

# SPECIFICATION

No: WM-S08-006

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| DIVISION   | DATE ISSUED   | SPEC.NO.      |
|------------|---------------|---------------|
| TECH. DERT | July, 17,2012 | WM-S08-006B03 |

# HLK TYPE -FOR Fixed calss 2 ceramic dielectric capacitors

**1. SCOPE**

This specification applies to ceramic insulated capacitors disk type used in electronic equipment.

**2. RELATIVE STANDARDS**

IEC 384-9 : 1988 [ Fixed capacitors of ceramic dielectric,class 2]  
 GB/T 5698-1996 [ Fixed capacitors of ceramic dielectric,class 2]

**3. QUALITY**

Capacitors are manufactured in a highly quality-controlled processes to ensure the reliability of the products

**4. OPERATING TEMPERATURE RANGE**

-25°C to +85°C

**5. PART NUMBERS**

Examples HLK 1H B 102 K A 2 B W  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- ① Type
- ② Rated Voltage
- ③ Temperature Characteristics
- ④ Nominal Capacitance
- ⑤ Capacitance Tolerance Symbol
- ⑥ Lead Style
- ⑦ Lead Spacing
- ⑧ Packaging
- ⑨ Internal code

**5.1 Type**

Type Designation

| Type | Designation                           |
|------|---------------------------------------|
| HLK  | class 2 ceramic dielectric capacitors |

**5.2 Raated Voltage**

| Code | Rated Voltage |
|------|---------------|
| 1H   | DC.50V/63V    |
| 2A   | DC.100v       |
| 2E   | DC.250v       |
| 2H   | DC.500v       |

5.3 Temperature Characteristics Code

| Code | Temperature Characteristics | Cap.Change Of Temp.coeff. | Temperature Range |
|------|-----------------------------|---------------------------|-------------------|
| B    | Y5P                         | $\pm 10\%$                | -25 to 85°C       |
| E    | Y5U                         | +20%~-55%                 |                   |
| F    | Y5V                         | +30%~-80%                 |                   |

5.4 Nominal Capacitance Code

Nominal capacitance shall consist of three numerals in the unit of picofarad(Pf). The first and second numerals mean the significant figures, and the third numeral shall represent the number of zeros following the significant figures.

Example:

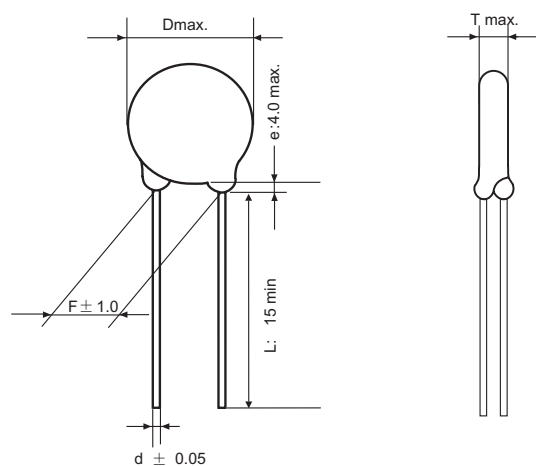
| Code | Capacitance(pF) |
|------|-----------------|
| 102  | 1000            |
| 103  | 10000           |
| 223  | 22000           |
| 104  | 100000          |

5.5 Capacitance Tolerance

| Code | Tolerance  |
|------|------------|
| K    | $\pm 10\%$ |
| M    | $\pm 20\%$ |
| Z    | -20%~+80%  |

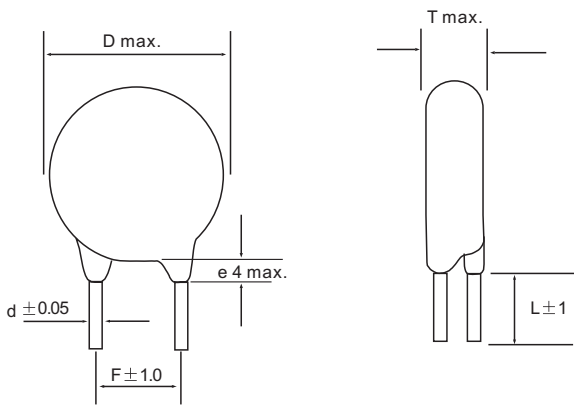
5.6 Lead style

5.6.1: Straight long lead (Lead Style Code :A )



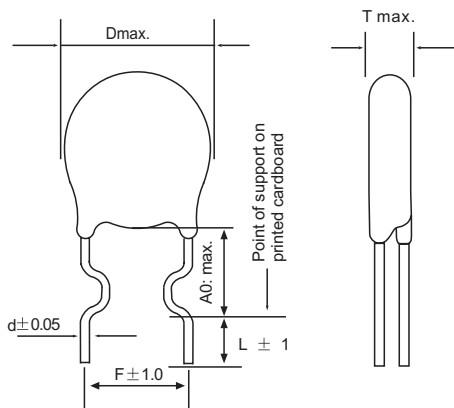
| Lead code | A1          | A2 | A3  | A4 |
|-----------|-------------|----|-----|----|
| F         | 2.5         | 5  | 7.5 | 10 |
| L         | 15 mm min   |    |     |    |
| d         | 0.45 or 0.5 |    |     |    |
| e         | Max. 4.0mm  |    |     |    |

5.6.2 : Straight short lead ( Lead Style Code : B )



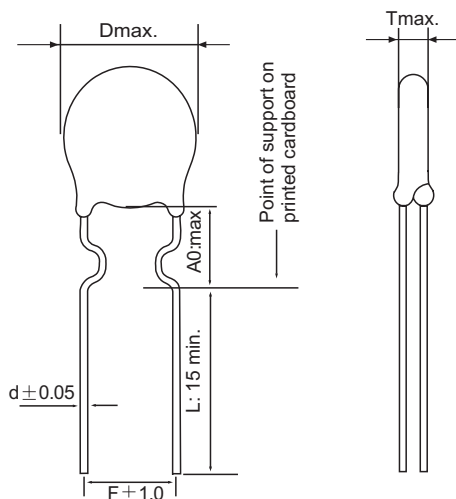
| Lead code | B1                    | B2 | B3  | B4 |
|-----------|-----------------------|----|-----|----|
| F         | 2.5                   | 5  | 7.5 | 10 |
| L         | 5 or depend on client |    |     |    |
| d         | 0.45 or 0.5           |    |     |    |
| e         | Max. 4.0mm            |    |     |    |

5.6.3 : Inside Crimped Short lead ( Lead Style Code : C )



