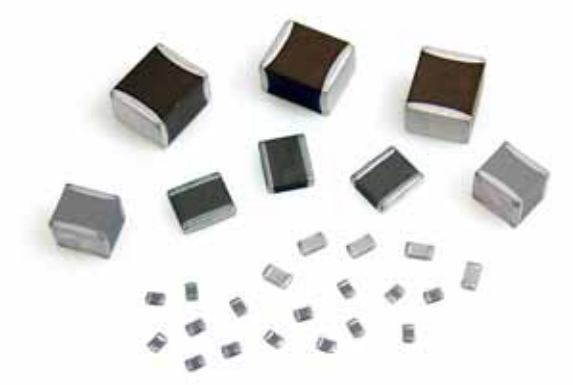
High Temperature Chip

A range of chip capacitors, available in sizes 0805 to 7565, designed to operate from -55°C to 150°C, (Class 2 dielectric) and from -55°C to 200°C (C0G & Class II dielectrics). Voltage ratings of 25V to 4kV.

- For dielectric characteristics see pages 4 & 7.
- For dimensions see page 12.
- For termination options see pages 3 & 15.
- For ordering information, inc. tolerances available, see page 15.

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



Maximum capacitance values - 150°C X8R (S) dielectric

Size	0805	1206	1210	1812	1825	2225	4540	7565
Min cap.	121	221	221	221	102	102	102	222
25V	563	184	334	684	125	155	565	156
50V	473	154	274	564	105	125	475	126
100V	333	104	184	394	824	105	395	106
250V	183	333	823	154	474	564	275	695
500V	562	153	393	563	124	154	125	325

Maximum capacitance values - 160°C C0G (F)/Class II (G) and 200°C C0G (D)/Class II (E) dielectrics

Size	0805		1206		1210		1515		1808		1812		1825		2225		3530		4540		6560		7565	
Min cap.	05R	121	1R0	121	5R0	121	5R0	151	120	151	220	151	330	471	470	471	221	102	390	102	560	222	101	222
Tmax inches: mm:	0.054 1.37		0.064 1.63		0.065 1.65		0.130 3.30		0.065 1.65		0.065 1.65		0.080 2.03		0.080 2.03		0.250 6.35		0.300 7.62		0.300 7.62		0.300 7.62	
Dielectric	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II	C0G	Class II
25V	272	823	562	224	123	394	223	824	123	334	223	684	563	155	563	185	104	395	184	565	334	156	394	186
50V	182	473	392	124	822	224	183	684	822	274	153	474	393	105	473	125	823	275	154	475	274	126	334	156
100V	681	183	182	473	332	104	103	274	332	823	822	154	153	474	183	474	563	225	104	335	224	825	274	126
250V	471	472	102	103	222	273	392	822	222	223	562	473	123	124	183	154	333	564	563	125	124	275	154	395
500V	181	102	391	222	821	562	272	183	102	562	222	103	392	273	562	333	123	124	273	334	563	684	683	824
1kV	470	181	101	391	221	821	821	272	221	821	561	152	821	472	102	562	562	273	153	683	333	154	393	224
2kV	•	•	270	•	560	151	181	561	560	•	121	221	181	561	271	681	152	682	332	183	822	393	103	473
3kV	•	•	•	•	•	•	820	•	220	•	560	•	820	•	101	•	561	272	152	682	332	153	392	183
4kV	•	•	•	•	•	•	470	•	120	•	270	•	330	•	470	•	331	122	821	272	182	562	222	822

Chip Ordering Information



Prefix	Case Size	Dielectric	Capacitance	Capacitance Tolerance	Voltage	Termination	Special Thickness	High Reliability Testing	Packaging	Marking		High Reliability Test Criteria
XX	1206	N	472	J	101	N	X050	H	T	M	-	HB

