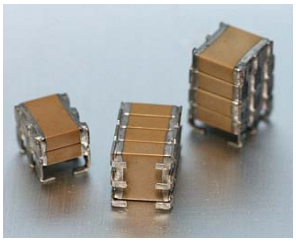
Multilayer Ceramic Chip Capacitors [Stacked Capacitors]

SMC Series



MLCC Design, Suitable for Switchmode Power Supply Filters

◆ Features

- ❑ Stacked design offers the high capacitance similar to Tantalum but with extremely low ESR advantage.
- ❑ 'J', 'L' and 'N' Leaded configuration provide mechanical and thermal stress relief.
- ❑ Capacitance values up to 34μF
- ❑ Voltage from 50V to 1000V.
- ❑ Available in NP0 and X7R dielectrics .
- ❑ HIREL screening available.
- ❑ RoHS compliant.

◆ Application

- ❑ Power supplies
- ❑ DC-DC converters
- ❑ Surge protection
- ❑ Industrial control circuits
- ❑ Snubbers
- ❑ Filtering, smoothing, and decoupling application
- ❑ HIREL applications
- ❑ Custom applications

◆ Summary of Specifications

Operating Temperature	-55 to +125 ℃
Rated Voltage	50Vdc to 1000Vdc
Temperature Coefficient of Capacitance	NPO : ≤ ± 30ppm/ ℃ , -55 to +125 ℃ (EIA Class Ⅰ)
	X7R : ≤ ± 15% , -55 to +125 ℃ (EIA Class Ⅱ)
Capacitance Range	NPO: 1.0nF to 400nF
	X7R : 27nF to 34uF
Dissipation Factor :	NPO : Q≧ 1000 at 1KHz
	X7R : 2.5%max. at 1KHz
Insulation Resistance	10GΩ or 500/C Ω whichever is smaller
Aging	NPO : 0% , X7R : 2.5% per decade of time
Dielectric Withstanding Voltage	V ≤50V ; 250% Rated Voltage
	100V ≤ V <500V ; 200% Rated Voltage
	500V ≤ V <1KV ; 150% Rated Voltage
	1000V = 120% Rated Voltage
Tolerance	± 1% & ± 2% tolerances are only available in NPO

