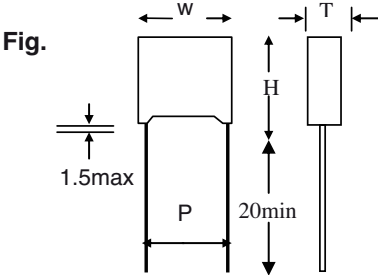
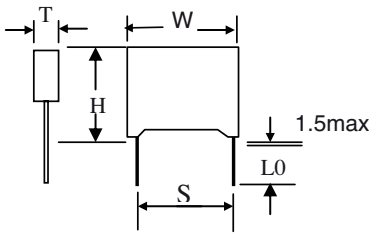


## PRODUCT SPECIFICATIONS

|                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CUSTOMER :                                                                                                                                                                                                                                                                                                                                                             |
| CUSTOMER'S REFERENCE : <b>3/34xx 3/35xx 3/36xx Series</b>                                                                                                                                                                                                                                                                                                              |
| DESCRIPTIONS : <b>METALLIZED POLYESTER FILM CAPACITOR-BOX</b>                                                                                                                                                                                                                                                                                                          |
| SHENGXIN TYPE : <b>CL21-B series</b>                                                                                                                                                                                                                                                                                                                                   |
| <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Fig1</p> </div> <div style="text-align: center;">  <p>Fig2</p> </div> </div> |

### 1. PRODUCT DIMENSIONS :

unit : mm

| CUSTOMER'S<br>PART NO. | CAP<br>nF | Tol.<br>±% | R.V.<br>VDC | T.V.<br>VDC | W<br>±0.5 | H<br>±0.5 | T<br>±0.5 | P<br>±1.0 | S<br>±0.5 | dψ<br>±0.05 | L0<br>±0.5 | LL<br>MIN | Fig. | SHENGXIN<br>PART NO. |
|------------------------|-----------|------------|-------------|-------------|-----------|-----------|-----------|-----------|-----------|-------------|------------|-----------|------|----------------------|
| 3/3406                 | 100,0     | 10         | 250         | 440         | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 104K250VDC    |
| 3/3408                 | 150,0     | 10         | 250         | 440         | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 154K250VDC    |
| 3/3410                 | 220,0     | 10         | 250         | 440         | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 224K250VDC    |
| 3/3412                 | 330,0     | 10         | 250         | 440         | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 334K250VDC    |
| 3/3476                 | 68,0      | 10         | 400         | 700         | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 683K400VDC    |
| 3/3482                 | 100,0     | 10         | 400         | 700         | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 104K400VDC    |
| 3/3488                 | 150,0     | 10         | 400         | 700         | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 154K400VDC    |
| 3/3498                 | 330,0     | 10         | 160         | 280         | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 334K160VDC    |
| 3/3504                 | 470,0     | 10         | 100         | 175         | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 474K100VDC    |
| 3/3512                 | 680,0     | 10         | 63          | 110         | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 684K63VDC     |
| 3/3520                 | 1000,0    | 10         | 63          | 110         | 18,0      | 12,0      | 6,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 105K63VDC     |
| 3/3526                 | 1000,0    | 10         | 250         | 440         | 18,0      | 14,5      | 8,5       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 105K250VDC    |
| 3/3616                 | 33,0      | 10         | 630         | 1100        | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 333K630VDC    |
| 3/3618                 | 47,0      | 10         | 630         | 1100        | 18,0      | 11,0      | 5,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 473K630VDC    |
| 3/3620                 | 68,0      | 10         | 630         | 1100        | 18,0      | 12,0      | 6,0       | 15,0      |           | 0,8         |            | 20,0      | 1    | CL21-B 683K630VDC    |