Capacitance Code

1st two digits are significant, third digit denotes number of zeros, R = decimal Examples:	1R0 = 1.0pF
	120 = 12pF
	471 = 470pF
	102 = 1,000pF
	273 = 0.027µF
	474 = 0.47µF
	105 = 1.0µF

Special Thickness

None	Standard thickness as per Novacap catalog specifications
X	Denotes a special thickness other than standard. Specify in inches if required. (As shown above **X** = 0.050")

Packaging

None	Bulk
T	Tape and Reel
W	Waffle Pack

Marking

None	Unmarked
M	Marked *Marking not available on sizes ≤ 0603

High Reliability Testing

None	Standard product
H	High Reliability Testing
H	High Temp Screening

Hi-Reliability Testing Criteria

HB	MIL-PRF-55681 Group A
HK	MIL-PRF-38534 Class K
HS	MIL-PRF-123 Group A

Dielectric Codes

N	C0G/NP0	Ultra Stable
M	C0G/NP0	Ultra Stable Magnetic Free
F	C0G/NP0	High Temp. (up to 160°C)
D	C0G/NP0	High Temp. (up to 200°C)
K	R3L	Ultra Stable
R	R2D	Pulse Energy
Y	Y5V	General Purpose
Z	Z5U	General Purpose
B	X7R	Stable
C	X7R	Stable Magnetic Free
X	BX	MIL
S	X8R	High Temp. (up to 150°C)
E	Class II	High Temp. (up to 200°C)
G	Class II	High Temp. (up to 160°C)
W	X5R	Stable
P	Positive VTC	Pulse Power
RN	NP0	RoHS 2013 ≤ 200V
RB	X7R	RoHS 2013 ≤ 200V

Voltage Code

1st two digits are significant, third digit denotes number of zeros. For example:

160 =	16 Volts
101 =	100 Volts
501 =	500 Volts
102 =	1,000 Volts
502 =	5,000 Volts
103 =	10,000 Volts

Termination Codes

P	Palladium Silver	
PR	Palladium Silver*	
K	Solderable Palladium Silver*	
N	Nickel Barrier*	100% tin
Y	Nickel Barrier	90% tin, 10% lead
NG	Nickel Barrier Gold Flash*	
C	FlexiCap™/Nickel Barrier*	100% tin
D	FlexiCap™/Nickel Barrier	90% tin, 10% lead
B	Copper Barrier*	100% tin
E	Copper Barrier	90% tin, 10% lead
S	Silver*	

* Indicates RoHS terminations

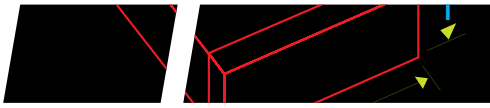
Capacitance Tolerance Codes

Code	Tolerance * Not RF series		C0G/NP0 N	C0G/NP0 M	C0G/NP0 F/D	R3L K	R2D R	Y5V Z5U Y/Z	X7R B	X7R C	BX X	X8R S	Class II E/G	X5R W	Positive VTC P
B	±0.10pF	Cap. Value ≤ 10pF	•	•											
C	±0.25pF		•	•		•									
D	±0.50pF		•	•		•									
F	±1%		•	•	•										
G	±2%		•	•	•	•									
J	±5%		•	•	•	•	•		•*	•	•*	•	•		
K	±10%		•	•	•	•	•		•	•	•	•	•	•	•
M	±20%		•		•	•	•	•	•	•	•	•	•	•	•
Z	+80% -20%		•				•	•	•*						•
P	+100% -0%		•				•	•	•*						•

Prefix Definitions

None	Standard chip	
RF	Improved ESR Capacitor	p. 23
LS	Y³ Certified Safety Capacitor	p. 42 - 43
ES	Y² Certified Safety Capacitor	p. 42 - 43
ST	Stacked Capacitor Assembly	p. 48 - 53
SM	Stacked Hi-Rel Capacitor Assembly	p. 48 - 53
CR	Cap-Rack Capacitor Array	p. 54
RC	Bleed Resistor	p. 58 - 61

Technical Summary



Technical Information

Novacap provides application notes throughout this catalog as a guide to chip selection and attachment methods. Refer to the Novacap Technical Brochure found at www.novacap.com for more details. This technical information includes the nature of capacitance, dielectric properties, electrical properties, classes of dielectrics, ferroelectric behavior, test standards, and high reliability test plans. Please do not hesitate to contact the sales office for any product or technical assistance.

