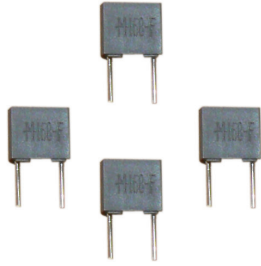


Type 168/185 Metallized Polyester Radial Lead Capacitors

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 μ F to 1.0 μ F |
| Voltage Range: | 50 Vdc to 400 Vdc |
| Capacitance Tolerance: | \pm 5%, \pm 10%, \pm 20% |
| Operating Temperature Range: | -55 $^{\circ}$ C to +125 $^{\circ}$ C (with 50% Vdc derating >85 $^{\circ}$ C) |
| Dielectric Withstand Voltage: | 1.6 x rated voltage for 2 sec @ +25 $^{\circ}$ C \pm 5 $^{\circ}$ C |
| Dissipation Factor (DF): | $\tan\delta \times 10^{-4}$ at 25 $^{\circ}$ C \pm 5 $^{\circ}$ C |

| kHz | C \leq 0.1 μ F | C > 0.1 μ F |
|-----|----------------------|-----------------|
| 1 | \leq 100 | \leq 100 |
| 10 | \leq 150 | \leq 150 |
| 100 | \leq 300 | |

| | |
|---|--|
| Total Self Inductance (L): | Approximately 7 nH |
| Long Term Stability (after two years): | Capacitance change $\Delta C/C \leq \pm 3\%$ under standard environmental conditions |

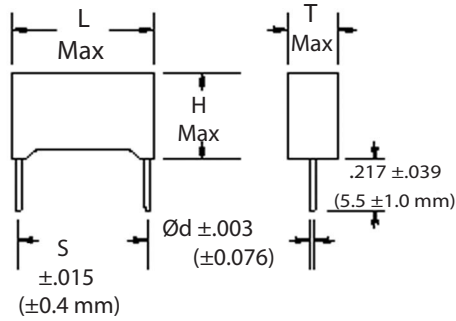
Maximum Pulse Rise Time (dv/dt):

| Vn | Capacitance | V/ μ s |
|-----|-----------------------------------|------------|
| 50 | | 4 |
| 63 | | 8 |
| 100 | C > .0068 μ F | 10 |
| | .0033 μ F < C < .0068 μ F | 15 |
| | C \leq .0033 μ F | 30 |
| 250 | | 44 |
| 400 | | 100 |

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



| Soldering | |
|--|--|
| Test Conditions | |
| Soldering Temperature: 260 °C ± 5 °C | |
| Soldering Duration: 10 sec ± 1 sec | |
| Performance | |
| Capacitance Change $\Delta C/C$: $\leq \pm 2\%$ | |
| DF Change $\Delta tg\delta$: $\leq 30 \times 10^{-4}$ at 10 kHz | |
| Insulation Resistance: \geq limit value | |

Test Method and Performance

| Insulation Resistance | |
|---|--|
| Test Conditions | |
| Temperature: 25 °C ± 5 °C | |
| Voltage Charge Time: 1 minute | |
| Voltage Charge: 10 Vdc for $V_n < 100$ Vdc 100 Vdc for $V_n \geq 100$ Vdc | |
| Performance | |
| For $V_n > 100$ Vdc: $C \leq 0.33 \mu F, \geq 15,000 M\Omega$ $C > 0.33 \mu F, \geq 5,000 S$ | |
| For $V_n \leq 100$ Vdc: $C \leq 0.33 \mu F, 30,000 M\Omega$ $C > 0.33 \mu F, \geq 10,000 S$ | |
| Damp Heat Test | |
| Test Conditions | |
| Temperature: +40 °C | |
| Relative Humidity: 95% | |
| Test Duration: 21 days | |
| Performance | |
| Capacitance Change $\Delta C/C$: $\pm 5\%$ | |
| DF Change $\Delta tg\delta$: ≤ 0.005 (10 KHz) | |
| Insulation Resistance: $\geq 50\%$ of limit value | |
| Life Test | |
| Test Conditions | |
| Temperature: +85 °C | |
| Test Duration: 2000 hrs | |
| Voltage Applied: 1.25 x V_n | |
| Performance | |
| Capacitance Change $\Delta C/C$: $\leq \pm 2\%$ | |
| DF Change $\Delta tg\delta$: $\leq 30 \times 10^{-4}$ at 10 kHz | |
| Insulation Resistance: $\geq 50\%$ of limit value | |

