|
| NP0 thru N330 | ±250(K) | ±120(J) | ±060(H) |
| N470 thru N750 | ±250(K) | ±120(J) | ±120(J) |
| N1500 and up | Same as for 10 pF and over | | |

CAPACITANCE TOLERANCE

| Nominal Capacitance 10 pF or Less | Code | Nominal Capacitance over 10 pF and all Resistance Values |
|--|---------|--|
| .1 pF .25 pF .5 pF 3 pF 1 pF 2 pF 3% | A | .50 20% |
| | B | |
| | C | |
| | D | |
| | E | .70 30% |
| | F | .1% |
| | G | .2% |
| | H | .3% |
| | I | .60 40% |
| | J | .5% |
| 5% 10% 2% 20% 4 pF 0.2 pF | K | .10% |
| | L | .100% 40 |
| | M | .20% |
| | N | .30% |
| | P | .100 0% |
| | Q | .15% |
| | R | .25% |
| | S | .50 15% |
| | T | .30 20% |
| | U | .80 0% |
| V W X Y Z | V | .70% |
| | W | .50 30% |
| | X | .40 10% |
| | Y | .50 0% |
| Z | .80 20% | |

TUSONIX GENERAL SPECIFICATIONS

This specification covers the qualification testing applicable to TUSONIX ceramic disc capacitors. Test conditions or limits not covered herein are specifically stated on the individual catalog pages. Refer also to EIA RS-198.

1.0 MECHANICAL

- 1.1 Case: Conformal dipped
- 1.2 Lead Material: Solder coated copper or copper clad steel.
- 1.3 Terminal Strength: Mil-Std-202, Method 211, Condition A (radial) 5 lbs.

2.0 ELECTRICAL

2.1 CAPACITANCE

Measurement Conditions: Capacitance is measured at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ at 40-50% R.H. High dielectric constant (Hi-K) capacitors are measured at 1 kHz at 1.0 volts or less. Temperature compensating types are measured at 1 MHz through 1000 pF, 1 kHz above.

Capacitance Tolerance: Standard tolerances available and their EIA and Mil codes are listed in this catalog. The closest tolerance TUSONIX offers in each body type is also listed for values above 10 pF. Closest tolerance for values below 10 pF is + 0.1 pF.

In the case of Hi-K types, the capacitance is figured on the basis of 1000 hour old capacitors. Because of the capacitance aging effect, it is possible that "fresh" parts (less than 10 days old) may be on the high side; but they will age into tolerance within a few days.

Maximum Capacitance: Per tables. It should be kept in mind that the catalog lists maximum-nominal capacitance.

2.2 Q OR POWER FACTOR

Measurement: Measurement conditions are the same as for capacity measurement (para. 1.1).

Maximum Dissipation Factor: Per tables.

Minimum Q: Per tables and page 10.

2.3 FLASH TEST (DIELECTRIC)

| | |
|--------------------|--------------------|
| Working Voltage dc | Test Voltage dc |
| 500V and less | 3 times working |
| above 500 V | 1.75 times working |

The test voltage will be applied to the capacitor leads for 2 seconds with charging current limited to 50 milliamps.

2.4 CASE TEST

| | |
|--------------------|-----------------|
| Working Voltage dc | Test Voltage dc |
| below 500V | 3 times working |
| 500V | 1300 Vdc |
| above 500V | 1500 Vdc |

The test voltage will be applied between both leads tied together and a container of 0.050 inch diameter lead shot. The body of the capacitor will be covered to within one sixteenth of an inch of the leads.

2.5 INSULATION RESISTANCE

The insulation resistance shall be 50,000 megohms minimum for T.C. types and 10,000 megohms minimum for Hi-K types at room temperature when measured at 100 volts d.c. in series with a protective resistance not exceeding one megohm. The electrification time shall be

not more than 2 minutes nor less than 30 seconds for qualification tests.

3.0 ENVIRONMENTAL

3.1 Barometric Pressure: Mil-Std-202, Method 105, Condition D (100,000 ft.). 100% of rated voltage applied for 5 seconds, current limited to 50mA.

