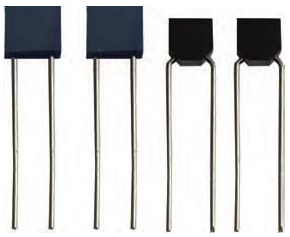
# FL4H and FT4H

Molded Lead Multilayer Ceramic Capacitors series
G, J military grade and Industrial grade



**Implementation Standards**
GFL4H: QZJ840624 and Q/MM195-2014
GFT4H: QZJ840624 and Q/MM196-2014
JFL4H, FL4H: Q／MM195-2014 "FL4H type molded bow multilayer porcelain dielectric Container Detailed Specification
JFT4H, FT4H: Q/MM196-2014 FT4H Molded Lead Multilayer Porcelain Dielectric Container Detailed Specification

**Features**
Good sealing, high physical strength, good moisture resistance, high capacitance stability, low loss,
Excellent insulation performance, resistance to mechanical vibration and impact performance;
The national military standard production line is produced on the same line.

**Application**
Applicable to military electronic equipment or high-end civilian equipment in the fields of weapons, electronics, ships, communications, etc.
Category 1 (FL4H): resonant circuit, high frequency coupling, high frequency amplifier, low noise circuit, high frequency bypass and low loss requirement,
Circuits with stable capacitance and high insulation requirements;
Category 2 (FT4H): Power supply filtering, bypassing, low-frequency coupling circuits, or circuits that do not require high losses and capacitor stability.

**Ordering Rules**

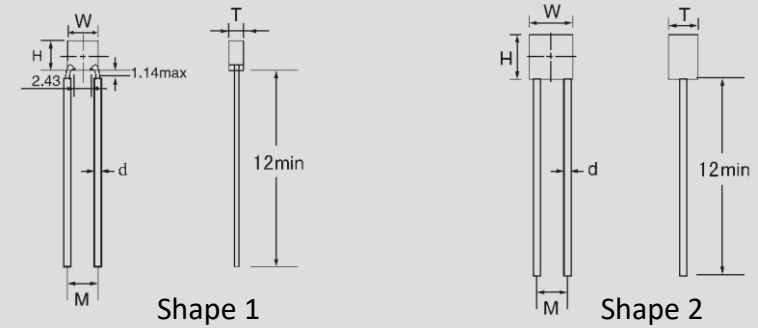
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| G | FL4H | – 1a | – 50V | – CG | – 391 | J | – W | T |
| J | FT4H | – 2b | – 50V | – X7R | – 224 | K | – W | T |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ |

① Grade
G: Seventh Special Level; J: General Military Level; No Mark: Industrial Level 3

② Series name
FL4H: Dielectric type Class 1
FT4H: Dielectric type Class 2

③ Size and shape code

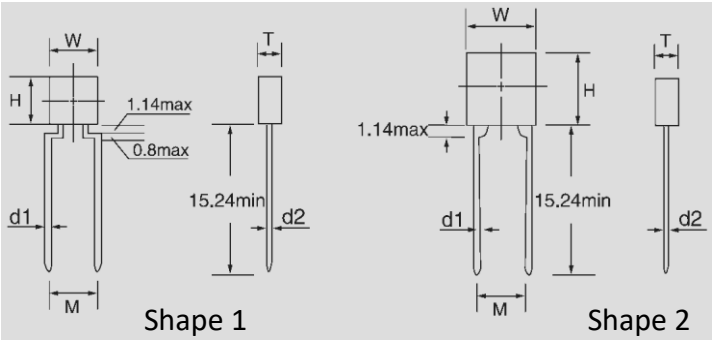
Terminal type W




Unit: mm

| Size | **Shape 1a** | **Shape 1b** | **Shape 2b** | **Shape 3b** |
|---|---|---|---|---|
| W | 5.00 ±0.20 | 5.00 ±0.20 | 7.50 ±0.20 | 10.16±0.30 |
| H | 5.00 ±0.20 | 5.00±0.20 | 7.50 ±0.20 | 10.16±0.30 |
| T | 2.50 ±0.25 | 2.00 ±0.25 | 2.20 ±0.25 | 5.60 ±0.35 |
| M | 5.1 ±0.5 | 3.6±0.5 | 5.1 ± 0.5 | 5.1 ± 0.5 |
| d | 0.60 ±0.05 | 0.60 ±0.05 | 0.60 ± 0.05 | 0.60 ± 0.05 |

