Innovative Service Around the Globe YAGEO

DATA SHEET

SURFACE-MOUNT CERAMIC MULTILAYER CAPACITORS

Hi Q Series

Class 1, NP0

16V TO 500V

0.1 pF to 100 pF

RoHS compliant & Halogen Free

YAGEO

Product Specification – May. 04, 2022 V.17

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SCOPE

This specification describes NP0 series chip capacitors with lead-free terminations.

APPLICATIONS

- Consumer electronics for example
  - Tuners
  - Television receivers
  - All types of cameras
- Telecommunications
- Data processing

FEATURES

- Supplied in tape on reel
- Nickel-barrier end termination
- RoHS compliant
- Halogen Free compliant
- MSL class: level 1

ORDERING INFORMATION - GLOBAL PART NUMBER, PHYCOMP CTC & 12NC

All part numbers are identified by the series, size, tolerance, TC material, packing style, voltage, process code, termination and capacitance value.

YAGEO/ PHYCOMP BRAND ordering code

GLOBAL PART NUMBER (PREFERRED)

CQ	xxxx	x	x	NPO	x	BN	xxx
	(1)	(2)	(3)		(4)		(5)

(1) SIZE – INCH BASED (METRIC)

0100 (0402)
0201 (0603)
0402 (1005)
0603 (1608)
0805 (2012)

(2) TOLERANCE

0.1pF
B = ±0.1 pF
0.2pF to 2.0 pF
A = ±0.05 pF
B = ±0.1 pF
C = ±0.25 pF

2.1pF to 5.0pF
A = ±0.05 pF
B = ±0.1 pF
C = ±0.25 pF
D = ±0.5 pF

5.1pF to 9.9pF
B = ±0.1 pF
C = ±0.25 pF
D = ±0.5 pF

10pF and over
F = ±1%
G = ±2%
J = ±5%

(3) PACKING STYLE

R = Paper/PE taping reel; Reel 7 inch
P = Paper/PE taping reel; Reel 13 inch

(4) RATED VOLTAGE

7 = 16V	0=100V	B=500V
8 = 25V	A=200V	
9 = 50V	Y=250V	

(5) CAPACITANCE VALUE

2 significant digits + number of zeros
The 3rd digit signifies the multiplying factor, and letter R is decimal point
Example: 121 = 12 x 10^1 = 120 pF

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CONSTRUCTION

The capacitor consists of a rectangular block of ceramic dielectric in which a number of interleaved metal electrodes are contained. This structure gives rise to a high capacitance per unit volume.

The inner electrodes are connected to the two end terminations and finally covered with a layer of plated tin (NiSn). The terminations are lead-free. A cross section of the structure is shown in Fig.1.

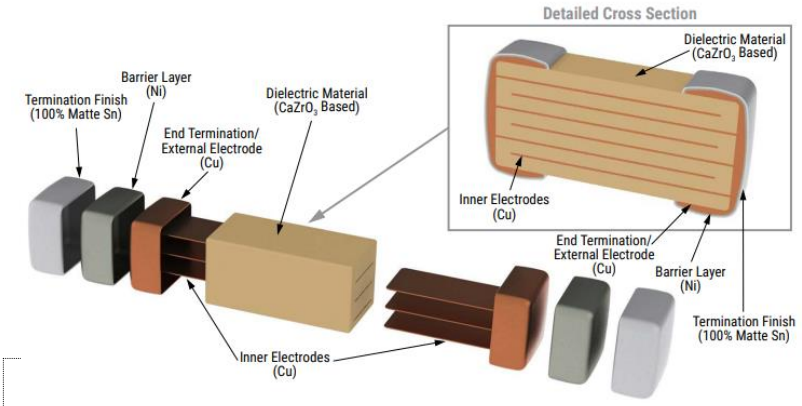

Fig. 1 Surface mounted multilayer ceramic capacitor construction

DIMENSION

Table 1 For outlines see fig. 2

TYPE	L_1 (mm)	W (mm)	T (MM)	L_2 / L_3 (mm)		L_4 (mm)
				min.	max.	min.
01005	0.4±0.02	0.2±0.02	0.2±0.02	0.07	0.14	0.13
0201	0.6±0.03	0.3±0.03	Refer to table 2 to 5	0.10	0.20	0.20
0402	1.0±0.05	0.5±0.05		0.15	0.35	0.30
0603	1.6±0.10	0.8±0.10		0.20	0.60	0.40
0805	2.0±0.20	1.25±0.20		0.25	0.75	0.55