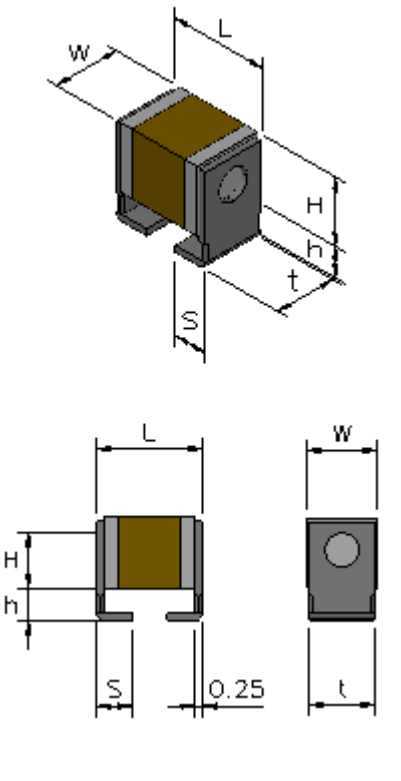
◆ How To Order

SMC	49	J	X	224	K	501	T	H	01

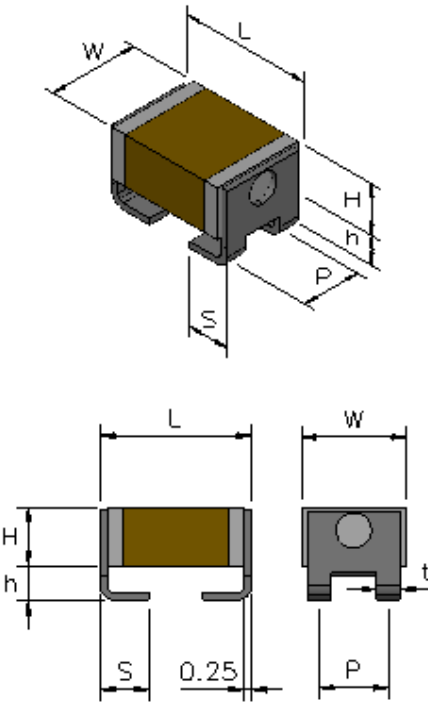
Product Code	Stack and Size	Lead Configuration	Material	Capacitance (pF)	Tolerance	Rated Voltage	Packaging	Special test Requirement	Special Requirement
SMC: Commercial Size Switchmode Stack Capacitor	The first digit: # of chips in stack Second Digit: Chip Size 5: 1210 6: 1812 7: 2220 8: 1825 9: 2225	Ex.: J :J Lead for h=0.070" L :L Lead for h=0.070" N:Straight Lead P :J Lead for h=0.045" S:L Lead for h=0.045"	Ex.: N: NPO X: X7R	Ex.: 103:10x10^3 224:22x10^4 475:47x10^5	Ex.: F: +/-1.0% G: +/-2.0% J: +/-5.0% K: +/- 10% M: +/- 20%	Ex.: 050: 50Vdc 101: 100Vdc 201: 200Vdc 501: 500Vdc 102:1000Vdc	B: Bulk T:Tape&Reel W: Waffle pack	Blank: Standard electrical test H: Hi-Rel Testing	Blank: No special requirement 01~99: Customer special requirement

