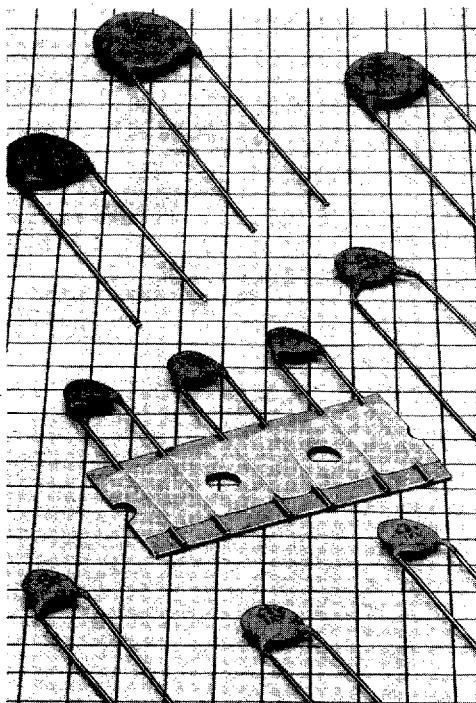


# CERAMIC DISC CAPACITORS

www.DataSheet4U.com



## SPECIFICATIONS:

TEMPERATURE CHARACTERISTICS: See Table 1  
 OPERATING TEMPERATURE: See Table 1  
 TEST VOLTAGE: For 12 through 100 VDC — 250% of rated voltage.  
 For 1000 VDC — 150% of rated voltage.

INSULATION RESISTANCE: 75,000 Megohms min. @ Working Voltage

Q (Ratio of Reactance to Equivalent Series Resistance)

Capacitance  $\leq 30\text{pf}$   $Q \geq 400 + 20 \times \text{Cpf}$   
 Capacitance  $> 30\text{pf}$   $Q \geq 1000$

CAPACITANCE VS. TEMPERATURE CHARACTERISTICS:

See performance curves (p. 9)

DISSIPATION FACTOR:

For Z5F, Z5R, Z5U 2.5% Max. @ 1 KC and 25°C  
 Z5V, 5.0% Max. @ 1 KC and 25°C  
 S2L, S3N 0.6% Max. @ 1 MC and 25°C

TEST PARAMETERS:

Class III Dielectric	Class I Dielectric
1 KHz $\pm 50$ Hz	1 MHz $\pm 50$ Hz.
0.5 VRMS, 25°C	1.0 $\pm 0.2$ VRMS, under 100 pF, 25°C

Now Available on Tape & Reel

TYPE	TCO	TCL	TCA	TCD	TCP	TCV	CCD
VOLTAGE	12	16	25	50	100	500	1000

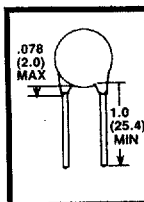
## General Specifications

Arco Disc Ceramic Capacitors are designed for applications requiring high capacitance and low power factors from 12 to 1000 volts. All units are coated with a rugged "Durez" coating and are available in a variety of tolerances and EIA characteristics.

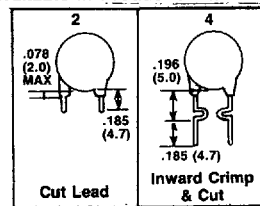
These miniature discs are ideally suited for all applications where size is a critical factor.

Arco Disc Ceramics exhibit a level of performance and reliability well above industry standards. The higher voltage ratings allow for improved reliability and provide that extra reserve to meet unexpected surges and temporary overloads.

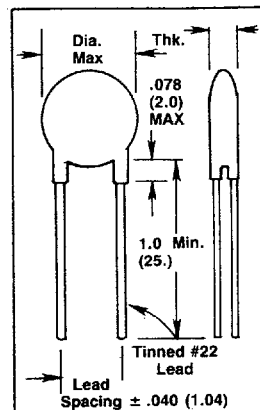
### Standard Leads



### Alternate Lead Configurations Available in Production Quantities



Contact factory for other configurations to your specifications.



