



风华高科

广东风华高新科技股份有限公司

FENGHUA

Fenghua Advanced Technology (Holding) CO., LTD

微波电容 (RF 系列)

概述

特点：

高 Q 值

低等效串联电阻

高自谐振频率

应用：

移动通信基站

无线通信产品

射频功率放大器

阻抗匹配网络

滤波网络

VCO

Microwave Caps (RF SERIES)

SUMMARY

Features

High Q

Low equivalent series resistance

High self-resonance

Applications

Celluar base station

Wireless communication devices

RF power amplifier

Matching network

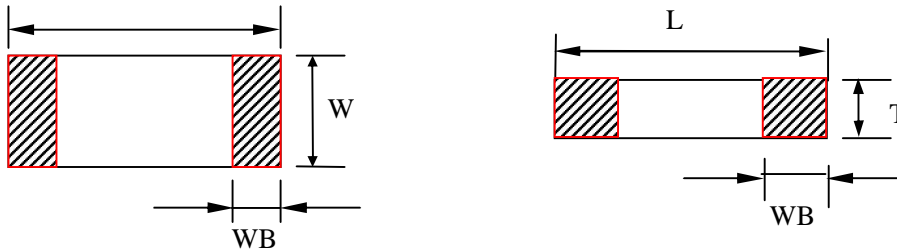
Filter network

VCO



二、尺寸及结构 DIMENSIONS AND STRUCTURE

尺寸 DIMENS L

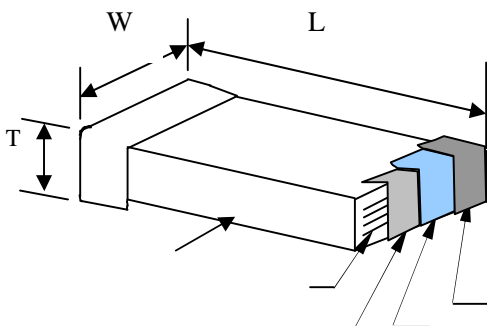


| 型号 Type | | 尺寸 Dimensions (mm) | | | |
|----------------------------|---------------------------|--------------------|-------------|----------------------------|-------------|
| 英制表示 British expression | 公制表示 Metric expression | L | W | T | WB |
| 0402 | 1005 | 1.00 ± 0.05 | 0.50 ± 0.05 | 0.50 ± 0.05 | 0.25 ± 0.10 |
| 0603 | 1608 | 1.60 ± 0.10 | 0.80 ± 0.10 | 0.80 ± 0.10 | 0.30 ± 0.10 |
| 0805 | 2012 | 2.00 ± 0.20 | 1.25 ± 0.20 | 0.80 ± 0.20 1.25 ± 0.20 | 0.50 ± 0.20 |
| 0505 | 1414 | 1.40 ± 0.38 | 1.40 ± 0.38 | 1.45 | 0.30 ± 0.10 |
| 1111 | 2828 | 2.79 ± 0.50 | 2.79 ± 0.50 | 2.59 | 0.80 ± 0.30 |

备注：可根据客户的特殊要求设计符合客户需求的产品。

Note：We can design according to customer special requirements

结构 STRUCTURE



| 序号 NO | 名称 Name |
|----------|----------------------------|
| | 陶瓷介质 Ceramic dielectric |
| | 内电极 Inner electrode |
| | 外电极 Substrate electrode |
| | 镍层 Nickel Layer |
| | 锡层 Tin Layer |



三、型号规格表示方法 HOW TO ORDER

 1111 RF 101 J 501 N T

说明 NOTES :

尺寸 DIMENSIONS

单位 (unit) : inch/ mm

| | | | | | |
|------------------|-----------|-----------|-----------|-------------|-----------|
| 尺寸规格 SizeCode | 0402 | 0603 | 0805 | 0505 | 1111 |
| 长×宽 (L×W)inch | 0.04×0.02 | 0.06×0.03 | 0.08×0.05 | 0.055×0.055 | 0.11×0.11 |
| 长×宽 (L×W)mm | 1.00×0.50 | 1.60×0.80 | 2.00×1.25 | 1.40×1.40 | 2.79×2.79 |

