

CD288H Series

Aluminum Electrolytic Capacitors

| Item Name | Rating | Case size |
|--------------|----------|-----------|
| CD288H2G220T | 400V22uF | D13X21L |

1. Operating Temp. Range

-40+105°C

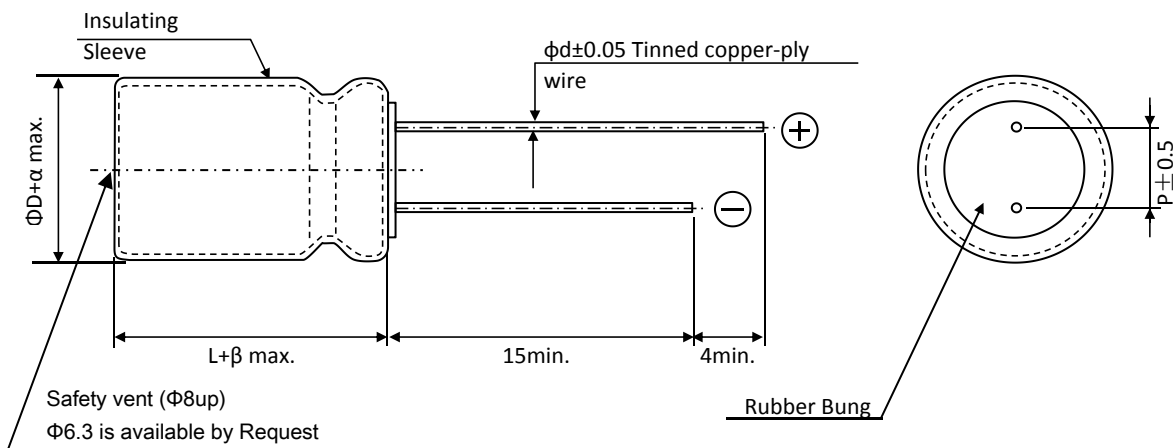
2. Electrical Characteristics

See Table 1.

【Table 1】

| Rated Voltage VDC | Surge Voltage VDC | Nominal Static Capacitance (μF) | Tolerance on Capacitance (%) 20°C 120Hz | Dissipation Factor (tanδ) max 20°C 120Hz | Leakage Current 2min. 20 °C(μA) | Permissible Ripple Current (mArms) 105°C120Hz | Impedance (Ω) 100KHz 20°C |
|-------------------|-------------------|---------------------------------|---|--|---------------------------------|---|---------------------------|
| 400 | 450 | 22 | -10%~+20% | 0.20 | 191 | 155 | / |

3. Dimensions



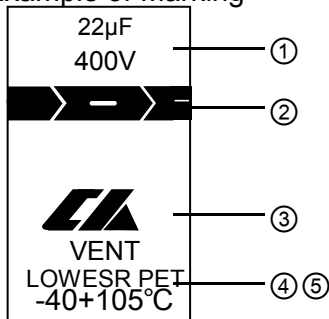
Unit(mm)

| ΦD | α | L | β | Φd | P |
|----|-----|------|-----|-----|-----|
| 13 | 0.5 | 21.0 | 2.0 | 0.6 | 5.0 |

4. Marking

Following items are printed with golden colour on green colour sleeve

Example of Marking



- ① Rated Voltage & Nominal Capacitance
- ② Polarity (negative)
- ③ Trade Mark of CH
- ④ Product Series
- ⑤ Operating Temp. Range

5. MULTIPLIER FOR RIPPLE CURRENT

①. Frequency Coefficient

| Freq.(Hz) | 60(50)Hz | 120Hz | 1KHz | 10KHz | 100KHz | |
|-----------|----------|-------|------|-------|--------|---|
| Cap(μF) | 22 | 0.7 | 0.85 | 0.9 | 0.95 | 1 |

②. Temperature Coefficient

| Ambient Temperature(°C) | 40 | 60 | 70 | 85 | 105 |
|-------------------------|-----|-----|------|------|-----|
| Coefficient | 2.4 | 2.1 | 1.78 | 1.65 | 1 |