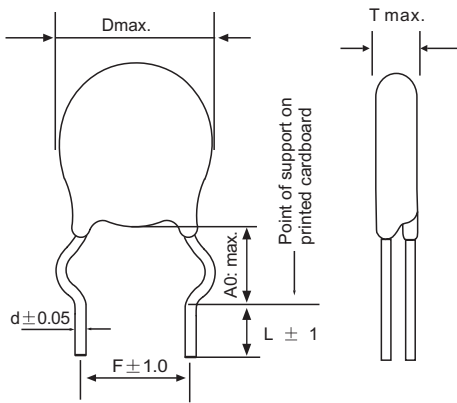
| Lead code | C2                    | C3  | C4  |
|-----------|-----------------------|-----|-----|
| F         | 5                     | 7.5 | 10  |
| A0        | 5                     | 5   | 6.5 |
| L         | 5 or depend on client |     |     |
| d         | 0.45 or 0.5           |     |     |

5.6.4 : Inside crimped long lead ( Lead Style Code : D )



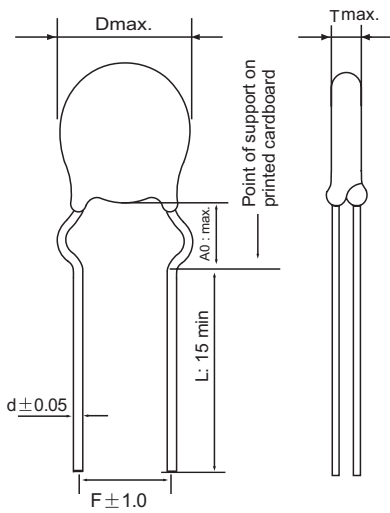
| Lead code | D2          | D3  | D4  |
|-----------|-------------|-----|-----|
| F         | 5           | 7.5 | 10  |
| A0        | 5           | 5   | 6.5 |
| L         | 15 mm min   |     |     |
| d         | 0.45 or 0.5 |     |     |

5.6.5 : Outside crimped Short lead ( Lead Style Code: E )



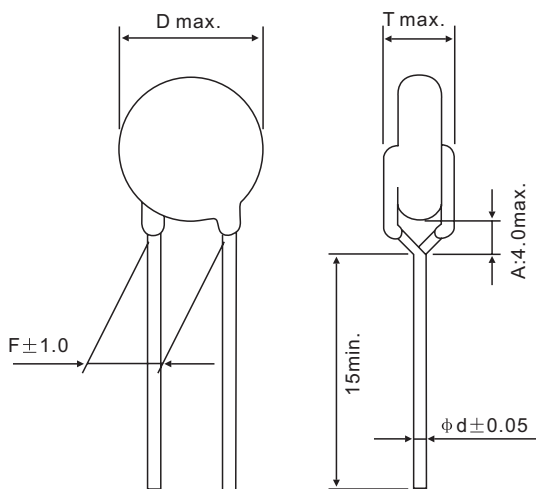
| Lead code | E2                    | E3  | E4  |
|-----------|-----------------------|-----|-----|
| F         | 5                     | 7.5 | 10  |
| A0        | 5                     | 5   | 6.5 |
| L         | 5 or depend on client |     |     |
| d         | 0.45 or 0.5           |     |     |

5.6.6 : Outside crimped long lead ( Lead Style Code: F )



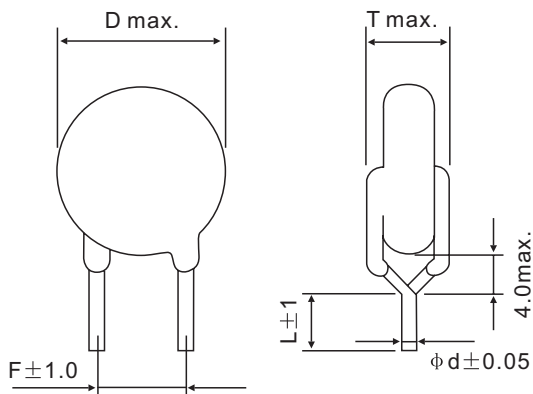
| Lead code | F2          | F3  | F4  |
|-----------|-------------|-----|-----|
| F         | 5           | 7.5 | 10  |
| A0        | 5           | 5   | 6.5 |
| L         | 15 mm min   |     |     |
| d         | 0.45 or 0.5 |     |     |

5.6.7 : Vertical crimped long lead ( Lead Style Code: G )



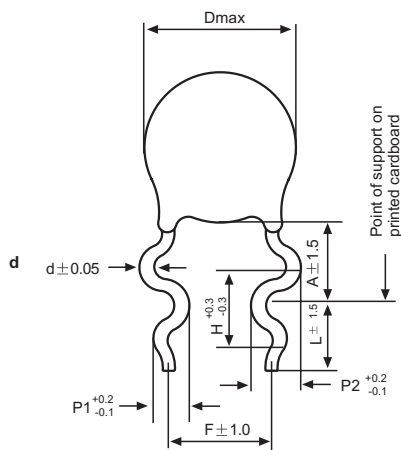
| Lead code | G2          | G3  | G4 |
|-----------|-------------|-----|----|
| F         | 5           | 7.5 | 10 |
| L         | 15 mm min   |     |    |
| d         | 0.45 or 0.5 |     |    |

5.6.8 : Vertical crimped short lead ( Lead Style Code: H )



| Lead code | H2          | H3  | H4 |
|-----------|-------------|-----|----|
| F         | 5           | 7.5 | 10 |
| L         | 5 ± 1 mm    |     |    |
| d         | 0.45 or 0.5 |     |    |

5.6.9 : Double crimped snap lead, (Lead Style Code: M)



| Lead code | M2                                 | M3   | M4   |
|-----------|------------------------------------|------|------|
| F         | 5                                  | 7.5  | 10   |
| H         | 2.6                                | 2.6  | 3.3  |
| P1        | 1.25                               | 1.25 | 1.65 |
| P2        | 1.65                               | 1.65 | 1.95 |
| A         | D < 8: 6.0 ± 1.5, D > 8: 7.0 ± 1.5 |      |      |
| L         | 3 to 30 mm                         |      |      |
| d         | 0.45 or 0.5                        |      |      |

General Information: PCB max. thickness 1.6mm

5.7 Lead Spacing Code

| Code | Lead Spacing(mm) |
|------|------------------|
| 1    | 2.5 ± 1.0        |
| 2    | 5.0 ± 1.0        |
| 3    | 7.5 ± 1.0        |
| 4    | 10.0 ± 1.0       |

5.9 Internal Code



| Code | Illuminate   |
|------|--------------|
| W    | Meeting RoHS |

5.8 Packaging Code

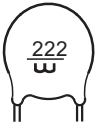

| Code | Pitch of components(mm) | Packaging        |
|------|-------------------------|------------------|
| B    | /                       | Bulk             |
| A    | 12.7                    | Taping Ammo Pack |
| C    | 25.4                    |                  |
| D    | 15.0                    |                  |
| E    | 30.0                    |                  |
| R    | 12.7                    | Taping Reel Pack |

