# Chip Monolithic Ceramic Capacitors

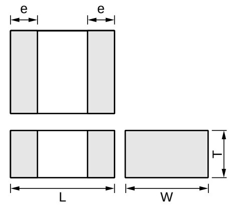
muRata

## High-Q & High Power Type

### SMD Type

■ Features (ERF Series)

1. The dielectric is composed of low dielectric loss ceramic. This series is perfectly suited to high frequency applications (VHS-microwave band).
2. The series is ultraminiature, yet has a high-power capacity. This is the best capacitor available for transmitter and amplifier circuits such as those in broadcasting equipment and mobile base stations.
3. ERF1D type is designed for both flow and reflow soldering and ERF22 type is designed for reflow soldering.




| Part Number | Dimensions (mm) | | | |
|---|---|---|---|---|
| | L | W | T | e |
| **ERF1DM** | $1.4^{+0.6}_{-0.4}$ | $1.4^{+0.6}_{-0.4}$ | $1.15^{+0.50}_{-0.35}$ | $0.25^{+0.25}_{-0.15}$ |
| **ERF22X** | $2.8^{+0.6}_{-0.4}$ | $2.8^{+0.6}_{-0.4}$ | $2.3^{+0.5}_{-0.3}$ | $0.4^{+0.4}_{-0.3}$ |

■ Applications

High frequency and high power circuits

| Part Number | **ERF1D** | | **ERF22** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L x W | 1.40x1.40 | | 2.80x2.80 | | | | | | | | | |
| TC | C0G (**5C**) | CH (**6C**) | C0G (**5C**) | | | | | CH (**6C**) | | | | |
| Rated Volt. | 50 (**1H**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) |
| Capacitance (Capacitance part numbering code) and T (mm) Dimension (T Dimension part numbering code) | | | | | | | | | | | | |
| 0.50pF(**R50**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 0.6pF(**R60**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 0.7pF(**R70**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 0.75pF(**R75**) | | 1.15(**M**) | | | | | | 2.30(**X**) | | | | |
| 0.8pF(**R80**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 0.9pF(**R90**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 1.0pF(**1R0**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 1.1pF(**1R1**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 1.2pF(**1R2**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 1.3pF(**1R3**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 1.4pF(**1R4**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 1.5pF(**1R5**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 1.6pF(**1R6**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 1.7pF(**1R7**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 1.8pF(**1R8**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 1.9pF(**1R9**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 2.0pF(**2R0**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 2.1pF(**2R1**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 2.2pF(**2R2**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 2.4pF(**2R4**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 2.7pF(**2R7**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 3.0pF(**3R0**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 3.3pF(**3R3**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 3.6pF(**3R6**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 3.9pF(**3R9**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 4.0pF(**4R0**) | | 1.15(**M**) | | | | | | 2.30(**X**) | | | | |
| 4.3pF(**4R3**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 4.7pF(**4R7**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |

