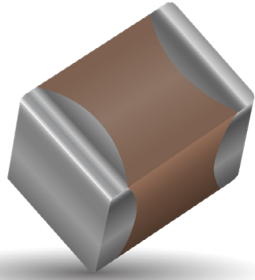


# High Voltage MLC Chips, KGM Series

## For 600V to 5000V Applications



High value, low leakage and small size are difficult parameters to obtain in capacitors for high voltage systems. KYOCERA AVX special high voltage MLC chip capacitors meet these performance characteristics and are designed for applications such as snubbers in high frequency power converters, resonators in SMPS, and high voltage coupling/dc blocking. These high voltage chip designs exhibit low ESRs at high frequencies.

Larger physical sizes than normally encountered chips are used to make high voltage MLC chip products. Special precautions must be taken in applying these chips in surface mount assemblies. The temperature gradient during heating or cooling cycles should not exceed 4°C per second. The preheat temperature must be within 50°C of the peak temperature reached by the ceramic bodies through the soldering process. Chip sizes 1210 and larger should be reflow soldered only. Capacitors may require protective surface coating to prevent external arcing.

For 1825, 2225 and 3640 sizes, KYOCERA AVX offers leaded version in either thru-hole or SMT configurations (for details see section on high voltage leaded MLC chips)

### NEW 630V RANGE

#### HOW TO ORDER

<b>KGM</b>	<b>05</b>	<b>A</b>	<b>CG</b>	<b>1E</b>	<b>101</b>	<b>M</b>	<b>U</b>	
Series	Size	Thickness	Dielectric	Voltage	Capacitance Code Code (in pF)	Capacitance Tolerance	Packaging	
General Purpose Tin/Nickel Finish	21 = 0805 31 = 1206 32 = 1210 42 = 1808 43 = 1812	44 = 1825 55 = 2220 56 = 2225 91 = 3640	See Cap Chart C0G = CG X7R = R7	2J = 630V 3A = 1000V 3N = 1500V 3D = 2000V	3U = 3000V 3G = 4000V 3H = 5000V	2 Significant Digits +Number of zeros eg. 10µF = 106 10nF = 103 47pF = 470	B = ± 0.1pF(<10pF)* C = ± 0.25pF(<10pF)* D = ± 0.5pF(<10pF)* G = ±2%* F = ±1%* J = ±5%* K = ±10% M = ±20%	See Table Below



#### PACKAGING CODES

Code	EIA (inch)	IEC(mm)	7" Paper	7" Embossed	13" Paper	13" Embossed
21	0805	2012		U		L
31	1206	3216		U		L
32	1210	3225		U		L
42	1808	4520		Y		K
43	1812	4532		V		S
44	1825	4564		V		S
55	2220	5750		V		S
56	2225	5763		V		S
91	3640	9110		N/A		N/A

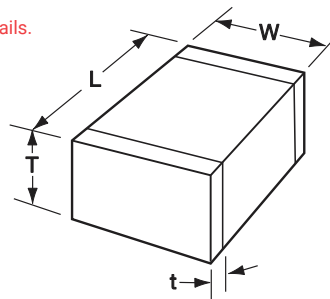
\* COG ONLY

#### Notes:

- Capacitors with X7R dielectrics are not intended for applications across AC supply mains or AC line filtering with polarity reversal. Contact plant for recommendations. Contact factory for availability of Termination and Tolerance options for Specific Part Numbers.
- \*Terminations with 5% minimum lead (Pb) is available, see pages 100 and 101 for LD style. Leaded terminations are available, see pages 102-106.

\*\*The 3640 Style is not available on Reels.

\*\*\* KYOCERA AVX offers nonstandard chip sizes. Contact factory for details.