Capacitor Size

Size availability is based primarily on capacitance values and voltage rating. Smaller units are generally less expensive. Because mass affects the thermal shock susceptibility of chip capacitors, size selection should consider the soldering method used to attach the chip to the board. Sizes 1812 and smaller can be wave, vapor phase, or reflow soldered. Larger units require reflow soldering.

Chip Selection

Multilayer capacitors (MLC) are categorized by dielectric performance with temperature. The Temperature Coefficient of Capacitance describes the variance of capacitance value with temperature. The choice of components is therefore largely determined by the temperature stability required of the device and the size necessary for the desired capacitance value and voltage rating.

Packaging

Units are available reeled, in waffle pack, or bulk packaged. Bar coded labels are standard for reeled and bulk packaging.

Primary Dielectric Types

C0G/NP0:

Ultra stable Class I dielectric, with negligible dependence of capacitance on temperature, voltage, frequency, and time. Used in circuitry requiring very stable performance.

X7R:

Stable Class II dielectric, with predictable change in properties across a temperature range of -55°C to +125°C. Used as blocking, decoupling, bypassing, and frequency discriminating elements. This dielectric is ferroelectric and provides higher capacitance than Class I materials.

BX:

The military specification for ceramic chip capacitors (MIL-PRF-55681) defines a mid-K stable dielectric designated as BX. The BX specification has voltage temperature limits in addition to temperature limits of capacitance. The BX dielectric is limited to ±15% maximum change in capacitance between 25°C and -55°C or +125°C and also has a voltage restriction of +15% / -25% maximum change in capacitance between 25°C and -55°C or +125°C at rated voltage.

Z5U/Y5V:

General purpose Class III dielectrics with higher dielectric constant and greater variation of properties over temperature and voltage. Very high capacitance per volume is attainable for general purpose applications where stability over a wide temperature range is not critical.

Dielectric Termination Combinations

		Palladium Silver	Palladium Silver	Solderable Palladium Silver	Nickel Barrier 100% tin	Nickel Barrier 90/10% tin/lead	Nickel Barrier Gold flash	FlexiCap™/Nickel Barrier 100% tin	FlexiCap™/Nickel Barrier 90/10% tin/lead	Copper Barrier 100% tin	Copper Barrier 90/10% tin/lead	Solderable Silver
			RoHS	RoHS	RoHS		RoHS	RoHS		RoHS		RoHS
Dielectric	**Code**	**P**	**PR**	**K**	**N**	**Y**	**NG**	**C**	**D**	**B**	**E**	**S**
C0G/NP0	**N/RN**	•	•	•	•	•	•	•	•			•
R3L	**K**	•	•	•	•	•	•	•	•			
X7R	**B/RB**	•	•	•	•	•	•	•	•			•
X5R	**W**				•	•	•					
BX	**X**	•	•	•	•	•	•	•	•			•
Y5V	**Y**				•	•		•	•			
Z5U	**Z**				•	•		•	•			
C0G/NP0 (Mag free)	**M**	•	•	•						•	•	
X7R (Mag free)	**C**	•	•	•						•	•	
X8R	**S**	•	•	•	•	•		•	•			•
C0G/NP0 (160°C)	**F**	•	•	•	•	•		•	•			•
C0G/NP0 (200°C)	**D**			•								•
Class II (160°C)	**G**	•	•	•	•	•		•	•			•
Class II (200°C)	**E**			•								•
Pulse Power	**P**	•	•	•								
R2D	**R**	•	•	•								