## PRODUCT SPECIFICATIONS

TYPE : **CL21-B**

| NO.  | ITEM                                                           | DESCRIPTIONS                                                                                                    |
|------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| 1.   | <b>SCOPE</b>                                                   | This specifications cover the requirements of SHENGXIN's Metallized Polyester Film Capacitor-BOX, Type : CL21-B |
| 2.   | <b>STANDARD ATMOSPHERIC CONDITIONS FOR MAKING MEASUREMENTS</b> |                                                                                                                 |
| 2.1. | AMBIENT TEMPERATURE                                            | 15°C to 35°C<br>(If there is any doubt on the results, the measurements shall be made at +20 +/- 5°C.)          |
| 2.2. | RELATIVE HUMIDITY (R.H.)                                       | 45% to 75%<br>(If there is any doubt on the results, the measurements shall be made at 60% to 70%.)             |
| 2.3. | AIR PRESSURE                                                   | 86 kpa to 106 kpa.                                                                                              |
| 2.4. | OPERATING TEMPERATURE RANGE                                    | -55°C to +105°C<br>for which the capacitor can be operated continuously at rated voltage.                       |
| 3.   | <b>CONSTRUCTION</b>                                            |                                                                                                                 |
| 3.1. | DIELECTRIC                                                     | Metallized Polyester Film                                                                                       |
| 3.2. | METAL SPRAY                                                    | Special Solder                                                                                                  |
| 3.3. | LEAD WIRE                                                      | Copper-clad Steel Wire                                                                                          |
| 3.4. | INNER COATING                                                  | Epoxy Resin                                                                                                     |
| 3.5. | OUTER COATING                                                  | PLastic Case                                                                                                    |
|      |                                                                |                                                                                                                 |
| 4.   | <b>MARKING</b>                                                 |                                                                                                                 |
| 4.1. | MANUFACTURER'S SYMBOL                                          | stands for SHENGXIN.                                                                                            |
| 4.2. | NOMINAL CAPACITANCE                                            | "474" for "470nF"                                                                                               |
| 4.3. | TOLERANCE                                                      | "K" for "±10%"                                                                                                  |
| 4.4. | RATED VOLTAGE                                                  | in VDC rating, unless otherwise indicated.                                                                      |
| 4.5. | MARKING COLOR                                                  | Black                                                                                                           |
|      |                                                                |                                                                                                                 |

| 5. ELECTRICAL CHARACTERISTICS |                              |                               |                                                                                                                    |                                                                                                                                                                                                   |
|-------------------------------|------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NO.                           | ITEM                         |                               | PERFORMANCE                                                                                                        | TEST CONDITIONS                                                                                                                                                                                   |
| 5.1.                          | Withstand Voltage (TV)       | Between Terminals             | Shll be no abnormality.                                                                                            | Apply 150% of rated voltage for 60 sec., or 175% of rated voltage for 1~5 sec. at +20 +/- 5°C. The charging current must be <= 1 Amp.                                                             |
|                               |                              | Between Terminals & Enclosure | Shll be no abnormality.                                                                                            | Apply 200% of rated voltage for 2 to 5 sec.                                                                                                                                                       |
| 5.2.                          | Insulation Resistance (I.R.) |                               | >= 7,500 MOhm (C <= 0.33 uF)<br>>= 2,500 MOhm*uF/C (C > 0.33 uF)                                                   | Apply Vt +/- 15% for 60 +/- 5 sec. at +20 +/- 5°C.<br>Vt = 50 VDC if rated voltage <= 100 VDC;<br>Vt = 100 VDC if 100 VDC < rated voltage <= 500 VDC;<br>Vt = 500 VDC if rated voltage > 500 VDC. |
| 5.3.                          | Capacitance (CAP)            |                               | Within the tolerance specified.<br>(at +20 +/- 5°C).                                                               | Measuring Frequency : 1 KHz +/- 10%.<br>Measuring Voltage : <= 1 Vrms.max.                                                                                                                        |
| 5.4.                          | Dissipation Factor (DF)      |                               | <= 0.010 (1.0%) at 1 KHz.                                                                                          | Measuring Frequency : 1KHz +/- 10%<br>Measuring Voltage : <= 1 Vrms.max.                                                                                                                          |
| 5.5.                          | Connection of Element        |                               | Shall be no open nor short-circuiting.<br>The connection shall be stable.<br>DF shall be <= 0.010 (1.0%) at 1 KHz. | Apply 200% of rated voltage for 10 times.                                                                                                                                                         |