## 6. MARKING



## 6.1 Characteristics : B(Y5P)

| Rated Voltage (V) | Marking item                                                                                                                           | Marking ex.                                                                         |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 50                | a: Manufacturers Trade Mark<br>b: Nominal capacitance<br>c: Rated Voltage                                                              |  |
| 500               | a: Manufacturers Trade Mark<br>b: Temperature Characteristic<br>c: Nominal capacitance<br>d: Capacitance Tolerance<br>e: Rated Voltage |  |

## 6.2 Characteristics : E(Y5U)

| Rated Voltage (V) | Marking item                                                                                                                           | Marking ex.                                                                           |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 50                | a: Manufacturers Trade Mark<br>b: Nominal capacitance<br>c: Rated Voltage                                                              |   |
| 500               | a: Manufacturers Trade Mark<br>b: Temperature Characteristic<br>c: Nominal capacitance<br>d: Capacitance Tolerance<br>e: Rated Voltage |  |

## 6.3 Characteristics : F(Y5V)

| Rated Voltage (V) | Marking item                                                                                                                           | Marking ex.                                                                           |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 50                | a: Manufacturers Trade Mark<br>b: Nominal capacitance<br>c: Rated Voltage                                                              |  |
| 500               | a: Manufacturers Trade Mark<br>b: Temperature Characteristic<br>c: Nominal capacitance<br>d: Capacitance Tolerance<br>e: Rated Voltage |  |

7. SPECIFICATION AND TEST METHOD

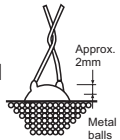
7.1 Test condition

Test and measurement shall be made at the standard condition, (Temperature 15 to 35°C, relative humidity 45 to 75% and atmospheric pressure 86-106 kPa), unless otherwise specified herein

If doubt occurred on the value of measurement, and remeasurement was requested by customer capacitors shall be measured at the reference condition (Temperature 20±2°C, relative humidity 60 to 70% and atmospheric pressure 86-106 kPa), unless otherwise specified herein

7.2 Performance

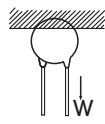
| No.                | Item                          | Specification                                                 | Testing Method                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |   |   |   |   |       |        |         |        |        |                    |      |
|--------------------|-------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---|---|---|---|-------|--------|---------|--------|--------|--------------------|------|
| 1                  | Operating Temperature Range   | -25 to +85°C                                                  | —                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |   |   |   |   |       |        |         |        |        |                    |      |
| 2                  | Capacitance                   | Within Specified tolerance.                                   | The capacitor shall be measured at 20°C with 1±0.2kHz and AC1±0.1V(r.m.s.).                                                                                                                                                                                                                                                                                                                                                                                  |        |   |   |   |   |       |        |         |        |        |                    |      |
| 3                  | Dissipation Factor(D.F.)      | B/E: D.F.≤2.5%<br>F : D.F.≤5.0%                               | Same condition as capacitance.                                                                                                                                                                                                                                                                                                                                                                                                                               |        |   |   |   |   |       |        |         |        |        |                    |      |
| 4                  | Insulation Resistance(I.R.)   | C*1 ≤0.02 μ F: 10000M Ω min.<br>C*1 >0.02 μ F: 7500M Ω min.   | The insulation resistance shall be measured with rated voltage within 60±5 s of charging.                                                                                                                                                                                                                                                                                                                                                                    |        |   |   |   |   |       |        |         |        |        |                    |      |
| 5                  | Dielectric Strength           | Between Lead Wires                                            | No Failure.<br>The capacitor shall not be damage when Dc voltage of 250% of the rated voltage are applied between the lead wires for 1 to 5 s. (Charge/Discharge current ≤50mA.)                                                                                                                                                                                                                                                                             |        |   |   |   |   |       |        |         |        |        |                    |      |
|                    |                               | Body Insulation                                               | No Failure.<br>The capacitor is placed in the container with metal balls of diameter 1mm so that each lead wire, short-circuited, is kept approximately 2mm off the balls as shown in the figure, and DC voltage of 250% of the rated voltage is applied for 1 to 5 s between capacitor lead wires and small metals. (Charge/Discharge current ≤50mA.)                                                                                                       |        |   |   |   |   |       |        |         |        |        |                    |      |
| 6                  | Temperature Characteristic    | B : Within ±10%<br>E : Within +20/-55%<br>F : Within +30/-80% | The capacitance measurement shall be made at each step specified in table and at a sufficient number of intermediate temperature between step 2 and 7. Capacitance change from the value of step 3 shall not exceed the limit specified.                                                                                                                                                                                                                     |        |   |   |   |   |       |        |         |        |        |                    |      |
|                    |                               |                                                               | <table border="1"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Temp.</td> <td>20±2°C</td> <td>-25±3°C</td> <td>20±2°C</td> <td>85±2°C</td> </tr> <tr> <td>DC Voltage applied</td> <td>None</td> <td>None</td> <td>None</td> <td>None</td> </tr> </tbody> </table> <p>Pre-treatment: Capacitor shall be stored at 85±2°C for 1 h, then placed at room condition for 24±2h before measurements.</p> | Step   | 1 | 2 | 3 | 4 | Temp. | 20±2°C | -25±3°C | 20±2°C | 85±2°C | DC Voltage applied | None |
| Step               | 1                             | 2                                                             | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4      |   |   |   |   |       |        |         |        |        |                    |      |
| Temp.              | 20±2°C                        | -25±3°C                                                       | 20±2°C                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 85±2°C |   |   |   |   |       |        |         |        |        |                    |      |
| DC Voltage applied | None                          | None                                                          | None                                                                                                                                                                                                                                                                                                                                                                                                                                                         | None   |   |   |   |   |       |        |         |        |        |                    |      |
| 7                  | Vibration Resistance          | Appearance                                                    | No marked defect.                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |   |   |   |   |       |        |         |        |        |                    |      |
|                    |                               | Capacitance                                                   | Within specified tolerance.                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |   |   |   |   |       |        |         |        |        |                    |      |
|                    |                               | D.F.                                                          | Satisfies initial requirement.                                                                                                                                                                                                                                                                                                                                                                                                                               |        |   |   |   |   |       |        |         |        |        |                    |      |
| 8                  | Soldering Effent              | Appearance                                                    | No marked defect                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |   |   |   |   |       |        |         |        |        |                    |      |
|                    |                               | Capacitance Change                                            | B : Within ±5%<br>E : Within ±15%<br>F : Within ±20%                                                                                                                                                                                                                                                                                                                                                                                                         |        |   |   |   |   |       |        |         |        |        |                    |      |
|                    |                               | Dielectric Strength (Between Lead Wires)                      | Pass the item No.5                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |   |   |   |   |       |        |         |        |        |                    |      |
| 9                  | Humidity (Under Steady State) | Appearance                                                    | No marked defect.                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |   |   |   |   |       |        |         |        |        |                    |      |
|                    |                               | Capacitance Change                                            | B : Within ±10%<br>E : Within ±20%<br>F : Within ±30%                                                                                                                                                                                                                                                                                                                                                                                                        |        |   |   |   |   |       |        |         |        |        |                    |      |
|                    |                               | D.F.                                                          | B/E: D.F.≤5.0%<br>F : D.F.≤7.5%                                                                                                                                                                                                                                                                                                                                                                                                                              |        |   |   |   |   |       |        |         |        |        |                    |      |
|                    |                               | I.R.                                                          | 1000M Ω min.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |   |   |   |   |       |        |         |        |        |                    |      |
|                    |                               | Dielectric Strength (Between Lead Wires)                      | Pass the item No.5                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |   |   |   |   |       |        |         |        |        |                    |      |