Termination Material

We recommend the following termination types:

Solder Attachment:

N Nickel Barrier, 100% matte tin plated - RoHS

C FlexiCap™ with Nickel Barrier, 100% tin plated - RoHS

Y Nickel Barrier, tin-lead plated

D FlexiCap™ Nickel Barrier, tin-lead plated

B Copper Barrier 100% matte tin plated - RoHS

E Copper Barrier, tin-lead plated

K Solderable Palladium Silver - RoHS

S Solderable Silver - RoHS

Conductive Epoxy attachment:

P Palladium Silver

PR Palladium Silver - RoHS

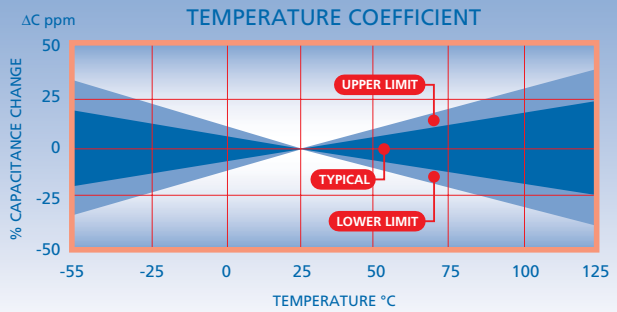
NG Nickel Barrier Gold Flash, also suitable for soldering attachment - RoHS



Dielectric Characteristics

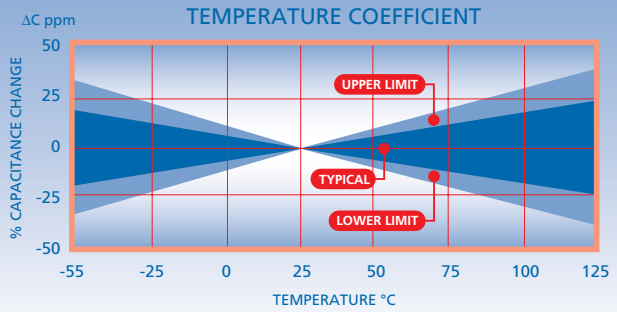
C0G/NP0 (N) Ultra Stable and RoHS 2013 (RN) type

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: @125°C:	>100GΩ or >1000ΩF whichever is less >10GΩ or >100ΩF whichever is less
Dielectric withstanding voltage	≤200V: 201-500V: >500V:	250% 150% or 500V whichever is greater 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



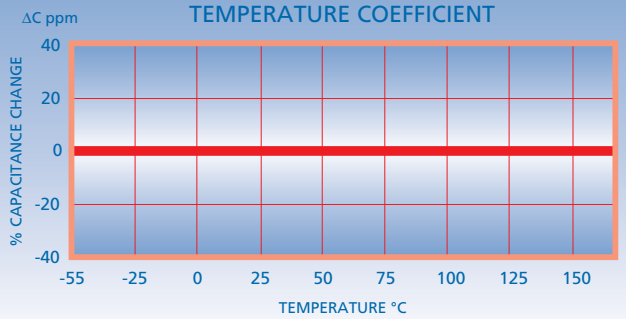
C0G/NP0 (M) Ultra Stable Non Magnetic

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: @125°C:	>1000ΩF or >10000ΩF whichever is less >100ΩF or >1000ΩF whichever is less
Dielectric withstanding voltage	≤200V: 201-500V: >500V:	250% 150% or 500V whichever is greater 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



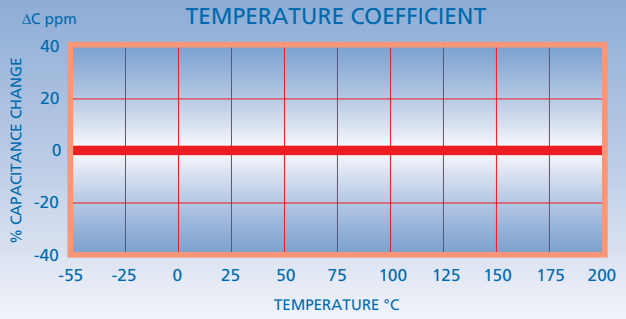
C0G/NP0 (F) Ultra Stable High Temperature (up to 160°C)

