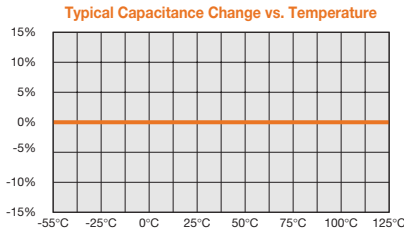


Ceramic Chip Capacitors

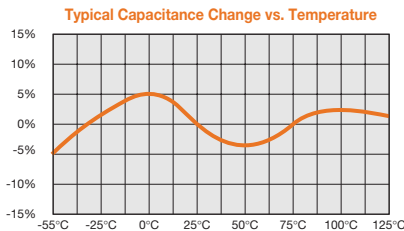
Multilayer chip capacitors have a low residual inductance, an excellent frequency response and minimal stray capacitance since there are no leads. These characteristics enable design to be very close to the theoretical values of the capacitors.

NP0/C0G: SPECIFICATIONS:



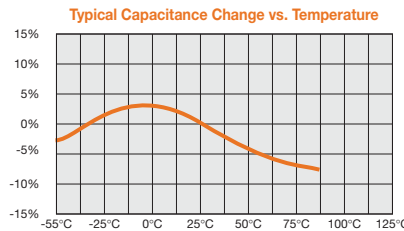
OPERATING TEMPERATURE RANGE:	-55°C to +125°C
TEMPERATURE COEFFICIENT:	0 ±30PPM/°C
TEMPERATURE VOLTAGE COEFFICIENT:	0 ±30PPM/°C
DISSIPATION FACTOR:	0.1% MAX.
INSULATION RESISTANCE:	>1000 ohms F or 100 G ohms, whichever is less at 25°C, VDCW. (The IR at 125°C is 10% of the value at 25°C)
AGEING:	None
WITHSTANDING VOLTAGE:	>2.5 times VDCW
TEST PARAMETERS:	1MHz ± 100KHz at 1.0 ± 0.2 Vrms ≤ 100 pF, 25°C 1KHz ± 100Hz at 1.0 ± 0.2 Vrms > 100 pF, 25°C
CAPACITANCE TOLERANCE:	B,C,D,F,G,J,K

X7R: SPECIFICATIONS:



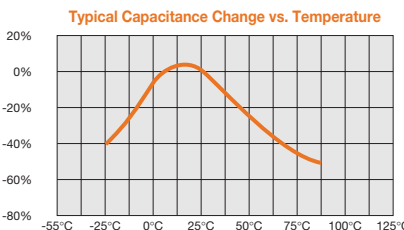
OPERATING TEMPERATURE RANGE:	-55°C to +125°C
TEMPERATURE COEFFICIENT:	0 ±15%Δ°C MAX.
TEMPERATURE VOLTAGE COEFFICIENT:	X7R not applicable
DISSIPATION FACTOR:	For 50 volts and 100 volts: 2.5% MAX.; For 25 volts: 3.0% MAX.; For 16 volts: 3.5% MAX.; For 10 volts: 5.0% MAX.; For 6.3 volts: 10% MAX. For values > 10μF and voltages ≤ 10V, the D.F. is 10% MAX.
INSULATION RESISTANCE:	>1000 ohms F or 100 G ohms, whichever is less at 25°C, VDCW. (The IR at 125°C is 10% of the value at 25°C)
AGEING:	2.5% per decade hour, typical
WITHSTANDING VOLTAGE:	>2.5 times VDCW
TEST PARAMETERS:*	1KHz ± 100Hz at 1.0 ± 0.2 Vrms > 100 pF, 25°C
CAPACITANCE TOLERANCE:	J,K,M

X5R: SPECIFICATIONS:



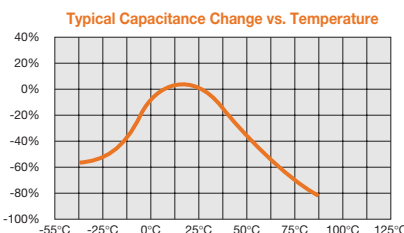
OPERATING TEMPERATURE RANGE:	-55°C to +85°C
TEMPERATURE COEFFICIENT:	0 ±15%Δ°C MAX.
TEMPERATURE VOLTAGE COEFFICIENT:	X5R not applicable
DISSIPATION FACTOR:	For 50 volts and 100 volts: 2.5% MAX.; For 25 volts: 3.0% MAX.; For 16 volts: 3.5% MAX.; For 10 volts: 5.0% MAX.; For 4.0 volts and 6.3 volts: 10% MAX. For values > 10μF and voltages ≤ 10V, the D.F. is 10% MAX.
INSULATION RESISTANCE:	>1000 ohms F or 100 G ohms, whichever is less at 25°C, VDCW. (10,000 ohms at 125°C)
AGEING:	2.5% per decade hour, typical
WITHSTANDING VOLTAGE:	>2.5 times VDCW
TEST PARAMETERS:*	1KHz ± 100Hz at 1.0 ± 0.2 Vrms > 100 pF, 25°C
CAPACITANCE TOLERANCE:	K,M

