



Capacitance	Code	0402	0603	0805	1206	Capacitance	Code
100pF	101					100pF	101
120	121					120	121
150	151					150	151
180	181					180	181
220	221					220	221
270	271					270	271
330	331					330	331
390	391					390	391
470	471					470	471
560	561					560	561
680	681					680	681
820	821					820	821
1.0nF	102					1.0nF	102
1.2	122					1.2	122
1.5	152					1.5	152
1.8	182					1.8	182
2.2	222					2.2	222
2.7	272					2.7	272
3.3	332					3.3	332
3.9	392					3.9	392
4.7	472					4.7	472
5.6	562					5.6	562
6.8	682					6.8	682
8.2	822					8.2	822
10nF	103					10nF	103
12	123					12	123
15	153					15	153
18	183					18	183
22	223					22	223
27	273					27	273
33	333					33	333
39	393					39	393
47	473					47	473
56	563					56	563
68	683					68	683
82	823					82	823
100nF	104					100nF	104
120	124					120	124
150	154					150	154
180	184					180	184
220	224					220	224
270	274					270	274
330	334					330	334
390	394					390	394
470	474					470	474
560	564					560	564
680	684					680	684
820	824					820	824
1.0µF	105					1.0µF	105
1.2	125					1.2	125
1.5	155					1.5	155
1.8	185					1.8	185
2.2	225					2.2	225
2.7	275					2.7	275
3.3	335					3.3	335
3.9	395					3.9	395
4.7	475					4.7	475
5.6	565					5.6	565
6.8	685					6.8	685
8.2	825					8.2	825
10µF	106					10µF	106
12	126					12	126
15	156					15	156
18	186					18	186
22µF	226					22µF	226

For 0504, 0907, 1005, 2020, 2221, 4040, 5440 and 43100 range information please refer to your local Knowles Sales Office.

- \* StackiCap™ high capacitance versions available from the StackiCap™ range - see page 62 for details.
- † Higher capacitance values available from the NC capacitor range - see page 63 for details.
- \*\* Max. capacitance of 27nF, has increased chip length of 3.5mm. Reduced max. cap value of 22nF, for standard dimension.
- = AEC-Q200 approved parts - maximum values.
- ▲ For 0603 50/63V values from 68nF to 100nF should be ordered with FB6 suffix.