3.2 Vibration: Mil-Std-202, Method 204, Condition B (10-2000 cps: 15G).

3.3 Shock: Mil-Std-202, Method 213, Condition I.

3.4 Thermal Shock: Mil-Std-202, Method 107, Condition A (-55°C to $+85^{\circ}\text{C}$). Pre-test and post-test measurements are not required.

3.5 Immersion Cycling: Mil-Std-202, Method 104, Condition A (tap water). Electrical measurements shall be made at least 4 hours, but not more than 24 hours, after completion of the final cycle.

Post-test limits: (25°C).

No evidence of corrosion, mechanical damage or obliteration of marking.

Insulation Resistance:

T.C. Types — 100 megohm mfd or 10K megohm, whichever is less.

Extended T.C. Types — 100 megohm mfd or 5K megohm, whichever is less.

General Purpose Types — 100 megohm mfd or 1K megohm, whichever is less.

Dielectric Withstanding Voltage (Flash): Refer to paragraph 2.3.

3.6 Moisture Resistance: Mil-Std-202, Method 106, 10 cycles without loading applied.

Post-test limits: Same as paragraph 3.5.

4.0 ACCELERATED LIFE TESTS

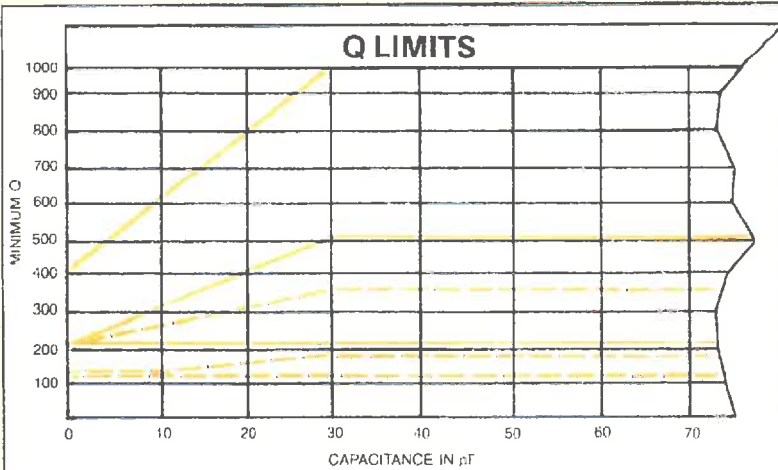
The capacitor shall be placed on test under the following conditions:

| Working Voltage dc | Test Voltage dc | Time |
|--------------------|------------------|------------------|
| 500V and less | 2 times working | 1000 hrs. @85° C |
| above 500V | 1½ times working | 1000 hrs. @85° C |

At the end of this period the capacitance shall not have changed by more than 1% or 0.5 pF (whichever is greater) for T.C. units, 5% or .5 pF (whichever is greater) for extended T.C. units, nor more than +20% for Hi-K units. The insulation resistance shall be 2000 megohms minimum. For T.C. Ceramics, the Q shall be 250 minimum for values of 30 pF and above decreasing in a straight line function to 100 minimum at .1 pF. For Hi-K Ceramics the power factor, shall not be greater than 4%. Acceptable quality level shall not be less than 9 out of 10 units passing this test.

TUSONIX

TEMPERATURE COMPENSATING CERAMICS



- Curve 1 — Initial Q for temperature coefficients NPO thru N1500.
- Curve 2 — Initial Q for N2200 thru N4200.
- Curve 3 — Initial Q for N4700 and N5600.
- Curve 4 — Q after life test for temperature coefficients NPO thru N1500.
- Curve 5 — Q after life test for N2200 thru N4200.
- Curve 6 — Q after life test for N4700 and N5600.

