

Flat Chip Capacitor/Resistor

Type CR73

1. Scope of Application

This specification applies to flat combined CR chip CR73 produced by KOA Corporation.

2. Rating

(a) Capacitor

| Item | Ratings |
|---------------------------------|--|
| Voltage Rating | 2A: 25 VDC / 2B: 50 VDC |
| Temperature Coefficient | +20%/-55% (-25°C ~ +85°C) |
| Dissipation Factor | 5% maximum (at 1 KHz 1.0 vrms) |
| Insulation Resistance | 10,000 Mohms minimum |
| Dielectric Withstanding Voltage | 2A: 62.5 VDC 5 sec. 50mA charge 2B: 125 VDC 5 sec. 50 mA charge |

(b) Resistor

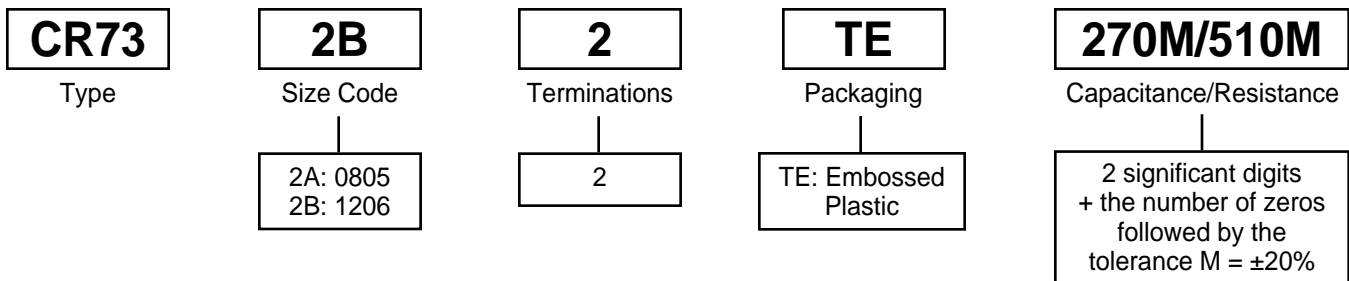
| Item | Ratings |
|--------------------------|-------------------------|
| Power Rating | 2A: 0.1 W / 2B: 0.125 W |
| Maximum Working Voltage | 2A: 3V / 2B: 5 V |
| Maximum Overload Voltage | 2A: 5V / 2B: 10 V |
| Temperature Coefficient | ±200 ppm/C° |

(c) Environment

| Item | Ratings |
|----------------------------|---------------|
| Operation Environment | -55°C ~ 125°C |
| Rating Ambient Temperature | 70°C |

3. Type Designation

The type designation shall be the following form:



4. Capacitance Range and Resistance Range

(a) Capacitance Range

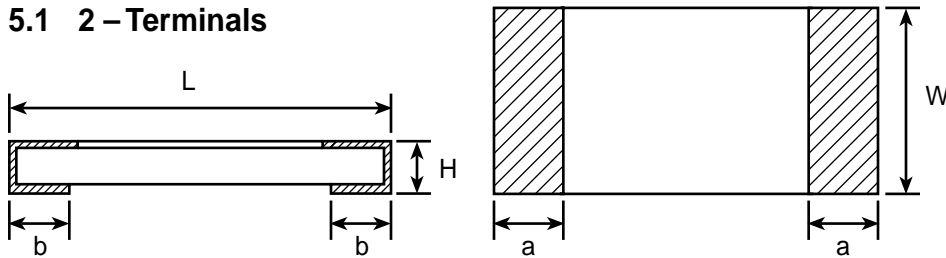
| Capacitance Tolerance | Capacitance Series | Capacitance Range |
|-----------------------|--------------------|-------------------|
| 2A: $\pm 20\%$ | E - 6 | 1 pF ~ 200 pF |
| 2B: $\pm 20\%$ | E - 12 | 27 pF ~ 100 pF |

