

圆板陶瓷电容器规格承认书

APPROVAL SPECIFICATION FOR DISC CERAMIC CAPACITORS

客户
CUSTOMER

立创

客户料号
CUSTOMER P/N

客户规格描述
CUST. DESCRIPTION

规格描述
DESCRIPTION

50V/47PF/J/F5.08/小单外弯/L3.5/酚醛(黄)/NPO/4B/OMN

产品编码
PART NUMBER

CC1H470JC74DCH4B10MN

日期
DATE

2020/8/22

文件编号
DOC. NO.

DEC-SA-WI003

| 德尔创承认栏 APPROVED BY DERSONIC | | | 客户承认栏 APPROVED BY CUSTOMER | |
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样品承认章

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圆板陶瓷电容器规格承认书
APPROVAL SPECIFICATION FOR DISC CERAMIC CAPACITORS

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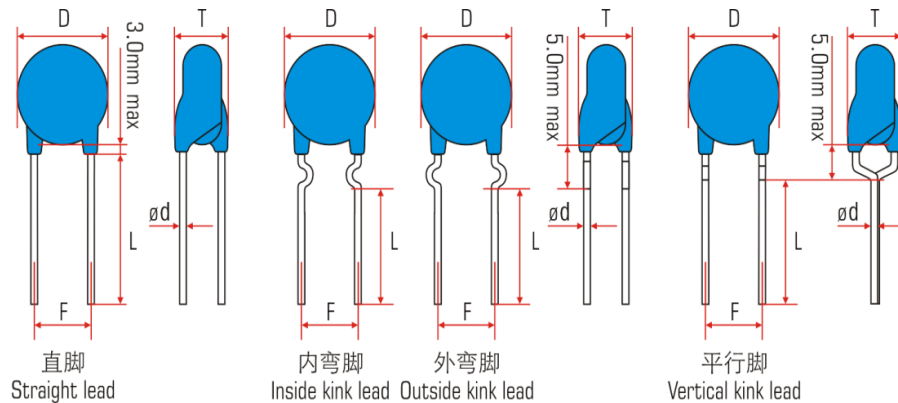
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1. 规格表

DATA SHEET



| | | |
|---------------------------------|---|---------------------|
| 产品编码 Part number | CC1H470JC74DCH4B10MN | |
| 规格描述 Description | 50V/47PF/J/F5.08/小单外弯/L3.5/酚醛(黄)/NPO/4B/0MN | |
| 客户料号 Customer P/N | | |
| 介质类别 Dielectric class | Class 1 | |
| 额定电压 Rated voltage | 50Vdc | |
| 电容量 Capacitance | 47pF $\pm 5\%$ @ 1MHz (100kHz) 1.0V 25°C | |
| 损耗角正切 Tangent of loss angle | 0.0015 max @ 1MHz (100kHz) 1.0V 25°C | |
| 耐电压 Testing voltage | 125Vdc (Charge/discharge 2mA max) 3s PASS | |
| 绝缘电阻 Insulation resistance | 10 000M Ω min @ 50V 60s, RH \leq 70% | |
| 温度系数 Temperature coefficient | NPO $\Delta C/C: 0 \pm 60PPM/^\circ C$ @ -25°C ~ 125°C | |
| 尺寸 DIMENSIONS | D (Diameter) | 4.7mm +0.7/-0.3mm |
| | T (Thickness) | 2.2mm ± 0.5 mm |
| | F (Lead spacing) | 5.08mm ± 0.8 mm |
| | L (Lead length) | 3.5mm ± 0.5 mm |
| | ϕd (Lead diameter) | 0.55mm max |
| | K (Kink height) | 5.0mm max |
| 标志 Marking | \oplus W 47 — | |

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2. 总则

GENERAL

- 1) 本规格书适用于额定电压不超过直流10KV的电子设备用温度补偿型圆板陶瓷电容器。

This specification applies to the temperature compensation type disc ceramic capacitors for the electronic equipment with a rated voltage not exceeding 10k VDC.

- 2) 温度补偿型电容器是专门设计并用在低损耗、电容量稳定性高或要求温度系数有明确规定的谐振电路中的一种电容器，例如，在电路中作温度补偿之用。

Temperature compensation type ceramic capacitor specially designed and suited for resonant circuit application where low losses and high stability of capacitance are essential or where a precisely defined temperature coefficient is required, for example for compensating temperature effects in the circuit.

