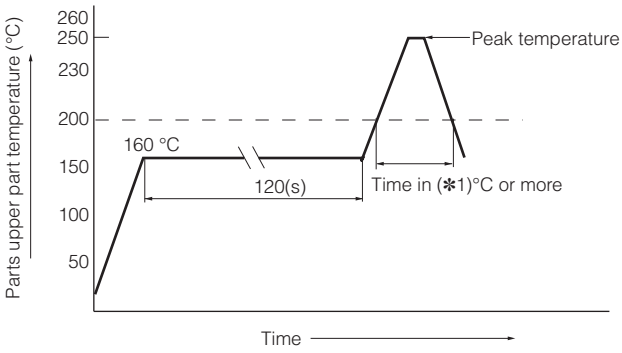
## Recommendable reflow soldering

● RoHS compliant




## Lead-Free reflow

| Reflow No. | Fig. (1) | Fig. (2) | Fig. (3) | Fig. (4) |
|---|---|---|---|---|
| Category | $\phi$4 to $\phi$6.3 | $\phi$8 to $\phi$10 | $\phi$12.5 to $\phi$18 | EB series ($\phi$10 to $\phi$18) |
| Peak temperature | 250 °C | 235 °C | 230 °C (220 °C) | 230 °C |
| Time in peak temperature | 5 s | 5 s | 5 s (5 s) | 5 s |
| Time in (✻1) °C or more | ≧200 °C 60 s | ≧200 °C 60 s | ≧200 °C 20 s (30 s) | ≧200 °C 20 s |
| Time of reflow | 1 time | 1 time | 1 time | 1 time |

## High temperature Lead-Free reflow

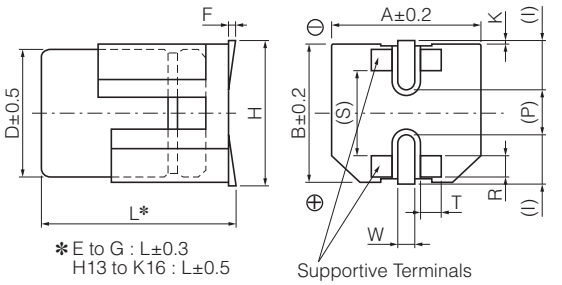
| Reflow No. | Fig. (5) | Fig. (6) | | Fig. (7) | | Fig. (8) | |
|---|---|---|---|---|---|---|---|
| Category | $\phi$4 to $\phi$6.3 | $\phi$8 to $\phi$10 | | $\phi$8 to $\phi$10 | | $\phi$6.3 to $\phi$10 (TK・TP series) | |
| Peak temperature | 260 °C (255 °C) | 245 °C | 260 °C | 250 °C | 260 °C | 255 °C | 260 °C |
| Time in peak temperature | ≧250 °C 5 s (10 s) | ≧240 °C 10 s | ≧250 °C 5 s | ≧240 °C 10 s | ≧250 °C 5 s | ≧250 °C 30 s | ≧250 °C 20 s |
| Time in (✻1) °C or more | ≧230 °C 30 s | ≧230 °C 30 s | ≧230 °C 30 s | ≧230 °C 30 s | ≧230 °C 30 s | ≧230 °C 40 s | ≧230 °C 30 s |
| | ≧217 °C 40 s | ≧217 °C 40 s | ≧217 °C 40 s | ≧217 °C 40 s | ≧217 °C 40 s | ≧217 °C 65 s | ≧217 °C 65 s |
| | ≧200 °C 70 s | ≧200 °C 70 s | ≧200 °C 70 s | ≧200 °C 70 s | ≧200 °C 70 s | ≧200 °C 90 s | ≧200 °C 70 s |
| Time of reflow | 2 times | 2 times | 1 time | 2 times | 1 time | 2 times | 2 times |

| Reflow No. | Fig. (9) | Fig. (10) | Fig. (11) |
|---|---|---|---|
| Category | $\phi$12.5 to $\phi$18 (FK, TK, HD series) 6.3 V.DC to 35 V.DC | $\phi$12.5 to $\phi$18 (FK series) 50 V.DC to 63 V.DC (TK series) 50 V.DC | $\phi$12.5 to $\phi$18 (FK series) 80 V.DC to 100 V.DC (TK series) 63 V.DC to 100 V.DC |
| Peak temperature | 245 °C | 245 °C | 245 °C |
| Time in peak temperature | ≧240 °C 30 s | ≧240 °C 5 s | ≧240 °C 5 s |
| Time in (✻1) °C or more | ≧217 °C 90 s | ≧217 °C 30 s | ≧217 °C 30 s |
| Time of reflow | 2 times | 2 times | 1 time |

✻ For reflow, use a thermal condition system such as infrared radiation (IR) or hot blast.
✻ Panasonic have several series available for pure Tin terminal and ZVEI reflow based on J-STD-020D (JEDEC). (Please contact sales for details.)

## Dimensions (Vibration-proof products)

✻ The size and shape are different from standard products. Please inquire details of our company.




