

MULTILAYER CERAMIC CHIP CAPACITORS

1005(0402) / 1608(0603) / 2012(0805) / 3216(1206) / 3225(1210) / 4532(1812) Series

Features

1. Low equivalent series resistance(ESR) provides excellent noise absorption characteristics.
2. Higher permissible ripple current values.
3. Smaller case sizes relative to rated voltage.
4. Multilayered ceramic construction provides high reliability.
5. Miniature size : 1005(0402)/1608(0603)/2012(0805)/3216(1206)/3225(1210)/4532(1812)

Applications

1. Filtering capacitors.
2. Power supply bypass capacitors.(LSI, IC, Converters)
3. General electronic equipment.
4. Smoothing capacitors.(DC-DC Converters, Switching power supplies)
5. PC, PCS, CDMA, Camcorder, TV, VCR etc.

Ordering Information

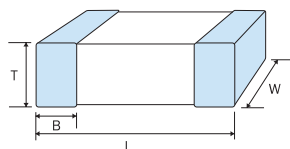
CODE: 0805 N 101 J 500 N T
(1) (2) (3) (4) (5) (6) (7)

- | | | |
|---|--|--|
| <p>(1) Size Code
See Catalogue for Chip Sizes
Code is L X W(in inch)
0805 = 0.08" X 0.05"</p> <p>(4) Capacitance Tolerance(EIA CODE)
B = $\pm 0.1\text{pF}$ B, C for $\text{Cap} \leq 5\text{pF}$
C = $\pm 0.25\text{pF}$ D for $5\text{pF} < \text{Cap} < 10\text{pF}$
D = $\pm 0.50\text{pF}$ NPO : B,C,D,J,K,M
F = $\pm 1.0\%$ X7R : J,K,M
G = $\pm 2.0\%$ Y5V : M,Z
H = $\pm 3.0\%$
J = $\pm 5.0\%$
K = $\pm 10\%$
M = $\pm 20\%$
Z = $-20\% + 80\%$</p> | <p>(2) Dielectric
N = COG(NPO)
B = X7R
F = Y5V</p> <p>(5) Voltage(VDCW)
Two Significant Digits
followed by no. of zeros</p> <p>(6) Termination
N = Nickel Barrier
P = Silver/Palladium</p> <p>(7) Packaging Code
No Code = Bulk
T = Reel</p> | <p>(3) Capacitance(Picofarads)
Two Significant Digits
followed by no. of zeros
101 = 100pF
102 = 1000pF
152 = 1500pF
103 = 10000pF</p> |
|---|--|--|

Typical Material Characteristics

Capacitance & Tolerance	NPO	X7R	Y5V
1R0 = 1.0pF 100 = 10pF 101 = 100pF 102 = 1000pF = 1nF 103 = 10000pF = 10nF 104 = 100nF 105 = 1000nF = 1uF 106 = 10000nF = 10uF	1R0 ~ 103	101 ~ 105	103 ~ 106
B = $\pm 0.1\text{pF}$ (Cap < 5pF) C = $\pm 0.25\text{pF}$ (Cap < 5pF) D = $\pm 0.5\text{pF}$ (5pF < Cap < 10pF) J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$ Z = $-20\% + 80\%$	B, C, D, J, K	J, K, M	M, Z

Shape and Dimensions



unit: mm [inch]

Dimension	1005	1608	2012	3216	3225	4532
L	1.00 $\pm$ 0.05 [0.040 $\pm$ 0.002]	1.60 $\pm$ 0.07 [0.063 $\pm$ 0.004]	2.00 $\pm$ 0.15 [0.080 $\pm$ 0.006]	3.20 $\pm$ 0.15 [0.125 $\pm$ 0.006]	3.20 $\pm$ 0.30 [0.125 $\pm$ 0.012]	4.50 $\pm$ 0.40 [0.180 $\pm$ 0.015]
W	0.50 $\pm$ 0.05 [0.020 $\pm$ 0.002]	0.80 $\pm$ 0.07 [0.030 $\pm$ 0.004]	1.25 $\pm$ 0.15 [0.050 $\pm$ 0.006]	1.60 $\pm$ 0.15 [0.063 $\pm$ 0.006]	2.50 $\pm$ 0.20 [0.100 $\pm$ 0.008]	3.20 $\pm$ 0.30 [0.125 $\pm$ 0.012]
B	0.25 + 0.05/-0.10 [0.010 + 0.002/-0.004]	0.40 $\pm$ 0.15 [0.015 $\pm$ 0.006]	0.50 $\pm$ 0.20 [0.020 $\pm$ 0.008]	0.60 $\pm$ 0.20 [0.025 $\pm$ 0.008]	0.75 $\pm$ 0.25 [0.030 $\pm$ 0.010]	0.75 $\pm$ 0.25 [0.030 $\pm$ 0.010]

