

# Disc Ceramic Capacitors

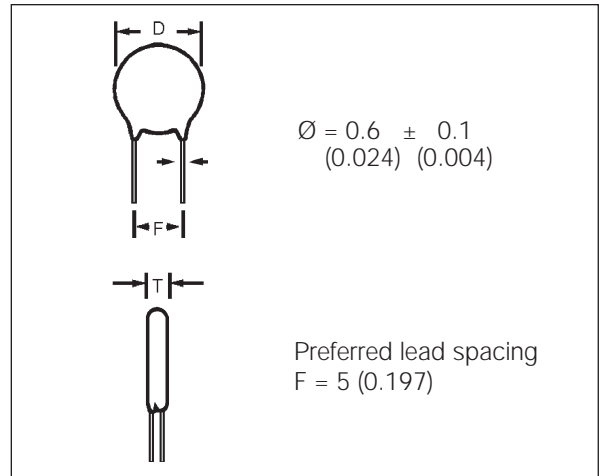


## General Specifications - Class III General Purpose

### DIELECTRIC - CLASS III

A thin dielectric layer is grown on a disc of conductive ceramic. Very large capacitances can be obtained due to reduced thickness of this barrier layer and its inherently high dielectric constant. Due its small dimensions, they are a less expensive replacement of multilayer ceramic or polyester capacitors. An equivalent circuit is shown below:

Meets IEC 324 (1970).



### DIMENSIONS

millimeters (inches)

Digit 9 of P.N. ( $\varnothing$ )	D $\pm$ 2 (0.079)	T max.	Available Lead Spacing
A	4.0 (0.157)	3.0 (0.118)	A,B,D,E,O,R
B	5.0 (0.197)	3.0 (0.118)	A,B,D,E,O,R,X
C	6.0 (0.236)	3.0 (0.118)	A,B,C,D,E,O,R,X
D	7.0 (0.276)	3.0 (0.118)	A,B,C,D,E,O,R,X
E	8.0 (0.315)	3.0 (0.118)	A,B,C,D,E,O,R,X
F	9.0 (0.354)	3.0 (0.118)	A,B,C,E,O,R,X
G	10.0 (0.394)	3.0 (0.118)	A,B,C,E,O,R,X
H	11.0 (0.433)	3.0 (0.118)	A,B,C,E,O,R,W
J	13.0 (0.512)	3.5 (0.138)	B,C,R,W
K	15.0 (0.591)	4.0 (0.157)	B,C,R,W

millimeters (inches)

Lead Spacing	Digit 8 of P.N.	
F		
2.5 (0.100)	D	—
5 (0.200)	A	O
6 (0.250)	E	X
7.5 (0.300)	B	R
10 (0.400)	C	W

### PERFORMANCE CHARACTERISTICS CLASS III

Measured at	1.0 kHz / 0.1 Vrms / 25°C	
Dissipation Factor	$C_R \leq 22 \text{ nF} \rightarrow \text{Y5V, Y5U} \leq 7.5\%$ $C_R > 22 \text{ nF} \rightarrow \text{Y5V, Y5P} \leq 5.0\%$	
Capacitance Tolerance	Y5P $\rightarrow \pm 20\% / -20 + 50\%$ Y5U $\rightarrow \pm 20\% / -20 + 80\%$ Y5V $\rightarrow \pm 20\% / -20 + 80\%$	
Climatic Category	30 / 085 / 21	
Insulation Resistance @ $V_R$	Y5P	$\geq 12 \text{ M}\Omega$
	Y5U	$4.7 \text{ nF} \dots 100 \text{ nF} \rightarrow \geq 10 \text{ M}\Omega$ $200 \text{ nF} \rightarrow \geq 1 \text{ M}\Omega$
	Y5V	$\geq 100 \text{ M}\Omega$
Dielectric Strength NOTE: Charging current limited to 50 mA	Between leads	$V_t = 1.25 V_R$
	Body insulation	$V_R = 25\text{V } V_t = 100\text{V (DC)}$ $V_R = 50\text{V } V_t = 150\text{V (DC)}$
Operating Temperature Range (°C)	-30... +85	

Note: Damp Heat Steady State: 90... 95% R.H. 40°C / 21 days. No voltage to be applied.

