# PRODUCT SPECIFICATIONS

CUSTOMER :

CUSTOMER'S REFERENCE : **3/34×× 3/36×× 3/37×× Series**

DESCRIPTIONS : **METALLIZED POLYESTER FILM CAPACITOR-BOX**

SHENGXIN TYPE : **CL21-B series**

Fig.

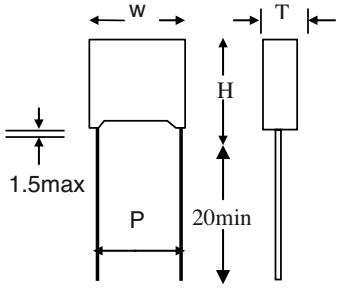



Fig1

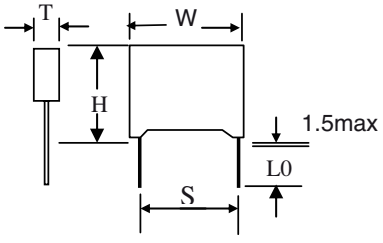



Fig2

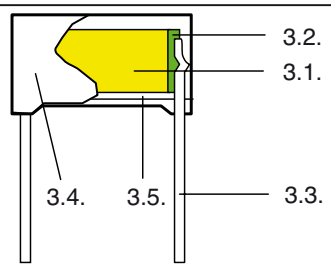
## 1. PRODUCT DIMENSIONS :

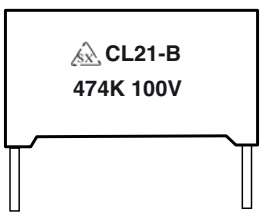
unit : mm

| CUSTOMER'S PART NO. | CAP uF | Tol. ±% | R.V. VDC | T.V. VDC | W ±0.5 | H ±0.5 | T ±0.5 | P ±1.0 | S ±0.5 | d? ±0.05 | L0 ±0.5 | LL MIN | Fig. | SHENGXIN PART NO. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/3420 | 1,50 | 10 | 250 | 440 | 31,0 | 18,0 | 9,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 155K250VDC |
| 3/3422 | 2,20 | 10 | 250 | 440 | 31,0 | 18,0 | 9,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 225K250VDC |
| 3/3424 | 3,30 | 10 | 250 | 440 | 32,0 | 20,0 | 11,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 335K250VDC |
| 3/3426 | 4,70 | 10 | 250 | 440 | 32,0 | 22,0 | 13,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 475K250VDC |
| 3/3428 | 6,80 | 10 | 250 | 440 | 32,0 | 24,5 | 15,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 685K250VDC |
| 3/3432 | 10,00 | 10 | 250 | 440 | 31,0 | 33,0 | 18,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 106K250VDC |
| 3/3632 | 0,33 | 10 | 630 | 1100 | 32,0 | 18,0 | 9,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 334K630VDC |
| 3/3634 | 0,47 | 10 | 630 | 1100 | 32,0 | 20,0 | 11,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 474K630VDC |
| 3/3748 | 0,68 | 10 | 400 | 700 | 32,0 | 18,0 | 9,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 684K400VDC |
| 3/3752 | 1,00 | 10 | 400 | 700 | 32,0 | 18,0 | 9,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 105K400VDC |
| 3/3762 | 3,30 | 10 | 160 | 280 | 32,0 | 18,0 | 9,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 335K160VDC |
| 3/3772 | 6,80 | 10 | 100 | 175 | 32,0 | 22,0 | 13,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 685K100VDC |
| 3/3778 | 10,00 | 10 | 63 | 110 | 31,5 | 21,6 | 13,0 | 27,5 | | 0,8 | | 20,0 | 1 | CL21-B 106K63VDC |