6. Characteristics

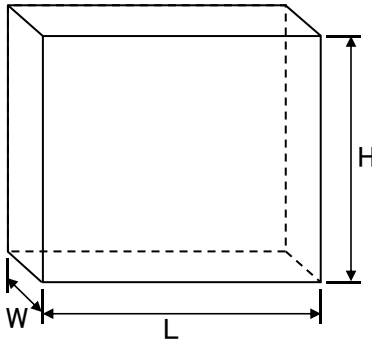
| No. | Item | Performance | Test Method | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|---|--|---|---------------------------------------|---------------------|---|---|--|--|------------------------------------|---|---|---|---------------|---|------------|---|--------------|---|--------------|---|------------|---|-------------|---|------------|
| 1 | Leakage Current | $I \leq 191\mu A$ | Protection Resistor: $1000 \pm 10\Omega$ Applied Volt: Rated Voltage Measuring time: 2 minutes | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Static Capacitance | $-10\% \sim +20\%$ | Measured Frequency: $120\text{Hz} \pm 20\%$ Measured Voltage: $\leq 0.5\text{Vrms}, 1.5 \sim 2.0\text{VDC}$ | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Dissipation Factor (tan δ) | 0.20 and Under | Same as condition of Capacitors | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Load Life | <table border="1"> <tr> <td>Leakage Current</td> <td>\leq the value specified in Table 1</td> </tr> <tr> <td>Cap. Change</td> <td>$\leq \pm 20\%$ of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>$\leq 200\%$ of value specified in Table 1</td> </tr> <tr> <td>Appearance</td> <td>No remarkable abnormality</td> </tr> </table> | Leakage Current | \leq the value specified in Table 1 | Cap. Change | $\leq \pm 20\%$ of initial value | Dissipation Factor | $\leq 200\%$ of value specified in Table 1 | Appearance | No remarkable abnormality | Test condition: $105 \pm 2^\circ\text{C}$ 120Hz Applied voltage: Rated voltage Applied Ripple Current: 155mArms Test Time: $3000 +72, -0$ hours | | | | | | | | | | | | | | | |
| Leakage Current | \leq the value specified in Table 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cap. Change | $\leq \pm 20\%$ of initial value | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor | $\leq 200\%$ of value specified in Table 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Appearance | No remarkable abnormality | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Shelf Life | <table border="1"> <tr> <td>Leakage Current</td> <td>\leq the value specified in Table 1</td> </tr> <tr> <td>Cap. Change</td> <td>$\leq \pm 20\%$ of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>$\leq 200\%$ of value specified in Table 1</td> </tr> <tr> <td>Appearance</td> <td>No remarkable abnormality</td> </tr> </table> | Leakage Current | \leq the value specified in Table 1 | Cap. Change | $\leq \pm 20\%$ of initial value | Dissipation Factor | $\leq 200\%$ of value specified in Table 1 | Appearance | No remarkable abnormality | Test Temp. : $105 \pm 2^\circ\text{C}$ No voltage applied Test Time 1000 hours $+24, -0$ hours | | | | | | | | | | | | | | | |
| Leakage Current | \leq the value specified in Table 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cap. Change | $\leq \pm 20\%$ of initial value | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor | $\leq 200\%$ of value specified in Table 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Appearance | No remarkable abnormality | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Terminal Strength | <table border="1"> <tr> <td>Tensile Strength</td> <td>45N {4.5kg}</td> </tr> <tr> <td>Bending Strength</td> <td>25N {2.5kg}</td> </tr> </table> | Tensile Strength | 45N {4.5kg} | Bending Strength | 25N {2.5kg} | Keeping time Tensile: 1 ~ 5 sec Bending: 30 ± 5 sec | | | | | | | | | | | | | | | | | | | |
| Tensile Strength | 45N {4.5kg} | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bending Strength | 25N {2.5kg} | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Impedance Ratio | <table border="1"> <tr> <td>Z(-25°C) / Z(+20°C)</td> <td>6</td> </tr> <tr> <td>Z(-40°C) / Z(+20°C)</td> <td>0</td> </tr> </table> | Z(-25°C) / Z(+20°C) | 6 | Z(-40°C) / Z(+20°C) | 0 | | | | | | | | | | | | | | | | | | | | |
| Z(-25°C) / Z(+20°C) | 6 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z(-40°C) / Z(+20°C) | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Temperature Characteristics | <table border="1"> <thead> <tr> <th>Stage</th> <th>Item</th> <th>Performance</th> </tr> </thead> <tbody> <tr> <td>2,3</td> <td>Impedance Ratio</td> <td>less than the value mentioned in 6-7</td> </tr> <tr> <td>5</td> <td>Cap. Change</td> <td>$\leq \pm 25\%$ against value in stage 4</td> </tr> </tbody> </table> <p>After the capacitor is held at temperature of each stage and reaches temperature stability, measure performance.</p> | Stage | Item | Performance | 2,3 | Impedance Ratio | less than the value mentioned in 6-7 | 5 | Cap. Change | $\leq \pm 25\%$ against value in stage 4 | <table border="1"> <thead> <tr> <th>Stage</th> <th>Test Temp(°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20 ± 2</td> </tr> <tr> <td>2</td> <td>$-25 \pm 3;$</td> </tr> <tr> <td>3</td> <td>$-40 \pm 3;$</td> </tr> <tr> <td>4</td> <td>20 ± 2</td> </tr> <tr> <td>5</td> <td>105 ± 2</td> </tr> <tr> <td>6</td> <td>20 ± 2</td> </tr> </tbody> </table> | Stage | Test Temp(°C) | 1 | 20 ± 2 | 2 | $-25 \pm 3;$ | 3 | $-40 \pm 3;$ | 4 | 20 ± 2 | 5 | 105 ± 2 | 6 | 20 ± 2 |
