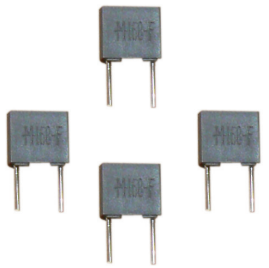
# Type 168/185 Metallized Polyester Radial Lead Capacitors

## Radial Box Metallized Polyester Capacitors for Automatic Insertion



The Type 168/185 series radial lead metallized polyester box capacitors are available in bulk (Type 168) or on ammo pack or tape and reel (Type 185). These capacitors are constructed in rugged rectangular plastic cases and all come with 5.0 mm (0.197“) lead spacing. They are good for general purpose applications such as bypass, decoupling, energy storage/discharge and arc suppression.

## Highlights

- Case and epoxy fill meets UL94V-0
- 5.0 mm (0.197“) lead spacing
- Bulk, tape and reel or ammo pack
- Non-inductively wound
- Non-polar
- Low leakage
- Lead material: Tinned copper wire

## Specifications — RoHS Compliant

**Capacitance Range:** 0.001 µF to 1.0 µF

**Voltage Range:** 50 Vdc to 400 Vdc (30 Vac to 200 Vac, 60 Hz)

**Capacitance Tolerance:** ±5%, ±10%, ±20%

**Operating Temperature Range:** –55 ºC to +125 ºC (with 50% Vdc derating >85 ºC)

**Dielectric Withstand Voltage:** 1.6 x rated voltage for 2 sec @ +25 ºC ±5 ºC

**Dissipation Factor (DF):** tanδ x $10^{-4}$ at 25 ºC ±5 ºC

| kHz | C ≤0.1 µF | C > 0.1 µF |
|---|---|---|
| 1 | ≤100 | ≤100 |
| 10 | ≤150 | ≤150 |
| 100 | ≤300 | |

**Total Self Inductance (L):** Approximately 7 nH

**Long Term Stability (after two years):** Capacitance change ΔC/C ≤ ±3% under standard environmental conditions

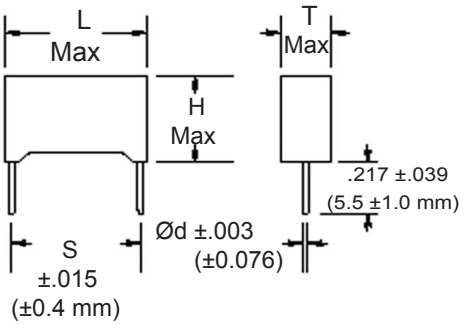
**Maximum Pulse Rise Time (dv/dt):**

| Vn | V/µs |
|---|---|
| 50 | 250 |
| 63 | 250 |
| 100 | 300 |
| 250 | 400 |
| 400 | 600 |

If the working voltage (V) is less than the nominal voltage (Vn), the capacitor can work at higher dv/dt. In this case, the maximum value allowed is obtained by multiplying the above value with the ratio Vn/V.

# Type 168/185 Metallized Polyester Radial Lead Capacitors

## Capacitor Outline Drawing




Lead length shown is as supplied on the 168 Series

| Soldering | |
|---|---|
| **Test Conditions** | |
| **Soldering Temperature:** | 260 ºC ±5 ºC |
| **Soldering Duration:** | 10 sec ±1 sec |
| **Performance** | |
| **Capacitance Change ΔC/C:** | ≤ ±2% |
| **DF Change Δtgδ:** | ≤30 x $10^{-4}$ at 10 kHz |
| **Insulation Resistance:** | ≥ limit value |

## Test Method and Performance

| Insulation Resistance | |
|---|---|
| **Test Conditions** | |
| **Temperature:** | 25 ºC ±5 ºC |
| **Voltage Charge Time:** | 1 minute |
| **Voltage Charge:** | 10 Vdc for Vn < 100 Vdc<br>100 Vdc for Vn ≥ 100 Vdc |
| **Performance** | |
| **For Vn > 100 Vdc:** | C ≤ 0.33 µF, ≥15,000 MΩ<br>C > 0.33 µF, ≥ 5,000 S |
| **For Vn ≤100 Vdc:** | C ≤ 0.33 µF, 30,000 MΩ<br>C > 0.33 µF, ≥ 10,000 S |

