

Disc Ceramic Capacitors

General Specifications - Class II General Purpose

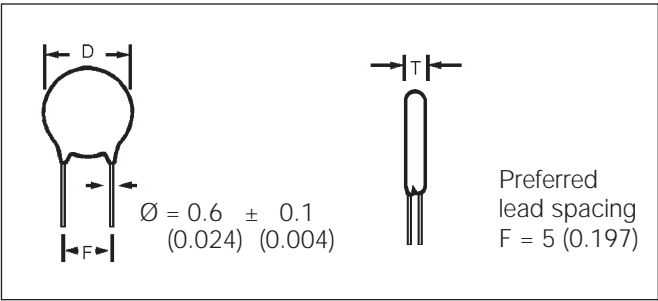


DIELECTRIC - CLASS II

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 (ø)	D ± 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														
330														
390	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			
470			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			
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 Y5U	Use Y5U	Use Y5U			
680														
820	6.0 (0.236)	7.0 (0.276)		7.0 (0.276)			5.0 (0.197)	5.0 (0.197)	4.0 (0.157)	4.0 (0.157)	Use Y5V			
1,000	7.0 (0.276)													
1,200	8.0 (0.315)	8.0 (0.315)	6.0 (0.236)	8.0 (0.315)	6.0 (0.236)	7.0 (0.276)	5.0 (0.197)	5.0 (0.197)	4.0 (0.157)	4.0 (0.157)	Use Y5V			
1,500		9.0 (0.354)	7.0 (0.276)	9.0 (0.354)								7.0 (0.276)		
1,800	9.0 (0.354)	11.0 (0.433)	8.0 (0.315)	11.0 (0.433)	8.0 (0.315)	9.0 (0.354)	6.0 (0.236)	7.0 (0.276)	5.0 (0.197)	5.0 (0.197)	Use Y5V			
2,200														
2,700	11.0 (0.433)	15.0 (0.591)	9.0 (0.354)	13.0 (0.512)	9.0 (0.354)	9.0 (0.354)	6.0 (0.236)	8.0 (0.315)	5.0 (0.197)	6.0 (0.236)	4.0 (0.157)			
3,300														
3,900														
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)	7.0 (0.276)	8.0 (0.315)	4.0 (0.157)	5.0 (0.197)	7.0 (0.276)	10.0 (0.394)	13.0 (0.512)	Use Y5U	Use Y5U												
330																						
390																						
470	6.0 (0.236)	8.0 (0.315)	9.0 (0.354)		6.0 (0.236)																	
560			5.0 (0.197)																			
680																						
820	7.0 (0.276)	9.0 (0.354)	10.0 (0.394)		7.0 (0.276)		8.0 (0.315)	11.0 (0.433)	4.0 (0.157)	6.0 (0.236)	7.0 (0.276)											
1,000			6.0 (0.236)																			
1,200																						
1,500	8.0 (0.315)	10.0 (0.394)	13.0 (0.512)	8.0 (0.315)	9.0 (0.354)	11.0 (0.433)	13.0 (0.512)	5.0 (0.197)	7.0 (0.276)	8.0 (0.315)												
1,800	9.0 (0.354)	11.0 (0.433)	15.0 (0.591)					7.0 (0.276)					6.0 (0.236)									
2,200	11.0 (0.433)	13.0 (0.512)		15.0 (0.591)	9.0 (0.354)			10.0 (0.394)			7.0 (0.276)	8.0 (0.315)	9.0 (0.354)									
2,700	13.0 (0.512)	15.0 (0.591)		19.0 (0.748)		8.0 (0.315)			11.0 (0.433)	15.0 (0.591)												
3,300	15.0 (0.591)		9.0 (0.354)		13.0 (0.512)			19.0 (0.748)														
3,900						9.0 (0.354)	11.0 (0.433)	13.0 (0.512)	15.0 (0.591)	19.0 (0.748)	9.0 (0.354)	11.0 (0.433)	13.0 (0.512)									
4,700						10.0 (0.394)																
5,600		11.0 (0.433)																				
6,800		13.0 (0.512)		15.0 (0.591)		19.0 (0.748)																
8,200		15.0 (0.591)																				
10,000		13.0 (0.512)																				
12,000		15.0 (0.591)																				
15,000																						
22,000																						