\*1 "C" expresses nominal capacitance value.

\*2 "room condition" ..... Temperature; 15 to 35°C, Relative humidity; 45 to 75%, Atmospheric pressure; 86 to 106kPa



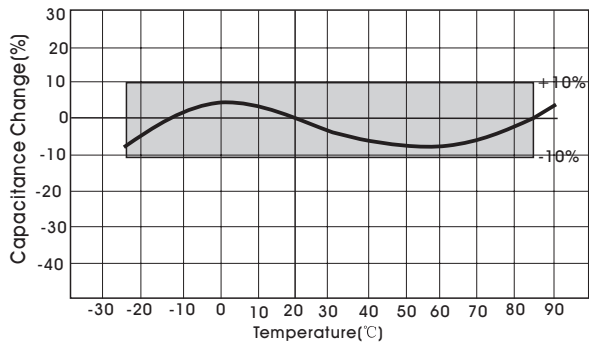
| No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Item                              | Specification                                                                                                                 | Testing Method                                                                                                                                                                                                                                             |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------|------|---|-------------|--------|---|------------|-------|---|------------|--------|---|------------|-------|
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Humidity Loading                  | Appearance                                                                                                                    | No marked defect.                                                                                                                                                                                                                                          |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | Capacitance Change                                                                                                            | B : Within $\pm 10\%$<br>E : Within $\pm 20\%$<br>F : Within $\pm 30\%$                                                                                                                                                                                    |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | D.F.                                                                                                                          | B/E: D.F. $\leq 5.0\%$<br>F : D.F. $\leq 7.5\%$                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | I.R.                                                                                                                          | 500M $\Omega$ min.                                                                                                                                                                                                                                         |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | Dielectric Strength (Between Lead Wires)                                                                                      | Pass the item No.5                                                                                                                                                                                                                                         |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| <p>Apply the rated voltage for 500 +24/-0 h at <math>40 \pm 2^\circ\text{C}</math> in 90 to 95% relative humidity.<br/>Pre-treatment : Capacitor shall be stored at <math>85 \pm 2^\circ\text{C}</math> for 1h, then placed at *<sup>2</sup>room condition for <math>24 \pm 2</math> h before initial measurements.<br/>Post-treatment: Capacitor shall be stored for 1 to 2 h at *<sup>2</sup>room condition.<br/>(Charge/Discharge current <math>\leq 50\text{mA}</math>.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   |                                                                                                                               |                                                                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Life                              | Appearance                                                                                                                    | No marked defect.                                                                                                                                                                                                                                          |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | Capacitance Change                                                                                                            | B : Within $\pm 10\%$<br>E : Within $\pm 20\%$<br>F : Within $\pm 30\%$                                                                                                                                                                                    |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | D.F.                                                                                                                          | B/E: D.F. $\leq 4.0\%$<br>F : D.F. $\leq 7.5\%$                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | I.R.                                                                                                                          | 2000M $\Omega$ min.                                                                                                                                                                                                                                        |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | Dielectric Strength (Between Lead Wires)                                                                                      | Pass the item No.5                                                                                                                                                                                                                                         |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| <p>Apply a DC voltage of 200% of the rated voltage for 1000 +48/-0 h at <math>85 \pm 2^\circ\text{C}</math><br/>Pre-treatment : Capacitor shall be stored at <math>85 \pm 2^\circ\text{C}</math> for 1h, then placed at *<sup>2</sup>room condition for <math>24 \pm 2</math> h before initial measurements.<br/>Post-treatment : Capacitor shall be stored at <math>24 \pm 2</math> h, at *<sup>2</sup>room condition.<br/>(Charge/Discharge current <math>\leq 50\text{mA}</math>.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                                                                                                                               |                                                                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Temperature and immersion cycling | Appearance                                                                                                                    | No marked defect.                                                                                                                                                                                                                                          |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | Capacitance Change                                                                                                            | B : Within $\pm 10\%$<br>E : Within $\pm 20\%$<br>F : Within $\pm 30\%$                                                                                                                                                                                    |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | D.F.                                                                                                                          | B/E: D.F. $\leq 5.0\%$<br>F : D.F. $\leq 7.5\%$                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | I.R.                                                                                                                          | 500M $\Omega$ min.                                                                                                                                                                                                                                         |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | Dielectric Strength (Between Lead Wires)                                                                                      | Pass the item No.5                                                                                                                                                                                                                                         |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| <p>The capacitor shall be subjected to 5 cycles of temperature variation according to Table 1, then the capacitor shall be immersed into two baths, the one a clean water bath at temperature <math>65 \pm 0.5^\circ\text{C}</math> and the other a saturated salt waterbath at temperature <math>0 \pm 3^\circ\text{C}</math> for 15 min.<br/>This immersion cycle shall be repeated 2 times, then the capacitor shall be washed in running water, wiped or dried with air draught.<br/>Pre-treatment : Capacitor shall be stored at <math>85 \pm 2^\circ\text{C}</math> for 1h, then placed at *<sup>2</sup>room condition for <math>24 \pm 2</math> h before initial measurements.<br/>Post-treatment : Capacitor shall be stored for 1 to 2h at *<sup>2</sup>room condition.<br/>(Charge/Discharge current <math>\leq 50\text{mA}</math>.)</p> <p>(Table 1)</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature(<math>^\circ\text{C}</math>)</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-25 \pm 3</math></td> <td>30 min</td> </tr> <tr> <td>2</td> <td>Room Temp.</td> <td>3 min</td> </tr> <tr> <td>3</td> <td><math>85 \pm 3</math></td> <td>30 min</td> </tr> <tr> <td>4</td> <td>Room Temp.</td> <td>3 min</td> </tr> </tbody> </table> |                                   |                                                                                                                               |                                                                                                                                                                                                                                                            | Step | Temperature( $^\circ\text{C}$ ) | Time | 1 | $-25 \pm 3$ | 30 min | 2 | Room Temp. | 3 min | 3 | $85 \pm 3$ | 30 min | 4 | Room Temp. | 3 min |
| Step                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Temperature( $^\circ\text{C}$ )   | Time                                                                                                                          |                                                                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | $-25 \pm 3$                       | 30 min                                                                                                                        |                                                                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Room Temp.                        | 3 min                                                                                                                         |                                                                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | $85 \pm 3$                        | 30 min                                                                                                                        |                                                                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Room Temp.                        | 3 min                                                                                                                         |                                                                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Strength of Lead                  | Pull                                                                                                                          | As a figure, fix the body of capacitor, apply a tensile weight gradually to each lead wire in the radial direction of capacitor up to 10N and keep it for $10 \pm 1$ s.                                                                                    |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   | Bending                                                                                                                       | Each lead wire shall be subjected to 5N weight and then a $90^\circ$ bend, at the point of egress, in one direction, return to original position, and then a $90^\circ$ bend in the opposite direction at the rate of one bend in 2 to 3 s.                |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                   |                                                                                                                               |                                                                                                                                                                                                                                                            |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Solderability of Leads            | Lead wire shall be soldered with uniformly coated on the axial direction over $\frac{3}{4}$ of the circumferential direction. | The lead wire of a capacitor shall be dipped into a methanol solution of 25wt% rosin and then into molten solder of $235 \pm 5^\circ\text{C}$ for $2 \pm 0.5$ s. In both cases the depth of dipping is up to about 1.5 to 2mm from the root of lead wires. |      |                                 |      |   |             |        |   |            |       |   |            |        |   |            |       |

