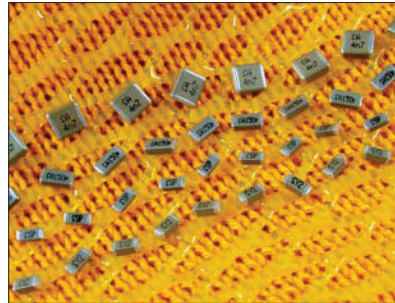


Safety Certified capacitors

Syfer Technology's Safety Certified capacitors comply with international UL and TÜV specifications to offer designers the option of using a surface mount ceramic multilayer capacitor to replace leaded film types. Offering the benefits of simple pick-and-place assembly, reduced board space required and lower profile, they are also available in a FlexiCap™ version to reduce the risk of mechanical cracking.

Syfer's high voltage capacitor expertise means the range offers among the highest range available of capacitance values in certain case sizes. Applications include: modems, AC-DC power supplies and where lightning strike or other voltage transients represent a threat to electronic equipment.

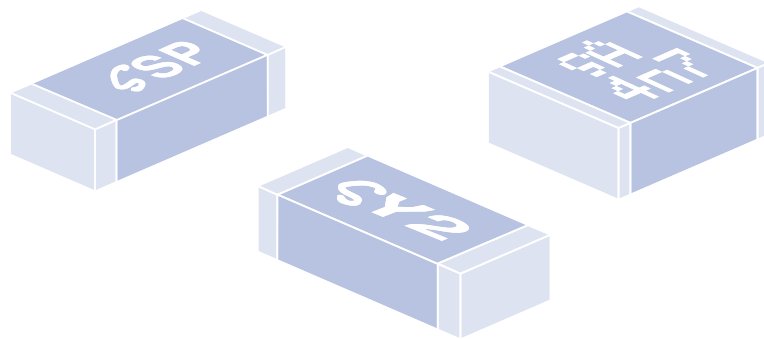
- Surface mount multilayer ceramic capacitors
- Meet Class Y2/X1, Y3/X2 and X2 requirements
- Approved for mains ac voltages, up to 250Vac
- Approved by UL and TÜV
- Sizes 1808, 1812, 2211, 2215 and 2220
- Smaller sizes suitable for use in equipment certified to EN60950



- Certification specifications for larger sizes include IEC/EN60384, UL/CSA60950 and UL1414
- Surface mount package
- Reduces board area and height restrictions
- Reduced assembly costs over conventional through hole components
- FlexiCap™ option available on all sizes.

Class	Rated voltage	Impulse voltage	Insulation bridging	May be used in primary circuit
Y1	250Vac	8000V	Double or reinforced	Line to protective earth
Y2	250Vac	5000V	Basic or supplementary*	Line to protective earth
Y3	250Vac	None	Basic or supplementary	-
Y4	150Vac	2500V	Basic or supplementary*	Line to protective earth
X1	250Vac	4000V	-	Line to line
X2	250Vac	2500V	-	Line to line
X3	250Vac	None	-	Line to line

* 2 x Y2 or Y4 rated may bridge double or reinforced insulation when used in series.



Safety Certified capacitors classification and approval specification.