#### DIMENSIONS: millimeters (inches)

SIZE	0805	1206	1210*	1808*	1812*	1825*	2220*	2225*	3640*
(L) Length	2.10 ± 0.20 (0.083 ± 0.008)	3.30 ± 0.30 (0.130 ± 0.012)	3.30 ± 0.40 (0.130 ± 0.016)	4.60 ± 0.50 (0.181 ± 0.020)	4.60 ± 0.50 (0.181 ± 0.020)	4.60 ± 0.50 (0.181 ± 0.020)	5.70 ± 0.50 (0.224 ± 0.020)	5.70 ± 0.50 (0.224 ± 0.020)	9.14 ± 0.25 (0.360 ± 0.010)
(W) Width	1.25 ± 0.20 (0.049 ± 0.008)	1.60 ± 0.30/-0.10 (0.063 ± 0.012/-0.004)	2.50 ± 0.30 (0.098 ± 0.012)	2.00 ± 0.20 (0.079 ± 0.008)	3.20 ± 0.30 (0.126 ± 0.012)	6.30 ± 0.40 (0.248 ± 0.016)	5.00 ± 0.40 (0.197 ± 0.016)	6.30 ± 0.40 (0.248 ± 0.016)	10.2 ± 0.25 (0.400 ± 0.010)
(t) terminal	min. 0.50 ± 0.20 max. (0.020 ± 0.008)	0.60 ± 0.20 (0.024 ± 0.008)	0.75 ± 0.35 (0.030 ± 0.014)	0.75 ± 0.35 (0.030 ± 0.014)	0.75 ± 0.35 (0.030 ± 0.014)	0.75 ± 0.35 (0.030 ± 0.014)	0.85 ± 0.35 (0.033 ± 0.014)	0.85 ± 0.35 (0.033 ± 0.014)	0.76 (0.030) 1.52 (0.060)

\*Reflow Soldering Only



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

# High Voltage MLC Chips, KGM Series

For 630V to 5000V Applications

## NPO (C0G) DIELECTRIC – PERFORMANCE CHARACTERISTICS

Capacitance Range	10 pF to 0.100 μF (25°C, 1.0 ±0.2 Vrms at 1kHz, for ≤ 1000 pF use 1 MHz)
Capacitance Tolerances	±5%, ±10%, ±20%
Dissipation Factor	0.1% max. (+25°C, 1.0 ±0.2 Vrms, 1kHz, for ≤ 1000 pF use 1 MHz)
Operating Temperature Range	-55°C to +125°C
Temperature Characteristic	0 ±30 ppm/°C (0 VDC)
Voltage Ratings	600, 630, 1000, 1500, 2000, 2500, 3000, 4000 & 5000 VDC (+125°C)
Insulation Resistance (+25°C, at 500 VDC)	100K MΩ min. or 1000 MΩ - μF min., whichever is less
Insulation Resistance (+125°C, at 500 VDC)	10K MΩ min. or 100 MΩ - μF min., whichever is less
Dielectric Strength	Minimum 120% rated voltage for 5 seconds at 50 mA max. current