\*<sup>2</sup> "room condition" ..... Temperature; 15 to  $35^\circ\text{C}$ , Relative humidity; 45 to 75%, Atmospheric pressure; 86 to 106kPa

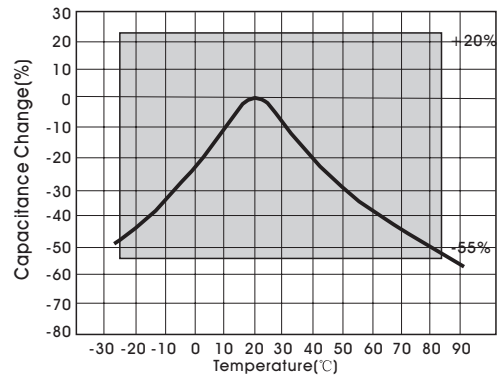
8. CHARACTERISTICS DATA ( TYPICCAL EXAMPLE)

8.1 Capacitance-Temperature Characteristics

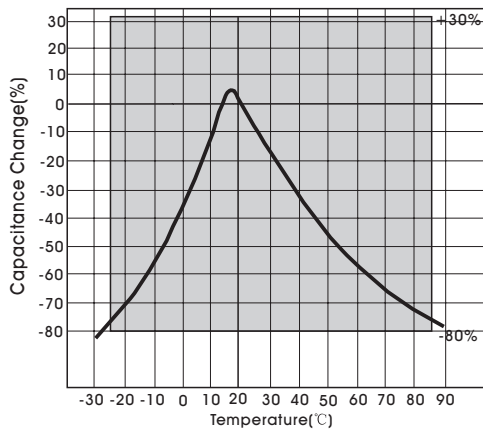
Char: B(Y5P)



Char:E (Y5U)

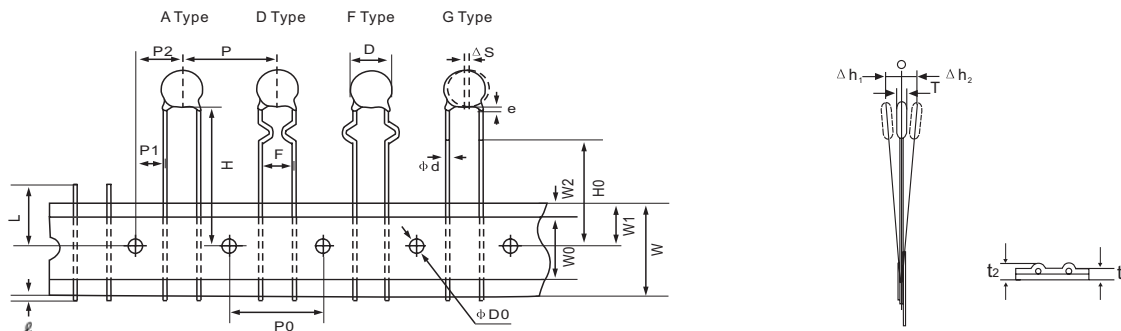


Char:F (Y5V)

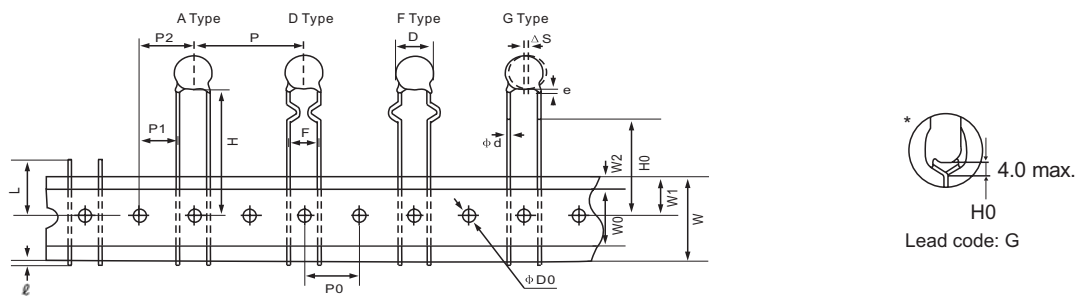


9 TAPING SPECIFICATION

- 12.7mm pitch/ lead spacing 5.0/7.5 mm taping (Lead Code:A2,A3,D2,D3,F2,F3,G2,G3 )



- 25.4mm pitch/ lead spacing 7.5/10.0mm taping (Lead Code:A3,A4,D3,D4,F3,F4,G3,G4 )

