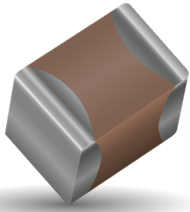


X7R Dielectric, KGM Series

General Specifications



The X7R dielectric is the most popular of the intermediate EIA class II materials due to its relative temperature stability. While the capacitance change is non-linear, temperature variation is within $\pm 15\%$ from -55°C to $+125^{\circ}\text{C}$.

Capacitance for X7R varies under the influence of electrical operating conditions such as voltage and frequency. X7R dielectric chip usage covers a broad spectrum of industrial applications where known changes in capacitance due to applied voltages are acceptable.

SpiCAT is an additional online resource that KAVX offers to help create engineering simulations. Please visit spicat.kyocera-avx.com for more information.

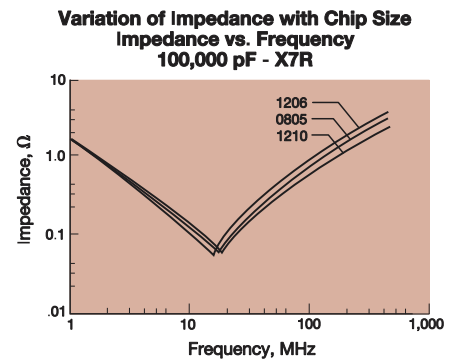
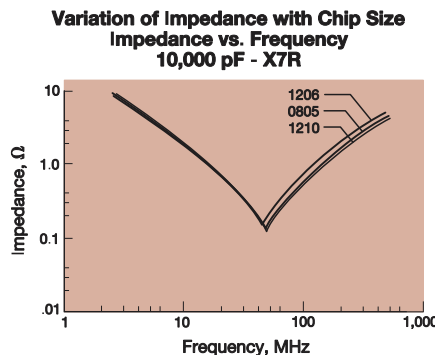
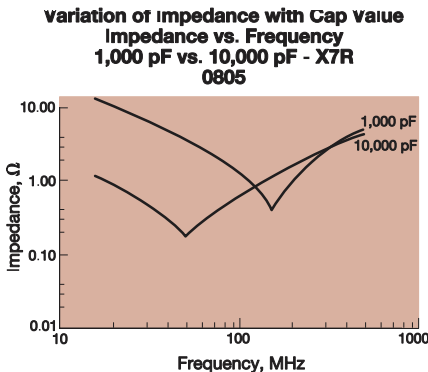
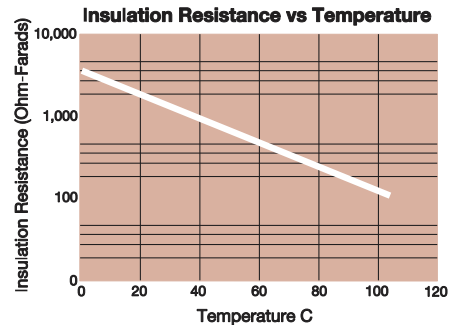
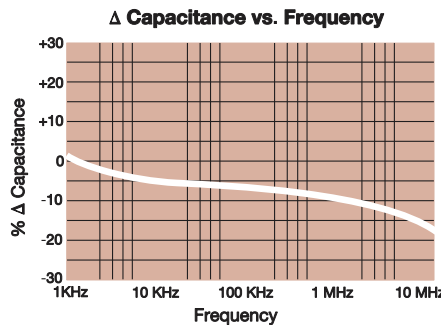
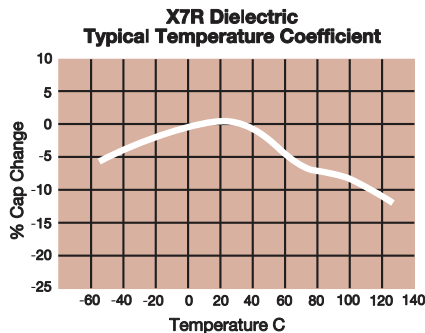
HOW TO ORDER

KGM	03	A	R7	1E	101	M	N
Series	Size	Thickness	Dielectric	Voltage	Capacitance Code Code (in pF)	Capacitance Tolerance	Packaging
General Purpose	02= 0101	See Cap Chart	X7R = R7	0G= 4.0V	2 Significant Digits	J* = +/- 5%	See Table Below
Tin/Nickel Finish	03= 0201			0J= 6.3V	+Number of zeros	K = +/- 10%	
	05= 0402			1A=10V	eg. 10 μF = 106	M = +/- 20%	
	15=0603			1C=16V	10nF = 103		
	21=0805			1E= 25V	47pF = 470		
	31=1206			2H=500V			