介质种类 DIELECTRIC STYLE

| | |
|---------------------------|-----|
| 介质种类 (Dielectric Code) | RF |
| 介质材料 (Dielectric) | COG |

标称容量 NOMINAL CAPACITANCE

单位(unit) : pF

| 表示方式 (Express Method) | 实际值 (Actual Value) | 注：头两位数字为有效数字，第三位数字为 0 的个数；R 为小数点。 Note: the first two digits are significant; third digit denotes number of zeros; R=decimal point. |
|--------------------------|-----------------------|--|
| R47 | 0.47 | |
| 0R5 | 0.5 | |
| 1R0 | 1.0 | |
| 101 | 10 × 10 ¹ | |
| 102 | 10 × 10 ² | |
| ... | ... | |



容量误差 CAPACITANCE TOLERANCE

| | | | | | | | | | | |
|-------------------|---------|---------|--------|------|------|------|------|------|--------------|--------------|
| 代码 (Code) | B | C | D | F | G | J | K | M | S | Z |
| 误差 (Tolerance) | ±0.10pF | ±0.25pF | ±0.5pF | ±10% | ±20% | ±50% | ±10% | ±20% | +50 -20 % | +80 -20 % |

备注：B、C、D级误差适用于容量 10pF 的产品。

Note：These capacitance tolerance B, C, D are just applicable the capacitance that equals to or less than 10pF.

额定电压 RATED VOLTAGE

单位(unit)：V

| 表示方式 (Express Method) | 实际值 (Actual Value) | 注：头两位数字为有效数字，第三位数字为0的个数； R为小数点。 Note: the first two digits are significant; third digit denotes number of zeros; R=decimal point. |
|--------------------------|-----------------------|---|
| 500 | 50×10^0 | |
| 501 | 50×10^1 | |
| ... | ... | |

端头材料 TERMINAL MATERIAL STYLES

| 端头类别 (Termination Styles) | 表示方式 (Express Method) |
|-------------------------------------|-----------------------|
| 三层电镀端头 (Nickel Barrier Termination) | N |

包装方式 PACKAGE STYLES

| | |
|----------------|-----------------------|
| B | T |
| 散包装 (Bulk Bag) | 编带包装 (Taping Package) |

四、温度系数/特性 Temperature Coefficient /Characteristics

| 介质种类 | 参考温度点 | 标称温度系数 | 工作温度范围 |
|------------|-----------------------------|-------------------------|-----------------------------|
| Dielectric | Reference Temperature Point | Temperature Coefficient | Operation Temperature Range |
| COG | 20°C | 0±30ppm/ | -55 ~ 125 |



五、电容量范围 (注：■ 和 ■ 表示可生产的容值)

| 项目 | 0402 | | | 0603 | | | |
|-------|------|-----|------|------|-----|------|----------|
| | COG | | | | | | |
| 电容量 | | | | | | | |
| 工作电压 | 25V | 50V | 100V | 25V | 50V | 100V | 200/250V |
| 0.1pF | ■ | ■ | ■ | | | | |
| 0.2pF | ■ | ■ | ■ | | | | |
| 0.3pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 0.4pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 0.5pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 0.6pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 0.7pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 0.8pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 0.9pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 1.0pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 1.2pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 1.5pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 1.8pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 2.2pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 2.7pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 3.3pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 3.9pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 4.7pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 5.6pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 6.8pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 8.2pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 10pF | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 12pF | ■ | ■ | | ■ | ■ | ■ | ■ |
| 13pF | ■ | ■ | | ■ | ■ | ■ | ■ |
| 15pF | ■ | ■ | | ■ | ■ | ■ | ■ |
| 16pF | ■ | ■ | | ■ | ■ | ■ | ■ |
| 18pF | ■ | ■ | | ■ | ■ | ■ | ■ |
| 20pF | ■ | ■ | | ■ | ■ | ■ | ■ |
| 22pF | ■ | ■ | | ■ | ■ | ■ | ■ |
| 27pF | | | | ■ | ■ | ■ | ■ |
| 33pF | | | | ■ | ■ | ■ | ■ |
| 39pF | | | | ■ | ■ | ■ | ■ |
| 43pF | | | | ■ | ■ | ■ | ■ |
| 47pF | | | | ■ | ■ | ■ | ■ |



