

Disc Ceramic Capacitors



Professional Ceramic Capacitors - Class I, II and III

MIL-STD-202F

The professional ceramic disc capacitors were specially developed for applications in severe environmental conditions, high humidity, temperature, gas, vapor and solvents.

The capacitors are flame retardant epoxy coated, meeting UL 94-V0 flammability specifications. The capacitors are 100% screened on following electrical parameters: Capacitance, loss factor, test voltage. After the 100% test, the capacitors are audited on its electrical and mechanical parameters with the following AQL:

Electrical parameters: 0.065% level II

Mechanical parameters: 0.65% level II

The capacitors withstand the following reliability essays:

Terminal strength: method 211 – condition A

Resistance to solvents: method 215

Resistance to soldering heat: method 210 – condition B

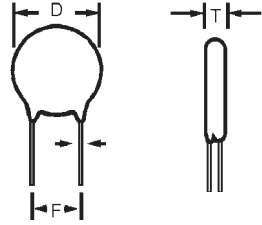
Solderability: method 208

Thermal shock: method 107 – condition A

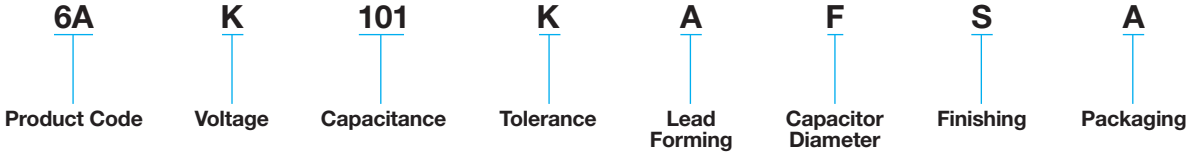
Humidity (steady state): method 103 – condition B

Life (at elevated ambient temperature): method 108 – condition D

Operating temperature and storage: -55... +125° C



HOW TO ORDER



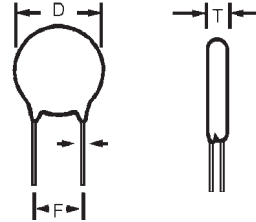
Disc Ceramic Capacitors



General Specifications - Class I and II Professional

DIELECTRIC - CLASS I

These ceramic capacitors have linear temperature coefficient, very low tolerances, low losses, high insulation resistance and are specially suitable for tuned circuits, timing and other precision circuits.



100V ... 500V PERFORMANCE CHARACTERISTICS CLASS I

Measured at	1.0 MHz @ 1.0 Vrms / 25°C	Dielectric Strength NOTE: Charging current limited to 50 mA	@ V _R = 100V → Vt = 250V (DC) @ V _R = 500V → Vt = 1250V (DC)
Dissipation Factor (%)	C _R ≤ 30 pF → ≤ 1/C _R + 0.07 C _R > 30 pF → ≤ 0.1%		
Tolerance	C _R < 10 pF → ±0.25 pF, ±0.5 pF C _R ≥ 10 pF → ±5%, ±10%	Operating Temperature Range (°C)	-55... +125°C Epoxy Coated
Insulation Resistance (IR)	@ V _R → ≥ 10 GΩ	Climatic Category	30 / 85 / 56

DIMENSION TABLE - CLASS I LOW AND MEDIUM VOLTAGE PROFESSIONAL

100V / 500V CLASS I EPOXY COATED – CAPACITANCE VS. DISC DIAMETER millimeters (inches)