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: @160°C:	>100GΩ or >1000ΩF whichever is less >1GΩ or >10ΩF whichever is less
Dielectric withstanding voltage	<200V: 201-500V: >500V:	250% 150% or 500V whichever is greater 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: @200°C:	>100GΩ or >1000ΩF whichever is less >1GΩ or >10ΩF whichever is less
Dielectric withstanding voltage	≤200V: 201-500V: >500V:	250% 150% or 500V whichever is greater 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

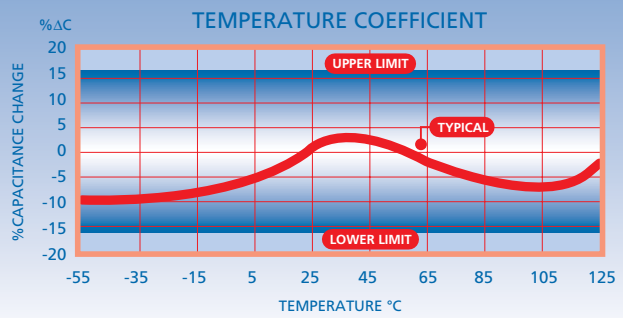




Dielectric Characteristics

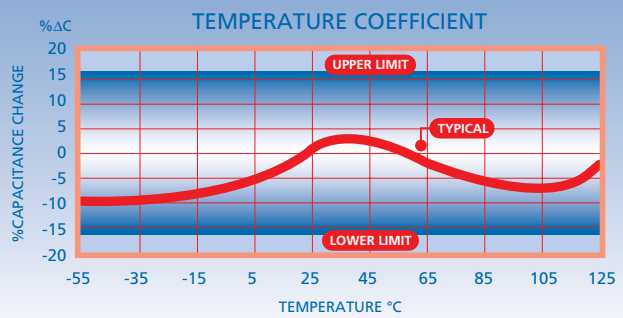
X7R (B) Stable and RoHS 2013 (RB) type

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



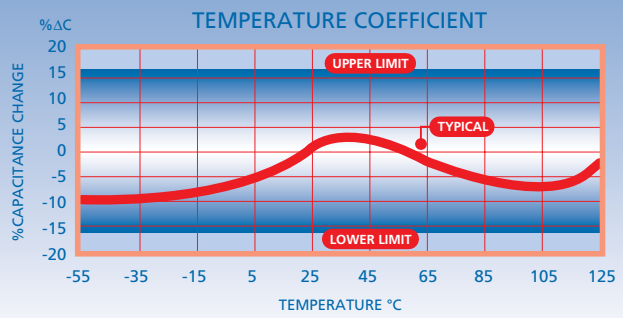
X7R (C) Stable Non Magnetic

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



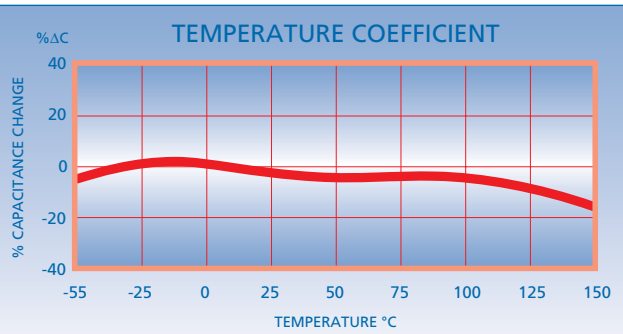
BX (X) Stable

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



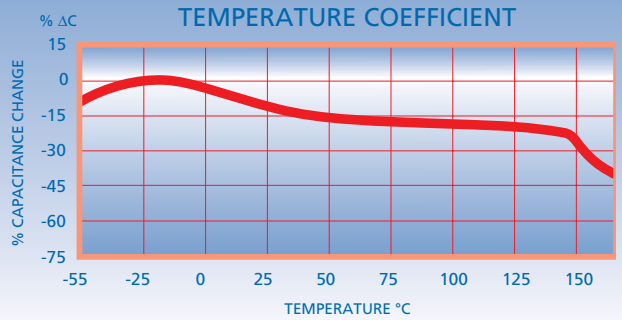
Dielectric Characteristics





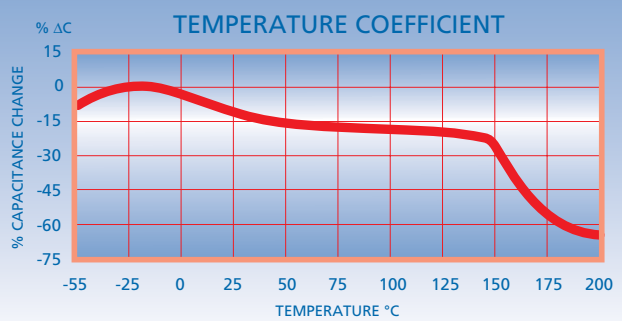
