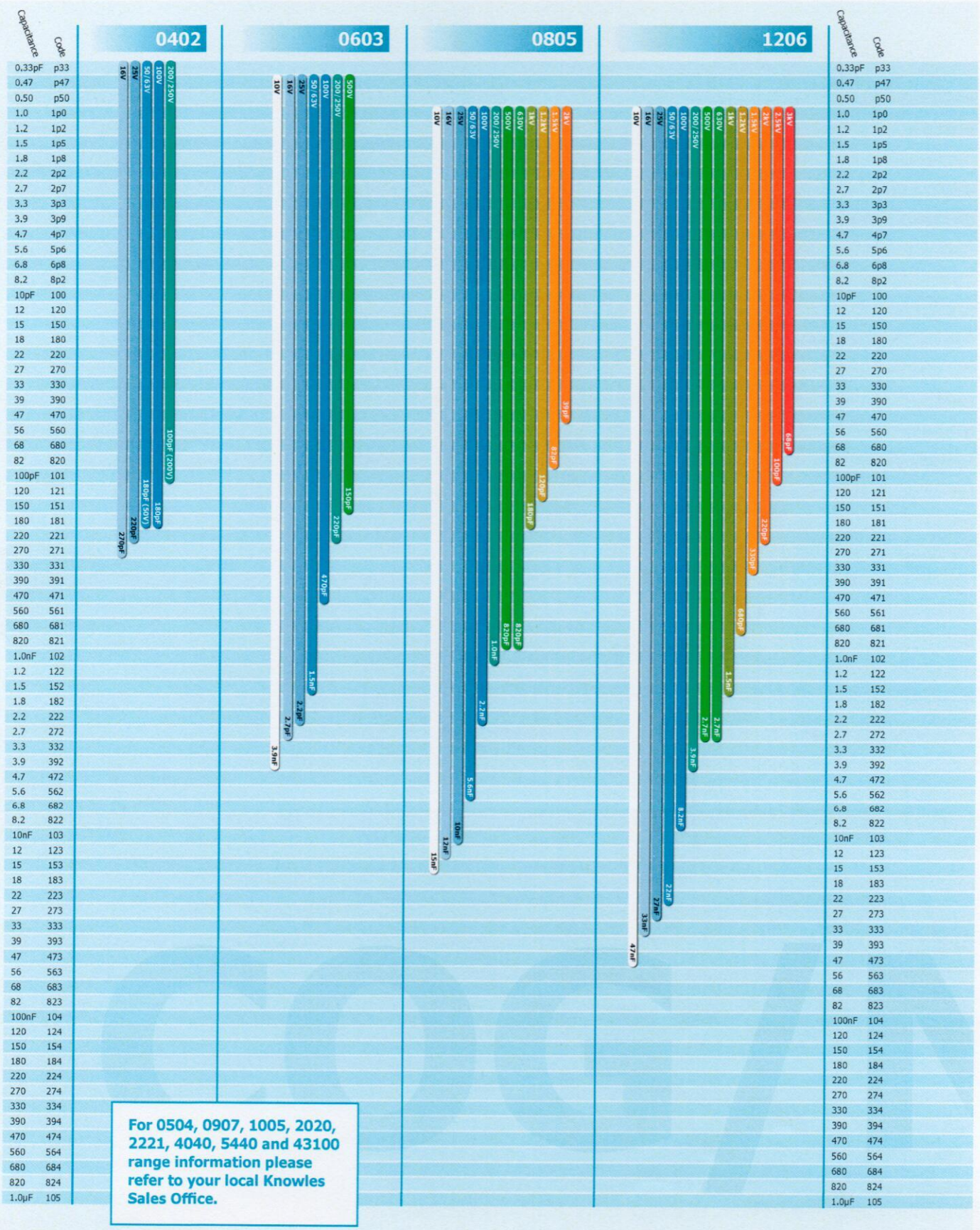
Industry Standard - MLC chip range - C0G/NP0 16V to 3KV

C0G/NP0



Capacitance	Code
0.33pF	p33
0.47	p47
0.50	p50
1.0	1p0
1.2	1p2
1.5	1p5
1.8	1p8
2.2	2p2
2.7	2p7
3.3	3p3
3.9	3p9
4.7	4p7
5.6	5p6
6.8	6p8
8.2	8p2
10pF	100
12	120
15	150
18	180
22	220
27	270
33	330
39	390
47	470
56	560
68	680
82	820
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

