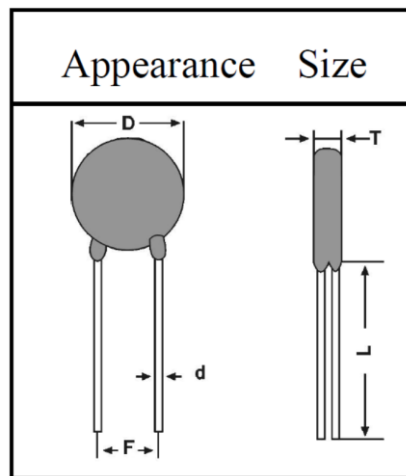


## Ceramic Capacitor CCH series

### ■ Appearance, Size and Structure



| PN             | Specification |        |          | L      | D       | T       | F      | d         |
|----------------|---------------|--------|----------|--------|---------|---------|--------|-----------|
|                | Volt          | Cap.   | Material | (mm)   | Max(mm) | Max(mm) | (mm)   | (mm)      |
| CCH-100P/1000V | 1kV           | 100 pF | SL       | 19 Min | 7       | 2.5     | 5±0.5  | 0.45±0.05 |
| CCH-1N/1000V   |               | 1 nF   | Y5P      | 25 Min | 7       | 3.5     | 5± 0.5 | 0.5±0.05  |
| CCH-2N2/1000V  |               | 2,2 nF | Y5P      | 25 Min | 9.5     | 3.5     | 5±0.5  | 0.5±0.05  |
| CCH-4N7/1000V  |               | 4,7 nF | Y5P      | 25 Min | 12.5    | 5       | 3      | 0.5±0.05  |