Terminal type Z




Unit: mm

| Size | **Shape 1a** | **Shape 1b** | **Shape 2b** | **Shape 3b** |
|---|---|---|---|---|
| W | 5.00 ±0.20 | 5.00 + 0.20 | 7.50+0.20 | 10.16+0.30 |
| H | 5.00 ±0.20 | 5.00 + 0.20 | 7.50+0.20 | 10.16+0.30 |
| T | 2.50 ±0.25 | 2.00 + 0.25 | 2.20+0.25 | 5.60 + 0.35 |
| M | 5.1 ±0.5 | 3.6+ 0.5 | 5.1 +0.5 | 5.1 +0.5 |
| d1 | 0.55 + 0.55 | 0.55 + 0.55 | 0.55 + 0.55 | 0.60 + 0.05 |
| d2 | 0.50 + 0.05 | 0.50 + 0.05 | 0.50 + 0.05 | 0.50 + 0.05 |

④ Rated voltage

Direct Labeling. For example, the lettering "50V" means that the Rated voltage is 50V.

⑤ Temperature characteristics

| Series | Temperature characteristic code | Capacity change over the entire operating temperature range (Relative to the capacity at a temperature of +20°) | Operating Temperature range |
|---|---|---|---|
| FL4H | CG | 0±30ppm/°C | -55℃ ~ +125℃ |
| | CH | 0±60ppm/°C | |
| | DL | -3300±500ppm/°C | |
| FT4H | X7R | ±15% | |
| | 2F1 | -80% ~ +30% | |

⑥ Nominal value of Capacitance

A three-digit number is used to indicate the value of capacity.
The first two digits indicate the nominal value of the capacity in pF, and the third digit indicates the power of 10 this number should be multiplied by. For example, the number "682" means that the capacity value is $68\times10^2$=6800 pF.
If the capacity is less than 10pF, then its value is indicated as it is, but the letter R is used to separate the integer part from the fractional part. For example, the number "1R5" means that the capacity value is 1.5pF.

⑦ Capacitance tolerance

| Temperature characteristics | CG, CH, DL | | | | | | | X7R, 2F1 | |
|---|---|---|---|---|---|---|---|---|---|
| Tolerance code | B | C | D | F | G | J | K | K | M |
| Permissible deviation | ±0.10pF | ±0.25pF | ±0.50pF | + 1% | + 2% | + 5% | ±10% | ±10% | ±20% |
| Note: When the capacitance value <10pF, applicable R, C, D;<br>When the capacitance ≥10pF applicable F, G, J, K, M | | | | | | | | | |

⑧ Terminal type

W – Terminal type: Steel-Copper-Tin-Lead alloy lead wire (Fe/C-Cu-Sn, Pb)
(Tin-lead alloy containing at least 3% lead);

Z – Terminal type: Fe/Ni-Sn/Pb lead wire (Tin-lead alloy containing at least 3% lead).

⑨ Packing

T: Bulk packaging: anti-static bag vacuum packaging.
Quantity: 50pcs/pack, 200pcs/pack, 500pcs/pack

F: Waffle packing: 50 pcs/box.

Note: The default packaging method is T.

Electrical parameters

**Electrical parameters**

<table>
<tr><th>Series</th><th>Temperature characteristics</th><th>Loss tangent tg δ</th><th>Dielectric Withstand Voltage</th><th>Insulation resistance (Ri) at +25℃</th></tr>
<tr><td rowspan="3">FL4H</td><td>CG</td><td rowspan="2">$C_R$< 5pF: No requirement for tg δ<br>5pF≤$C_R$≤50pF: tg δ ≤1.5×(150/$C_R$+7)×$10^{-4}$<br>$C_R$> 50pF: tg δ ≤ 15×$10^{-4}$<br>Note: The unit of $C_R$ in the above formula is pF</td><td rowspan="5">$U_R$≤100V: 2.5$U_R$<br>100V<$U_R$ ≤200V: 1.5$U_R$+100V<br>200V<$U_R$ ≤500V: 1.3$U_R$+100V<br>$U_R$ >500V: 1.3$U_R$</td><td rowspan="2">$C_R$ ≤ 0.01μF: Ri ≥ $10^4$MΩ<br>$C_R$ > 0.01 μF: Ri ≥ (100/$C_R$)·MΩ·μF<br>Note: The unit of $C_R$ in the above formula is μF</td></tr>
<tr><td>CH</td></tr>
<tr><td>DL</td><td>tg δ ≤ 30×$10^{-4}$</td></tr>
<tr><td rowspan="2">FT4H</td><td>X7R</td><td>tg δ ≤ 250×$10^{-4}$</td><td rowspan="2">$C_R$ < 0.025μF: Ri ≥ 4000MΩ<br>$C_R$ ≥ 0.025μF: Ri ≥ (100/$C_R$)·MΩ·μF<br>Note: The unit of $C_R$ in the above formula is μF</td></tr>
<tr><td>2F1</td><td>tg δ ≤ 350×$10^{-4}$</td></tr>
</table>