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

| NO. | ITEM | DESCRIPTIONS |
|---|---|---|
| **1.** | **SCOPE** | This specifications cover the requirements of SHENGXIN's Metallized Polyester Film Capacitor-BOX, Type : CL21-B |
| **2.** | **STANDARD ATMOSPHERIC CONDITIONS FOR MAKING MEASUREMENTS** | |
| 2.1. | AMBIENT TEMPERATURE | 15°C to 35°C (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% (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 for which the capacitor can be operated continuously at rated voltage. |
| **3.** | **CONSTRUCTION** | |
| 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.** | **MARKING** | |
| 4.1. | MANUFACTURER'S SYMBOL | SX 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<br>175% of rated voltage for 1~5 sec. at +20 +/- 5°C.<br>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%)<br>at 1 KHz. | Apply 200% of rated voltage for 10 times. |



| 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.<br>to the terminal in the axial direction,<br>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.,<br>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 | Shall be no remarkable change. | 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 | Shall satisfy No. 5.1. | |
| | | Capacitance Change Rate (ΔC/C) | Within +/-8% 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. | |
| 7.3. | Damp Heat Loading | Appearance | Shall be no remarkable change.<br>The marking shall be legible. | 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 beforemaking measurements. |
| | | Withstand Voltage | Shall satisfy No. 5.1. | |
| | | Capacitance Change Rate (ΔC/C) | Within +/- 10% 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. | |
| 7.4. | Soldering Heat Resistance | Appearance | Shall be no remarkable change.<br>The marking shall be legible. | Testing method per IEC 68-2-20 Tb.<br>Soldering Temperature : +270 +/- 5°C.<br>Immersion Duration : 3 +/- 0.5 sec.<br>Immersion Deepth : 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 | 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 (I.R.) | >= 50% of the limit value of No. 5.2. | |
| | | Connection of Element | Shall be stable. | |
| 7.5. | Dry Heat Resistance | Appearance | Shall be no remarkable change. | Test Temperature : +105 +/- 2°C<br>Test Duration : 16 +1/-0 hrs. |
| | | Withstand Voltage | Shall satisfy No. 5.1. | |
| | | Capacitance Change Rate (Δ C/C) | Within +/- 5% 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. | |

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

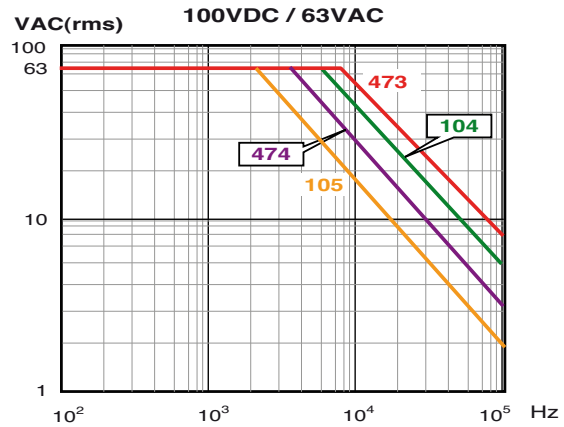
| | | | | |
|---|---|---|---|---|
| 7.6. | Cold Resistance | Appearance | Shall be no remarkable change. | Test Temperature : -55 +/-2 °C<br>Test Duration : 2 +/-1 hrs. |
| | | Withstand Voltage | Shall satisfy No. 5.1. | |
| | | Capacitance Change Rate (Δ C/C) | Within +0/- 10% of the value before test. | |
| | | Dissipation Factor | Tanδ :1.0% max.(1KHz) | |
| | | Insulation Resistance (I.R.) | >= 50% of the limit value of No. 5.2. | |

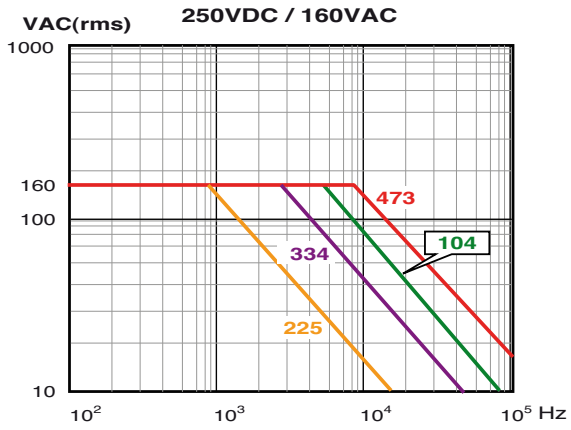
| NO. | ITEM | | PERFORMANCE | TEST CONDITIONS |
|---|---|---|---|---|
| 7.7. | Humidity Resistance | Appearance | Shall be no remarkable change. | Testing method per IEC 68-2-3 Ca.<br>Refer to JIS C 0022.<br>Test Temperature : +40 +/- 2°C.<br>Test Humidity : 90% to 95% R.H.<br>Test Duration : 500 +24/-0 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. 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. | |
| | | | | |