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| Part Number | **ERF1D** | | **ERF22** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L x W | 1.40x1.40 | | 2.80x2.80 | | | | | | | | | |
| TC | C0G (**5C**) | CH (**6C**) | C0G (**5C**) | | | | | CH (**6C**) | | | | |
| Rated Volt. | 50 (**1H**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) |
| Capacitance (Capacitance part numbering code) and T (mm) Dimension (T Dimension part numbering code) | | | | | | | | | | | | |
| 5.0pF(**5R0**) | | 1.15(**M**) | | | | | | 2.30(**X**) | | | | |
| 5.1pF(**5R1**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 5.6pF(**5R6**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 6.0pF(**6R0**) | | 1.15(**M**) | | | | | | 2.30(**X**) | | | | |
| 6.2pF(**6R2**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 6.8pF(**6R8**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 7.0pF(**7R0**) | | 1.15(**M**) | | | | | | 2.30(**X**) | | | | |
| 7.5pF(**7R5**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 8.0pF(**8R0**) | | 1.15(**M**) | | | | | | 2.30(**X**) | | | | |
| 8.2pF(**8R2**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 9.0pF(**9R0**) | | 1.15(**M**) | | | | | | 2.30(**X**) | | | | |
| 9.1pF(**9R1**) | 1.15(**M**) | | 2.30(**X**) | | | | | | | | | |
| 10pF(**100**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 11pF(**110**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 12pF(**120**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 13pF(**130**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 15pF(**150**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 16pF(**160**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 18pF(**180**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 20pF(**200**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 22pF(**220**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 24pF(**240**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 27pF(**270**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 30pF(**300**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 33pF(**330**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 36pF(**360**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 39pF(**390**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 43pF(**430**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 47pF(**470**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 51pF(**510**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 56pF(**560**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 62pF(**620**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 68pF(**680**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 75pF(**750**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 82pF(**820**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 91pF(**910**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 100pF(**101**) | 1.15(**M**) | 1.15(**M**) | 2.30(**X**) | | | | | 2.30(**X**) | | | | |
| 110pF(**111**) | | | | 2.30(**X**) | | | | | 2.30(**X**) | | | |
| 120pF(**121**) | | | | 2.30(**X**) | | | | | 2.30(**X**) | | | |
| 130pF(**131**) | | | | 2.30(**X**) | | | | | 2.30(**X**) | | | |
| 150pF(**151**) | | | | 2.30(**X**) | | | | | 2.30(**X**) | | | |
| 160pF(**161**) | | | | 2.30(**X**) | | | | | 2.30(**X**) | | | |
| 180pF(**181**) | | | | 2.30(**X**) | | | | | 2.30(**X**) | | | |
| 200pF(**201**) | | | | 2.30(**X**) | | | | | 2.30(**X**) | | | |
| 220pF(**221**) | | | | | 2.30(**X**) | | | | | 2.30(**X**) | | |
| 240pF(**241**) | | | | | 2.30(**X**) | | | | | 2.30(**X**) | | |
| 270pF(**271**) | | | | | 2.30(**X**) | | | | | 2.30(**X**) | | |
| 300pF(**301**) | | | | | 2.30(**X**) | | | | | 2.30(**X**) | | |
| 330pF(**331**) | | | | | 2.30(**X**) | | | | | 2.30(**X**) | | |
| 360pF(**361**) | | | | | 2.30(**X**) | | | | | 2.30(**X**) | | |
| 390pF(**391**) | | | | | 2.30(**X**) | | | | | 2.30(**X**) | | |
| 430pF(**431**) | | | | | 2.30(**X**) | | | | | 2.30(**X**) | | |

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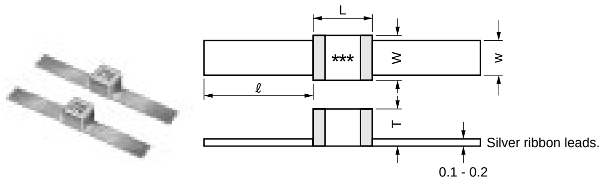
| Part Number | ERF1D | | ERF22 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L x W | 1.40x1.40 | | 2.80x2.80 | | | | | | | | | |
| TC | C0G (**5C**) | CH (**6C**) | C0G (**5C**) | | | | | CH (**6C**) | | | | |
| Rated Volt. | 50 (**1H**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) |
| Capacitance (Capacitance part numbering code) and T (mm) Dimension (T Dimension part numbering code) | | | | | | | | | | | | |
| 470pF(**471**) | | | | | 2.30(**X**) | | | | | 2.30(**X**) | | |
| 510pF(**511**) | | | | | | 2.30(**X**) | | | | | 2.30(**X**) | |
| 560pF(**561**) | | | | | | 2.30(**X**) | | | | | 2.30(**X**) | |
| 620pF(**621**) | | | | | | 2.30(**X**) | | | | | 2.30(**X**) | |
| 680pF(**681**) | | | | | | 2.30(**X**) | | | | | 2.30(**X**) | |
| 750pF(**751**) | | | | | | | 2.30(**X**) | | | | | 2.30(**X**) |
| 820pF(**821**) | | | | | | | 2.30(**X**) | | | | | 2.30(**X**) |
| 910pF(**911**) | | | | | | | 2.30(**X**) | | | | | 2.30(**X**) |
| 1000pF(**102**) | | | | | | | 2.30(**X**) | | | | | 2.30(**X**) |

The part numbering code is shown in ( ).
Dimensions are shown in mm and Rated Voltage in Vdc.