PACKAGING CODES

Code	EIA (inch)	IEC(mm)	7" Paper	7" Embossed	13" Paper	13" Embossed
02	0101	0402				
03	0201	0603	H		N	
05	0402	1005	H		N	
15	0603	1608	T	U	M	L
21	0805	2012	T	U	M	L
31	1206	3216	T	U	M	L
32	1210	3225		U		L
43	1812	4532		V		S
44	1825	4564		V		S
55	2220	5750		V		S
56	2225	5763		V		S



X7R Dielectric, KGM Series

Specifications and Test Methods



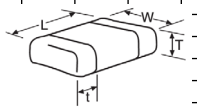
Parameter/Test		X7R Specification Limits	Measuring Conditions	
Operating Temperature Range		-55°C to +125°C	Temperature Cycle Chamber	
Capacitance		Within specified tolerance		
Dissipation Factor		$\leq 10\%$ for $\geq 50V$ DC rating $\leq 12.5\%$ for 25V DC rating $\leq 12.5\%$ for $\leq 10V$ DC rating Contact Factory for DF by PN	Freq.: 1.0 kHz $\pm 10\%$ Voltage: 1.0Vrms $\pm .2V$ For Cap > 10 μ F, 0.5Vrm @ 120Hz	
Insulation Resistance		10,000M Ω or 500M Ω - μ F, whichever is less	Charge device with rated voltage for 120 \pm 5 secs @ room temp/humidity	
Dielectric Strength		No breakdown or visual defects	Charge device with 250% of rated voltage for 1-5 seconds, w/ charge and discharge current limited to 50 mA (max) Note: Charge device with 150% of rated voltage for 500V devices.	
Resistance to Flexure Stresses	Appearance	No defects	Deflection: 2mm Test Time: 30 seconds	
	Capacitance Variation	$\leq \pm 12\%$		
	Dissipation Factor	Meets Initial Values (As Above)		
	Insulation Resistance	\geq Initial Value x 0.3		
Solderability		$\geq 95\%$ of each terminal should be covered with fresh solder	Dip device in eutectic solder at 230 \pm 5°C for 5.0 \pm 0.5 seconds	
Resistance to Solder Heat	Appearance	No defects, <25% leaching of either end terminal	Dip device in eutectic solder at 260°C for 60 seconds. Store at room temperature for 24 \pm 2 hours before measuring electrical properties.	
	Capacitance Variation	$\leq \pm 7.5\%$		
	Dissipation Factor	Meets Initial Values (As Above)		
	Insulation Resistance	Meets Initial Values (As Above)		
	Dielectric Strength	Meets Initial Values (As Above)		
Thermal Shock	Appearance	No visual defects	Step 1: -55°C $\pm 2^\circ$	30 \pm 3 minutes
	Capacitance Variation	$\leq \pm 7.5\%$	Step 2: Room Temp	≤ 3 minutes
	Dissipation Factor	Meets Initial Values (As Above)	Step 3: +125°C $\pm 2^\circ$	30 \pm 3 minutes
	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp	≤ 3 minutes
	Dielectric Strength	Meets Initial Values (As Above)	Repeat for 5 cycles and measure after 24 \pm 2 hours at room temperature	
Load Life	Appearance	No visual defects	Pre-treatment: After mounting, perform heat treatment 150+0/-10C for 2 hour, then stabilise for 24+/-2 hour at room temp, then measure. Charge device with \geq rated voltage in test chamber set at 125°C $\pm 2^\circ$ C for 1000 hours (+48, -0). Pre-treatment: After remove from test chamber, perform heat treatment 150+0/-10C for 2 hour, then stabilise for 24+/-2 hour at room temp, then measure. Contact KYOCERA AVX for datasheet of specific parts.	
	Capacitance Variation	$\leq \pm 12.5\%$		
	Dissipation Factor	\leq Initial Value x 2.0 (See Above)		
	Insulation Resistance	\geq Initial Value x 0.3 (See Above)		
	Dielectric Strength	Meets Initial Values (As Above)		
Load Humidity	Appearance	No visual defects	Pre-treatment: After mounting, perform heat treatment 150+0/-10C for 2 hour, then stabilise for 24+/-2 hour at room temp, then measure. Store in a test chamber set at 85°C $\pm 2^\circ$ C/ 85% $\pm 5\%$ relative humidity for 1000 hours (+48, -0) with rated voltage applied. Pre-treatment: After remove from test chamber, perform heat treatment 150+0/-10C for 2 hour, then stabilise for 24+/-2 hour at room temp, then measure.	
	Capacitance Variation	$\leq \pm 12.5\%$		
	Dissipation Factor	\leq Initial Value x 2.0 (See Above)		
	Insulation Resistance	\geq Initial Value x 0.3 (See Above)		
	Dielectric Strength	Meets Initial Values (As Above)		