OUTLINES

For dimension see Table 1

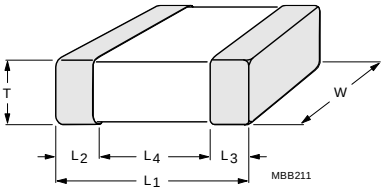

Fig. 2 Surface mounted multilayer ceramic capacitor dimension

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CAPACITANCE RANGE & THICKNESS FOR NP0

Table 2 Sizes from 0201 to 0402

CAP.	01005	0201		0402	CAP.	01005	0201		0402
	16V/25V	25V/50V	100V	50V to 250V		16V/25V	25V/50V	100V	50V to 250V
0.1 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	2.6 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
0.2 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	2.7 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
0.3 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	2.8 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
0.4 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	2.9 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
0.5 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	3.0 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
0.6 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	3.1 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
0.7 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	3.2 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
0.8 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	3.3 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
0.9 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	3.4 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
1.0 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	3.5 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
1.1 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	3.6 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
1.2 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	3.7 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
1.3 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	3.8 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
1.4 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	3.9 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
1.5 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	4.0 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
1.6 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	4.1 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
1.7 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	4.2 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
1.8 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	4.3 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
1.9 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	4.4 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
2.0 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	4.5 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
2.1 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	4.6 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
2.2 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	4.7 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
2.3 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	4.8 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
2.4 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	4.9 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
2.5 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	5.0 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
Tape Width		8mm			Tape Width		8mm		

NOTE

1. Values in shaded cells indicate thickness class in mm

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CAPACITANCE RANGE & THICKNESS FOR NP0

Table 3 Sizes from 0201 to 0402

CAP.	01005	0201		0402	CAP.	01005	0201		0402
	16V/ 25V	25V/50V	100V	50V to 250V		16V/25V	25V/50V	100V	50V to 250V
5.1 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	8.2 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
5.2 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	8.3 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
5.3 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	8.4 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
5.4 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	8.5 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
5.5 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	8.6 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
5.6 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	8.7 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
5.7 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	8.8 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
5.8 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	8.9 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
5.9 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	9.0 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
6.0 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	9.1 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
6.1 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	9.2 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
6.2 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	9.3 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
6.3 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	9.4 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
6.4 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	9.5 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
6.5 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	9.6 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
6.6 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	9.7 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
6.7 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	9.8 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
6.8 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	9.9 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
6.9 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	10 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05
7.0 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	12 pF	0.2±0.02	0.3±0.03		0.5±0.05
7.1 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	15 pF	0.2±0.02	0.3±0.03		0.5±0.05
7.2 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	18 pF		0.3±0.03		0.5±0.05
7.3 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	22 pF		0.3±0.03		0.5±0.05
7.4 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	27 pF		0.3±0.03		0.5±0.05
7.5 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	33 pF		0.3±0.03		0.5±0.05
7.6 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	39 pF		0.3±0.03		0.5±0.05
7.7 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	47 pF				0.5±0.05
7.8 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	56 pF				0.5±0.05
7.9 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	68 pF				0.5±0.05
8.0 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	82 pF				0.5±0.05
8.1 pF	0.2±0.02	0.3±0.03	0.3±0.03	0.5±0.05	100 pF				0.5±0.05
Tape Width		8mm			Tape Width		8mm		

NOTE

Values in shaded cells indicate thickness class in mm

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CAPACITANCE RANGE & THICKNESS FOR NP0

Table 4 Sizes from 0603 to 0805

CAP.	0603		0805		
	50V	100V/250V	50V	100V/250V	500V
0.1 pF	0.8±0.1	0.8±0.1			
0.2 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
0.3 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
0.4 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
0.5 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
0.6 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
0.7 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
0.8 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
0.9 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
1.0 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
1.1 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
1.2 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
1.3 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
1.4 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
1.5 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
1.6 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
1.7 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
1.8 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
1.9 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
2.0 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
2.1 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
2.2 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
2.3 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
2.4 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
2.5 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
Tape Width			8mm		