## Ribbon Terminal

### ■ Features (ERH Series)

1. The dielectric is composed of low dielectric loss ceramics. This series is perfectly suited to high frequency applications (VHS-microwave band).
2. The series is ultraminiature, yet has a high power capacity. This is the best capacitor available for transmitter and amplifier circuits such as those in broadcasting equipment and mobile base stations.
3. ERH1X/3X Series capacitors withstand high temperatures because ribbon leads are attached with silver paste.
4. ERH1X/3X Series capacitors are easily soldered and especially well suited in applications where only a soldering iron can be used.




*** : Capacitance Code

| Part Number | Dimensions (mm) | | | | |
|---|---|---|---|---|---|
| | L | W | T max. | ℓ | w |
| **ERH1XC** | 1.6 ±0.4 | 1.4 ±0.4 | 1.6 | 5.0 min. | 1.3 ±0.4 |
| **ERH3XX** | 3.2 ±0.4 | 2.8 ±0.4 | 3.0 | 9.0 ±2.0 | 2.35 ±0.15 |



### ■ Applications

High frequency and high power circuits

| Part Number | ERH1X | | ERH3X | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L x W | 1.60x1.40 | | 3.20x2.80 | | | | | | | | | |
| TC | C0G (**5C**) | CH (**6C**) | C0G (**5C**) | | | | | CH (**6C**) | | | | |
| Rated Volt. | 50 (**1H**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) |
| Capacitance (Capacitance part numbering code) and T (mm) Dimension (T Dimension part numbering code) | | | | | | | | | | | | |
| 0.50pF(**R50**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 0.6pF(**R60**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 0.7pF(**R70**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 0.75pF(**R75**) | | 1.60(**C**) | | | | | | 3.00(**X**) | | | | |
| 0.8pF(**R80**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 0.9pF(**R90**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 1.0pF(**1R0**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 1.1pF(**1R1**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 1.2pF(**1R2**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 1.3pF(**1R3**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 1.4pF(**1R4**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 1.5pF(**1R5**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |

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| Part Number | ERH1X | | ERH3X | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L x W | 1.60x1.40 | | 3.20x2.80 | | | | | | | | | |
| TC | C0G (**5C**) | CH (**6C**) | C0G (**5C**) | | | | | CH (**6C**) | | | | |
| Rated Volt. | 50 (**1H**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) |
| Capacitance (Capacitance part numbering code) and T (mm) Dimension (T Dimension part numbering code) | | | | | | | | | | | | |
| 1.6pF(**1R6**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 1.7pF(**1R7**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 1.8pF(**1R8**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 1.9pF(**1R9**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 2.0pF(**2R0**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 2.1pF(**2R1**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 2.2pF(**2R2**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 2.4pF(**2R4**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 2.7pF(**2R7**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 3.0pF(**3R0**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 3.3pF(**3R3**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 3.6pF(**3R6**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 3.9pF(**3R9**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 4.0pF(**4R0**) | | 1.60(**C**) | | | | | | 3.00(**X**) | | | | |
| 4.3pF(**4R3**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 4.7pF(**4R7**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 5.0pF(**5R0**) | | 1.60(**C**) | | | | | | 3.00(**X**) | | | | |
| 5.1pF(**5R1**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 5.6pF(**5R6**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 6.0pF(**6R0**) | | 1.60(**C**) | | | | | | 3.00(**X**) | | | | |
| 6.2pF(**6R2**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 6.8pF(**6R8**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 7.0pF(**7R0**) | | 1.60(**C**) | | | | | | 3.00(**X**) | | | | |
| 7.5pF(**7R5**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 8.0pF(**8R0**) | | 1.60(**C**) | | | | | | 3.00(**X**) | | | | |
| 8.2pF(**8R2**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 9.0pF(**9R0**) | | 1.60(**C**) | | | | | | 3.00(**X**) | | | | |
| 9.1pF(**9R1**) | 1.60(**C**) | | 3.00(**X**) | | | | | | | | | |
| 10pF(**100**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 11pF(**110**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 12pF(**120**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 13pF(**130**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 15pF(**150**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 16pF(**160**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 18pF(**180**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 20pF(**200**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 22pF(**220**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 24pF(**240**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 27pF(**270**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 30pF(**300**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 33pF(**330**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 36pF(**360**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 39pF(**390**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 43pF(**430**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 47pF(**470**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 51pF(**510**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 56pF(**560**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 62pF(**620**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 68pF(**680**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 75pF(**750**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 82pF(**820**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 91pF(**910**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |

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| Part Number | **ERH1X** | | **ERH3X** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L x W | 1.60x1.40 | | 3.20x2.80 | | | | | | | | | |
| TC | C0G (**5C**) | CH (**6C**) | C0G (**5C**) | | | | | CH (**6C**) | | | | |
| Rated Volt. | 50 (**1H**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) | 500 (**2H**) | 300 (**YD**) | 200 (**2D**) | 100 (**2A**) | 50 (**1H**) |
| Capacitance (Capacitance part numbering code) and T (mm) Dimension (T Dimension part numbering code) | | | | | | | | | | | | |
| 100pF(**101**) | 1.60(**C**) | 1.60(**C**) | 3.00(**X**) | | | | | 3.00(**X**) | | | | |
| 110pF(**111**) | | | | 3.00(**X**) | | | | | 3.00(**X**) | | | |
| 120pF(**121**) | | | | 3.00(**X**) | | | | | 3.00(**X**) | | | |
| 130pF(**131**) | | | | 3.00(**X**) | | | | | 3.00(**X**) | | | |
| 150pF(**151**) | | | | 3.00(**X**) | | | | | 3.00(**X**) | | | |
| 160pF(**161**) | | | | 3.00(**X**) | | | | | 3.00(**X**) | | | |
| 180pF(**181**) | | | | 3.00(**X**) | | | | | 3.00(**X**) | | | |
| 200pF(**201**) | | | | 3.00(**X**) | | | | | 3.00(**X**) | | | |
| 220pF(**221**) | | | | | 3.00(**X**) | | | | | 3.00(**X**) | | |
| 240pF(**241**) | | | | | 3.00(**X**) | | | | | 3.00(**X**) | | |
| 270pF(**271**) | | | | | 3.00(**X**) | | | | | 3.00(**X**) | | |
| 300pF(**301**) | | | | | 3.00(**X**) | | | | | 3.00(**X**) | | |
| 330pF(**331**) | | | | | 3.00(**X**) | | | | | 3.00(**X**) | | |
| 360pF(**361**) | | | | | 3.00(**X**) | | | | | 3.00(**X**) | | |
| 390pF(**391**) | | | | | 3.00(**X**) | | | | | 3.00(**X**) | | |
| 430pF(**431**) | | | | | 3.00(**X**) | | | | | 3.00(**X**) | | |
| 470pF(**471**) | | | | | 3.00(**X**) | | | | | 3.00(**X**) | | |
| 510pF(**511**) | | | | | | 3.00(**X**) | | | | | 3.00(**X**) | |
| 560pF(**561**) | | | | | | 3.00(**X**) | | | | | 3.00(**X**) | |
| 620pF(**621**) | | | | | | 3.00(**X**) | | | | | 3.00(**X**) | |
| 680pF(**681**) | | | | | | 3.00(**X**) | | | | | 3.00(**X**) | |
| 750pF(**751**) | | | | | | | 3.00(**X**) | | | | | 3.00(**X**) |
| 820pF(**821**) | | | | | | | 3.00(**X**) | | | | | 3.00(**X**) |
| 910pF(**911**) | | | | | | | 3.00(**X**) | | | | | 3.00(**X**) |
| 1000pF(**102**) | | | | | | | 3.00(**X**) | | | | | 3.00(**X**) |