| 项目 | 0805 | | | | 0505 | | | |
|-------|------|-----|------|----------|------|-----|------|----------|
| 材料 | COG | | | | COG | | | |
| 电容量 | | | | | | | | |
| 工作电压 | 25V | 50V | 100V | 200/250V | 25V | 50V | 100V | 200/250V |
| 0.3pF | | | | | | | | |
| 0.4pF | | | | | | | | |
| 0.5pF | | | | | | | | |
| 0.6pF | | | | | | | | |
| 0.7pF | | | | | | | | |
| 0.8pF | | | | | | | | |
| 0.9pF | | | | | | | | |
| 1.0pF | | | | | | | | |
| 1.2pF | | | | | | | | |
| 1.5pF | | | | | | | | |
| 1.8pF | | | | | | | | |
| 2.2pF | | | | | | | | |
| 2.7pF | | | | | | | | |
| 3.3pF | | | | | | | | |
| 3.9pF | | | | | | | | |
| 4.7pF | | | | | | | | |
| 5.6pF | | | | | | | | |
| 6.8pF | | | | | | | | |
| 8.2pF | | | | | | | | |
| 10pF | | | | | | | | |
| 12pF | | | | | | | | |
| 15pF | | | | | | | | |
| 18pF | | | | | | | | |
| 22pF | | | | | | | | |
| 27pF | | | | | | | | |
| 33pF | | | | | | | | |
| 39pF | | | | | | | | |
| 47pF | | | | | | | | |
| 56pF | | | | | | | | |
| 68pF | | | | | | | | |
| 82pF | | | | | | | | |
| 100pF | | | | | | | | |



| | | | | | |
|-------|------|-----|------|----------|------|
| 项目 | 1111 | | | | |
| 材料 | COG | | | | |
| 电容量 | | | | | |
| 工作电压 | 25V | 50V | 100V | 200/250V | 500V |
| 0.5pF | | | | | |
| 0.6pF | | | | | |
| 0.7pF | | | | | |
| 0.8pF | | | | | |
| 0.9pF | | | | | |
| 1.0pF | | | | | |
| 1.2pF | | | | | |
| 1.5pF | | | | | |
| 1.8pF | | | | | |
| 2.2pF | | | | | |
| 2.7pF | | | | | |
| 3.3pF | | | | | |
| 3.9pF | | | | | |
| 4.7pF | | | | | |
| 5.6pF | | | | | |
| 6.8pF | | | | | |
| 8.2pF | | | | | |
| 10pF | | | | | |
| 12pF | | | | | |
| 15pF | | | | | |
| 18pF | | | | | |
| 22pF | | | | | |
| 27pF | | | | | |
| 33pF | | | | | |
| 39pF | | | | | |
| 47pF | | | | | |