CHIP SIZE	DIELECTRIC	CAP RANGE	SYFER FAMILY CODE	CLASSIFICATION	APPROVAL SPECIFICATION	APPROVAL BODY
1808	COG/NPO	4.7pF to 1.5nF	SP ⁽¹⁾	Y3/X2 NWGQ2, NWGQ8	IEC60384-14:2005 EN60384-14:2005 UL-60950-1, 2nd Ed CSA 60950-1-07 2nd Ed	TÜV UL
1808	X7R	150pF to 2.2nF	SP ⁽¹⁾	Y3/X2 NWGQ2, NWGQ8	IEC60384-14:2005 EN60384-14:2005 UL-60950-1, 2nd Ed CSA 60950-1-07 2nd Ed	TÜV UL
1808	COG/NPO	4.7pF to 390pF	PY2 ⁽¹⁾	Y2/X1 NWGQ2, NWGQ8	IEC60384-14:2005 EN60384-14:2005 UL-60950-1, 2nd Ed CSA 60950-1-07 2nd Ed	TÜV UL
1808	X7R	150pF to 1nF	PY2 ⁽¹⁾	Y2/X1 NWGQ2, NWGQ8	IEC60384-14:2005 EN60384-14:2005 UL-60950-1, 2nd Ed CSA 60950-1-07 2nd Ed	TÜV UL
1812	COG/NPO	4.7pF to 390pF	PY2 ⁽¹⁾	Y2/X1 NWGQ2, NWGQ8	IEC60384-14:2005 EN60384-14:2005 UL-60950-1, 2nd Ed CSA 60950-1-07 2nd Ed	TÜV UL
1812	X7R	150pF to 1.0nF	PY2 ⁽¹⁾	Y2/X1 NWGQ2, NWGQ8	IEC60384-14:2005 EN60384-14:2005 UL-60950-1, 2nd Ed CSA 60950-1-07 2nd Ed	TÜV UL
2211	COG/NPO	4.7pF to 1nF	SP ⁽²⁾	Y2/X1 NWGQ2, NWGQ8	IEC60384-14:2005 EN60384-14:2005 UL-60950-1, 2nd Ed CSA 60950-1-07 2nd Ed	TÜV UL
2211	X7R	100pF to 2.2nF	SP ⁽²⁾	Y2/X1 NWGQ2, NWGQ8	IEC60384-14:2005 EN60384-14:2005 UL-60950-1, 2nd Ed CSA 60950-1-07 2nd Ed	TÜV UL
2215	COG/NPO	820pF to 1.0nF	SP ⁽²⁾	Y2/X1 NWGQ2, NWGQ8	IEC60384-14:2005 EN60384-14:2005 UL-60950-1, 2nd Ed CSA 60950-1-07 2nd Ed	TÜV UL
2215	X7R	2.7nF to 3.3nF	SP ⁽²⁾	Y2/X1 NWGQ2, NWGQ8	IEC60384-14:2005 EN60384-14:2005 UL-60950-1, 2nd Ed CSA 60950-1-07 2nd Ed	TÜV UL
2220	X7R	150pF to 4.7nF	B16	Y2/X1 ⁽²⁾ Y2/X1, ⁽¹⁾ FOWX2	IEC60384-14:2005 EN60384-14:2005 UL1414: 6th Edition	TÜV UL
2220	X7R	150pF to 10nF	B17 ⁽²⁾	X2	IEC60384-14:2005 EN60384:2005	TÜV

Notes Termination Availability

- (1), (2) J: Silver base with Nickel Barrier (100% Matte Tin Plating). RoHS compliant.
 (1), (2) Y: FlexiCap™ termination base with Nickel Barrier (100% Tin Plating). RoHS compliant.
 (2) H: FlexiCap™ termination base with Nickel Barrier (Tin/ Lead plating with min 10% Lead).
 (2) A: Silver base with Nickel Barrier (Tin/ Lead Plating with min 10% Lead).
 PY2 Unmarked capacitors also available as released in accordance with approval specifications. Family code SY2 applies.
 SP Unmarked capacitors also available as released in accordance with approval specifications. Family code SPU applies.




Safety Certified capacitors

Ordering information


Ordering information - Safety Certified capacitors - Class SPU/SP ranges

1808	J	A25	0102	J	C	T	SP
Chip size	Termination	Voltage	Capacitance in pifarads (pF)	Capacitance tolerance	Dielectric codes	Packaging	Suffix
1808 2211 2215	J = Nickel barrier Y = FlexiCap™ termination base with nickel barrier (100% matte tin plating). RoHS compliant. 2211/2215 only: A = Silver base with nickel barrier (Tin/lead plating with min. 10% lead). H = FlexiCap™ termination base with Ni barrier (Tin/lead plating with min. 10% lead).	A25 = 250Vac	First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is number of zeros following. Example: 0102 = 1.0nF	<10pF C = ±0.25pF D = ±0.5pF >10pF F = ±1% G = ±2% J = ±5% K = ±10% M = ±20%	C = COG/NPO X = X7R	T = 178mm (7") reel R = 330mm (13") reel B = Bulk pack - tubs	SP = Surge Protection capacitors (marked and approved) SPU = Surge Protection capacitors (un-marked parts are in accordance with, but not certified)




Ordering information - Safety Certified capacitors - Class PY2/SY2

1808	J	A25	0102	J	X	T	PY2
Chip size	Termination	Voltage	Capacitance in pifarads (pF)	Capacitance tolerance	Dielectric codes	Packaging	Suffix
1808 1812	J = Nickel barrier Y = FlexiCap™ termination base with nickel barrier (100% matte tin plating). RoHS compliant.	A25 = 250Vac	First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is number of zeros following. Example: 0102 = 1.0nF	<10pF C = ±0.25pF D = ±0.5pF >10pF F = ±1% G = ±2% J = ±5% K = ±10% M = ±20%	C = COG/NPO X = X7R	T = 178mm (7") reel R = 330mm (13") reel B = Bulk pack - tubs	PY2 = Safety tested Surge Protection capacitors (marked and approved) SY2 = Surge Protection capacitors (un-marked parts are in accordance with, but not certified)



