



SPECIFICATION FOR APPROVAL

File No.: O/FRK 0.GS.E.C42-C14

| | |
|---------------|--|
| Product Name | Box-type Metallized Polypropylene Film Interference Suppression Capacitor (Class X2) |
| Product Type | MKP62 |
| Product Code | C42 |
| Customer | |
| Customer Code | |
| Issue Date | |

| | | | |
|-----------------------------------|---------|----------|----------------------|
| Xiamen Faratronic Co. Ltd. | | | Approved by Customer |
| Drafted | Checked | Approved | |
| | | | |



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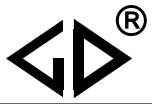
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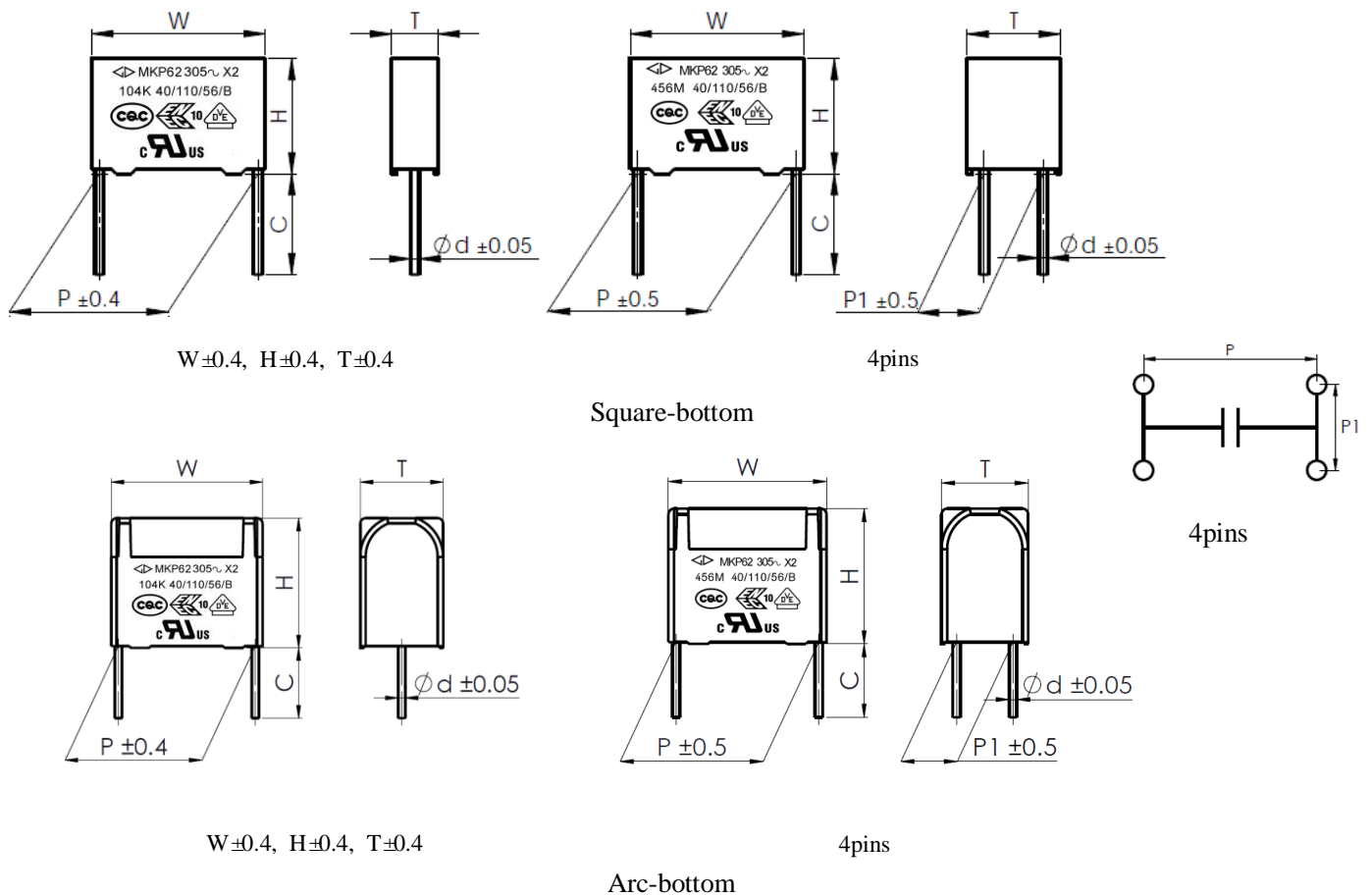
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Version history