(b) Resistance Range

| Resistance Tolerance | Resistance Series | Resistance Range |
|----------------------|-------------------|--------------------|
| 2A: M ($\pm 20\%$) | E - 12 | 10 ohms ~ 200 ohms |
| 2B: M ($\pm 20\%$) | E - 24 | 51 ohms ~ 200 ohms |

5. Dimensions

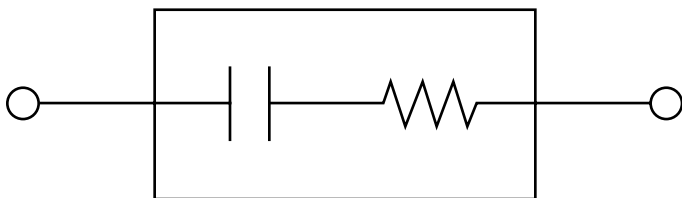
5.1 2 - Terminals



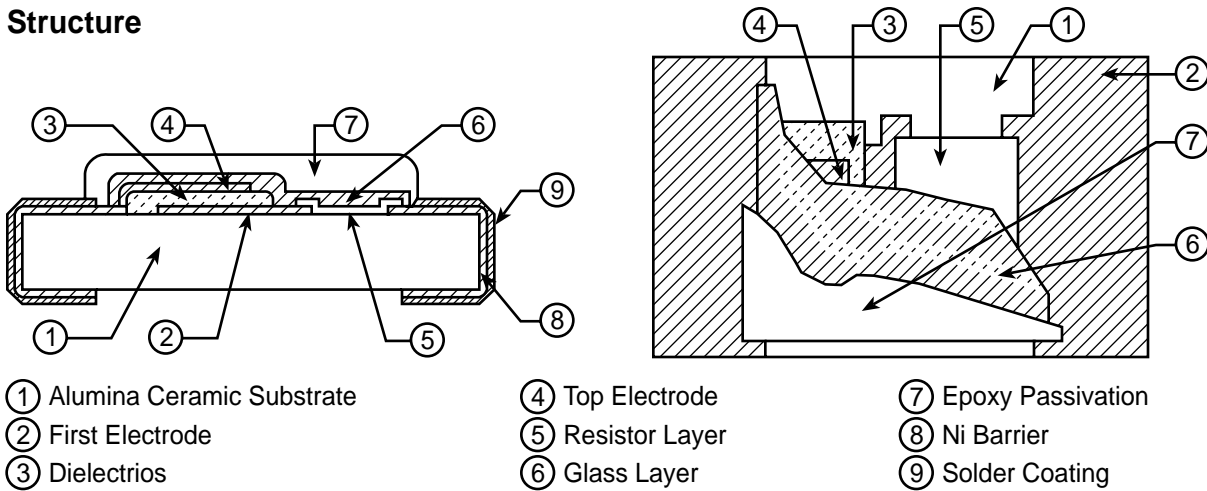
(unit: mm)

| | Dimensions | | | | |
|----|---------------|----------------|---------------|---------------|--|
| | L | W | H | a | b |
| 2A | 2.0 ± 0.2 | 1.25 ± 0.2 | 0.7 ± 0.1 | 0.4 ± 0.3 | $0.3 \pm \begin{smallmatrix} 0.2 \\ 0.1 \end{smallmatrix}$ |
| 2B | 3.2 ± 0.2 | 1.6 ± 0.2 | 0.7 ± 0.1 | 0.5 ± 0.3 | $0.4 \pm \begin{smallmatrix} 0.2 \\ 0.1 \end{smallmatrix}$ |

5.2 Circuit Schematic



6. Structure



7. Outer Coating Color

Outer Coating Color (Capacitor Side) — Dark blue
 Outer Coating Color (Resistor Side) — Yellow