Z5U: SPECIFICATIONS:



OPERATING TEMPERATURE RANGE:	+10°C to +85°C
TEMPERATURE COEFFICIENT:	+22% - 56%Δ°C MAX.
DISSIPATION FACTOR:	4.0% MAX.
INSULATION RESISTANCE:	>100 ohms F or 10 G ohms, whichever is less at 25°C, VDCW.
AGEING:	5% per decade hour, typical
WITHSTANDING VOLTAGE:	>2.5 times VDCW
TEST PARAMETERS:	1KHz ± 100Hz at 0.5 ± 0.1 Vrms, 25°C
CAPACITANCE TOLERANCE:	M,Z,P

Y5V: SPECIFICATIONS:

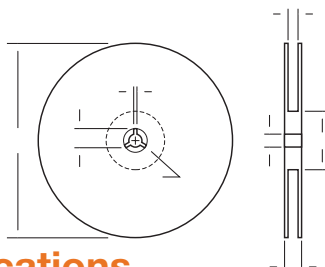


OPERATING TEMPERATURE RANGE:	-30°C to +85°C
TEMPERATURE COEFFICIENT:	+22% - 82%Δ°C MAX.
DISSIPATION FACTOR:	For 25 volts and 50 volts: 5% MAX.; For 16 volts: 7% MAX.; For 10 volts: 9% MAX.; For 6.3 volts: 11% MAX. For higher Cap values > 10μF, the D.F. is 20% MAX.
INSULATION RESISTANCE:	>100 ohms F or 10 G ohms, whichever is less at 25°C, VDCW.
AGEING:	7% per decade hour, typical
WITHSTANDING VOLTAGE:	>2.5 times VDCW
TEST PARAMETERS:*	1KHz ± 100Hz at 1.0 ± 0.2 Vrms, 25°C
CAPACITANCE TOLERANCE:	M,Z

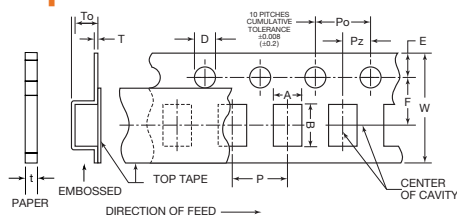
* Test parameters for Hi-Caps: X7R, X5R and Y5V
1KHz ± 100Hz at 1.0 ± 0.2 Vrms ≤ 10μF (10 V min.)
1KHz ± 100Hz at 0.5 ± 0.1 Vrms ≤ 10μF (6.3V max.)
120Hz ± 24Hz at 0.5 ± 0.1 Vrms > 10μF

All components in this section are RoHS compliant per the EU directives and definitions.

All tape and reel specifications must be adhered to per EIA-481-1-A as noted and stated in the Chip Resistor section on page 61.



Taping Specifications



Reel Dimensions

Unit: mm (inch)

TAPE	B min	C	A (7")	A (13")	D min	N min	G	T max
8mm	0.3 (.012)	13 ± .05 (.512 ± .02)	178 ± 2.0 (7 ± .079)	330 ± 2.0 (13 ± .08)	20.2 (.795)	50 (1.97)	10 ± 1.5 (.394 ± .059)	14.9 (.587)
12mm	0.3 (.012)	13 ± .05 (.512 ± .02)	178 ± 2.0 (7 ± .079)	330 ± 2.0 (13 ± .08)	20.2 (.795)	50 (1.97)	10 ± 1.5 (.394 ± .059)	14.9 (.587)

7 in. Reel Quantities**

SIZE	01005	0201*	0402*	0603	0805	1206	1210	1812	2221
TAPE SIZE	8mm	8mm	8mm	8mm	8mm	8mm	8mm	12mm	12mm
MIN QTY PER REEL	20,000†	15,000	5000	3000	2000	2000	1000	1000	1000
MAX QTY PER REEL	20,000†	15,000	10,000	4000	5000	5000	5000	3000	1000

** Quantity dependent on Chip Thickness

* 0201 and 0402 Pitch ("P") is .079" ± .004" (2.0 ± 0.1mm)

† Smaller quantities may be available. Please contact your sales person.