Capacitance and Voltage (NPO)

Dielectric		NPO																							
EIA Cap	Size	1005(0402)				1608(0603)				2012(0805)				3216(1206)				3225(1210)				4532(1812)			
Code	VDCW	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V
0R5	0.5pF	N																							
1R0	1																								
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	S																							
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																								
392	3900																								
472	4700																								
562	5600																								
682	6800																								
822	8200																								
103	0.01uF																								

* Other size and capacitance and voltage and 13" reel are available upon customer's request.

Tape and Reel

Size	1005	1608	2012	3216	3225	4532
A = 0.65 ± 0.05 / -0.15mm	-	-	Paper 4Kp/Reel	-	-	-
B = 0.85 ± 0.05 / -0.15mm	-	-	Paper 4Kp/Reel	-	-	-
C = 1.00 ± 0.05 / -0.15mm	-	-	Plastic 3Kp/Reel	Plastic 3Kp/Reel	-	-
D = 1.2 ± 0.15mm	-	-	Plastic 3Kp/Reel	Plastic 3Kp/Reel	Plastic 3Kp/Reel	Plastic 1Kp/Reel
S = 0.8 ± 0.07mm	Paper 4Kp/Reel	-	-	-	-	-
N = 0.50 ± 0.05mm	Paper 10Kp/Reel	-	-	-	-	-

MULTILAYER CERAMIC CHIP CAPACITORS

Capacitance and Voltage (High-voltage NPO)

Dielectric		NPO																													
EIA Cap	Size	1608(0603)				2012(0805)				3216(1206)						3225(1210)						4532(1812)						4520(1808)			
Code	VDCW	100	100	200	250	500	100	200	250	500	1000	2000	100	200	250	500	1000	2000	100	200	250	500	1000	2000	100	200	250	500	1000	2000	3000
0R5	0.5pF																														
1R0	1																														
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																														
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103	0.01uF																														
123	0.012																														
153	0.015																														
183	0.018																														
223	0.022																														

* Other size and capacitance and voltage and 13" reel are available upon customer's request.

Tape and Reel

Size	1005	1608	2012	3216	3225	4532
A = 0.65 ± 0.05/-0.15mm	-	-	-	-	-	-
B = 0.85 ± 0.05/-0.15mm	-	-	Paper 4Kp/Reel	-	-	-
C = 1.00 ± 0.05/-0.15mm	-	-	Plastic 3Kp/Reel	Plastic 3Kp/Reel	-	-
D = 1.2 ± 0.15mm	-	-	Plastic 3Kp/Reel	Plastic 3Kp/Reel	Plastic 3Kp/Reel	Plastic 1Kp/Reel
S = 0.8 ± 0.07mm	Paper 4Kp/Reel	-	-	-	-	-
N = 0.50 ± 0.05mm	Paper 10Kp/Reel	-	-	-	-	-

Capacitance and Voltage (X7R)

Dielectric		X7R																							
EIA Cap	Size	1005(0402)				1608(0603)				2012(0805)				3216(1206)				3225(1210)				4532(1812)			
Code	VDCW	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V
101	100pF	N																							
121	120																								
151	150																								
181	180																								
221	220																								
271	270																								
331	330																								
391	390																								
471	470																								
561	560																								
681	680																								
821	820																								
102	1000pF	S																							
122	1200																								
152	1500																								
182	1800																								
222	2200																								
272	2700																								
332	3300																								
392	3900																								
472	4700																								
562	5600																								
682	6800																								
822	8200																								
103	0.01uF	B																							
123	0.012																								
153	0.015																								
183	0.018																								
223	0.022																								
273	0.027																								
333	0.033																								
393	0.039																								
473	0.047																								
563	0.056																								
683	0.068																								
823	0.082																								
104	0.1uF																								
154	0.15																								
184	0.18																								
224	0.22																								
334	0.33																								
474	0.47																								
564	0.56																								
824	0.82																								
105	1uF																								

*Other size and capacitance and voltage and 13" reel are available upon customer's request.