| Stage | Item | Performance | | | | | | | | | | | | | | | | | | | | | | | | |
| 2,3 | Impedance Ratio | less than the value mentioned in 6-7 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Cap. Change | $\leq \pm 25\%$ against value in stage 4 | | | | | | | | | | | | | | | | | | | | | | | | |
| Stage | Test Temp(°C) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 20 ± 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | $-25 \pm 3;$ | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | $-40 \pm 3;$ | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 20 ± 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 105 ± 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 20 ± 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Surge Voltage | <table border="1"> <thead> <tr> <th>Item</th> <th>Performance</th> </tr> </thead> <tbody> <tr> <td>Leakage Current</td> <td>\leq the initial specified value</td> </tr> <tr> <td>Cap. Change</td> <td>$\leq \pm 15\%$ against value before test</td> </tr> <tr> <td>Dissipation Factor</td> <td>\leq the initial specified value</td> </tr> <tr> <td>Appearance</td> <td>No remarkable abnormality</td> </tr> </tbody> </table> | Item | Performance | 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 remarkable abnormality | Test Temp.: $15 \sim 35^\circ\text{C}$ Test volt.: Surge Volt. Specified in 2 Voltage apply 1,000 times of charge for 30 ± 5 sec, under frequency of 6 ± 0.5 sec, and discharge for 5min 30sec. | | | | | | | | | | | | | |
| Item | Performance | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 remarkable abnormality | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Vibration Resistance | <table border="1"> <tr> <td>Capacitance</td> <td>Stability required</td> </tr> <tr> <td>Cap. Change</td> <td>$\leq \pm 5\%$ of the initial specified value</td> </tr> <tr> <td>Appearance</td> <td>No remarkable abnormality</td> </tr> </table> | Capacitance | Stability required | Cap. Change | $\leq \pm 5\%$ of the initial specified value | Appearance | No remarkable abnormality | Frequency: $10 \sim 55\text{Hz}$ Width of vibration: 1.5mm Direction and duration: X,Y and Z directions, each for 2 hours | | | | | | | | | | | | | | | | | |
| Capacitance | Stability required | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cap. Change | $\leq \pm 5\%$ 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: $240 \pm 5^\circ\text{C}$ Dipping degree: $2 \sim 2.5\text{mm}$ Flux: Ethanol solution (JIS K8101) or Isopropylalcohol (JIS K8839) solution of Rosin (JIS K5902) | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Resistance to Soldering | <table border="1"> <tr> <td>Leakage Current</td> <td>\leq the initial specified value</td> </tr> <tr> <td>Cap. Change</td> <td>$\leq \pm 15\%$ against value before test</td> </tr> <tr> <td>Dissipation Factor</td> <td>\leq the initial specified value</td> </tr> <tr> <td>Appearance</td> <td>No remarkable abnormality</td> </tr> </table> | 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 remarkable abnormality | Soldering Temp. $280 \pm 5^\circ\text{C}$ Soldering Time . 10 ± 1 sec. | | | | | | | | | | | | | | | |
| 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 remarkable abnormality | | | | | | | | | | | | | | | | | | | | | | | | | |

6-2. Characteristics

| No. | Item | Performance | Test Method | | | | | | | | |
|--------------------|---------------------------------------|---|---|---------------------------|-------------|-------------------------|--------------------|---------------------------|------------|---------------------------|---|
| 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 specified 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 specified 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 specified value | | | | | | | | | | |
| Appearance | No remarkable abnormality | | | | | | | | | | |
| 14 | Pressure valve moment characteristics | Pressure valve open safely. There must be nothing ignition or scattering from product. | DC method: Apply an reverse current of 1A to impress the reverse voltage until pressure valve open. | | | | | | | | |

7. Packing method

Packaging shape, size, quantity



| | |
|-------------------|----------------|
| Component size | D13X21L |
| Quantity per case | PCS |
| Symbol of box | Y-2 |
| L | 480 |
| H | 320 |
| W | 320 |

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 Soldering

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 time: 2~4sec.

11 Cleaning of PC board after soldering

Some solvents is acceptable 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 then 60°C.
- ② Control of pollution is necessary.
- ③ Keep away from cleaning agent. Please do not store in air-tight container.
Dry it by hot air, keep the temperature of air less than maximum operating temp.

单击下面可查看定价，库存，交付和生命周期等信息

[>>KINGTOP\(勤拓\)](#)