The part numbering code is shown in ( ).
Dimensions are shown in mm and Rated Voltage in Vdc.

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# Specifications and Test Methods

| No. | Item | | Specifications | Test Method |
|---|---|---|---|---|
| 1 | Operating Temperature Range | | −55℃ to +125℃ | |
| 2 | Rated Voltage | | See the previous pages. | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>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 | Appearance | | No defects or abnormalities | Visual inspection |
| 4 | Dimensions | | Within the specified dimension | Using calipers |
| 5 | Dielectric Strength | | No defects or abnormalities | No failure should be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA. |
| 6 | Insulation Resistance (I.R.) | 25℃ | C≦ 470pF :1,000,000MΩ min.<br>470pF<C≦1,000pF : 100,000MΩ min. | The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 25℃ and 125℃ standard humidity and within 2 minutes of charging. |
| | | 125℃ | C≦ 470pF : 100,000MΩ min.<br>470pF<C≦1,000pF : 10,000MΩ min. | |
| 7 | Capacitance | | Within the specified tolerance. | The capacitance/Q should be measured at 25℃ at the frequency and voltage shown in the table.<br>Item \| <br>Frequency \| 1±0.1MHz<br>Voltage \| 0.5 to 5Vr.m.s. |
| 8 | Q | | C≦ 220pF : Q≧10,000<br>220pF<C≦ 470pF : Q≧ 5,000<br>470pF<C≦1,000pF : Q≧ 3,000<br>C : Nominal Capacitance (pF) | |
| 9 | Capacitance Temperature Characteristics | Capacitance Variation Rate | Within the specified tolerance (Table A-7) | The temperature coefficient is determined using the capacitance measured in step 3 as a reference. When cycling the temperature sequentially from step 1 through 5, the capacitance should be within the specified tolerance for the temperature coefficient and capacitance change as Table A.<br>The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in steps 1, 3 and 5 by the capacitance value in step 3.<br>The capacitance change should be measured after 5 min. at each specified temperature stage.<br>Step \| Temperature (℃)<br>1 \| 25±2<br>2 \| −55±3<br>3 \| 25±2<br>4 \| 125±3<br>5 \| 25±2 |
| | | Temperature Coefficient | Within the specified tolerance (Table A-7) | |
| | | Capacitance Drift | Within ±0.2% or ±0.05pF<br>(Whichever is larger) | |
| 10 | Terminal Strength | Adhesive Strength of Termination (for chip type) | No removal of the terminations or other defects should occur. | Solder the capacitor to the test jig (alumina substrate) shown in Fig. 1 using solder containing 2.5% silver. The soldering should be done either with an iron or in furnace and be conducted with care so the soldering is uniform and free of defects such as heat shock. Then apply a 10N* force in the direction of the arrow.<br>*ERF1D : 5N<br>(see Fig. 1 below) |
| | | Tensile Strength (for micro-strip type) | Capacitor should not be broken or damaged. | The capacitor body is fixed and a load is applied gradually in the axial direction until its value reaches 10N (5N for ERH1X). |
| | | Bending Strength of lead wire terminal (for micro-strip type) | Lead wire should not be cut or broken. | Position the main body of the capacitor so the lead wire terminal is perpendicular, and load 2.5N to the lead wire terminal. Bend the main body by 90 degrees, bend back to original position, bend 90 degrees in the reverse direction, and then bend back to original position. |

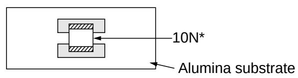


Fig. 1

Continued on the following page.