Ordering information - Safety Certified capacitors - Class B16/B17 ranges

2220	J	A25	0102	J	X	T	B16
Chip size	Termination	Voltage	Capacitance in pifarads (pF)	Capacitance tolerance	Dielectric codes	Packaging	Suffix
2220	J = Nickel barrier Y = FlexiCap™ termination base with nickel barrier (100% matte tin plating). RoHS compliant. A = Silver base with nickel barrier (Tin/lead plating with min. 10% lead). H = FlexiCap™ termination base with Ni barrier (Tin/lead plating with min. 10% lead).	A25 = 250Vac	First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is number of zeros following. Example: 0471 = 470pF	J = ±5% K = ±10% M = ±20%	X = X7R	T = 178mm (7") reel 1000 pieces R = 330mm (13") reel 4000 pieces B = Bulk	B16 = Type A: X1/Y2 B17 = Type B: X2

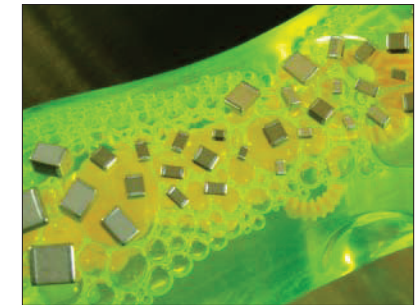


250Vac Non Safety Rated AC capacitors

Industry wide standard multilayer ceramic capacitors are supplied with a DC rating only. For AC use, Surge and Safety capacitors with an AC rating of 250Vac have been available but the capacitance range is limited as a result of the strict impulse and VP requirements in the international standards. Syfer Technology have developed a range which provides a solution for use at up to 250Vac 60Hz continuous use and provides for non safety-critical applications where extended capacitance ranges are required.

Capacitance range

Case sizes 0805 to 2220 are available in both X7R and COG/NPO dielectrics with capacitances of up to 120nF. The capacitance ranges are divided into four groups which are based on the voltage coefficient of capacitance, COG/NPO which has negligible capacitance shift with applied voltage and three subgroups of X7R. Type A with ±30% maximum capacitance shift 0V-240V, Type B with +30% to



-50% maximum capacitance shift 0V-240V and Type C with +30 to -80% maximum capacitance shift 0V to 240V.

Chip size	0805	1206	1210	1808	1812	2220
COG/NPO	1.0pF - 470pF	1.0pF - 1.2nF	4.7pF - 2.2nF	4.7pF - 2.2nF	10pF - 5.6nF	10pF - 10nF
X7R A ±30%	560pF - 1.5nF	1.5nF - 10nF	2.7nF - 22nF	2.7nF - 22nF	6.8nF - 56nF	12nF - 120nF
X7R B +30% -50%	1.8nF - 3.3nF	12nF	27nF	27nF	68nF - 82nF	-
X7R C +30% -80%	3.9nF - 10nF	15nF - 47nF	33nF - 100nF	33nF - 100nF	100nF - 120nF	-

NOTE: X7R A has a VCC of +30% over 0 to 240Vac 50Hz
X7R B has a VCC of +30% to -50% over 0 to 240Vac 50Hz
X7R C has a VCC of +30% to -80% over 0 to 240Vac 50Hz
Measurement conditions described in Syfer Application Notes AN0033

Ordering information - 250Vac Non Safety Rated AC capacitors

1812	Y	A25	0103	K	X	T
Chip size	Termination	Voltage	Capacitance in pifarads (pF)	Capacitance tolerance	Dielectric codes	Packaging
0805 1206 1210 1808 1812 2220	Y = FlexiCap™ J = Nickel Barrier	250Vac 60Hz	<10pF Insert a P for the decimal point, eg P300 = 0.3pF, 8P20 = 8.2pF. ≥10pF 1st digit is 0. 2nd and 3rd digits are significant figures of capacitance code. The 4th digit is number of 0's following eg. 0103 = 10000pF Values <1pF in 0.1pF steps, above this values are E24 series	<10pF B = ±0.1pF C = ±0.25pF D = ±0.5pF ≥10pF F = ±1% G = ±2% J = ±5% K = ±10%	C = COG/NPO X = X7R	T = 178mm (7") reel R = 330mm (13") reel B = Bulk pack - tubs