Temp. Coefficient Digits 1, 2, 3 of P.N. Rated Voltage (V _R) C _R (pF)	NP0		N750		N1500						
	6AK	6AQ	6GK	6GQ	6HK	6HQ					
100 VDC	500 VDC	100 VDC	500 VDC	100 VDC	500 VDC						
1.0	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)						
1.2											
1.5											
1.8											
2.2											
2.7											
3.3											
3.9											
4.7											
5.6											
6.8											
8.2											
10											
12											
15											
18											
22											
27											
33											
39											
47	7.0 (0.276)	7.0 (0.276)	8.0 (0.315)	8.0 (0.315)	7.0 (0.276)						
56	8.0 (0.315)	8.0 (0.315)				6.0 (0.236)	6.0 (0.236)	6.0 (0.236)			
68						7.0 (0.276)	7.0 (0.276)		7.0 (0.276)	7.0 (0.276)	
82						9.0 (0.354)	9.0 (0.354)				8.0 (0.315)
100	9.0 (0.354)	11.0 (0.433)				10.0 (0.394)	11.0 (0.433)	9.0 (0.354)			
120	11.0 (0.433)	12.0 (0.472)							8.0 (0.315)	8.0 (0.315)	8.0 (0.315)
150									14.0 (0.551)	14.0 (0.551)	
180	12.0 (0.472)	14.0 (0.551)				11.0 (0.433)	14.0 (0.551)	11.0 (0.433)			
220									16.0 (0.630)	16.0 (0.630)	10.0 (0.394)
270	12.0 (0.472)	14.0 (0.551)				11.0 (0.433)	14.0 (0.551)	11.0 (0.433)			
330									19.0 (0.748)	19.0 (0.748)	10.0 (0.394)

Diameter (φ) = 9th Part Number Digit



Disc Ceramic Capacitors

Dimension Table - Class II

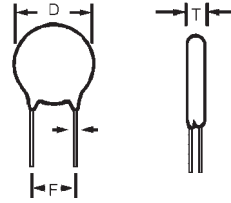
Low and Medium Voltage Professional



DIELECTRIC - CLASS II

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

Typical applications are decoupling and by pass.



100V AND 500V PERFORMANCE CHARACTERISTICS CLASS II

Measured at	1.0 kHz @ 0.3 Vrms / 25°C		Dielectric Strength NOTE: Charging current limited to 50 mA	@ V _R = 100V → Vt = 250V (DC) @ V _R = 500V → Vt = 1250V (DC) Between leads and body insulation
Dissipation Factor (%)	X5E / X5F / X5P ≤ 2.5% X5U / X5V / Z5V ≤ 3.0%			
Capacitance Tolerance	X5E / X5F / X5P → ±10% X5U / X5V / Z5V → -20 +50% X5E / X5F / X5P / X5U → ±20%		Operating Temperature Range (°C)	-55... +125°C Epoxy Coated
Insulation Resistance (IR)	@ V _R → ≥ 10 GΩ		Climatic Category	30 / 85 / 56

Note: Damp Heat Steady State: 90... 95% R.H. 40°C / 56 days. No voltage to be applied.

DIMENSION TABLE - CLASS II LOW AND MEDIUM VOLTAGE PROFESSIONAL 100V / 500V CLASS II EPOXY COATED

millimeters (inches)