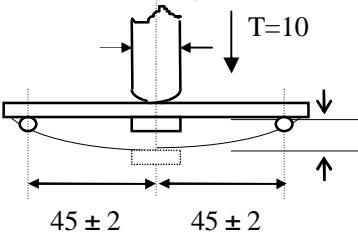
| | | | | | |
|--------|-------|------|-------|----------|-------|
| 项目 | 1111 | | | | |
| 材料 | COG | | | | |
| 容量 | | | | | |
| 工作电压 | 25V | 50V | 100V | 200/250V | 500V |
| 56pF | Green | Grey | Green | Grey | Green |
| 68pF | Green | Grey | Green | Grey | Green |
| 82pF | Green | Grey | Green | Grey | Green |
| 100pF | Green | Grey | Green | Grey | Green |
| 120pF | Green | Grey | Green | Grey | |
| 150pF | Green | Grey | Green | Grey | |
| 180pF | Green | Grey | Green | Grey | |
| 220pF | Green | Grey | Green | Grey | |
| 270pF | Green | Grey | Green | Grey | |
| 330pF | Green | Grey | Green | Grey | |
| 390pF | Green | Grey | Green | Grey | |
| 470pF | Green | Grey | Green | Grey | |
| 560pF | Green | Grey | Green | | |
| 680pF | Green | Grey | | | |
| 820pF | Green | Grey | | | |
| 1000pF | Green | Grey | | | |



六、可靠性测试 Reliability Test

| 项目 Item | 技术规格 Technical Specification | 测试方法 Test Method and Remarks |
|--|---|---|
| 容量 Capacitance | 应符合指定的误差级别 Should be within the specified tolerance. | 测试温度：25 ± 3 Test Temperature: 25 ± 3 C < 1000pF：测试频率：1MHZ ± 10% 测试电压：1.0 ± 0.2Vrms Test Frequency: 1MHZ ± 10% Test Voltage: 1.0 ± 0.2Vrms C > 1000pF：测试频率：1KHZ ± 10% 测试电压：1.0 ± 0.2Vrms Test Frequency: 1KHZ ± 10% Test Voltage: 1.0 ± 0.2Vrms |
| Q | C 30pF, Q 1400 C 30pF, Q 800+20C | 测试频率：1MHZ ± 10% 测试电压：1.0 ± 0.2Vrms Test Frequency: 1MHZ ± 10% Test Voltage: 1.0 ± 0.2Vrms |
| 绝缘电阻 (IR) Insulation Resistance | 10,000M | 测试电压：额定电压 测试时间：60 ± 5 秒 测试湿度：75% 测试温度：25 ± 3 测试充放电电流：50mA Measuring Voltage: Rated Voltage Duration: 60 ± 5s Test Humidity: 75% Test Temperature: 25 ± 3 Test Current: 50mA |
| 介质耐电强度 (DWV) Dielectric Withstanding Voltage | 不应有介质被击穿或损伤 No breakdown or damage. | 测量电压：额定电压 < 100V，300% 额定电压 100V 额定电压 500V，250% 额定电压 时间：1 ~ 5 秒 充/放电电流：不应超过 50mA Measuring Voltage: Rated voltage e< 100V, 300% Rated voltage 100V Rated voltage 500V, 250% Rated voltage Duration: 1 ~ 5s Charge/ Discharge Current: 50mA max. |