该类陶瓷介质是由标称温度系数（alpha）来确定。

The ceramic dielectric is defined by its rated temperature coefficient (alpha)。

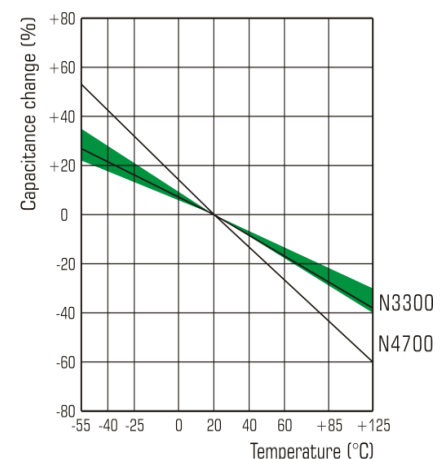
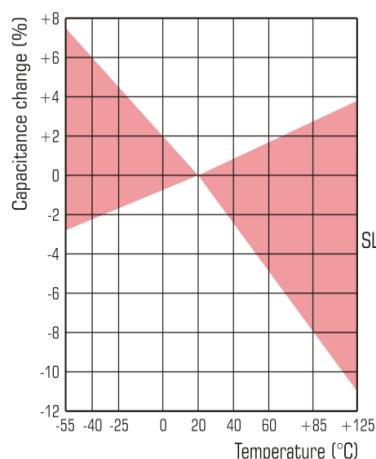
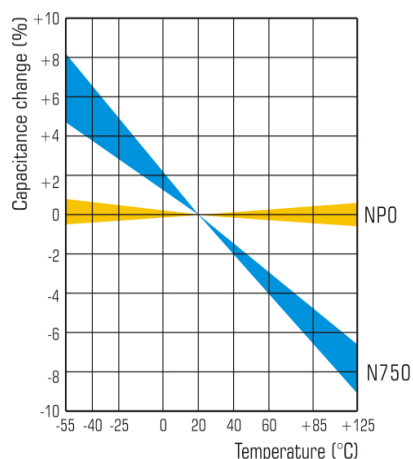
表 – 温度系数(alpha)表

Table – Temperature coefficient (alpha) chart

| 温度系数 Temperature coefficient (alpha) | $10^{-6}/K$ | EIA-198 code | IEC 60384-8 code | 德尔创代码 Dersonic code |
|--|------------------|-----------------|---------------------|---------------------------|
| NPO | 0 ± 60 | COH | CH | CH |
| N150 | -150 ± 60 | P2H | PH | PH |
| N220 | -220 ± 60 | R2H | RH | RH |
| N330 | -330 ± 60 | S2H | SH | SH |
| N470 | -470 ± 60 | T2H | TH | TH |
| N750 | -750 ± 120 | U2J | UJ | UJ |
| N3300 | -3300 ± 500 | S3L | DL | DL |
| N4700 | -4700 ± 1000 | T3M | EM | EM |
| SL | $+140/-1000$ | --- | SL | SL |

- 几种常见的温度系数曲线图，如下图所示。

Several common temperature coefficient curve, as shown below.



- 3) 符合RoHS 2.0

Complies with RoHS 2.0

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3. 适用标准

APPLICABLE STANDARD

本产品符合下列标准，且本规格书的相关内容引用以下标准，当双方对此存在争议时，可依以下标准进行仲裁。

This product complies with the following standards, and the relevant content of this specification refers to the following standards, when the two sides in dispute, the following criteria for arbitration.

GB/T 2693-2001 电子设备用固定电容器 第1部分 总规范(IDT IEC 60384-1)

Fixed capacitors for use in electronic equipmen — Part 1: Generic specification (IDT IEC 60384-1)

GB/T 5966-2011 电子设备用固定电容器 第8部分 分规范 1类瓷介固定电容器(IDT IEC 60384-8)

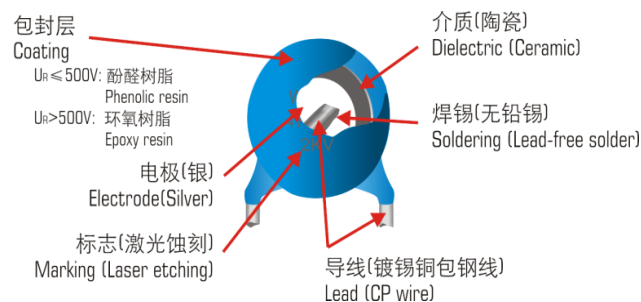
Fixed capacitors for use in electronic equipmen — Part 8: Sectional specification: Fixed capacitors of ceramic dielectric, Class 1 (IDT IEC 60384-8)

4. 结构

STRUCTURE

本产品结构如下图所示，外部包封层为环氧树脂（蓝色）或酚醛树脂（土黄色），内部介质为陶瓷，银电极，导线为镀锡铜包钢线，电极与导线采用无铅锡焊接而成，经过激光打标而成。

The structure of this product is shown in the following figure, external coating layer to epoxy resin (blue) or phenolic resin (yellowish), internal dielectric for ceramics, silver electrodes, lead wires for tin-plated copper clad steel wire, electrodes and lead wires using lead-free tin soldering, through laser marking.