## PRODUCT SPECIFICATIONS

TYPE : **CL21-B**

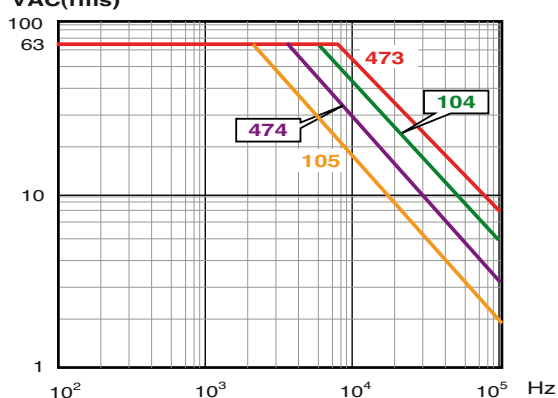
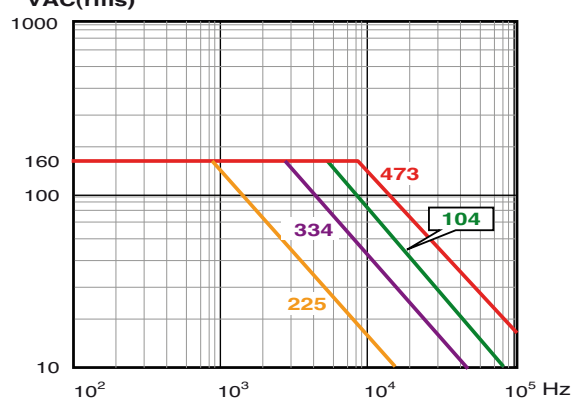
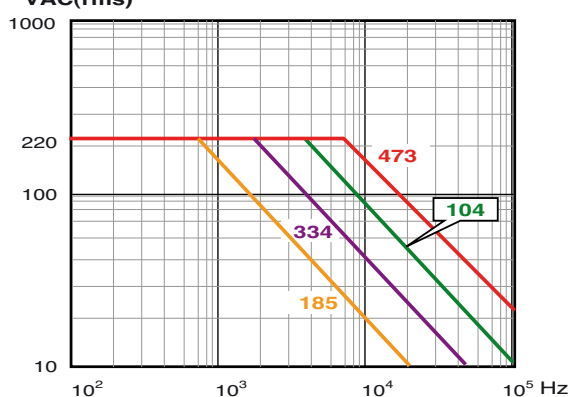
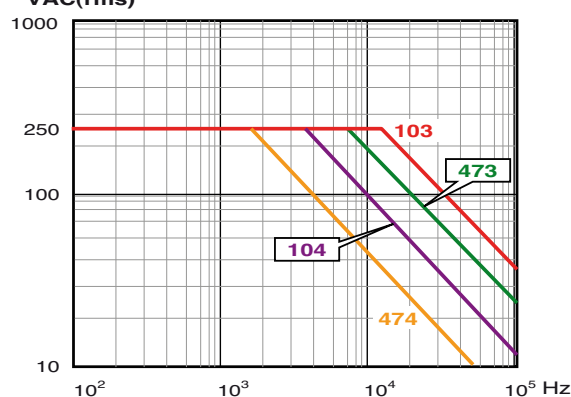
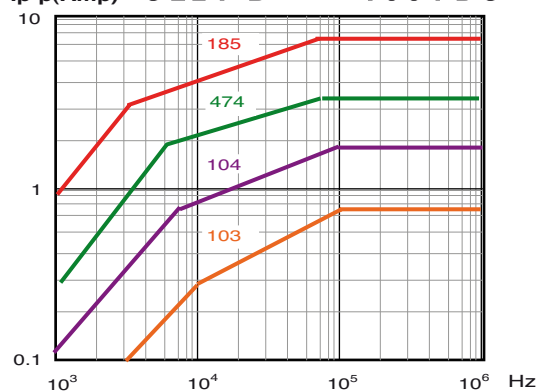
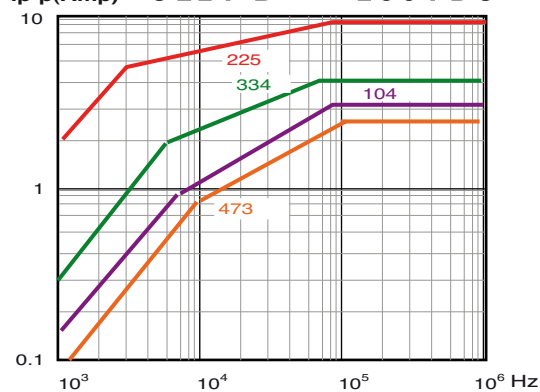
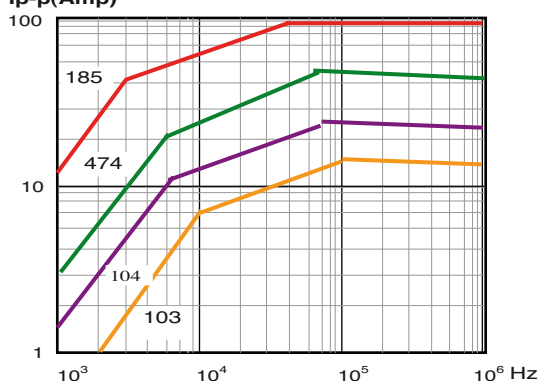
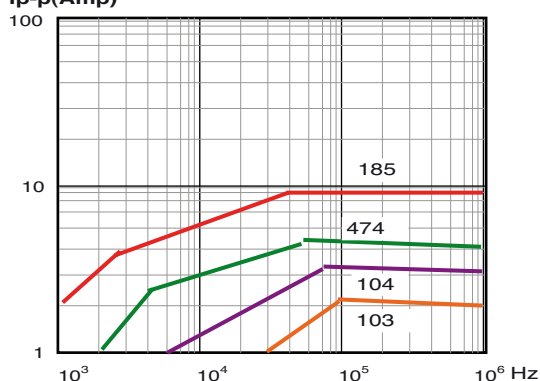
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|-------------------------------|-------------------|---------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.6.                          | Solderability     |                                 | More than 90% of circumferential surface of lead wire shall be covered with new solder. | Testing method per IEC 68-2-20 Ta.<br>Soldering temperature : +235 +/- 5°C.<br>Immersion duration : 2 +/- 0.5 sec.                                                                                                      |
| 6. MECHANICAL CHARACTERISTICS |                   |                                 |                                                                                         |                                                                                                                                                                                                                         |
| NO.                           | ITEM              |                                 | PERFORMANCE                                                                             | TEST CONDITIONS                                                                                                                                                                                                         |
| 6.1.                          | Terminal Strength | Tensil                          | Shall be no abnormality.                                                                | Testing method per IEC 68-2-21.<br>Apply 1.0 kg for 10 +/- 1 sec. to the terminal in the axial direction, and acting in a direction away from the body.                                                                 |
|                               |                   | Bending                         | Shall be no abnormality.                                                                | Apply 0.5 kg for 2 cycles.<br>Each cycle includes:<br>90° once, return to its initial position for 2-3 sec., and then to the opposite direction once.                                                                   |
