

SHC Series

Aluminum Electrolytic Capacitors

| Item Name | Rating | Case size | KNSCHA Lifetime |
|----------------|--------------------|--------------|-----------------|
| SHC1E471M-0812 | SHC 25V470 μ F | Φ 8*12L | 2000 hours |

1. Operating Temp. Range

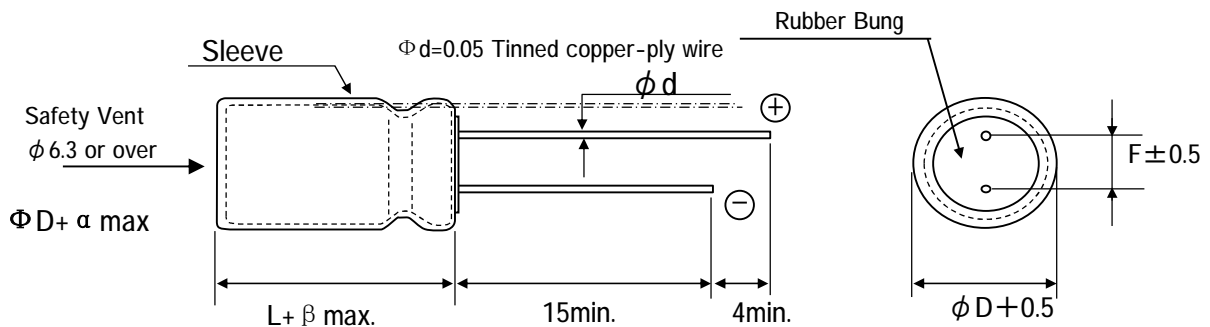
-40°C ~ + 105°C

2. Electrical Characteristics

【Table 1】

| Rated Voltage VDC | Surge Voltage VDC | Nominal Static Capacitance (μ F) | Tolerance on Capacitance(%) 20°C 120Hz | Dissipation Factor ($\tan \delta$) max 20°C 120Hz | Leakage Current 2min. 20°C (μ A) max | Permissible Ripple Current (mA rms) max 105°C 120Hz |
|-------------------|-------------------|---------------------------------------|--|---|---|---|
| 25 | 32 | 470 | -20~+20 | 0.16 | 47 | 250 |

3. Dimensions



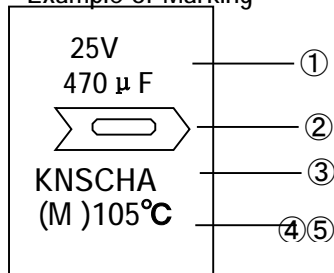
Unit(mm)

| | | | |
|--------------------|-------------|-------------|--------------|
| $\phi D + 0.5$ Max | $L + 2$ Max | $F \pm 0.5$ | $d \pm 0.05$ |
| 8 | 12 | 3.5 | 0.5 |

4. Marking

Following items are printed with white color on black color sleeve

Example of Marking



- ① Rated voltage & Nominal Capacitance
- ② Polarity (negative)
- ③ Trade Mark
- ④ Symbol of Capacitance Tolerance (M)
- ⑤ Max Operating Temp.

5. MULTIPLIER FOR RIPPLE CURRENT

①. Frequency Coefficient

| Freq.(Hz) | 60(50) | 120 | 300 | 1K | 10K |
|---------------|--------|------|------|------|------|
| Cap(μ F) | | | | | |
| 0.1-47 | 0.75 | 1.00 | 1.35 | 1.55 | 2.00 |
| 68-680 | 0.80 | 1.00 | 1.25 | 1.34 | 1.50 |
| 1000-22000 | 0.85 | 1.00 | 1.10 | 1.13 | 1.15 |

②. Temperature Coefficient

| Ambient Temperature(°C) | 40 | 60 | 70 | 85 | 105 |
|-------------------------|------|------|------|------|------|
| Coefficient | 2.40 | 2.10 | 1.78 | 1.65 | 1.00 |