5. 特性

GENERAL SPECIFICATIONS

| | |
|---|---|
| 工作温度范围 Operating temperature range | -25°C to +125°C |
| 电容量 Capacitance (C _R) | 0.5pF to 1 000pF 在25±1°C下使用1MHz (100kHz) 1.0Vrms进行测量，在允许偏差范围内。 Measured at 1MHz (100kHz), 1.0Vrms and 25°C±1°C, within the specified tolerance. |
| 损耗角正切 Tangent of loss angle (tanδ) | ≥50pF, 15×10 ⁻⁴ max <50pF, (1.5×150/C _R +7)×10 ⁻⁴ max |
| 额定电压 Rated Voltage (U _R),DC | 50V to 6 300V 在两导线间施加下列电压无异常，时间1s到5s（充/放电流小于5mA）： The capacitor should not be damaged when the following voltage is applied between the lead wires for 1 to 5 sec (Charge / Discharge current ≤5mA). ≤500V, 2.5U _R > 500V, 1.5U _R |
| 绝缘电阻 Insulation resistance (IR) | 10 000MΩ min 施加额定电压(额定电压大于500V时，使用500V)进行测量，时间不超过1分钟。 The insulation resistance should be measured with a DC voltage not exceeding the rated voltage (above 500V rated voltage tested by 500V) at normal temperature and humidity and less than 1 min. of charging. |
| 温度系数 Temperature coefficient | NPO, N150, N220, N470, N750, SL DL etc. |

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6. 产品编码

PART NUMBER

本公司产品编码方式，举例说明如下：

The product part number representation of the company, examples are as follows :

| | | | | | | | | | |
|--------------|--------------------------|--------------------------------|----------------------------------|----------------------------|---|-----------------------------|------------------------------------|---|---------------|
| CC | 1H | 470 | J | G7 | 4 | D | CH | 4B1 | OMN |
| 系列 Series | 额定电压 Rated voltage | 标称容量 Nominal capacitance | 容量偏差 Capacitance tolerance | 引线 成型方式 Leads format | 编带包装 或脚长 Taping packing or Leads length | 包封材质 Coating material | 温度系数 Temperature coefficient | 生产识别 码 Production identification code | 标志 Marking |

■ 系列
Series
CC: 圆板陶瓷电容器
Disc ceramic capacitors

■ 额定电压
Rated voltage
1H: 50V
2A: 100V
2H: 500V
3A: 1kV
3D: 2kV
3F: 3kV
3G: 4kV
3H: 5kV
3I: 6kV
3K: 8kV

■ 标称容量
Nominal capacitance
用3位数表示，单位pF。如下所示：
In 3 digits, unit is pF, as shown in below:
470: 47pF

■ 容量偏差
Capacitance tolerance
C: ±
D: ±
J: ±5%
K: ±10%
M: ±20%
S: +50%/-20%
Z: +80%/-20%
P: +100%/-0%

■ 引线成型方式
Leads format

| 代码 Code | 脚距 Leads spacing |
|------------|---------------------|
| A | 2.54mm |
| C | 5.08mm |
| D | 7.50mm |
| E | 10.0mm |

| 代码 Code | 1 | 2 | 4 | 5 | 7 |
|------------------------------------|---|---|---|---|---|
| 脚型 样式 Leads style drawing | | | | | |

■ 编带包装或脚长
Taping packing or
Leads length
● Taping
T: Reel packing
P: Ammo packing
● Bulk (Leads length)
4: 3.5mm
6: 4.0mm
8: 5.0mm
9: 6.0mm
A: 8.0mm
B: 10.0mm
E: 16.0mm
F: 18.0mm
G: 20.0mm
I: 24.0mm

■ 包封材质
Coating material
D: 酚醛 (黄)
Phenolic (Yellow)
E: 环氧 (蓝)
Epoxy (Blue)

■ 温度系数
Temperature coefficient
如“温度系数表” (页码4)
See "Temperature coefficient (α) chart" (P4)
CH: NPO UJ: N750 SL: SL DL: N3300

■ 生产识别码
Production identification
code
内部控制码，本规格书不作说明。
Inter control code will not be described in this an approval specifications.