| 7. ENDURANCE CHARACTERISTICS  |                   |                                 |                                                                                         |                                                                                                                                                                                                                         |
| NO.                           | ITEM              |                                 | PERFORMANCE                                                                             | TEST CONDITIONS                                                                                                                                                                                                         |
| 7.1.                          | Temperature Cycle | Appearance                      | Shall be no remarkable change.                                                          | Test Temperature Cycle : Total 5 cycles.<br>Each cycle includes :<br>1. +20 +/- 2°C for 3 min.<br>2. -55 +0/-3 °C for 30 min.<br>3. +20 +/- 2°C for 3 min.<br>4. +105 +3/-0 °C for 30 min.<br>5. +20 +/- 2°C for 3 min. |
|                               |                   | Withstand Voltage               | Shall satisfy No. 5.1.                                                                  |                                                                                                                                                                                                                         |
|                               |                   | Capacitance Change Rate (Δ C/C) | Within +/- 3% of the value before test.                                                 |                                                                                                                                                                                                                         |
|                               |                   | Dissipation Factor              | Tanδ :1.2% max.(1KHz)                                                                   |                                                                                                                                                                                                                         |
|                               |                   | Insulation Resistance (I.R.)    | >= 50% of the limit value of No. 5.2.                                                   |                                                                                                                                                                                                                         |

