

Capacitor Assemblies - ST & SM

These ranges of both High Capacitance and High Voltage MLC assemblies are available in COG and X7R dielectrics.

Low ESR and Low ESL are inherent in the design giving the assemblies a high capability up to 1MHz and offer far superior performance than either Aluminum or Tantalum electrolytic capacitors.

They are designed for use in high power or high frequency applications such as switched mode power supplies, DC-DC converters, high capacitance discharge circuits, high temperature filtering/decoupling.

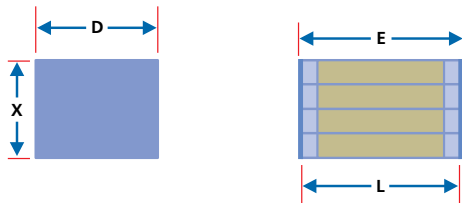
They can be made with up to five same size chips with various lead configurations to safeguard against thermal and mechanical stresses.

The commercial 'ST' series provide the highest capacitance available and are 100% tested for Dielectric Withstanding Voltage, Insulation Resistance, Capacitance, and Dissipation Factor.

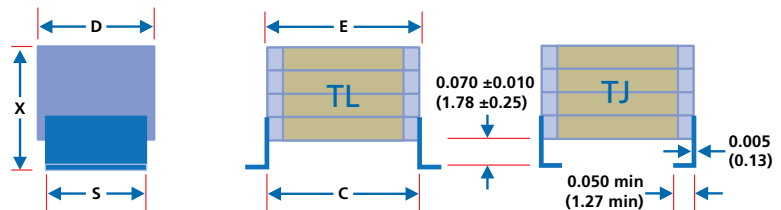
In contrast, the High Reliability 'SM' series is designed and tested for military and industrial applications and tested as per of MIL-PRF-49470 (DSCC 87106), Group A.

Dimensions - inches/mm

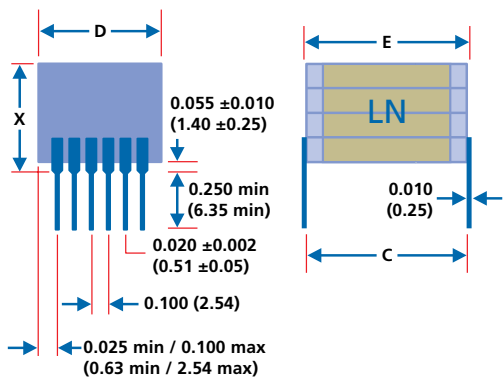
NN or NP (no leads)



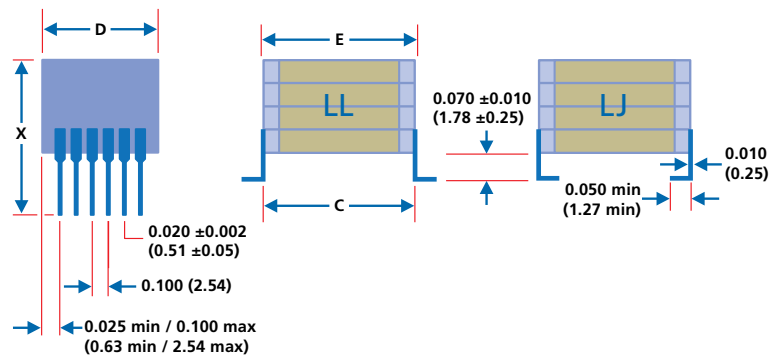
TJ & TL (tab leads)



LN (straight wire leads)



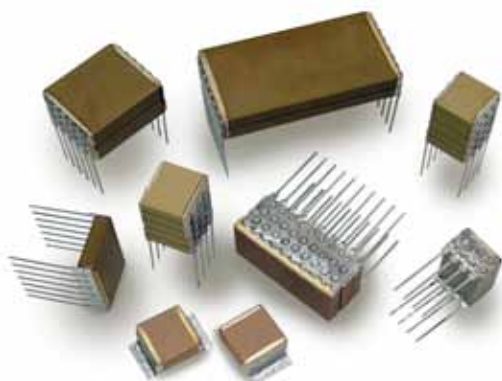
LJ & LL (bent wire leads)



Size	1812	1825	2225	3640	4540	5550	7565
C inches ± 0.025 /mm ± 0.64 :	0.210/5.33	0.210/5.33	0.250/6.35	0.400/10.20	0.480/12.20	0.580/14.70	0.780/19.80
D inches ± 0.025 /mm ± 0.64 :	0.125/3.18	0.250/6.35	0.250/6.35	0.400/10.20	0.400/10.20	0.500/12.70	0.650*/16.50
E max inches/mm:	0.260/6.60	0.260/6.60	0.300/7.62	0.430/10.90	0.530/13.50	0.630/16.00	0.830/21.10
L nom inches/mm:	0.180/4.57	0.180/4.57	0.220/5.59	0.360/9.14	0.450/11.40	0.550/14.00	0.750/19.10
Leads per side	N/A	3	3	4	4	5	6

* ± 0.035 /1.89

Capacitor Assemblies - ST & SM



Our complete testing facility is available for any additional military testing requirements.