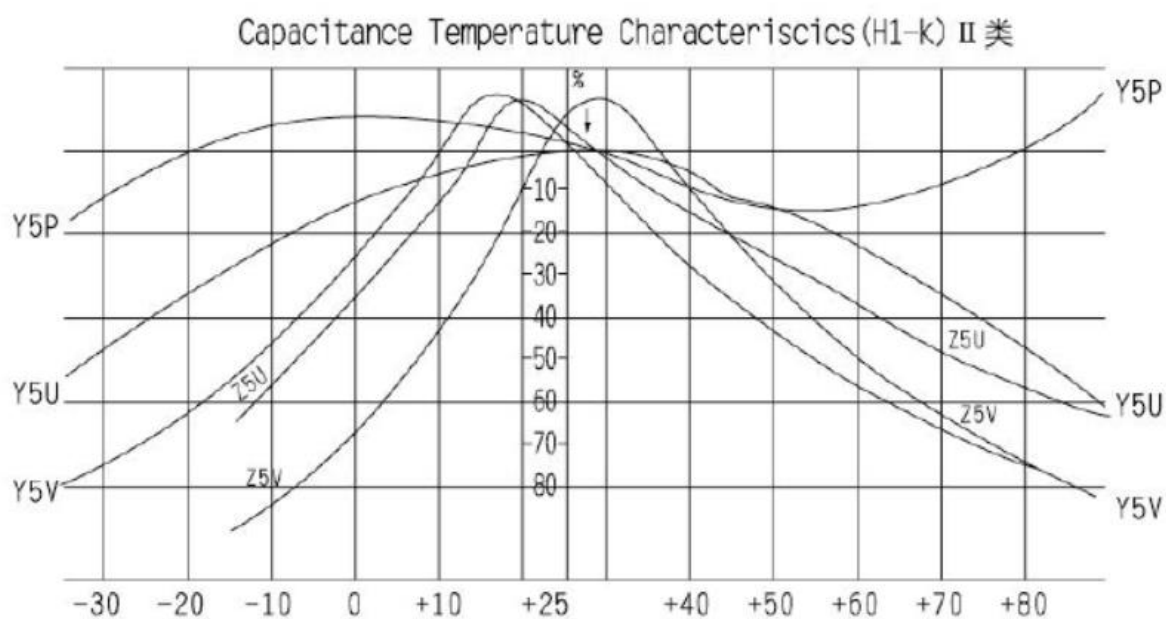
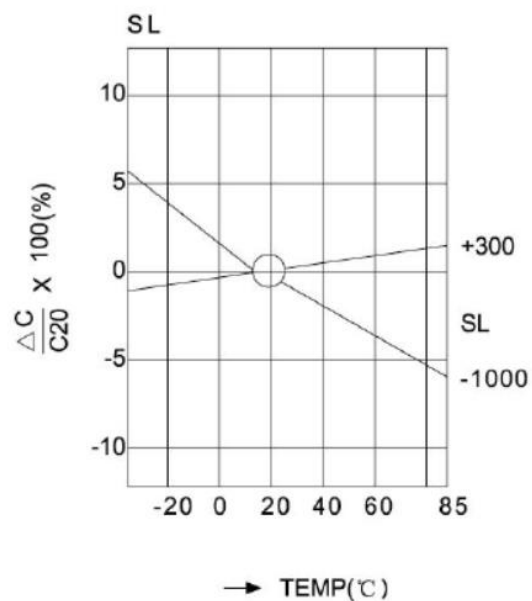
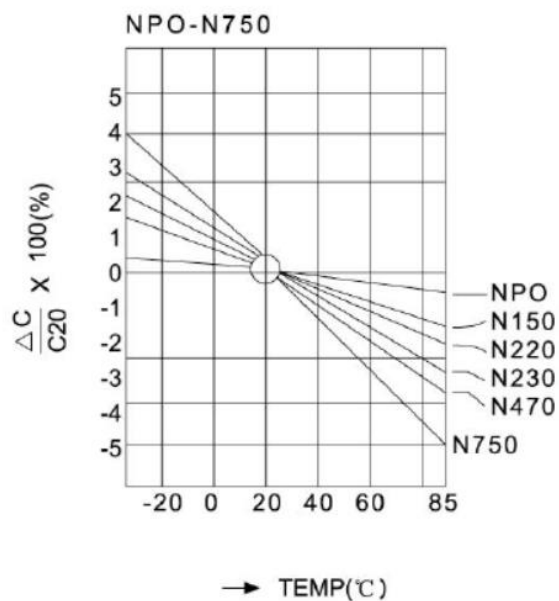
| PN             | Specification |        |          | L      | D       | T       | F       | d        |
|----------------|---------------|--------|----------|--------|---------|---------|---------|----------|
|                | Volt          | Cap.   | Material | (mm)   | Max(mm) | Max(mm) | (mm)    | (mm)     |
| CCH-100P/2000V | 2kV           | 100 pF | YL       | 25 Min | 7       | 4       | 5±0.5   | 0.6±0.05 |
| CCH-10N/2000V  |               | 10 nF  | Y5V      | 25 Min | 11.5    | 4.5     | 7.5±0.5 | 0.6±0.05 |
| CCH-1N/2000V   |               | 1 nF   | Y5P      | 25 Min | 8.5     | 4       | 5±0.5   | 0.6±0.05 |
| CCH-1N5/2000V  |               | 1,5 nF | Y5P      | 25 Min | 10      | 4       | 7.5±0.5 | 0.6±0.05 |
| CCH-470P/2000V |               | 470 pF | Y5P      | 25 Min | 7       | 4       | 5±0.5   | 0.6±0.05 |

| PN             | Specification |        |          | L      | D       | T       | F       | d        |
|----------------|---------------|--------|----------|--------|---------|---------|---------|----------|
|                | Volt          | Cap.   | Material | (mm)   | Max(mm) | Max(mm) | (mm)    | (mm)     |
| CCH-100P/3000V | 3kV           | 100 pF | Y5P      | 25 Min | 7       | 4       | 7.5±0.5 | 0.6±0.05 |
| CCH-10N/3000V  |               | 10 nF  | Y5V      | 25 Min | 15      | 5.5     | 7.5±0.5 | 0.6±0.05 |
| CCH-150P/3000V |               | 150 pF | Y5P      | 25 Min | 8       | 4.5     | 7.5±0.5 | 0.6±0.05 |
| CCH-1N/3000V   |               | 1 nF   | Y5P      | 25 Min | 11      | 5       | 7.5±0.5 | 0.6±0.05 |
| CCH-1N5/3000V  |               | 1,5 nF | Y5P      | 25 Min | 10      | 4.5     | 7.5±0.5 | 0.6±0.05 |
| CCH-220P/3000V |               | 220 pF | Y5P      | 25 Min | 8       | 4.5     | 7.5±0.5 | 0.6±0.05 |
| CCH-2N2/3000V  |               | 2,2 nF | Y5P      | 25 Min | 13      | 7.5     | 4±0.5   | 0.6±0.05 |
| CCH-3N3/3000V  |               | 3,3 nF | Y5P      | 25 Min | 14.5    | 7.5     | 4±0.5   | 0.6±0.05 |
| CCH-470P/3000V |               | 470 pF | Y5P      | 25 Min | 9       | 4.5     | 7.5±0.5 | 0.6±0.05 |
| CCH-4N7/3000V  |               | 4,7 nF | Y5U      | 25 Min | 13      | 5.5     | 7.5±0.5 | 0.6±0.05 |

