

# KGM15AR71C221MT Datasheet



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DiGi Electronics Part Number	KGM15AR71C221MT-DG
Manufacturer	<a href="#">KYOCERA AVX</a>
Manufacturer Product Number	KGM15AR71C221MT
Description	CAP CER 220PF 16V X7R 0603
Detailed Description	220 pF ±20% 16V Ceramic Capacitor X7R 0603 (1608 Metric)

This model KGM15AR71C221MT is available at DiGi Electronics.

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## Purchase and inquiry

Manufacturer Product Number:

KGM15AR71C221MT

Series:

KGM - X7R

Capacitance:

220 pF

Voltage - Rated:

16V

Operating Temperature:

-55°C ~ 125°C

Ratings:

-

Failure Rate:

-

Package / Case:

0603 (1608 Metric)

Height - Seated (Max):

-

Lead Spacing:

-

Manufacturer:

KYOCERA AVX

Product Status:

Active

Tolerance:

±20%

Temperature Coefficient:

X7R

Features:

-

Applications:

General Purpose

Mounting Type:

Surface Mount, MLCC

Size / Dimension:

0.063" L x 0.032" W (1.60mm x 0.81mm)

Thickness (Max):

0.035" (0.90mm)

Lead Style:

-

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8532.24.0020

Moisture Sensitivity Level (MSL):

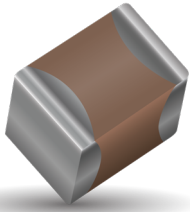
1 (Unlimited)

ECCN:

EAR99

# 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  $-55^{\circ}\text{C}$  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 KYOCERA AVX offers to help create engineering simulations. Please visit [spicat.kyocera-avx.com](http://spicat.kyocera-avx.com) for more information.

### HOW TO ORDER

#### KGM

**Series**  
General Purpose  
Tin/Nickel Finish

#### 03

**Size**  
02= 01005 32= 1210  
03= 0201 43= 1812  
05= 0402 44= 1825  
15= 0603 55= 2220  
21= 0805 56= 2225  
31= 1206

#### A

**Thickness**  
See Cap Chart

#### R7

**Dielectric**  
R7 = X7R

#### 1E

**Voltage**  
0G = 4.0V 1H = 50V  
0J = 6.3V 2A = 100V  
1A = 10V 2D = 200V  
1C = 16V 2E = 250V  
1E = 25V 2H = 500V

#### 101

**Capacitance Code**  
2 Significant Digits +  
Number of zeros  
eg. 106 =  $10\mu\text{F}$   
103 =  $10\text{nF}$

#### M

**Tolerance**  
J\* =  $\pm 5\%$   
K =  $\pm 10\%$   
M =  $\pm 20\%$   
  
\* $\leq 1\mu\text{F}$  only, contact  
factory for additional  
values

#### N

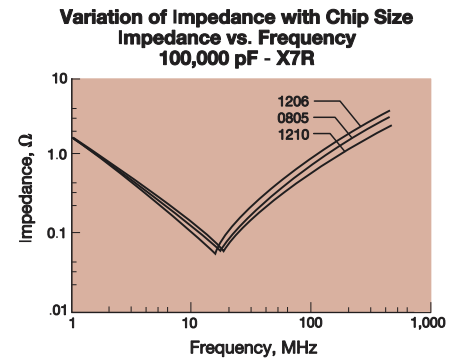
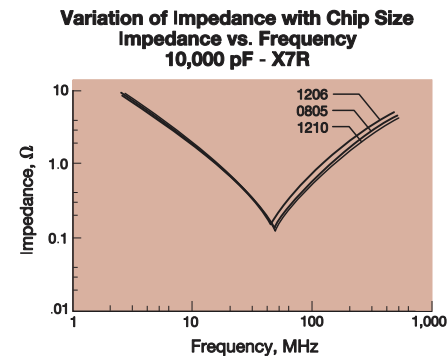
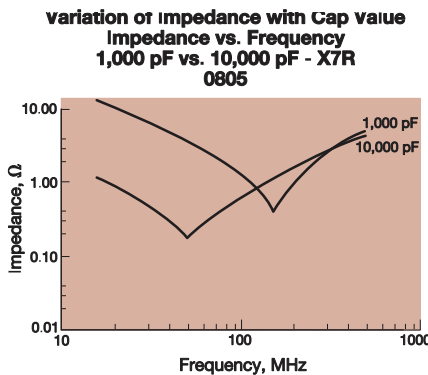
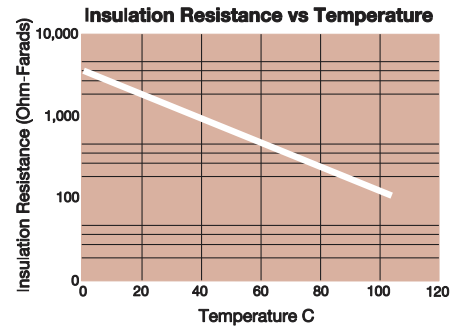
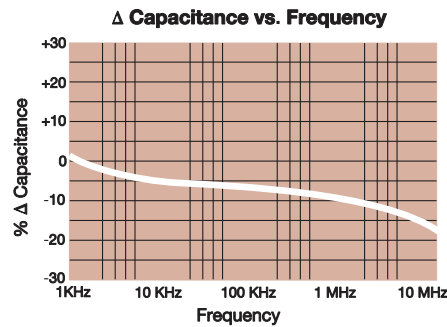
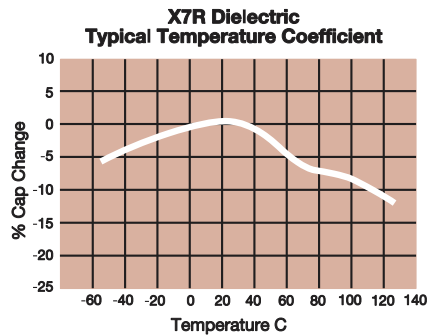
**Packaging**  
See Table Below