Tape and Reel

Size	1005	1608	2012	3216	3225	4532
A = 0.65 ± 0.05/-0.15mm	-	-	-	-	-	-
B = 0.85 ± 0.05/-0.15mm	-	-	Paper 4Kp/Reel	-	-	-
C = 1.00 ± 0.05/-0.15mm	-	-	Plastic 3Kp/Reel	Plastic 3Kp/Reel	-	-
D = 1.2 ± 0.15mm	-	-	Plastic 3Kp/Reel	Plastic 3Kp/Reel	Plastic 1Kp/Reel	-
S = 0.8 ± 0.07mm	Paper 4Kp/Reel	-	-	-	-	-
N = 0.50 ± 0.05mm	Paper 10Kp/Reel	-	-	-	-	-

MULTILAYER CERAMIC CHIP CAPACITORS

Capacitance and Voltage (High-voltage X7R)

Dielectric		X7R																													
EIA Cap	Size	1608(0603)				2012(0805)				3216(1206)						3225(1210)						4532(1812)						4520(1808)			
Code	VDCW	100	100	200	250	500	100	200	250	500	1000	1500	2000	100	200	250	500	1000	100	200	250	500	1000	2000	1000	2000	1000	1500	2000		
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																												K		
152	1500																														
182	1800																														
222	2200																														
272	2700																														
332	3300																														
392	3900																														
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223	0.022																														
273	0.027																														
333	0.033																														
393	0.039																														
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823	0.082																														
104	0.1uF																														
124	0.12																														
154	0.15																														
184	0.18																														
224	0.22																														
334	0.33																														
474	0.47																														
684	0.68																														
824	0.82																														
105	1uF																														

*Other size and capacitance and voltage and 13" reel are available upon customer's request.

Thickness	Tape and Reel
B = 0.85 + 0.05/-0.15mm	Paper 4Kp/Reel
C = 1.00 + 0.05/-0.15mm	Plastic 3Kp/Reel
D = 1.2 ± 0.15mm	Plastic 1Kp/Reel
F = 1.40 + 0.05/-0.15mm	Plastic 1Kp/Reel
G = 1.60 + 0.05/-0.15mm	Plastic 1Kp/Reel
K = 2.00 ± 0.2mm	Plastic 1Kp/Reel

Capacitance and Voltage (Y5V)

Dielectric		Y5V																							
EIA Cap	Size	1005(0402)				1608(0603)				2012(0805)				3216(1206)				3225(1210)				4532(1812)			
Code	VDCW	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V
102	1000pF																								
122	1200																								
152	1500																								
182	1800																								
222	2200																								
272	2700																								
332	3300																								
392	3900																								
472	4700																								
562	5600																								
682	6800																								
822	8200																								
103	0.01uF	N																							
123	0.012																								
153	0.015																								
183	0.018																								
223	0.022																								
273	0.027																								
333	0.033																								
393	0.039																								
473	0.047																								
563	0.056																								
683	0.068																								
823	0.082																								
104	0.1uF																								
154	0.15																								
224	0.22																								
334	0.33																								
474	0.47																								
684	0.68																								
105	1.0uF																								
155	1.5																								
225	2.2																								
335	3.3																								
475	4.7																								
106	10uF																								

* Other size and capacitance and voltage and 13" reel are available upon customer's request.