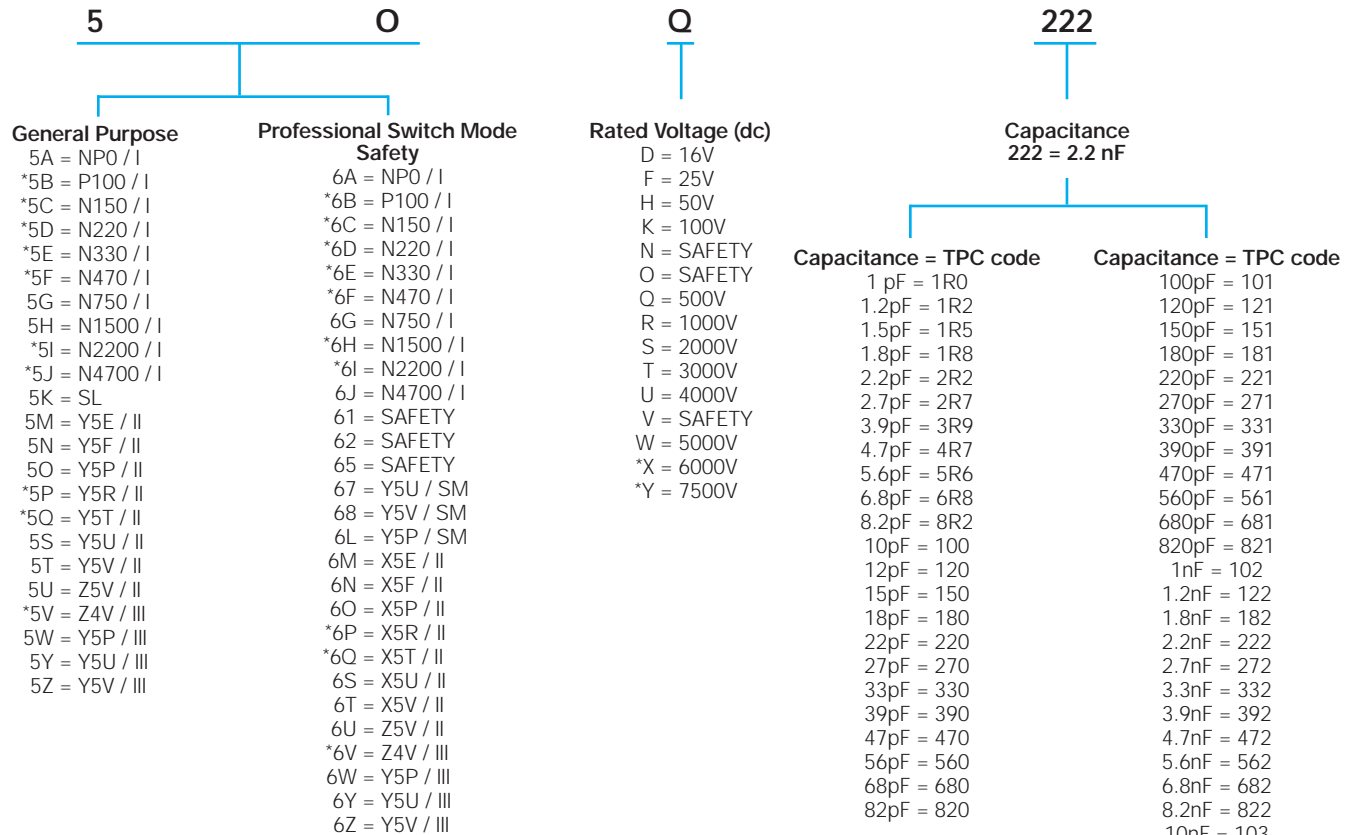
Diameter (φ) = 9th Part Number Digit

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)