CAP.	0603		0805		
	50V	100V/250V	50V	100V/250V	500V
2.6 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
2.7 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
2.8 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
2.9 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
3.0 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
3.1 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
3.2 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
3.3 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
3.4 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
3.5 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
3.6 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
3.7 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
3.8 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
3.9 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
4.0 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
4.1 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
4.2 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
4.3 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
4.4 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
4.5 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
4.6 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
4.7 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
4.8 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
4.9 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
5.0 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
Tape Width			8mm		

NOTE

1. Values in shaded cells indicate thickness class in mm

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CAPACITANCE RANGE & THICKNESS FOR NP0

Table 5 Sizes from 0603 to 0805

CAP.	0603		0805		
	50V	100V/250V	50V	100V/250V	500V
5.1 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
5.2 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
5.3 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
5.4 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
5.5 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
5.6 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
5.7 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
5.8 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
5.9 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
6.0 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
6.1 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
6.2 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
6.3 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
6.4 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
6.5 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
6.6 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
6.7 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
6.8 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
6.9 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
7.0 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
7.1 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
7.2 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
7.3 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
7.4 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
7.5 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
7.6 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
7.7 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
7.8 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
7.9 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
8.0 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
8.1 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
Tape Width	8mm				

CAP.	0603		0805		
	50V	100V/250V	50V	100V/250V	500V
8.2 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
8.3 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
8.4 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
8.5 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
8.6 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
8.7 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
8.8 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
8.9 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
9.0 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
9.1 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
9.2 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
9.3 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
9.4 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
9.5 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
9.6 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
9.7 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
9.8 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
9.9 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
10 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
12 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
15 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
18 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
22 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
24 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
27 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
33 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
39 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
47 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
56 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
68 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	0.85±0.1
82 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	
100 pF	0.8±0.1	0.8±0.1	0.6±0.1	0.6±0.1	
Tape Width	8mm				

NOTE

1. Values in shaded cells indicate thickness class in mm

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THICKNESS CLASSES AND PACKING QUANTITY

Table 6

SIZE CODE	THICKNESS CLASSIFICATION	TAPE WIDTH QUANTITY PER REEL	Ø180 MM / 7 INCH		Ø330 MM / 13 INCH		QUANTITY PER BULK CASE
			Paper/PE	Blister	Paper/PE	Blister	
01005	0.2 ± 0.02 mm	8 mm	20,000	---	80,000	---	---
0201	0.3 ±0.03 mm	8 mm	15,000	---	50,000	---	---
0402	0.5 ±0.05 mm	8 mm	10,000	---	50,000	---	---
0603	0.8 ±0.1 mm	8 mm	4,000	---	15,000	---	---
0805	0.6 ±0.1 mm	8 mm	4,000	---	20,000	---	---
0805	0.85 ±0.1 mm	8 mm	4,000	---	15,000	---	---

ELECTRICAL CHARACTERISTICS

NP0 DIELECTRIC CAPACITORS; NISN TERMINATIONS

Unless otherwise stated all electrical values apply at an ambient temperature of 20±1 °C, an atmospheric pressure of 86 to 106 kPa, and a relative humidity of 63 to 67%.

Table 7

DESCRIPTION		VALUE
Capacitance range		0.1 pF to 100 pF
Capacitance tolerance		
	C < 10 pF	±0.05 pF, ±0.1 pF, ±0.25 pF, ±0.5 pF
	C ≥ 10 pF	±1%, ±2%, ±5%
Q value		
	C < 30 pF	Q ≥ (400 + 20C) C: pF
	C ≥ 30 pF	Q ≥ 1000
Insulation resistance after 1 minute at U_r (DC)		R_{ins} ≥ 10 GΩ or R_{ins} × C_r ≥ 500 seconds whichever is less
Maximum capacitance change as a function of temperature (temperature characteristic/coefficient):		±30 ppm/°C
Operating temperature range:		–55 °C to +125 °C

SOLDERING RECOMMENDATION

Table 8

SOLDERING METHOD	SIZE 01005	0201	0402	0603	0805
Reflow	○	○	○	○	○
Wave	---	---	---	○	○