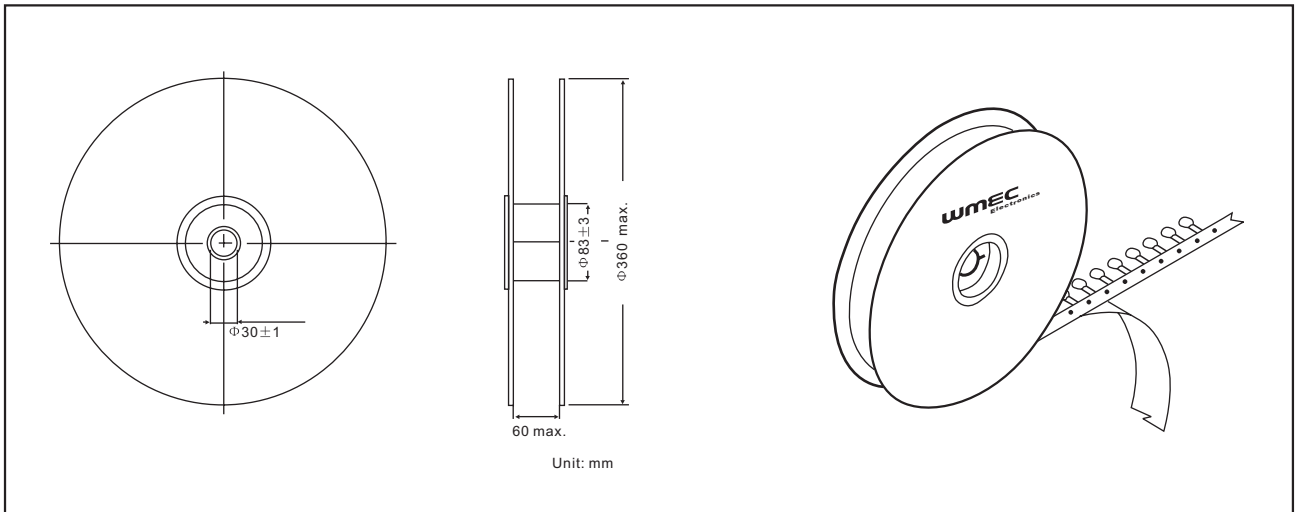


| Item                                              | Code            | A2/D2/F2/G2                                  | A3/D3/F3/G3 | A3/D3/F3/G3 | A4/D4/F4/G4 |
|---------------------------------------------------|-----------------|----------------------------------------------|-------------|-------------|-------------|
| Pitch of component                                | P               | 12.7                                         | 12.7        | 25.4        | 25.4        |
| Pitch of sprocket hole                            | P <sub>0</sub>  | 12.7±0.3                                     | 12.7±0.3    | 12.7±0.3    | 12.7±0.3    |
| Lead spacing                                      | F               | 5.0±1.0                                      | 7.5±1.0     | 7.5±1.0     | 10.0±1.0    |
| Length from hole center to component center       | P <sub>2</sub>  | 6.35±1.3                                     | 6.35±1.3    | 12.7±1.3    | 12.7±1.3    |
| Length from hole center to lead                   | P <sub>1</sub>  | 3.85±0.7                                     | 2.6±0.7     | 8.95±1.0    | 7.7±1.0     |
| Body diameter                                     | D               | See the individual product specification     |             |             |             |
| Deviation along tape, left or right               | ΔS              | 0±2.0                                        |             |             |             |
| Carrier tape width                                | W               | 18.0±0.5                                     |             |             |             |
| Position of sprocket hole                         | W <sub>1</sub>  | 9.0±0.5                                      |             |             |             |
| Lead distance between reference and bottom planes | H               | 20.0±2.0 (Lead Code:A2/A3/A4)                |             |             |             |
|                                                   | H <sub>0</sub>  | 18.0±2.0 (Crimp type)                        |             |             |             |
| Diameter of sprocket hole                         | φD <sub>0</sub> | 4.0±0.2                                      |             |             |             |
| Lead diameter                                     | φd              | 0.5±0.05                                     |             |             |             |
| Total tape thickness                              | t <sub>1</sub>  | 0.6±0.3                                      |             |             |             |
| Total thickness, tape and lead wire               | t <sub>2</sub>  | 2.0 max.                                     |             |             |             |
| Body thickness                                    | T               | See the individual product specification     |             |             |             |
| Portion to cut in case of defect                  | L               | 11.0 max.                                    |             |             |             |
| Hold down tape width                              | W <sub>0</sub>  | 10.0±2                                       |             |             |             |
| Hold down tape position                           | W <sub>2</sub>  | 1.5±1.5                                      |             |             |             |
| Coating extension on lead                         | e               | 3.0 max. (Crimp type:Up to the end of crimp) |             |             |             |
| Deviation across tape                             | Δh <sub>1</sub> | 2.0 max.                                     |             |             |             |
|                                                   | Δh <sub>2</sub> |                                              |             |             |             |
| Protrusion length                                 | ℓ               | +0.5 to -1.0                                 |             |             |             |

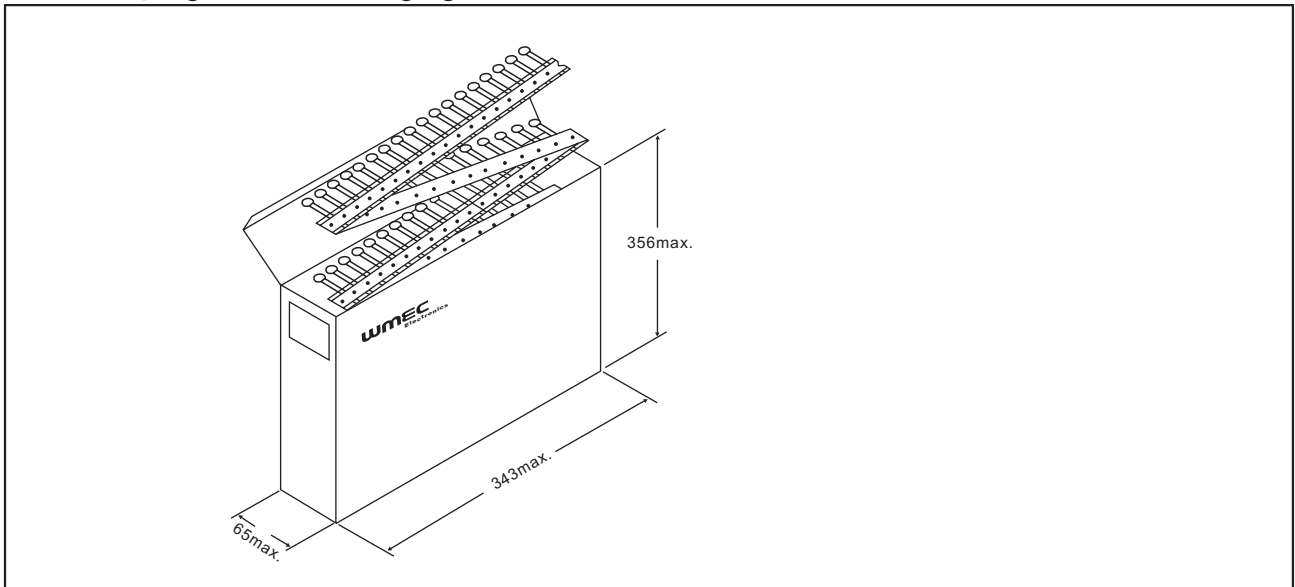
(in mm)

