

# Disc Ceramic Capacitors

## General Specifications - SL

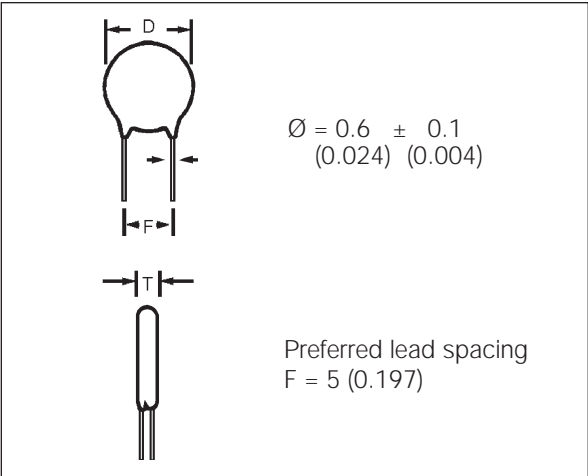


### CAPACITORS - CLASS SL

These capacitors have wide temperature characteristics but still offer low loss and linear type TC's.

They are specially designed to be smaller alternative to standard Class I capacitors of linear temperature coefficient.

Typical application is RF tuning and decoupling.



### DIMENSIONS

millimeters (inches)

Digit 9 of P.N. (ø)	D ± 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

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

Measured at	$C_R \leq 100 \text{ pF} \rightarrow 1\text{MHz}/1.0 \text{ Vrms} / 25^\circ\text{C}$ $C_R > 100 \text{ pF} \rightarrow 1\text{kHz}/0.3 \text{ Vrms} / 25^\circ\text{C}$
Dissipation Factor	$C_R \leq 100 \text{ pF} \dots 0.25\%$ 1MHz @ 1.0 Vrms $C_R > 100 \text{ pF} \dots 1.0\%$ 100kHz @ 0.3 Vrms $C_R > 100 \text{ pF} \dots 0.25\%$ 1kHz @ 0.3 Vrms
Tolerance	$C_R < 10 \text{ pF} \rightarrow \pm 0.25 \text{ pF}, \pm 0.5 \text{ pF}$ $C_R \geq 10 \text{ pF} \rightarrow \pm 5\%, \pm 10\%, \pm 20\%$
Temperature Coefficient	+350 ppm... -1500 ppm (P350... N1500)
Insulation Resistance	@ $V_R \rightarrow \geq 10 \text{ G}\Omega$
Dielectric Strength NOTE: Charging current limited to 50 mA	$V_R = 100\text{V} \rightarrow V_t = 250\text{V (DC)}$ $V_R = 500\text{V} \rightarrow V_t = 1.25\text{kV (DC)}$
Operating Temperature Range (°C)	-30... +85
Climatic Category	30 / 085 / 21

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

# Disc Ceramic Capacitors



## Dimension Table - SL

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

millimeters (inches)

Temp. Coefficient		
Digits 1,2,3 of P.N.	5KK	5KQ
Rated Voltage $C_R$ (pF) ( $V_R$ )	100 VDC 50 VAC	500 VDC 100 VAC
1.0	4.0 (0.157)	4.0 (0.157)
1.5		
2.2		
3.3		
4.7		
5.6		
8.2		
10		
12		
15		
18		
22		
33		
47		
56		
68		
82		
100		
150		
180		
220		
270	5.0 (0.197)	6.0 (0.236)
330		
470	6.0 (0.236)	7.0 (0.276)
560		
680		8.0 (0.315)
820		
1000	7.0 (0.276)	