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TESTS AND REQUIREMENTS

Table 9 Test procedures and requirements

TEST	TEST METHOD		PROCEDURE	REQUIREMENTS
Mounting	IEC 60384-21/22	4.3	The capacitors may be mounted on printed-circuit boards or ceramic substrates	No visible damage
Visual inspection and dimension check		4.4	Any applicable method using × 10 magnification	In accordance with specification
Capacitance		4.5.1	Class 1: f = 1 MHz for C ≤ 1 nF, measuring at voltage 1 V_{rms} at 20 °C f = 1 KHz for C > 1 nF, measuring at voltage 1 V_{rms} at 20 °C	Within specified tolerance
Q value		4.5.2	Class 1: f = 1 MHz for C ≤ 1 nF , measuring at voltage 1 V_{rms} at 20 °C f = 1 KHz for C > 1 nF, measuring at voltage 1 V_{rms} at 20 °C	In accordance with specification
Insulation resistance		4.5.3	At U_r (DC) for 1 minute	In accordance with specification

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TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Temperature coefficient	4.6	Capacitance shall be measured by the steps shown in the following table. The capacitance change should be measured after 5 min at each specified temperature stage. Step / Temperature(°C): a 25±2; b Lower temperature±3°C; c 25±2; d Upper Temperature±2°C; e 25±2 (1) Class I Temperature Coefficient shall be calculated from the formula as below $\text{Temp, Coefficient} = \frac{C2 - C1}{C1 \times \Delta T} \times 10^6$ [ppm/°C] C1: Capacitance at step c C2: Capacitance at 125°C ΔT: 100°C (=125°C -25°C)	Class1: Δ C/C: ±30ppm
Adhesion	4.7	A force applied for 10 seconds to the line joining the terminations and in a plane parallel to the substrate	Force size ≥ 0603: 5N size = 0402: 2.5N size = 01005 / 0201: 1N
Bending Strength	4.8	Mounting in accordance with IEC 60384-22 paragraph 4.3 Conditions: bending 1 mm at a rate of 1 mm/s, radius jig 5 mm	No visible damage ΔC/C NP0: within ±1% or 0.5 pF whichever is greater
ESR (0201 to 0805)		Measuring frequency: 1 ± 0.2GHz at room temperature.	0.2pF ≤ C ≤ 1pF : 350mΩ / C max 1pF < C ≤ 5pF : 300mΩ max 5pF < C ≤ 10pF : 250mΩ max C : Nominal cap (pF)
		Measuring frequency: 500 ± 50MHz at room temperature.	10pF < C ≤ 100pF :400mΩ max
ESR (01005)		Measuring frequency: 1 ± 0.2 GHz at room temperature.	0.2pF to 1pF: 700 mΩ /C max 1.1pF to 5pF: 500 mΩ max 5.1pF to 15pF: 300 mΩ max C: Nominal Cap. (pF)

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TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Resistance to soldering heat	IEC 60384-21/22 4.9	Precondition: 150 +0/–10 °C for 1 hour, then keep for 24 ±1 hours at room temperature Preheating: for size ≤ 1206: 120 °C to 150 °C for 1 minute Preheating: for size >1206: 100 °C to 120 °C for 1 minute and 170 °C to 200 °C for 1 minute Solder bath temperature: 260 ±5 °C Dipping time: 10 ±0.5 seconds Recovery time: 24 ±2 hours	Dissolution of the end face plating shall not exceed 25% of the length of the edge concerned ΔC/C NP0: within ±0.5% or 0.5 pF whichever is greater Q value within initial specified value R_{ins} within initial specified value
Solderability	4.10	Preheated the temperature of 80 °C to 140 °C and maintained for 30 seconds to 60 seconds. Test conditions for lead containing solder alloy Temperature: 235 ±5 °C Dipping time: 2 ±0.2 seconds Depth of immersion: 10 mm Alloy Composition: 60/40 Sn/Pb Number of immersions: 1 Test conditions for lead-free containing solder alloy Temperature: 245 ±5 °C Dipping time: 3 ±0.3 seconds Depth of immersion: 10 mm Alloy Composition: SAC305 Number of immersions: 1	The solder should cover over 95% of the critical area of each termination
Rapid change of temperature	4.11	Preconditioning; 150 +0/–10 °C for 1 hour, then keep for 24 ±1 hours at room temperature 5 cycles with following detail: 30 minutes at lower category temperature 30 minutes at upper category temperature Recovery time 24 ±2 hours	No visual damage ΔC/C NP0: within ±1% or 1 pF whichever is greater Q value meet initial specified value R_{ins} meet initial specified value