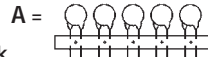
*Wire 0.8 (0.031) recommended

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

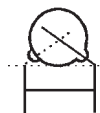


Avisert			Panaset		
I	M	M	K	M	M

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	—	—

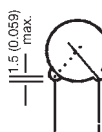
Finishing

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 $\begin{smallmatrix} 0.8 \\ (0.031) \end{smallmatrix} \pm \begin{smallmatrix} 0.1 \\ (0.004) \end{smallmatrix}$

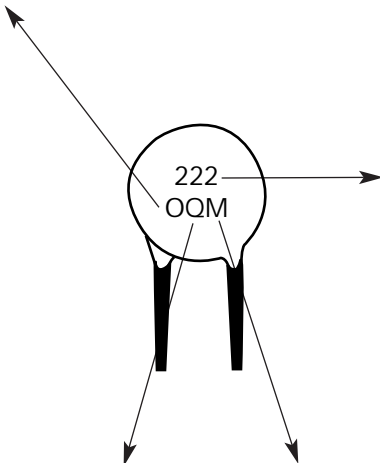
L = Phenolic wire diameter $\begin{smallmatrix} 0.6 \\ (0.024) \end{smallmatrix} \pm \begin{smallmatrix} 0.1 \\ (0.004) \end{smallmatrix}$

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	
		8.2pF = 829		820pF = 821	
K = SL	7 = Y5U / SM	10pF = 100		1nF = 102	
M = Y5E / II	8 = Y5V / SM	12pF = 120		1.2nF = 122	
N = Y5F / II	L = Y5P / SM	15pF = 150		1.8nF = 182	
O = Y5P / II	M = X5E / II	18pF = 180		2.2nF = 222	
P = Y5R / II	N = X5F / II	22pF = 220		2.7nF = 272	
Q = Y5T / II	O = X5P / II	27pF = 270		3.9nF = 392	
S = Y5U / II	P = X5R / II	39pF = 390		4.7nF = 472	
T = Y5V / II	Q = X5T / II	47pF = 470		5.6nF = 562	
U = Z5V / II	R = X5U / II	56pF = 560		6.8nF = 682	
V = Z4V / III	S = X5V / II	68pF = 680		8.2nF = 822	
*W = Y5P / II	T = X5V / II	82pF = 820		10nF = 103	
*X = Y5R / II	U = Z5V / II			15nF = 153	
Y = Y5U / II	V = Z4V / III			22nF = 223	
Z = Y5V / II	W = Y5P / III			33nF = 333	
	X = Y5R / III			47nF = 473	
	Y = Y5U / III			100nF = 104	
	Z = Y5V / III			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%

*Upon Request

TC – Temperature coefficient.

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

Safety Front

Capacitance

As above

61V

471M

Type

61V

620

65N

Tolerance

As above

Back: (Approval marks)

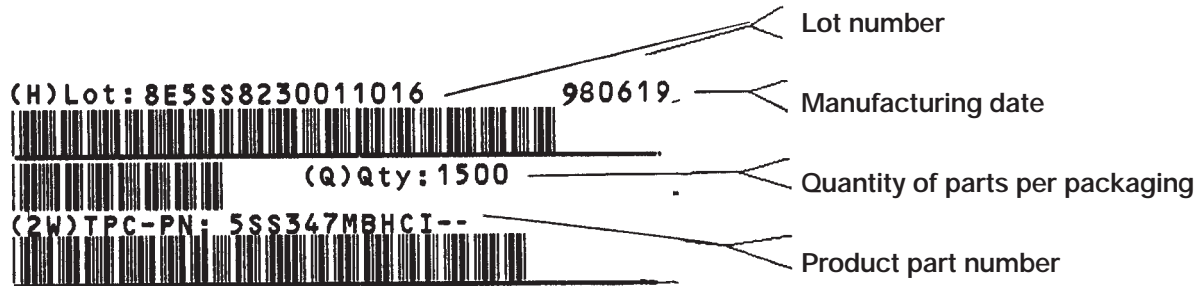
Disc Ceramic Capacitors



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.

