

## General purpose capacitor series

### FEATURES

- A wide selection of sizes is available (0201 to 2225).
- High capacitance in given case size.
- Capacitor with lead-free termination (pure Tin).
- RoHS & HALOGEN compliant.

### APPLICATION

- For general digital circuit.
- For power supply bypass capacitors.
- For consumer electronics.
- For telecommunication.
- DC to DC converter.

### PART NUMBER

FN	21	X	471	K	500	P	X	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
General Purpose product $\leq 50Vdc$	<b>03</b> 0201 (0603) <b>15</b> 0402 (1005) <b>18</b> 0603 (1608) <b>21</b> 0805 (2012) <b>31</b> 1206 (3216) <b>32</b> 1210 (3225) <b>42</b> 1808 (4520) <b>43</b> 1812 (4532) <b>46</b> 1825 (4563) <b>55</b> 2220 (5750) <b>56</b> 2225 (5763)	<b>N</b> COG(NPO) <b>X</b> X7R <b>B</b> X5R <b>F</b> Y5V	<b>102</b> = $10 \times 10^2$ =1000pF <b>100</b> = $10 \times 10^0$ =10pF	<b>J</b> = $\pm 5\%$ <b>K</b> = $\pm 10\%$ <b>M</b> = $\pm 20\%$ <b>Z</b> = -0/+80%	<b>6R3</b> =6.3V <b>100</b> =10V <b>160</b> =16V <b>250</b> =25V <b>500</b> =50V	<b>E</b> = Tape and 7" Reel, Embossed Tape <b>P</b> = Tape and 7" Reel, Paper Tape <b>L</b> = Tape and 13" Reel, Embossed <b>G</b> = Tape and 13" Reel, Paper Tape	Reference Thickness Description	<b>G</b> =RoHS Compliant

### GENERAL ELECTRICAL DATA

Dielectric	COG(NPO)	X7R	Y5V	X5R
<b>Size</b>	0201 to 2225	0201 to 2225	0201 to 1812	0201 to 0603
<b>Capacitance range*</b>	0.1pF ~ 390nF	100pF ~ 820nF	10nF ~ 680nF	100pF ~ 820nF
<b>Capacitance tolerance</b>	J ( $\pm 5\%$ ) K ( $\pm 10\%$ )	J ( $\pm 5\%$ ) K ( $\pm 10\%$ ) M ( $\pm 20\%$ )	Z (-20/+80%)	J ( $\pm 5\%$ ) K ( $\pm 10\%$ ) M ( $\pm 20\%$ )
<b>Rated voltage (WVDC)</b>	10V, 16V, 25V, 50V	6.3V, 10V, 16V, 25V, 50V	6.3V, 10V, 16V, 25V, 50V	6.3V, 4V, 10V, 16V, 25V, 50V
<b>Tan <math>\delta</math> *</b>	Cap<30pF: Q $\geq$ 400+20C Cap $\geq$ 30pF: Q $\geq$ 1000		Note 1	
<b>Operating temperature</b>		-55 to +125°C	-25 to +85°C	-55 to +85°C
<b>Capacitance characteristic</b>	$\pm 30ppm$	$\pm 15\%$	$\pm 30/-80\%$	$\pm 15\%$
<b>Termination</b>		Cu (or Ag)/Ni/Sn (lead-free termination)		

\* Measured at the condition of 30~70% related humidity.

COG: Apply  $1.0 \pm 0.2V_{rms}$ , 1.0MHz  $\pm 10\%$  for Cap $\leq$ 1000pF and  $1.0 \pm 0.2V_{rms}$ , 1.0kHz  $\pm 10\%$  for Cap $>$ 1000pF, 25°C at ambient temperature.

X7R: Apply  $1.0 \pm 0.2V_{rms}$ , 1.0kHz  $\pm 10\%$ , at 25°C ambient temperature.

Y5V: Apply  $1.0 \pm 0.2V_{rms}$ , 1.0kHz  $\pm 10\%$ , at 20°C ambient temperature.

Note 1:

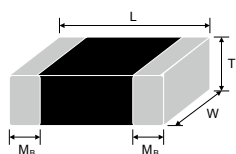
#### X7R/X5R

Rated vol.	D.F.	Exception of D.F.
$\geq 50V$	$\leq 2.5\%$	$\leq 3\%$ 0603 $\geq$ 0.047 $\mu F$ ; 0805 $\geq$ 0.18 $\mu F$ , 1206 $\geq$ 0.47 $\mu F$
25V	$\leq 3.5\%$	$\leq 5\%$ $\leq 7\%$ 0603 $\geq$ 0.33 $\mu F$
16V	$\leq 3.5\%$	$\leq 5\%$ $\leq 10\%$ 0402 $\geq$ 0.033 $\mu F$ ; 0603 $\geq$ 0.15 $\mu F$ ; 0805 $\geq$ 0.68 $\mu F$ ; 1206 $\geq$ 2.2 $\mu F$
10V	$\leq 5.0\%$	$\leq 10\%$ 0603 $\geq$ 1 $\mu F$ ; 0805 $\geq$ 2.2 $\mu F$