### PACKAGING CODES

Code	EIA (inch)	IEC(mm)	7" Paper	7" Embossed	13" Paper	13" Embossed
02	01005	0402	H			
03	0201	0603	H		N	
05	0402	1005	H		N	
15	0603	1608	T		M	
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

\*Note: The thickness determines if packaging is paper or embossed.



# X7R Dielectric, KGM Series

## Specifications and Test Methods

Parameter/Test		X7R Specification Limits	Measuring Conditions (Complies with JIS C5101 / IEC60384)
Operating Temperature Range		-55°C to +125°C	Temperature Cycle Chamber
Capacitance		Within specified tolerance	Measure after heat treatment
Dissipation Factor / Tanδ		Refer to <a href="https://spicat.kyocera-avx.com">https://spicat.kyocera-avx.com</a> for individual part number specification	Capacitance Frequency Volt C≤10μF Frequency : 1kHz±10% Volt : 1.0±0.2Vrms *0.5±0.2Vrms  C>10μF Frequency : 120Hz±10% Volt : 0.5±0.2Vrms The charge and discharge current of the capacitor must not exceed 50mA.
Insulation Resistance		Refer to <a href="https://spicat.kyocera-avx.com">https://spicat.kyocera-avx.com</a> for individual part number specification	Apply the rated voltage for 1 minute, and measure it in normal temperature and humidity. The charge and discharge current of the capacitor must not exceed 50mA.
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.
Bending Strength		No significant damage with 1mm bending	Glass epoxy PCB: Fulcrum spacing: 90mm, duration time 10 seconds.
Solderability		Solder coverage : 95% min.	Soaking condition Sn-3Ag-0.5Cu 245±5°C 3±0.5 sec.
Resistance to Solder Heat	Appearance	No problem observed	Take the initial value after heat treatment. Soak the sample in 260°C±5°C solder for 10±0.5 seconds and place in normal temperature and humidity, and measure after heat treatment. (Pre-heating conditions) Order      Temperature      Time 1            80 to 100°C            2 minutes 2            150 to 200°C            2 minutes The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.
	Capacitance Variation	≤ ±7.5%	
	Dissipation Factor / Tanδ	Within specification	
	Insulation Resistance	Within specification	
Withstanding Voltage / Dielectric Strength		Resist without problem	
Thermal Shock	Appearance	No visual defects	Take the initial value after heat treatment. (Cycle) Room temperature (3 min.)→ Lowest operation temperature (30 min.)→ Room temperature (3 min.)→ Highest operation temperature(30 min.) After 5 cycles, measure after heat treatment. The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.
	Capacitance Variation	≤ ±7.5%	
	Dissipation Factor	Within specification	
	Insulation Resistance	Within specification	
Withstanding Voltage / Dielectric Strength		Resist without problem	
Load Life	Appearance	No visual defects	Take the initial value after heat treatment. After applying *1.5 the rated voltage at the highest operation temperature for 1000+12/ -0 hours, and measure the sample after heat treatment in normal temperature and humidity. The charge and discharge current of the capacitor must not exceed 50mA for IR measurement. *Apply 1.0 times when the rated voltage is 4V or less. Applied voltages for respective products are indicated in the chart below.
	Capacitance Variation	≤ ±12.5%	
	Dissipation Factor / Tanδ	≤ Initial Value x 2.0 (See Above)	
	Insulation Resistance	Over 1000MΩ or 50MΩ · μF, whichever is less. *Exceptions Listed Below	
Load Humidity	Appearance	No visual defects	Take the initial value after heat treatment. After applying rated voltage for 500+12/ -0 hours in the condition of 40°C ± 2°C and 90 to 95%RH, and place in normal temperature and humidity, then measure the sample after heat treatment. The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.
	Capacitance Variation	≤ ±12.5%	
	Dissipation Factor / Tanδ	Within specification	
	Insulation Resistance	Over 1000MΩ or 50MΩ · μF, whichever is less. *Exceptions Listed Below	
Appearance		No problem observed	Microscope
Termination Strength		No problem observed	Apply a sideward force of 500g (5N) to a PCB-mounted sample. note : 2N for 0201 size, and 1N for 01005 size.
Vibration	Appearance	No problem observed	Take the initial value after heat treatment. Vibration frequency: 10 to 55 (Hz) Amplitude: 1.5mm Sweeping condition: 10 → 55 → 10Hz/ 1 minute in X, Y and Z directions: 2 hours each, 6 hours in total, and place in normal temperature and humidity, then measure the sample after heat treatment.
	Capacitance	Within tolerance	
	Tanδ	Within tolerance	
Heat Treatment		Expose sample in the temperature of 150+0/ -10°C for 1 hour and leave the sample in normal temperature and humidity for 24±2 hours.	