## NPO (C0G) CAPACITANCE RANGE

Case Size	0805		1206				1210					1808					1812						
	Reflow/Wave		Reflow/Wave				Reflow Only					Reflow Only					Reflow Only						
(L) Length	2.10 ± 0.20 (0.085 ± 0.008)		3.30 ± 0.30 (0.130 ± 0.012)				3.30 ± 0.40 (0.130 ± 0.016)					4.60 ± 0.50 (0.181 ± 0.020)					4.60 ± 0.50 (0.181 ± 0.020)						
(W) Width	1.25 ± 0.20 (0.049 ± 0.008)		1.60 ± 0.30/-0.10 (0.063 ± 0.012/-0.004)				2.50 ± 0.30 (0.098 ± 0.012)					2.00 ± 0.20 (0.079 ± 0.008)					3.20 ± 0.30 (0.126 ± 0.012)						
(t) Terminal	0.50 ± 0.20 (0.020 ± 0.008)		0.60 ± 0.20 (0.04 ± 0.008)				0.75 ± 0.35 (0.030 ± 0.014)					0.75 ± 0.35 (0.030 ± 0.014)					0.75 ± 0.35 (0.030 ± 0.014)						
Voltage (V)	630	1000	630	1000	1500	2000	630	1000	1500	2000	3000	630	1000	1500	2000	3000	4000	630	1000	1500	2000	3000	4000
0R5 Cap (pF) 0.50	C	E																					
1R0 1.0	C	E																					
1R2 1.2	C	E																					
1R5 1.5	C	E	B	B	B	B																	
1R8 1.8	C	E	B	B	B	B																	
2R2 2.2	C	E	B	B	B	B						A	A	A	A	A	A						
2R7 2.7	C	E	B	B	B	B						A	A	A	A	A	A						
3R3 3.3	C	E	B	B	B	B						A	A	A	A	A	A						
3R9 3.9	C	E	B	B	B	B						A	A	A	A	A	A						
4R7 4.7	C	E	B	B	B	B						A	A	A	A	A	A						
5R6 5.6	C	E	B	B	B	B						A	A	A	A	A	A						
6R8 6.8	C	E	B	B	B	B						A	A	A	A	A	A						
8R2 8.2	C	E	B	B	B	B						A	A	A	A	A	A						
100 10	C	E	D	D	B	D	R	R	R	E	J	A	A	A	A	B	A	A	B	A	B	B	E
120 12	C	E	D	D	B	D	R	R	R	E	J	A	A	A	A	B	A	A	B	A	B	B	E
150 15	C	E	D	D	B	D	R	R	R	R	J	A	A	A	A	B	A	A	B	A	B	B	E
180 18	C	E	D	D	B	D	R	R	R	R	J	A	A	A	A	B	A	A	B	A	B	B	E
220 22	C	E	D	D	B	D	R	R	R	R	J	A	A	A	A	B	B	A	B	A	B	B	E
270 27	C	E	D	D	B	D	R	R	R	R	J	A	A	A	A	B	B	A	B	A	B	B	E
330 33	C	E	D	D	D	D	E	E	R	E	J	A	A	A	A	B	C	A	B	A	B	B	E
390 39	C	E	D	D	D	D	E	E	R	E	J	A	A	A	A	B	C	A	B	A	B	B	E
470 47	C	E	D	D	D	D	E	E	E	E	J	A	A	A	A	B	C	A	B	A	B	B	E
560 56	C	A	D	D	D	D	E	E	E	E	J	A	A	A	A	B		B	B	A	B	B	F
680 68	C	A	D	D	D	D	E	E	E	E	J	A	A	A	A	B		B	B	A	B	B	F
820 82	C	A	D	D	D	D	E	E	E	E	J	A	A	A	A	B		B	B	A	B	B	F
101 100	C	E	D	D	D	D	E	E	E	E	J	A	A	A	A	C		B	B	A	B	B	F
121 120	E	E	D	D	A	A	E	E	E	E	J	A	A	A	A	C		B	B	A	B	B	J
151 150	E	E	D	D	A	A	E	E	H	H	J	A	A	A	C	C		B	B	A	B	B	J
181 180	E	E	D	A	A	A	E	E	H	H	J	A	A	A	C	C		B	B	A	B	F	
221 220	E	E	D	A	A	A	E	H	H	H	J	A	A	A	C	C		B	B	A	B	F	
271 270	E	E	D	A	H	H	E	H	H	J	J	L	C	C	C	C		B	B	F	F	F	
331 330	E	E	D	A	H	H	E	H	H	J	J	L	C	C	C	C		B	B	F	F	F	
391 390	E	E	D	A	H	H	E	H	H	L	L	L	C	C	C	C		B	B	F	F	F	
471 470	A		D	A	H	H	E	H	L	L	L	L	C	C	C	C		B	F	F	F	F	
561 560	A		D	A			E	H	L	L	L	L	C	C	C	C		B	F	F	F	F	
681 680	A		D	A			E	H	L	L	L	L	C	C	C	C		B	F	F	F	F	
751 750	A		A	A			E	H	L	L	L	L	C	C	C	C		B	F	F	F	F	J
821 820	A		A	A			E	H	L	L	L	L	C	C	A	C		B	F	F	F	J	
102 1000	A		A	A			E	H	L	L	L	L	C	C	B	C		B	F	F	F	J	
122 1200			A				E	H	L	L	L	L	C	C	B	C		B	F	F	F		
152 1500			A				E	J	L	L	L	L	C	C		C		B	F	F	F		
182 1800			A				E	L	L	L	L	L	C	C		C		A	F	F	F		
222 2200			A				E	L					C	C				A	F	F	J		
272 2700			A				E	L					C					A	F	J	J		
332 3300			A				E	L					C					A	F	J	J		
392 3900			A				E	L										A	J				
472 4700			A				E	G										A	J				
562 5600			G				E	G										A	J				
682 6800			G				H	G										A					
822 8200			G				H	G										A					
103 Cap (μF) 0.010			G				J	L										F					
123 0.012							L											E					
153 0.015							L											E					
183 0.018							L											F					
223 0.022							L											F					
273 0.027							L											F					
333 0.033							L																
473 0.047																							
563 0.056																							
683 0.068																							
104 0.100																							
Voltage (V)	630	1000	630	1000	1500	2000	630	1000	1500	2000	3000	630	1000	1500	2000	3000	4000	630	1000	1500	2000	3000	4000
Case Size	0805		1206				1210					1808					1812						