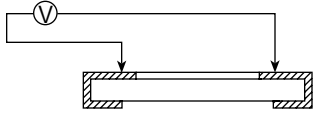
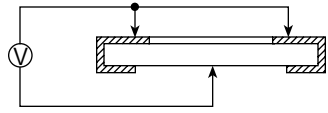
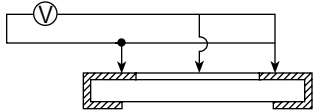
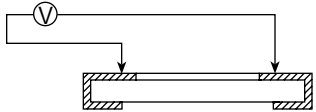
8. Test Conditions

Unless otherwise specified, the test shall be performed in accordance with JIS-C-5020 specifying at the temperature of $20 \pm 15^\circ\text{C}$ and at the humidity of $65 \pm 20\%$.

If questions arise about the test results, the test shall be performed at the temperature of $20 \pm 2^\circ\text{C}$ and at the humidity of $65 \pm 5\%$.

9. Reliability Test

9.1 Electrical Characteristics

| Item | Requirement | Test Methods |
|---------------------------------|---|--|
| Insulation Resistance | More than 10^4 M Ω | Within 2 minutes at 50 VDC between terminal and another  |
| | More than 10^4 M Ω | 1 minute at 500 VDC between both terminals and reverse side  |
| | More than 10^3 M Ω | 1 minute at 500 VDC between both terminals and coating  |
| Dielectric Withstanding Voltage | No evidence of fuming, flaming or breakdown | 2.5 times maximum rated voltage for 5 seconds with 50 mA maximum charging current  |
| Noise (Resistor) | More less 15dB | Per MIL-STD-202, Method 308 |

9.2 Mechanical Characteristics

| Item | Requirement | Test Methods |
|-------------------------------|--|--|
| Resistance to Soldering Heat | No evidence of damage ΔC within $\pm 10\%$ ΔR within $\pm 3\%$ | Immerse in the solder (H63A) of $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 10 ± 1 sec |
| Solderability | Approximately 95% of the terminal should be covered with new solder | Immerse in the solder (H63A) of $230^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 3 ± 0.5 sec |
| Terminal Strength (Bend test) | No mechanical damage | Specimen shall be soldered on PCB and support by applying strength so that the bending width becomes 3mm |
| Terminal Strength (Pull test) | 200g minimum | Per MIL-R-55342 4.7.12.2 |
| Vibration | No evidence of damage ΔC within $\pm 10\%$ ΔR within $\pm 3\%$ | 2 hours in each direction of X,Y,Z on PCB at a frequency range of 10-55-10Hz with 1.5mm amplitude |

9.3 Environmental Characteristics

| Item | Requirement | Test Methods |
|---------------------|--|--|
| Temperature cycling | No evidence of damage ΔC within $\pm 10\%$ ΔR within $\pm 3\%$ | 100 cycles between $-40^{\circ}\text{C}/30$ minutes and $+125^{\circ}\text{C}/30$ minutes |
| Humidity (No Load) | No evidence of damage ΔC within $\pm 10\%$ ΔR within $\pm 3\%$ | Per MIL-STD-202F Method 106 10 cycles |
| Moisture Resistance | No evidence of damage ΔC within $\pm 10\%$ ΔR within $\pm 3\%$ | Temp. $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Humidity 90% ~ 95% 1000 hours DC 50V 1.5 hours ON 0.5 hours OFF |
| Load Life | No evidence of damage ΔC within $\pm 10\%$ ΔR within $\pm 3\%$ | Temp. $70^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 1000 hours DC 50V 1.5 hours ON 0.5 hours OFF |