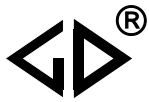
| Current version | Date | Author | Change description |
|-----------------|------|--------|--------------------|
| | | | |
| | | | |
| | | | |

Metallized polypropylene film interference suppression capacitor(Class X2, 305Vac/275Vac)
■ Outline Drawing

■ Features

- Metallized polypropylene structure
- Withstanding overvoltage stressing
- Excellent active and passive flame resistant abilities
- Used in across-the-line, interference suppression circuit.

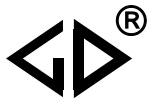
■ Safety Approvals

| | | | |
|---|--|----------|---|
| ● | | CQC | IEC 60384-14:2013, X2, 305Vac/275Vac, 0.0010μF~50.0μF, 40/110/56/B Certificate No.: CQC03001002875 |
| ● | | ENEC-VDE | EN 60384-14:2013, X2, 305Vac/275Vac, 0.0010μF~50.0μF, 40/110/56/B Certificate No.: 40000358 |
| ● | | UL-CUL | UL 60384-14:2009, CSA E60384-14:09, X2, 305Vac/275Vac, 0.0010μF~50.0μF, 40/110/56/B File No.: E186600, CCN: FOWX2/8 |
| ● | | KC | K60384-14(2006-12), X2, 305Vac/275Vac, 0.0010μF~3.0μF, 40/110/56/B Certificate No.: SU03060-12001A/12002/12003/12004 |



■ Specifications

| | | | |
|--|---|----------------------------------|-----------------------------------|
| Class | Class X2 | | |
| Climatic Category / Passive Flammability | 40/110/56/B | | |
| Operating Temperature Range | -40°C ~ +110°C | | |
| Rated Voltage (U _R) | 305Vac/275Vac, 50/60Hz | | |
| Maximum continuous DC voltage | 630Vdc | | |
| Capacitance Range | 0.0010μF~25.0μF | | |
| Capacitance Tolerance | ±10%(K), ±20%(M) | | |
| Voltage Proof | Between Terminals | 4.3U _R (dc), 2s | |
| | Between Terminals To Case | 2 120Vac, 1min | |
| Insulation Resistance | R≥15 000MΩ, C _N ≤0.33μF RC _N ≥5 000s, C _N >0.33μF (20°C, 100V, 1min) | | |
| Dissipation Factor | 0.0010μF≤C _N <0.010μF | ≤20×10 ⁻⁴ (1kHz,20°C) | ≤20×10 ⁻⁴ (10kHz,20°C) |
| | 0.010μF≤C _N <0.47μF | ≤10×10 ⁻⁴ (1kHz,20°C) | ≤20×10 ⁻⁴ (10kHz,20°C) |
| | 0.47μF≤C _N ≤1.0μF | ≤20×10 ⁻⁴ (1kHz,20°C) | ≤40×10 ⁻⁴ (10kHz,20°C) |
| | 1.0μF<C _N ≤10.0μF | ≤30×10 ⁻⁴ (1kHz,20°C) | ----- |
| | 10.0μF<C _N ≤50.0μF | ≤40×10 ⁻⁴ (1kHz,20°C) | ----- |



■ Part number system

The 18 digits part number is formed as follow:

