

Disc Ceramic Capacitors



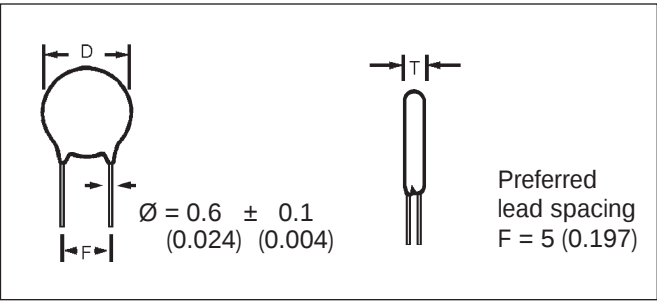
General Specifications - Class II General Purpose

DIELECTRIC - CLASS II

These ceramic capacitors have a high dielectric constant, what makes possible a high capacitance values in reduced dimensions, however temperature coefficient and loss factor are greater than Class I.

Typical applications are decoupling and by pass.

Meets IEC 384-9 (1988).



DIMENSIONS

millimeters (inches)

Digit 9 (ϕ)	D $\pm$ 2 (0.079)	T max.	Available Lead Spacing				
			Vn = 100V/500V	Vn = 1000V	Vn = 2000V	Vn = 3000V	Vn = 4000/5000V
A	4.0 (0.157)	3.0 (0.118)	A,B,D,E,O,R	A,B,E,N,R	A,B,E,N,R	B,E	
B	5.0 (0.197)	4.0 (0.157)	A,B,D,E,O,R,X	A,B,E,N,R,X	A,B,E,N,R	B,E	
C	6.0 (0.236)	4.0 (0.157)	A,B,C,D,E,O,R,X	A,B,C,E,N,R,X	A,B,C,E,N,R	B,C,E	C
D	7.0 (0.276)	4.0 (0.157)	A,B,C,D,E,O,R,X	A,B,C,E,N,Q,R,X	A,B,C,E,N,Q,R	B,C,E	C
E	8.0 (0.315)	4.0 (0.157)	A,B,C,D,E,O,R,X	A,B,C,E,N,Q,R,X	A,B,C,E,N,Q,R	B,C,E	C
F	9.0 (0.354)	5.0 (0.197)	A,B,C,E,O,R,X	A,B,C,E,N,R,X	A,B,C,E,N,R	B,C,E	C
G	10.0 (0.394)	5.0 (0.197)	A,B,C,E,O,R,X	A,B,C,E,N,R,X	A,B,C,E,N,R	B,C,E	C
H	11.0 (0.433)	5.0 (0.197)	A,B,C,E,O,R,X	A,B,C,E,N,P,R,W	A,B,C,E,N,P,R,W	B,C,E,P,W	C,P
J	13.0 (0.512)	6.0 (0.236)	B,C,R,W	B,C,N,P,R,W	B,C,P,W	B,C,P,W	C,P
K	15.0 (0.591)	6.0 (0.236)	B,C,R,W	B,C,N,P,R,W	B,C,P,W	B,C,P,W	C,P
M	19.0 (0.748)	7.0 (0.276)	B,C	B,C,P	B,C,P	B,C,P	C,P

(E), (X), (W): upon request

LEAD SPACING – DIGIT 8 OF P.N. millimeters (inches)

	100V/500V		1kV...5kV/100Vac...150Vac		
F					
2.5 (0.100)	D	—	—	—	—
5 (0.200)	A	O	A	—	N
6 (0.250)	E	X	E	X	—
7.5 (0.300)	B	R	B	R	Q
10 (0.400)	C	W	C	W	—
12.5 (0.500)	P	—	P	—	—