| Damp Heat Test | |
|---|---|
| **Test Conditions** | |
| **Temperature:** | +40 ºC |
| **Relative Humidity:** | 95% |
| **Test Duration:** | 21 days |
| **Performance** | |
| **Capacitance Change ΔC/C:** | ±5% |
| **DF Change Δtgδ:** | ≤ 0.005 (10 KHz) |
| **Insulation Resistance:** | ≥ 50% of limit value |

| Life Test | |
|---|---|
| **Test Conditions** | REF |
| **Temperature:** | +85 ºC |
| **Test Duration:** | 2000 hrs |
| **Voltage Applied:** | 1.25 x Vn |
| **Performance** | |
| **Capacitance Change ΔC/C:** | ≤ ±2% |
| **DF Change Δtgδ:** | ≤30 x $10^{-4}$ at 10 kHz |
| **Insulation Resistance:** | ≥ 50% of limit value |

## Ratings

RoHS Compliant

| Catalog Part Number | Tape & Reel Ammo Pack | Cap (µF) | Inches | | | | | Millimeters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | H | S | Ød | L | T | H | S | Ød |
| **50 Vdc / 30 Vac** | | | | | | | | | | | | |
| 168104*50A-F | 185104*50#A>-F | 0.10 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168154*50A-F | 185154*50#A>-F | 0.15 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168224*50C-F | 185224*50#C>-F | 0.22 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168334*50C-F | 185334*50#C>-F | 0.33 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168474*50H-F | 185474*50#H>-F | 0.47 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168684*50F-F | 185684*50#F>-F | 0.68 | 0.283 | 0.236 | 0.433 | 0.197 | 0.024 | 7.2 | 6.0 | 11.0 | 5.0 | 0.6 |
| 168824*50G-F | 185824*50#G>-F | 0.82 | 0.283 | 0.236 | 0.433 | 0.197 | 0.024 | 7.2 | 6.0 | 11.0 | 5.0 | 0.6 |
| 168105*50G-F | 185105*50#G>-F | 1.00 | 0.283 | 0.236 | 0.433 | 0.197 | 0.024 | 7.2 | 6.0 | 11.0 | 5.0 | 0.6 |
| **63 Vdc / 40 Vac** | | | | | | | | | | | | |
| 168473*63A-F | 185473*63#A>-F | 0.047 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168563*63A-F | 185563*63#A>-F | 0.056 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168683*63A-F | 185683*63#A>-F | 0.068 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168823*63A-F | 185823*63#A>-F | 0.082 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168104*63A-F | 185104*63#A>-F | 0.10 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168154*63C-F | 185154*63#C>-F | 0.15 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168184*63C-F | 185184*63#C>-F | 0.18 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168224*63C-F | 185224*63#C>-F | 0.22 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168274*63C-F | 185274*63#C>-F | 0.27 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168334*63H-F | 185334*63#H>-F | 0.33 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168474*63H-F | 185474*63#H>-F | 0.47 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168684*63F-F | 185684*63#F>-F | 0.68 | 0.283 | 0.177 | 0.374 | 0.197 | 0.024 | 7.2 | 4.5 | 9.5 | 5.0 | 0.6 |
| 168105*63G-F | 185105*63#G>-F | 1.00 | 0.283 | 0.236 | 0.433 | 0.197 | 0.024 | 7.2 | 6.0 | 11.0 | 5.0 | 0.6 |

* Indicates capacitance tolerance: J = ±5%, K = ±10%, M = ±20%
# Indicates packaging type: R = Tape and Reel, A = Ammo Pack
> Indicates tooling code: A = 16.5 mm, B = 18.5 mm (See H dimension in taping specifications)