■ 标志
Marking
见规格表最后一栏
See the last column of the Data sheet

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7. 测量和试验

MEASUREMENT AND TEST

| 序 No. | 项目 Item | 标准 Specifications | 试验方法 Testing Method |
|-------|---|--|---|
| 1 | 工作温度范围 Operating temp. range | -25°C - +125°C | |
| 2 | 额定电压 Rated voltage (U_R) | 见"规格表" (页码3) See "Data sheet" (P3). | 额定电压是指在工作温度范围内, 可连续施加在电容器上的最大直流电压或最大交流电压有效值或脉冲电压的峰值。 当交流电压附加于直流电压时, V_p -p或 V_o -p (以较大者为准) 应维持在额定电压范围内。 The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor within the operating temperature range. When AC voltage is superimposed on DC voltage, V_p -p or V_o -p, whichever is larger, should be maintained within the rated voltage range. |
| 3 | 外观与尺寸 Appearance (APP) and Dimension | 外观形状没有明显的缺点, 尺寸在标准范围内。 No marked defect on appearance form and dimensions are within specified range. | 电容必须用目视检查其明显的缺点。 The capacitor should be visually inspected for evidence of defect. 尺寸用游标卡尺测量。 Dimensions should be measured with slide calipers. |
| 4 | 标志 Marking | 清晰易于识别。 To be easily legible. | 目视检查。 The capacitor should be visually inspected. |
| 5 | 容量 (C_R) Capacitance (C_R) | 在误差范围内。 Within specified tolerance | 容量与 $\tan\delta$ 在 $25\pm 1^\circ\text{C}$ 下, 使用1MHz (100kHz) 和1Vrms下测量。 The capacitance, $\tan\delta$ should be measured at $25^\circ\text{C}\pm 1^\circ\text{C}$ with 1MHz (100kHz) and 1.0V (r.m.s.). |
| 6 | 损耗角正切($\tan\delta$) Tangent of loss angle ($\tan\delta$) | 见下表 See the table below | |

 损耗角正切标准表 ($\times 10^{-4}$ 最大值)

 Specifications chart for Tangent of loss angle ($\times 10^{-4}$ Maximum)

| 容量 Capacitance | $+100 \geq \alpha > -750$ & SL | $-750 \geq \alpha > -1500$ & UM | $-1500 \geq \alpha > -3300$ | $-3300 \geq \alpha > -5600$ | $\alpha \leq -3300$ |
|----------------------------------|---|------------------------------------|-----------------------------|-----------------------------|--------------------------|
| $\geq 50\text{pF}$ | 15 | 20 | 30 | 40 | 50 |
| $\geq 5\text{pF}, < 50\text{pF}$ | $1.5 \times 150/C_R + 7$ | $2.0 \times 150/C_R + 7$ | $3.0 \times 150/C_R + 7$ | $4.0 \times 150/C_R + 7$ | $5.0 \times 150/C_R + 7$ |
| $< 5\text{pF}$ | 当客户要求测量时, 相关规范规定其极限值 When the measurement is required by the user, the detail specification shall specify the limit. | | | | |

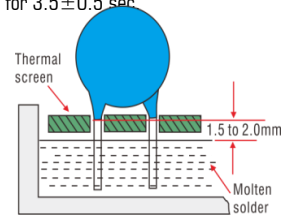
| | | | |
|----|---------------------------------------|---|--|
| 7 | 绝缘电阻 Insulation Resistance (IR) | $> 10\ 000\ \Omega$ | 在两导线间施加额定电压(额定电压大于500V时, 使用500V)进行测量, 时间不超过1分钟。 The insulation resistance should be measured with a DC voltage not exceeding the rated voltage (above 500V rated voltage tested by 500V) at normal temperature and humidity and less than 1 min. of charging. |
| 8 | 耐电压 Testing Voltage (TV) | 没有不合格 No failure. | 在电容器两导线间施加下列测试电压1到5s后不被破坏(充/放电流不大于5mA)。 The capacitor should not be damaged when test voltages of below are applied between the lead wires for 1 to 5 sec. (Charge/Discharge current $\leq 5\text{mA}$) $\leq 500\text{V}, 2.5U_R$ $> 500\text{V}, 1.5U_R$ |
| 9 | 导线抗张强度 Terminal Tensile Strength | 引线不应断开, 电容器不应破裂。 Lead wire should not be cut off capacitor should not be broken. | 固定住电容器, 在引线上逐步施加径向拉力直至10N, 并保持 10 ± 1 秒钟。 Fix the body of the capacitor and apply a tensile weight gradually to each lead wire in the radial direction of the capacitor up to 10N and keep it for 10 ± 1 sec. |
| 10 | 导线抗折强度 Terminal Bending Strength | 引线不应断开, 电容器不应破裂。 Lead wire should not be cut off capacitor should not be broken. | 在引线出口处沿一个方向施加5N、 90° 的弯曲压力, 再恢复至初始状态。之后, 在2至3秒内再以相反方向施加一次 90° 的弯曲压力。 Each lead wire should be subjected to 5N of weight and bent 90° at the point of egress, in one direction, then returned to its original position and bent 90° in the opposite direction at the rate of one bent in 2 to 3 sec. |