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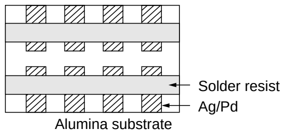
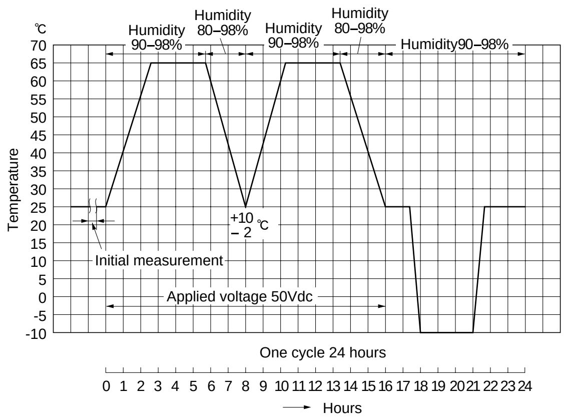
# Specifications and Test Methods

Continued from the preceding page.

<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specifications</th><th>Test Method</th></tr>
<tr><td rowspan="3">11</td><td rowspan="3">Vibration Resistance</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="3">Solder the capacitor to the test jig (alumina substrate) shown in Fig. 2 using solder containing 2.5% silver. The soldering should be done either with an iron or using the reflow method and should be conducted with care so the soldering is uniform and free of defects such as heat shock. The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz. The frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1 minute. This motion should be applied for a period of 2 hours in each of 3 mutually perpendicular directions (total of 6 hours).<br><br><br>Fig. 2</td></tr>
<tr><td>Capacitance</td><td>Within the specified tolerance</td></tr>
<tr><td>Q</td><td>Satisfies the initial value.<br>C≦ 220pF : Q≧10,000<br>220pF<C≦ 470pF : Q≧ 5,000<br>470pF<C≦1,000pF : Q≧ 3,000<br>C : Nominal Capacitance (pF)</td></tr>
<tr><td>12</td><td colspan="2">Solderability of Termination</td><td>95% of the terminations are to be soldered evenly and continuously.</td><td>Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Preheat at 80 to 120℃ for 10 to 30 seconds. After preheating immerse in solder containing 2.5% silver for 5±0.5 seconds at 230±5℃. The dipping depth for microstrip type capacitors is up to 1 mm from the root of the terminal.</td></tr>
<tr><td>13</td><td colspan="2">Resistance to Soldering Heat</td><td>The measured and observed characteristics should satisfy the specifications in the following table.
<table>
<tr><th>Item</th><th>Specifications</th></tr>
<tr><td>Appearance</td><td>No marked defect</td></tr>
<tr><td>Capacitance Change</td><td>Within ±2.5% or ±0.25pF<br>(Whichever is larger)</td></tr>
<tr><td>Q</td><td>C≦ 220pF : Q≧10,000<br>220pF<C≦ 470pF : Q≧ 5,000<br>470pF<C≦1,000pF : Q≧ 3,000</td></tr>
<tr><td>I.R.</td><td>More than 30% of the initial specification value at 25℃.</td></tr>
<tr><td>Dielectric Strength</td><td>No failure</td></tr>
</table>
C : Nominal Capacitance (pF)</td><td>Preheat the capacitor at 80 to 100℃ for 2 minutes and then at 150 to 200℃ for 5 minutes.<br>Immerse in solder containing 2.5% silver for 3±0.5 seconds at 270±5℃. Set at room temperature for 24±2 hours, then measure. The dipping depth for microstrip type capacitors is up to 2mm from the root of the terminal.</td></tr>
<tr><td>14</td><td colspan="2">Temperature Cycle</td><td>The measured and observed characteristics should satisfy the specifications in the following table.
<table>
<tr><th>Item</th><th>Specifications</th></tr>
<tr><td>Appearance</td><td>No marked defect</td></tr>
<tr><td>Capacitance Change</td><td>Within ±1% or ±0.25pF<br>(Whichever is larger)</td></tr>
<tr><td>Q</td><td>C≦ 220pF : Q≧10,000<br>220pF<C≦ 470pF : Q≧ 5,000<br>470pF<C≦1,000pF : Q≧ 3,000</td></tr>
<tr><td>I.R.</td><td>More than 30% of the initial specification value at 25℃.</td></tr>
<tr><td>Dielectric Strength</td><td>No failure</td></tr>
</table>
C : Nominal Capacitance (pF)</td><td>Fix the capacitor to the supporting jig in the same manner and under the same conditions as (11). Perform the five cycles according to the four heat treatments listed in the following table.<br>Then, repeat twice the successive cycles of immersion, each cycle consisting of immersion in a fresh water at $65^{+5}_{-0}$℃ for 15 minutes and immersion in a saturated aqueous solution of salt at 0±3℃ for 15 minutes.<br>The capacitor is promptly washed with running water, dried with a dry cloth, and allowed to sit at room temperature for 24±2 hours.
<table>
<tr><th>Step</th><th>1</th><th>2</th><th>3</th><th>4</th></tr>
<tr><td>Temp.(℃)</td><td>$-55^{+0}_{-3}$</td><td>RoomTemp.</td><td>$125^{+3}_{-0}$</td><td>RoomTemp.</td></tr>
<tr><td>Time(min.)</td><td>30±3</td><td>2 to 3</td><td>30±3</td><td>2 to 3</td></tr>
</table></td></tr>
<tr><td>15</td><td colspan="2">Humidity</td><td>The measured and observed characteristics should satisfy the specifications in the following table.
<table>
<tr><th>Item</th><th>Specifications</th></tr>
<tr><td>Appearance</td><td>No marked defect</td></tr>
<tr><td>Capacitance Change</td><td>Within ±5% or ±0.5pF<br>(Whichever is larger)</td></tr>
<tr><td>Q</td><td>C≦ 220pF : Q≧10,000<br>220pF<C≦ 470pF : Q≧ 5,000<br>470pF<C≦1,000pF : Q≧ 3,000</td></tr>
<tr><td>I.R.</td><td>More than 30% of the initial specification value at 25℃.</td></tr>
</table>
C : Nominal Capacitance (pF)</td><td>Apply the 24-hour heat (−10 to +65℃) and humidity (80 to 98%) treatment shown below, 10 consecutive times. Remove, let sit for 24±2 hours at room temperature, and measure.<br><br></td></tr>
</table>