6. Characteristics

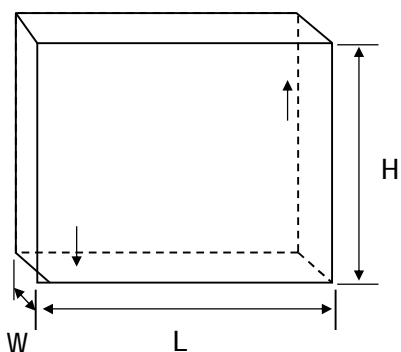
| No. | Item | Performance | Test Method | | | | | | |
|--|--------------------------------------|---|--|---|----------------------------------|-------------------------|----------------------------------|---|--|
| 1 | Leakage Current | $I = 117.5 \mu A$ ($I=0.01CV$) I = Max Leakage Current C =Ctatic Capacitor: V =Rated Voltage | Protection Resistor : $1000 \pm 10 \Omega$ Applied Volt : Rated Voltage Mesasuring time : 2minutes | | | | | | |
| 2 | Static Capacitance | 376 ~ 564 μF | Measured Frequency : $120Hz \pm 20\%$ Measured Voltage $\leq 0.5V_{rms}$, 1.5 ~ 2.0VDC | | | | | | |
| 3 | Dissipation Factor ($\tan \delta$) | 0.16 and Under | Same as condition of Capacitors | | | | | | |
| 4 | High Temp. Load Characteristics | Leakage Current | \leq the value specified in Table 1 | Test Temp. : $105 \pm 2^\circ C$ Applied voltage: Rated voltage Test Time :2,000 hours +72, -0 hours | | | | | |
| | | Cap. Change | $\cong \pm 20\%$ of initial value | | | | | | |
| | | Dissipation Factor | $\leq 200\%$ of value specified in Table | | | | | | |
| | | Appearance | No remarkable abnormality | | | | | | |
| 5 | High Temp. no load Characteristics | Leakage Current | \leq the value specified in Table 1 | Test Temp. : $105 \pm 2^\circ C$ No voltage applied Test Time :1000 hours +24, -0 hurs | | | | | |
| | | Cap. Change | $\cong \pm 20\%$ of initial value | | | | | | |
| | | Dissipation Factor | $\leq 200\%$ of value specified in Table | | | | | | |
| | | Appearance | No remarkable abnormality | | | | | | |
| 6 | Terminal Strength | Tensile Strength | 45N {4.5kg} | Keeping time Tensile 1~5sec Bending 30 \pm 5sec | | | | | |
| | | Bending Strength | 25N {2.5kg} | | | | | | |
| | | | | | | | | | |
| 7 | Impedance Ratio | <table border="1"> <thead> <tr> <th>W V</th> <th></th> </tr> </thead> <tbody> <tr> <td>Z-25$^\circ C$/Z+20$^\circ C$</td> <td>2</td> </tr> <tr> <td>Z-40$^\circ C$/Z+20$^\circ C$</td> <td>3</td> </tr> </tbody> </table> | W V | | Z-25 $^\circ C$ /Z+20 $^\circ C$ | 2 | Z-40 $^\circ C$ /Z+20 $^\circ C$ | 3 | |
| W V | | | | | | | | | |
| Z-25 $^\circ C$ /Z+20 $^\circ C$ | 2 | | | | | | | | |
| Z-40 $^\circ C$ /Z+20 $^\circ C$ | 3 | | | | | | | | |
| 8 | Temperature Charac - teristics | Stage | Item | Performance | Stage | Test Temp($^\circ C$) | | | |
| | | 2,3 | Impedance Ratio | less than the value mentioned in 5-7, | 1 | 20 \pm 2 | | | |
| | | 5 | Cap, Change | $\leq \pm 25\%$ against value in stage 4 | 2 | -25 \pm 3; | | | |
| | | | | | 3 | -25 \pm 3; | | | |
| | | | | | 4 | 20 \pm 2 | | | |
| | | | | | 5 | 105 \pm 2 | | | |
| | | | 6 | 20 \pm 2 | | | | | |
| | | After the capacitor is held at temperature of each stage and reaches temperature stability, measure performance. | | | | | | | |
| 9 | Surge Voltage | Item | Perforemance | | | | | | |
| | | Leakage Current | \leq the initial specified value | | | | | | |
| | | Cap, Change | $\leq \pm 15\%$ against value before test | | | | | | |
| | | Dissipation Factor | \leq the initial specified value | | | | | | |
| | | Appearance | No remakable abnormality | | | | | | |
| Test Temp. 15~35 $^\circ C$ Test volt. Surge Volt.Specified in 2 Voltage apply. 1,000times of chage for 30 \pm 5sec, under frequency of 6 \pm 0.5sec, and discharge for 5min30sec. | | | | | | | | | |