Disc Ceramic Capacitors



General Specifications - Class II General Purpose

100V / 500V PERFORMANCE CHARACTERISTICS CLASS II

Voltage Rating	100V and 500V
Measured at	1.0 kHz / 0.3 Vrms / 25°C
Dissipation Factor	Y5E / Y5F / Y5P $\leq$ 2.5% Y5U / Y5V / Z5V $\leq$ 3.0%
Capacitance Tolerance	Y5E / Y5F / Y5P $\rightarrow \pm 10\%$ Y5E / Y5E / Y5P / Y5U $\rightarrow \pm 20\%$ Y5U / Y5V / Z5V $\rightarrow -20\%$ +50%
Insulation Resistance	@ $V_R \rightarrow \geq 10 \text{ G}\Omega$
Dielectric Strength NOTE: Charging current limited to 50 mA	$V_R = 100\text{V} \rightarrow V_t = 250\text{V (DC)}$ $V_R = 500\text{V} \rightarrow V_t = 1250\text{V (DC)}$
Operating Temperature Range (°C)	-30... +85
Climatic Category	30 / 085 / 21 Phenolic Coated

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

1kV ... 5kV PERFORMANCE CHARACTERISTICS CLASS II

Voltage Rating	1kV ... 5kV
Measured at	1.0 kHz / 0.3 Vrms / 25°C
Dissipation Factor	Y5F $\rightarrow \leq 2.5\%$ Y5U / Y5V $\leq 3.0\%$
Capacitance Tolerance	Y5F $\rightarrow \pm 10\%$ / $\pm 20\%$ Y5U $\rightarrow \pm 20\%$ / -20 +50% Y5V $\rightarrow -20$ +50%
Insulation Resistance	@ 500V $\rightarrow \geq 10 \text{ G}\Omega$
Dielectric Strength NOTE: Charging current limited to 50 mA	$1.5 \times V_R + 500 \text{ (DC)}$
Operating Temperature Range (°C)	-30... +85 Phenolic Coated -30... +125 Epoxy Coated
Climatic Category	30 / 085 / 21 Phenolic Coated 30 / 085 / 56 Epoxy Coated

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

Disc Ceramic Capacitors

Dimension Table - Class II

Low and Medium Voltage General Purpose



100V / 500V CLASS II – CAPACITANCE VS. DISC DIAMETER

millimeters (inches)

Temp. Coefficient	Y5E		Y5F		Y5P		Y5U		Y5V		Z5V
Digits 1,2,3 of P.N.	5MK	5MQ	5NK	5NQ	5OK	5OQ	5SK	5SQ	5TK	5TQ	5UK
Rated Voltage (V _R)	100 VDC	500 VDC	100 VDC	500 VDC	100 VDC	500 VDC	100 VDC	500 VDC	100 VDC	500 VDC	100 VDC
C _R (pF)											
56	4.0 (0.157)	4.0 (0.157)	Use Y5E	Use Y5E	Use Y5E	Use Y5E	Use Y5E	Use Y5E	Use Y5E	Use Y5E	Use Y5E
68											
82											
100											
120											
150											
180											
220											
270	5.0 (0.197)	5.0 (0.197)	4.0 (0.157)	4.0 (0.157)	Use Y5F	Use Y5F	Use Y5F	Use Y5F	Use Y5F	Use Y5F	Use Y5F
330											
390											
470											
560	6.0 (0.236)	6.0 (0.236)	5.0 (0.197)	5.0 (0.197)	4.0 (0.157)	4.0 (0.157)	Use Y5P	Use Y5P	Use Y5P	Use Y5P	Use Y5P
680											
820	7.0 (0.276)	7.0 (0.276)	6.0 (0.236)	6.0 (0.236)	5.0 (0.197)	5.0 (0.197)	4.0 (0.157)	4.0 (0.157)	Use Y5U	Use Y5U	Use Y5U
1,000											
1,200	8.0 (0.315)	8.0 (0.315)	7.0 (0.276)	7.0 (0.276)	6.0 (0.236)	6.0 (0.236)	5.0 (0.197)	5.0 (0.197)	4.0 (0.157)	4.0 (0.157)	Use Y5V
1,500											
1,800	9.0 (0.354)	9.0 (0.354)	8.0 (0.315)	8.0 (0.315)	7.0 (0.276)	7.0 (0.276)	6.0 (0.236)	6.0 (0.236)	5.0 (0.197)	5.0 (0.197)	4.0 (0.157)
2,200											
2,700	11.0 (0.433)	11.0 (0.433)	9.0 (0.354)	9.0 (0.354)	8.0 (0.315)	8.0 (0.315)	7.0 (0.276)	7.0 (0.276)	6.0 (0.236)	6.0 (0.236)	5.0 (0.197)
3,300											
3,900	11.0 (0.433)	15.0 (0.591)	11.0 (0.433)	15.0 (0.591)	11.0 (0.433)	11.0 (0.433)	7.0 (0.276)	7.0 (0.276)	6.0 (0.236)	6.0 (0.236)	4.0 (0.157)
4,700											
5,600											
6,800											
8,200											
10,000											
12,000											
15,000											
22,000											