Case Size	0805 (KGM 21)			1206 (KGM31)				1210 (KGM32)					1808 (KGM42)			1812 (KGM43)				
Thickness Letter	C	E	A	B	D	A	H	R	E	H	J	L	A	B	C	A	B	F	J	
Max Thickness (mm)	0.95	1.35	1.45	0.94	1.45	1.80	1.9	1.05	1.45	1.80	2.21	2.80	1.45	1.80	2.21	1.4	1.45	2.21	2.80	
Carrier Tape	PAPER	EMB	EMB	PAPER	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	
Packaging Code 7" reel	T	U	U	T	U	U	U	U	U	U	U	U	U	Y	Y	Y	V	V	V	
Packaging Code 13" reel	M	L	L	M	L	L	L	L	L	L	L	L	L	K	K	K	S	S	S	
	Paper												Embossed(EMB)							





# High Voltage MLC Chips, KGM Series

For 630V to 5000V Applications



## X7R CAPACITANCE RANGE

SIZE	1825						2220						2225						3640								
Soldering	Reflow Only						Reflow Only						Reflow Only						Reflow Only								
(L) Length	mm		(in.)				mm		(in.)				mm		(in.)				mm		(in.)						
(W) Width	mm		(in.)				mm		(in.)				mm		(in.)				mm		(in.)						
(t) Terminal	mm		(in.)				mm		(in.)				mm		(in.)				mm		(in.)						
Voltage (V)	630	1000	1500	2000	2500	3000	630	1000	1500	2000	2500	3000	630	1000	1500	2000	2500	3000	630	1000	1500	2000	3000	4000	5000		
101	Cap (pF)	100																									
121	Cap (pF)	120																									
151	Cap (pF)	150																									
181	Cap (pF)	180																									
221	Cap (pF)	220																									
271	Cap (pF)	270																									
331	Cap (pF)	330																									
391	Cap (pF)	390																									
471	Cap (pF)	470																									
561	Cap (pF)	560																									
681	Cap (pF)	680																									
751	Cap (pF)	750																									
821	Cap (pF)	820																									
102	Cap (pF)	1000	C	C	C	C	C	C	Z	Z	Z	Z	Z	C	D	D	D	D	D	D	A	A	A	A	A		
122	Cap (pF)	1200	C	C	C	C	C	C	Z	Z	Z	Z	Z	C	D	D	D	D	D	D	A	A	A	A	A		
152	Cap (pF)	1500	C	C	C	C	C	C	Z	Z	Z	Z	Z	C	D	D	D	D	D	D	A	A	A	A	A		
182	Cap (pF)	1800	C	C	C	C	C	C	Z	Z	Z	Z	Z	C	D	D	D	D	D	D	A	A	A	A	A		
222	Cap (pF)	2000	C	C	C	C	C	C	Z	Z	Z	Z	Z	C	D	D	D	D	D	D	A	A	A	A	A		
272	Cap (pF)	2700	C	C	C	C	C	C	Z	Z	Z	Z	Z	C	D	D	D	D	D	D	A	A	A	A	A		
332	Cap (pF)	3300	C	C	C	C	C	C	Z	Z	Z	Z	Z	C	D	D	D	D	D	D	A	A	A	A	A		