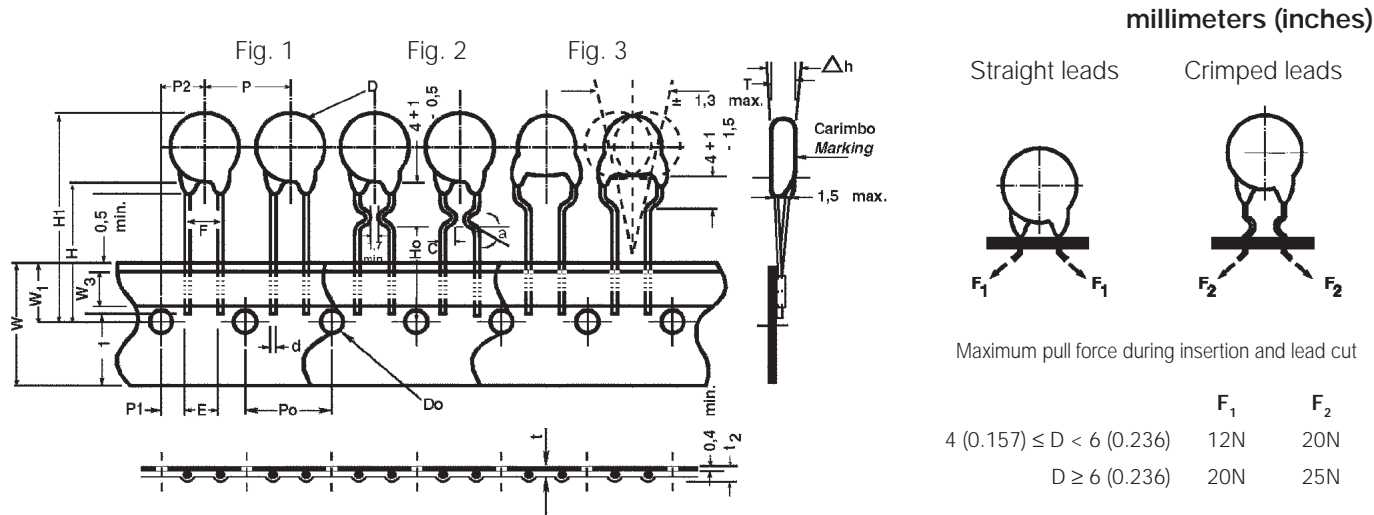
Disc Ceramic Capacitors



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 Tapings			Digit 9
L M	➡	Sizes	4 (0.157) ≤ D ≤ 11 (0.433)	A... H
J H K I	➡	Sizes	6 (0.236) ≤ D ≤ 11 (0.433)	C... H

TPC Code Digit 11

Packaging	Avisert	Panasert
Reel 	H FIGURE 1 L L 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

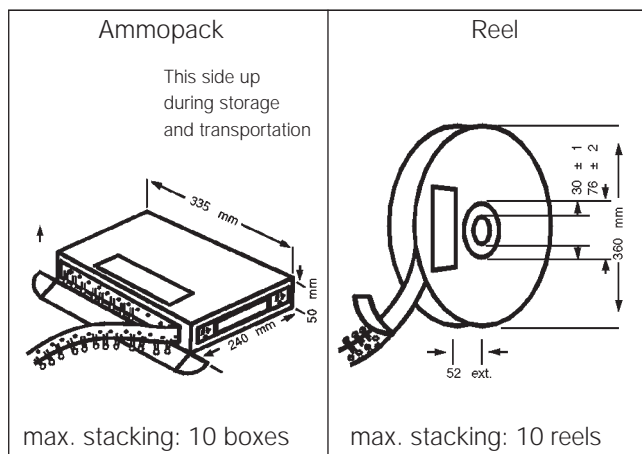


Tape and Reel Specifications

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.	$\begin{matrix} >23.5 \\ <32.25 \end{matrix}$	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