| NO.  | ITEM                      | PERFORMANCE                              | TEST CONDITIONS                                                                                                                                                                                                                                                                           |
|------|---------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7.2. | High Temperature Loading  | Appearance                               | Testing method per IEC 6038-17.<br>Refer to JIS C 5102-1994.<br>Test Temperature : +105 +/- 2 °C.<br>Apply 140% of rated voltage for 240 +8/-0hrs;<br>After test, allow it stay alone for 1.5+/- 0.5 hrs at standard temperature and humidity before making measurements.                 |
|      |                           | Withstand Voltage                        |                                                                                                                                                                                                                                                                                           |
|      |                           | Capacitance Change Rate ( $\Delta C/C$ ) |                                                                                                                                                                                                                                                                                           |
|      |                           | Dissipation Factor                       |                                                                                                                                                                                                                                                                                           |
|      |                           | Insulation Resistance (I.R.)             |                                                                                                                                                                                                                                                                                           |
| 7.3. | Damp Heat Loading         | Appearance                               | Refer to JIS C 0022.<br>Test temperature : +40 +/- 2?<br>Test humidity : 90% to 95% R.H.<br>Test voltage : rated voltage.<br>Test duration : 500 +24/-0 hrs.<br>After test, allow it stay alone for 1.5+/- 0.5 hrs at standard temperature and humidity before making measurements.       |
|      |                           | Withstand Voltage                        |                                                                                                                                                                                                                                                                                           |
|      |                           | Capacitance Change Rate ( $\Delta C/C$ ) |                                                                                                                                                                                                                                                                                           |
|      |                           | Dissipation Factor                       |                                                                                                                                                                                                                                                                                           |
|      |                           | Insulation Resistance (I.R.)             |                                                                                                                                                                                                                                                                                           |
| 7.4. | Soldering Heat Resistance | Appearance                               | Testing method per IEC 68-2-20 Tb.<br>Soldering Temperature : +270 +/- 5°C.<br>Immersion Duration : 3 +/- 0.5 sec.<br>Immersion Depth : 4 +/- 0.8 mm from roots.<br>After test, allow it stay alone for 1.5 +/- 0.5 hrs. at standard temperature and humidity before making measurements. |
|      |                           | Withstand Voltage Between Terminals      |                                                                                                                                                                                                                                                                                           |
|      |                           | Capacitance Change Rate ( $\Delta C/C$ ) |                                                                                                                                                                                                                                                                                           |
|      |                           | Dissipation Factor                       |                                                                                                                                                                                                                                                                                           |
|      |                           | Insulation Resistance (I.R.)             |                                                                                                                                                                                                                                                                                           |
|      |                           | Connection of Element                    |                                                                                                                                                                                                                                                                                           |
| 7.5. | Dry Heat Resistance       | Appearance                               | Test Temperature : +105 +/- 2°C<br>Test Duration : 16 +/- 0 hrs.                                                                                                                                                                                                                          |
|      |                           | Withstand Voltage                        |                                                                                                                                                                                                                                                                                           |
|      |                           | Capacitance Change Rate ( $\Delta C/C$ ) |                                                                                                                                                                                                                                                                                           |
|      |                           | Dissipation Factor                       |                                                                                                                                                                                                                                                                                           |
|      |                           | Insulation Resistance (I.R.)             |                                                                                                                                                                                                                                                                                           |