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↘ 续上表
 Continued on the table

| 序 No. | 项目 Item | 标准 Specifications | 试验方法 Testing Method |
|-------|--------------------------------------|--|---|
| 11 | 可焊性 Solderability of Leads | 导线必须有3/4以上的面积均匀附着焊锡 Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction. | 引线必须浸入焊料中 3 ± 0.5 秒钟，浸入深度离导线根部1.5-2.0mm。 The lead wire of a capacitor should be dipped into molten solder for 3 ± 0.5 sec. The depth of immersion is up to about 1.5 to 2.0mm from the root of lead wires. 焊锡温度：无铅焊(Sn-3Ag-0.5Cu) $245\pm 5^\circ\text{C}$ Temp. of solder: Lead Free Solder (Sn-3Ag-0.5Cu) $245\pm 5^\circ\text{C}$ 易溶解的H63号锡 $235\pm 5^\circ\text{C}$ H63 Eutectic Solder $235\pm 5^\circ\text{C}$ |
| 12 | 焊锡耐热性 Soldering Effect | APP | 如图所示，导线浸入离导线根部1.5-2.0mm处、锡温为 $260\pm 10^\circ\text{C}$ 中 3.5 ± 0.5 秒。 As shown in figure, the lead wires should be immersed in solder of $260\pm 5^\circ\text{C}$ up to 1.5 to 2.0mm from the root of terminal for 3.5 ± 0.5 sec. 试验后处理： Post-treatment: 电容必须存放在室温下1-2小时。 Capacitor should be stored for 1 to 2 h at room condition. |
| | | $\Delta\text{C}/\text{C}$ | |
| | | IR | |
| | | TV | |
| 13 | 振动 Vibration Resistance | APP | 将电容器导线焊稳和调整振动频率范围为10-55Hz、总振幅为1.5mm，振动从10Hz到55Hz，然后再回到10Hz，大约一分钟。 The capacitor should be firmly soldered to the supporting lead wire and vibrated at a frequency range of 10 to 55Hz, 1.5mm in total amplitude, with about a 1 minute rate of vibration change from 10Hz to 55Hz and back to 10Hz. 总时间六个小时，每两小时在相互垂直方向来回三次。 Apply for a total of 6 hours, 2 hours each in 3 mutually perpendicular directions. |
| | | C_R | |
| | | $\tan\delta$ | |
| 14 | 温度系数 Temperature Coefficient (TC) | 无偏置 No Bias | 电容器必须按照下列每一步骤进行测量。 The capacitance measurement should be made at each step specified in below. |
| | | 容量漂移 Cap. Drift | |
| 15 | 耐湿负荷 Humidity Loading | APP | 施加额定电压的电容保持在温度为 $40\pm 2^\circ\text{C}$ 、相对湿度为90-95%条件下 500 ± 12 小时。 Apply the rated voltage for 500 ± 12 hours at $40\pm 2^\circ\text{C}$ in 90 to 95% relative humidity. 试验后处理： Post-treatment: 电容必须贮存在室温条件下24小时。 Capacitor should be stored for 24 h. at room condition. |
| | | $\Delta\text{C}/\text{C}$ | |
| | | $\tan\delta$ | |
| | | IR | |
| | | TV | |