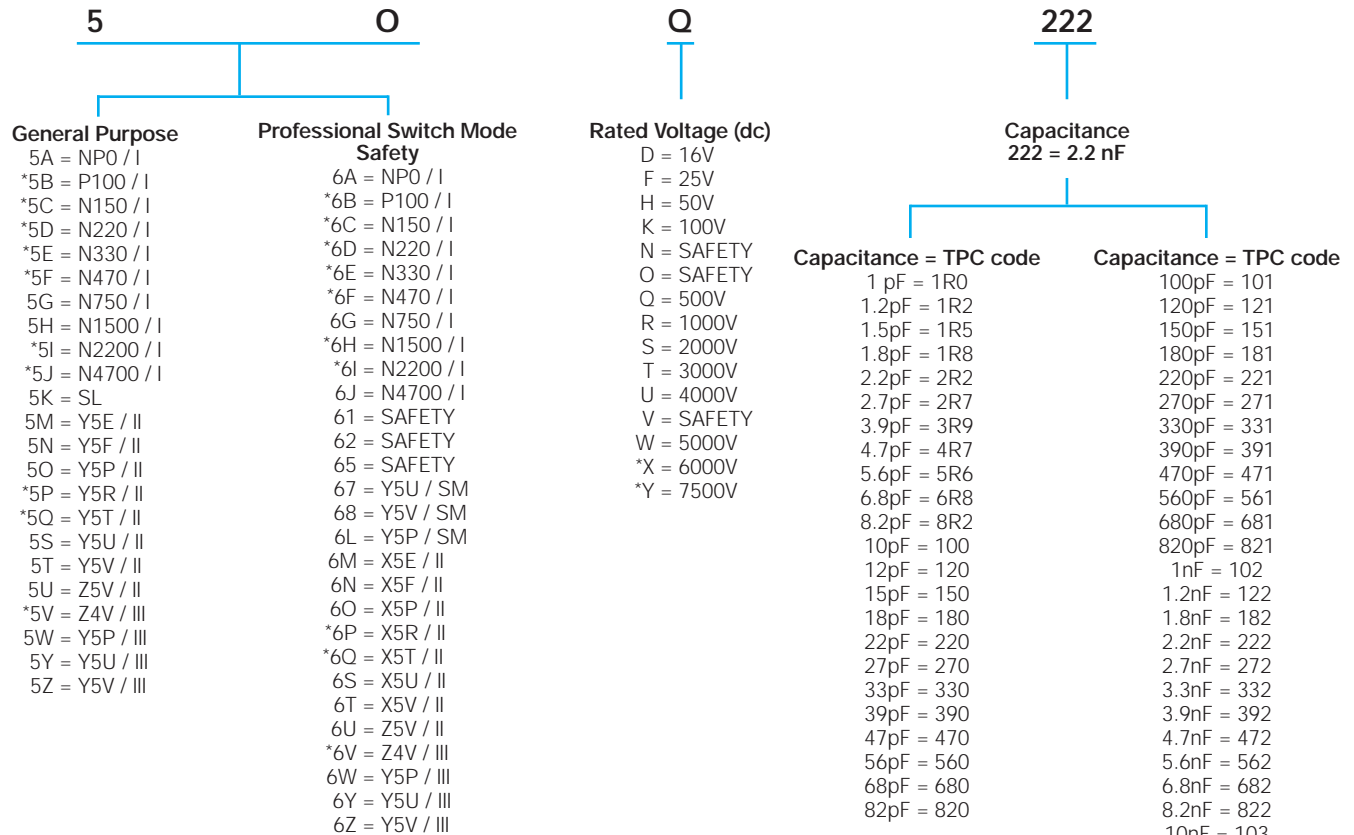
Diameter ( $\phi$ ) = 9th Part Number Digit

# Disc Ceramic Capacitors



## Ordering Code

### HOW TO ORDER



\*Upon Request

# Disc Ceramic Capacitors

## Ordering Code



**M**

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

**A**

**Capacitor Diameter  
 $\pm 2$  (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)

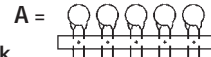
\*Wire 0.8 (0.031) recommended

**A**

**A**

**Packaging**

**Cardboard Strips**



**Bulk**

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

**Taping**

**Reel**



Avisert			Panaset		
H	L	L	J	L	L

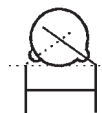


Avisert			Panaset		
I	M	M	K	M	M

Lead Forming				
mm	inches			
2.5 $\pm 0.5$	.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	—	—

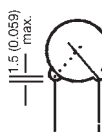
**Finishing**

Diam  $\leq 9$  (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  
 $\leq 8$  (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	R = X5U / II	47pF = 470		5.6nF = 562		
V = Z4V / III	S = X5V / II	56pF = 560		6.8nF = 682		
*W = Y5P / II	T = X5V / II	68pF = 680		8.2nF = 822		
*X = Y5R / II	U = Z5V / II	82pF = 820		10nF = 103		
Y = Y5U / II	V = Z4V / III			15nF = 153		
Z = Y5V / II	W = Y5P / III			22nF = 223		
	X = Y5R / III			33nF = 333		
	Y = Y5U / III			47nF = 473		
	Z = Y5V / III			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

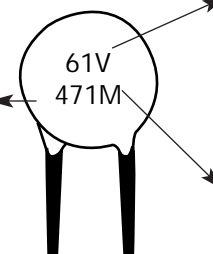
\*Upon Request

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)