10. Packaging

10.1 Bulk Packaging

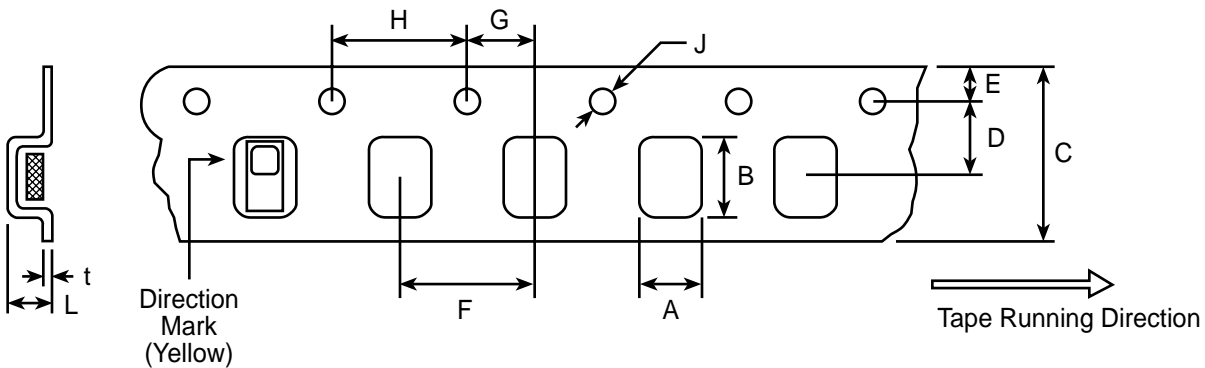
200 pieces chip are packed in a poly bag.
The marking seal shall be marked:

- (1) Type designation
- (2) Nominal Capacitance/Nominal Resistance
- (3) Quantity
- (4) Production Lot. No.
- (5) Manufacturer's name

10.2 Taping

The taping shall be embossed carrier tapes
of 8 mm width and 4 mm pitches.
The standard quantity per reel shall be 4000 pieces.

(1) Dimensions of Carrier Tape



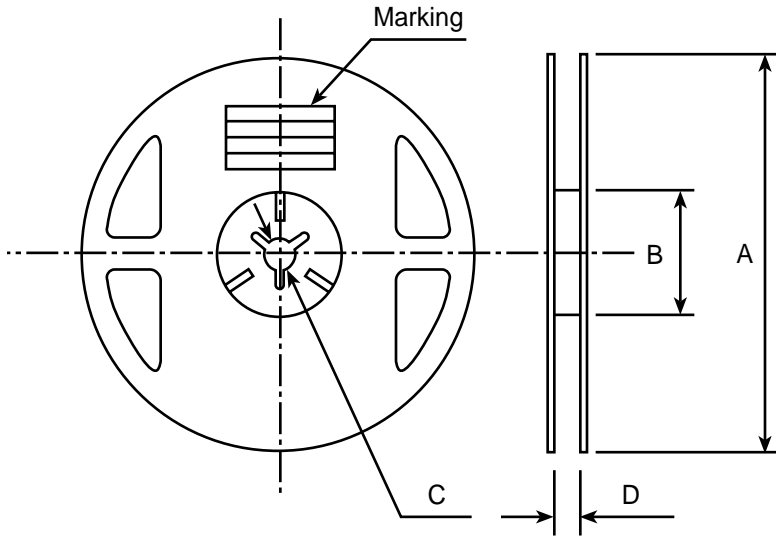
(unit: mm)

| Type | A | B | C | D | E |
|---------|---------------|---------------|---------------|----------------|----------------|
| CR73 2A | 1.6 ± 0.2 | 2.4 ± 0.2 | 8.0 ± 0.2 | 3.5 ± 0.05 | 1.75 ± 0.1 |
| CR73 2B | 1.9 ± 0.2 | 3.5 ± 0.2 | 8.0 ± 0.2 | 3.5 ± 0.05 | 1.75 ± 0.1 |

| F | G | H | J | L | t |
|-------------------|---------------|---------------|---------------|----------------|----------------|
| 2A: 4.0 ± 0.1 | 2.0 ± 0.1 | 4.0 ± 0.1 | 1.5 ± 0.1 | 1.0 ± 0.15 | 0.25 ± 0.1 |
| 2B: 4.0 ± 0.1 | 2.0 ± 0.1 | 4.0 ± 0.1 | 1.5 ± 0.1 | 0.85 ± 0.1 | 0.25 ± 0.1 |