Diameter (φ) = 9th Part Number Digit

Disc Ceramic Capacitors

Dimension Table

High Voltage - Class II General Purpose



1kV / 5kV CLASS II – CAPACITANCE VS. DISC DIAMETER

millimeters (inches)

Temp. Coefficient	Y5F			Y5U					Y5V																							
Digits 1,2,3 of P.N.	5NR	5NS	5NT	5SR	5SS	5ST	5SU	5SW	5TR	5TS	5TT																					
Rated Voltage (V _R)	1000 VDC 100 VAC	2000 VDC 150 VAC	3000 VDC 150 VAC	1000 VDC 100 VAC	2000 VDC 150 VAC	3000 VDC 150 VAC	4000 VDC 150 VAC	5000 VDC 150 VAC	1000 VDC 150 VAC	2000 VDC 150 VAC	3000 VDC 150 VAC																					
C _R (pF)																																
100	4.0 (0.157)	4.0 (0.157)		Use Y5F	Use Y5F	Use Y5F	8.0 (0.315)	11.0 (0.433)	Use Y5F	Use Y5F	Use Y5F																					
120																																
150		5.0 (0.197)																														
180			6.0 (0.236)																													
220			7.0 (0.276)																													
270	5.0 (0.197)	6.0 (0.236)		4.0 (0.157)	5.0 (0.197)	7.0 (0.276)	8.0 (0.315)	11.0 (0.433)	Use Y5U	Use Y5U																						
330																																
390		7.0 (0.276)	8.0 (0.315)																													
470		6.0 (0.236)	8.0 (0.315)								9.0 (0.354)	5.0 (0.197)	6.0 (0.236)	7.0 (0.276)	8.0 (0.315)	10.0 (0.394)	4.0 (0.157)	6.0 (0.236)														
560																																
680	7.0 (0.276)	8.0 (0.315)		5.0 (0.197)	7.0 (0.276)	8.0 (0.315)	11.0 (0.433)	13.0 (0.512)	7.0 (0.276)	8.0 (0.315)	9.0 (0.354)																					
820			9.0 (0.354)									10.0 (0.394)	11.0 (0.433)	6.0 (0.236)	7.0 (0.276)	8.0 (0.315)	9.0 (0.354)	10.0 (0.394)	11.0 (0.433)	13.0 (0.512)												
1,000																																
1,200		8.0 (0.315)																			10.0 (0.394)	13.0 (0.512)	6.0 (0.236)	7.0 (0.276)	8.0 (0.315)	9.0 (0.354)	10.0 (0.394)	11.0 (0.433)	13.0 (0.512)			
1,500		8.0 (0.315)	10.0 (0.394)									13.0 (0.512)	7.0 (0.276)	9.0 (0.354)	10.0 (0.394)	11.0 (0.433)	13.0 (0.512)	7.0 (0.276)	8.0 (0.315)	9.0 (0.354)												