| PN             | Specification |        |          | L      | D       | T       | F      | d        |
|----------------|---------------|--------|----------|--------|---------|---------|--------|----------|
|                | Volt          | Cap.   | Material | (mm)   | Max(mm) | Max(mm) | (mm)   | (mm)     |
| CCH-100P/6000V | 6kV           | 100 pF | Y5P      | 25 Min | 8       | 4       | 10±0.5 | 0.6±0.05 |
| CCH-1N/6000V   |               | 1 nF   | Y5P      | 25 Min | 13      | 5.5     | 10±0.5 | 0.6±0.05 |
| CCH-220P/6000V |               | 220 pF | Y5P      | 25 Min | 8       | 4       | 10±0.5 | 0.6±0.05 |
| CCH-470P/6000V |               | 470 pF | Y5P      | 25 Min | 10      | 4.5     | 10±0.5 | 0.6±0.05 |
| CCH-4N7/6000V  |               | 4,7 nF | Y5V      | 25 Min | 13      | 5.5     | 10±0.5 | 0.6±0.05 |

## ▪ Capacitance and Temperature Curve

| Material | Temperature Range | Capacitance Range |
|----------|-------------------|-------------------|
| NPO      | −25°C~+85°C       | 0±60PPM/°C        |
| SL       | −25°C~+85°C       | +300~-1000PPM/°C  |
| Y5P      | −25°C~+85°C       | +10%~-10%         |
| Y5U      | −25°C~+85°C       | +22%~-56%         |
| Y5V      | -25°C~+85°C       | +22%~-82%         |



## ▪ According to: Specification

|            |                                                                                                                                                                                              |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GB/T 2693  | 《Fixed capacitors for use in electronic equipment<br>Part1: Generic specification》                                                                                                           |
| GB/T 5966  | 《Fixed capacitors for use in electronic equipment<br>Part8: Sectional specification<br>Fixed capacitors of ceramic dielectric, Class I 》                                                     |
| GB/T 5968  | 《Fixed capacitors for use in electronic equipment<br>Part8: Sectional specification<br>Fixed capacitors of ceramic dielectric, Class II 》                                                    |
| GB 11305   | 《Fixed capacitors for use in electronic equipment<br>Sectional specification<br>Fixed capacitors of ceramic dielectric, Class III 》                                                          |
| GB/T 14472 | 《Fixed capacitors for use in electronic equipment<br>Part14: Sectional specification<br>Fixed capacitors for electromagnetic interference suppression and<br>connection to the supply mains》 |
| GB2828     | 《Sampling procedures and tables for lot-by-lot inspection<br>by attributes》                                                                                                                  |
| GB2829     | 《Sampling procedures and tables for periodic inspection by attributes》                                                                                                                       |

## ▪ Quality Assurance(OQC)and Test

| Check item<br>(lot)                                                     | Check level |      |
|-------------------------------------------------------------------------|-------------|------|
|                                                                         | IL          | AQL  |
| 1. Appearance<br>2. Size                                                | S--4        | 2.5  |
| 1. Capacitance<br>2. DF<br>3. Voltage proof<br>4. Insulation resistance | II          | 0.25 |
| 1. Solder ability of leads                                              | S--3        | 2.5  |