Tape and Reel

Size	1005	1608	2012	3216	3225	4532
A = 0.65 ± 0.05 / -0.15mm	-	-	Paper 4Kp/Reel	-	-	-
B = 0.85 ± 0.05 / -0.15mm	-	-	Paper 4Kp/Reel	-	-	-
C = 1.00 ± 0.05 / -0.15mm	-	-	Plastic 3Kp/Reel	Plastic 3Kp/Reel	Plastic 3Kp/Reel	-
D = 1.2 ± 0.15mm	-	-	Plastic 3Kp/Reel	Plastic 3Kp/Reel	Plastic 3Kp/Reel	Plastic 1Kp/Reel
S = 0.8 ± 0.07mm	Paper 4Kp/Reel	-	-	-	-	-
N = 0.50 ± 0.05mm	Paper 10Kp/Reel	-	-	-	-	-

MULTILAYER CERAMIC CHIP CAPACITORS

Capacitance and Voltage (High-voltage Y5V)

Dielectric		Y5V								
EIA Cap	Size	2012(0805)			3216(1206)			3225(1210)		
Code	VDCW	100	200	250	100	200	250	100	200	250
103	0.01uF									
123	0.012									
153	0.015									
183	0.018									
223	0.022									
273	0.027									
333	0.033									
393	0.039									
473	0.047									
563	0.056									
683	0.068									
823	0.082									
104	0.1uF									
154	0.15									
224	0.22									
334	0.33									
684	0.68									
105	1.0									

* Other size and capacitance and voltage and 13" reel are available upon customer's request.

Thickness	Tape and Reel
B = 0.85+0.05/-0.15mm	Paper 4Kp/Reel
C = 1.00+0.05/-0.15mm	Plastic 3Kp/Reel
D = 1.2±0.15mm	Plastic 1Kp/Reel
F = 1.40+0.05/-0.15mm	Plastic 1Kp/Reel
G = 1.60+0.05/-0.15mm	Plastic 1Kp/Reel
K = 2.00±0.2mm	Plastic 1Kp/Reel

NPO Specifications

NPO Serial Products

Above product satisfies the requirements as follow :

No	Test Items	Test Conditions		Requirements
1	Visual & Mechanical			* No remarkable defect. * Dimensions to conform to individual specification sheet.
2	Capacitance	$\leq 1000\text{pF}$ $> 1000\text{pF}$	$1.0 \pm 0.2\text{Vrms}$, $1\text{MHz} \pm 10\%$ $1.0 \pm 0.2\text{Vrms}$, $1\text{KHz} \pm 10\%$	* Shall not exceed the limits given in the detailed spec.
3	Q Value	$\leq 1000\text{pF}$ $> 1000\text{pF}$	$1.0 \pm 0.2\text{Vrms}$, $1\text{MHz} \pm 10\%$ $1.0 \pm 0.2\text{Vrms}$, $1\text{KHz} \pm 10\%$	* More than 30pF : $Q \geq 1000$ * Less than 30pF : $Q \geq 400+20C$
4	Dielectric strength	Rated Voltage : <50V * To apply voltage : 250% of rated voltage for 1~5 sec. * Charge & discharge current less than 50mA.		No evidence of damage or flash over during test.
		Rated Voltage : 100V 200V~300V 500V~999V 1000V~3000V	Cut-off, set at 10mA TEST=15 RAMP=0	100V >=3 times VDC 200V~300V >=2 times VDC 500V~999V >=1.5 times VDC 1000V~3000V >=1.2 times VDC
5	Insulation resistance	Rated Voltage : <50V To apply rated voltage for max. 120sec.		10G Ω MIN. or 500 Ω -F MIN., whichever is smaller.
		Rated Voltage : 100V~500V	To apply rated Voltage	> 10G Ω
		Rated Voltage : >500V	To apply 500V * 60sec	> 10G Ω
6	Temperature coefficient	With no electrical load -55~125°C at 25°C		Within $\pm 30\text{ppm}/^\circ\text{C}$
7	Bending test	* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1mm per second until the deflection becomes 1mm and then the pressure shall be maintained for 5sec.(Appendix 1) * Mesurement to be made after keeping at room temp. for 24 $\pm$ 2 hours.		* No remarkable damage. * Cap change : $\pm 5.0\%$MAX. or $\pm 0.5\text{pF}$ MAX., whichever is larger. - This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance mesured before the test.
8	Solderability	* Solder temperature : 230 $\pm$ 5°C * Dipping time : 2 $\pm$ 0.5sec * Solder : SN63A		90%MIN. coverage of all metallized area.
9	Resistance to soldering heat	* Solder temperature : 260 $\pm$ 5°C * Dipping time : 10 $\pm$ 1sec * Solder : SN63A * Mesurement to be made after keeping at room temp. for 24 $\pm$ 2 hours.		* No remarkable damage. * Cap change : $\pm 2.5\%$MAX. or $\pm 0.25\text{pF}$ MAX., whichever is large. * Q & I.R. & Dielectric strength : To meet initial requirements. * 25%max. Leaching on each edge.