Class II (G) Stable High Temperature (up to 160°C)

Operating temperature range:		-55°C to 160°C
Temperature coefficient up to 160°C:		+15 -40% ΔC Max.
Dissipation factor @ 25°C:		2.5% Max.
Insulation resistance	@25°C: @160°C:	>100GΩ or >1000ΩF whichever is less >1GΩ or >10ΩF whichever is less
Dielectric withstanding voltage	≤200V: 201-500V: >500V:	250% 150% or 500V whichever is greater 120% or 750V whichever is greater
Ageing rate:		< 2.0% per decade
Test parameters:		1KHz, 1.0 ±0.2 VRMS, 25°C



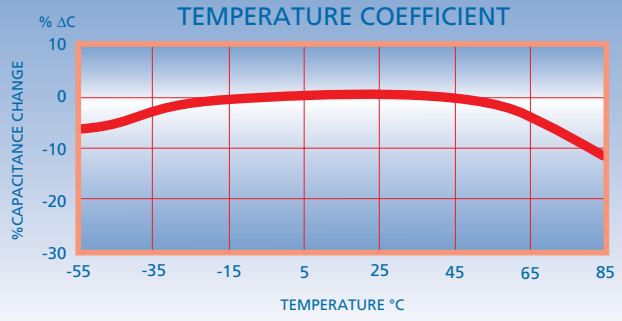
Class II (E) Stable High Temperature (up to 200°C)

Operating temperature range:		-55°C to 200°C
Temperature coefficient up to 200°C:		+15 -65% ΔC Max.
Dissipation factor @ 25°C:		2.5% Max.
Insulation resistance	@25°C: @200°C:	>100GΩ or >1000ΩF whichever is less >1GΩ or >10ΩF whichever is less
Dielectric withstanding voltage	≤200V: 201-500V: >500V:	250% 150% or 500V whichever is greater 120% or 750V whichever is greater
Ageing rate:		< 2.0% per decade
Test parameters:		1KHz, 1.0 ±0.2 VRMS, 25°C