# Disc Ceramic Capacitors

## Dimension Table

### Barrier Layer Capacitors - Class III General Purpose



#### PHENOLIC COATED – CAPACITANCE VS. DISC DIAMETER

millimeters (inches)

Class III	$\Delta C/C$ (max.) $\pm 12\%$		Range -30... +85°C		$\Delta C/C$ (max.) +30 -65%		Range -30... +85°C		$\Delta C/C$ (max.) +22 -85%		Range -30... +85°C	
Temp. Coefficient	Y5P				Y5U				Y5V			
Digits 1,2,3 of P.N.	5WF		5WH		5YF		5YH		5ZH			
Rated Voltage ( $V_R$ )	25 VDC		50 VDC		25 VDC		50 VDC		50 VDC			
$C_R$ (pF)												
4,700	4.0 (0.157)		4.0 (0.157)		4.0 (0.157)		4.0 (0.157)		4.0 (0.157)			
10,000	6.0 (0.236)		6.0 (0.236)									
22,000	7.0 (0.276)		8.0 (0.315)		5.0 (0.197)		6.0 (0.236)					
33,000	8.0 (0.315)		9.0 (0.354)		6.0 (0.236)		7.0 (0.276)					
47,000			11.0 (0.433)									
50,000	10.0 (0.394)		—		7.0 (0.276)		8.0 (0.315)		5.0 (0.197)			
68,000	11.0 (0.433)		13.0 (0.512)									
100,000	13.0 (0.512)		15.0 (0.591)		8.0 (0.315)		9.0 (0.354)		7.0 (0.276)			
200,000	—		—		13.0 (0.512)		—		—			

Y5U, Y5V - Preferences

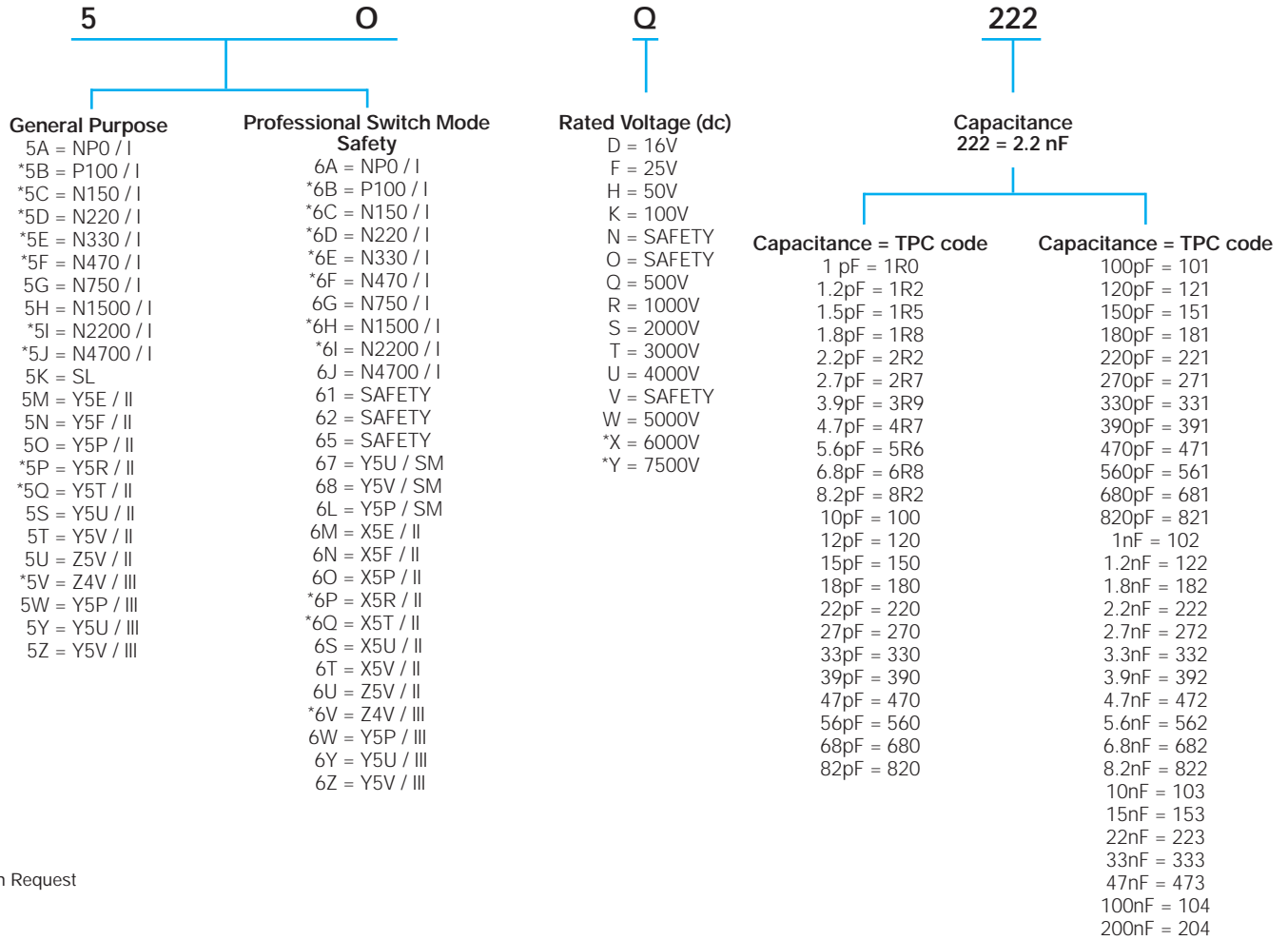
Diameter ( $\phi$ ) = 9th Part Number Digit