Options available include thru-hole and surface mount lead styles, to make them suitable for mounting on ceramic substrates or epoxy PCBs.

Consult the Sales Office if your specific requirements exceed our catalog maximums (size, cap. value, and voltage).

Maximum stack height, X dimension - inches/mm

No. of chips	Chip size	Style NN, NP	Style TJ & TL	Style LN, LJ & LL
1	1812	0.100/2.54	0.180/4.57	N/A
	1825	0.100/2.54	0.180/4.57	0.180/4.57
	2225	0.120/3.05	0.200/5.08	0.200/5.08
	>2225	N/A	0.200/5.08	0.200/5.08
2	1812	0.200/5.08	0.280/7.11	N/A
	1825	0.200/5.08	0.280/7.11	0.280/7.11
	2225	0.240/6.10	0.320/8.13	0.320/8.13
	>2225	N/A	0.320/8.13	0.320/8.13
3	812	0.300/7.62	0.380/9.65	N/A
	1825	0.300/7.62	0.380/9.65	0.380/9.65
	2225	0.360/9.14	0.440/11.2	0.440/11.20
	>2225	N/A	0.440/11.2	0.440/11.20
4	1812	0.400/10.20	0.480/12.2	N/A
	1825	0.400/10.20	0.480/12.2	0.480/12.20
	2225	0.480/12.20	0.560/14.2	0.560/14.20
	>2225	N/A	0.560/14.2	0.560/14.20
5	1812	0.520/13.20	0.600/15.2	N/A
	1825	0.520/13.20	0.600/15.2	0.600/15.2
	2225	0.635/16.10	0.715/18.2	0.715/18.2
	>2225	N/A	0.715/18.2	0.715/18.2

How to Order - ST & SM Capacitor Assemblies

ST	3640	B	474	M	101	LJ	X	W	5
STYLE ST = Commercial SM = High Reliability	SIZE See Chart	DIELECTRIC N = COG B = X7R	CAPACITANCE Value in Picofarads. Two significant figures, followed by number of zeros: 825 = 8,200,000pF (8.2μF)	TOLERANCE F = ±1%* G = ±2%* H = ±3%* J = ±5% K = ±10% M = ±20% Z = +80 -20% P = +100 -0% *COG only	VOLTAGE-VDCW Two significant figures, followed by number of zeros: 101 = 100V	LEAD STYLE LN = Straight* LL = L Lead* LJ = J Lead* TL = L Tab TJ = J tab NN = Nickel* NP = Pd/Ag *Not 1812	THICKNESS OPTION Specify standoff dimension if less than max.	PACKING W = Waffle T = Tape & Reel* *Consult the sales office	No. Chips 1 to 5

[illegible]

Note: Capacitance values are shown as 3 digit code: 2 significant figures followed by the no. of zeros e.g. 183 = 18,000pF.

Capacitance Values



Size	1812								1825								2225								3640								Size
Vdc	50V		100V		200V		500V		50V		100V		200V		500V		50V		100V		200V		500V		50V		100V		200V		500V		Vdc
Type	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	ST	SM	Type		
102	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	102		
122	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	122		
152	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	152		
182	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	182		
222	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	222		
272	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	272		
332	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	332		
392	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	392		
472	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	472		
562	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	562		
682	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	682		
822	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	822		
103	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	103		
123	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	123		
153	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	153		
183	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	183		
223	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	223		
273	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	273		
333	1	1	1	1</																													

Note: Capacitance values are shown as 3 digit code: 2 significant figures followed by the no. of zeros e.g. 183 = 18,000pF.