MULTILAYER CERAMIC CHIP CAPACITORS

NPO Specifications

NPO Serial Products

Above product satisfies the requirements as follow :

No	Test Items	Test Conditions	Requirements
10	Temperature cycle	* Test temp : -55~125°C * Test step : 1)-55°C -3/+0°C 30±3min. 2)room temp. 2~3min. 3)125°C +3/-0°C 30±2min. 4)room temp. 2~3min. * Conduct the five cycles according to the temperatures and time. * Measurement to be made after keeping at room temp. for 24±2 hours.	* No remarkable damage. * Cap change : ±2.5%MAX. or ±0.25pF MAX., whichever is larger. * Q & I.R. & Dielectric strength : To meet initial requirements.
11	Humidity(Damp Heat) steady state	* Test temp : 40±2°C * Humidity : 90~95%RH * Test time : 1000+24/-0 hours. * Measurement to be made after keeping at room temp. for 24±2 hours.	* No remarkable damage. * Cap change : ±5.0%MAX. or ±0.5pF MAX., whichever is larger. * Q value : More than 30pF Q≥350 10pF≤C<30pF Q≥275+2.5C - Less than 10pF Q≥200+10C * I.R. : 1G∅ MIN. or 50∅-F MIN., whichever is smaller.
12	Humidity(Damp Heat) Load	* Test temp : 40±2°C * Humidity : 90~95%RH * Test time : 1000+24/-0 hours. * To apply voltage : rated voltage. * Measurement to be made after keeping at room temp. for 24±2 hours.	* No remarkable damage. * Cap change : ±7.5%MAX. or ±0.75pF MAX., whichever is larger. * Q value : More than 30pF Q≥200 - C<30pF Q≥100+10/3C * I.R. : 500M∅ MIN. or 25∅-F MIN., whichever is smaller.
13	Adhesive strength of termination	* Pressurizing force : 1kg(10N) * Test time : 10±1sec(Appendix 2)	* No remarkable damage or removal of the terminations.
14	Vibration Resistance	* Vibration frequency : 10~55Hz/min. * Total amplitude : 1.5mm * Test time : 6 hours. (Two hours each in three mutually perpendicular directions.)	* No remarkable damage. * Cap change & Q : To meet initial requirements.
15	High Temperature Load (Endurance)	* Test temp : 125±3°C * To apply voltage : 200% of rated voltage * Test time : 1000+24/-0 hours. * Measurement to be made after keeping at room temp. for 24±2 hours.	* No remarkable damage. * Cap change : ±3.0%MAX. or ±0.3pF MAX., whichever is larger. * Q value : More than 30pF Q≥350 10pF≤C<30pF Q≥275+2.5C - Less than 10pF Q≥200+10C * I.R. : 1G∅ MIN. or 50∅-F MIN., whichever is smaller.

* High voltage products' reliability items depend on customer's request.

X7R Specifications

X7R Serial Products

Above product satisfies the requirements as follow :

No	Test Items	Test Conditions		Requirements
1	Visual & Mechanical			* No remarkable defect. * Dimensions to conform to individual specification sheet.
2	Capacitance	1.0±0.2Vrms, 1KHz±10%		* Shall not exceed the limits given in the detailed spec.
3	Dissipation factor	1.0±0.2Vrms, 1KHz±10%		* ≤2.5% Rated voltage : 50V ↑ * ≤3.5% Rated voltage : 25V, 16V * ≤5.0% Rated voltage : 10V
4	Dielectric strength	Rated Voltage : <50V * To apply voltage : 250% of rated voltage for 1~5 sec. * Charge & discharge current less than 50mA.		No evidence of damage or flash over during test.
		Rated Voltage : 100V 200V~300V 500V~999V 1000V~3000V	Cut-off, set at 10mA TEST=15 RAMP=0	100V >=3 times VDC 200V~300V >=2 times VDC 500V~999V >=1.5 times VDC 1000V~3000V >=1.2 times VDC
5	Insulation resistance	Rated Voltage : <50V To apply rated voltage for max. 120sec.		10G Ω MIN. or 500 Ω-F MIN., whichever is smaller.
		Rated Voltage : 100V~500V	To apply rated Voltage	> 10G Ω
		Rated Voltage : > 500V	To apply 500V * 60sec	> 10G Ω
6	Temperature coefficient	With no electrical load -55~125°C at 25°C		Within ±15%
7	Bending test	* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1mm per second until the deflection becomes 1mm and then the pressure shall be maintained for 5sec.(Appendix 1) * Mesurement to be made after keeping at room temp. for 24±2 hours.		* No remarkable damage. * Cap change : ≤±12.5% This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance mesured before the test.
8	Solderability	* Solder temperature : 230±5°C * Dipping time : 2±0.5sec * Solder : SN63A		90%MIN. coverage of all metallized area.
9	Resistance to soldering heat	* Solder temperature : 260±5°C * Dipping time : 10±1sec * Solder : SN63A * Mesurement to be made after keeping at room temp. for 48±4 hours.		* No remarkable damage. * Cap change : <±7.5% * DF value & I.R. : To meet initial standard value. * Dielectric strength : no defect.