Paper Tape Carrier Dimensions

(8mm)

SIZE	A	B	W	F	E	Po	Pz	D	t	P
01005	0.25 ± 0.05 (.010 ± .002)	0.45 ± 0.05 (.018 ± .002)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.039 ± .002)	1.5 ± 0.1 - 0.0 (.064 ± .004) - .000	1.15 MAX (.045 MAX)	2.0 ± 0.05 (.079 ± .002)
0201	0.37 ± 0.05 (.014 ± .002)	0.67 ± 0.05 (.026 ± .002)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.039 ± .002)	1.5 ± 0.1 - 0.0 (.064 ± .004) - .000	1.15 MAX (.045 MAX)	2.0 ± 0.05 (.079 ± .002)
0402	0.65 ± 0.1 (.026 ± .004)	1.10 ± 0.2 (.043 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.039 ± .002)	1.5 ± 0.1 - 0.0 (.064 ± .004) - .000	1.15 MAX (.045 MAX)	2.0 ± 0.05 (.079 ± .002)
0603	1.10 ± 0.2 (.043 ± .008)	1.90 ± 0.2 (.075 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.064 ± .004) - .000	1.15 MAX (.045 MAX)	4.0 ± 0.1 (.157 ± .004)
0805	1.16 ± 0.2 (.046 ± .008)	2.4 ± 0.2 (.095 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.064 ± .004) - .000	1.15 MAX (.045 MAX)	4.0 ± 0.1 (.157 ± .004)
1206	2.0 ± 0.2 (.079 ± .008)	3.6 ± 0.2 (.142 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.064 ± .004) - .000	1.15 MAX (.045 MAX)	4.0 ± 0.1 (.157 ± .004)

Unit: mm (inch)

Embossed Carrier Dimensions

(8mm & 12mm)

SIZE	A	B	W	F	E	Po	Pz	D	To	T	P
0805	1.48 ± 0.2 (.058 ± .008)	2.3 ± 0.2 (.091 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± .01 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	2.5 MAX (.098 MAX)	0.6 MAX (.024 MAX)	4.0 ± 0.1 (.157 ± .004)
1206	2.0 ± 0.2 (.079 ± .008)	3.6 ± 0.2 (.142 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± .01 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	2.5 MAX (.098 MAX)	0.6 MAX (.024 MAX)	4.0 ± 0.1 (.157 ± .004)
1210	2.9 ± 0.2 (.114 ± .008)	3.6 ± 0.2 (.142 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± .01 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	2.5 MAX (.098 MAX)	0.6 MAX (.024 MAX)	4.0 ± 0.1 (.157 ± .004)
1812	3.6 ± 0.2 (.142 ± .008)	4.9 ± 0.2 (.193 ± .008)	12.0 ± 0.3 (.472 ± .012)	5.6 ± .01 (.221 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	3.8 MAX (.150 MAX)	0.6 MAX (.024 MAX)	8.0 ± 0.1 (.315 ± .004)

How To Order

C0805 C0G

Series Temperature
See Chart Characteristic

500

Rated Voltage
1st two digits are significant followed by number of zeroes.
4R0 = 4.0 VDCW
6R3 = 6.3 VDCW
10 = 10 VDCW
160 = 16 VDCW
250 = 25 VDCW
500 = 50 VDCW
630 = 63 VDCW
101 = 100 VDCW
201 = 200 VDCW
251 = 250 VDCW

101

Capacitance (pico - Farads)
1st two digits are significant, followed by number of zeroes.
101 = 100 pF
R denotes decimal
6R8 = 6.8 pF

J

Tolerance Code:
*B = ± 0.1 pF
*C = ± 0.25 pF
*D = ± 0.5 pF
F = ± 1%
G = ± 2%
J = ± 5%
K = ± 10%
M = ± 20%
N = ± 30%
Z = +80 - 20%
P = +100 - 0%
* For capacitance values below 10 pF only.

N

Termination
N = Nickel Barrier,
Tinned Termination
Composition is
100% matte Tin (Sn)
‡ P = Palladium Silver
‡ G = Gold over Nickel
Pb: 90% Tin (Sn)/10% Lead (Pb) Termination

Standard termination finish for this product is 100% matte Tin (Sn). If a 100% Tin designation is required, replace the N with Sn.