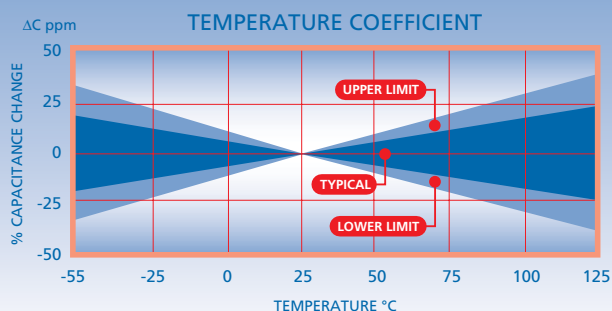
Capacitance Values



Dielectric Characteristics

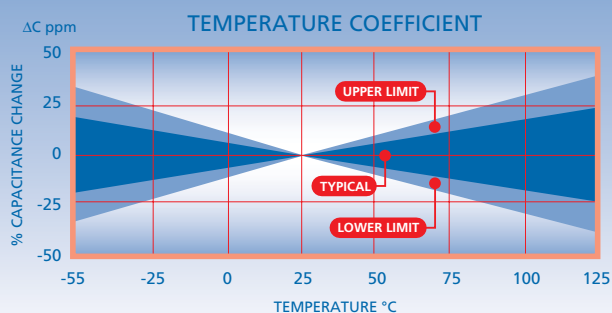
C0G/NP0 (N) Ultra Stable and RoHS 2013 (RN) type

Operating temperature range:	-55°C to 125°C
Temperature coefficient:	0 ±30 ppm/°C
Dissipation factor:	0.1% max @ 25°C
Insulation resistance	@25°C: >100GΩ or >1000ΩF whichever is less @125°C: >10GΩ or >100ΩF whichever is less
Dielectric withstanding voltage	≤200V: 250% 201-500V: 150% or 500V whichever is greater >500V: 120% or 750V whichever is greater
Ageing rate:	0% per decade
Test parameters:	1KHz, 1.0 ±0.2 VRMS, 25°C 1MHz for Capacitance ≤100pF



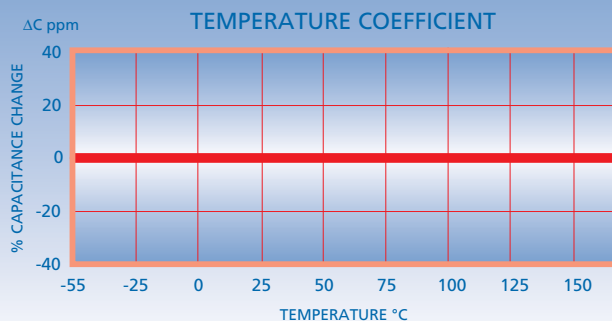
C0G/NP0 (M) Ultra Stable Non Magnetic

Operating temperature range:	-55°C to 125°C
Temperature coefficient:	0 ±30 ppm/°C
Dissipation factor:	0.1% max @ 25°C
Insulation resistance	@25°C: >1000ΩF or >10000ΩF whichever is less @125°C: >100ΩF or >1000ΩF whichever is less
Dielectric withstanding voltage	≤200V: 250% 201-500V: 150% or 500V whichever is greater >500V: 120% or 750V whichever is greater
Ageing rate:	0% per decade
Test parameters:	1KHz, 1.0 ±0.2 VRMS, 25°C 1MHz for Capacitance ≤100pF



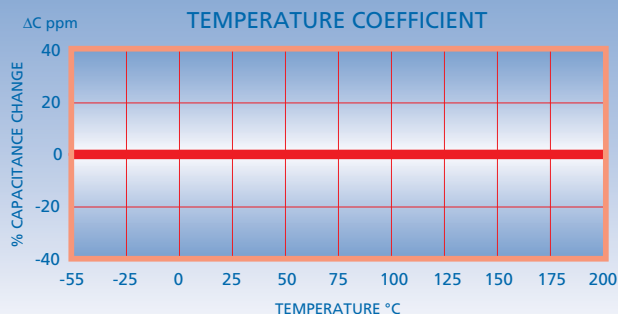
C0G/NP0 (F) Ultra Stable High Temperature (up to 160°C)

Operating temperature range:	-55°C to 160°C
Temperature coefficient:	0 ±30 ppm/°C
Dissipation factor:	0.1% max @ 25°C
Insulation resistance	@25°C: >100GΩ or >1000ΩF whichever is less @160°C: >1GΩ or >10ΩF whichever is less
Dielectric withstanding voltage	≤200V: 250% 201-500V: 150% or 500V whichever is greater >500V: 120% or 750V whichever is greater
Ageing rate:	0% per decade
Test parameters:	1KHz, 1.0 ±0.2 VRMS, 25°C 1MHz for Capacitance ≤100pF



C0G/NP0 (D) Ultra Stable High Temperature (up to 200°C)

Operating temperature range:	-55°C to 200°C
Temp. coefficient ≤200°C:	0 ±30 ppm/°C
Dissipation factor @ 25°C:	0.1% Max.
Insulation resistance	@25°C: >100GΩ or >1000ΩF whichever is less @200°C: >1GΩ or >10ΩF whichever is less
Dielectric withstanding voltage	≤200V: 250% 201-500V: 150% or 500V whichever is greater >500V: 120% or 750V whichever is greater
Ageing rate:	0% per decade
Test parameters:	1KHz, 1.0 ±0.2 VRMS, 25°C 1MHz for capacitance ≤100pF