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续上表

Continued on the table

| 序 No. | 项目 Item | 标准 Specifications | 试验方法 Testing Method | | | | | | | | | |
|-------|---|-------------------|--|-------------|-------------|------|---|---------|-------|---|----------|-------|
| 16 | 高温负荷 High Temperature Load | APP | 在125±2°C、相对湿度不大于50%条件下施加1.2倍额定电压1000+48/-0小时（充/放电流小于5mA） Apply a DC voltage of 120% of the rated voltage for 1000+48/-0 hours at 125±2°C with a relative humidity of 50% max. (Charge/discharge current ≤5mA) 试验后处理：电容器应在室温下储存12小时。 Post-treatment: Capacitor shall be stored for 12 h at room condition. | | | | | | | | | |
| | | ΔC/C | | | | | | | | | | |
| | | tanδ | | | | | | | | | | |
| | | IR | | | | | | | | | | |
| | | TV | | | | | | | | | | |
| 17 | 温度循环 Temperature and Immersion Cycle | APP | 温度循环试验按以下条件进行试验和测量 Temperature cycling shall be measured in the following test. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-25±2°C</td> <td>30min</td> </tr> <tr> <td>2</td> <td>+125±2°C</td> <td>30min</td> </tr> </tbody> </table> 循环次数：5次 Cycle numbers: 5 cycles 试验后处理：电容器应在室温下储存4小时。 Post-treatment: Capacitor shall be stored for 4 h at room condition. | Step | Temperature | Time | 1 | -25±2°C | 30min | 2 | +125±2°C | 30min |
| | | Step | | Temperature | Time | | | | | | | |
| | | 1 | | -25±2°C | 30min | | | | | | | |
| | | 2 | | +125±2°C | 30min | | | | | | | |
| | | ΔC/C | | | | | | | | | | |
| tanδ | | | | | | | | | | | | |
| IR | | | | | | | | | | | | |
| TV | | | | | | | | | | | | |

表A – 温度系数允许偏差表

Table A – Temperature coefficient tolerance chart

| 温度系数 Temperature coefficient (alpha) | 标称值与偏差 Nominal Value & tolerance (10 ⁻⁶ /K) | 代码 Code | 相对20°C时的容量变化率 (‰) Capacitance Change from 20°C (‰) | | | | | | | |
|--|--|------------|---|------|-------|-------|-------|-------|--------|-------|
| | | | -55°C | | -25°C | | +85°C | | +125°C | |
| | | | max | min | max | min | max | min | max | min |
| NPO | 0±60 | CH | 8.19 | -4.5 | 4.91 | -2.71 | 3.9 | -3.9 | 6.3 | -6.3 |
| N150 | -150±60 | PH | 21.9 | 6.75 | 13.1 | 4.05 | -5.85 | -13.7 | -9.45 | -22.1 |
| N220 | -220±60 | RH | 28.3 | 12 | 17 | 7.2 | -10.4 | -18.2 | -16.8 | -29.4 |
| N330 | -330±60 | SH | 38.4 | 20.3 | 23 | 12.2 | -17.6 | -25.4 | -28.4 | -41 |
| N470 | -470±60 | TH | 51.2 | 30.8 | 30.7 | 18.5 | -26.7 | -34.5 | -43.1 | -55.7 |
| N750 | -750±120 | UJ | 82.3 | 47.3 | 49.4 | 28.4 | -41 | -56.6 | -66.2 | -91.4 |
| N3300 | -3300±500 | DL | 350 | 210 | 210 | 126 | -182 | -247 | -294 | -399 |
| N4700 | -4700±1000 | EM | 524 | 278 | 315 | 167 | -241 | -371 | -389 | -599 |

注：SL和UM可以不进行检验，因为IEC 60384-8中没有规定电容量相对变化的极限值。

Note: SL and UM characteristics are not subject to inspection, since no limits for relative capacitance variation are specified in IEC 60384-8.

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8. 包装和储存

PACKAGING AND STORAGE

8.1. 包装

PACKAGING

盒装编带品，每盒2000pcs（每箱20 000pcs）。

Taping of ammo packing, 2000 pcs/box (20 000 pcs/carton)

散包包装，每包1000pcs（视瓷片大小不等，每箱20 000~100 000pcs）。

Bulk packing, 1000 pcs/bag (Depending on the disc size, each carton is 20 000~100 000pcs)

8.2. 贮存条件

STORAGE ENVIRONMENT

电容器绝缘包封层不是完美的密封形式，因此，请勿将电容器存放在腐蚀性气体中，尤其是存在氯气、硫气、酸、碱、盐等场所，同时应防潮。电容器应存放在温度及相对湿度分别不超出5~40℃及15~70%范围的场所。

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture. Store the capacitors where the temperature and relative humidity do not exceed 5 to 40 degrees centigrade and 15 to 70%.

请在6个月内使用电容器。超过6个月，在使用前确认其可焊性和电容量。

Use capacitors within 6 months after delivered. for more than 6 months, confirm the solderability and capacitance before use.

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9. 测量和使用注意事项

MEASURING AND APPLICATION NOTICE

9.1. 测量注意事项

Measurement notice

请在以下条件下测量。

Please measure under the following conditions.