| 项目 Item | 技术规格 Technical Specification | | 测试方法 Test Method and Remarks |
|--|--|--|--|
| 可焊性 Solderability | 上锡率应大于 95% 外观：无可见损伤。 At least 95% of the terminal electrode is covered by new solder. Visual Appearance: No visible damage. | | 将电容在 80~120 的温度下预热 10~30 秒。 Preheating conditions: 80 to 120 ; 10~30s. |
| | | | 有铅焊料：(SnPb : 63/37) 浸锡温度 235 ± 5 浸锡时间 2 ± 0.5s Solder Temperature: 235 ± 5 Duration: 2 ± 0.5s 无铅焊料： 浸锡温度 245 ± 5 浸锡时间 2 ± 0.5s Solder Temperature: 245 ± 5 Duration: 2 ± 0.5s |
| 耐焊热 Resistance to Soldering Heat | CC | 在 ± 0.5% 或 ± 0.5pF 范围内，取较大值 Within ± 0.5% or ± 0.5pF, whichever is larger | 将电容在 100~200 的温度下预热 10 ± 2 分钟。 浸锡温度: 265 ± 5 浸锡时间: 10 ± 1s 然后取出溶剂清洗干净，在 10 倍以上的显微镜底下观察。 放置时间：24 ± 2 小时 放置条件：室温 Preheating conditions: 100 to 200 ; 10 ± 2min. Solder Temperature: 265 ± 5 Duration: 10 ± 1s Clean the capacitor with solvent and examine it with a 10X(min.) microscope. Recovery Time: 24 ± 2h Recovery condition: Room temperature |
| | Q | 同初始标准 Same to initial value. | |
| | IR | 同初始标准 Same to initial value. | |
| | 外观：无可见损伤 上锡率： 95% Appearance : No visible damage. At least 95% of the terminal electrode is covered by new solder. | | |
| 抗弯曲强度 Resistance to Flexure of Substrate (Bending Strength) | 外观：无可见损伤。 Appearance: No visible damage. | | 试验基板：Al ₂ O ₃ 或 PCB 弯曲深度：1mm 施压速度：0.5mm/sec. 单位：mm 应在弯曲状态下进行测量。  Test Board: Al ₂ O ₃ or PCB Warp: 1mm Speed: 0.5mm/sec. Unit: mm The measurement should be made with the board in the bending position. |
| | C/C | 在 ± 0.5% 或 ± 0.5pF 范围内，取较大值 Within ± 0.5% or ± 0.5pF, whichever is larger | |



| 项目 Item | 技术规格 Technical Specification | | 测试方法 Test Method and Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|--|---|--|--------|--------|--------|-------|------|----|-------|---------|-------|-------|------|----|-------|---------|-------|------|-----------------|-------------|---|---------------------|----|---|--------------------|-------|---|--------------------|----|---|--------------------|-------|
| 端头结合强度 Termination Adhesion | 外观无可见损伤 No visible damage. | | 施加的力：5N 时间：10 ± 1S Applied Force: 5N Duration: 10 ± 1S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 温度循环 Temperature Cycle | C/C | 在 ± 1% 或 ± 1pF 范围内，取两者中最大者 C/C: Within ± 1% or ± 1pF, whichever is larger. | 初始测量 循环次数：5 次，一个循环分以下 4 步： <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>阶段</th> <th>温度 ()</th> <th>时间(分钟)</th> </tr> </thead> <tbody> <tr> <td>第 1 步</td> <td>下限温度</td> <td>30</td> </tr> <tr> <td>第 2 步</td> <td>常温(+20)</td> <td>2 ~ 3</td> </tr> <tr> <td>第 3 步</td> <td>上限温度</td> <td>30</td> </tr> <tr> <td>第 4 步</td> <td>常温(+20)</td> <td>2 ~ 3</td> </tr> </tbody> </table> 试验后放置（恢复）时间：24 ± 2h Preheating conditions: up-category temperature, 1h Recovery time: 24 ± 1h Initial Measurement Cycling Times: 5 times, 1 cycle, 4 steps: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Step</th> <th>Temperature ()</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Low- category temp.</td> <td>30</td> </tr> <tr> <td>2</td> <td>Normal temp. (+20)</td> <td>2 ~ 3</td> </tr> <tr> <td>3</td> <td>Up- category temp.</td> <td>30</td> </tr> <tr> <td>4</td> <td>Normal temp. (+20)</td> <td>2 ~ 3</td> </tr> </tbody> </table> Recovery time after test: 24 ± 2h | 阶段 | 温度 () | 时间(分钟) | 第 1 步 | 下限温度 | 30 | 第 2 步 | 常温(+20) | 2 ~ 3 | 第 3 步 | 上限温度 | 30 | 第 4 步 | 常温(+20) | 2 ~ 3 | Step | Temperature () | Time (min.) | 1 | Low- category temp. | 30 | 2 | Normal temp. (+20) | 2 ~ 3 | 3 | Up- category temp. | 30 | 4 | Normal temp. (+20) | 2 ~ 3 |
| | 阶段 | 温度 () | | 时间(分钟) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 第 1 步 | 下限温度 | | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 第 2 步 | 常温(+20) | | 2 ~ 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 第 3 步 | 上限温度 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 第 4 步 | 常温(+20) | 2 ~ 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Step | Temperature () | Time (min.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Low- category temp. | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Normal temp. (+20) | 2 ~ 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Up- category temp. | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Normal temp. (+20) | 2 ~ 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q | 同初始标准 Same to initial value. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IR | 同初始标准 Same to initial value. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DWV | 同初始标准 Same to initial value. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 潮湿试验 Moisture Resistance | C/C | 在 ± 2% 或 ± 1pF 范围内，取两者中最大者 Within ± 2% or ± 1pF, whichever is larger. | 温度：40 ± 2 湿度：90~95%RH 时间：500 小时 放置条件：室温 放置时间：48 小时 Temperature：40 ± 2 Humidity：90~95%RH Duration：500h Recovery conditions：Room temperature Recovery Time：48h | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Q | C 30pF, Q 350 10pF C 30pF, Q 275+5C/2 C 10pF, Q 200+10C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | IR | Ri 2500M 或 Ri C _R 25S 取两者之中较小者。 Ri 2500M 或 Ri C _R 25S whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 外观：无损伤 Appearance: No visible damage. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