Voltage to be applied in the High Temperature Load (Applied voltage is the multiple of the rated voltage)

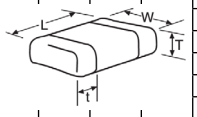




# X7R Dielectric, KGM Series

## 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 mm (in.)	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 mm (in.)	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 mm (in.)	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	500	25	50	100	200	500	50	100	200	500			
Cap 100 (pF)	101																												
Cap 150 (pF)	151																												
Cap 220 (pF)	221	R	R	R	R	R	R	D	A	A	A	A	A	A															
Cap 330 (pF)	331	R	R	R	R	R	R	D	A	A	A	A	A	A															
Cap 470 (pF)	471	R	R	R	R	R	R	D	A	A	A	A	A	A															
Cap 680 (pF)	681	R	R	R	R	R	R	D	A	A	A	A	A	A															
Cap 1000 (pF)	102	R	R	R	R	R	R	D	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 1500 (pF)	152	R	R	R	R	R	R	D	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 2200 (pF)	222	R	R	R	R	R	R	D	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 3300 (pF)	332	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 3900 (pF)	392	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 4700 (pF)	472	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 5600 (pF)	562	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 6800 (pF)	682	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.010 (µF)	103	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.012 (µF)	123	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.015 (µF)	153	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.018 (µF)	183	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.022 (µF)	223	R	R	R	R	R	R	E	A	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.027 (µF)	273	R	R	R	R	R	R	E	H	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.033 (µF)	333	R	R	R	R	R	R	E	H	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.039 (µF)	393	R	R	R	R	R	R	E	H	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.047 (µF)	473	R	R	R	R	R	R	E	H	A	A	A	A	B	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.068 (µF)	683	R	R	R	R	R	R	H	P	A	A	A	A	B	F	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D
Cap 0.082 (µF)	823	R	R	R	R	R	R	H	P	A	A	A	A	B	F	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D
Cap 0.100 (µF)	104	R	R	R	R	R	R	H	P	A	A	A	A	B	F	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D
Cap 0.120 (µF)	124	R	R	R	R	R	R	H		A	A	A	B	B	J	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D
Cap 0.150 (µF)	154	E	E	E	E	E	E	L		A	A	A	B	F	J	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D
Cap 0.220 (µF)	224	E	E	E	E	E	E	L		A	A	A	B	F	J	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D
Cap 0.330 (µF)	334	E	E	E	E	H	L		A	A	A	B	F	J	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.470 (µF)	474	E	E	E	E	L	L		A	A	A	F	F	J	C	C	C	C	Z	Z	Z	Z	Z	Z	D	D	D	D	
Cap 0.680 (µF)	684	E	E	E	E	L	L		F	F	F	F	J		C	C	C		Z	Z	Z	Z	Z	C	D	D	D	G	
Cap 1.000 (µF)	105	E	E	E	E	G	L		F	F	F	F	J		C	C	C		Z	Z	Z	Z	Z	C	D	D	D	D	
Cap 2.200 (µF)	225	L	L	L	L	L			F	F	F	J			C	C	F		Z	Z	Z	C			D	D	G		
Cap 4.700 (µF)	475	L	L	L	L	L			J	J	J	J			C	F			Z	C	C				D	G			
Cap 10 (µF)	106	L	L	L	L	A			J	J	J				F	F			C	C	D				G	G			
Cap 22 (µF)	226	L	A	L															D	D	H								
Cap 47 (µF)	476	L																											
Cap 100 (µF)	107																												
WVDC	10	16	25	50	100	200	500	16	25	50	100	200	500	50	100	200	500	25	50	100	200	500	50	100	200	500			
SIZE	1210								1812					1825				2220					2225						



Case Size	1210 (KGM 32)								1812 (KGM 43)				1825 (KGM 44)				2220 (KGM 55)				2225 (KGM56)		
Thickness Letter	R	D	E	G	H	P	A	L	A	B	F	J	C	F	Z	C	D	H	D	G			
Max Thickness (mm)	1.05	1.4	1.45	1.78	1.8	2.2	2.70	2.80	1.4	1.45	2.21	2.80	2.21	2.80	2.21	2.80	3.3	3.4	2.21	2.80			
Carrier Tape	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB			
Packaging Code 7" reel	U	U	U	U	U	U	U	U	V	V	V	V	V	V	V	V	V	V	V	V			
Packaging Code 13" reel	L	L	L	L	L	L	L	L	S	S	S	S	S	S	S	S	S	S	S	S			

EMBOSSED (EMB)

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