# Class III — Low Voltage Barrier Capacitors

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12 WVDC

Inches (mm)

Cap. Mfd.	Type	Tolerance	TC	Max. Dia.	Max. Thickness	Lead Space
.1	TCO104M	±20%	Y5T	.354 ( 9.0)	.118 (3.0)	.250 (6.4)
.1	TCO104Z	+80/-20%	Y5T	.354 ( 9.0)	.118 (3.0)	.250 (6.4)
.22	TCO224M	±20%	Y5T	.512 (13.0)	.118 (3.0)	.250 (6.4)
.22	TCO224Z	+80/-20%	Y5T	.512 (13.0)	.118 (3.0)	.250 (6.4)
.47	TCO474M	±20%	Y5T	.610 (15.5)	.118 (3.0)	.375 (9.5)
.47	TCO474Z	+80/-20%	Y5T	.610 (15.5)	.118 (3.0)	.375 (9.5)

## 16WVDC

.01	TCL103K	±10%	Y5P	.197 ( 5.0)	.118 (3.0)	.250 (6.4)
.01	TCL103M	±20%	Z5R	.250 ( 6.4)	.118 (3.0)	.250 (6.4)
.022	TCL223K	±10%	Y5P	.236 ( 6.0)	.118 (3.0)	.250 (6.4)
.022	TCL223M	±20%	Z5R	.299 ( 7.6)	.118 (3.0)	.250 (6.4)
.033	TCL333K	±10%	Y5P	.256 ( 6.5)	.118 (3.0)	.250 (6.4)
.033	TCL333M	±20%	Z5R	.315 ( 8.0)	.118 (3.0)	.250 (6.4)
.047	TCL473K	±10%	Y5P	.295 ( 7.5)	.118 (3.0)	.250 (6.4)
.05	TCL503M	±20%	Y5T	.331 ( 8.4)	.118 (3.0)	.250 (6.4)
.1	TCL104M	±20%	Y5T	.354 ( 9.0)	.118 (3.0)	.375 (9.5)
.22	TCL224M	±20%	Y5T	.512 (13.0)	.118 (3.0)	.375 (9.5)
.47	TCL474M	±20%	Y5T	.610 (15.5)	.118 (3.0)	.375 (9.5)

## 25WVDC

.01	TCA103K	±10%	Y5P	.236 ( 6.0)	.118 (3.0)	.250 (6.4)
.022	TCA223K	±10%	Y5P	.295 ( 7.5)	.118 (3.0)	.250 (6.4)
.022	TCA223Z	+80/-20%	Z5V	.315 ( 8.0)	.118 (3.0)	.250 (6.4)
.033	TCA333K	±10%	Y5P	.315 ( 8.0)	.118 (3.0)	.250 (6.4)
.033	TCA333Z	+80/-20%	Z5V	.315 ( 8.0)	.118 (3.0)	.250 (6.4)
.047	TCA473K	±10%	Y5P	.374 ( 9.5)	.118 (3.0)	.250 (6.4)
.05	TCA503Z	+80/-20%	Z5V	.394 (10.0)	.118 (3.0)	.250 (6.4)
.1	TCA104M	±20%	Y5P	.531 (13.5)	.118 (3.0)	.375 (9.5)
.1	TCA104Z	+80/-20%	Z5V	.516 (13.1)	.118 (3.0)	.375 (9.5)

# Class I — Temperature Compensating Disc

50WVDC

Inches (mm)

Cap. pF	Type	Tolerance	TC	Max. Dia.	Max. Thickness	Lead Space
1	TCD010D	±.5pF	NPO	.197 ( 5.0)	.118 (3.0)	.098 (2.5)
3	TCD030D	±.5pF	NPO	.197 ( 5.0)	.118 (3.0)	.098 (2.5)
5	TCD050D	±.5pF	NPO	.197 ( 5.0)	.118 (3.0)	.098 (2.5)
10	TCD100J	±5%	NPO	.197 ( 5.0)	.118 (3.0)	.098 (2.5)
12	TCD120J	±5%	NPO	.197 ( 5.0)	.118 (3.0)	.098 (2.5)
15	TCD150J	±5%	NPO	.197 ( 5.0)	.118 (3.0)	.098 (2.5)
18	TCD180J	±5%	NPO	.197 ( 5.0)	.118 (3.0)	.098 (2.5)
20	TCD200J	±5%	NPO	.197 ( 5.0)	.118 (3.0)	.098 (2.5)
22	TCD220J	±5%	NPO	.248 ( 6.3)	.118 (3.0)	.197 (5.0)
24	TCD240J	±5%	NPO	.248 ( 6.3)	.118 (3.0)	.197 (5.0)
25	TCD250J	±5%	NPO	.248 ( 6.3)	.118 (3.0)	.197 (5.0)
27	TCD270J	±5%	NPO	.248 ( 6.3)	.118 (3.0)	.197 (5.0)
30	TCD300J	±5%	NPO	.248 ( 6.3)	.118 (3.0)	.197 (5.0)
33	TCD330J	±5%	NPO	.248 ( 6.3)	.118 (3.0)	.197 (5.0)
39	TCD390J	±5%	NPO	.315 ( 8.0)	.118 (3.0)	.197 (5.0)
47	TCD470J	±5%	NPO	.315 ( 8.0)	.118 (3.0)	.197 (5.0)
50	TCD500J	±5%	NPO	.315 ( 8.0)	.118 (3.0)	.197 (5.0)
51	TCD510J	±5%	NPO	.315 ( 8.0)	.118 (3.0)	.197 (5.0)
56	TCD560J	±5%	NPO	.315 ( 8.0)	.118 (3.0)	.197 (5.0)
62	TCD620J	±5%	NPO	.315 ( 8.0)	.118 (3.0)	.197 (5.0)
68	TCD680J	±5%	NPO	.394 (10.0)	.118 (3.0)	.197 (5.0)
75	TCD750J	±5%	NPO	.394 (10.0)	.118 (3.0)	.197 (5.0)
82	TCD820J	±5%	NPO	.394 (10.0)	.118 (3.0)	.197 (5.0)
91	TCD910J	±5%	NPO	.394 (10.0)	.118 (3.0)	.197 (5.0)
100	TCD101J	±5%	NPO	.394 (10.0)	.118 (3.0)	.197 (5.0)