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

Ceramic Chip Capacitors (C0G/NPO)

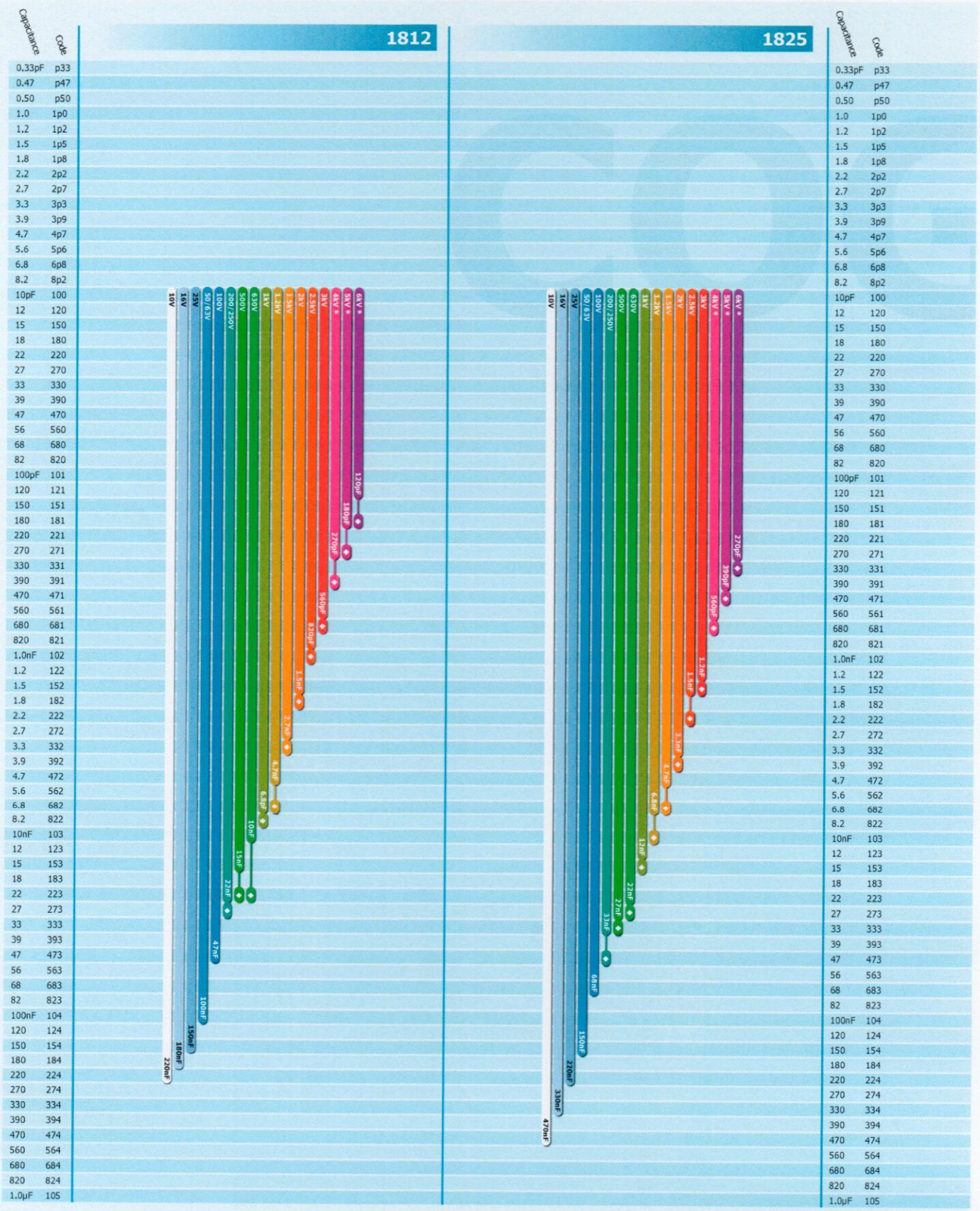
16V to 6KV

Capacitance	Code	1210	1808
0.33pF	p33		
0.47	p47		
0.50	p50		
1.0	1p0		
1.2	1p2		
1.5	1p5		
1.8	1p8		
2.2	2p2		
2.7	2p7		
3.3	3p3		
3.9	3p9		
4.7	4p7		
5.6	5p6		
6.8	6p8		
8.2	8p2		
10pF	100		
12	120		
15	150		
18	180		
22	220		
27	270		
33	330		
39	390		
47	470		
56	560		
68	680		
82	820		
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		

Notes: 1) * These parts may require conformal coating post soldering.
2) Standard chip thickness = 2.5mm maximum unless specified as 3.2 or 4.0mm.

