

MURATA Hi-Cap Multilayer Ceramic Chip Capacitors



Hi-Cap: The Murata hi-cap, tantalum replacement product lineup is available in X7R, X6S, X7S, and X5R with capacitance of 1µF and larger. This line of high volumetric capacitance ceramic chip capacitors is available in 4V, 6.3V, 10V, 16V, 25V, and 50V. This product series (GRM) is offered with a nickel (Ni) barrier termination plated with tin (Sn), and is RoHS compliant. Stringent dimensional tolerances allow highly reliable, high-speed automatic chip placement on PCBs.

Why use ceramic chips over tantalum and aluminum capacitors? Ceramic chips offer better reliability, performance, no polarity, and allow design engineers to downsize designs with various package options from 0402 X5R 1µF to 1210 X5R and X6S 100µF. This line of high volumetric multilayer capacitance ceramic chip capacitors (MLCC) has excellent high frequency noise absorption performance compared to tantalum and aluminum caps. For bypass/decoupling applications, MLCC is equivalent to 1/2 to 1/5 the capacitance value of a tantalum capacitor because impedance (ESR) of MLCC is lower at higher frequencies, above 100kHz. Consider Murata hi-cap as your tantalum capacitor replacement.



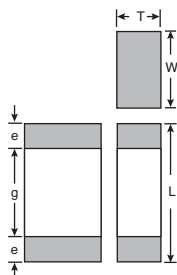
This product is RoHS compliant.

Recommended Capacitance of MLCC for Tantalum Cap. Replacement

Depending on the operating frequency, MLCC is equivalent to 1/2 to 1/10 capacitance value of tantalum cap. Because impedance (ESR) of MLCC is lower than tantalum cap. Refer to the impedance curve graph below.

Tantalum Cap.
1µF
2.2µF
4.7µF
10µF
22µF
47µF
100µF
220µF

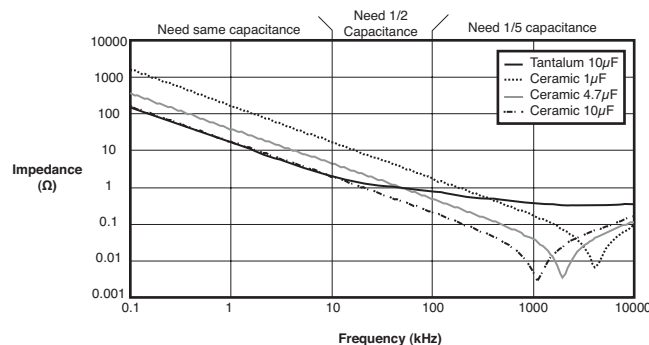
MLCC Recommended Cap.
0.1 to 0.47µF
0.22 to 1µF
0.47 to 2.2µF
1 to 4.7µF
2.2 to 10µF
4.7 to 22µF
10 to 47µF
22 to 100µF



RoHS Compliant

Impedance Curve of MLCC

It is important that capacitor's impedance is lower at ripple noise frequency.



Part No.	DIMENSIONS: mm				
	L	W	T	e Min.	g Min.
GRM155	1.0±0.05	0.5±0.05	0.5±0.05	0.15 to 0.35	0.3
GRM188	1.6±0.1	0.8±0.1	0.8±0.1	0.2 to 0.5	0.5
GRM219	2.0±0.1	1.25±0.1	0.85±0.1	0.2 to 0.7	0.7
GRM21B			1.25±0.1		
GRM319	3.2±0.15	1.6±0.15	0.85±0.1	0.3 to 0.8	1.5
GRM31M			1.15±0.1		
GRM31C	3.2±0.2	1.6±0.2	1.6±0.2	0.3	1.0
GRM32C			1.6±0.2		
GRM32D	3.2±0.3	2.5±0.2	2.0±0.2	0.3	2.0
GRM32E			2.5±0.2		
GRM32M	3.2±0.3	2.5±0.2	1.15±0.1	0.3	1.0
GRM32N			1.35±0.15		
GRM32R	4.5±0.4	3.2±0.3	1.8±0.2	0.3	2.0
GRM43E			2.5±0.2		
GRM43S	5.7±0.4	5.0±0.4	2.8±0.2	0.3	2.0
GRM55E			2.5±0.2		
GRM55R			1.8±0.2		

0402 Case Size

For quantities greater than listed, call for quote.