X7R Dielectric, KGM Series

Capacitance Range



SIZE	1210							1812					1825			2220					2225				
Soldering	Reflow Only							Reflow Only					Reflow Only			Reflow Only					Reflow Only				
Packaging	Paper/Embossed							All Embossed					All Embossed			All Embossed					All Embossed				
(L) Length	3.30 ± 0.4 (0.130 ± 0.016)							4.50 ± 0.40 (0.177 ± 0.016)					4.50 ± 0.40 (0.177 ± 0.016)			5.70 ± 0.50 (0.224 ± 0.020)					5.70 ± 0.40 (0.224 ± 0.016)				
(W) Width	2.50 ± 0.30 (0.098 ± 0.012)							3.20 ± 0.40 (0.126 ± 0.016)					6.40 ± 0.40 (0.252 ± 0.016)			5.00 ± 0.40 (0.197 ± 0.016)					6.30 ± 0.40 (0.248 ± 0.016)				
(t) Terminal	0.50 ± 0.25 (0.020 ± 0.010)							0.61 ± 0.36 (0.024 ± 0.014)					0.61 ± 0.36 (0.024 ± 0.014)			0.64 ± 0.39 (0.025 ± 0.015)					0.64 ± 0.39 (0.025 ± 0.015)				
WVDC	10	16	25	50	100	200	500	16	25	50	100	200	500	50	100	200	25	50	100	200	500	50	100	200	
Cap 100 101																									
(pF) 150 151																									
220 221	R	R	R	R	R	R	D																		
330 331	R	R	R	R	R	R	D	A	A	A	A	A	A												
470 471	R	R	R	R	R	R	D	A	A	A	A	A	A												
680 681	R	R	R	R	R	R	D	A	A	A	A	A	A												
1000 102	R	R	R	R	R	R	D	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
1500 152	R	R	R	R	R	R	D	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
2200 222	R	R	R	R	R	R	D	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
3300 332	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
3900 392	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
4700 472	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
5600 562	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
6800 682	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
Cap 0.010 103	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
(μF) 0.012 123	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.015 153	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.018 183	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.022 223	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.027 273	R	R	R	R	R	R	E	H	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.033 333	R	R	R	R	R	R	E	H	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.039 393	R	R	R	R	R	R	E	H	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.047 473	R	R	R	R	R	R	E	H	A	A	A	A	B	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.068 683	R	R	R	R	R	R	H	P	A	A	A	A	B	F	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.082 823	R	R	R	R	R	R	H	P	A	A	A	A	B	F	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.100 104	R	R	R	R	R	R	H	P	A	A	A	B	B	F	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.120 124	R	R	R	R	R	R	H		A	A	A	B	B	J	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.150 154	E	E	E	E	E	L			A	A	A	B	F	J	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.220 224	E	E	E	E	E	L			A	A	A	B	F	J	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.330 334	E	E	E	E	H	L			A	A	A	B	F	J	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.470 474	E	E	E	E	L	L			A	A	A	F	F	J	C	C	Z	Z	Z	Z	Z	Z	D	D	D
0.680 684	E	E	E	E	L	L			F	F	F	F	J		C	C	Z	Z	Z	Z	Z	C	D	D	D
1.000 105	E	E	E	E	L				F	F	F	F	J		C	C	Z	Z	Z	Z	Z	D	D	D	D
2.200 225	L	L	L	L	L				F	F	F	J			C	C	F	Z	Z	Z	C		D	D	G
4.700 475	L	L	L	L	L				J	J	J	J			C	F		Z	Z	Z			D	D	G
10 106	L	L	L	L	L				J	J	J				F	F		C	C	C			G	G	
22 226	L	L	L																D						
47 476	L																								
100 107																									
WVDC	10	16	25	50	100	200	500	16	25	50	100	200	500	50	100	200	25	50	100	200	500	50	100	200	
SIZE	1210							1812					1825			2220					2225				



Case Size	1210 (KGM 32)						1812 (KGM 43)				1825 (KGM 44)		2220 (KGM 55)			2225 (KGM56)	
Thickness Letter	D	E	H	L	P	R	A	B	F	J	C	F	D	C	Z	D	G
Max Thickness (mm)	1.4	1.45	1.8	2.80	2.2	1.05	1.4	1.45	2.21	2.80	2.21	2.80	3.3	2.80	2.21	2.21	2.80
Carrier Tape	EMB	EMB	EMB	EMB	EMB	PAPER	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB
Packaging Code 7"reel	U	U	U	U	U	T	V	V	V	V	V	V	V	V	V	V	V
Packaging Code 13"reel	L	L	L	L	L	M	S	S	S	S	S	S	S	S	S	S	S
	PAPER						EMBOSS(EMB)										