## ▪ Specification and Testing Method

| Item                          | Specification                                                                                    | Testing Method                                                                                                                                                                                                                                                                                                                                                                                                        |      |             |   |       |   |        |   |       |   |       |   |       |
|-------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|---|-------|---|--------|---|-------|---|-------|---|-------|
| 1.Operating Temperature Range | -25~ +85℃                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |   |       |   |        |   |       |   |       |   |       |
| 2.Capacitance                 | K : ±10%<br>M : ±20%<br>Z : +80%/-20%                                                            | Temperature : 25±2℃<br>Voltage : 1.0±0.2Vrms<br>Frequency : 1.0±0.2KHz                                                                                                                                                                                                                                                                                                                                                |      |             |   |       |   |        |   |       |   |       |   |       |
| 3.DF                          | Y5P:2.5%max<br>Y5U:2.5%max<br>Y5V:5.0%max                                                        | Temperature : 25±2℃<br>Voltage : 1.0±0.2Vrms<br>Frequency : 1.0±0.2KHz                                                                                                                                                                                                                                                                                                                                                |      |             |   |       |   |        |   |       |   |       |   |       |
| 4.Insulation Resistance(IR)   | 5000MΩmin                                                                                        | Apply voltage : U=500V<br>Apply current : I≤0.05A<br>Test time : 1min                                                                                                                                                                                                                                                                                                                                                 |      |             |   |       |   |        |   |       |   |       |   |       |
| 5.Dielectric Strength         | Nofailure                                                                                        | Ratedvoltage : $U_R>500V$ ,<br>Testvoltage $U=1.5U_R$<br>Applycurrent : $I\leq0.05A$ ,<br>Testtime : 1min                                                                                                                                                                                                                                                                                                             |      |             |   |       |   |        |   |       |   |       |   |       |
| 6.Temperature Characteristic  | Y5P : +10%~ -10%<br>Y5U : +22%~ -56%<br>Y5V : +22%--82%<br>NPO : 0±60PPM/℃<br>SL : +30-1000PPM/℃ | The capacitance measurement shall be made at each step :<br><br>Before Test : Set the capacitor for 1 hour at 85±2℃, after24±2 hour at room temperature, then can be measured.<br><br><table><tr><td>Step</td><td>Temperature</td></tr><tr><td>1</td><td>20±2℃</td></tr><tr><td>2</td><td>-25±3℃</td></tr><tr><td>3</td><td>20±2℃</td></tr><tr><td>4</td><td>85±2℃</td></tr><tr><td>5</td><td>20±2℃</td></tr></table> | Step | Temperature | 1 | 20±2℃ | 2 | -25±3℃ | 3 | 20±2℃ | 4 | 85±2℃ | 5 | 20±2℃ |
| Step                          | Temperature                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |   |       |   |        |   |       |   |       |   |       |
| 1                             | 20±2℃                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |   |       |   |        |   |       |   |       |   |       |
| 2                             | -25±3℃                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |   |       |   |        |   |       |   |       |   |       |
| 3                             | 20±2℃                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |   |       |   |        |   |       |   |       |   |       |
| 4                             | 85±2℃                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |   |       |   |        |   |       |   |       |   |       |
| 5                             | 20±2℃                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |   |       |   |        |   |       |   |       |   |       |