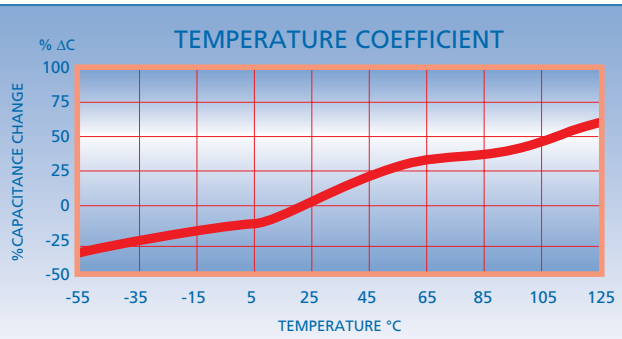
X5R (W) Stable

Operating temperature range:	-55°C to 85°C
Temperature coefficient up to 200°C:	±15% ΔC Max.
Dissipation factor @ 25°C:	See page 44
Insulation resistance @25%:	>10GΩ or >500ΩF whichever is less
Dielectric withstanding voltage:	250%
Ageing rate:	< 5.0% per decade
Test parameters: Except: 22µF, 47µF & 100µF	1KHz, 1.0 ±0.2 VRMS, 25°C 120KHz, 0.5 ±0.1 VRMS, 25°C

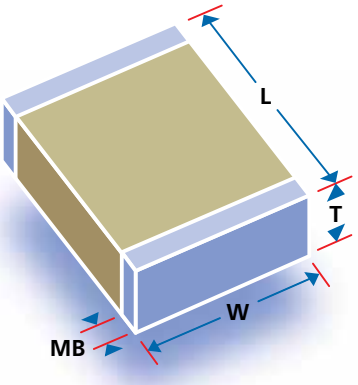


Positive VTC (P) Pulse Power

Operating temperature range:		-55°C to 85°C (derate at 125°C)
Temperature coefficient	-55°C to 85°C: +25°C to +125°C:	3000 ±1000 ppm/°C 7000 ±1000 ppm/°C
Dissipation factor @ 25°C:		1.0% Max.
Insulation resistance	@25°C: @125°C:	>10GΩ or >100ΩF whichever is less >1GΩ or >10ΩF whichever is less
Dielectric withstanding voltage:		Rated voltage +100V
Ageing rate:		<2% per decade
Test parameters:		1KHz, 1.0 ±0.2 VRMS, 25°C



Chip Dimensions



Dimensions - inches (mm)