# Knowles/NOVACAP Knowles/SYFER

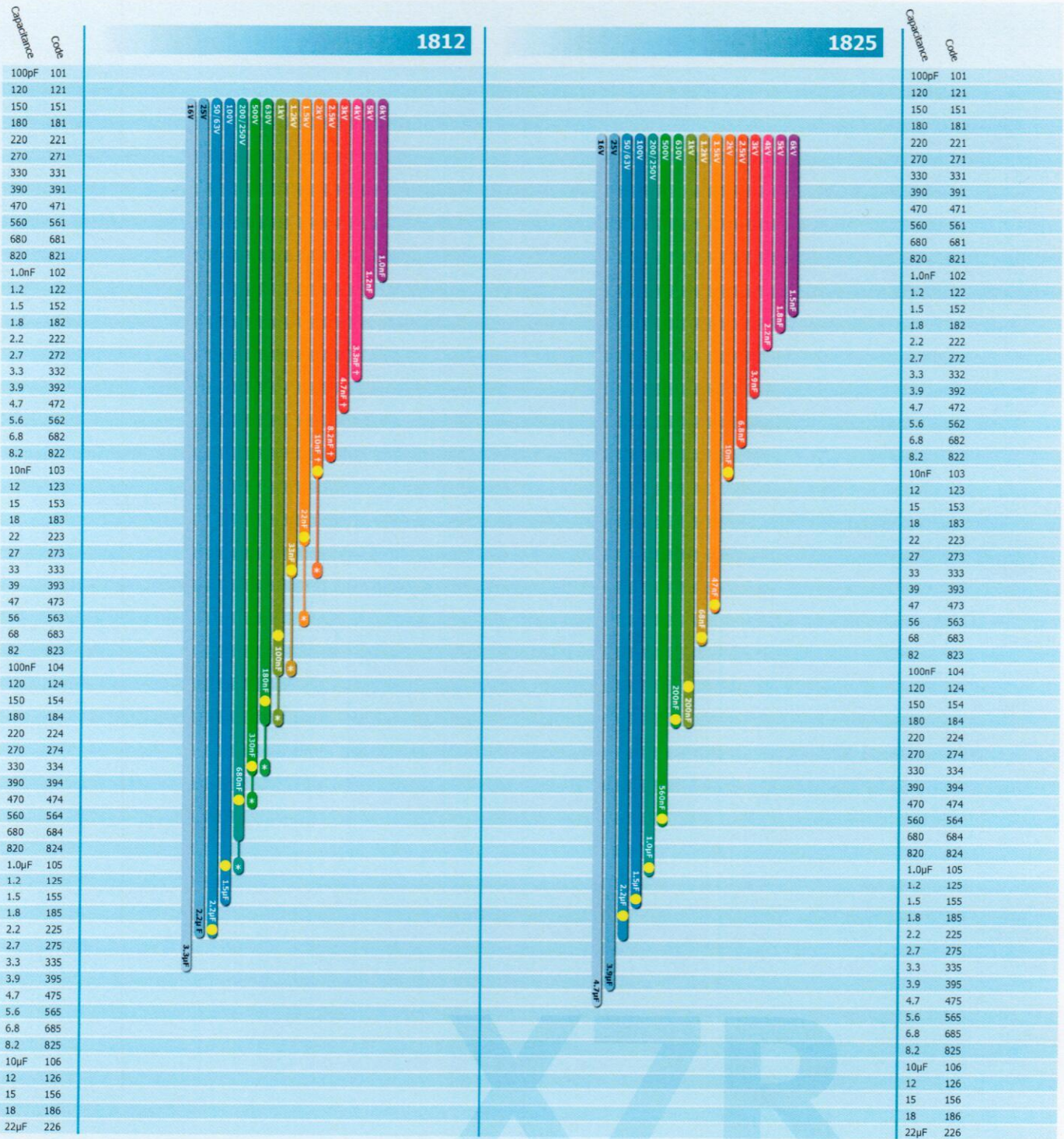
## Ceramic Chip Capacitors (X7R)

10Vdc to 50V to 6KV



Capacitance	Code	1210	1808
100pF	101		
120	121		
150	151		
180	181		
220	221		
270	271		
330	331		
390	391		
470	471		
560	561		
680	681		
820	821		
1.0nF	102		
1.2	122		
1.5	152		
1.8	182		
2.2	222		
2.7	272		
3.3	332		
3.9	392		
4.7	472		
5.6	562		
6.8	682		
8.2	822		
10nF	103		
12	123		
15	153		
18	183		
22	223		
27	273		
33	333		
39	393		
47	473		
56	563		
68	683		
82	823		
100nF	104		
120	124		
150	154		
180	184		
220	224		
270	274		
330	334		
390	394		
470	474		
560	564		
680	684		
820	824		
1.0µF	105		
1.2	125		
1.5	155		
1.8	185		
2.2	225		
2.7	275		
3.3	335		
3.9	395		
4.7	475		
5.6	565		
6.8	685		
8.2	825		
10µF	106		
12	126		
15	156		
18	186		
22µF	226		





For 0504, 0907, 1005, 2020, 2221, 4040, 5440 and 43100 range information please refer to your local Knowles Sales Office.

- \* StackiCap™ high capacitance versions available from the StackiCap™ range - see page 62 for details.
- † Higher capacitance values available from the NC capacitor range - see page 63 for details.
- = AEC-Q200 approved parts - maximum values.