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| C | 4 | 2 | | | | | | | | | | | | | | | |

Digit 1 to 3 Series code

C42=MKP62

Digit 4 to 5 A.C. rated voltage

Q2=305V P2=275V

Digit 6 to 8 Rated capacitance value

For example : 103=10×10³ pF= 0.01μF

Digit 9 Capacitance tolerance

K=±10%, M=±20%

Digit 10 Pitch

3=7.5mm 4=10.0mm 6=15.0mm 9=22.5mm

B=27.5mm F=37.5mm M=52.5mm

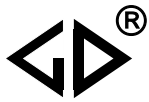
Digit 11 Internal use

Digit 12 to 15 Lead form and packaging code

Digit 16 to 18 Internal use

Table1 Lead form and packaging code

| Digit 12 | | Digit 13 | | Digit 14 | | Digit 15 | | | | | | | |
|----------|--|----------|--|----------|-----------------------------|----------|---|----|--|----|-----------------------|----|-------|
| code | explanation | code | explanation | code | explanation | code | explanation | | | | | | |
| A | ammo-pack | 3 | F=7.5mm | 0 | Straight | 1 | each cap. among two consecutive holes P3=12.7mm,H=18.5mm (For P=7.5mm) | | | | | | |
| | | 4 | F=10.0mm | | | | | | | | | | |
| | | 6 | F=15.0mm | | | | | | | | | | |
| C | straight lead "C" in the figure above | code | explanation | 0 | | 2 | Length tolerance ±0.5mm or standard length Length tolerance ±0.3mm | | | | | | |
| | | 00 | standard lead length (18mm~26mm) | | | | | | | | | | |
| | | 45 | lead length 4.5mm | | | | | | | | | | |
| | | 35 | lead length 3.5mm | | | | | | | | | | |
| D | Insulated stranded leads | C5 | 35mm | 1 | | 1 | Length tolerance -5 mm~0 mm | | | | | | |
| | | | | | | | | K0 | 100mm | | | | |
| | | | | | | | | | | E | Insulated solid leads | K2 | 120mm |
| | | | | | | | | | | | | | |
| M | Insulated stranded leads Box with mounting foot | | Note 1: This length includes the stripping parts. Note 2: Normally, for P≥27.5 Caps can choice Insulated leads. | 3 | Length tolerance 0 mm~+10mm | | | | | | | | |
| | | | | | | 4 | Length tolerance ±5 mm | | | | | | |
| T | P1=20.3mm±0.5mm | 45 | lead length 4.5mm | 0 | | | | 0 | Length tolerance ±0.5mm or standard length | | | | |
| | | | | | | 3 | P1=20mm±0.5mm | | | 55 | lead length 5.5mm | | |



Dimensions(mm)

Table with columns for dimensions (C_N, W, H, T, P, d) and part numbers for 305Vac/275Vac# capacitors. The table is organized into three main sections, each with a header row for dimensions and part numbers. The first section covers dimensions 10.5 to 17.5 mm, the second covers 17.5 to 25.0 mm, and the third covers 25.0 to 42.0 mm. Each row lists a specific capacitor model and its corresponding physical dimensions.

Note: 1. “-”=capacitance tolerance code, M=±20%, K=±10%

- 2. “***”=lead form and packaging mode code (refer to table 1)
3. “#”when the rated voltage is 275Vac, the digit 4~5 is P2.
4. Not for use in series with the mains, the capacitors for series with the mains please refer to A.C. Capacitors for Capacitive Divider.
5. “★” = Arc bottom of the outer shell.