9.1.1. 标准大气条件

Standard atmospheric conditions

除非另有规定，所有试验和测量应按在IEC 60068-1的5.3中规定的试验用标准大气条件下表进行。

Unless otherwise specified, all tests and measurements shall be made under standard atmospheric conditions for testing as given in 5.3 of IEC 60068-1.

| 温度 Temperature | 相对湿度 Relative humidity | 气压 Air pressure |
|-------------------|---------------------------|--------------------|
| 15°C~35°C | 25%~75% | 86kPa~106kPa |

在进行测量之前，电容器应在测量温度下存放足够时间，以使整个电容器都达到这一温度。为此目的，规定与试验后恢复时间同样的时间，通常是足够的。

Before the measurements are made, the capacitor shall be stored at the measuring temperature for a time sufficient to allow the entire capacitor to reach this temperature. The period as prescribed for recovery at the end of a test is normally sufficient for this purpose.

在标准大气条件下进行测量，其测量结果存在争议时应采用仲裁温度（见9.1.3）重复测量。

Test and measurement shall be made under standard atmospheric conditions for testing, in the event of a dispute, the measurements shall be repeated using one of the referee temperatures (as given in 9.1.3).

当按某一顺序进行试验时，一个试验的最后测量可以作为下一试验的初始测量。

When tests are conducted in a sequence, the final measurements of one test may be taken as the initial measurements for the succeeding test.

在测量期间，不应使电容器受到气流、阳光直射或可能引起误差的其他影响。

During measurements the capacitor shall not be exposed to draughts, direct sunlight or other influences likely to cause error.

9.1.2. 恢复条件

Recovery conditions

除非另有规定，恢复应在试验用标准大气条件（见9.1.1）下进行。

Unless otherwise specified recovery shall take place under the standard atmospheric conditions for testing (9.1.1).

如果恢复必须在严格控制的条件下进行，应采用IEC 60068-1中5.4.1的控制条件。

If recovery under closely controlled conditions is necessary, the controlled recovery conditions of 5.4.1 of IEC 60068-1 shall be used.

除非有关规范另有规定，恢复时间应为1h~2h。

Unless otherwise specified in the relevant specification, a duration of 1 h to 2 h shall be used.

9.1.3. 仲裁条件

Referee conditions

在仲裁情况下，应选用IEC 60068-1中5.2中规定的仲裁试验用标准大气条件。

For referee purposes, one of the standard atmospheric conditions for referee tests taken from 5.2 of IEC 60068-1, as given in table 1 below, shall be selected:

| 温度 Temperature | 相对湿度 Relative humidity | 气压 Air pressure |
|-------------------|---------------------------|--------------------|
| 25°C±1°C | 48%~52% | 86kPa~106kPa |

9.2. 工作电压

Operating voltage

向电容器施加的电压切勿超过额定电压。

The voltage applied to the capacitor must not exceed the rated voltage.

| 电压 Voltage | 直流电压 DC Voltage | 直流+交流电压 DC+AC Voltage | 交流电压 AC Voltage | 脉冲电压 Pulse Voltage |
|-----------------------------------|--------------------|--------------------------|--------------------|-----------------------|
| 测量位置 Positional Measurement | | | | |

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在交流电路或纹波电流电路中使用直流额定电压电容器时，请务必将外加电压的Vp-p值或包含直流偏置电压的Vo-p值维持在额定电压范围内。

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the Vp-p value of the applied voltage or the Vo-p which contains DC bias within the rated voltage range.

若向电路施加电压，开始或停止时可能会因谐振或切换产生暂时的异常电压。请务必使用额定电压范围包含这些异常电压的电容器。

When the voltage is applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.

9.3. 过电压影响

Overvoltage effects

施加到电容器的过电压可能会导致电容器内部介质层击穿而引起电路短路。

The overvoltage applied to the capacitor may cause the dielectric layer of the capacitor to break down and cause a short circuit.

击穿前的可持续时间取决于施加电压和周围温度。

The duration before the breakdown depends on the applied voltage and the ambient temperature.

9.4. 焊锡

Soldering

当在PCB/PWB焊锡这个产品时，不要超过电容器的焊锡耐热性标准。过度的热量会使电容器内部焊锡熔化，可能导致热冲击而使陶瓷介质出现暗裂。

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specifications of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.



注意：请不要使用于双波峰焊锡中，如果需要用于双波峰焊锡，请提前通知我公司。

Note: please do not use in double wave soldering. If you use double wave soldering, please inform our company in advance.