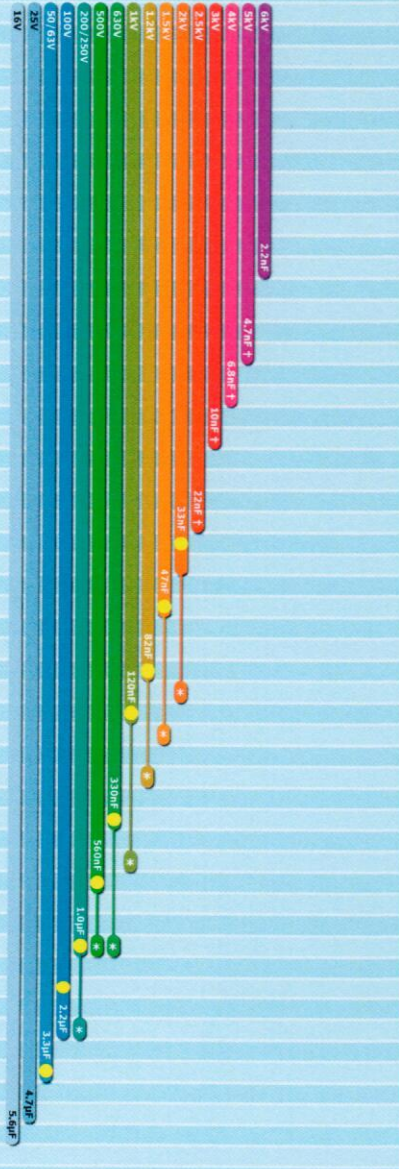


Ceramic Chip Capacitors (X7R)

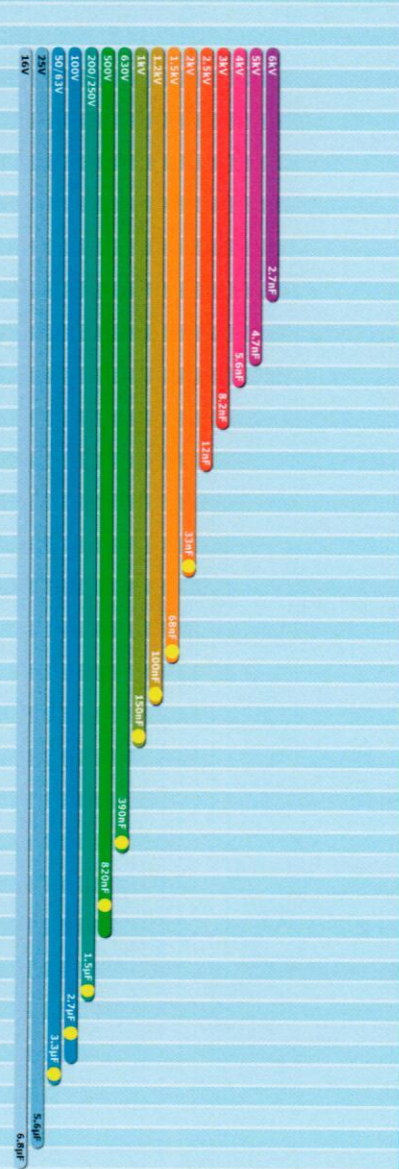
10Vdc 50V to 6KV

Capacitance	Code
100pF	101
120	121
150	151
180	181
220	221
270	271
330	331
390	391
470	471
560	561
680	681
820	821
1.0nF	102
1.2	122
1.5	152
1.8	182
2.2	222
2.7	272
3.3	332
3.9	392
4.7	472
5.6	562
6.8	682
8.2	822
10nF	103
12	123
15	153
18	183
22	223
27	273
33	333
39	393
47	473
56	563
68	683
82	823
100nF	104
120	124
150	154
180	184
220	224
270	274
330	334
390	394
470	474
560	564
680	684
820	824
1.0µF	105
1.2	125
1.5	155
1.8	185
2.2	225
2.7	275
3.3	335
3.9	395
4.7	475
5.6	565
6.8	685
8.2	825
10µF	106
12	126
15	156
18	186
22µF	226