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# Specifications and Test Methods

Continued from the preceding page.

| No. | Item | Specifications | Test Method |
|---|---|---|---|
| 16 | High Temperature Load | The measured and observed characteristics should satisfy the specifications in the following table.<br>**Item / Specifications**<br>Appearance: No marked defect<br>Capacitance Change: Within ±2.5% or ±0.25pF (Whichever is larger)<br>Q: C≦ 220pF : Q≧10,000; 220pF<C≦ 470pF : Q≧ 5,000; 470pF<C≦1,000pF : Q≧ 3,000<br>I.R.: More than 30% of the initial specification value at 25℃.<br>C : Nominal Capacitance (pF) | Apply 150% of the rated voltage for 2,000±12 hours at 125±3℃. Remove and let sit for 24±2 hours at room temperature, then measure.<br>The charge/discharge current is less than 50mA. |

Table A

| Char. Code | Temp. Coeff. (ppm/℃) Note 1 | Capacitance Change from 25℃ Value (%) | | | | | |
|---|---|---|---|---|---|---|---|
| | | −55℃ | | −30℃ | | −10℃ | |
| | | Max. | Min. | Max. | Min. | Max. | Min. |
| 5C | 0±30 | 0.58 | −0.24 | 0.40 | −0.17 | 0.25 | −0.11 |

Note 1 : Nominal values denote the temperature coefficient within a range of 25 to 125℃.

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