■ Maximum permissible voltage change per unit of time

| Rated Voltage (Vac) | dV/dt(V/us) at 440 Vdc | | | | | | |
|---------------------|------------------------|--------|--------|----------|----------|----------|----------|
| | P=7.5mm | P=10mm | P=15mm | P=22.5mm | P=27.5mm | P=37.5mm | P=52.5mm |
| 305 | 500 | 500 | 400 | 200 | 150 | 100 | 50 |

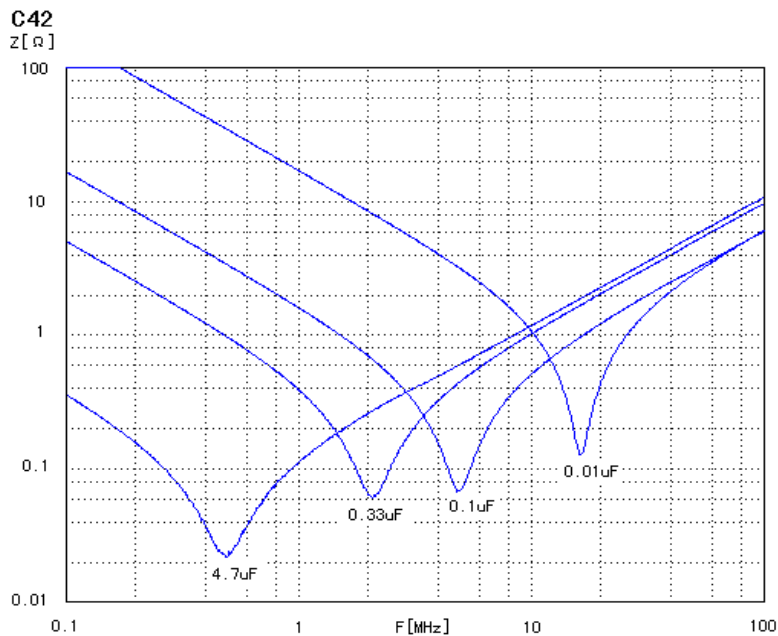
Note:

1. Rated voltage pulse slope $(dV/dt)_R$ at rated voltage.
2. If the working voltage(U) is lower than the rated voltage(U_R),the capacitor can be worked at a higher dV/dt. In this case, the maximum allowed dV/dt is obtain by multiplying the right value with U_R/U .

■ Impedance Vs. Frequency

TYPICAL GRAPHS

Z=f(f) Typical values



■ Quality ensuring test (before shipment):

| Inspection item (each batch) | Inspection level (GB/T 2828.1, ISO2859-1) | |
|------------------------------|---|-------|
| | IL | AQL |
| Appearance inspection | II | 1.5% |
| Dimensions | | |
| Capacitance | II | 0.25% |
| Tangent of the loss angle | | |
| Dielectric strength | | |
| Insulation resistance | | |
| Solderability | S-3 | 2.5% |