3) △ For 1210 630V 6.8nF, order with AG1 suffix.

Industry Standard - MLC chip range - C0G/NP0 16V to 6KV



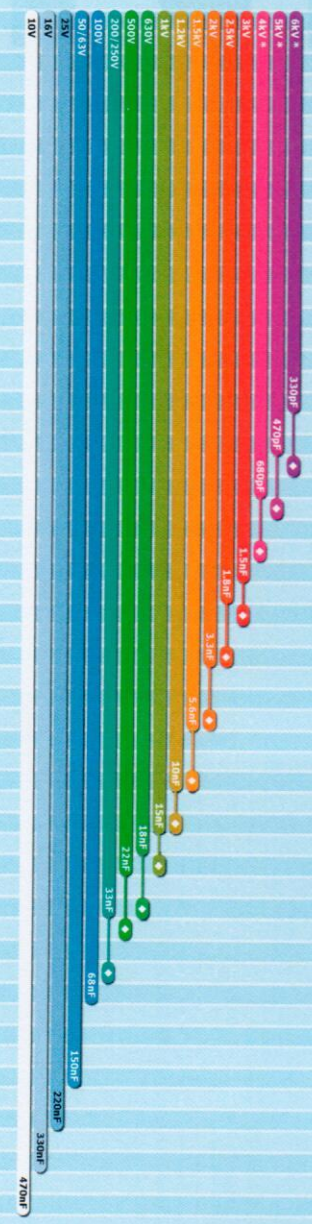
Capacitance	Code	1812	1825
0.33pF	p33	10V	10V
0.47	p47	16V	16V
0.50	p50	25V	25V
1.0	1p0	50/63V	50/63V
1.2	1p2	100V	100V
1.5	1p5	200/250V	200/250V
1.8	1p8	500V	500V
2.2	2p2	630V	630V
2.7	2p7	1kV	1kV
3.3	3p3	1.2kV	1.2kV
3.9	3p9	1.5kV	1.5kV
4.7	4p7	2kV	2kV
5.6	5p6	2.5kV	2.5kV
6.8	6p8	3kV	3kV
8.2	8p2	4kV *	4kV *
10pF	100	5kV *	5kV *
12	120	6kV *	6kV *
15	150	120pF	270pF
18	180	180pF	390pF
22	220	270pF	560pF
27	270	560pF	1.2nF
33	330	820pF	1.5nF
39	390	1.5nF	3.3nF
47	470	2.7nF	4.7nF
56	560	4.7nF	6.8nF
68	680	6.8nF	12nF
82	820	10nF	22nF
100pF	101	15nF	27nF
120	121	22nF	33nF
150	151	47nF	68nF
180	181	100nF	150nF
220	221	150nF	220nF
270	271	180nF	330nF
330	331	220nF	470nF
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		

Ceramic Chip Capacitors (C0G/NPO)

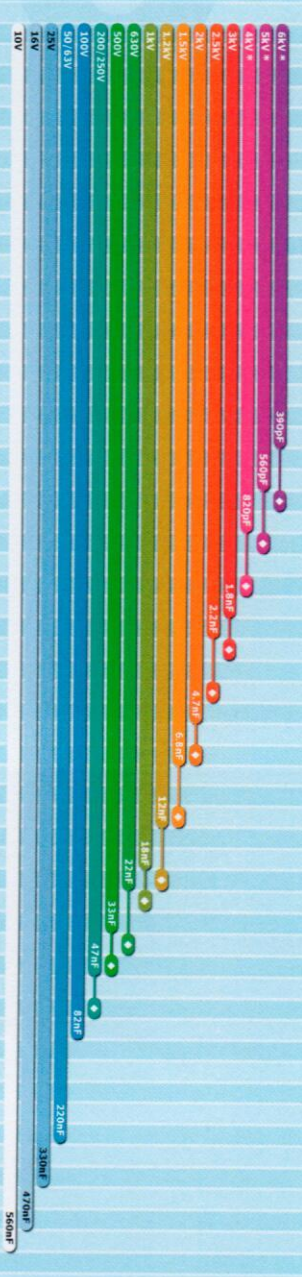
16V to 6KV

Capacitance	Code
0.33pF	p33
0.47	p47
0.50	p50
1.0	1p0
1.2	1p2
1.5	1p5
1.8	1p8
2.2	2p2
2.7	2p7
3.3	3p3
3.9	3p9
4.7	4p7
5.6	5p6
6.8	6p8
8.2	8p2
10pF	100
12	120
15	150
18	180
22	220
27	270
33	330
39	390
47	470
56	560
68	680
82	820
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