**PRODUCT SPECIFICATIONS****TYPE : CL21-B**

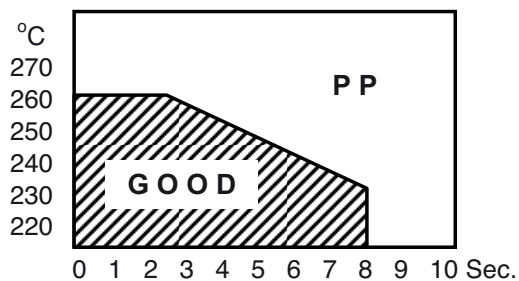
|      |                 |                                          |                                                                 |
|------|-----------------|------------------------------------------|-----------------------------------------------------------------|
| 7.6. | Cold Resistance | Appearance                               | Test Temperature : -55 +/- 2 °C<br>Test Duration : 2 +/- 1 hrs. |
|      |                 | Withstand Voltage                        |                                                                 |
|      |                 | Capacitance Change Rate ( $\Delta C/C$ ) |                                                                 |
|      |                 | Dissipation Factor                       |                                                                 |
|      |                 | Insulation Resistance (I.R.)             |                                                                 |

| NO.                               | ITEM                           |                                 | PERFORMANCE                                                               | TEST CONDITIONS                                                                                                                                                                                                                                                                           |
|-----------------------------------|--------------------------------|---------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7.7.                              | Humidity Resistance            | Appearance                      | Shall be no remarkable change.                                            | Testing method per IEC 68-2-3 Ca.<br>Refer to JIS C 0022.<br>Test Temperature : +40 +/- 2°C.<br>Test Humidity : 90% to 95% R.H.<br>Test Duration : 500 +24/-0 hrs<br>After test, allow it stay alone for 1.5 +/- 0.5 hrs at standard temperature and humidity before making measurements. |
|                                   |                                | Withstand Voltage               | Shall satisfy No. 5.1.                                                    |                                                                                                                                                                                                                                                                                           |
|                                   |                                | Capacitance Change Rate (Δ C/C) | Within +/- 10% of the value before test.                                  |                                                                                                                                                                                                                                                                                           |
|                                   |                                | Dissipation Factor              | Tanδ :1.2% max.(1KHz)                                                     |                                                                                                                                                                                                                                                                                           |
|                                   |                                | Insulation Resistance           | >= 50% of the limit value of No. 5.2.                                     |                                                                                                                                                                                                                                                                                           |
| 7.8.                              | Vibration Resistance           | Connection Strength             | Shall be no open nor short-circuiting.<br>The connection shall be stable. | Testing method per IEC 68-2-6 Fc.<br>Frequency Change : 10--55--10 Hz.<br>Vibration Distance : 1.5 mm.<br>Test Direction : X, Y, Z.<br>Test Duration : 2 hrs +1/-0 each direction.                                                                                                        |
|                                   |                                | Appearance                      | Shall be no mechanical damage.                                            |                                                                                                                                                                                                                                                                                           |
| 7.9.                              | Rapid Temperature Change       | Appearance                      | Shall be no remarkable change.                                            | Testing method per IEC 68-2-14 Na.<br>Test Temperature Cycle : Total 5 cycles.<br>High Temperature : +105 +5/-5 °C<br>Low Temperature : -55 +5/-5°C<br>30 min +/- 10% for each temperature.                                                                                               |
|                                   |                                | Withstand Voltage               | Shall satisfy No. 5.1.                                                    |                                                                                                                                                                                                                                                                                           |
|                                   |                                | Capacitance Change Rate (Δ C/C) | Within +/- 3% of the value before test.                                   |                                                                                                                                                                                                                                                                                           |
|                                   |                                | Dissipation Factor              | Tanδ :1.0% max.(1KHz)                                                     |                                                                                                                                                                                                                                                                                           |
|                                   |                                | Insulation Resistance           | >= 50% of the limit value of No. 5.2.                                     |                                                                                                                                                                                                                                                                                           |
|                                   |                                |                                 |                                                                           |                                                                                                                                                                                                                                                                                           |
| 8. ACCEPTABLE QUALITY LEVEL (AQL) |                                |                                 |                                                                           |                                                                                                                                                                                                                                                                                           |
| NO.                               | ITEM                           |                                 | AQL                                                                       | SAMPLING PLAN                                                                                                                                                                                                                                                                             |
| 8.1.                              | Appearance AQL                 |                                 | 0,65                                                                      | According to MIL-STD-105E level II.<br>By lot outgoing inspection.                                                                                                                                                                                                                        |
| 8.2.                              | Dimension AQL                  |                                 | 0,65                                                                      |                                                                                                                                                                                                                                                                                           |
| 8.3.                              | Mechanical Characteristics AQL |                                 | 0,40                                                                      |                                                                                                                                                                                                                                                                                           |
| 8.4.                              | Electrical Characteristics AQL |                                 |                                                                           |                                                                                                                                                                                                                                                                                           |
|                                   | CAP, DF,                       | 0,04                            |                                                                           |                                                                                                                                                                                                                                                                                           |
|                                   | TV, IR,                        | Zero Defect                     |                                                                           |                                                                                                                                                                                                                                                                                           |

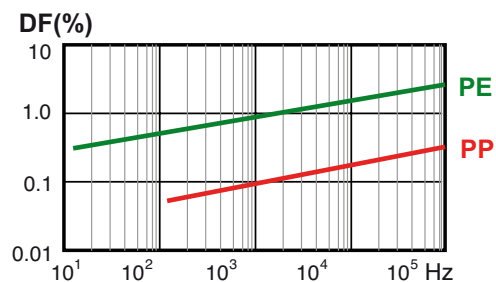
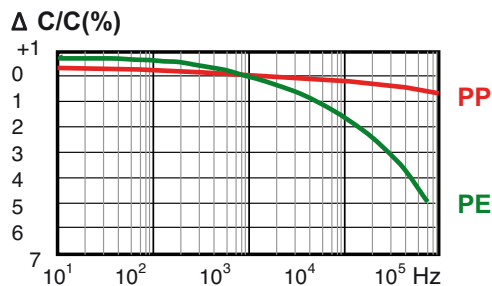
**Permissible AC Voltage VS Frequency Curve****CL21-B****VAC(rms) 100VDC / 63VAC****VAC(rms) 250VDC / 160VAC****VAC(rms) 400VDC / 220VAC****VAC(rms) 630VDC / 250VAC****Permissible Pulse Current VS Frequency Curve****CL21-B****Ip-p(Amp) CL21-B 100VDC****Ip-p(Amp) CL21-B 250VDC****Ip-p(Amp) CL21-B 400VDC****Ip-p(Amp) CL21-B 630VDC**

## CHARACTERISTICS REFERENCE

## Soldering Temperature VS Time



## Frequency Characteristics



## Temperature Characteristics