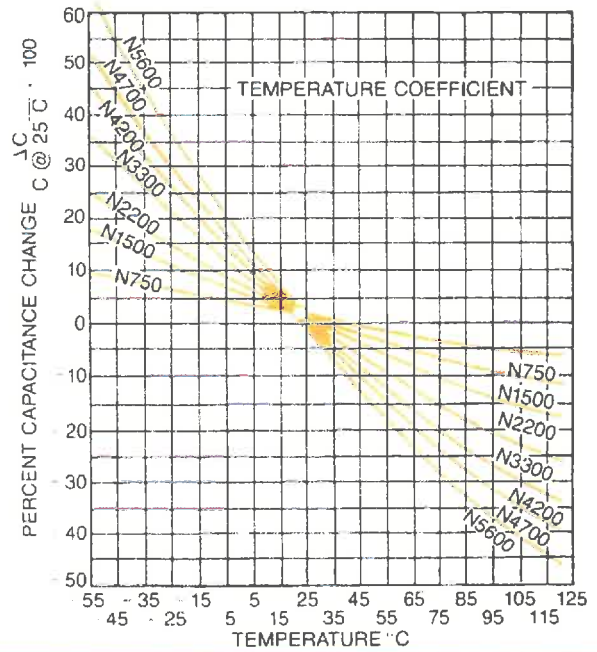
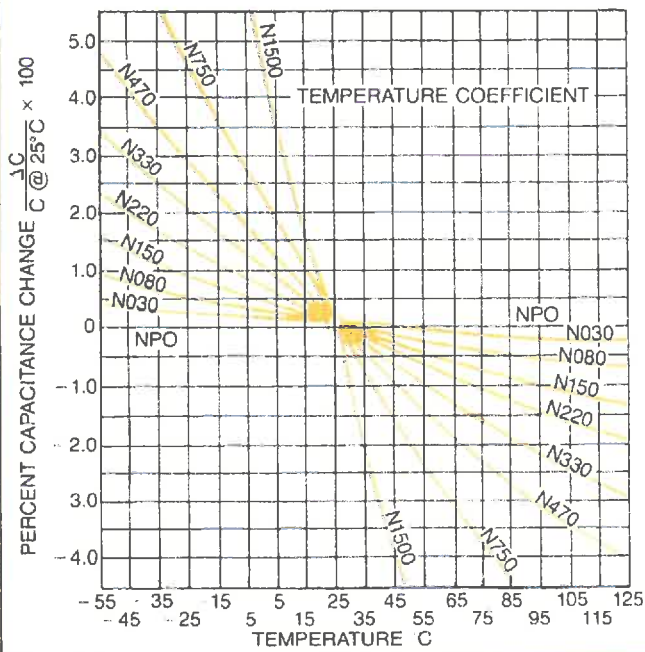
FREQUENCY DEPENDENCE

The dielectric constant and hence the capacitance of most ceramic capacitors does not vary significantly with frequency and the parts are useful well into the gigahertz region. Measurements made on high value capacitors at high frequency often show changes in capacitance which are likely due to the effect of inductance in the measuring instrument or in the leads of the capacitor. For greatest capacitor effectiveness the lead length should always be as short as possible.

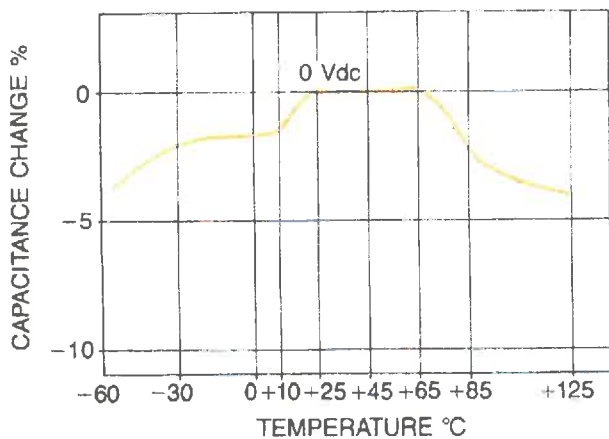
TEMPERATURE DEPENDENCE

The two sets of curves below indicate the change in capacitance with temperature for TUSONIX temperature compensating capacitors. It should be noted that capacitance change with temperature is not strictly linear. The nominal temperature is computed by

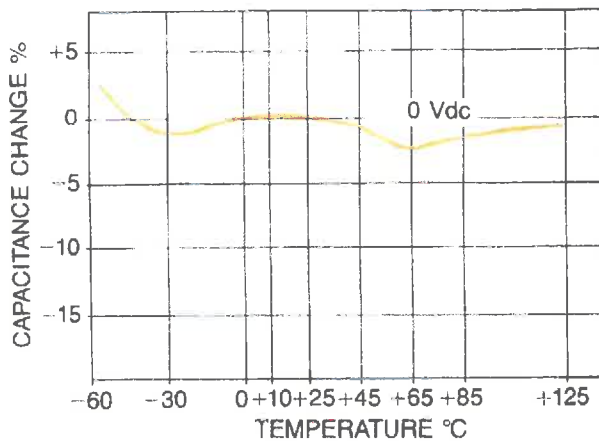
measuring the capacitance change between 25°C and 85°C and converting the change into ppm/°C. EIA RS-198 provides details on computing the temperature coefficient and tolerance . . . and details the expanded tolerance envelope at cold temperatures.