392	Cap (pF)	3900	C	C	C	C	C	C	Z	Z	Z	Z	Z	C	D	D	D	D	D	D	A	A	A	A	A		
472	Cap (pF)	4700	C	C	C	C	C	C	Z	Z	Z	Z	Z	C	D	D	D	D	D	D	A	A	A	A	A		
562	Cap (pF)	5600	C	C	C	C	F	F	Z	Z	Z	Z	Z	C	D	D	D	D	G	G	A	A	A	A	A		
682	Cap (pF)	6800	C	C	F	F	F	F	Z	Z	Z	Z	Z	C	D	D	D	D	G	G	A	A	A	A	A		
822	Cap (pF)	8200	C	C	F	F	F	F	Z	Z	C	C	C	C	D	D	D	D	G	G	A	A	A	A	A		
103	Cap (pF)	0.010	C	C	F	F	F	F	Z	Z	C	C	C	C	D	D	D	D	G	G	A	A	A	A	A		
153	Cap (pF)	0.015	C	C	F	F	G		Z	Z	C	C	C	C	D	D	G	G	G	H	A	A	A	A	A		
183	Cap (pF)	0.018	C	C	F	F			Z	Z	C	D	D		D	D	G	G	G		A	A	A	A	A		
223	Cap (pF)	0.022	C	C	F	F			B	B	C	D	D		D	D	G	G	G		A	A	A	A	A		
273	Cap (pF)	0.027	C	C	F				B	B	C	D			D	D	G	G			A	A	A	A	A		
333	Cap (pF)	0.033	C	C	F				B	B	D				D	D	G	G			A	A	A	A	A		
393	Cap (pF)	0.039	C	C	F				B	B	D				D	D	G				A	A	A	A	A		
473	Cap (pF)	0.047	C	C	F				B	B	D				D	D	G				A	A	A	A	A		
563	Cap (pF)	0.056	C	C	F				B	B	D				D	D	H				A	A	A	A	A		
683	Cap (pF)	0.068	C	F					B	C					D	D	H				A	A	A	A	A		
823	Cap (pF)	0.082	C	F					B	C					D	G					A						
104	Cap (pF)	0.100	C	F					B	C					D	G					A						
154	Cap (pF)	0.150	C						B	D					D	H					A						
224	Cap (pF)	0.220	C						Z	D					D						A						
274	Cap (pF)	0.270	C						Z						D						A						
334	Cap (pF)	0.330	C						Z						D						A						
394	Cap (pF)	0.390	C						Z						D						A						
474	Cap (pF)	0.470	C						Z						D						A						
564	Cap (pF)	0.560	F						C						D						A						
684	Cap (pF)	0.680							C						G												
824	Cap (pF)	0.820													G												
105	Cap (pF)	1.000													G												
WVDC			630	1000	1500	2000	2500	3000	630	1000	1500	2000	2500	3000	630	1000	1500	2000	2500	3000	630	1000	1500	2000	3000	4000	5000
SIZE			1825						2220						2225						3640						

Case Size	1825 (KGM 44)				2220 (KGM55)				2225 (KGM56)				3640 (KGM91)
Thickness Letter	C	F	G	Z	B	C	D	D	G	H			A
Max Thickness (mm)	2.21	2.80	3.3	2.21	2.54	2.80	3.30	2.21	2.80	3.3			2.80
Carrier Tape	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB	EMB			EMB
Packaging Code 7"reel	V	V	V	V	V	V	V	V	V	V			N/A
Packaging Code 13"reel	S	S	S	S	S	S	S	S	S	S			N/A
Embossed(EMB)													