# Class II — By-pass & Coupling Disc

50 WVDC

Inches (mm)

Cap. Mfd	Type	Tolerance	TC	Max. Dia	Max. Thickness	Lead Space
.001	TCD102Z	± 80/—20%	Z5V	.197 ( 5.0)	.118 (3.0)	.250 (6.4)
.005	TCD502Z	± 80/—20%	Z5V	.197 ( 5.0)	.118 (3.0)	.250 (6.4)
.01	TCD103Z	± 80/—20%	Z5V	.236 ( 6.0)	.118 (3.0)	.250 (6.4)
.02	TCD203Z	± 80/—20%	Z5V	.315 ( 8.0)	.118 (3.0)	.375 (9.5)
.05	TCD503Z	± 80/—20%	Z5V	.394 (10.0)	.118 (3.0)	.375 (9.5)
.068	TCD683Z	± 80/—20%	Z5V	.512 (13.0)	.118 (3.0)	.375 (9.5)
.1	TCD104Z	± 80/—20%	Z5V	.512 (13.0)	.118 (3.0)	.375 (9.5)
.001	TCD102K	± 10%	Y5P	.197 ( 5.0)	.118 (3.0)	.250 (6.4)
.0022	TCD222K	± 10%	Y5P	.236 ( 6.0)	.118 (3.0)	.250 (6.4)
.0033	TCD332K	± 10%	Y5F	.315 ( 8.0)	.118 (3.0)	.250 (6.4)
.0047	TCD472K	± 20%	Z5U	.315 ( 8.0)	.118 (3.0)	.250 (6.4)
.001	TCD102M	± 20%	Z5U	.236 ( 6.0)	.118 (3.0)	.250 (6.4)
.01	TCD103M	± 20%	Z5U	.315 ( 8.0)	.118 (3.0)	.250 (6.4)
.015	TCD153M	± 20%	Z5U	.276 (10.0)	.118 (3.0)	.250 (6.4)
.022	TCD223M	± 20%	Z5U	.276 (10.0)	.118 (3.0)	.250 (6.4)
.033	TCD333M	± 20%	Z5U	.512 (13.0)	.118 (3.0)	.375 (9.5)
.047	TCD473M	± 20%	Z5U	.512 (13.0)	.118 (3.0)	.375 (9.5)
.05	TCD503M	± 20%	Z5U	.512 (13.0)	.118 (3.0)	.375 (9.5)

## 100WVDC

.005	TCP502K	± 10%	Y5P	.390 ( 9.9)	.118 (3.0)	.250 (6.4)
.005	TCPR005	± 20%	Z5U	.390 ( 9.9)	.118 (3.0)	.250 (6.4)
.01	TCP103K	± 10%	Y5P	.390 ( 9.9)	.118 (3.0)	.250 (6.4)
.01	TCPR01	± 20%	Z5U	.390 ( 9.9)	.118 (3.0)	.250 (6.4)
.02	TCP203K	± 10%	Y5P	.441 (11.2)	.118 (3.0)	.250 (6.4)
.02	TCPR02	± 20%	Z5U	.441 (11.2)	.118 (3.0)	.250 (6.4)
.03	TCP303K	± 10%	Y5P	.512 (13.0)	.118 (3.0)	.250 (6.4)
.03	TCPR03	± 20%	Z5V	.590 (15.0)	.118 (3.0)	.375 (9.5)
.05	TCP503M	± 20%	Z5U	.625 (15.9)	.118 (3.0)	.375 (9.5)
.1	TCP104M	± 20%	Z5U	.724 (18.4)	.118 (3.0)	.375 (9.5)
.1	TCPR1	± 80/—20%	Z5V	.724 (18.4)	.118 (3.0)	.375 (9.5)