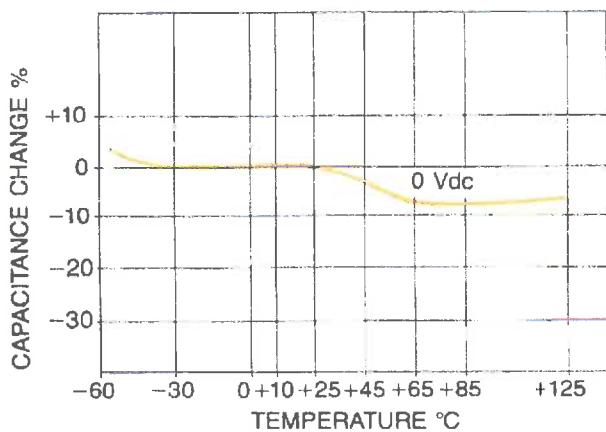
Z5D Y5E X5F X7F



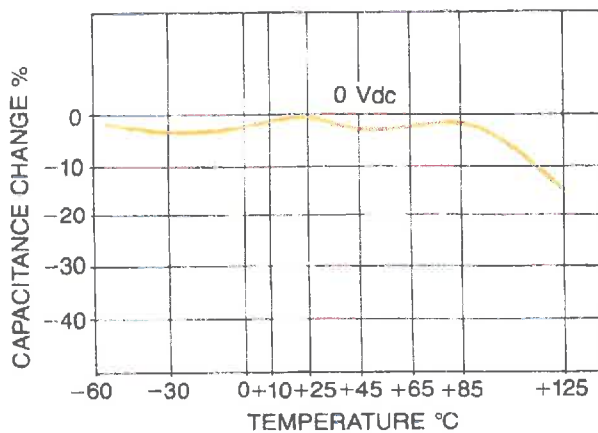
Z5D Y5E X5F X7R



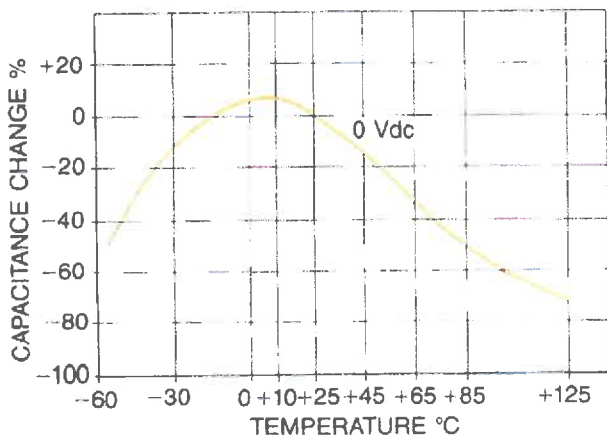
Z5F Y5F X5F X7P



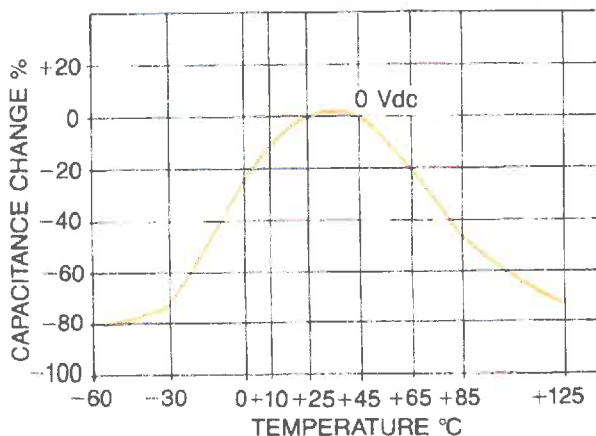