‡ Pd/Ag & Gold terminations have limited values available. Please consult your salesperson.

□

Marking**
6 = EIA "J" Code
"Leave blank if No Marking"

P

Packaging
D = Paper Tape (10" Reel)
E = Embossed Tape (7" Reel)
P = Paper Tape (7" Reel)
R = Paper Tape (13" Reel)
U = Embossed Tape (13" Reel)

*

Optional Identifier
** 0201 and 0402 size capacitors cannot be marked

* OPTIONAL IDENTIFIER Min./Max. thickness

- designates minimum thickness
* designates maximum thickness

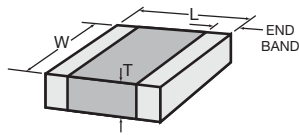
The following letters define thickness as signified below:											
CODE:	B	C	D	E	F	G	H	I	J	K	L
DIMENSION:	.010	.015	.020	.026	.030	.035	.040	.045	.050	.055	.060
	.065	.070	.075	.080	.085	.090	.095	.095	.095	.095	.095

Please Note: Venkel offers Engineering Kits for this product. See page 117 for details.

NOTE: See the Web site for soldering information. 0603 size and smaller are not recommended for wave soldering.

Ceramic Chip Capacitors

NP0/C0G Dielectric



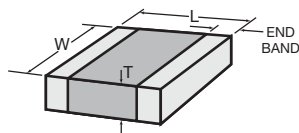
Values that are typically available.
25V Available in 25V only.

(All measurements in inches)		□		□		□		□		□		□		□		□		□	
Size		01005 (± 0.0008)		0201 (± 0.002)		0402 (± 0.004)		0504 (± 0.008)		0603 (± 0.006)		0805 (± 0.008)		1206 (± 0.008)		1210 (± 0.008)		1812 (± 0.012)	
L		.016		.024		.040		.050		.063		.080		.126		.126		.177	
W		.008		.012		.020		.040		.032		.050		.063		.098		.126	
T (max)*		.008		.012		.025		.040		.033		.055		.070		.075		.085	
Min E/B		.002		.002		.004		.005		.008		.020 ± .010		.020 ± .010		.020 ± .010		.024 ± .015	
VDCW (MAX)		16V		25V 50V		25V 50V		50V 100V		50V 100V		25V 50V 100V		50V 100V		50V 100V		50V 100V	
CAP CODE ↑ ↓	OR1	0.1pF																	
	OR2	0.2pF																	
	OR3	0.3pF																	
	OR4	0.4pF																	
	OR5	0.5pF																	
	1R0	1.0pF																	
	1R2	1.2																	
	1R5	1.5																	
	1R8	1.8																	
	2R2	2.2																	
	2R7	2.7																	
	3R3	3.3																	
	3R9	3.9																	
	4R7	4.7																	
	5R6	5.6																	
	6R8	6.8																	
	8R2	8.2																	
	100	10pF																	
	120	12																	
	150	15																	
	180	18																	
	220	22																	
	270	27																	
	330	33																	
	390	39																	
	470	47																	
	560	56																	
	680	68																	
	820	82																	
	101	100pF																	
	121	120																	
	151	150																	
	181	180																	
	221	220																	
	271	270																	
	331	330																	
	391	390																	
	471	470																	
	561	560																	
	681	680																	
	821	820																	
	102	1000pF																	
	122	1200																	
	152	1500																	
	182	1800																	
	222	2200																	
	272	2700																	
	332	3300																	

Note: * For additional values that may be available, please consult your salesperson.

Ceramic Chip Capacitors

NP0/C0G Dielectric



Values that are typically available.

25V Available in 25V only.