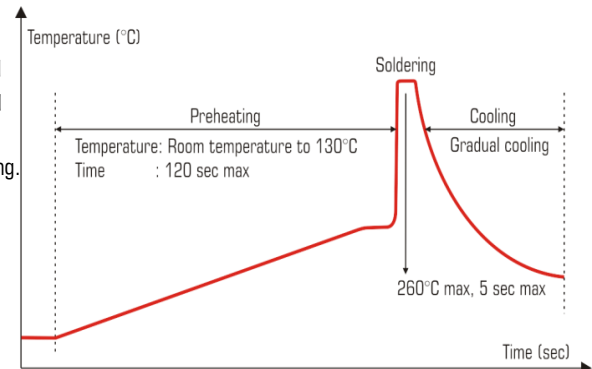


Fig.: Wave-soldering temperature-time profile to recommend

当使用烙铁进行手工焊锡时，应该遵照下列条件：

When soldering capacitor with a soldering iron, it should be performed in the following conditions.

焊锡温度：320°C最大

Temperature of iron-tip: 320 degrees C. Max.

烙铁头：不超过40W

Soldering iron wattage: 40W max.

焊锡时间：不超过3.0秒

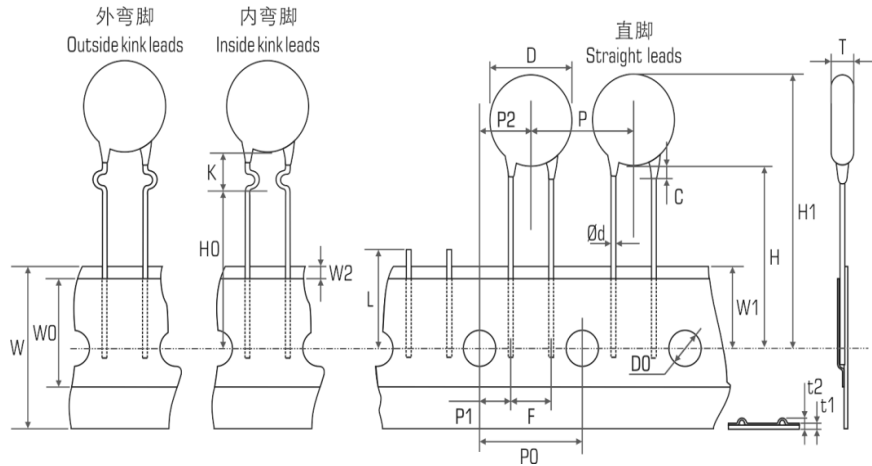
Soldering time: 3.0 sec. Max.

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10. 编带尺寸规格

TAPING SPECIFICATIONS



| 项目 Item | 代码 Symbol | 标准 (mm) Specification (mm) | 备注 Remarks |
|---|--------------------------------|-------------------------------|---|
| 导线直径 Lead-wire diameter | d | 0.50±0.05 | |
| 元件间间距 Pitch of component | P | 12.7±1.0 | |
| 进料孔间距 Feed hole pitch | P0 | 12.7±0.3 | 间距累积误差: 每20孔1.0mm Cumulative pitch error: 1.0mm/20 pitch |
| 进料孔与导线垂直距离 Feed hole center to lead | P1 | 3.85±0.7 | |
| 进料孔与元件垂直距离 Hole center to component center | P2 | 6.35±1.3 | |
| 脚距 Lead-to-lead distance | F | 5.0±0.8 | |
| 元件偏移 Component alignment | Δh | ≤2.0 | |
| 元件沿编带偏离, 左或右 Deviation along tape, Left or right | ΔS | ≤1.3 | |
| 纸带宽 Tape width | W | 18.0+1.0/-0.5 | |
| 胶带宽 Hold-down tape width | W0 | ≥7.0 | |
| 孔位 Hole position | W1 | 9.0+0.75/-0.5 | |
| 胶带位置 Hole-down tape position | W2 | ≤3.0 | |
| 元件到纸带的高度 Height of component from tape center | 直脚类型 For straight lead type | H | 18.0+2/-0 |
| | 弯脚类型 For kinked lead type | H0 | 16.0±0.5 |
| 元件高度 Component height | H1 | ≤32.25 | |
| 进料孔直径 Feed hole diameter | D0 | 4.0±0.3 | |
| 编带厚度 Total tape thickness | t1 | ≤0.9 | 纸带厚度: 0.5±0.1mm Ground paper: 0.5±0.1mm |
| 编带厚度 (含导线) Total thickness, tape and lead wire | t2 | ≤1.5 | |
| 剪切长度 Length of snipped | L | ≤11.0 | |