MOUSER STOCK NO.	Murata Part No.	Value (µF)	Volt (DC)	Tol.±	Temperature Coefficient	Price Each				Reel Qty.	Price Per Piece
						1	50	100	500		
81-GRM155R60J105KE19	GRM155R60J105KE19D	1.0	6.3	10%	X5R	.10	.04	.03	.016	10000	.007
81-GRM155R61A105KE15	GRM155R61A105KE15D	1.0	10	10%	X5R	.10	.028	.024	.02	10000	.011
81-GRM155F50J105ZE01	GRM155F50J105ZE01D	1.0	6.3	+80% -20%	Y5V	.10	.026	.022	.017	10000	.01

0603 Case Size

81-GRM188R70J105KA01	GRM188R70J105KA01D	1.0	6.3	10%	X7R	.22	.156	.14	.12	4000	.072
81-GRM188R71A105KA61	GRM188R71A105KA61D	1.0	10	10%	X7R	.22	.156	.14	.12	4000	.072
81-GRM188R71C105KA12	GRM188R71C105KA12D	1.0	16	10%	X7R	.22	.153	.137	.118	4000	.071
81-GRM399R105K6.3	GRM188R60J105KA01D	1.0	6.3	10%	X5R	.10	.026	.023	.019	4000	.01
81-GRM185R61A105KE36	GRM185R61A105KE36D	1.0	10	10%	X5R	.17	.118	.091	.046	4000	.025
81-GRM399R105K10	GRM188R61A105KA61D	1.0	10	10%	X5R	.15	.051	.038	.02	4000	.01
81-GRM185R61C105KE44	GRM185R61C105KE44D	1.0	16	10%	X5R	.09	.063	.057	.048	4000	.028
81-GRM399R105K16	GRM188R61C105KA93D	1.0	16	10%	X5R	.09	.04	.03	.016	4000	.009
81-GRM188R61E105KA12	GRM188R61E105KA12D	1.0	25	10%	X5R	.10	.035	.03	.025	4000	.017
81-GRM399Y105Z10D	GRM188F51C105ZA01D	1.0	10	+80%-20%	Y5V	.10	.025	.021	.017	4000	.009
81-GRM188F51C105ZA01	GRM188F51C105ZA01D	1.0	16	+80%-20%	Y5V	.10	.025	.021	.017	4000	.009
81-GRM188F51E105ZA12	GRM188F51E105ZA12D	1.0	25	+80%-20%	Y5V	.10	.038	.033	.019	4000	.011
81-GRM188R71A225KE15	GRM188R71A225KE15D	2.2	10	10%	X7R	.46	.261	.218	.139	4000	.074
81-GRM185R60J225KE26	GRM185R60J225KE26D	2.2	6.3	10%	X5R	.09	.065	.058	.05	4000	.03
81-GRM188R60J225KE19D	GRM188R60J225KE19D	2.2	6.3	10%	X5R	.10	.051	.046	.037	4000	.021
81-GRM188R61A225KE34	GRM188R61A225KE34D	2.2	10	10%	X5R	.10	.051	.046	.037	4000	.021
81-GRM188R61C225KE15	GRM188R61C225KE15D	2.2	16	10%	X5R	.23	.139	.111	.054	4000	.032
81-GRM188F50J225ZE01D	GRM188F50J225ZE01D	2.2	6.3	+80%-20%	Y5V	.10	.05	.045	.039	4000	.021
81-GRM188F51A225ZE01D	GRM188F51A225ZE01D	2.2	10	+80%-20%	Y5V	.10	.05	.045	.039	4000	.021
81-GRM188R60J475KE19D	GRM188R60J475KE19D	4.7	6.3	10%	X5R	.09	.063	.057	.048	4000	.028
81-GRM188F50J475ZE20D	GRM188F50J475ZE20D	4.7	6.3	+80%-20%	Y5V	.16	.112	.086	.044	4000	.023
81-GRM188F51A475ZE20D	GRM188F51A475ZE20D	4.7	10	+80%-20%	Y5V	.16	.112	.086	.044	4000	.023
81-GRM188R60G106ME47	GRM188R60G106ME47D	10	4	20%	X5R	.47	.27	.225	.144	4000	.077
81-GRM188R60J106ME47	GRM188R60J106ME47D	10	6.3	20%	X5R	.47	.27	.225	.144	4000	.076
81-GRM188R60G226ME0L	GRM188R60G226MEA0L	22	4	20%	X5R	.79	.475	.415	.297	4000	.149