# Type 168/185 Metallized Polyester Radial Lead Capacitors

RoHS Compliant

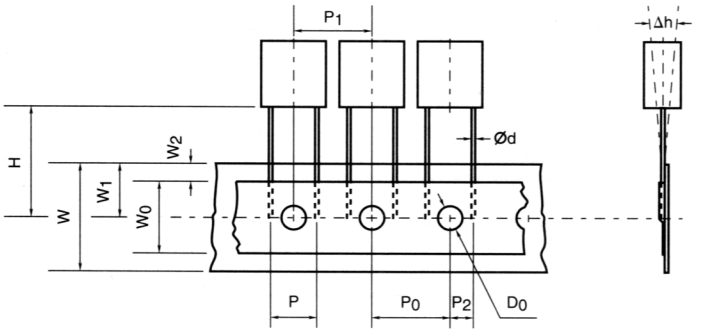
| Catalog Part Number | Tape & Reel Ammo Pack | Cap (µF) | Inches | | | | | Millimeters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | H | S | Ød | L | T | H | S | Ød |
| **100 Vdc / 63 Vac** | | | | | | | | | | | | |
| 168102*100A-F | 185102*100#A>-F | 0.0010 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168152*100A-F | 185152*100#A>-F | 0.0015 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168222*100A-F | 185222*100#A>-F | 0.0022 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168272*100A-F | 185272*100#A>-F | 0.0027 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168332*100A-F | 185332*100#A>-F | 0.0033 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168392*100A-F | 185392*100#A>-F | 0.0039 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168472*100A-F | 185472*100#A>-F | 0.0047 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168562*100A-F | 185562*100#A>-F | 0.0056 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168682*100A-F | 185682*100#A>-F | 0.0068 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168822*100A-F | 185822*100#A>-F | 0.0082 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168103*100A-F | 185103*100#A>-F | 0.010 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168153*100A-F | 185153*100#A>-F | 0.015 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168183*100A-F | 185183*100#A>-F | 0.018 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168223*100A-F | 185223*100#A>-F | 0.022 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168273*100A-F | 185273*100#A>-F | 0.027 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168333*100C-F | 185333*100#C>-F | 0.033 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168393*100C-F | 185393*100#C>-F | 0.039 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168473*100C-F | 185473*100#C>-F | 0.047 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168683*100H-F | 185683*100#H>-F | 0.068 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168104*100H-F | 185104*100#H>-F | 0.10 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168154*100F-F | 185154*100#F>-F | 0.15 | 0.283 | 0.177 | 0.374 | 0.197 | 0.024 | 7.2 | 4.5 | 9.5 | 5.0 | 0.6 |
| 168224*100G-F | 185224*100#G>-F | 0.22 | 0.283 | 0.197 | 0.394 | 0.197 | 0.024 | 7.2 | 5.0 | 10.0 | 5.0 | 0.6 |
| **250 Vdc / 160 Vac** | | | | | | | | | | | | |
| 168332*250A-F | 185332*250#A>-F | 0.0033 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168472*250A-F | 185472*250#A>-F | 0.0047 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168682*250A-F | 185682*250#A>-F | 0.0068 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168103*250A-F | 185103*250#A>-F | 0.010 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168153*250A-F | 185153*250#A>-F | 0.015 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168223*250C-F | 185223*250#C>-F | 0.022 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168333*250C-F | 185333*250#C>-F | 0.033 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168473*250F-F | 185473*250#F>-F | 0.047 | 0.283 | 0.177 | 0.374 | 0.197 | 0.024 | 7.2 | 4.5 | 9.5 | 5.0 | 0.6 |
| 168683*250F-F | 185683*250#F>-F | 0.068 | 0.283 | 0.177 | 0.374 | 0.197 | 0.024 | 7.2 | 4.5 | 9.5 | 5.0 | 0.6 |
| 168104*250G-F | 185104*250#G>-F | 0.100 | 0.283 | 0.197 | 0.394 | 0.197 | 0.024 | 7.2 | 5.0 | 10 | 5.0 | 0.6 |
| **400 Vdc / 200 Vac** | | | | | | | | | | | | |
| 168102*400A-F | 185102*400#A>-F | 0.001 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168152*400A-F | 185152*400#A>-F | 0.0015 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168222*400A-F | 185222*400#A>-F | 0.0022 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168332*400C-F | 185332*400#C>-F | 0.0033 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168472*400C-F | 185472*400#C>-F | 0.0047 | 0.283 | 0.098 | 0.256 | 0.197 | 0.020 | 7.2 | 2.5 | 6.5 | 5.0 | 0.5 |
| 168682*400C-F | 185682*400#C>-F | 0.0068 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168103*400F-F | 185103*400#F>-F | 0.010 | 0.283 | 0.138 | 0.295 | 0.197 | 0.020 | 7.2 | 3.5 | 7.5 | 5.0 | 0.5 |
| 168153*400F-F | 185153*400#F>-F | 0.015 | 0.283 | 0.177 | 0.374 | 0.197 | 0.024 | 7.2 | 4.5 | 9.5 | 5.0 | 0.6 |
| 168223*400G-F | 185223*400#G>-F | 0.022 | 0.283 | 0.197 | 0.394 | 0.197 | 0.024 | 7.2 | 5.0 | 10 | 5.0 | 0.6 |