## 500WVDC

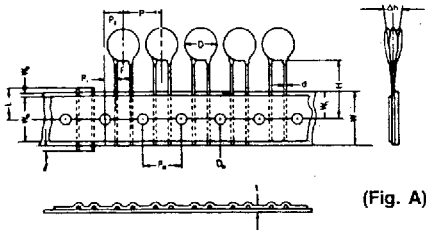
pF

100	TCV101K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
120	TCV121K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
130	TCV131K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
150	TCV151K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
180	TCV181K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
200	TCV201K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
220	TCV221K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
240	TCV241K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
250	TCV251K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
270	TCV271K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
300	TCV301K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
330	TCV331K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
390	TCV391K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
470	TCV471K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
500	TCV501K	± 10%	Y5E	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
510	TCV511K	± 10%	Y5E	.256 ( 7.0)	.118 (3.0)	.250 (6.4)
560	TCV561K	± 10%	Y5E	.256 ( 7.0)	.118 (3.0)	.250 (6.4)
620	TCV621K	± 10%	Y5E	.256 ( 7.0)	.118 (3.0)	.250 (6.4)
680	TCV681K	± 10%	Y5E	.256 ( 7.0)	.118 (3.0)	.250 (6.4)
750	TCV751K	± 10%	Y5E	.256 ( 7.0)	.118 (3.0)	.250 (6.4)
820	TCV821K	± 10%	Y5P	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
910	TCV911K	± 10%	Y5P	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
1000	TCV102K	± 10%	Y5P	.276 ( 7.0)	.118 (3.0)	.250 (6.4)
1200	TCV122K	± 10%	Y5P	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
1300	TCV132K	± 10%	Y5P	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
1500	TCV152K	± 10%	Y5P	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
1600	TCV162K	± 10%	Y5P	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
1800	TCV182K	± 10%	Y5P	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
2000	TCV202K	± 10%	Y5P	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
2200	TCV222K	± 10%	Y5P	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
2400	TCV242M	± 20%	Z5U	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
2500	TCV252M	± 20%	Z5U	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
2700	TCV272M	± 20%	Z5U	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
3000	TCV302M	± 20%	Z5U	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
3300	TCV332M	± 20%	Z5U	.335 ( 8.5)	.118 (3.0)	.250 (6.4)
3900	TCV392M	± 20%	Z5U	.394 (10.0)	.118 (3.0)	.250 (6.4)
4700	TCV472M	± 20%	Z5U	.394 (10.0)	.118 (3.0)	.250 (6.4)
5000	TCV502M	± 20%	Z5U	.394 (10.0)	.118 (3.0)	.250 (6.4)
5600	TCV562M	± 20%	Z5U	.394 (10.0)	.118 (3.0)	.250 (6.4)
6800	TCV682M	± 20%	Z5U	.492 (12.5)	.118 (3.0)	.250 (6.4)
7500	TCV752M	± 20%	Z5U	.492 (12.5)	.118 (3.0)	.250 (6.4)
8200	TCV822M	± 20%	Z5U	.492 (12.5)	.118 (3.0)	.250 (6.4)
.010 μF	TCV103M	± 20%	Z5U	.492 (12.5)	.118 (3.0)	.250 (6.4)
.015 μF	TCV153M	± 20%	Z5U	.669 (17.0)	.118 (3.0)	.275 (9.5)
.022 μF	TCV223M	± 20%	Z5U	.669 (17.0)	.118 (3.0)	.275 (9.5)
.1 μF	TCV104M	± 20%	Z5U	.906 (23.0)	.156 (4.0)	.354 (9.0)
.1 μF	TCV104Z	± 80/—20%	Z5V	.650 (16.5)	.118 (3.0)	.354 (9.0)

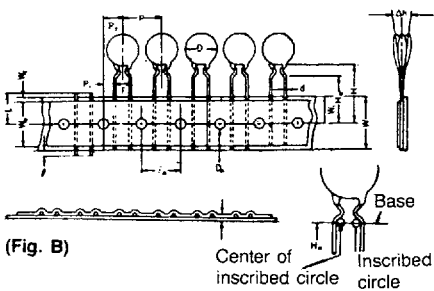
# TAPE & REEL PACKAGING

Arco ceramic disc capacitors whether straight lead or kink lead configuration are available in tape & reel packaging.