# Disc Ceramic Capacitors



## Ordering Code

### HOW TO ORDER



\*Upon Request

# Disc Ceramic Capacitors



## Ordering Code

**M**

**Tolerance**  
 C = ±0.25 pF  
 D = ±0.50 pF  
 J = ±5%  
 K = ±10%  
 M = ±20%  
 S = -20+50%  
 Z = -20+80%  
 P = 0+100%

**A**

**Capacitor Diameter  
 ± 2 (0.079)**  
 A = 4 (0.157)  
 B = 5 (0.197)  
 C = 6 (0.236)  
 D = 7 (0.276)  
 E = 8 (0.315)  
 F = 9 (0.354)  
 G = 10 (0.394)  
 H = 11 (0.433)  
 J = 13 (0.512)  
 K = 15 (0.591)  
 M\* = 19 (0.748)

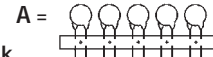
\*Wire 0.8 (0.031) recommended

**A**

**A**

**Packaging**

**Cardboard Strips**



**Bulk**

E = 5 (0.197) ± 1 (0.039) free wire length  
 C = 10 (0.394) ± 1 (0.039) free wire length  
 D = 25 (0.984) ± 1 (0.039) free wire length

**Taping**

**Reel**



Avisert			Panaset		
H	L	L	J	L	L



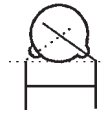
**Ammo Pack**

Avisert			Panaset		
I	M	M	K	M	M

Lead Forming				
mm	inches			
2.5 ±0.5	.1 ± .025	D	-	-
5 <sup>+0.6</sup> <sub>-0.2</sub>	.2 ± .025	A	O	N
6 <sup>+0.6</sup> <sub>-0.2</sub>	.25 ± .025	E	X	-
7.5 <sup>+1</sup> <sub>-0.5</sub>	.3 ± .05	B	R	Q
10 <sup>+0.5</sup> <sub>-1.0</sub>	.4 ± .05	C	W	-
12.5 <sup>+1</sup> <sub>-0.5</sub>	.5 ± .05	P	-	-

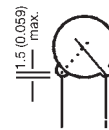
**Finishing**

Diam ≤ 9 (0.354) and  
 F = 5.00 (0.197)



Coating does not surpass the bend

For every other:



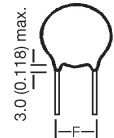
**Low Voltage**

A = Phenolic (General Purpose) Q = Waxed phenolic

S = Epoxy (Professional) cap. diameter ≤ 8 (0.315)

D = Epoxy (Professional) cap. diameter > 8 (0.315)

**High Voltage**



F = Measured from the center of leads

C = Epoxy wire diameter 0.6 ± 0.1 (0.024) ± (0.004)

I = Epoxy wire diameter 0.8 ± 0.1 (0.031) ± (0.004)

L = Phenolic wire diameter 0.6 ± 0.1 (0.024) ± (0.004)

Please note that not all code combinations are either possible or available.