(All measurements in inches)		□		□		□		□		□		□		□		□		□	
Size		0201 (± 0.002)		0402 (± 0.004)		0504 (± 0.008)		0603 (± 0.006)		0805 (± 0.008)		1206 (± 0.008)		1210 (± 0.008)		1812 (± 0.012)		2220 / 2221 (± 0.016)	
L		.024		.040		.050		.063		.080		.126		.126		.177		.225 / .225	
W		.012		.020		.040		.032		.050		.063		.098		.126		.200 / .210	
T (max)*		.012		.025		.040		.033		.055		.070		.075		.085		.108 / .108	
Min E/B		.002		.004		.005		.008		.020 ± .010		.020 ± .010		.020 ± .010		.024 ± .015		.025 ± .015	
VDCW (MAX)		25V		25V		50V		100V		25V		50V		100V		50V		100V	
CAP. CODE	CAP. VALUE	392		472		562		682		822		103		123		153		183	
		3900		4700		5600		6800		8200		.01µF		.012		.015		.018	
CAP. CODE	CAP. VALUE	223		273		333		393		473		563		683		823		104	
		.022		.027		.033		.039		.047		.056		.068		.082		.100µF	
CAP. CODE	CAP. VALUE	124		154		184		224		274		334		394		474		564	
		.120		.150		.180		.220		.270		.330		.390		.470		.560	
CAP. CODE	CAP. VALUE	684		824		105		125		155		185		225		275		335	
		.680		.820		1.00µF		1.20		1.50		1.80		2.20		2.70		3.30	
CAP. CODE	CAP. VALUE	395		475		685		106		156		226		276		336		396	
		3.90		4.70		6.80		10.0µF		15.0µF		22.0µF		27.0µF		33.0µF		39.0µF	
CAP. CODE	CAP. VALUE	476		107															
		47.0µF		100.0µF															

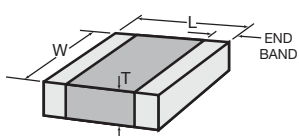
Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.

* For values above 1µF, thickness may be greater than specified above.

Ceramic Chip Capacitors

X7R Dielectric



Values that are typically available.



X5R Available in X5R only. See X5R chart on page 14, for all values 1µF and above

(All measurements in inches)			□			□			□			□			□					□			
Size			01005 (± 0.0008)			0201 (± 0.002)			0402 (± 0.004)			0504 (± 0.008)			0603 (± 0.006)					0805 (± 0.008)			
L			.016			.024			.040			.050			.063					.080			
W			.008			.012			.020			.040			.032					.050			
T (max)*			.008			.012			.025			.040			.033					.055			
Min E/B			.002			.002			.004			.005			.008					.020 ± .010			
VDCW (MAX)			6.3V			6.3V	10V	16V	25V	16V	25V	50V	25V	50V	100V	10V	16V	25V	50V	100V	25V	50V	100V
CAP. CODE ↑ ↓	101	CAP. VALUE ↑ ↓	100pF																				
	121		120																				
	151		150																				
	181		180																				
	221		220																				
	271		270																				
	331		330																				
	391		390																				
	471		470																				
	561		560																				
	681		680																				
	821		820																				
	102	1000pF	X5R																				
	122	1200																					
	152	1500	X5R																				
	182	1800																					
	222	2200	X5R																				
	272	2700																					
	332	3300	X5R																				
	392	3900																					
	472	4700	X5R																				
	562	5600																					
	682	6800	X5R																				
	822	8200																					
103	.01μF	X5R																					
123	.012																						
153	.015		X5R																				
183	.018																						
223	.022		X5R																				
273	.027																						
333	.033		X5R																				

* For values above 1µF, thickness may be greater than specified above.

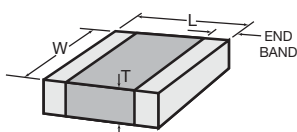
T(max): 0603 – 0.048"
0805 – 0.075"

Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.
All components manufactured with the X7R dielectric are also available as an X5R dielectric.

Ceramic Chip Capacitors

X7R Dielectric



Values that are typically available.

X5R Available in X5R only. See X5R chart on page 14, for all values 1μF and above

(All measurements in inches)		□		□		□		□		□		□		□									
Size		0201 (± 0.002)		0402 (± 0.004)		0603 (± 0.006)		0805 (± 0.008)															
L		.024		.040		.063		.080															
W		.012		.020		.032		.050															
T (max)*		.012		.025		.033		.055															
Min E/B		.002		.004		.008		.020 ± .010															
VDCW (MAX)		4V	6.3V	10V	4V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	50V	100V	6.3V	10V	16V	25V	50V	100V		
CAP. CODE ↑	393	CAP. VALUE ↓	.039	X5R																			
	473		.047	X5R																			
	563		.056																				
	683		.068																				
	823		.082																				
	104		.100μF	X5R																			
	124		.120																				
	154		.150																				
	184		.180																				
	224		.220	X5R			X5R	X5R															
	274		.270																				
	334		.330				X5R																
	394		.390																				
	474		.470																				
	564		.560																				
	684		.680									X5R	X5R										
	824		.820																				
	105		1.00μF					X5R	X5R					X5R									
	125		1.20																				
	155		1.50																				
	185		1.80																				
	225		2.20				X5R	X5R				X5R	X5R	X5R									
	335		3.30																X5R	X5R			
	475		4.70									X5R	X5R						X5R				
	685		6.80																				
	106		10.0μF									X5R								X5R			
156	15.0μF																						
226	22.0μF																						
476	47.0μF																						
107	100.0μF																						