1,800	9.0 (0.354)	11.0 (0.433)	15.0 (0.591)	8.0 (0.315)	10.0 (0.394)	11.0 (0.433)	13.0 (0.512)	15.0 (0.591)	7.0 (0.276)	8.0 (0.315)																						
2,200	11.0 (0.433)	13.0 (0.512)	19.0 (0.748)								9.0 (0.354)	10.0 (0.394)									11.0 (0.433)	13.0 (0.512)	15.0 (0.591)	7.0 (0.276)	8.0 (0.315)							
2,700	13.0 (0.512)	15.0 (0.591)	22.0 (0.866)																							10.0 (0.394)	11.0 (0.433)	13.0 (0.512)	15.0 (0.591)	17.0 (0.668)	7.0 (0.276)	8.0 (0.315)
3,300	15.0 (0.591)	19.0 (0.748)	27.0 (1.063)																													
3,900	17.0 (0.668)	22.0 (0.866)	33.0 (1.320)										13.0 (0.512)	15.0 (0.591)	17.0 (0.668)	19.0 (0.748)	22.0 (0.866)	7.0 (0.276)	8.0 (0.315)													
4,700	19.0 (0.748)	27.0 (1.063)	39.0 (1.560)	15.0 (0.591)	17.0 (0.668)	19.0 (0.748)	22.0 (0.866)	27.0 (1.063)	7.0 (0.276)	8.0 (0.315)																						
5,600	22.0 (0.866)	33.0 (1.320)	47.0 (1.870)								17.0 (0.668)	19.0 (0.748)								22.0 (0.866)	27.0 (1.063)	33.0 (1.320)	7.0 (0.276)	8.0 (0.315)								
6,800	27.0 (1.063)	39.0 (1.560)	56.0 (2.240)																						19.0 (0.748)	22.0 (0.866)	27.0 (1.063)	33.0 (1.320)	39.0 (1.560)	7.0 (0.276)	8.0 (0.315)	
8,200	33.0 (1.320)	47.0 (1.870)	68.0 (2.720)																													22.0 (0.866)
10,000	39.0 (1.560)	56.0 (2.240)	82.0 (3.260)										27.0 (1.063)	33.0 (1.320)	39.0 (1.560)	47.0 (1.870)	56.0 (2.240)	7.0 (0.276)	8.0 (0.315)													
12,000	47.0 (1.870)	68.0 (2.720)	10,000	33.0 (1.320)	39.0 (1.560)	47.0 (1.870)	56.0 (2.240)	68.0 (2.720)	82.0 (3.260)	10,000																						
15,000	56.0 (2.240)	82.0 (3.260)	12,000	39.0 (1.560)	47.0 (1.870)	56.0 (2.240)	68.0 (2.720)	82.0 (3.260)	10,000	12,000																						
22,000	68.0 (2.720)	10,000	15,000	47.0 (1.870)	56.0 (2.240)	68.0 (2.720)	82.0 (3.260)	10,000	12,000	15,000																						