2220



2225

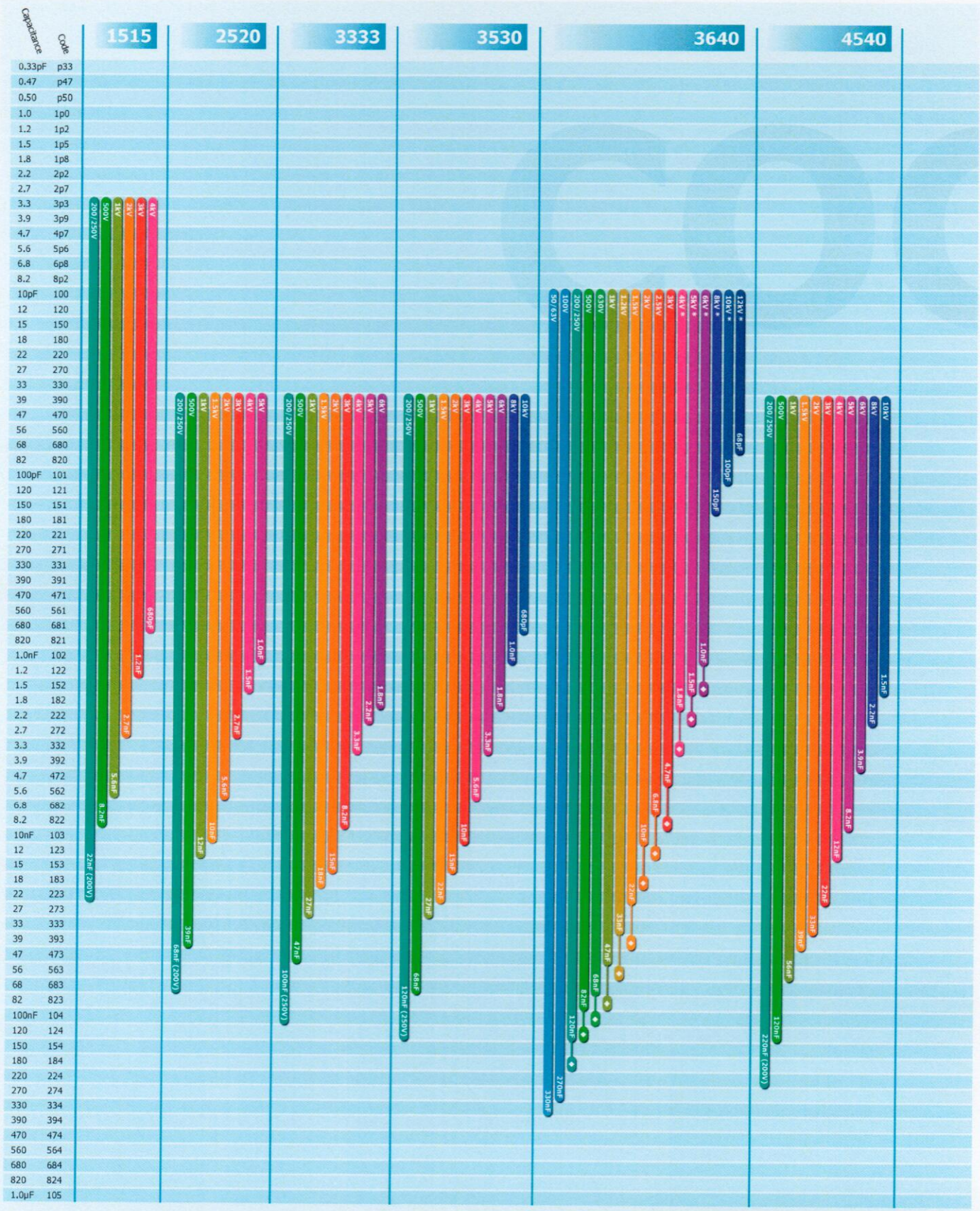


For 0504, 0907, 1005, 2020, 2221, 4040, 5440 and 43100 range information please refer to your local Knowles Sales Office.