MULTILAYER CERAMIC CHIP CAPACITORS

X7R Specifications

X7R Serial Products

Above product satisfies the requirements as follow :

No	Test Items	Test Conditions	Requirements
10	Temperature cycle	* Test temp : -55~125°C * Test step : 1)-55°C -3/+0°C 30±3min. 2)room temp. 2~3min. 3)125°C +3/-0°C 30±2min. 4)room temp. 2~3min. * Conduct the five cycles according to the temperatures and time. * Measurement to be made after keeping at room temp. for 48±4 hours.	* No remarkable damage. * Cap change : < ±7.5% * DF value & I.R. : To meet initial standard value.
11	Humidity(Damp Heat) steady state	* Test temp : 40±2°C * Humidity : 90~95%RH * Test time : 1000+24/-0 hours. * Measurement to be made after keeping at room temp. for 48±4 hours.	* No remarkable damage. * Cap change : < ±12.5% * DF value : ≤3.0% Rated voltage : 50V ≤5.0% Rated voltage : 25V, 16V ≤7.5% Rated voltage : 10V * I.R. : 1G Ω MIN. or 50 Ω-F MIN., whichever is smaller.
12	Humidity(Damp Heat) Load	* Test temp : 40±2°C * Humidity : 90~95%RH * Test time : 1000+24/-0 hours. * To apply voltage : rated voltage * Measurement to be made after keeping at room temp. for 48±4 hours.	* No remarkable damage. * Cap change : < ±12.5% * DF value : ≤3.0% Rated voltage : 50V ≤5.0% Rated voltage : 25V, 16V ≤7.5% Rated voltage : 10V * I.R. : 500M Ω MIN. or 25 Ω-F MIN., whichever is smaller.
13	Adhesive strength of termination	* Pressurizing force : 1kg(10N) * Test time : 10±1sec(Appendix 2)	* No remarkable damage or removal of the terminations.
14	Vibration Resistance	* Vibration frequency : 10~55Hz/min. * Total amplitude : 1.5mm * Test time : 6 hours. (Two hours each in three mutually perpendicular directions.)	* No remarkable damage. * Cap change & DF : To meet initial requirements.
15	High Temperature Load (Endurance)	* Test temp : 125±3°C * To apply voltage : 200% of rated voltage * Test time : 1000+24/-0 hours. * Measurement to be made after keeping at room temp. for 48±4 hours.	* No remarkable damage. * Cap change : < ±12.5% * DF value : ≤3.0% Rated voltage : 50V ≤5.0% Rated voltage : 25V, 16V ≤7.5% Rated voltage : 10V * I.R. : 1G Ω MIN. or 50 Ω-F MIN., whichever is smaller.

* High voltage products' reliability items depend on customer's request.

