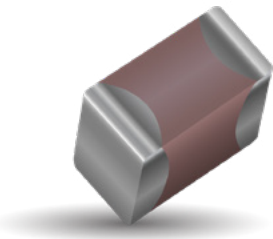


X5R Dielectric, KGM Series

General Specifications



GENERAL DESCRIPTION

- General Purpose Dielectric for Ceramic Capacitors
- EIA Class II Dielectric
- Temperature variation of capacitance is within $\pm 15\%$ from -55°C to $+85^{\circ}\text{C}$
- Well suited for decoupling and filtering applications
- Available in High Capacitance values (up to $100\mu\text{F}$)

HOW TO ORDER

KGM	03	A	R5	1E	101	M	N
Series	Size	Thickness	Dielectric	Voltage	Capacitance Code Code (in pF)	Capacitance Tolerance	Packaging
General Purpose Tin/Nickel Finish	02 = 0101 03 = 0201 05 = 0402 15 = 0603 21 = 0805 31 = 1206 32 = 1210 43 = 1812	See Cap Chart	X5R= R5	0G = 4.0V 0J = 6.3V 1A = 10V 1C = 16V 1E = 25V 1V = 35V 1H = 50V 2A = 100V	2 Significant Digits +Number of zeros eg 10uF = 106 10nF = 103 47pF = 470	J* = +/- 5% K = +/- 10% M = +/- 20%	See Table Below

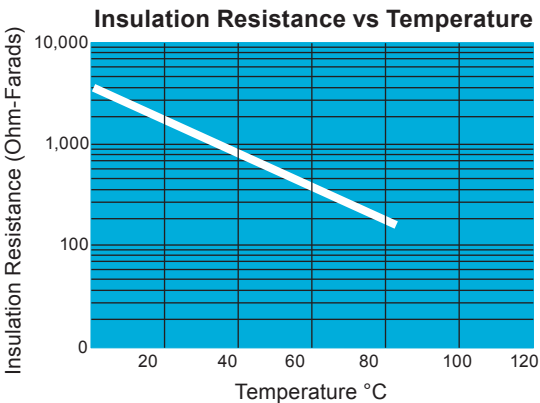
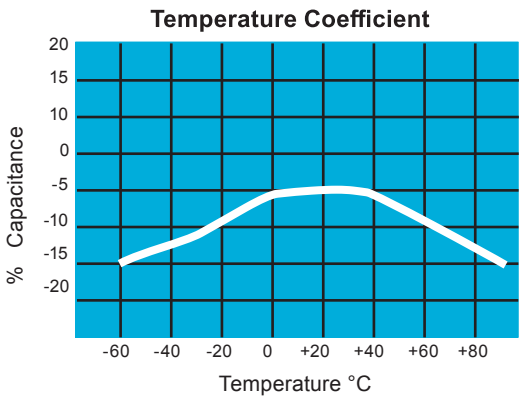
NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.
Contact factory for non-specified capacitance values.



PACKAGING CODES

Code	EIA (inch)	IEC(mm)	7" Paper	7" Embossed	13" Paper	13" Embossed
02	0101	0402	H			
03	0201	0603	H		N	
05	0402	1005	H		N	
15	0603	1608		U		L
21	0805	2012		U		L
31	1206	3216		U		L
32	1210	3225		U		L
43	1812	4532		V		S

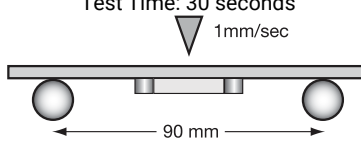
TYPICAL ELECTRICAL CHARACTERISTICS



The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at www.kyocera-avx.com/disclaimer/ by reference and should be reviewed in full before placing any order.