# Disc Ceramic Capacitors



## Marking

DIG. 2		Logo: Only in diam. ≥ 6mm	Capacitance		EIA	
O				1pF = 109	100pF = 101	
TC / Class		1.2pF = 129		120pF = 121		
General Purpose	Professional	1.5pF = 159		150pF = 151		
A = NP0 / I	A = NP0 / I	1.8pF = 189		180pF = 181		
*B = P100 / I	B = P100 / I	2.2pF = 229		220pF = 221		
*C = N150 / I	C = N150 / I	2.7pF = 279		270pF = 271		
*D = N220 / I	D = N220 / I	3.9pF = 399		390pF = 391		
*E = N330 / I	E = N330 / I	4.7pF = 479		470pF = 471		
*F = N470 / I	F = N470 / I	5.6pF = 569		560pF = 561		
G = N750 / I	G = N750 / I	6.8pF = 689		680pF = 681		
H = N1500 / I	H = N1500 / I	8.2pF = 829	820pF = 821			
*I = N2200 / I	I = N2200 / I	10pF = 100	1nF = 102			
*J = N4700 / I	J = N4700 / I	12pF = 120	1.2nF = 122			
K = SL	7 = Y5U / SM	15pF = 150	1.8nF = 182			
M = Y5E / II	8 = Y5V / SM	18pF = 180	2.2nF = 222			
N = Y5F / II	L = Y5P / SM	22pF = 220	2.7nF = 272			
O = Y5P / II	M = X5E / II	27pF = 270	3.9nF = 392			
P = Y5R / II	N = X5F / II	39pF = 390	4.7nF = 472			
Q = Y5T / II	O = X5P / II	47pF = 470	5.6nF = 562			
S = Y5U / II	P = X5R / II	56pF = 560	6.8nF = 682			
T = Y5V / II	Q = X5T / II	68pF = 680	8.2nF = 822			
U = Z5V / II	S = X5U / II	82pF = 820	10nF = 103			
V = Z4V / III	T = X5V / II		15nF = 153			
*W = Y5P / II	U = Z5V / II		22nF = 223			
*X = Y5R / II	V = Z4V / III		33nF = 333			
Y = Y5U / II	W = Y5P / III		47nF = 473			
Z = Y5V / II	X = Y5R / III		100nF = 104			
	Y = Y5U / III		200nF = 204			
	Z = Y5V / III					

DIG. 3	DIG. 7
Q	M
<b>Rated Voltage</b>	<b>Tolerance</b>
D = 16V	C = ±0.25pF
F = 25V	D = ±0.5pF
H = 50V	J = ±5%
K = 100V	K = ±10%
Q = 500V	M = ±20%
R = 1000V	S = -20 +50%
S = 2000V	Z = -20 +80%
T = 3000V	P = 0 +100%
U = 4000V	
W = 5000V	
X = 6000V	
Y = 7500V	

\*Upon Request

Safety Front		Back: (Approval marks)	
Capacitance	As above		<b>Type</b>
			61V
			620
			65N
		<b>Tolerance</b>	As above

TC – Temperature coefficient.

DIG – for better understanding, check pages 3 and 4.

	D % 19 (0.748)	500	-
500V<Vr<=2KV	D% 9 (0.354)	1500	1000
	9 (0.354)% D % 11 (0.433)	-	1000
	9 (0.354)% D % 13 (0.512)	1000	-
	11 (0.433)% D % 19 (0.748)	-	500
	13 (0.512)% D % 19 (0.748)	500	-
2KV<Vr<=5KV	D% 9 (0.354)	1500	-
Safety 65N 62O	D% 11 (0.433)	-	1000
	D % 13 (0.512)	500	500
Safety	D% 6 (0.236)	1500	1500
61V	7 (0.275)% D % 9 (0.354)	1000	1000
	9 (0.354)% D	500	500