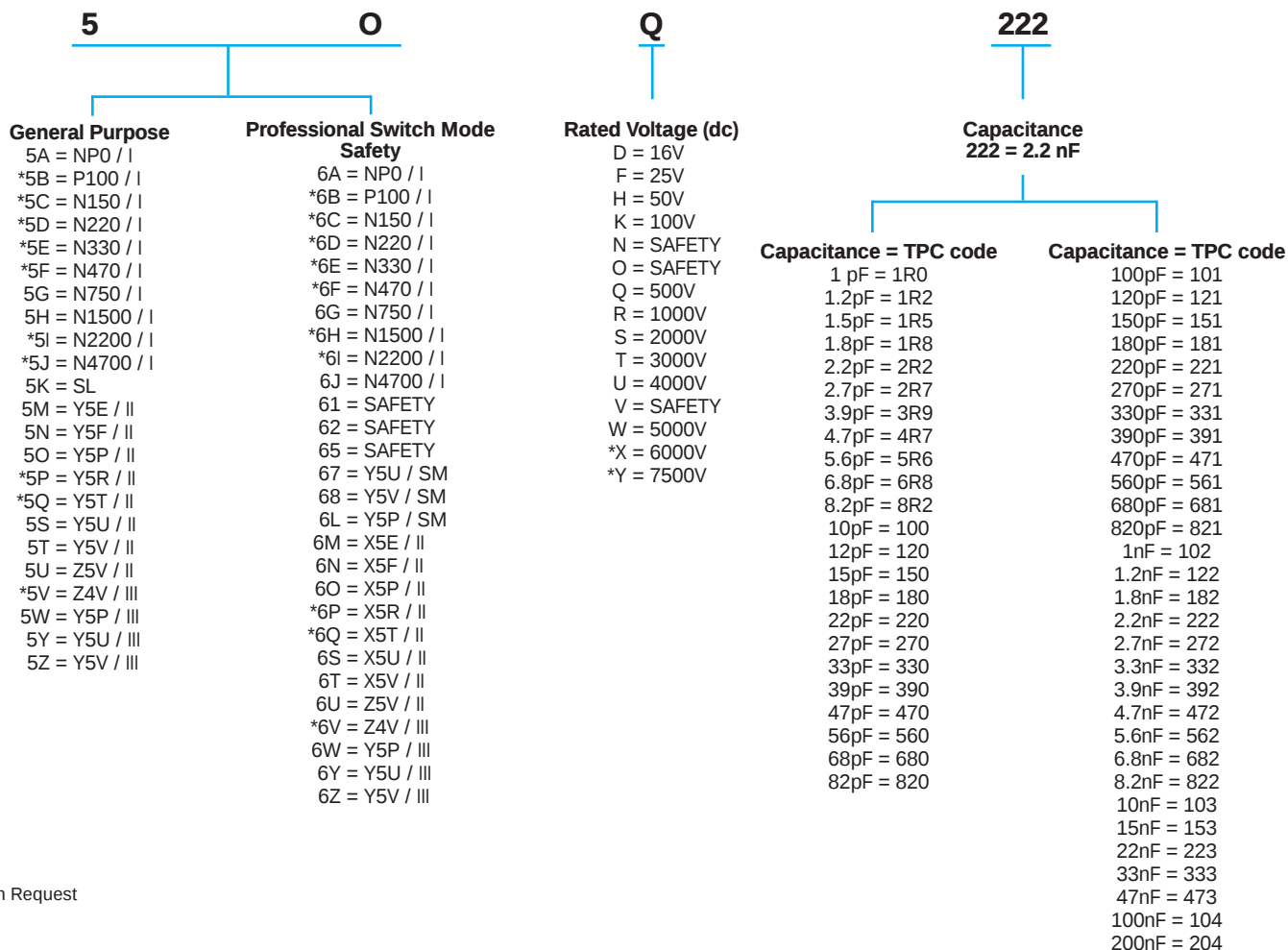
Diameter (φ) = 9th Part Number Digit

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 = $\pm 5\%$
K = $\pm 10\%$
M = $\pm 20\%$
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)

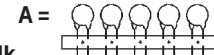
*Wire 0.8 (0.031) recommended

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

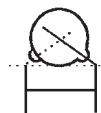


Avisert			Panaset		
I	M	M	K	M	M

Lead Forming				
mm	inches			
2.5 ± 0.5	.1 $\pm .025$	D	—	—
5 $\begin{smallmatrix} +0.6 \\ -0.2 \end{smallmatrix}$	.2 $\pm .025$	A	O	N
6 $\begin{smallmatrix} +0.6 \\ -0.2 \end{smallmatrix}$	.25 $\pm .025$	E	X	—
7.5 $\begin{smallmatrix} +1 \\ -0.5 \end{smallmatrix}$	.3 $\pm .05$	B	R	Q
10 $\begin{smallmatrix} +0.5 \\ -1.0 \end{smallmatrix}$	.4 $\pm .05$	C	W	—
12.5 $\begin{smallmatrix} +1 \\ -0.5 \end{smallmatrix}$	.5 $\pm .05$	P	—	—