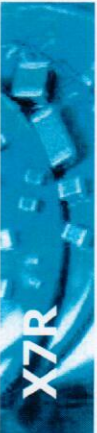
2220



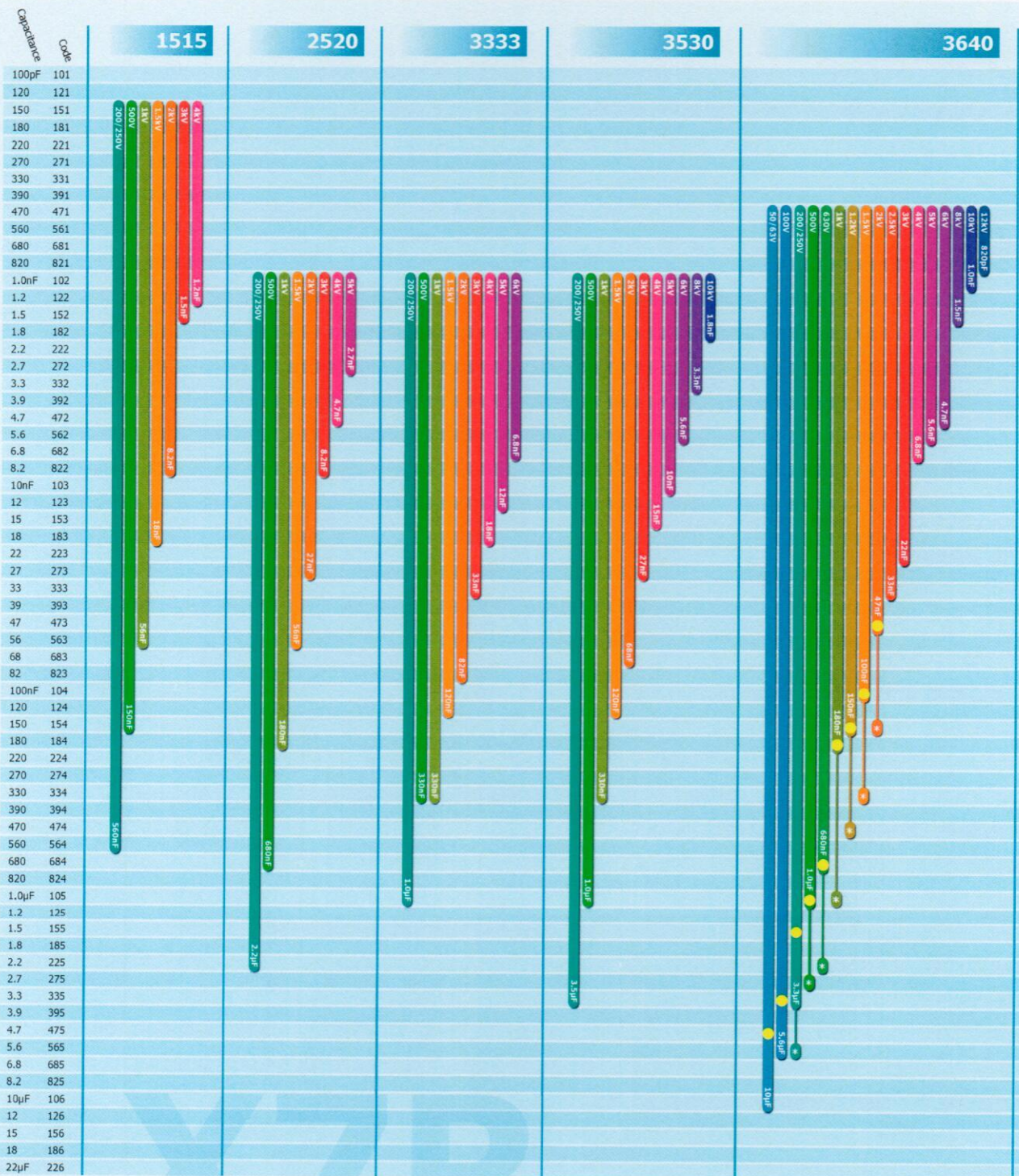
2225



Capacitance	Code
100pF	101
120	121
150	151
180	181
220	221
270	271
330	331
390	391
470	471
560	561
680	681
820	821
1.0nF	102
1.2	122
1.5	152
1.8	182
2.2	222
2.7	272
3.3	332
3.9	392
4.7	472
5.6	562
6.8	682
8.2	822
10nF	103
12	123
15	153
18	183
22	223
27	273
33	333
39	393
47	473
56	563
68	683
82	823
100nF	104
120	124
150	154
180	184
220	224
270	274
330	334
390	394
470	474
560	564
680	684
820	824
1.0µF	105
1.2	125
1.5	155
1.8	185
2.2	225
2.7	275
3.3	335
3.9	395
4.7	475
5.6	565
6.8	685
8.2	825
10µF	106
12	126
15	156
18	186
22µF	226







\* StackiCap™ high capacitance versions available from the StackiCap™ range - see page 62 for details.