Y5V Specifications

Y5V Serial Products

Above product satisfies the requirements as follow :

No	Test Items	Test Conditions		Requirements
1	Visual & Mechanical			* No remarkable defect. * Dimensions to conform to individual specification sheet.
2	Capacitance	1.0±0.2Vrms, 1KHz±10%, 25°C		* Shall not exceed the limits given in the detailed spec.
3	Dissipation factor	1.0±0.2Vrms, 1KHz±10%, 25°C		* DF ≤5.0%(50V ↑) * DF ≤5.0%(25V) (Except 0603 ≥0.1 μF ; 0805 ≥0.33 μF 1206 ≥1 μF, DF ≤7%) * DF ≤7.0%(C<1.0 μF, 16V) ; * DF ≤9.0%(C≥1.0 μF, 16V) ; * DF ≤12.5%(10V)
4	Dielectric strength	Rated Voltage : <50V * To apply voltage : 250% of rated voltage for 1~5 sec. * Charge & discharge current less than 50mA.		No evidence of damage or flash over during test.
		Rated Voltage : 100V 200V~300V 500V~999V 1000V~3000V	Cut-off, set at 10mA TEST=15 RAMP=0	100V >=3 times VDC 200V~300V >=2 times VDC 500V~999V >=1.5 times VDC 1000V~3000V >=1.2 times VDC
5	Insulation resistance	Rated Voltage : <50V To apply rated voltage for max. 120sec.		10G Ω MIN. or 500 Ω·F MIN., whichever is smaller.
		Rated Voltage : 100V~500V	To apply rated Voltage	> 10G Ω
		Rated Voltage : >500V	To apply 500V * 60sec	> 10G Ω
6	Temperature coefficient	With no electrical load -25~85°C at 20°C		Within +30% / -80%
7	Bending test	* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1mm per second until the deflection becomes 1mm and then the pressure shall be maintained for 5sec.(Appendix 1) * Mesurement to be made after keeping at room temp. for 48±4 hours.		* No remarkable damage. * Cap change : ≤±30% - This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance mesured before the test.
8	Solderability	* Solder temperature : 230±5°C * Dipping time : 2±0.5sec * Solder : SN63A		90%MIN. coverage of all metallized area.
9	Resistance to soldering heat	* Solder temperature : 260±5°C * Dipping time : 10±1sec * Solder : SN63A * Mesurement to be made after keeping at room temp. for 48±4 hours.		* No remarkable damage. * Cap change : <±20% * DF value & I.R. : To meet initial standard value. * Dielectric strength : no defect. * 25% max. Leaching on each edge.

MULTILAYER CERAMIC CHIP CAPACITORS

Y5V Specifications

Y5V Serial Products

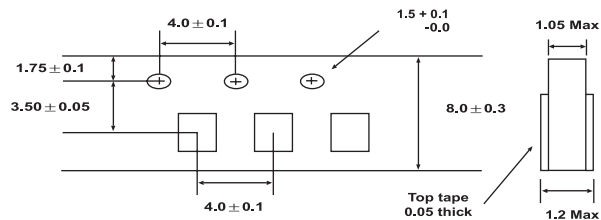
Above product satisfies the requirements as follow :