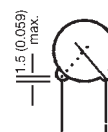
Finishing

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 $\begin{smallmatrix} 0.6 \\ (0.024) \end{smallmatrix} \pm \begin{smallmatrix} 0.1 \\ (0.004) \end{smallmatrix}$

I = Epoxy wire diameter $\begin{smallmatrix} 0.8 \\ (0.031) \end{smallmatrix} \pm \begin{smallmatrix} 0.1 \\ (0.004) \end{smallmatrix}$

L = Phenolic wire diameter $\begin{smallmatrix} 0.6 \\ (0.024) \end{smallmatrix} \pm \begin{smallmatrix} 0.1 \\ (0.004) \end{smallmatrix}$

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

DIG. 3	DIG. 7
Q	M
Rated Voltage	Tolerance
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	

Safety Front	Type
	61V

*Upon Request

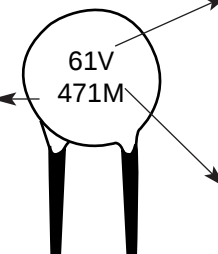
*Upon Request

TC – Temperature coefficient.

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

Safety Front

Capacitance
As above



Type
61V
620
65N

Tolerance
As above

Back: (Approval marks)

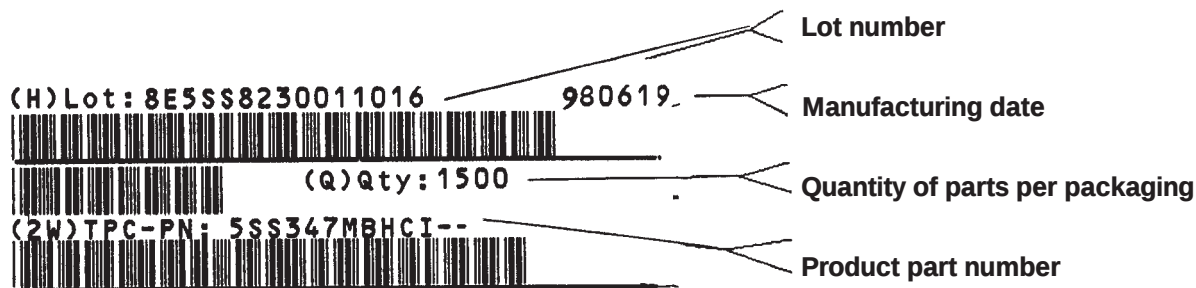
Disc Ceramic Capacitors



Packaging

IDENTIFICATION AND TRACEABILITY

On all TPC ceramic capacitors packages, you will find a bar code label with the following information:



TAPED PARTS QUANTITY TABLE

millimeters (inches)

Rated Voltage	Diameter	Quantities	
(Vr)	D	Ammopack	Reel
Vr ≤ 500V	D ≤ 7 (0.276)	2000	2500
	7 < D ≤ 11 (0.433)	2000	2000
500V < Vr ≤ 2KV	D ≤ 11 (0.433)	1500	2000
2KV < Vr ≤ 5KV	D ≤ 11 (0.433)	1000	1500

CARDBOARD STRIPS QUANTITY TABLE

millimeters (inches)

Rated Voltage	Diameter	Lead Space	
(Vr)	D	≤ 5 (0.197)	> 5 (0.197)
Vr ≤ 500V	D ≤ 8 (0.315)	2500	1500
	8 (0.315) ≤ D ≤ 11 (0.433)	1500	-
	8 (0.315) ≤ D ≤ 13 (0.512)	-	1000
	11 (0.433) ≤ D ≤ 15 (0.591)	1000	-
	13 (0.512) ≤ D ≤ 19 (0.748)	-	500
	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

Quantities for other package alternative, upon request.