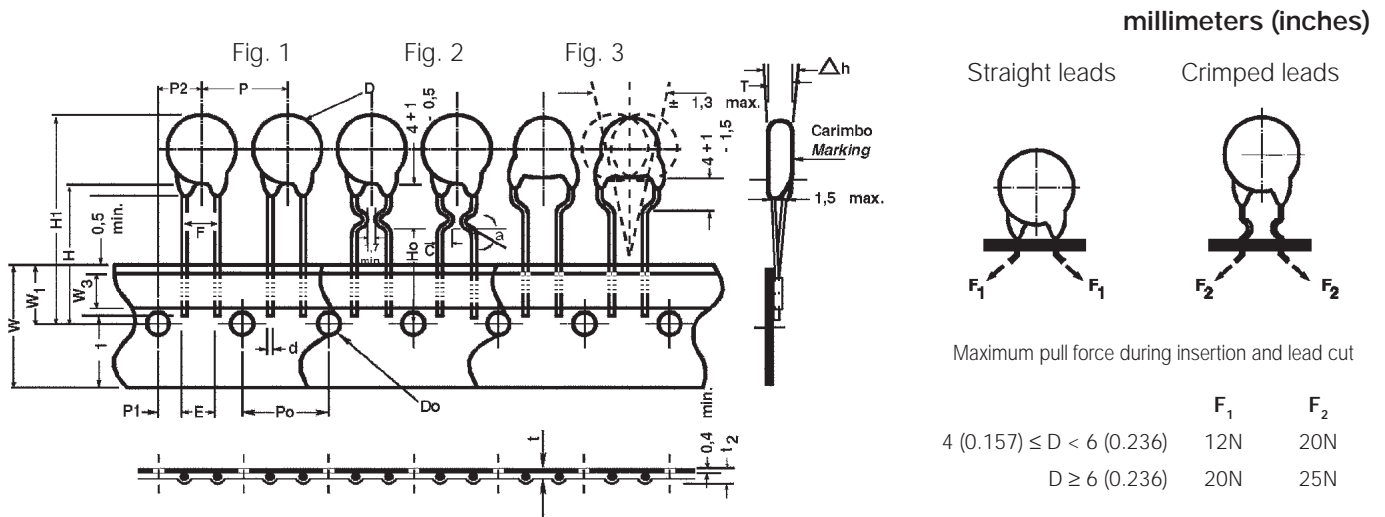
# Disc Ceramic Capacitors



## Tape and Reel Specifications

There are two types of taped disc ceramic capacitors:  
Straight or crimped leads.

Both types can be shipped on reels or ammopack.  
The standard packaging quantities are shown below:



Digit 11	Available Tapings	Digit 9
L	→ Sizes $4 (0.157) \leq D \leq 11 (0.433)$	A... H
M		
J H	→ Sizes $6 (0.236) \leq D \leq 11 (0.433)$	C... H
K I		

### TPC Code Digit 11

Packaging	Avisert	Panasert
Reel 	 H L L FIGURE 1 FIGURE 2 FIGURE 3	 J L L FIGURE 1 FIGURE 2 FIGURE 3
Ammopack 	 I M M FIGURE 1 FIGURE 2 FIGURE 3	 K M M FIGURE 1 FIGURE 2 FIGURE 3

Figure 2: Inside Crimp 100V... 1000V

Figure 3: Outside Crimp 1000V

# Disc Ceramic Capacitors

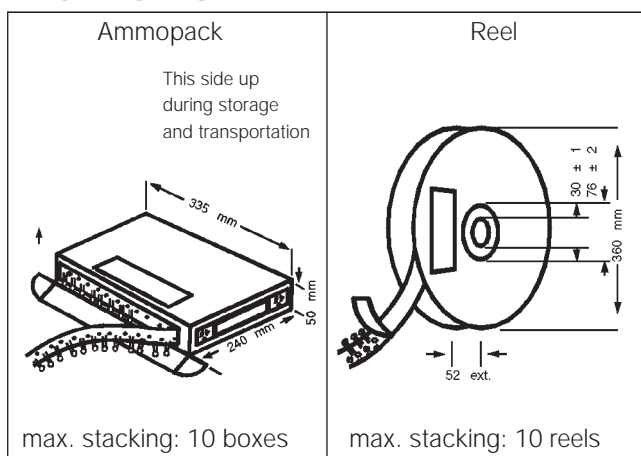


## Tape and Reel Specifications

millimeters (inches)

Description of Symbols		Straight Leads		Crimped
		Figure 1		Figure 2 & 3
		A (Avisert)	P (Panaset)	Avisert & Panaset
Crimp angle	$\infty$	—	—	20°...45°
Crimp length	C	—	—	1.7 min.
Lead diameter	d	0.60 ± 0.1		
Disc diameter	D	11 max.		
Lead hole diameter	Do	4.0 ± 0.2		
Disc thickness	T	See Catalog		
Lead spacing	F	5.0 $^{+0.6}_{-0.2}$		
Component alignment, front-rear	$\Delta h$	0 ± 1		
Height of component from tape center	H	19.5 ± 0.5	16.5 ± 0.5 - 0	—
Height from tape center to crimp	Ho	—	—	16 + 0.5 - 0
Component height	H1	32.25 max.	>23.5 <32.25	32.25 max.
Distance from component leads to tape bottom	$\ell_1$	12 max.		
Tape width	W	18 $^{+1}_{-0.5}$		
Bonding tape width	W <sub>3</sub>	5.5 min.		
Feed hole position	W <sub>1</sub>	9.0 ± 0.5		
Pitch between discs	P	12.7 ± 1		
Feed hole pitch	Po	12.7 ± 0.3		
Hole center to lead	P1	3.85 ± 0.7		
Feed hole center to component center	P2	6.35 ± 1		
Tape + bonding tape thickness	t	0.7 ± 0.2		
Total tape thickness, including lead	t <sub>2</sub>	1.5 max.		

### PACKAGING



### SHIPPING CONTAINER