FL4H series Capacitance range

| Size code / Nominal Capacitance / Rated voltage | 1a / 1b | | | 2b | | | 3b | |
|---|---|---|---|---|---|---|---|---|
| | 50 | 100 | 200 | 50 | 100 | 200 | 50 | 100 |
| 0R5–1R0 | | | | | | | | |
| 1R1–1R2 | | | | | | | | |
| 1R3–1R5 | | | | | | | | |
| 1R6–1R8 | | | | | | | | |
| 3R0–3R3 | | | | | | | | |
| 3R6–3R9 | | | | | | | | |
| 4R3–4R7 | | | | | | | | |
| 5R1–5R6 | | | | | | | | |
| 6R2–6R8 | | | | | | | | |
| 7R5–8R2 | | | | | | | | |
| 9R1–100 | | | | | | | | |
| 110–120 | | | | | | | | |
| 130–150 | | | | | | | | |
| 160–180 | | | | | | | | |
| 200– 220 | | | | | | | | |
| 240–270 | | | | | | | | |
| 300–330 | | | | | | | | |
| 360–390 | | | | | | | | |
| 430–470 | | | | | | | | |
| 510–560 | | | | | | | | |
| 620–680 | | | | | | | | |
| 750–820 | | | | | | | | |
| 910–101 | | | | | | | | |
| 111–121 | | | | | | | | |
| 131–151 | | | | | | | | |
| 161–181 | | | | | | | | |
| 201–221 | | | | | | | | |
| 241–271 | | | | | | | | |
| 301–331 | | | | | | | | |
| 361–391 | | | | | | | | |
| 431–471 | | | | | | | | |
| 511–561 | | | | | | | | |
| 621–681 | | | | | | | | |
| 751–821 | | | | | | | | |
| 911–102 | | | | DL | | | | |
| 112–122 | | | | DL | | | | |
| 202–222 | | | CG、CH / DL | | | CG、CH / DL | | |
| 132–152 | | | CG、CH / DL | | | CG、CH / DL | | |
| 162–182 | | | CG、CH / DL | | | CG、CH / DL | | |
| 202–222 | | | CG、CH / DL | | | CG、CH / DL | | |
| 242–272 | | | CG、CH / DL | | | CG、CH / DL | | |
| 302–332 | | CG、CH / DL | CG、CH / DL | | | CG、CH / DL | | |
| 362–392 | | CG、CH / DL | CG、CH / DL | | | CG、CH / DL | | |
| 432–472 | | CG、CH / DL | CG、CH / DL | | | CG、CH / DL | | |
| 512–562 | | CG、CH / DL | CG、CH / DL | | | CG、CH / DL | CG、CH / DL | |
| 622–682 | | CG、CH / DL | CG、CH / DL | | | CG、CH / DL | CG、CH / DL | |
| 752–822 | | CG、CH / DL | | | | CG、CH / DL | CG、CH / DL | |
| 912–103 | | CG、CH / DL | | | | CG、CH / DL | CG、CH / DL | |
| 113–123 | | CG、CH / DL | | | | CG、CH / DL | | |
| 133–153 | | CG、CH / DL | | | | CG、CH / DL | | |
| 163–183 | | CG、CH / DL | | | | CG、CH / DL | | |
| 203–223 | | CG、CH / DL | | | | CG、CH / DL | | |
| 243–273 | | | | | | CG、CH / DL | | |
| 303–333 | | | | | | CG、CH / DL | | |
| 363–393 | | | | | | CG、CH / DL | | |
| 433–473 | | | | | | CG、CH / DL | | |
| 513–563 | | | | | | CG、CH / DL | | |
| 623–683 | | | | | | CG、CH / DL | | |
| 753–823 | | | | | | | | |
| 913–104 | | | | | | | | |
| 154 | | | | | | | | |
| 224 | | | | | | | | |

CG、CH DL

Note: CG is recommended for the same capacity

FT4H series Capacitance range