| 项目 Item | 技术规格 Technical Specification | | 测试方法 Test Method and Remarks |
|---|--|--|---|
| 寿命试验 Life Test | C/C | 在 $\pm 2\%$ 或 $\pm 1\text{pF}$ 范围内, 取两者中最大者 Within $\pm 2\%$ or $\pm 1\text{pF}$, whichever is larger. | 低压产品 ($< 100\text{V}$) 电压: 1.5 倍额定工作电压 时间: 1000 小时 温度: 125 充电电流: 不应超过 50mA 放置条件: 室温 放置时间: 24 小时 Low-Voltage ($< 100\text{V}$) Applied Voltage: $1.5 \times \text{Rated Voltage}$ Duration: 1000h Temperature: 125 Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: 24h |
| | Q | C 30pF, Q 350 10pF C 30pF, Q 275+5C/2 C 10pF, Q 200+10C | |
| | IR | Ri 4000M 或 Ri C _R 40S 取两者之中较小者. Ri 4000M 或 Ri C _R 40S whichever is smaller. | |
| | 外观: 无损伤 Visual Appearance: No visible damage. | | |
| 中高压产品 寿命试验 Middle & high voltage Life Test | C/C | 在 $\pm 2\%$ 或 $\pm 1\text{pF}$ 范围内, 取两者中最大者 Within $\pm 2\%$ or $\pm 1\text{pF}$, whichever is larger. | 中高压产品: 100V 额定电压 $< 500\text{V}$: 2 倍工作电压 500V 额定电压 1000V: 1.5 倍工作电压 额定电压 $> 1000\text{V}$: 1.2 倍工作电压 时间: 100 小时 充电电流: 不应超过 50mA 温度: 125 放置条件: 室温 放置时间: 24 小时 Applied Voltage: 100V Rated Voltage $< 500\text{V}$: 2 Multiple 500V Rated Voltage 1000V: 1.5 Multiple $> 1000\text{V}$ Rated Voltage: 1.2 Multiple Duration: 100h Charge/ Discharge Current: 50mA max. Temperature: 125 Recovery Conditions: Room Temperature Recovery Time: 24h |
| | Q | C 30pF, Q 350 10pF C 30pF, Q 275+5C/2 C 10pF, Q 200+10C | |
| | IR | Ri 4000M 或 Ri C _R 40S 取两者之中较小者. Ri 4000M 或 Ri C _R 40S whichever is smaller. | |
| | 外观: 无损伤 Visual Appearance: No visible damage. | | |



七、典型特性曲线