◆ Dimensions

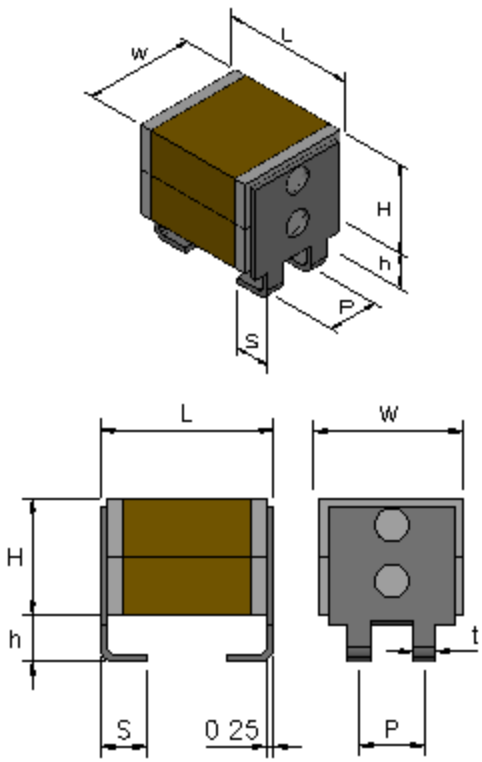
1210 Size



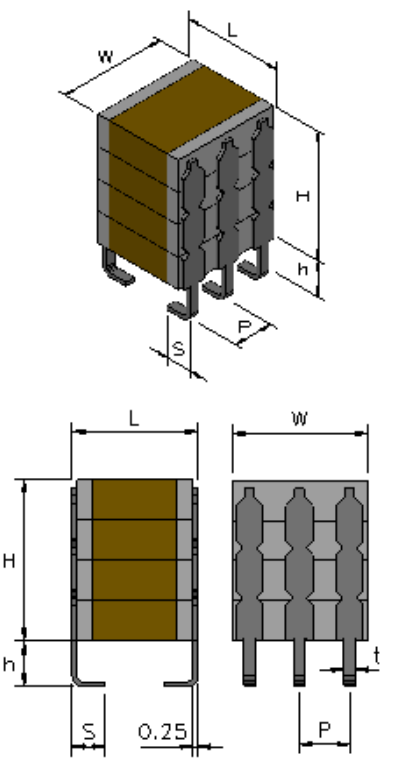
1812 Size



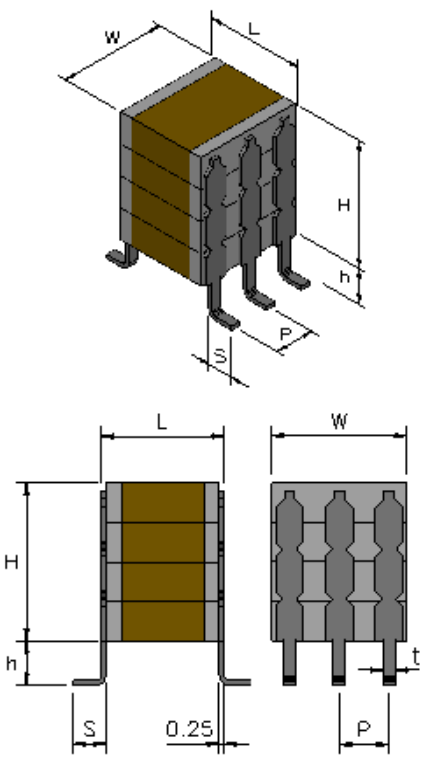
2220 Size



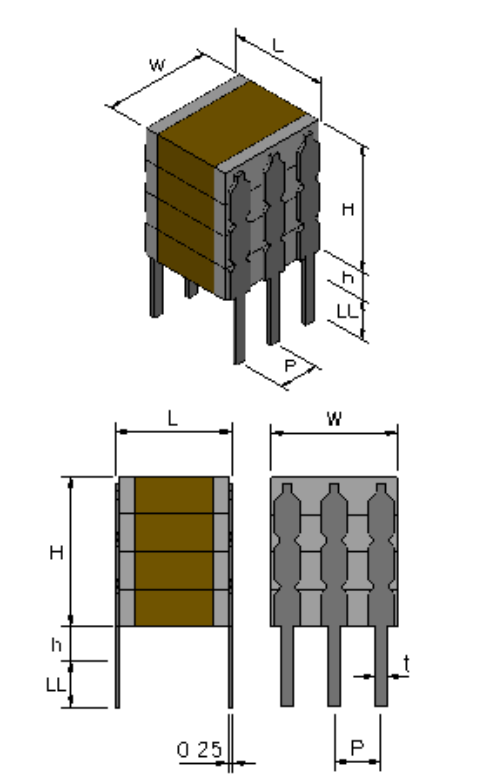
1825/2225 J Type



1825/2225 L Type



1825/2225 N Type



Unit : mm [inches]

EIA Size Code	1210		1812		2220		1825	
Size Code	15	25	16	26	17	27	18	28
L	3.80 Max [.150 Max]	3.80 Max [.150 Max]	5.50 Max [.217 Max]	5.50 Max [.217 Max]	6.50 Max [.256 Max]	6.50 Max [.256 Max]	5.35±0.50 [.210±.020]	5.35±0.50 [.210±.020]
W (max.)	2.90 [.114]	2.90 [.114]	4.00 [.157]	4.00 [.157]	5.50 [.217]	5.50 [.217]	6.85 [.270]	6.85 [.270]
H(max.)	2.15 [.083]	4.30 [.165]	2.10 [.083]	4.20 [.165]	2.10 [.083]	4.20 [.165]	2.54 [.100]	5.08 [.200]
S	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]
P			2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]
h* (Typical)	1.30 Max [.051 Max]	1.30 Max [.051 Max]	1.30 Max [.051 Max]	1.30 Max [.051 Max]	1.30 Max [.051 Max]	1.30 Max [.051 Max]	1.78 [.070]	1.78 [.070]
h* (P/S Type)							1.14 [.045]	1.14 [.045]
LL** (min.)					2.54 [.100]	2.54 [.100]	2.54 [.100]	2.54 [.100]
t	2.25±0.1 [.089±.004]	2.25±0.1 [.089±.004]	0.50±0.05 [.020±.002]	0.50±0.05 [.020±.002]	0.50±0.10 [.020±.004]	0.50±0.10 [.020±.004]	0.50±0.10 [.020±.004]	0.50±0.10 [.020±.004]
# of leads per side	1	1	2	2	2	2	3	3