10 PACKAGING STYLES

10.1 Taping: Reel Packaging



10.2 Taping: Ammo Packaging



10.3 Bulk

Polyethylene Bag

**11 : PACKAGING QUANTITY**

11.1 ( Bulk) at standards specification

Body Diameter 4.5 to 8.0 mm : 1000 pcs

Body Diameter 9.0 mm over : 500 pcs

11.2 Taping (Pitch : 12.7 mm)

Taping : 2000 pcs./Box

**12 : LABEL AND TRANSPORT**

Capacitors shall be packaged prior to shipment so as to prevent damage during transportation and storage.

Shipping carton contains the following information on the label

- a) Our Part No.
- b) Quantity
- c) Lot No.
- D) Manufacturers Name.

**13: NOTIFICATION BEFORE THE MODIFICATION**

We'll previously notify the modified place of manufacture, Manufactured articles and materials.

**14 : MANUFACTURER**

XIAMEN WANMING ELECTRONICS CO., LTD.

The operating conditions for the guarantee of this product are as shown in the specification.

Please note that Wanming Electronics co.,Ltd. Shall not be responsible for a failure and/or abnormality which are caused by use under the conditions other than the aforesaid operating conditions.

## Attached Table 1

## Series HLK (Rated Voltage: 50 / 500 VDC , Temp.Char. B/Y5P, E/Y5U,/F/Y5V)

| Part Number    | Temp. Char. | Rated Voltage | Capacitance (pF) | Body Dia.D (mm) | Lead Spacing F (mm) | Body Thickness T (mm) | Lead Package Long Bulk | Lead Package Short Bulk | Lead Package Taping |
|----------------|-------------|---------------|------------------|-----------------|---------------------|-----------------------|------------------------|-------------------------|---------------------|
| HLK1HB101K□□□□ | B/Y5P       | 50VDC         | 100 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB121K□□□□ | B/Y5P       | 50VDC         | 120 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB151K□□□□ | B/Y5P       | 50VDC         | 150 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB181K□□□□ | B/Y5P       | 50VDC         | 180 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB221K□□□□ | B/Y5P       | 50VDC         | 220 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB271K□□□□ | B/Y5P       | 50VDC         | 270 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB331K□□□□ | B/Y5P       | 50VDC         | 330 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB391K□□□□ | B/Y5P       | 50VDC         | 390 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB471K□□□□ | B/Y5P       | 50VDC         | 470 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB561K□□□□ | B/Y5P       | 50VDC         | 560 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB681K□□□□ | B/Y5P       | 50VDC         | 680 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB821K□□□□ | B/Y5P       | 50VDC         | 820 ±10%         | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB102K□□□□ | B/Y5P       | 50VDC         | 1000 ±10%        | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB122K□□□□ | B/Y5P       | 50VDC         | 1200 ±10%        | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB152K□□□□ | B/Y5P       | 50VDC         | 1500 ±10%        | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB182K□□□□ | B/Y5P       | 50VDC         | 1800 ±10%        | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB222K□□□□ | B/Y5P       | 50VDC         | 2200 ±10%        | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB272K□□□□ | B/Y5P       | 50VDC         | 2700 ±10%        | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB332K□□□□ | B/Y5P       | 50VDC         | 3300 ±10%        | 7.0             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB392K□□□□ | B/Y5P       | 50VDC         | 3900 ±10%        | 7.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB472K□□□□ | B/Y5P       | 50VDC         | 4700 ±10%        | 8.0             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB562K□□□□ | B/Y5P       | 50VDC         | 5600 ±10%        | 9.0             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB682K□□□□ | B/Y5P       | 50VDC         | 6800 ±10%        | 10.0            | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB882K□□□□ | B/Y5P       | 50VDC         | 8800 ±10%        | 11.0            | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HB103K□□□□ | B/Y5P       | 50VDC         | 10000 ±10%       | 12.0            | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK2HB101K□□□□ | B/Y5P       | 500VDC        | 100 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB121K□□□□ | B/Y5P       | 500VDC        | 120 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB151K□□□□ | B/Y5P       | 500VDC        | 150 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB181K□□□□ | B/Y5P       | 500VDC        | 180 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB221K□□□□ | B/Y5P       | 500VDC        | 220 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB271K□□□□ | B/Y5P       | 500VDC        | 270 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB331K□□□□ | B/Y5P       | 500VDC        | 330 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB391K□□□□ | B/Y5P       | 500VDC        | 390 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB471K□□□□ | B/Y5P       | 500VDC        | 470 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB561K□□□□ | B/Y5P       | 500VDC        | 560 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB681K□□□□ | B/Y5P       | 500VDC        | 680 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB821K□□□□ | B/Y5P       | 500VDC        | 820 ±10%         | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB102K□□□□ | B/Y5P       | 500VDC        | 1000 ±10%        | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB122K□□□□ | B/Y5P       | 500VDC        | 1200 ±10%        | 6.5             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB152K□□□□ | B/Y5P       | 500VDC        | 1500 ±10%        | 7.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB182K□□□□ | B/Y5P       | 500VDC        | 1800 ±10%        | 8.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB222K□□□□ | B/Y5P       | 500VDC        | 2200 ±10%        | 8.5             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB272K□□□□ | B/Y5P       | 500VDC        | 2700 ±10%        | 9.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for appropriate code.