0805 Case Size

81-GRM40X105K10L	GRM21BR71A105KA01L	1.0	10	10%	X7R	.18	.132	.101	.052	3000	.023
81-GRM40X105K16K	GRM21BR71C105KA01K	1.0	16	10%	X7R	.10	.051	.046	.037	10000	.018
81-GRM40X105K16L	GRM21BR71C105KA01L	1.0	16	10%	X7R	.10	.051	.046	.037	3000	.021
81-GRM21BR71E105KA99	GRM21BR71E105KA99L	1.0	25	10%	X7R	.27	.197	.148	.118	3000	.077
81-GRM21F51C105ZA01D	GRM21F51C105ZA01D	1.0	16	+80%-20%	Y5V	.10	.04	.035	.029	4000	.019
81-GRM40Y105Z16L	GRM21BF51C105ZA01L	1.0	16	+80%-20%	Y5V	.16	.099	.075	.039	3000	.016
81-GRM21F51E105ZA01D	GRM21F51E105ZA01D	1.0	25	+80%-20%	Y5V	.10	.04	.035	.029	4000	.019
81-GRM21F51H105ZA12L	GRM21BF51H105ZA12L	1.0	50	+80%-20%	Y5V	.15	.083	.064	.033	3000	.018
81-GRM21R60J225KA01L	GRM21BR60J225KA01L	2.2	6.3	10%	X5R	.10	.07	.063	.054	3000	.032
81-GRM21R61C225KA88L	GRM21BR61C225KA88L	2.2	16	10%	X5R	.15	.105	.094	.081	3000	.049
81-GRM21R61C225K88D	GRM21R61C225K88D	2.2	16	10%	X5R	.29	.20	.185	.163	4000	.097
81-GRM21R61E225K	GRM21R61E225KA12D	2.2	25	10%	X5R	.45	.254	.212	.135	4000	.106
81-GRM21R60J226ME39L	GRM21BR60J226ME39L	22	6.3	20%	X5R	.43	.232	.184	.105	3000	.064
81-GRM21BR71A225KA01	GRM21BR71A225KA01L	2.2	10	10%	X7R	.10	.07	.063	.054	3000	.032
81-GRM21BR71C225KA12L	GRM21BR71C225KA12L	2.2	16	10%	X7R	.18	.128	.114	.098	3000	.059
81-GRM21BR71E225KA73L	GRM21BR71E225KA73L	2.2	25	10%	X7R	.41	.285	.264	.232	3000	.138
81-GRM40Y5V225Z010AL	GRM21BF51A225ZA01L	2.2	10	+80%-20%	Y5V	.10	.052	.046	.04	3000	.024
81-GRM40Y5V225Z016AL	GRM21BF51C225ZA01L	2.2	16	+80%-20%	Y5V	.10	.052	.046	.04	3000	.024
81-GRM40Y225Z25L	GRM21BF51E225ZA01L	2.2	25	+80%-20%	Y5V	.09	.064	.058	.049	3000	.03
81-GRM21BR60J335K	GRM21BR60J335KA11L	3.3	6.3	10%	X5R	.34	.236	.217	.139	3000	.108