| Item                            | Specification                            | Testing Method                                                                               |                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7.Vibration resistance          | Appearance                               | No marked defect                                                                             | The capacitor shall firmly be soldered to the supporting terminal and vibration which is 10HZ to 55HZ in the vibration frequency range 1.5mm in total amplitude and about 1min.in the rate of vibration change from 10HZ to 55HZ and back to 10HZ is applied for a total of 6 hours, 2hours each in there mutually perpendicular direction.           |
|                                 | Capacitance                              | Y5P : $\Delta C/C \leq 10\%$<br>Y5V : $\Delta C/C \leq 30\%$<br>Y5U : $\Delta C/C \leq 20\%$ |                                                                                                                                                                                                                                                                                                                                                       |
|                                 | DF                                       | Y5P : 5.0%max<br>Y5V : 5.0%max<br>Y5U : 5.0%max                                              |                                                                                                                                                                                                                                                                                                                                                       |
| 8.Soldering effect              | Appearance                               | No marked defect                                                                             | The lead wire shall be immersed into the melted solder of 260+50C up to about 1.5to 2.0mm from the main body for 3.5+0.5sec. Pre-treatment : capacitor shall be stored 1hour at 85±2°C after at normal temperature for 24±2 hour before initial measurements.<br>Post-treatment : capacitor shall be measured after 24±2 hours at normal temperature. |
|                                 | Capacitance                              | Y5P : $\Delta C/C \leq 10\%$<br>Y5V : $\Delta C/C \leq 30\%$<br>Y5U : $\Delta C/C \leq 20\%$ |                                                                                                                                                                                                                                                                                                                                                       |
|                                 | Dielectric strength (between lead wires) | No failure                                                                                   |                                                                                                                                                                                                                                                                                                                                                       |
| 9.Humidity (under steady state) | Appearance                               | No marked defect                                                                             | Set the capacitor for 500 hours at 40+20C in 90 to 95%RH<br>Pre-treatment : capacitor shall be stored 1hour at 85±2°C after at normal temperature for 24±2 hour before initial measurements.<br>Post-treatment : capacitor shall be measured after 24±2 hours at normal temperature.                                                                  |
|                                 | Capacitance change                       | Y5P : $\Delta C/C \leq 10\%$<br>Y5V : $\Delta C/C \leq 30\%$<br>Y5U : $\Delta C/C \leq 20\%$ |                                                                                                                                                                                                                                                                                                                                                       |
|                                 | DF                                       | Y5P : 5.0%max<br>Y5V : 5.0%max<br>Y5U : 5.0%max                                              |                                                                                                                                                                                                                                                                                                                                                       |
|                                 | Insulation Resistance (IR)               | 500MΩmin                                                                                     |                                                                                                                                                                                                                                                                                                                                                       |

| Item                      | Specification                                                                     | Testing Method                                                 |                                                                                                                                                                                                                                                                                           |
|---------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10. Humidity loading      | Appearance                                                                        | No marked defect                                               | Apply rated voltage for 500 hours at 40±2°C in 90 to 95%RH<br><br>Pre-treatment : capacitor shall be stored 1hour at 85±2°C after at normal temperature for24±2 hour before initial measurements.<br>Post-treatment : capacitor shall be measured after 24±2 hours at normal temperature. |
|                           | Capacitance change                                                                | Y5P : ΔC/C≤10%<br>Y5V : ΔC/C≤30%<br>Y5U : ΔC/C≤20%             |                                                                                                                                                                                                                                                                                           |
|                           | DF                                                                                | Y5P : 5.0%max<br>Y5U : 5.0%max<br>Y5V : 7.0%max                |                                                                                                                                                                                                                                                                                           |
|                           | Insulation Resistance (IR)                                                        | 1000MΩmin                                                      |                                                                                                                                                                                                                                                                                           |
| 11.LifeTest               | Appearance                                                                        | No marked defect                                               | Apply 150% of the rated voltage for 1000 hours at 85±2°C<br><br>Pre-treatment : capacitor shall be stored 1hour at 85±2°C after at normal temperature for24±2 hour before initial measurements.<br>Post-treatment : capacitor shall be measured after 24±2 hours at normal temperature.   |
|                           | Capacitance change                                                                | Y5P : ΔC/C≤10%<br>Y5V : ΔC/C≤30%<br>Y5U : ΔC/C≤20%             |                                                                                                                                                                                                                                                                                           |
|                           | DF                                                                                | Y5P : 5.0%max<br>Y5U : 5.0%max<br>Y5V : 7.5%max                |                                                                                                                                                                                                                                                                                           |
|                           | Insulation Resistance (IR)                                                        | 1000MΩmin                                                      |                                                                                                                                                                                                                                                                                           |
| 12.Strength of lead       | Dielectric strength                                                               | Lead wire shall not cut off,<br>Capacitor shall not be broken. | As a figure fix the body of capacitor, apply a tensile weight gradually to each lead in the radial direction of capacitor up to 10N and keep it for 10±15 sec.                                                                                                                            |
|                           | Bending                                                                           |                                                                | Each lead wire shall be subjected to 5N weight and then ±45°bend twice.                                                                                                                                                                                                                   |
|                           | Turn back strength                                                                |                                                                | Each lead wire shall be turn back twice at 180°.                                                                                                                                                                                                                                          |
| 13.Solderability of leads | Lead wire shall be soldered with coated over 95% of the circumferential direction |                                                                | The lead wire of a capacitor shall be dipped into flax and then into molten solder of 235±5°C for 2±0.5sec.                                                                                                                                                                               |