● = AEC-Q200 approved parts - maximum values.







## Chip ordering information - Novacap parts

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

### Prefix Definitions

None	Standard chip	
<b>RF</b>	Improved ESR Capacitor	p. 39
<b>ST</b>	Stacked Capacitor Assembly	p. 76 - 81
<b>SM</b>	Stacked Hi-Rel Capacitor Assembly	p. 76 - 81
<b>CR</b>	Cap Rack Arrays	p. 82

### Dielectric Codes

<b>N</b>	COG/NPO	Ultra Stable
<b>K</b>	R3L	Ultra Stable
<b>B</b>	X7R	Stable
<b>W</b>	X5R	Stable
<b>X</b>	BX	MIL
<b>BB</b>	X7R	Stable BME
<b>BW</b>	X5R	Stable BME
<b>M</b>	COG/NPO	Non Magnetic
<b>C</b>	X7R	Non Magnetic
<b>F</b>	COG/NPO	High Temp. (up to 160°C)
<b>D, RD</b>	COG/NPO	High Temp. (up to 200°C)
<b>S</b>	X8R	High Temp. (up to 150°C)
<b>E, RE</b>	Class II	High Temp. (up to 200°C)
<b>G</b>	Class II	High Temp. (up to 160°C)
<b>RN</b>	COG/NPO	Lead free
<b>RB</b>	X7R	Lead free

### Capacitance Codes

1 <sup>st</sup> two digits are significant figures of capacitance, 3 <sup>rd</sup> digit denotes number of zeros, R = decimal point Examples:	1R0	1.0pF
	120	12pF
	471	470pF
	102	1,000pF
	273	0.027µF
	474	0.47µF
	105	1.0µF

### Capacitance Tolerance Codes

Code	Tolerance	COG/NPO									
		N	M	F/D, RD	K	B	C, RE	X	S	E/G	W
<b>B</b>	±0.10pF	•	•								
<b>C</b>	±0.25pF	•	•		•						
<b>D</b>	±0.50pF	•	•		•						
<b>F</b>	±1%	•	•	•							
<b>G</b>	±2%	•	•	•	•						
<b>J</b>	±5%	•	•	•	•	•*	•	•*	•	•	
<b>K</b>	±10%	•	•	•	•	•	•	•	•	•	•
<b>M</b>	±20%	•		•	•	•	•	•	•	•	•

### Special Thickness

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

### High Reliability Testing

None	Standard product
<b>H</b>	High Reliability Testing
<b>H</b>	High Temp Screening

### Voltage Code

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

<b>160</b>	16 Volts
<b>101</b>	100 Volts
<b>501</b>	500 Volts
<b>102</b>	1,000 Volts
<b>502</b>	5,000 Volts
<b>103</b>	10,000 Volts

### Termination Codes

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

\*Indicates RoHS terminations

### Marking

None	Unmarked
<b>M</b>	Marked *Marking not available on sizes ≤ 0603

Note: Refer to page 17.

### Packaging

None	Bulk
<b>T</b>	Tape and Reel
<b>W</b>	Waffle Pack

### High Reliability Testing Criteria

<b>HB</b>	MIL-PRF-55681 Group A
<b>HV</b>	MIL-PRF-49467 Group A
<b>HS</b>	MIL-PRF-123 Group A
<b>HK</b>	MIL-PRF-38534 Class K



## Chip ordering information - Syfer parts

<b>1210</b>	<b>Y</b>	<b>100</b>	<b>0103</b>	<b>K</b>	<b>X</b>	<b>T</b>	<b>---</b>
Chip Size	Termination	Voltage	Capacitance in picofarads (pF)	Capacitance Tolerance	Dielectric	Packaging	Suffix code

### Case Code

0402
0603
0805
1206
1210
1808
1812
1825
2220
2225
3640
5550
8060

### Termination Codes

<b>A</b>	Nickel barrier	90/10% tin/lead
<b>F</b>	Palladium Silver*	
<b>H</b>	FlexiCap™/Nickel Barrier	90/10% tin/lead
<b>J</b>	Nickel Barrier*	100% tin
<b>Y</b>	FlexiCap™/Nickel Barrier*	100% tin
<b>2</b>	Copper Barrier* (Non Mag)	100% tin
<b>3</b>	FlexiCap™/Copper Barrier* (Non Mag)	100% tin
<b>4</b>	Copper Barrier (Non Mag)	90/10% tin/lead
<b>5</b>	FlexiCap™/Copper Barrier (Non Mag)	90/10% tin/lead