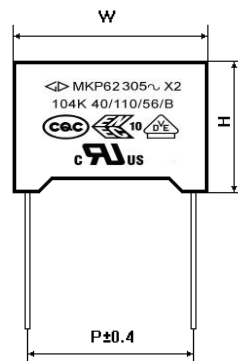
■ Test Method And Performance

| No. | Item | Performance | Test Method (IEC 60384-14) |
|-----|--|---|---|
| 1 | 4.5 Solderability | Good quality of tinning | Solder temperature: 245°C ±5°C Immersion time: 2.0s±0.5s |
| 2 | 4.3 Terminal strength | There shall be no visible damage | Tense: 0.50<d≤0.80, 10N 0.80<d≤1.25, 20N Bend: 0.50<d≤0.80, 5N 0.80<d≤1.25, 10N The terminals shall be bent 2 times in each direction |
| 3 | 4.4 Resistance to solder heat | There shall be no visible damage $\Delta C/C \leq \pm 5\%$ (relative to the initial value) | Solder temperature: 260°C ±5°C Immersion time: 10s ±1s |
| 4 | 4.20 Solvent resistance of the marking | The marking shall be legible | Solvent: Industrial isopropanol. Solvent temperature: 23°C ±5°C Dipping time: 5min ±0.5min Condition: scrub Scrub material: absorbent cotton Reverting time: No |
| 5 | 4.2 Initial measurement | Capacitance, Tgδ | |
| | 4.6 Rapid change of temperature | There shall be no evidence of deterioration. | T _A = -40°C, T _B = +110°C 5 cycles Duration: t = 30min |
| | 4.7 Vibration | There shall be no evidence of deterioration. | Amplitude 0.75mm or acceleration 100m/s ² (whichever is the smaller severity), f: 10Hz to 500Hz. Three directions, 2h for each direction, total 6h. |
| | 4.8 Bump | There shall be no evidence of deterioration. | 4 000 times, Acceleration: 400m/s ² , Pulse duration, 6ms |
| | Final measurement | There shall be no visible damage $\Delta C/C \leq \pm 5\%$ (relative to the initial value) | |
| 6 | 4.11 Climate sequence | Initial measurement | |
| | | Dry heat | +110°C, 16h |
| | | Damp heat, Cyclic | Test Db, Severity: b, the first cycle |
| | | Cold | -40°C, 2h |
| | | Damp heat, cyclic other | Test Db, Severity b, the other cycles |
| | | Final measurement | There shall be no visible damage, legible marking $\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of tgδ: C _N ≤ 1μF: ≤ 0.008 (10kHz) C _N > 1μF: ≤ 0.005 (1kHz) Dielectric strength : there shall be no permanent breakdown or flashover I.R.: ≥ 50% of the rated value |

| No. | Item | Performance | Test Method (IEC 60384-14) |
|-----|-------------------------------------|---|---|
| 7 | 4.12 Damp heat steady state | There shall be no visible damage, legible marking $\Delta C/C \leq \pm 5\%$ (relative to the initial value) Increase of $\text{tg}\delta$: $C_N \leq 1\mu\text{F}$: ≤ 0.008 (10kHz) $C_N > 1\mu\text{F}$: ≤ 0.005 (1kHz) Dielectric strength : there shall be no permanent breakdown or flashover I.R.: $\geq 50\%$ of the rated value | Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity: $93 \pm 3\% \text{RH}$ Duration: 56 days |
| 8 | 4.13 Impulse voltage | There are three or more waveforms which indicate that no self-heating breakdown have occurred when it is monitored by the monitor | Each individual capacitor shall be subjected to 24 impulses of the same polarity (when any three successive impulses are shown by the monitor to have a wave form indicating that no self-heating breakdown have taken place the impulses can be stopped), the time between impulses shall not be less than 10S, and the peak value of the voltage impulse: 2.5kV (suitable for $C_N \leq 1\mu\text{F}$; When $C_N > 1\mu\text{F}$, the capacitor can endure pulse voltage value is $2.5/\sqrt{C_N}$ kV) |
| 9 | 4.14 Endurance | There shall be no visible damage, legible marking $\Delta C/C \leq \pm 10\%$ (relative to the initial value) Increase of $\text{tg}\delta$: $C_N \leq 1\mu\text{F}$: ≤ 0.008 (10kHz) $C_N > 1\mu\text{F}$: ≤ 0.005 (1kHz) Dielectric strength : There shall be no breakdown or flashover I.R. : $\geq 50\%$ of the rated value | $+110^\circ\text{C}$, $1.25U_R$ V a.c., 1 000h The voltage shall be subjected to $1000V_{\text{rms}}$ for 0.1s every one hour during test. |
| 10 | 4.15 Charging and discharging | $\Delta C/C \leq \pm 10\%$ (relative to the initial value) Increase of $\text{tg}\delta$: $C_N \leq 1\mu\text{F}$: ≤ 0.008 (10kHz) $C_N > 1\mu\text{F}$: ≤ 0.005 (1kHz) I.R. : $\geq 50\%$ of the rated value | Times: 10 000 Duration of charging: 0.5s Duration of discharging: 0.5s Charging voltage: $\sqrt{2} U_R$ V d.c. Charging resistance: $220/C_N$ (Ω) or the current $\leq 1.0\text{A}$ (whichever is the minor) Discharging resistance: $R = \frac{\sqrt{2}U_R}{C_N \times \frac{dU}{dt}} (\Omega)$ C_N : Capacitance (μF) dU/dt (V/us) : $100\text{V}/\mu\text{s}$ |
| 11 | 4.17 Passive flammability | The flaming time of each capacitor shall not go beyond 10s after it is taken apart from the flame. Drop of each capacitor caused by flame shall not fire the tissue below. | Ref.item 4.17 Needle flame test The category of flammability: B Expose time: 1 time Capacitor Volume Exposing time $250 < V(\text{mm}^3) \leq 500$ 20s $500 < V(\text{mm}^3) \leq 1750$ 30s $V(\text{mm}^3) > 1750$ 60s |