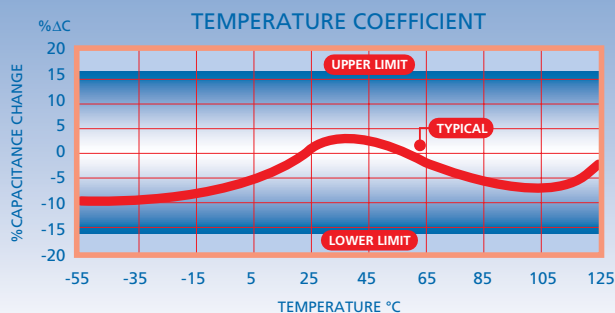




Dielectric Characteristics

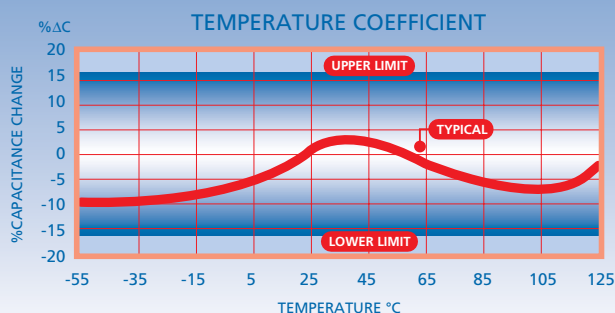
X7R (B) Stable and RoHS 2013 (RB) type

Operating temperature range:	-55°C to 125°C
Temperature coefficient :	±15% ΔC Max.
Dissipation factor	>25V rating: 2.5% max ≤25V rating: 3.5% max
Insulation resistance:	@25°C: >100GΩ or >1000ΩF whichever is less @125°C: >10GΩ or >100ΩF whichever is less
Dielectric withstanding voltage	≤200V: 250% 201-500V: 150% or 500V whichever is greater >500V: 120% or 750V whichever is greater
Ageing rate:	<2.0% per decade
Test parameters:	1KHz, 1.0 ±0.2 VRMS, 25°C



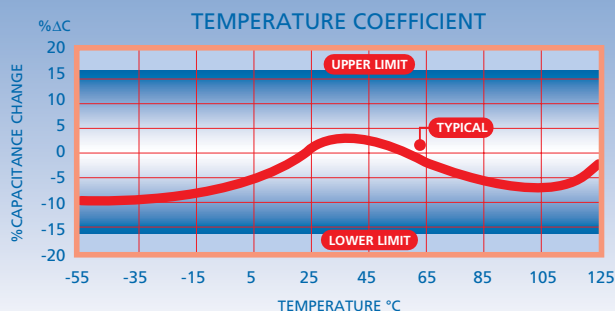
X7R (C) Stable Non Magnetic

Operating temperature range:	-55°C to 125°C
Temperature coefficient:	±15% ΔC Max.
Dissipation factor	>25V rating: 2.5% max ≤25V rating: 3.5% max
Insulation resistance:	@25°C: >100GΩ or >1000ΩF whichever is less @125°C: >10GΩ or >100ΩF whichever is less
Dielectric withstanding voltage	≤200V: 250% 201-500V: 150% or 500V whichever is greater >500V: 120% or 750V whichever is greater
Ageing rate:	<2.0% per decade
Test parameters:	1KHz, 1.0 ±0.2 VRMS, 25°C



BX (X) Stable

Operating temperature range:	-55°C to 125°C
Temperature coefficient:	±15% ΔC Max.
Temp-voltage coefficient:	+15% -25% ΔC Max.
Dissipation factor	>25V rating: 2.5% max ≤25V rating: 3.5% max
Insulation resistance:	@25°C: >100GΩ or >1000ΩF whichever is less @125°C: >10GΩ or >100ΩF whichever is less
Dielectric withstanding voltage	≤200V: 250% 201-500V: 150% or 500V whichever is greater >500V: 120% or 750V whichever is greater
Ageing rate:	<2.0% per decade
Test parameters:	1KHz, 1.0 ±0.2 VRMS, 25°C



X8R (S) Stable

Operating temperature range:	-55°C to 150°C
Temp. coefficient ≤150°C:	±15% ΔC Max.
Dissipation factor	>25V rating: 2.5% max ≤25V rating: 3.5% max
Insulation resistance	@25°C: >100GΩ or >1000ΩF whichever is less @150°C: >10GΩ or >100ΩF whichever is less
Dielectric withstanding voltage	≤200V: 250% 201-500V: 150% or 500V whichever is greater >500V: 120% or 750V whichever is greater
Ageing rate:	<2.0% per decade
Test parameters:	1KHz, 1.0 ±0.2 VRMS, 25°C