## Attached Table 2

## Series HLK (Rated Voltage: 50 / 500 VDC , Temp.Char. B/Y5P, E/Y5U,/F/Y5V)

| Part Number   | Temp. Char. | Rated Voltage | Capacitance (pF) | Body Dia.D (mm) | Lead Spacing F (mm) | Body Thickness T (mm) | Lead Package Long Bulk | Lead Package Short Bulk | Lead Package Taping |
|---------------|-------------|---------------|------------------|-----------------|---------------------|-----------------------|------------------------|-------------------------|---------------------|
| HLK2HB332K□□□ | B/Y5P       | 500VDC        | 3300 ± 10%       | 10.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB392K□□□ | B/Y5P       | 500VDC        | 3900 ± 10%       | 11.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB472K□□□ | B/Y5P       | 500VDC        | 4700 ± 10%       | 12.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB562K□□□ | B/Y5P       | 500VDC        | 5600 ± 10%       | 13.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB682K□□□ | B/Y5P       | 500VDC        | 6800 ± 10%       | 14.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB822K□□□ | B/Y5P       | 500VDC        | 8200 ± 10%       | 15.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HB103K□□□ | B/Y5P       | 500VDC        | 10000 ± 10%      | 16.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK1HE102M□□□ | E/Y5U       | 50VDC         | 1000 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE122M□□□ | E/Y5U       | 50VDC         | 1200 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE152M□□□ | E/Y5U       | 50VDC         | 1500 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE182M□□□ | E/Y5U       | 50VDC         | 1800 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE222M□□□ | E/Y5U       | 50VDC         | 2200 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE272M□□□ | E/Y5U       | 50VDC         | 2700 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE332M□□□ | E/Y5U       | 50VDC         | 3300 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE392M□□□ | E/Y5U       | 50VDC         | 3900 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE472M□□□ | E/Y5U       | 50VDC         | 4700 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE562M□□□ | E/Y5U       | 50VDC         | 5600 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE682M□□□ | E/Y5U       | 50VDC         | 6800 ± 20%       | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE822M□□□ | E/Y5U       | 50VDC         | 8200 ± 20%       | 6.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HE103M□□□ | E/Y5U       | 50VDC         | 10000 ± 20%      | 6.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK2HE102M□□□ | E/Y5U       | 500VDC        | 1000 ± 20%       | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE122M□□□ | E/Y5U       | 500VDC        | 1200 ± 20%       | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE152M□□□ | E/Y5U       | 500VDC        | 1500 ± 20%       | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE182M□□□ | E/Y5U       | 500VDC        | 1800 ± 20%       | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE222M□□□ | E/Y5U       | 500VDC        | 2200 ± 20%       | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE272M□□□ | E/Y5U       | 500VDC        | 2700 ± 20%       | 7.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE332M□□□ | E/Y5U       | 500VDC        | 3300 ± 20%       | 8.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE392M□□□ | E/Y5U       | 500VDC        | 3900 ± 20%       | 8.5             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE472M□□□ | E/Y5U       | 500VDC        | 4700 ± 20%       | 9.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE562M□□□ | E/Y5U       | 500VDC        | 5600 ± 20%       | 9.5             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE682M□□□ | E/Y5U       | 500VDC        | 6800 ± 20%       | 10.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE822M□□□ | E/Y5U       | 500VDC        | 8200 ± 20%       | 11.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE103M□□□ | E/Y5U       | 500VDC        | 10000 ± 20%      | 12.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE153M□□□ | E/Y5U       | 500VDC        | 15000 ± 20%      | 14.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HE223M□□□ | E/Y5U       | 500VDC        | 22000 ± 20%      | 16.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK1HF102M□□□ | F/Y5V       | 50VDC         | 1000 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF122Z□□□ | F/Y5V       | 50VDC         | 1200 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF152Z□□□ | F/Y5V       | 50VDC         | 1500 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF182Z□□□ | F/Y5V       | 50VDC         | 1800 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF222Z□□□ | F/Y5V       | 50VDC         | 2200 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF272Z□□□ | F/Y5V       | 50VDC         | 2700 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF332Z□□□ | F/Y5V       | 50VDC         | 3300 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF392Z□□□ | F/Y5V       | 50VDC         | 3900 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |

Three blank columns are filled with the lead and packaging codes. Please refer to the three columns on the right for appropriate code.

Attached Table 3

Series HLK (Rated Voltage: 50 / 500 VDC , Temp.Char. B/Y5P, E/Y5U,F/Y5V)

| Part Number   | Temp. Char. | Rated Voltage | Capacitance (pF) | Body Dia.D (mm) | Lead Spacing F (mm) | Body Thickness T (mm) | Lead Package Long Bulk | Lead Package Short Bulk | Lead Package Taping |
|---------------|-------------|---------------|------------------|-----------------|---------------------|-----------------------|------------------------|-------------------------|---------------------|
| HLK1HF472Z□□□ | F/Y5V       | 50VDC         | 4700 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF562Z□□□ | F/Y5V       | 50VDC         | 5600 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF682Z□□□ | F/Y5V       | 50VDC         | 6800 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF822Z□□□ | F/Y5V       | 50VDC         | 8200 +80/-20%    | 5.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF103Z□□□ | F/Y5V       | 50VDC         | 10000 +80/-20%   | 6.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF223Z□□□ | F/Y5V       | 50VDC         | 22000 +80/-20%   | 8.0             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF333Z□□□ | F/Y5V       | 50VDC         | 33000 +80/-20%   | 9.5             | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK1HF473Z□□□ | F/Y5V       | 50VDC         | 47000 +80/-20%   | 11.0            | 2.5 / 5.0           | 3.0                   | A1B/A2B                | D1B/D2B                 | D2A                 |
| HLK2HF102Z□□□ | F/Y5V       | 500VDC        | 1000 +80/-20%    | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF122Z□□□ | F/Y5V       | 500VDC        | 1200 +80/-20%    | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF152Z□□□ | F/Y5V       | 500VDC        | 1500 +80/-20%    | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF182Z□□□ | F/Y5V       | 500VDC        | 1800 +80/-20%    | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF222Z□□□ | F/Y5V       | 500VDC        | 2200 +80/-20%    | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF272Z□□□ | F/Y5V       | 500VDC        | 2700 +80/-20%    | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF332Z□□□ | F/Y5V       | 500VDC        | 3300 +80/-20%    | 6.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF392Z□□□ | F/Y5V       | 500VDC        | 3900 +80/-20%    | 6.5             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF472Z□□□ | F/Y5V       | 500VDC        | 4700 +80/-20%    | 7.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF562Z□□□ | F/Y5V       | 500VDC        | 5600 +80/-20%    | 7.5             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF682Z□□□ | F/Y5V       | 500VDC        | 6800 +80/-20%    | 8.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF822Z□□□ | F/Y5V       | 500VDC        | 8200 +80/-20%    | 8.5             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF103Z□□□ | F/Y5V       | 500VDC        | 10000 +80/-20%   | 9.0             | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF223Z□□□ | F/Y5V       | 500VDC        | 22000 +80/-20%   | 12.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF333Z□□□ | F/Y5V       | 500VDC        | 33000 +80/-20%   | 15.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF473Z□□□ | F/Y5V       | 500VDC        | 47000 +80/-20%   | 17.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |
| HLK2HF104Z□□□ | F/Y5V       | 500VDC        | 100000 +80/-20%  | 20.0            | 5.0                 | 3.5                   | A2B                    | D2B                     | D2A                 |

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