EIA Size Code	1825			2225				
Size Code	38	48	58	19	29	39	49	59
L	5.35±0.50 [.210±.020]	5.35±0.50 [.210±.020]	5.35±0.50 [.210±.020]	6.35±0.50 [.250±.020]	6.35±0.50 [.250±.020]	6.35±0.50 [.250±.020]	6.35±0.50 [.250±.020]	6.35±0.50 [.250±.020]
W (max.)	6.85 [.270]	6.85 [.270]	6.85 [.270]	6.85 [.270]	6.85 [.270]	6.85 [.270]	6.85 [.270]	6.85 [.270]
H(max.)	7.62 [.300]	10.16 [.400]	12.7 [.500]	2.54 [.100]	5.08 [.200]	7.62 [.300]	10.16 [.400]	12.70 [.500]
S	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]	1.65±0.50 [.065±.020]
P	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]	2.54±0.25 [.100±.010]
h* (Typical)	1.78 [.070]	1.78 [.070]	1.78 [.070]	1.78 [.070]	1.78 [.070]	1.78 [.070]	1.78 [.070]	1.78 [.070]
h* (P/S Type)	1.14 [.045]	1.14 [.045]	1.14 [.045]	1.14 [.045]	1.14 [.045]	1.14 [.045]	1.14 [.045]	1.14 [.045]
LL** (min.)	2.54 [.100]	2.54 [.100]	2.54 [.100]	2.54 [.100]	2.54 [.100]	2.54 [.100]	2.54 [.100]	2.54 [.100]
t	0.50±0.10 [.020±.004]	0.50±0.10 [.020±.004]	0.50±0.10 [.020±.004]	0.50±0.10 [.020±.004]	0.50±0.10 [.020±.004]	0.50±0.10 [.020±.004]	0.50±0.10 [.020±.004]	0.50±0.10 [.020±.004]
# of leads per side	3	3	3	3	3	3	3	3

- * 'h' varies depends on the lead style. See lead configuration above
- ** "LL" Applies only to Straight (N) leads

◆ Capacitance Range

EIA Chip Size	Size Code	NPO Maximum Capacitance					X7R Maximum Capacitance				
		50V	100V	200V/250V	500V	1000V	50V	100V	200V/250V	500V	1000V
1210	15 (1×Cap)	183	103	822	222	102	125	105	224	683	273
	25 (2×Cap)	363	203	163	442	204	245	205	444	134	543
1812	16 (1×Cap)	293	183	123	822	562	335	155	824	154	683
	26 (2×Cap)	583	363	243	163	113	665	305	165	304	134
2220	17 (1×Cap)	623	543	453	393	123	475	335	155	274	823
	27 (2×Cap)	124	104	903	783	243	945	665	305	544	164
1825	18 (1×Cap)	653	563	473	393	123	475	335	155	274	823
	28 (2×Cap)	134	114	943	783	243	945	665	305	544	164
	38 (3×Cap)	194	164	144	114	363	146	995	455	814	244
	48 (4×Cap)	264	224	184	154	483	186	136	605	105	324
	58 (5×Cap)	324	284	234	194	603	236	166	755	135	414
2225	19 (1×Cap)	813	653	563	473	153	685	475	225	394	104
	29 (2×Cap)	164	134	114	943	303	136	945	445	784	204
	39 (3×Cap)	244	194	164	144	453	206	146	665	115	304
	49 (4×Cap)	324	264	224	184	603	276	186	885	155	404
	59 (5×Cap)	404	324	284	234	753	346	236	116	195	504

- ***Other Stacked configuration on other sizes, capacitance values and voltages rating are available. Please contact HEC.***

***Soldering And Handling Precautions:**

The recommended method for soldering large SMC capacitor, is reflow soldering. Wave soldering and manual soldering with Iron is not recommended. Ceramic capacitors must be preheated with less than 2ºC/sec rate to about 50ºC below the reflow temperature. Sudden increase, or decrease in temperature more than the recommended rate, during soldering, may cause internal thermal cracks.