Notes: 1) * These parts may require conformal coating post soldering.
2) ◆ Standard chip thickness = 2.5mm maximum unless specified as 3.2 or 4.0mm.

Other Popular Sizes - MLC chip range - C0G/NP0 50V to 12KV

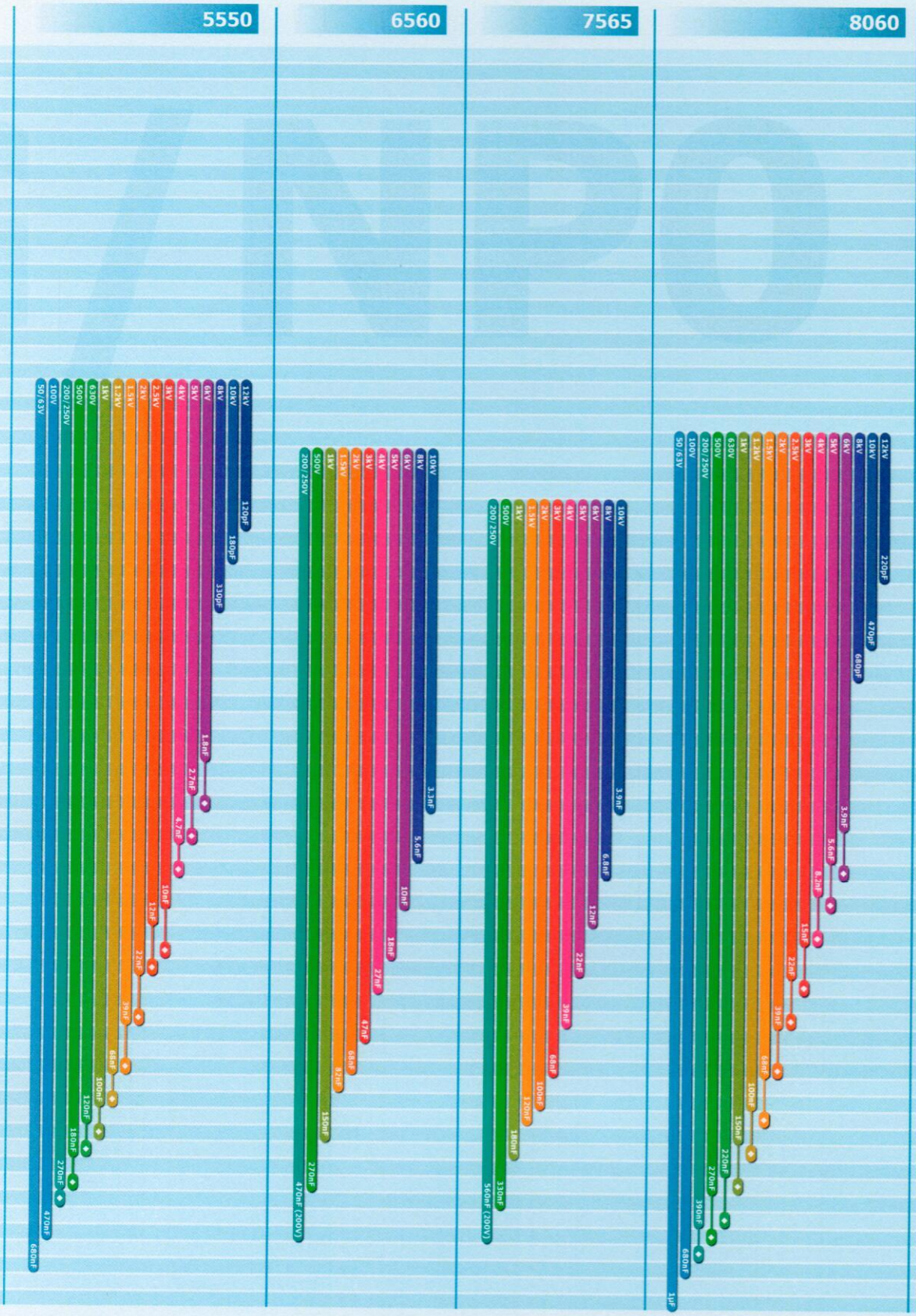
C0G/NP0



Ceramic Chip Capacitors (C0G/NPO)