Z5F Y5F X5F X7S

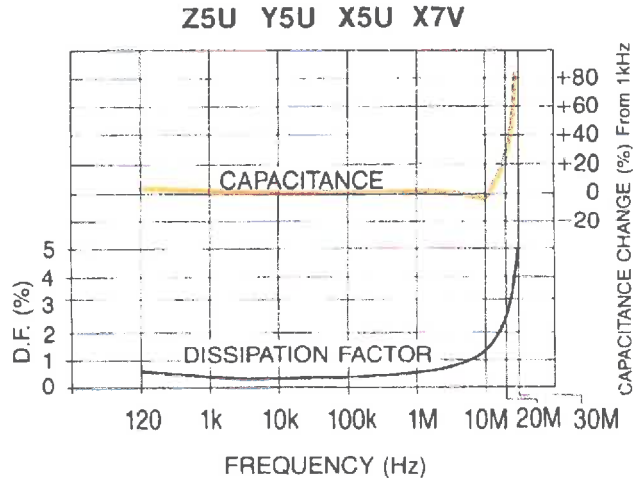
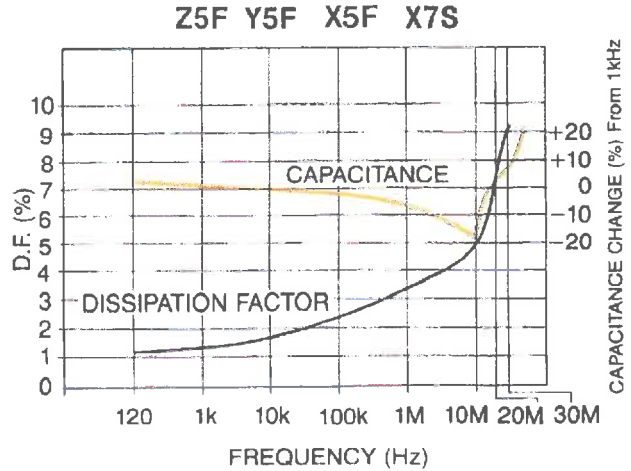
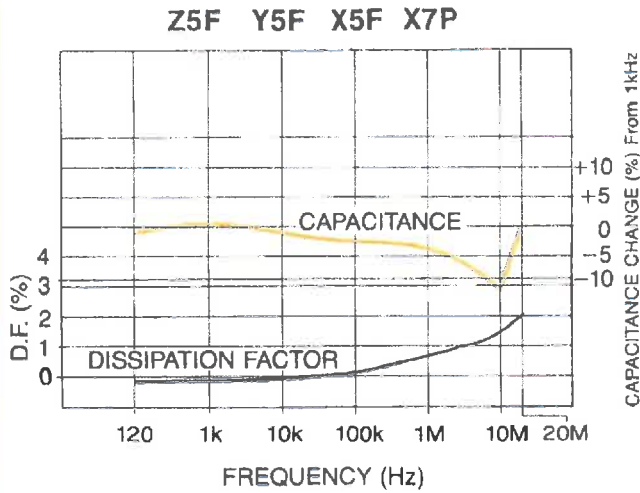
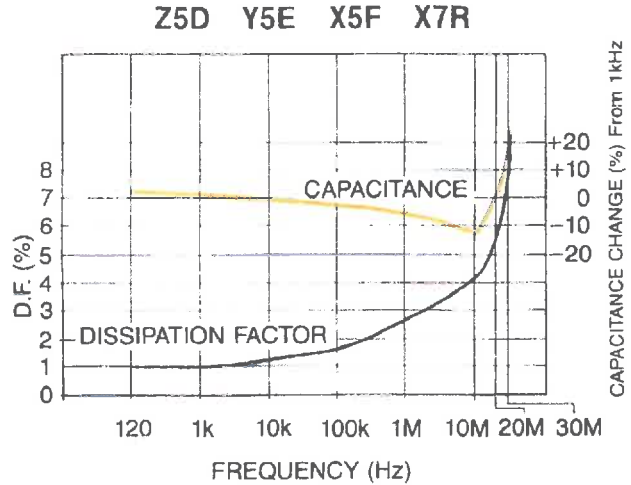
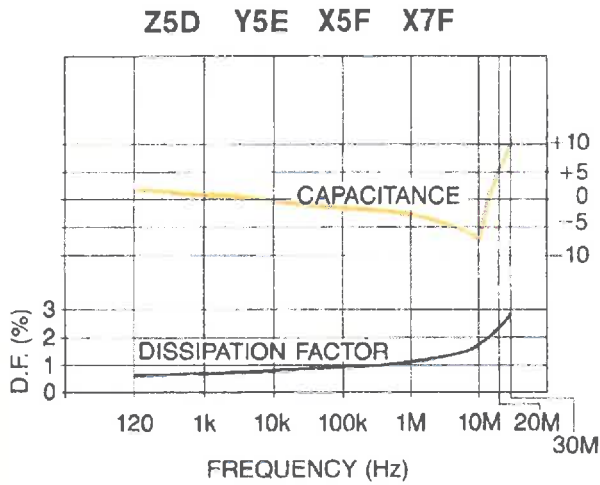