X5R Dielectric, KGM Series

Specifications and Test Methods

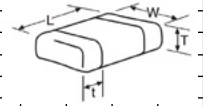
Parameter/Test		X5R Specification Limits	Measuring Conditions	
Operating Temperature Range		-55°C to +85°C	Temperature Cycle Chamber	
Capacitance		Within specified tolerance	Freq.: 1.0 kHz $\pm$ 10% Voltage: 1.0Vrms $\pm$.2V For Cap > 10 μ F, 0.5Vrms @ 120Hz	
Dissipation Factor		$\leq$ 2.5% for $\geq$ 50V DC rating $\leq$ 12.5% for 25V, 35V DC rating $\leq$ 12.5% Max. for 16V DC rating and lower Contact Factory for DF by PN		
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)	
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 60seconds. 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°	30 $\pm$ 3 minutes
	Capacitance Variation	$\leq \pm 7.5\%$	Step 2: Room Temp	$\leq$ 3 minutes
	Dissipation Factor	Meets Initial Values (As Above)	Step 3: +85°C $\pm$ 2°	30 $\pm$ 3 minutes
	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp	$\leq$ 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	Charge device with 1.5X rated voltage in test chamber set at 85°C $\pm$ 2°C for 1000 hours (+48, -0).	
	Capacitance Variation	$\leq \pm 12.5\%$		
	Dissipation Factor	$\leq$ Initial Value x 2.0 (See Above)	Note: Contact factory for *optional specification part numbers that are tested at < 1.5X rated voltage.	
	Insulation Resistance	$\geq$ Initial Value x 0.3 (See Above)		
	Dielectric Strength	Meets Initial Values (As Above)	Remove from test chamber and stabilize at room temperature for 24 $\pm$ 2 hours	
Load Humidity	Appearance	No visual defects	Store in a test chamber set at 85°C $\pm$ 2°C/ 85% $\pm$ 5% relative humidity for 1000 hours (+48, -0) with rated voltage applied.	
	Capacitance Variation	$\leq \pm 12.5\%$		
	Dissipation Factor	$\leq$ Initial Value x 2.0 (See Above)	Remove from chamber and stabilize at room temperature and humidity for 24 $\pm$ 2 hours before measuring.	
	Insulation Resistance	$\geq$ Initial Value x 0.3 (See Above)		
	Dielectric Strength	Meets Initial Values (As Above)		

X5R Dielectric, KGM Series

Capacitance Range



Case Size		0101		0201				0402					0603						0805									
Soldering		Reflow Only		Reflow Only				Reflow/Wave					Reflow/Wfeve						Reflow/Wfeve									
Packaging		Paper/Embossed		All Paper				All Paper					Reflow/Wfeve						Reflow/Wfeve									
(L) Length	mm	0.40 ± 0.02		0.60 ± 0.09				1.00 ± 0.20					1.60 ± 0.20						2.01 ± 0.20									
	(in.)	(0.016 ± 0.0008)		(0.024 ± 0.004)				(0.040 ± 0.008)					(0.063 ± 0.008)						(0.079 ± 0.008)									
W) Width	mm	0.20 ± 0.02		0.30 ± 0.09				0.50 ± 0.20					0.80 ± 0.20						1.25 ± 0.20									
	(in.)	(0.008 ± 0.0008)		(0.011 ± 0.004)				(0.020 ± 0.008)					(0.031 ± 0.008)						(0.049 ± 0.008)									
(t) Terminal	mm	0.10 ± 0.04		0.15 ± 0.05				0.25 ± 0.10					0.35 ± 0.15						0.50 ± 0.25									
	(in.)	(0.004 ± 0.0016)		(0.006 ± 0.002)				(0.010 ± 0.004)					(0.014 ± 0.006)						(0.020 ± 0.010)									
Voltage:		6.3	10	4	6.3	10	16	25	4	6.3	10	16	25	50	4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50
Cap (pF)	100	101	A					A																				
	150	151	A					A																				
	220	221	A					A						A														
	330	331	A					A						A														
	470	471	A					A						A														
	680	681	A					A						A														
	1000	102	A				A	A						A														
	1500	152	A	A			A	A						A														
	2200	222	A	A			A	A	A					A														
	3300	332	A	A			A	A	A					A														
	4700	472	A	A	A		A	A	A				A								A							
	6800	682	A	A			A	A	A					A							A							
Cap (µF)	0.010	103	A	A			A	A	A					A				A	A	A								
	0.015	153	A											A				A	A	A								
	0.022	223	A			A	A	A	A				A	A				A	A	A								K
	0.033	333	A										A					A	A	A								K
	0.047	473	A			A	A	A	A				A	A				A	A	A								K
	0.068	683	A										A					A		A								K
	0.10	104	A			A	A	A	B			A	A	A	A			A	A	A						K	K	K
	0.15	154																A								K	K	K
	0.22	224	A		A	A	A	C			A	A	A	A	A	B	B	B	B	B	B	B				K	K	K
	0.33	334														B	B	B	B	B						A		
	0.47	474	A		A	A				A	A	A	H	A	H	B	B	B	B	B	B	B				A	A	A
	0.68	684														B	B	B	B	B						A	A	A
	1	105			B	B	C	C			A	A	A	A	H	B	B	B	B	B	B	B				A	A	A
	2.2	225			B	B	C				A	A	A	A	H	H	B	B	B	B	C	C				A	A	A
	4.7	475			C	D					H	H	B	C			B	B	B	B	C			A	A	A	A	A
	10	106									C	C	C				C	C	C	C	C			A	A	A	A	A
	22	226									C	C					C	C	C	C				A	A	A	A	A
	47	476															C	C						A	A	A		
	100	107																						A	A			
Voltage:		6.3	10	4	6.3	10	16	25	4	6.3	10	16	25	50	4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50
Case Size		0101		0201				0402					0603						0805									