\*Indicates RoHS terminations

### Voltage Code

Code	Value	Code	Value	Code	Value
<b>010</b>	10Vdc	<b>1K0</b>	1kVdc	<b>A25</b>	250Vac
<b>016</b>	16Vdc	<b>1K2</b>	1.2kVdc		
<b>025</b>	25Vdc	<b>1K5</b>	1.5kVdc		
<b>050</b>	50Vdc	<b>2K0</b>	2kVdc		
<b>063</b>	63Vdc	<b>2K5</b>	2.5kVdc		
<b>100</b>	100Vdc	<b>3K0</b>	3kVdc		
<b>200</b>	200Vdc	<b>4K0</b>	4kVdc		
<b>250</b>	250Vdc	<b>5K0</b>	5kVdc		
<b>500</b>	500Vdc	<b>6K0</b>	6kVdc		
<b>630</b>	630Vdc	<b>8K0</b>	8kVdc		
		<b>10K</b>	10kVdc		
		<b>12K</b>	12kVdc		

### Capacitance Tolerance Codes

Code	Tolerance	Cap. Value
<b>H</b>	±0.05pF	< 4.7pF
<b>H</b>	±0.05pF	
<b>B</b>	±0.10pF	Cap. Value < 10pF
<b>C</b>	±0.25pF	
<b>D</b>	±0.50pF	
<b>F</b>	±1%	
<b>G</b>	±2%	
<b>J</b>	±5%	Cap. Value ≥ 10pF
<b>K</b>	±10%	
<b>M</b>	±20%	

### Packaging

Code	Description
<b>T</b>	178mm (7") reel
<b>R</b>	330mm (13") reel
<b>B</b>	Bulk pack - tubs or trays

### Suffix Definitions

Used for specific customer requirements

<b>PXX</b>	Palladium electrodes
<b>LS*</b>	Chip marking *(consult sales office)

### Dielectric Codes

Code	Dielectric	Features
<b>C</b>	COG/NP0 (1B)	Ultra Stable
<b>H</b>	X8G	Ultra Stable/High Q
<b>P</b>	X5R	Stable
<b>X</b>	X7R (2R1)	Stable
<b>J</b>	X7R (2R1)(BME)	Stable
<b>N</b>	X8R	Stable
<b>Q</b>	COG/NP0 (1B)	Ultra Stable/High Q
<b>U</b>	COG/NP0 (1B)	Ultra Stable/Ultra-low ESR
<b>A</b>	COG/NP0 (1B)	AEC-Q200 approved
<b>S</b>	X7R (2R1)(BME)	AEC-Q200 approved
<b>E</b>	X7R (2R1)	AEC-Q200 approved
<b>T</b>	X8R	AEC-Q200 approved
<b>K</b>	COG/NP0 (1B)(BME)	AEC-Q200 approved
<b>F</b>	COG/NP0 (1B)	IECQ-CECC release
<b>D</b>	X7R (2R1)	IECQ-CECC release
<b>R</b>	BZ (2C1)	IECQ-CECC release
<b>B</b>	BX (2X1)	IECQ-CECC release
<b>G</b>	COG/NP0 (1B)(BME)	Ultra Stable

### Capacitance Code

Calculation	Example	Capacitance value
<1.0pF Insert a P for the decimal point as the 1 <sup>st</sup> character.	<b>P300</b>	0.3pF (values in 0.1pF steps)
≥1.0pF & <10pF Insert a P for the decimal point as the 2 <sup>nd</sup> character.	<b>8P20</b>	8.2pF (values are E24 series)
≥10pF 1 <sup>st</sup> digit is 0. 2 <sup>nd</sup> and 3 <sup>rd</sup> digits are significant figures of capacitance value. 4 <sup>th</sup> digit is number of zeros.	<b>0101</b>	100pF (values are E24 series)