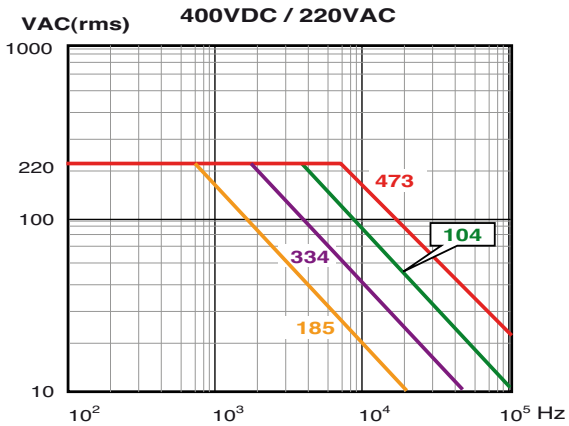
## 8. ACCEPTABLE QUALITY LEVEL (AQL)

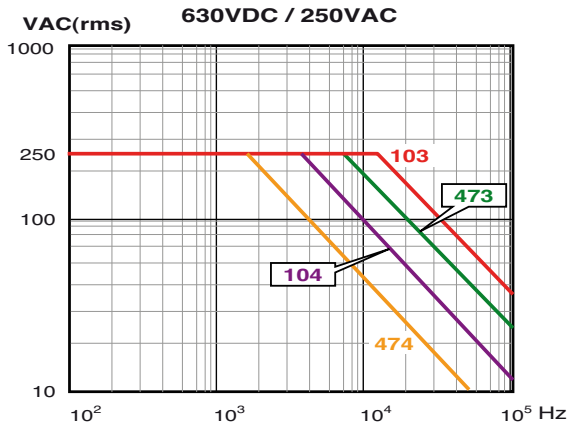
| NO. | ITEM | AQL | SAMPLING PLAN |
|---|---|---|---|
| 8.1. | Appearance AQL | 0,65 | According to MIL-STD-105E level II.<br>By lot outgoing inspection. |
| 8.2. | Dimension AQL | 0,65 | |
| 8.3. | Mechanical Characteristics AQL | 0,40 | |
| 8.4. | Electrical Characteristics AQL | | |
| | CAP, DF, | 0,04 | |
| | TV, IR, | Zero Defect | |