6-2. Characteristics

| No. | Item | Performance | Test Method | | | | | | | | |
|--------------------|---------------------------------------|--|---|---------------------------|-------------|-------------------------------------|--------------------|------------------------------|------------|---------------------------|--|
| 10 | Vibration Resistance | <table border="1"> <tr> <td>Capacitance</td> <td>Stability required</td> </tr> <tr> <td>Cap. Change</td> <td>≤±5% of the initial specified value</td> </tr> <tr> <td>Appearance</td> <td>No remarkable abnormality</td> </tr> </table> <p>Frequency : 10~55Hz/1min. Width of vibration, 1.5mm Direction and duration X, Y and Z directions, each for 2 hours (Total 9 hours)</p> | Capacitance | Stability required | Cap. Change | ≤±5% of the initial specified value | Appearance | No remarkable abnormality | | | |
| Capacitance | Stability required | | | | | | | | | | |
| Cap. Change | ≤±5% of the initial specified value | | | | | | | | | | |
| Appearance | No remarkable abnormality | | | | | | | | | | |
| 11 | Solderbility | 3/4 area of surrounding directions of surface should be covered with new solder. | Solder: Sn-Ag, Sn-Cu Type Soldering Temp : 240±5°C Dipping degree : 2~2.5mm Flux : Ethanol solution (JIS K8101) or Isopropylalchol (JIS K8839) solution of Rosin (JIS K5902) | | | | | | | | |
| 12 | Resistance to Soldering | <table border="1"> <tr> <td>Leakage Current</td> <td>≤ Initial specified value</td> </tr> <tr> <td>Cap. Change</td> <td>≤ ±10% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>≤ Initial specified in value</td> </tr> <tr> <td>Appearance</td> <td>No remarkable abnormality</td> </tr> </table> | Leakage Current | ≤ Initial specified value | Cap. Change | ≤ ±10% of initial value | Dissipation Factor | ≤ Initial specified in value | Appearance | No remarkable abnormality | Soldering Temp. 280±5°C Soldering Time . 10±1sec. |
| Leakage Current | ≤ Initial specified value | | | | | | | | | | |
| Cap. Change | ≤ ±10% of initial value | | | | | | | | | | |
| Dissipation Factor | ≤ Initial specified in value | | | | | | | | | | |
| Appearance | No remarkable abnormality | | | | | | | | | | |
| 13 | Resistance to Humidity | <table border="1"> <tr> <td>Leakage Current</td> <td>≤ Initial specified value</td> </tr> <tr> <td>Cap. Change</td> <td>≤ ±15% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>≤ Initial spesified value</td> </tr> <tr> <td>Appearance</td> <td>No remarkable abnormality</td> </tr> </table> | Leakage Current | ≤ Initial specified value | Cap. Change | ≤ ±15% of initial value | Dissipation Factor | ≤ Initial spesified value | Appearance | No remarkable abnormality | Test Temp. : 40±2°C Humidity 90~95% Test Time : 500 ± 8 hours After the above condition,restored to normal temp, and then measured. |
| Leakage Current | ≤ Initial specified value | | | | | | | | | | |
| Cap. Change | ≤ ±15% of initial value | | | | | | | | | | |
| Dissipation Factor | ≤ Initial spesified value | | | | | | | | | | |
| Appearance | No remarkable abnormality | | | | | | | | | | |
| 14 | Perssure valve moment charact-erstics | There must not be thing ignition, scattering the resolution that that case works safely | Dcmethod: impress the reverse voltage and of 1A, I cancel an electric current. | | | | | | | | |

7 Packing method

Packaging shape, size, quantity



| Component size | Quantity per |
|----------------|--------------|
| 8*12 | 24000pcs. |