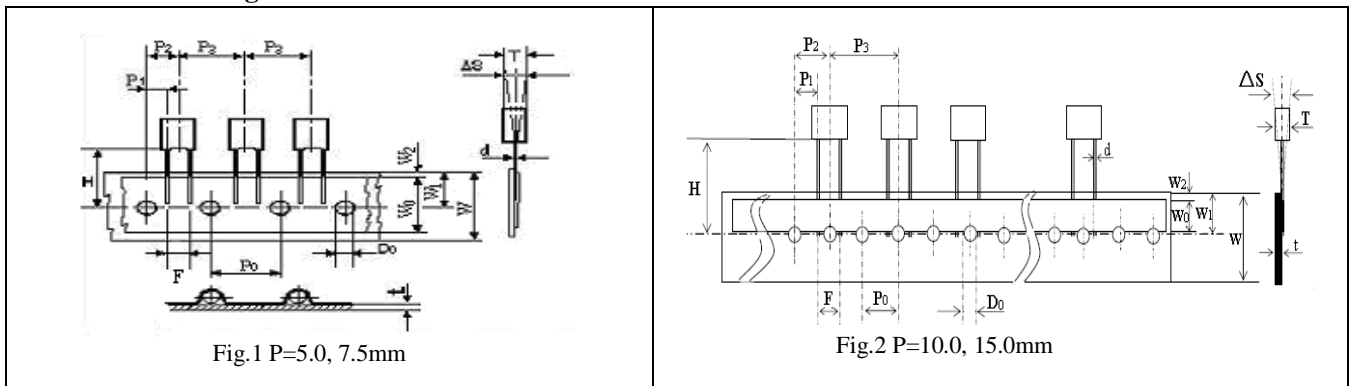
| No. | Item | Performance | Test Method (IEC 60384-14) |
|-----|-----------------------------|--|---|
| 12 | 4.18 Active flammability | The cheese cloth around the capacitor shall not burn with a flame. | <p>The specimens shall be individually wrapped in at least 1, but not more than 2, complete layers of cheesecloth, the cheesecloth shall be untreated pure cotton cloth.</p> <p>Each sample shall be subjected to 20 discharges, the interval between successive discharges shall be 5s.</p> <p>$U_i = 2.5kV_0^{+7\%}$</p> <p>U_R be applied and be maintained for 120_0^{+10} s after the last discharge.</p> |

■ Marking



Marking Introduction

| Sign | explain | Sign | explain |
|-------|---------------------------------|-------------|--|
| | Brand | 40/110/56/B | Climate category / Passive Flammability Class |
| MKP62 | Type | | ENEC-VDE Approval |
| 305~ | Rated voltage | | CQC Approval |
| X2 | Class | | UL, CUL Approval |
| 104K | Rated capacitance and tolerance | | |