No	Test Items	Test Conditions	Requirements
10	Temperature cycle	* Test temp : -25~85℃ * Test step : 1)-25℃ -3/+0℃ 30±3min. 2)room temp. 2~3min. 4)room temp. 2~3min. * Conduct the five cycles according to the temperatures and time. * Measurement to be made after keeping at room temp. for 48±4 hours.	* No remarkable damage. * Cap change : < ±20% * DF value & I.R. : To meet initial standard value. 3)85℃+3/-0℃ 30±2min.
11	Humidity(Damp Heat) steady state	* Test temp : 40±2℃ * Humidity : 90~95%RH * Test time : 1000+24/-0 hours. * Measurement to be made after keeping at room temp. for 48±4hours.	* No remarkable damage. * Cap change : < ±30% * DF value : ≤7.5% Rated voltage : ≥50V ≤7.5% Rated voltage : 25V (Except 0603 ≥0.1μF ; 0805 ≥0.33μF 1206 ≥1μF, DF ≤10%) * DF ≤10.0%(C<1.0μF, 16V) ; * DF ≤12.5%(C≥1.0μF, 16V) ; * DF ≤15%(10V) * I.R. : 1G Ω MIN. or 50 Ω-F MIN., whichever is smaller.
12	Humidity(Damp Heat) Load	* Test temp : 40±2℃ * Humidity : 90~95%RH * Test time : 1000+24/-0 hours. * To apply voltage : rated voltage * Measurement to be made after keeping at room temp. for 48±4 hours.	* No remarkable damage. * Cap change : < ±30% * DF value : ≤7.5% Rated voltage : ≥50V ≤7.5% Rated voltage : 25V (Except 0603 ≥0.1μF ; 0805 ≥0.33μF 1206 ≥1μF, DF ≤10%) * DF ≤10.0%(C<1.0μF, 16V) ; * DF ≤12.5%(C≥1.0μF, 16V) ; * DF ≤15%(10V) * I.R. : 25 Ω-F MIN. or 500M Ω-F MIN., whichever is smaller.
13	Adhesive strength of termination	* Pressurizing force : 1kg(10N) * Test time : 10±1sec(Appendix 2)	* No remarkable damage or removal of the terminations.
14	Vibration Resistance	* Vibration frequency : 10~55Hz/min. * Total amplitude : 1.5mm * Test time : 6 hours. (Two hours each in three mutually perpendicular directions.)	* No remarkable damage. * Cap change & DF : To meet initial requirements.
15	High Temperature Load (Endurance)	* Test temp : 85±3℃ * To apply voltage : 200% of rated voltage * Test time : 1000+24/-0 hours. * Measurement to be made after keeping at room temp. for 48±4 hours.	* No remarkable damage. * Cap change : < ±30% * DF value : ≤7.5% Rated voltage : ≥50V ≤7.5% Rated voltage : 25V (Except 0603 ≥0.1μF ; 0805 ≥0.33μF 1206 ≥1μF, DF ≤10%) * DF ≤10.0%(C<1.0μF, 16V) ; * DF ≤12.5%(C≥1.0μF, 16V) ; * DF ≤15%(10V) * I.R. : 1G Ω MIN. or 50 Ω-F MIN., whichever is smaller.

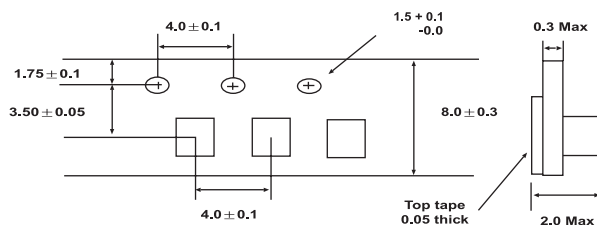
* High voltage products' reliability items depend on customer's request.

Capacitors On Tape and Reel

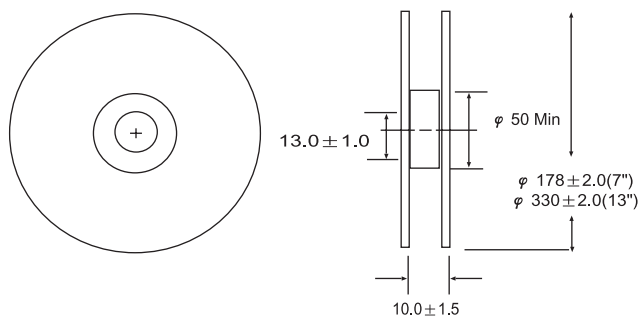
● PAPER TAPE



● PLASTIC TAPE



● Reel size : 7" diameter stand (13" reel available)



Packaging On Tape and Reel

Size	T (mm)	Tape	Quantity
1005(0402)	(0.60 ~ 0.40)	Paper tape	10Kpcs/reel
1608(0603)	(0.90 ~ 0.70)	Paper tape	4Kpcs/reel
2012(0805)	(0.70 ~ 0.50)	Paper tape	4Kpcs/reel
	(0.90 ~ 0.70)	Paper tape	4Kpcs/reel
	(1.05 ~ 0.85)	Plastic tape	3Kpcs/reel
	(1.35 ~ 1.05)	Plastic tape	3Kpcs/reel
3216(1206)	(0.90 ~ 0.70)	Paper tape	4Kpcs/reel
	(1.05 ~ 0.85)	Plastic tape	3Kpcs/reel
	(1.35 ~ 1.05)	Plastic tape	3Kpcs/reel
3225(1210)	(1.05 ~ 0.85)	Plastic tape	3Kpcs/reel
	(1.35 ~ 1.05)	Plastic tape	3Kpcs/reel
4532(1812)	(1.35 ~ 1.05)	Plastic tape	1Kpcs/reel