#### Y5V

Rated vol.	D.F.	Exception of D.F.
$\geq 50V$	$\leq 5.0\%$	7.0% 0603 $\geq$ 0.1 $\mu F$ ; 0805 $\geq$ 0.47 $\mu F$
25V	$\leq 5.0\%$	$\leq 7\%$ $\leq 9\%$ 0402 $\geq$ 0.047 $\mu F$ ; 0603 $\geq$ 0.1 $\mu F$ ; 0805 $\geq$ 0.33 $\mu F$ ; 1206 $\geq$ 1 $\mu F$
16V (C<1.0 $\mu F$ )	$\leq 7.0\%$	$\leq 9\%$ 0402 $\geq$ 0.068 $\mu F$ ; 0603 $\geq$ 0.47 $\mu F$
16V (C $\geq$ 1.0 $\mu F$ )	$\leq 9.0\%$	$\leq 12.5\%$ 0805 $\geq$ 4.7 $\mu F$ ; 1206 $\geq$ 10 $\mu F$ ; 1210 $\geq$ 22 $\mu F$ ; 1812 $\geq$ 47 $\mu F$
10V	$\leq 12.5\%$	---

### DIMENSIONS



Size	inch (mm)	L (mm)	W (mm)	T (mm)	code	M <sub>B</sub> min (mm)
0201 (0603)		0.60 $\pm$ 0.03	0.30 $\pm$ 0.03			0.15 $\pm$ 0.05
0402 (1005)		1.00 $\pm$ 0.10	0.50 $\pm$ 0.10			0.25+0.05/-0.10
0603 (1608)		1.60 $\pm$ 0.15	0.80 $\pm$ 0.15			0.40 $\pm$ 0.15
0805 (2012)		2.00 $\pm$ 0.20	1.25 $\pm$ 0.20			0.50 $\pm$ 0.20
1206 (3216)		3.20 $\pm$ 0.20	1.60 $\pm$ 0.20			0.60 $\pm$ 0.20
1210 (3225)		3.20 $\pm$ 0.30	2.50 $\pm$ 0.30			0.75 $\pm$ 0.35
1808 (4520)		4.50 $\pm$ 0.40	2.00 $\pm$ 0.25			0.75 $\pm$ 0.35
1812 (4532)		4.50 $\pm$ 0.40	3.20 $\pm$ 0.30			0.75 $\pm$ 0.35
1825 (4563)		4.50 $\pm$ 0.40	6.30 $\pm$ 0.40		Reference Thickness Description	0.75 $\pm$ 0.35
2220 (5750)		5.70 $\pm$ 0.40	5.00 $\pm$ 0.40			0.85 $\pm$ 0.35
2225 (5763)		5.70 $\pm$ 0.40	6.30 $\pm$ 0.40			0.85 $\pm$ 0.35





## General purpose capacitor series

### RATING

#### X5R

Size		0201						0402					0603				
Cap	Code	4V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
100pF	101				L	L	L										
120pF	121				L	L	L										
150pF	151				L	L	L										
180pF	181				L	L	L										
220pF	221				L	L	L										
270pF	271				L	L	L										
330pF	331				L	L	L										
390pF	391				L	L	L										
470pF	471				L	L	L										
560pF	561				L	L	L										
680pF	681				L	L	L										
820pF	821				L	L	L										
1000pF	102			L	L	L	L										
1500pF	152			L	L	L	L										
2200pF	222			L	L	L	L										
2700pF	272			L	L	L	L										
3300pF	332			L	L	L	L										
4700pF	472			L	L	L	L										
6800pF	682			L	L	L	L										
0.01μF	103		L	L	L	L	L										
0.015μF	153		L	L													
0.022μF	223		L	L													
0.027μF	273		L	L						N							
0.033μF	333		L	L						N							
0.039μF	393		L	L						N							
0.047μF	473		L	L				N	N	N							
0.056μF	563		L	L				N	N	N							
0.068μF	683		L	L				N	N	N							
0.082μF	823		L	L				N	N	N							
0.1μF	104		L	L	L	L		N	N	N	N					S	
0.15μF	154							N	N	N	N						
0.22μF	224		L	L	L			N	N	N	N	N	B	B	B	B	B
0.27μF	274								N					B	B	B	B
0.33μF	334		L					N	N				B	B	B	B	
0.39μF	394								N					B	B	B	B
0.47μF	474	L	L					N	N	K	K	K	B	B	B	B	B
0.68μF	684							N	N				B	B	B	B	
0.82μF	824												B	B	B	B	

#### Y5V

Size		0201		0402				0603					0805				1206				1210				1812			
Cap	Code	6.3V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V
0.010μF	103			N	N	N	N		S	S	S	S	A	A	A	A	X	X	X	X								
0.015μF	153			N	N	N	N		S	S	S	S	A	A	A	A	X	X	X	X								
0.022μF	223			N	N	N	N		S	S	S	S	A	A	A	A	X	X	X	X								
0.033μF	333			N	N	N	N		S	S	S	S	A	A	A	A	X	X	X	X								
0.047μF	473			N	N	N			S	S	S	S	A	A	A	A	X	X	X	X								
0.068μF	683			N	N	N			S	S	S	S	A	A	A	A	X	X	X	X								
0.10μF	104	L		N	N	N			S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C
0.15μF	154			N	N				S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C
0.22μF	224		N	N	N			S	S	S	S	S	A	A	A	A	X	X	X	X	M	M	M	M	C	C	C	C
0.33μF	334		N	N	N				S	S	S	B	X	X	X	X	X	X	X	X	M	M	M	M	C	C	C	C
0.47μF	474		N	N	N				S	S	B	B	X	X	X	X/C	X	X	X	X	M	M	M	M	C	C	C	C
0.68μF	684		N						S	B	B		X	X	C	C	X	X	X	X	M	M	M	M	C	C	C	C

MLCC

Chip R

Diode

Coil