■ Taping specification for box-type capacitors
▲ Outline Drawing

▲ Taping Dimensions(mm)

| Technology index title | Code | Dimensions | | | | Tolerance |
|--------------------------------------|----------------|------------|-------|--------|--------|--------------|
| | | P=5.0 | P=7.5 | P=10.0 | P=15.0 | |
| Taping type | — | Fig 1 | Fig 1 | Fig2 | Fig 2 | — |
| Part number Digit12-15 | Ammo-pack | A201 | A301 | A405 | A605 | |
| Taping pitch | P ₃ | 12.7 | 12.7 | 25.4 | 25.4 | ±1.0 |
| Feed hole pitch | P ₀ | 12.7 | 12.7 | 12.7 | 12.7 | ±0.3 |
| Center of wire | P ₁ | 3.85 | 2.6 | 7.7 | 5.2 | ±0.7 |
| Center of body | P ₂ | 6.35 | 6.35 | 12.7 | 12.7 | ±1.3 |
| Pitch of taping wire | F** | 5.0 | 7.5 | 10.0 | 15.0 | +0.6 -0.1 |
| Component alignment | △S | 0 | 0 | 0 | 0 | ±2.0 |
| Height of component from tape center | H*** | 18.5 | 18.5 | 18.5 | 18.5 | ±0.5 |
| Carrier tape width | W | 18.0 | 18.0 | 18.0 | 18.0 | +1.0 -0.5 |
| Hold down tape width | W ₀ | 6min | 10min | 10min | 10min | — |
| Hole position | W ₁ | 9.0 | 9.0 | 9.0 | 9.0 | ±0.5 |
| Hold down tape position | W ₂ | 3max | 3max | 3max | 3max | — |
| Feed hole dia. | D ₀ | 4.0 | 4.0 | 4.0 | 4.0 | ±0.2 |
| Tape thickness | t | 0.7 | 0.7 | 0.7 | 0.7 | ±0.2 |

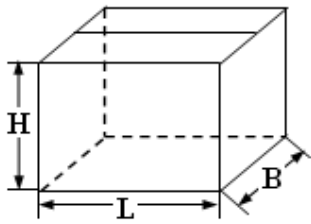
▲ Packing Quantity

| Pitch (mm) | Box thickness T(mm) | Ammo-pack (pcs/box) | |
|---------------|---------------------|---------------------|--------|
| | | Domestic | Export |
| 5.0 | 2.5 | 2500 | 2 000 |
| | 3.5 | 1 700 | 1 500 |
| | 4.5 | 1 400 | 1 300 |
| | 5.0 | 1 200 | 1 000 |
| | 6.0 | 1 000 | 800 |
| 7.5 | 3.5 | 1 700 | 1 500 |
| | 4.0 | 1 500 | 1 350 |
| | 5.0 | 1 200 | 1 050 |
| | 6.0 | 1 000 | 850 |
| 10.0/ 15.0 | 4.0 | 750 | 650 |
| | 5.0 | 600 | 500 |
| | 6.0 | 500 | 450 |
| 15.0 | 7.5 | 400 | 350 |
| | 8.5 | 350 | 300 |
| | 10.0 | 300 | 250 |
| | 11.0 | 250 | 220 |

Note: * P₀=15mm is also available;
 **F can be other lead spacing;
 ***H=16.5mm is available;

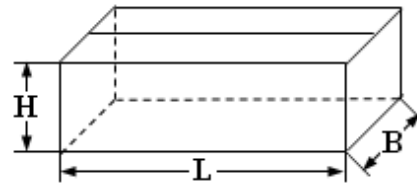
■ Packing box sizes(mm)

1. Out packing box for bulk



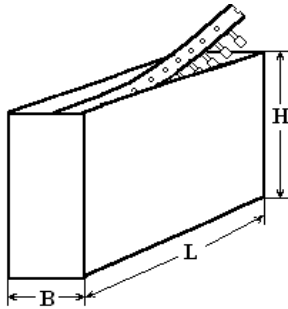
L:375±5
B:375±5
H:265±5

2. Inner packing box for bulk



L:355±3
B:175±3
H:118±3

3. Box sizes for Ammo-pack



L:330±3
B:48±3
H:260±3