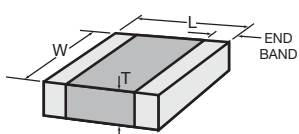
* For values above 1μF, thickness may be greater than specified above.
T(max): 0603 – 0.048"
0805 – 0.075"

Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.
All components manufactured with the X7R dielectric are also available as an X5R dielectric.

Ceramic Chip Capacitors

X7R Dielectric



Values that are typically available.

X5R Available in X5R only. See X5R chart on page 14, for all values 1μF and above

(All measurements in inches)																					
Size		1206 (± 0.008)					1210 (± 0.008)					1812 (± 0.012)					2220 / 2221 (± 0.016)				
L		.126					.126					.177					.225 / .225				
W		.063					.098					.126					.200 / .210				
T (max)*		.070					.075					.085					.108 / .108				
Min E/B		.020 ± .010					.020 ± .010					.024 ± .015					.025 ± .015				
VDCW (MAX)		10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	6.3V	10V	16V	25V	50V	100V	16V	25V	50V	100V
CAP. CODE	102	1000pF																			
	122	1200																			
	152	1500																			
	182	1800																			
	222	2200																			
	272	2700																			
	332	3300																			
	392	3900																			
	472	4700																			
	562	5600																			
CAP. VALUE	682	6800																			
	822	8200																			
	103	.01μF																			
	123	.012																			
	153	.015																			
	183	.018																			
	223	.022																			
	273	.027																			
	333	.033																			
	393	.039																			
CAP. VALUE	473	.047																			
	563	.056																			
	683	.068																			
	823	.082																			
	104	.100μF																			
	124	.120																			
	154	.150																			
	184	.180																			
	224	.220																			
	274	.270																			
CAP. VALUE	334	.330																			

* For values above 1μF, thickness may be greater than specified above.

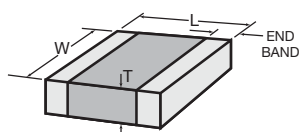
T(max): 1206 – 0.110" 1812 – 0.130"
1210 – 0.125" 2220 – 0.135"

Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.
All components manufactured with the X7R dielectric are also available as an X5R dielectric.

Ceramic Chip Capacitors

X7R Dielectric



Values that are typically available.

X5R Available in X5R only. See X5R chart on page 14, for all values 1μF and above

(All measurements in inches)																					
Size		1206 (± 0.008)					1210 (±0.008)					1812 (±0.012)					2220 / 2221 (±0.016)				
L		.126					.126					.177					.225 / .225				
W		.063					.098					.126					.200 / .210				
T (max)*		.070					.075					.085					.108 / .108				
Min E/B		.020 ± .010					.020 ± .010					.024 ± .015					.025 ± .015				
VDCW (MAX)		10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	6.3V	10V	16V	25V	50V	100V	16V	25V	50V	100V
CAP. CODE ↑ ↓	394	.390																			
	474	.470																			
	564	.560																			
	684	.680																			
	824	.820																			
	105	1.00μF																			
	125	1.20																			
	155	1.50																			
	185	1.80																			
	225	2.20																			
	335	3.30																			
	475	4.70																			
	685	6.80																			
	106	10.0μF		X5R	X5R										X5R				X5R		
	156	15.0μF																X5R			
	226	22.0μF					X5R	X5R	X5R					X5R	X5R						
	476	47.0μF										X5R	X5R								
	107	100.0μF																			

* For values above 1μF, thickness may be greater than specified above.

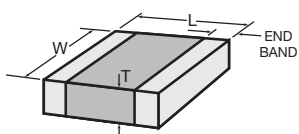
T(max): 1206 – 0.110" 1812 – 0.130"
1210 – 0.125" 2220 – 0.135"

Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.
All components manufactured with the X7R dielectric are also available as an X5R dielectric.

Ceramic Chip Capacitors

X5R Dielectric (1μF and above)



Values that are typically available.
For values less than 1μF, see X7R chart on pages 10–13.