Top tape peeling strength: 10 ~ 50g

(2) Reel Dimensions and Marking



Contents on label

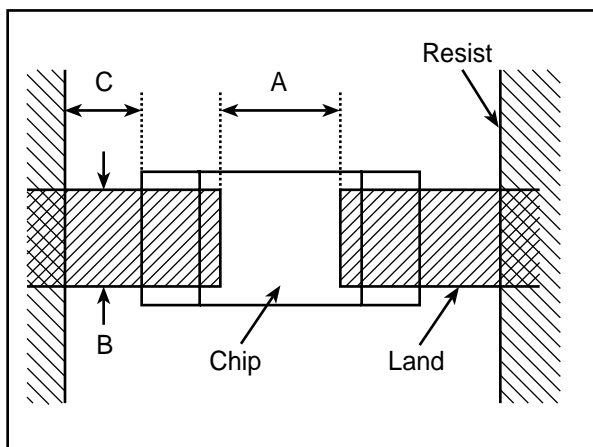
- (1) Article No.
- (2) Quantity
- (3) Nominal capacitance/
Nominal resistance
- (4) Customer's code No.
(Subject to change)
- (5) Production lot No.
- (6) Manufacturer's name

(unit: mm)

| Type | Tape | | A | B | C | D |
|---------|------------------|----|---------|--------|----------|----------|
| 2A / 2B | Embossed Carrier | TE | 178 ± 2 | 60 ± 2 | 13 ± 0.5 | 10 ± 1.5 |

| Quan./Reel (pieces) | Reel Material |
|---------------------|---------------|
| 4,000 | Plastic |

11. Pattern Design



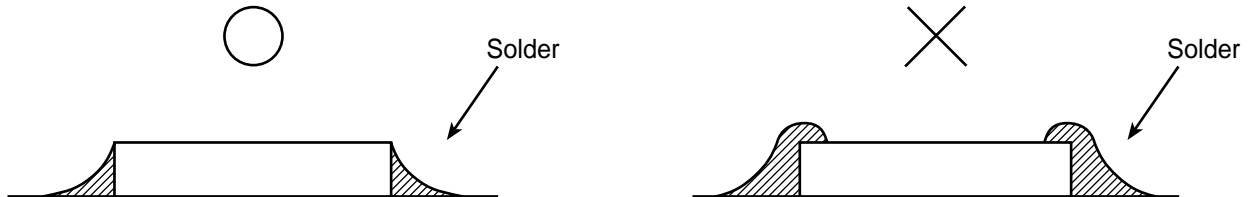
(unit: mm)

| Type | A | B | C |
|------|-----------|-----------|-----------|
| 2A | 1.3 | 1.05 | 0.4 ~ 0.8 |
| 2B | 2.0 ~ 2.4 | 1.2 ~ 1.6 | 0.4 ~ 0.8 |

12. Soldering

Reflow soldering should be done at 240°C for less than 20 seconds.

Flow soldering should be done at 260°C for less than 10 seconds.



13. Measurement Method

(1) Measurement Method of C and R

An impedance element connected with a resistor and a capacitor in series shall be considered as a series equivalent circuit element and a C value and R value shall be measured in $f = 100\text{MHz}$ with the series equivalent circuit.

(2) Measurement Method of D. F.

DISSIPATION FACTOR shall be measured in $f = 1\text{KHz}$ as the impedance element connected in series with the resistor and the capacitor.

(3) Tolerance

a) CAPACITANCE TOLERANCE

The capacitance tolerance is regulated to measure Z (impedance) in $f = 1\text{MHz}$ and to compare the C value with a nominal capacitance tolerance at this time.

b) RESISTANCE TOLERANCE

The resistance tolerance is regulated to measure Z (impedance) in $f = 100\text{MHz}$ and to seek the resistance with the C value and to compare it with the nominal resistance.