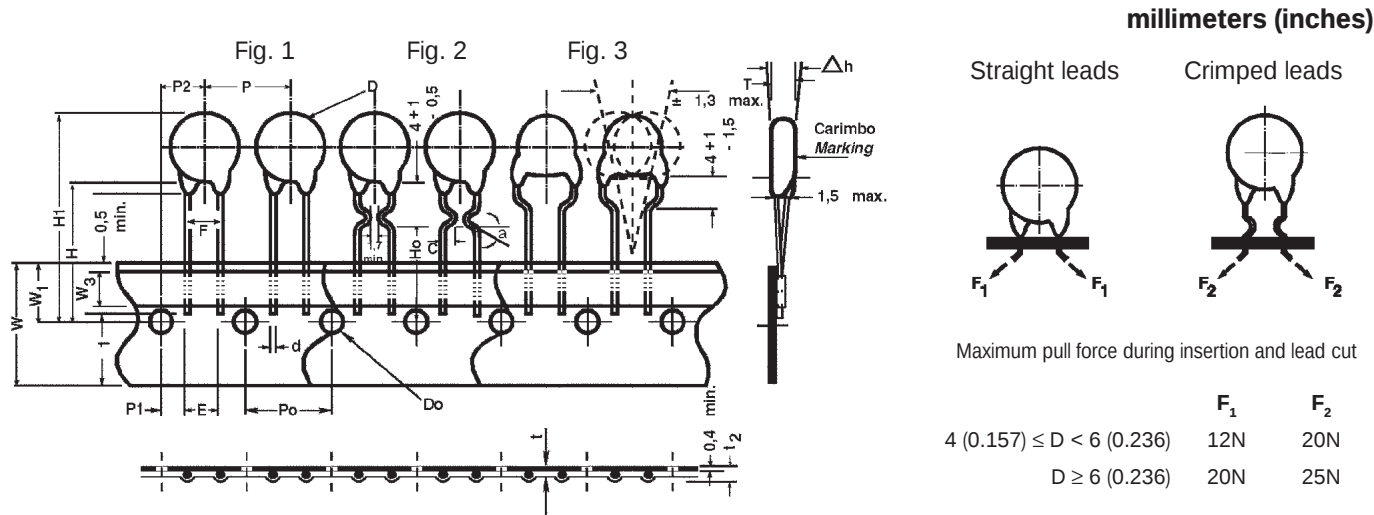
Disc Ceramic Capacitors



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 ammpack.
The standard packaging quantities are shown below:



Digit 11	Available Tappings		Digit 9
L	→	Sizes 4 (0.157) ≤ D ≤ 11 (0.433)	A... H
M			
J H	→	Sizes 6 (0.236) ≤ D ≤ 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
Ammpack 	 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

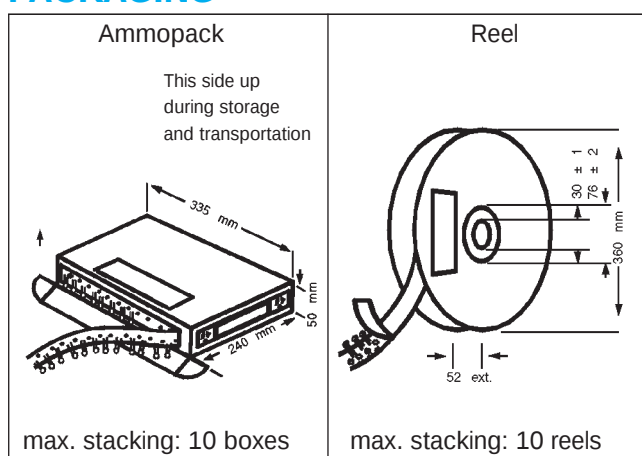


Tape and Reel Specifications

millimeters (inches)

Description of Symbols		Straight Leads		Crimped
		Figure 1		Figure 2 & 3
		A (Avisert)	P (Panaset)	Avisert & Panaset
Crimp angle	∞	—	—	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	Δh	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	ℓ_1	12 max.		
Tape width	W	18 $^{+1}_{-0.5}$		
Bonding tape width	W ₃	5.5 min.		
Feed hole position	W ₁	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 ₂	1.5 max.		

PACKAGING



SHIPPING CONTAINER