(All measurements in inches)																					
Size		□				□				□				□				□			
		0402 (± 0.004)				0603 (± 0.006)				0805 (± 0.008)				1206 (± 0.008)				1210 (± 0.008)			
L		.040				.063				.080				.126				.126			
W		.020				.032				.050				.063				.098			
T (max)*		.025				.033				.055				.070				.075			
Min E/B		.004				.008				.020 ± .010				.020 ± .010				.020 ± .010			
VDCW (MAX)		4V	6.3V	10V		4V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V
CAP. CODE 105 125 155 185 225 335	CAP. VALUE	1.00μF																			
		1.20																			
		1.50																			
		1.80																			
		2.20																			
		3.30																			

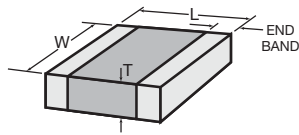
* For values above 1μF, thickness may be greater than specified above.
T(max): 0603 – 0.048" 1206 – 0.110" 1812 – 0.130"
0805 – 0.075" 1210 – 0.125" 2220 – 0.135"

Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.
All components manufactured with the X7R dielectric are also available as an X5R dielectric.

Ceramic Chip Capacitors

X5R Dielectric (1μF and above)



Values that are typically available.
For values less than 1μF, see X7R chart on pages 10–13.

(All measurements in inches)																														
Size		0402 (± 0.004)		0603 (± 0.006)		0805 (± 0.008)					1206 (± 0.008)				1210 (±0.008)				1812 (±0.012)				2220 / 2221 (±0.016)							
L		.040		.063		.080					.126				.126				.177				.225 / .225							
W		.020		.032		.050					.063				.098				.126				.200 / .210							
T (max)*		.025		.033		.055					.070				.075				.085				.108 / .108							
Min E/B		.004		.008		.020 ± .010					.020 ± .010				.020 ± .010				.024 ± .015				.025 ± .015							
VDCW (MAX)		6.3V		4V	6.3V	10V	4V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	6.3V	10V	25V	50V			
CAP. CODE ↕	395	CAP. VALUE ↕	3.90																											
	475		4.70																											
	685		6.80																											
	106		10.0µF																											
	156		15.0µF																											
	226		22.0µF																											
	476		47.0µF																											
	107		100.0µF																											

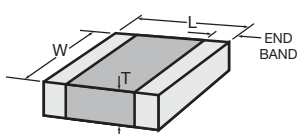
* For values above 1μF, thickness may be greater than specified above.
T(max): 0603 – 0.048" 1206 – 0.110" 1812 – 0.130"
0805 – 0.075" 1210 – 0.125" 2220 – 0.135"

Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.
All components manufactured with the X7R dielectric are also available as an X5R dielectric.

Ceramic Chip Capacitors

Z5U Dielectric



Values that are typically available.

(All measurements in inches)																	
Size		0504 (± 0.008)		0603 (± 0.006)		0805 (± 0.008)		1206 (± 0.008)		1210 (±0.008)		1812 (±0.012)		2220 / 2221 (±0.016)			
L		.050		.063		.080		.126		.126		.177		.225 / .225			
W		.040		.032		.050		.063		.098		.126		.200 / .210			
T (max)*		.040		.033		.055		.070		.075		.085		.108 / .108			
Min E/B		.005		.008		.020 ± .010		.020 ± .010		.020 ± .010		.024 ± .015		.025 ± .015			
VDCW (MAX)		25V		50V		25V		50V		25V		50V		25V		50V	
CAP. CODE ↑	102	CAP. VALUE ↑	1000pF														
	122		1200														
	152		1500														
	182		1800														
	222		2200														
	272		2700														
	332		3300														
	392		3900														
	472		4700														
	562		5600														
682	6800																
822	8200																
103	.01μF																
123	.012																
153	.015																
183	.018																
223	.022																
273	.027																
333	.033																
393	.039																
473	.047																
563	.056																
683	.068																
823	.082																
104	.100μF																
124	.120																
154	.150																
184	.180																
224	.220																
274	.270																
334	.330																

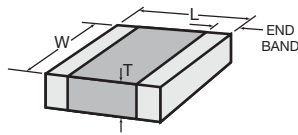
Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.

* For values above 1μF, thickness may be greater than specified above.

Ceramic Chip Capacitors

Z5U Dielectric



Values that are typically available.