Temp. Coefficient Digits 1,2,3 of P.N.	X5E		X5F		X5P		X5U		X5V		Z5V
	6MK	6MQ	6NK	6NQ	6OK	6OQ	6SK	6SQ	6TK	6TQ	6UK
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	5.0 (0.197)	5.0 (0.197)									
68											
82											
100											
120											
150											
180											
220											
270											
330											
390	6.0 (0.236)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	
470											
560	7.0 (0.276)	7.0 (0.276)	6.0 (0.236)	7.0 (0.276)	6.0 (0.236)	7.0 (0.276)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	
680											
820											
1,000											
1,200											
1,500											
1,800											
2,200											
2,700											
3,300											
3,900	11.0 (0.433)	12.0 (0.472)	9.0 (0.354)	10.0 (0.394)	9.0 (0.354)	10.0 (0.394)	6.0 (0.236)	7.0 (0.276)	5.0 (0.197)	5.0 (0.197)	
4,700											
5,600											
6,800											
8,200											
10,000											
12,000											
15,000											
22,000											
33,000											
47,000	14.0 (0.551)	16.0 (0.630)	11.0 (0.433)	12.0 (0.472)	11.0 (0.433)	12.0 (0.472)	7.0 (0.276)	9.0 (0.354)	7.0 (0.276)	7.0 (0.276)	
100,000											
100,000											
100,000											
100,000											
100,000											
100,000											
100,000											
100,000											
100,000											
100,000	10.0 (0.394)	12.0 (0.472)	9.0 (0.354)	10.0 (0.394)	9.0 (0.354)	10.0 (0.394)	10.0 (0.394)	11.0 (0.433)	7.0 (0.276)	9.0 (0.354)	10.0 (0.394)
100,000											
100,000											
100,000											
100,000											
100,000											
100,000											
100,000											
100,000											
100,000											
100,000	9.0 (0.354)	12.0 (0.472)	9.0 (0.354)	10.0 (0.394)	9.0 (0.354)	10.0 (0.394)	10.0 (0.394)	11.0 (0.433)	9.0 (0.354)	10.0 (0.394)	10.0 (0.394)
100,000											
100,000											
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100,000											

Diameter (φ) = 9th Part Number Digit



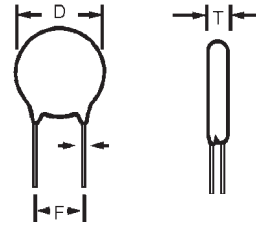
Disc Ceramic Capacitors



General Specifications - Class III Professional

DIELECTRIC - CLASS III

These ceramic capacitors have linear temperature coefficient, very low tolerances, low losses, high insulation resistance and are specially suitable for tuned circuits, timing and other precision circuits. Meets IEC 384-8 (1988).



PERFORMANCE CHARACTERISTICS CLASS III

Measured at	1.0 kHz / 0.1 Vrms / 25°C	
Dissipation Factor (%)	$C_R \leq 22 \text{ nF} \rightarrow Y5V, Y5U \leq 7.5\%$ $C_R > 22 \text{ nF} \rightarrow Y5V, Y5P \leq 5.0\%$	
Tolerance	$Y5P \rightarrow \pm 20\% / -20 + 50\%$ $Y5U \rightarrow \pm 20\% / -20 + 50\%$ $Y5V \rightarrow -20\% + 50\% / -20 + 80\%$	
Insulation Resistance (IR)	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	$V_R = 25V \quad V_t = 100V \text{ (DC)}$ $V_R = 50V \quad V_t = 150V \text{ (DC)}$
Operating Temperature Range (°C)	-55... +125°C	
Climatic Category	30 / 085 / 56	

EPOXY COATED – CAPACITANCE VS. DISC DIAMETER

millimeters (inches)

Class III	$\Delta C/C$ (max.) $\pm 12\%$		$\Delta C/C$ (max.) $+30 -65\%$		$\Delta C/C$ (max.) $+30 -65\%$	
	Range -30... +85°C		Range -30... +85°C		Range -30... +85°C	
Temp. Coefficient	Y5P		Y5U		Y5V	
Digits 1,2,3 of P.N.	6WF	6WH	6YF	6YH	6ZH	
Rated Voltage (V_R)	25 VDC	50 VDC	25 VDC	50 VDC	50 VDC	
C_R (pF)						
4,700	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	5.0 (0.197)	
10,000	6.0 (0.236)	6.0 (0.236)				
22,000	7.0 (0.276)	8.0 (0.315)	6.0 (0.236)	7.0 (0.276)		
33,000	8.0 (0.315)	9.0 (0.354)	6.0 (0.236)	7.0 (0.276)		
47,000	9.0 (0.354)	11.0 (0.433)	7.0 (0.276)	8.0 (0.315)	6.0 (0.236)	
50,000						
68,000						
100,000	11.0 (0.433)	11.0 (0.433)	8.0 (0.315)	9.0 (0.354)	10.0 (0.394)	
220,000						

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