Size	Length (L)	Width (W)	Max. Thickness (T)*	Termination Band (MB)
0402	0.040 ± 0.004 (1.02 ± 0.102)	0.020 ± 0.004 (0.508 ± 0.102)	0.024 (0.610)	0.010 ± 0.006 (0.254 ± 0.152)
0504	0.050 ± 0.006 (1.27 ± 0.152)	0.040 ± 0.006 (1.02 ± 0.152)	0.044 (1.12)	0.014 ± 0.006 (0.356 ± 0.152)
RF0505	0.055 +0.015 -0.010 (1.4 +0.38 -0.25)	0.055 ± 0.015 (1.40 ± 0.381)	0.057 (1.45)	0.014 ± 0.006 (0.356 ± 0.152)
0603	0.060 ± 0.006 (1.52 ± 0.152)	0.030 ± 0.006 (0.762 ± 0.152)	0.035 (0.889)	0.014 ± 0.006 (0.356 ± 0.152)
0805	0.080 ± 0.008 (2.03 ± 0.203)	0.050 ± 0.008 (1.27 ± 0.203)	0.054 (1.37)	0.020 ± 0.010 (0.508 ± 0.254)
0907	0.090 ± 0.008 (2.29 ± 0.203)	0.070 ± 0.008 (1.78 ± 0.203)	0.060 (1.52)	0.020 ± 0.010 (0.508 ± 0.254)
1005	0.100 ± 0.008 (2.54 ± 0.203)	0.050 ± 0.008 (1.27 ± 0.203)	0.054 (1.37)	0.020 ± 0.010 (0.508 ± 0.254)
RF1111	0.110+0.025 -0.010 (2.79 +0.64 -0.25)	0.110 ± 0.015 (2.79 ± 0.381)	0.102 (2.59)	0.020 ± 0.010 (0.508 ± 0.254)
1206	0.125 ± 0.008 (3.18 ± 0.203)	0.060 ± 0.008 (1.52 ± 0.203)	0.064 (1.63)	0.020 ± 0.010 (0.508 ± 0.254)
1210	0.125 ± 0.008 (3.18 ± 0.203)	0.100 ± 0.008 (2.54 ± 0.203)	0.065 (1.65)	0.020 ± 0.010 (0.508 ± 0.254)
1515	0.150 ± 0.015 (3.81 ± 0.381)	0.150 ± 0.015 (3.81 ± 0.381)	0.130 (3.30)	0.030 ± 0.015 (0.762 ± 0.381)
1808	0.180 ± 0.012 (4.57 ± 0.305)	0.080 ± 0.008 (2.03 ± 0.203)	0.065 (1.65)	0.024 ± 0.014 (0.610 ± 0.356)
1812	0.180 ± 0.012 (4.57 ± 0.305)	0.125 ± 0.008 (3.18 ± 0.203)	0.065 (1.65)	0.024 ± 0.014 (0.610 ± 0.356)
1825	0.180 ± 0.012 (4.57 ± 0.305)	0.250 ± 0.015 (6.35 ± 0.381)	0.080 (2.03)	0.024 ± 0.014 (0.610 ± 0.356)
2020	0.200 ± 0.015 (5.08 ± 0.381)	0.200 ± 0.015 (5.08 ± 0.381)	0.180 (4.57)	0.024 ± 0.014 (0.610 ± 0.356)
2221	0.220 ± 0.015 (5.59 ± 0.381)	0.210 ± 0.015 (5.33 ± 0.381)	0.080 (2.03)	0.030 ± 0.015 (0.762 ± 0.381)
2225	0.220 ± 0.015 (5.59 ± 0.381)	0.250 ± 0.015 (6.35 ± 0.381)	0.080 (2.03)	0.030 ± 0.015 (0.762 ± 0.381)
2520	0.250 ± 0.015 (6.35 ± 0.381)	0.200 ± 0.015 (5.08 ± 0.381)	0.180 (4.57)	0.030 ± 0.015 (0.762 ± 0.381)
RF2525	0.230 +0.020 -0.012 (5.84 +0.51 -0.30)	0.250 ± 0.015 (6.35 ± 0.381)	0.165 (4.19)	0.030 ± 0.015 (0.762 ± 0.381)
3333	0.330 ± 0.017 (8.38 ± 0.432)	0.330 ± 0.017 (8.38 ± 0.432)	0.250 (6.35)	0.030 ± 0.015 (0.762 ± 0.381)
3530	0.350 ± 0.018 (8.89 ± 0.457)	0.300 ± 0.015 (7.62 ± 0.381)	0.250 (6.35)	0.030 ± 0.015 (0.762 ± 0.381)
4040	0.400 ± 0.020 (10.2 ± 0.508)	0.400 ± 0.020 (10.2 ± 0.508)	0.300 (7.62)	0.040 ± 0.020 (1.02 ± 0.508)
4540	0.450 ± 0.023 (11.4 ± 0.584)	0.400 ± 0.020 (10.2 ± 0.508)	0.300 (7.62)	0.040 ± 0.020 (1.02 ± 0.508)
5440	0.540 ± 0.027 (13.7 ± 0.686)	0.400 ± 0.020 (10.2 ± 0.508)	0.300 (7.62)	0.040 ± 0.020 (1.02 ± 0.508)
5550	0.550 ± 0.028 (14.0 ± 0.711)	0.500 ± 0.025 (12.7 ± 0.635)	0.300 (7.62)	0.040 ± 0.020 (1.02 ± 0.508)
6560	0.650 ± 0.033 (16.5 ± 0.838)	0.600 ± 0.030 (15.2 ± 0.762)	0.300 (7.62)	0.040 ± 0.020 (1.02 ± 0.508)
7565	0.750 ± 0.038 (19.1 ± 0.965)	0.650 ± 0.033 (16.5 ± 0.838)	0.300 (7.62)	0.040 ± 0.020 (1.02 ± 0.508)

* Non standard thicknesses are available - consult the sales office for details.