## Permissible AC Voltage VS Frequency Curve CL21-B

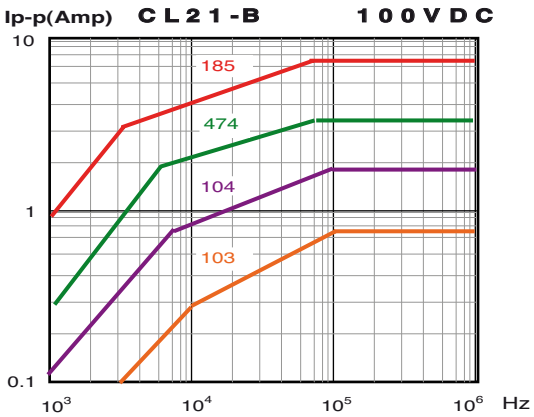


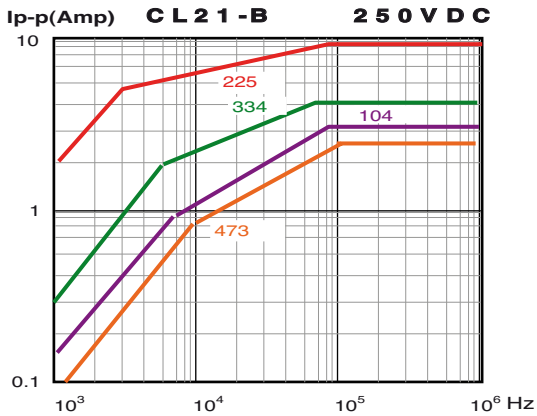



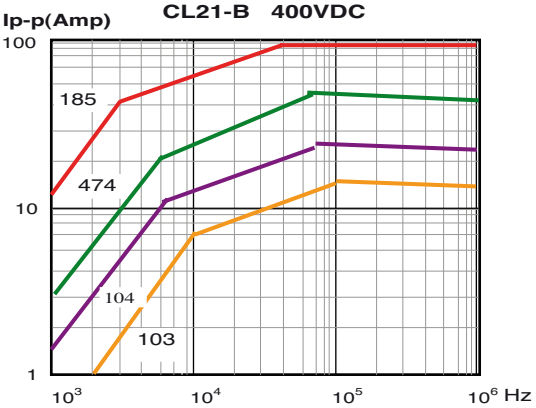



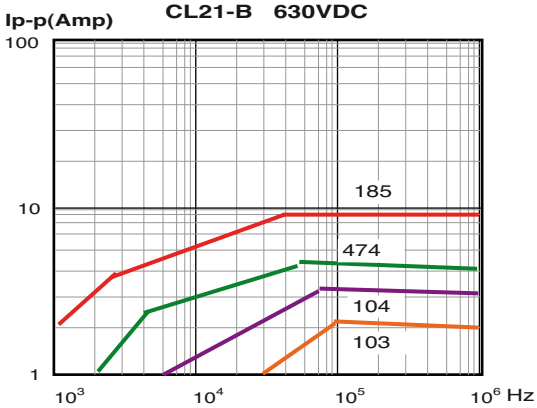




## Permissible Pulse Current VS Frequency Curve CL21-B



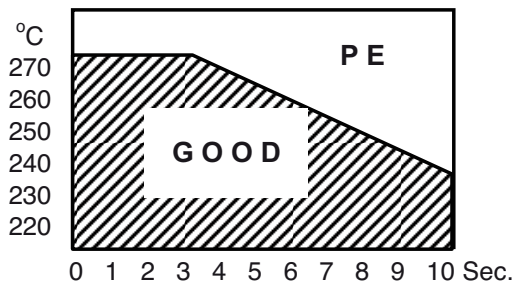



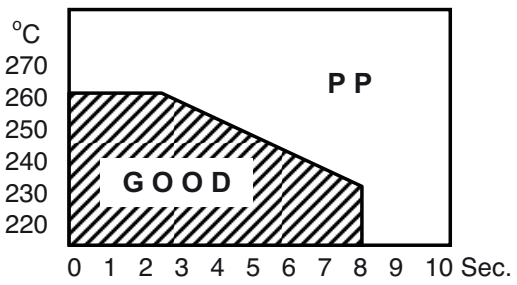



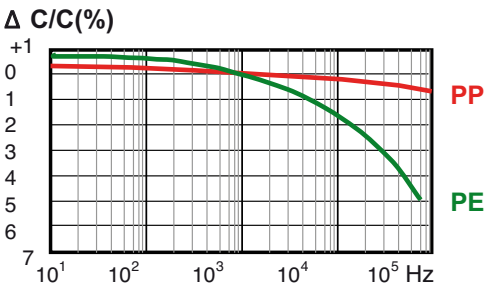
## CHARACTERISTICS REFERENCE

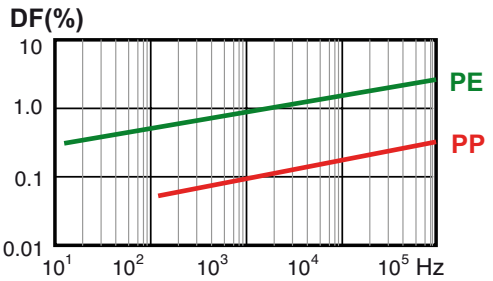
### Soldering Temperature VS Time




### Frequency Characteristics




### Temperature Characteristics