(All measurements in inches)															
Size		0504 (± 0.008)		0603 (± 0.006)		0805 (± 0.008)		1206 (± 0.008)		1210 (±0.008)		1812 (±0.012)		2220 / 2221 (±0.016)	
L		.050		.063		.080		.126		.126		.177		.225 / .225	
W		.040		.032		.050		.063		.098		.126		.200 / .210	
T (max)*		.040		.033		.055		.070		.075		.085		.108 / .108	
Min E/B		.005		.008		.020 ± .010		.020 ± .010		.020 ± .010		.024 ± .015		.025 ± .015	
VDCW (MAX)		25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V	25V	50V
CAP. CODE ↑ ↓	394	CAP. VALUE ↑ ↓	.390												
	474		.470												
	564		.560												
	684		.680												
	824		.820												
	105		1.00µF												
	125		1.20												
	155		1.50												
	185		1.80												
	225		2.20												
	335		3.30												
	395		3.90												
	475		4.70												
	685		6.80												
	106		10.0µF												
	156		15.0µF												
	226		22.0µF												
	476		47.0µF												
	107		100.0µF												

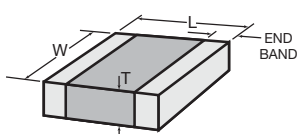
Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.

* For values above 1 μ F, thickness may be greater than specified above.

Ceramic Chip Capacitors

Y5V Dielectric



Values that are typically available.

(All measurements in inches)																																				
Size	0201 (± 0.002)	0402 (± 0.004)					0603 (± 0.006)					0805 (± 0.008)					1206 (± 0.008)					1210 (±0.008)					1812 (±0.012)									
L	.024	.040					.063					.080					.126					.126					.177									
W	.012	.020					.032					.050					.063					.098					.126									
T (max)*	.012	.025					.033					.055					.070					.075					.085									
Min E/B	.002	.004					.008					.020 ± .010					.020 ± .010					.020 ± .010					.024 ± .015									
VDCW (MAX)		10V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	10V	16V	25V	50V	6.3V	10V	16V	25V	6.3V	10V	25V	6.3V	10V	25V					
CAP CODE ↑	102	CAP VALUE ↑	1000pF																																	
	122		1200																																	
	152		1500																																	
	182		1800																																	
	222		2200																																	
	272		2700																																	
	332		3300																																	
	392		3900																																	
	472		4700																																	
	562		5600																																	
682	6800																																			
822	8200																																			
103	.01μF																																			
123	.012																																			
153	.015																																			
183	.018																																			
223	.022																																			
273	.027																																			
333	.033																																			
393	.039																																			
473	.047																																			
563	.056																																			
683	.068																																			
823	.082																																			
104	.100μF																																			
124	.120																																			
154	.150																																			
184	.180																																			
224	.220																																			
274	.270																																			
334	.330																																			

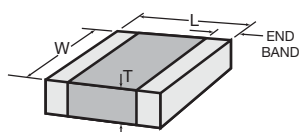
Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.

* For values above 1μF, thickness may be greater than specified above.

Ceramic Chip Capacitors

Y5V Dielectric



Values that are typically available.

(All measurements in inches)																																				
Size	0201 (± 0.002)	0402 (± 0.004)					0603 (± 0.006)					0805 (± 0.008)					1206 (± 0.008)					1210 (±0.008)					1812 (±0.012)									
L	.024	.040					.063					.080					.126					.126					.177									
W	.012	.020					.032					.050					.063					.098					.126									
T (max)*	.012	.025					.033					.055					.070					.075					.085									
Min E/B	.002	.004					.008					.020 ± .010					.020 ± .010					.020 ± .010					.024 ± .015									
VDCW (MAX)	10V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	10V	16V	25V	50V	6.3V	10V	16V	25V	6.3V	10V	25V	6.3V	10V	25V						
CAP. CODE ↑ ↓	394	↑ ↓	.390																																	
	474	.470																																		
	564	.560																																		
	684	.680																																		
	824	.820																																		
	105	1.00µF																																		
	125	1.20																																		
	155	1.50																																		
	185	1.80																																		
	225	2.20																																		
	335	3.30																																		
	395	3.90																																		
	475	4.70																																		
	685	6.80																																		
	106	10.0µF																																		
	156	15.0µF																																		
226	22.0µF																																			
476	47.0µF																																			
107	100.0µF																																			

Note:

Due to demand and raw material fluctuations in the market, changes and availability of individual values may occur. Minimum order quantities may apply.

* For values above 1µF, thickness may be greater than specified above.

All components in this section are RoHS compliant per the EU directives and definitions.