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TEST	TEST METHOD		PROCEDURE	REQUIREMENTS
Damp heat with U_r load	IEC 60384-21/22	4.13	1. Preconditioning, class 2 only: 150 +0/-10 °C /1 hour, then keep for 24 ±1 hour at room temp 2. Initial measure: Spec: refer to initial spec C 3. Damp heat test: 500 ±12 hours at 40 ±2 °C; 90 to 95% R.H. 1.0 U_r applied 4. Recovery: Class 1: 6 to 24 hours 5. Final measure: C P.S. If the capacitance value is less than the minimum value permitted, then after the other measurements have been made the capacitor shall be preconditioned according to *"IEC 60384 4.1"* and then the requirement shall be met.	No visual damage after recovery ΔC/C NP0: within ±7.5% or 0.75pF whichever is greater Q value: ≥30pF: Q ≥ 200 ≤30pF: Q ≥ 100+10C/3 I.R.: NP0: ≥ 500 MΩ or $R_{ins} \times C_r \geq 25s$ whichever is less
Endurance		4.14	1. Preconditioning, class 2 only: 150 +0/-10 °C /1 hour, then keep for 24 ±1 hour at room temp 2. Initial measure: Spec: refer to initial spec C 3. Endurance test: Temperature: NP0: 125 °C Specified stress voltage applied for 1,000 hours: Applied 2.0 x Ur for 16V to 100V product. Applied 1.5 x Ur for 200V to 250V product. Applied 1.3 x Ur for 500V product. 4. Recovery time: 24 ±2 hours 5. Final measure: C P.S. If the capacitance value is less than the minimum value permitted, then after the other measurements have been made the capacitor shall be preconditioned according to *"IEC 60384 4.1"* and then the requirement shall be met.	No visual damage ΔC/C NP0: within ±3% or 0.3pF whichever is greater Q value: ≥30pF: Q ≥ 350 10pF to 30pF: Q ≥ 275+5C/2 ≤10pF: Q ≥ 200+10C NP0: ≥ 1,000 MΩ or $R_{ins} \times C_r \geq 50\Omega.F$ whichever is less
Voltage proof	IEC 60384-1	4.6	Specified stress voltage applied for 1 minute $U_r \leq 100$ V: series applied 2.5 U_r 100 V < $U_r \leq 200$ V series applied (1.5 U_r + 100) 200 V < $U_r \leq 500$ V series applied (1.3 U_r + 100) $U_r > 500$ V: 1.3 U_r I: 7.5 mA	No breakdown or flashover

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REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 17	May 04, 2022	-	- Add 01005 0.1pF to 15pF, 16V to 25V capacitance range.
Version 16	May 14, 2021	-	- Add 0201 to 0603 0.1pF, 0201, 100V and 0805, 500V capacitance range
Version 15	Mar.30, 2018	-	- Add 0603/100V, 250V capacitance range
Version 14	Feb. 14, 2018	-	- Revised ESR requirements (0.2pF to 1pF)
Version 13	Jul. 5, 2016	-	- Add 0201/50V and 0402/100V, 250V Capacitance range
Version 12	Feb. 23, 2016	-	- Size update
Version 11	Mar 19, 2014	-	- Size update
Version 10	Mar 19, 2014	-	- Tests and requirements
Version 9	Feb. 27, 2014	-	- Tolerance update
Version 8	Oct. 28, 2013	-	- Rated voltage update
Version 7	Oct. 09, 2013	-	- Rated voltage update
Version 6	Jun. 24, 2013	-	- Tolerance update
Version 5	Apr. 15, 2013	-	- Tolerance update
Version 4	Mar. 28, 2013	-	- Capacitance range & thickness update
Version 3	Feb. 07, 2013	-	- Capacitance range & thickness update
Version 2	Dec. 25, 2012	-	- Capacitance range & thickness update
Version 1	Dec. 03, 2012	-	- Capacitance range & thickness update
Version 0	Nov. 23, 2012	-	- New datasheet for HiQ NP0 series with RoHS compliant

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