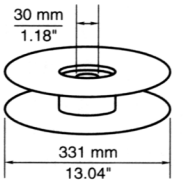
* Indicates capacitance tolerance: J = ±5%, K = ±10%, M = ±20%
# Indicates packaging type: R = Tape and Reel, A = Ammo Pack
> Indicates tooling code: A = 16.5 mm, B = 18.5 mm (See H dimension in taping specification)

# Type 168/185 Metallized Polyester Radial Lead Capacitors

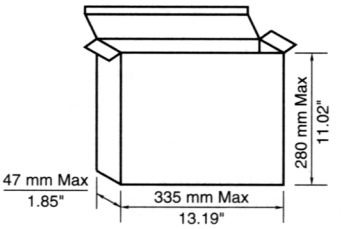
## Tape Specification - 5.0 mm Lead Spacing

### Standard EIA-468-B




Reel Packing




Ammo Box Packing

| Item | Code | Millimeters | Inches |
|---|---|---|---|
| Lead-to-Lead Distance | P | $5.0^{+0.6\ -0.2}$ | $.197^{+.024\ -.040}$ |
| Feed Hole Pitch | $P_0$ | $12.7^{\pm0.3}$ | $.5^{\pm.012}$ |
| Pitch of Component | $P_1$ | $12.7^{\pm1.0}$ | $.5^{\pm.039}$ |
| Hole Center to Lead | $P_2$ | $2.54^{\pm0.7}$ | $.100^{\pm.028}$ |
| Feed Hole Center to Component Center | $P_3$ | $6.35^{\pm1.3}$ | $.250^{\pm.051}$ |
| Component Alignment, F-R | Δh | $0^{\pm2.0}$ | $0^{\pm.079}$ |
| Tape Width | W | $18^{+1.0\ -0.1}$ | $.709^{+.039\ -.004}$ |
| Hold-down Tape Width | $W_0$ | 6.0 min | .236 min |
| Hole Position | $W_1$ | $9.0^{+0.75\ -0.05}$ | $.355^{+.030\ -.001}$ |
| Hold-down Tape Position | $W_2$ | 3.0 Max | .118 Max |
| Height of Component from Tape Center | H | > | > |
| Feed Hole Diameter | $D_0$ | $4.0^{\pm0.3}$ | $.157^{\pm.012}$ |

| Case Thickness T | Quantity Reeled | Quantity Ammo Pack |
|---|---|---|
| 2.5 | 2500 | 2000 |
| 3.5 | 1800 | 1500 |
| 4.5 | 1400 | 1300 |
| 5 | 1200 | 1000 |
| 6 | 1000 | 800 |

> The H dimension depends on the insertion equipment used. Specify the proper tooling code as indicated below.

| Tooling | H Dimensions | |
|---|---|---|
| Code | Millimeters | Inches |
| A | $16.5^{\pm0.75}$ | $.679^{\pm0.030}$ |
| B | $18.5^{\pm0.75}$ | $.728^{\pm0.030}$ |

## Part Numbering System for Auto Insertion

| 168/185 | 104 | K | 100 | R | H | B | –F |
|---|---|---|---|---|---|---|---|
| | | | | Packaging Type | Internal Code | *Tooling Code | RoHS Compliant |
| Series | Capacitance | Tolerance | Voltage | (#) | Letter | (>) | Designation |
| 185 | 102 = .001 µF | J = ±5% | 50 = 50 Vdc | A = Ammo | | A | |
| | 103 = .01 µF | K = ±10% | 63 = 63 Vdc | R = Tape & Reel | | B | |
| | 104 = .1 µF | M = ±20% | 100 = 100 Vdc | | | | |
| | 105 = 1.0 µF | | 250 = 250 Vdc | | | | |
| | | | 400 = 400 Vdc | | | | |

* Tooling code (>) depends on the users insertion equipment requirements. See table for available options.

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
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