Z5U Y5U X5U X7V



Z5U Y5V X5W X7W



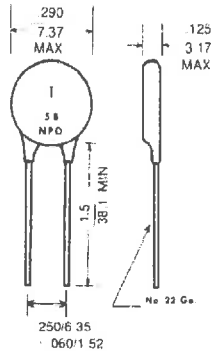


TUSONIX SPECIAL DISC CERAMIC CAPACITORS

"Double D" Low Capacitance Capacitors

Our "Double D" type of disc capacitors provide extremely low capacity close tolerance while maintaining desired electrical properties.

1. Available in Tusonix Style 831.
2. See page 8 for T.C. tolerances.
3. 500 VDC or lower.
4. Straight lead type only.



Ordering Data

| TC (NOM) | Capacitance | | MIN CAP TOL. |
|----------|-------------|-----|---------------|
| | MIN | MAX | |
| NP0 | .50 | 1.3 | ±.1pF |
| N030 | .70 | 2.9 | + 1pF |
| N080 | .75 | 3.4 | + .1pF |
| N150 | .83 | 3.8 | ±.1pF |
| N220 | .91 | 4.0 | ±.1pF |
| N330 | 1.0 | 4.5 | ±.1pF |
| N470 | 1.1 | 5.0 | + .1pF |
| N750 | 1.5 | 7.0 | ±.1pF |
| N1500 | 2.2 | 12 | + .25pF or 2% |
| N2200 | 3.0 | 24 | ±.25pF or 2% |
| N3300 | 4.3 | 25 | ±.5pF or 5% |
| N4200 | 6.2 | 44 | ±.5pF or 5% |
| N4700 | 7.8 | 50 | ±.5pF or 5% |
| N5600 | 9.0 | 75 | ±.5pF or 5% |

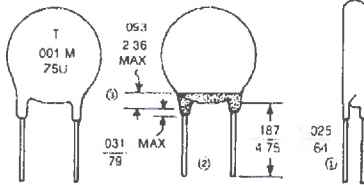
Plug-In Lead Discs For Printed Circuit Boards

TUSONIX offers inside kink leads, outside kink leads and short pin leads to the electronic industry for use in printed wiring board applications.

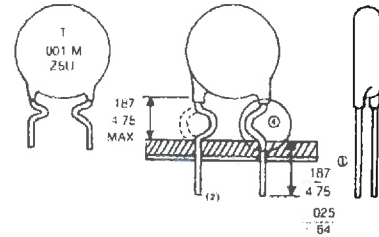
1. Standard lead length .187", also available in lengths .125" to .375".
2. Standard wire size is 20 AWG; also available in 22 AWG.
3. Shaded portion may be free of insulating material for voltage ratings 500V and less

4. Inside kink leads not available on 3 and 4kV.
5. Special lead styles below not available on 5 and 6kV.

Pin Type Leads



Kink Type Leads



Military Grade Discs

TUSONIX has a complete line of military approved disc capacitors to Mil-C-11015 and Mil-C-20.

Styles Approved to Mil-C-11015

CK60
CK61
CK62
CK63
CK64
CK65
CK66
CK67

Styles Approved to Mil-C-20

CC50
CC51
CC52
CC53
CC54
CC55
CC56
CC57