High Capacitance Chip - X7R, X5R

knowles
DLI•JohansonMFG•Novacap•Syfer•Voltronics

A range of High Capacitance value BME MLC chip capacitors, in stable Class II dielectrics X7R and X5R, with a spread of capacitance values offered up to 100µF.

Comparable circuit designs can be achieved at typically a third to a fifth of the capacitance values because of the low ESR characteristics these parts exhibit. As a consequence they are also ideal to replace Tantalum and Low ESR Electrolytic Capacitors without polarity concerns. They find application as power supply bypass capacitors, smoothing capacitors, input/output filters in DC-DC Converters and in digital circuits and LCD modules.

Parts are RoHS Compliant and suitable for reflow soldering process.

- Nickel Barrier terminations with tin, tin/lead or gold flash
- Capacitance tolerances available: ±10%, ±20%
- Available with high reliability screening. Contact the Knowles Capacitors Sales Office for details

Capacitance values - High Capacitance Chip

Size	0402		0603		0805		1206		1210				1812	
Tmax inches: mm:	0.024 0.61		0.035 0.89		0.054 1.37		0.072* 1.83		0.085* 2.16		0.110* 2.79		0.110* 2.79	
Dielectric	X7R	X5R	X7R	X5R	X7R	X5R	X7R	X5R	X7R	X5R	X7R	X5R	X7R	X5R
4V				22µF†				100µF†						-
6.3V	470nF	1µF 2.2µF† 4.7µF†		4.7µF 10µF†		22µF†		47µF†		47µF†	47µF†	100µF†		-
10V		1µF	2.2µF	4.7µF 10µF†	10µF†	10µF	22µF†	22µF†		22µF†		47µF†		-
16V	15nF 22nF 33nF 47nF 100nF 220nF	220nF 470nF 100nF 220nF 470nF	100nF 1µF	2.2µF 4.7µF	470nF 1.0µF 2.2µF 4.7µF†	4.7µF 10µF	10µF	10µF 22µF†	4.7µF† 10µF†			22µF†		-
25V	6.8nF 10nF 47nF 100nF	10nF 220nF	470nF 1.0µF	220nF 470nF 1.0µF 2.2µF	1.0µF 2.2µF 4.7µF	2.2µF 4.7µF	2.2µF 4.7µF 10µF	4.7µF 10µF	3.3µF† 4.7µF†	4.7µF† 10µF†	22µF†			-
35V										2.2µF† 4.7µF†		10µF		-
50V	10nF	100nF	220nF 470nF	100nF 470nF 1.0µF	220nF 470nF 1.0µF	220nF 470nF 1.0µF 2.2µF	470nF 1.0µF 2.2µF 4.7µF	4.7µF	1.0µF		4.7µF†	4.7µF† 10µF†		-
100V			100nF		220nF		1.0µF		1.0µF 2.2µF				1.0µF 2.2µF	-

* Denotes non standard chip thickness. Order code needs to have an 'X' inserted together with the dimension in inches -e.g. X072 where dimension is 0.072".

† Denotes only available in ±20% capacitance tolerance

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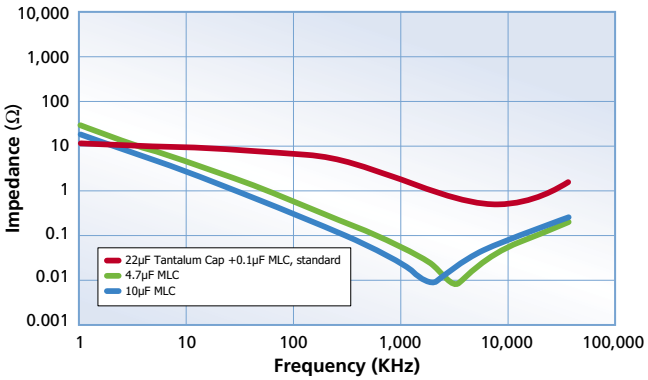
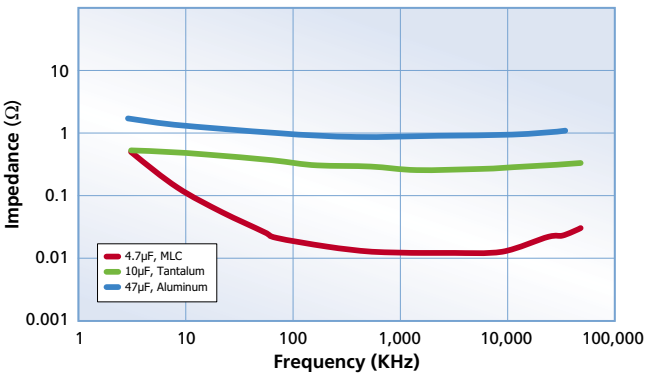
Comparison with other dielectric capacitors

Impedance Curves



ESR Characteristics



Dielectric characteristics

	X7R (BB) Stable	X5R (BW) Stable
Operating temperature range:	-55°C to 125°C	-55°C to 85°C
Temperature coefficient:	±15% ΔC Max.	±15% ΔC Max.
Dissipation factor:	3.5% max except: 0402 ≥ 0.1µF = 5%, 0603 ≥ 0.22µF = 10%, 0805 ≥ 1.0µF = 5%, 0805 ≥ 2.2µF = 10%, 1206 ≥ 2.2µF = 10%, 1210 ≥ 4.7µF = 5%, 1210 ≥ 22µF = 10%	5% max except: 0402 ≥ 1.0µF = 10%, 0603 ≥ 1.0µF = 10%, 0805 ≥ 4.7µF = 10%, 1206 ≥ 4.7µF = 10%, 1210 ≥ 10µF = 10%
Insulation resistance @25°C:	>10GΩ or >100ΩF whichever is less	>10GΩ or >100ΩF whichever is less
Dielectric withstanding voltage:	250%	250%
Ageing Rate:	X7R 3.5% typical	X5R 5% typical
Test parameters @ 25°C:	1KHz, 1.0 ±0.2 VRMS	1KHz, 1.0 ±0.2 VRMS 120Hz, 0.5 ±0.1 VRMS for 22µF, 47µF & 100µF

Ordering information - High Capacitance Chip Capacitors

1206	W	476	K	6R3	N	X080	T
Chip sizes	Dielectric	Capacitance	Tolerance	Voltage-VDCW	Termination	Thickness option	Packing
0402 **0603** **0805** **1206** **1210** **1812**	BB* = X7R BW*= X5R *Formerly B & W codes	Value in Picofarads. Two significant figures, followed by number of zeros: **476** = 47µF (47,000,000pF)	**K** = ± 10% **M** = ± 20%	Two significant figures, followed by number of zeros. R denotes decimal point: **6R3** = 6.3V **501** = 500V	**N** = Nickel Barrier (100% tin) **Y** = Nickel Barrier (90% tin/10% lead) **NG** = Nickel Barrier Gold Flash	Blank = Standard thickness **X** = special thickness, specified in inches: **X085** = 0.085"	No suffix = Bulk **T** = Tape & Reel

Note: BME parts available with added high reliability test. Consult the factory.

Should be ordered as Novacap parts.