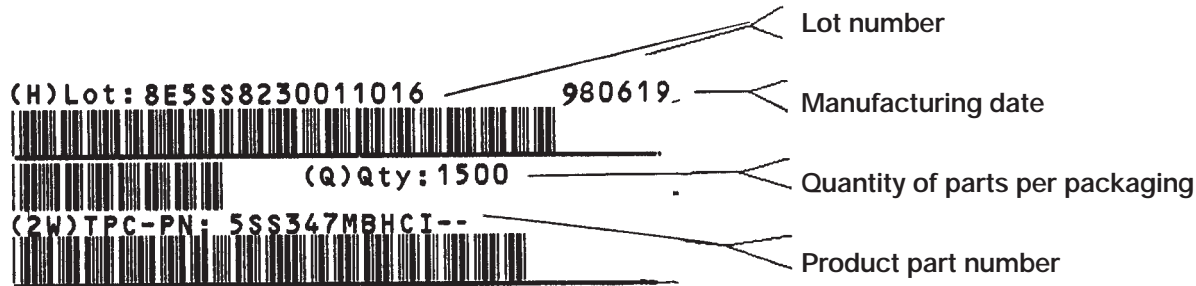
# Disc Ceramic Capacitors



## 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.

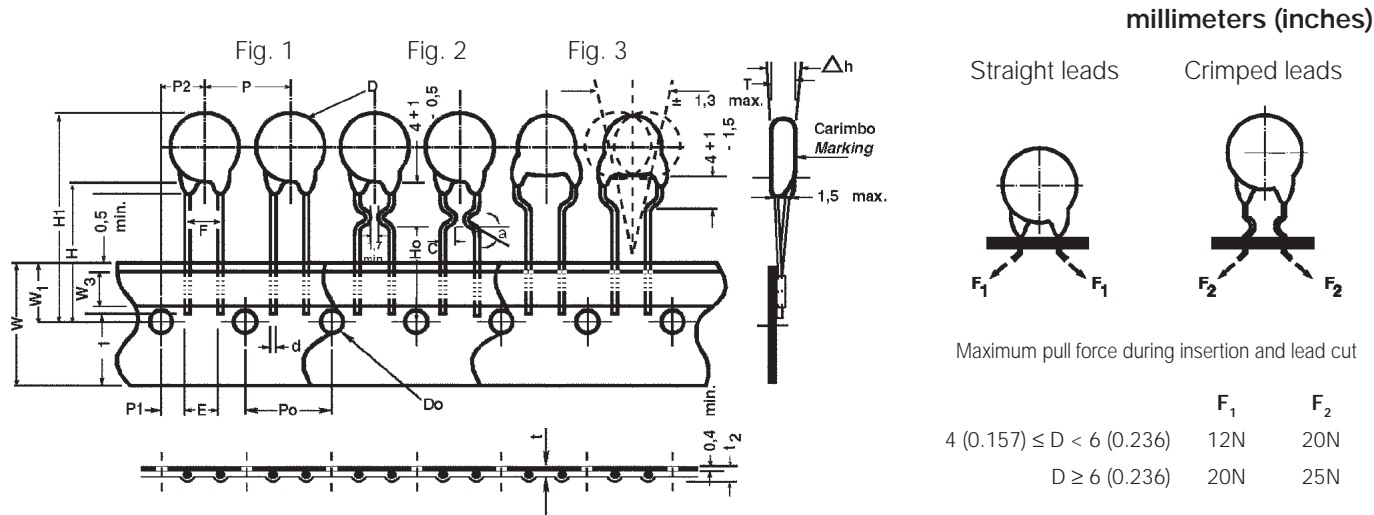
# Disc Ceramic Capacitors



## 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 FIGURE 1 L FIGURE 2 L FIGURE 3	 J FIGURE 1 L FIGURE 2 L FIGURE 3
Ampack 	 I FIGURE 1 M FIGURE 2 M FIGURE 3	 K FIGURE 1 M FIGURE 2 M FIGURE 3

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

Figure 3: Outside Crimp 1000V

# Disc Ceramic Capacitors

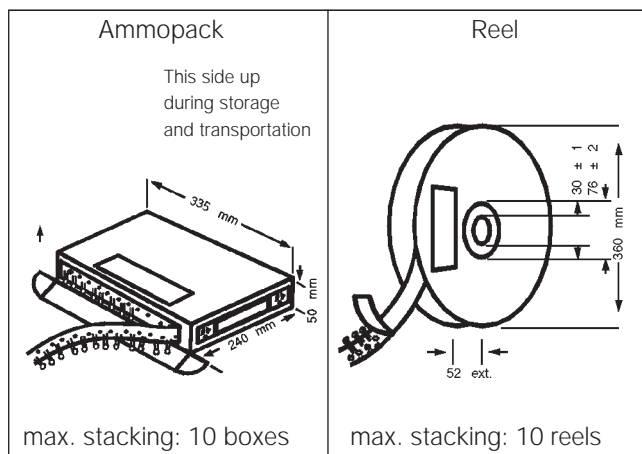


## Tape and Reel Specifications

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