✻E to G : L±0.3
H13 to K16 : L±0.5

( ) Reference size

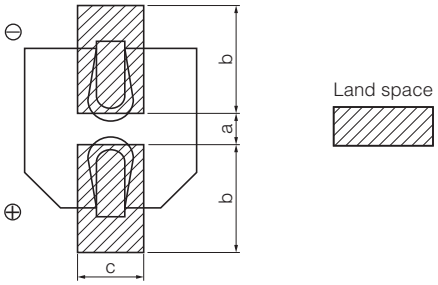
(Unit : mm)

| Size code | φD | L | A, B | H max. | F | I | W | P | K | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | 8.0 | 6.5 | 8.3 | 9.5 | 0 to +0.15 | 3.4 | 0.7±0.1 | 2.2 | $0.35^{+0.15}_{-0.20}$ | 0.70±0.2 | 5.3±0.2 | 1.7±0.2 |
| F | 8.0 | 10.5 | 8.3 | 10.0 | 0 to +0.15 | 3.4 | 1.2±0.2 | 3.1 | 0.70±0.2 | 0.70±0.2 | 5.3±0.2 | 1.3±0.2 |
| G | 10.0 | 10.5 | 10.3 | 12.0 | 0 to +0.15 | 3.5 | 1.2±0.2 | 4.6 | 0.70±0.2 | 0.70±0.2 | 6.9±0.2 | 1.3±0.2 |
| H13 | 12.5 | 13.8 | 13.5 | 15.0 | –0.1 to +0.15 | 4.7 | 1.2±0.2 | 4.4 | 0.70±0.3 | 2.2±0.2 | 7.1±0.2 | 2.4±0.2 |
| J16 | 16.0 | 16.8 | 17.0 | 19.0 | –0.1 to +0.15 | 5.5 | 1.4±0.2 | 6.7 | 0.70±0.3 | 3.0±0.2 | 9.0±0.2 | 1.9±0.2 |
| K16 | 18.0 | 16.8 | 19.0 | 21.0 | –0.1 to +0.15 | 6.7 | 1.4±0.2 | 6.7 | 0.70±0.3 | 3.0±0.2 | 11.0±0.2 | 1.9±0.2 |

## Land/Pad pattern

The circuit board land/pad pattern size for chip capacitors is specified in the following table.
The land pitch influences installation strength and consider it.

● Standard products



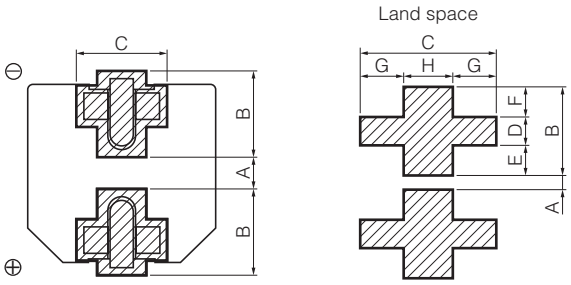

[Table of board land size vs. capacitor size]

(Unit : mm)

| Size code (Dimensions) | a | b | c |
|---|---|---|---|
| B (φ4) | 1.0 | 2.5 | 1.6 |
| C (φ5) | 1.5 | 2.8 | 1.6 |
| D (φ6.3) | 1.8 | 3.2 | 1.6 |
| E (φ8 × 6.2L) | 2.2 | 4.0 | 1.6 |
| F (φ8 × 10.2L) | 3.1 | 4.0 | 2.0 |
| G (φ10 × 10.2L) | 4.6 | 4.1 | 2.0 |
| H (φ12.5) | 4.0 | 5.7 | 2.0 |
| J (φ16) | 6.0 | 6.5 | 2.5 |
| K (φ18) | 6.0 | 7.5 | 2.5 |

✻ When size “a” is wide, back fillet can be made, decreasing fitting strength.

● Vibration-proof products




[Table of board land size vs. capacitor size]

(Unit : mm)

| Size code (Dimensions) | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| E (φ8 × 6.5L) | 1.8 | 4.2 | 5.0 | 1.3 | 1.5 | 1.4 | 1.5 | 2.0 |
| F (φ8 × 10.5L) | 2.7 | 4.0 | 4.7 | 1.3 | 1.0 | 1.7 | 1.1 | 2.5 |
| G (φ10) | 3.9 | 4.4 | 4.7 | 1.3 | 1.2 | 1.9 | 1.1 | 2.5 |
| H (φ12.5) | 3.9 | 6.0 | 6.9 | 2.8 | 1.3 | 1.9 | 2.2 | 2.5 |
| J (φ16) | 5.8 | 6.8 | 6.2 | 3.6 | 1.3 | 1.9 | 1.7 | 2.8 |
| K (φ18) | 5.8 | 7.3 | 6.2 | 3.6 | 1.8 | 1.9 | 1.7 | 2.8 |

✻ When size “A” is wide, back fillet can be made, decreasing fitting strength.

✻ Take mounting conditions, solderability and fitting strength into consideration when selecting parts for your company’s design.

## Expected life estimate quick reference guide