## \* Taping products of straight lead configuration



## \* Taping products of kink lead configuration



Name of each part	Symbol	Dimensions (mm)
Outer diameter of product <sup>1</sup>	D	11.0 max.
Pitch between products	P	12.7 ± 1
Pitch of sprocket hole <sup>2</sup>	P <sub>1</sub>	12.7 ± 0.3
Position gap of sprocket hole	P <sub>1</sub>	3.85 ± 0.7
Position gap of sprocket hole	P <sub>2</sub>	6.35 ± 1.3
Lead wire space	F	5 ± 0.8
Product fall <sup>3</sup>	Δh	0 ± 2
Tape width	W	18 <sup>+1.0</sup> / <sub>-0.5</sub>
Sticking tape width	W <sub>2</sub>	12.5 min.
Position gap of sprocket hole	W <sub>1</sub>	9 <sup>+0.75</sup> / <sub>-0.5</sub>
Sticking tape gap	W <sub>2</sub>	3 max.
Lower surface position of product	H	20 <sup>+1.5</sup> / <sub>-1.0</sub>
Tape thickness (total thickness) <sup>4</sup>	t	0.7 ± 0.2
Lead clinch height <sup>5</sup>	H <sub>2</sub>	16 ± 0.5
Lead wire protrusion	ℓ	2 max.
Sprocket hole diameter	D <sub>2</sub>	4 ± 0.3
Lead wire diameter	d	0.6 <sup>+0.06</sup> / <sub>-0.05</sub>
Cut position of rejected article	L	11 max.

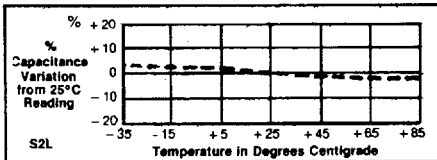
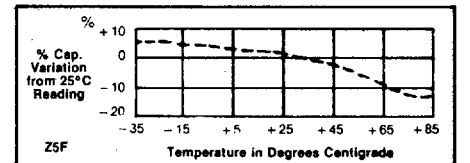
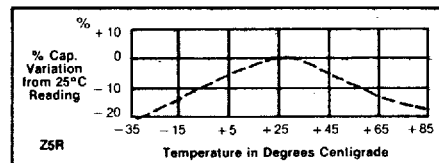
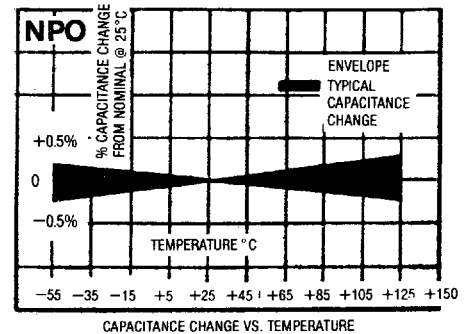
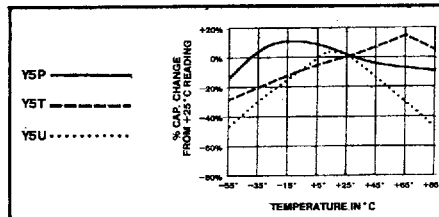
- 1 Nominal outer diameter.
- 2 Less than 2mm of cumulative error per 20 pitches.
- 3 Including fall by bend of lead wire.
- 4 Excluding thickness of lead wire.
- 5 Available only for kink lead configurations.

## Temperature Characteristics

Symbol	Z5	Y5	X5	
Temp. Range For Characteristic Determination (°C)	+10 Thru ±85	-30 Thru ±85	-55 Thru ±85	
Symbol	E	F	P	R
Max. Cap. Change (%)	±4.7 T +22 -33	+7.5 U +22 -56	±10 V +22	+15 -82

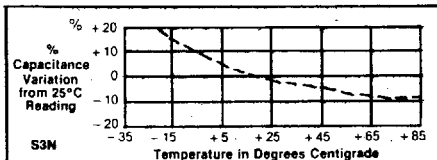
Over Temp. Range

## Performance Curves



### S2L CHARACTERISTIC:

N330 ± 500 parts-per-million per-degree C (PPM/°C) maximum capacitance change from +25°C reading over temperature range of -35°C to +85°C.



### S3N CHARACTERISTICS:

N3300 ± 2500 parts-per-million per-degree C (PPM/°C) maximum capacitance change from +25°C reading over temperature range of -35°C to +85°C.