50V to 12KV

C0G/NP0



Capacitance	Code
0.33pF	p33
0.47	p47
0.50	p50
1.0	1p0
1.2	1p2
1.5	1p5
1.8	1p8
2.2	2p2
2.7	2p7
3.3	3p3
3.9	3p9
4.7	4p7
5.6	5p6
6.8	6p8
8.2	8p2
10pF	100
12	120
15	150
18	180
22	220
27	270
33	330
39	390
47	470
56	560
68	680
82	820
100pF	101
120	121
150	151
180	181
220	221
270	271
330	331
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1.0nF	102
1.2	122
1.5	152
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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

Note: * These parts may require conformal coating post soldering.

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	
RF	Improved ESR Capacitor	p. 39
ST	Stacked Capacitor Assembly	p. 76 - 81
SM	Stacked Hi-Rel Capacitor Assembly	p. 76 - 81
CR	Cap Rack Arrays	p. 82

Dielectric Codes

N	C0G/NP0	Ultra Stable
K	R3L	Ultra Stable
B	X7R	Stable
W	X5R	Stable
X	BX	MIL
BB	X7R	Stable BME
BW	X5R	Stable BME
M	C0G/NP0	Non Magnetic
C	X7R	Non Magnetic
F	C0G/NP0	High Temp. (up to 160°C)
D, RD	C0G/NP0	High Temp. (up to 200°C)
S	X8R	High Temp. (up to 150°C)
E, RE	Class II	High Temp. (up to 200°C)
G	Class II	High Temp. (up to 160°C)
RN	C0G/NP0	Lead free
RB	X7R	Lead free

Capacitance Codes

1st two digits are significant figures of capacitance, 3rd 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 (* Not RF series)		C0G/NP0 N	C0G/NP0 M	C0G/NP0 F/D, RD	R3L K	X7R B	X7R C, RE	BX X	X8R S	Class II E/G	X5R W
B	±0.10pF	Cap. Value < 10pF	•	•								
C	±0.25pF		•	•		•						
D	±0.50pF		•	•		•						
F	±1%		•	•	•							
G	±2%		•	•	•	•						
J	±5%		•	•	•	•	•*	•	•*	•	•	
K	±10%		•	•	•	•	•	•	•	•	•	•
M	±20%		•		•	•	•	•	•	•	•	•

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")

Marking

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

Note: Refer to page 17.

Packaging

None	Bulk
T	Tape and Reel
W	Waffle Pack

High Reliability Testing

None	Standard product
H	High Reliability Testing
H	High Temp Screening

High Reliability Testing Criteria

HB	MIL-PRF-55681 Group A
HV	MIL-PRF-49467 Group A
HS	MIL-PRF-123 Group A
HK	MIL-PRF-38534 Class K

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

Chip ordering information - Syfer parts

1210	Y	100	0103	K	X	T	– – –
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

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

*Indicates RoHS terminations

Voltage Code

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

Capacitance Tolerance Codes

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

Packaging

Code	
T	178mm (7") reel
R	330mm (13") reel
B	Bulk pack - tubs or trays

Suffix Definitions

Used for specific customer requirements	
PXX	Palladium electrodes
LS*	Chip marking *(consult sales office)

Dielectric Codes

Code	Dielectric	Features
C	C0G/NP0 (1B)	Ultra Stable
H	X8G	Ultra Stable/High Q
P	X5R	Stable
X	X7R (2R1)	Stable
J	X7R (2R1)(BME)	Stable
N	X8R	Stable
Q	C0G/NP0 (1B)	Ultra Stable/High Q
U	C0G/NP0 (1B)	Ultra Stable/Ultra-low ESR
A	C0G/NP0 (1B)	AEC -Q200 approved
S	X7R (2R1)(BME)	AEC -Q200 approved
E	X7R (2R1)	AEC -Q200 approved
T	X8R	AEC -Q200 approved
K	C0G/NP0 (1B)(BME)	AEC -Q200 approved
F	C0G/NP0 (1B)	IECQ-CECC release
D	X7R (2R1)	IECQ-CECC release
R	BZ (2C1)	IECQ-CECC release
B	BX (2X1)	IECQ-CECC release
G	C0G/NP0 (1B)(BME)	Ultra Stable

Capacitance Code

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