Case Size	0101 (KGM 02)	0201 (KGM03)				0402 (KGM05)			0603 (KGM15)			0805 (KGM21)	
Thickness Letter	A	A	B	C	D	A	C	E	A	B	D	F	K
Max Thickness (mm)	0.22	0.33	0.35	0.39	0.55	0.55	0.70	0.90	0.90	0.95	1.02	1.52	1.40
Carrier Tape	PAPER	PAPER				PAPER			PAPER			EMB	
Packaging Code 7"reel	H	H	H	H	H	H	H	H	T	T	T	U	U
Packaging Code 13"reel	n/a	N	N	N	N	N	N	N	M	M	M	L	L
	PAPER								EMBOSSSED (EMB)				

X5R Dielectric, KGM Series

Capacitance Range



PREFERRED SIZES ARE SHADED

Case Size			1206							1210							1812						
Soldering			Reflow/Wave							Reflow Only							Reflow Only						
Packaging			Paper/Embossed							Paper/Embossed							All Embossed						
(L) Length	mm	(in.)	3.20 ± 0.40 (0.126 ± 0.016)							3.20 ± 0.40 (0.126 ± 0.016)							4.50 ± 0.30 (0.177 ± 0.012)						
W) Width	mm	(in.)	1.60 ± 0.30 (0.063 ± 0.012)							2.50 ± 0.30 (0.098 ± 0.012)							3.20 ± 0.20 (0.126 ± 0.008)						
(t) Terminal	mm	(in.)	0.50 ± 0.25 (0.020 ± 0.010)							0.50 ± 0.25 (0.020 ± 0.010)							0.61 ± 0.36 (0.024 ± 0.014)						
Voltage:			4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50
Cap (pF)	100	101																					
	150	151.0																					
	220	221																					
	330	331																					
	470	471																					
	680	681																					
	1000	102																					
	1500	152																					
	2200	222																					
	3300	332																					
Cap (μF)	3900	392																					
	4700	472																					
	5600	562																					
	6800	682																					
	0.01	103																					
	0.012	123																					
	0.015	153																					
	0.018	183																					
	0.022	223																					
	0.027	273																					
	0.033	333																					
	0.039	393																					
	0.047	473																					
	0.068	683																					
	0.082	823																					
	0.10	104																					
	0.12	124																					
	0.15	154																					
	0.22	224																					
	0.33	334																					
	0.47	474	M	M	M	M	M	M	M							C	C						
	0.68	684																					
	1	105	H	H	H	H	H	H	H	E	E	E	E	E	E	E							
	2.2	225	H	H	H	H	H	H	H	L	L	L	L	L	L	L							
	4.7	475	H	H	H	H	H	H	A	J	J	J	J	J	J	A	A						
	10	106	H	H	H	H	A	H	H	J	J	J	J	J	J	A	A					J	
	22	226	H	H	H	A	H			A	A	A	A	A				J	J	J			
	47	476	H	H	H	H				L	L	L	L	L									
	100	107	H	H						L	L												
	Voltage:		4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50
Case Size			1206							1210							1812						

Case Size	1206 (KGM 31)				1210 (KGM 32)				1812 (KGM 43)
Thickness Letter	M	A	H	C	E	J	A	L	J
Max Thickness (mm)	1.25	1.8	1.9	1.27	1.45	2.21	2.7	2.80	2.80
Carrier Tape	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB
Packaging Code 7*reel	U	U	U	U	U	U	U	U	V
Packaging Code 13*reel	L	L	L	L	L	L	L	L	S
EMBOSSED (EMB)									