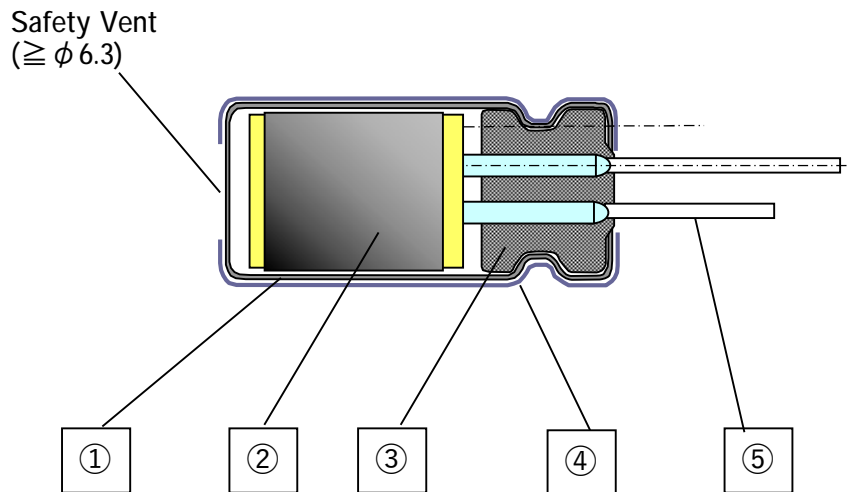
8 Related Standards JIS C 5141

9 Marking on packing box

- ① Item name
- ② Series name
- ③ Rated Voltage
- ④ Nominal Static Capacitance
- ⑤ Case size
- ⑥ Lot No.
- ⑦ Quantity

- 10 Soldeing
- 10-1 Soldering by soldering iron
 Temperature of iron top : 270~350°C
 Operating time : within 3 sec.
- 10-2 Flow soldering.
 Preheat : PCB surface temperature 120°C±5°C
 Solder Temp : 260°C±5°C
 Solder Dipping Temp. : 2~4sec.
- 11 Cleaning of PC board after soldering
 Using following solvents is possible but make sure following condition
 Solvent
 IPA or Alcoholic agent like Pinealpha ST-100S, Cleanthrough 750H, 750L, 710M, 750K,
 or Technocare FRW-14~17
- ① Cleaning should be made by ultrasonic within 5min, at the temperature less than 60°C.
 - ② Control of pollution is necessary (conductivity,pH, specific gravity, water volume)
 - ③ Please do not keep near cleaning agent. Please do not store in air-tight container.
 Please let it dry by hot air at the temperature less than maximum operating temp.
- 12 The situation of using
 Please do not use a condenser in the next use environment.
- ① One circumference environment(weatherability) condition.
 - (a) Direct water,salt water and environment oil works or become a dew condensation state.
 - (b) Environment full of harmful gas (a hydrogen chloride, sulfurous acid, nitrous acid hydrochloric acid, ammonia).
 - (c) Ozone, infrared rays and the environment where radioactive rays are done collation of
 - ② Vibration shock condition is extreme environment more than rule ranges of delivery specifications.
- 13 A country of origin
 A country of origin of an LQ series alminum electrolysis condenser of specifications: China
- 14 Effective life for storage
- Storage conditions:
- ① Temperature range must be between 5-35°C
 - ② Relative humidity must be less than 75%
 - ③ Must be stored indoor
 - ④ Must be free from water, oil or salt water
 - ⑤ Must be free from toxic gasses (hydrogen sulfide, sulfurous acid, chlorine, ammonium, etc.)
 - ⑥ Must be free from ozone, ultraviolet rays or any other radiation
 - ⑦ Must be kept in capacitor original package
- I Storage life is 12 months for capacitor of rated voltage $\leq 160V$
 II Storage life is 6 months for capacitor of rated voltage $\geq 200V$

Aluminum Electrolytic Capacitor SHC Series Structure



| No. | Name | Material |
|-----|---------------------|---------------------------|
| ① | Case | Aluminum |
| ② | Element (Electrode) | High Purity Aluminum foil |
| | (Separator) | Manila hemp pulp |
| | (Electrolyte) | --- |
| ③ | Rubber Bung | Synthetic Rubber |
| ④ | Sleeve | PET |
| ⑤ | Lead Wire | Tin plated Steel Wire |

Controls of ozone layer destructive chemical materials

Regulated materials : CFCs, Halon, Carbon Tetrachloride, 1.1.1-Trichloroethane

The products and parts do not include the above materials

The products and parts are not used the above materials on process.

The products and parts are not used PBBOs (Poly Bromo Bi-phenyl Oxides).

All materials are mentioned as existing chemical material in the "Law of examine and control of Production of Chemical Material"

The products are not listed in Appendix 1 of Export Trade Rule and Regulation

A condenser of this series supports RoHS regulation.