Ratings

RoHS Compliant

| Catalog Part Number | Tape & Reel Ammo Pack | Cap (μF) | Inches | | | | | Millimeters | | | | |
|---------------------|-----------------------|-----------------|--------|-------|-------|-------|----------|-------------|-----|------|-----|----------|
| | | | L | T | H | S | ϕd | L | T | H | S | ϕd |
| 50 Vdc | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | |
| 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 = $\pm 5\%$, K = $\pm 10\%$, M = $\pm 20\%$

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

| Catalog Part Number | Tape & Reel Ammo Pack | Cap (µF) | Inches | | | | | Millimeters | | | | |
|---------------------|-----------------------|----------|--------|-------|-------|-------|-------|-------------|-----|------|-----|-----|
| | | | L | T | H | S | Ød | L | T | H | S | Ød |
| 100 Vdc | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | |
| 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%

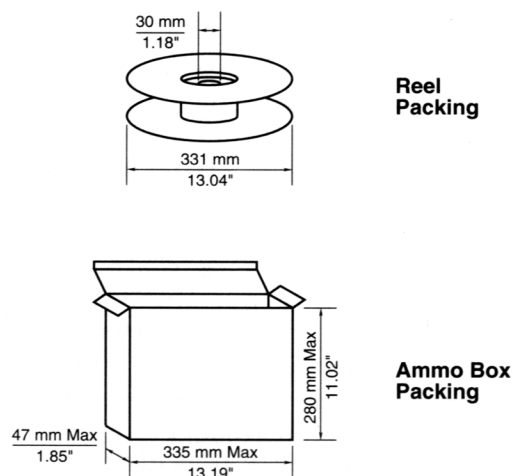
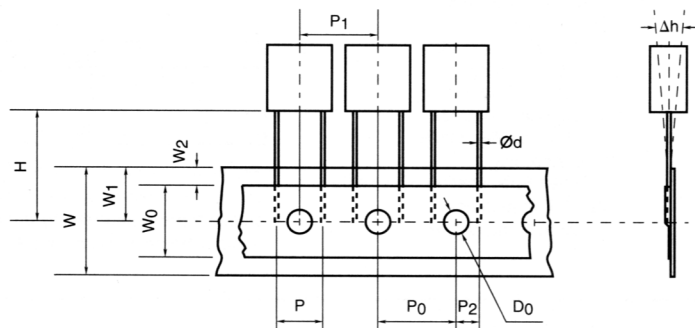
Indicates packaging type: R = Tape and Reel, A = Ammo Pack

> 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



| Item | Code | Millimeters | Inches |
|--------------------------------------|----------------|----------------------------|-------------------------------|
| Lead-to-Lead Distance | P | 5.0 ^{+0.6 -0.2} | .197 ^{+0.024 -0.040} |
| Feed Hole Pitch | P ₀ | 12.7 ^{±0.3} | .5 ^{±0.12} |
| Pitch of Component | P ₁ | 12.7 ^{±1.0} | .5 ^{±0.39} |
| Hole Center to Lead | P ₂ | 2.54 ^{±0.7} | .100 ^{±0.28} |
| Feed Hole Center to Component Center | P ₃ | 6.35 ^{±1.3} | .250 ^{±0.51} |
| Component Alignment, F-R | Δh | 0 ^{±2.0} | 0 ^{±0.79} |
| Tape Width | W | 18 ^{+1.0 -0.1} | .709 ^{+0.039 -0.004} |
| Hold-down Tape Width | W ₀ | 6.0 min | .236 min |
| Hole Position | W ₁ | 9.0 ^{+0.75 -0.05} | .355 ^{+0.030 -0.001} |
| 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 ^{±0.3} | .157 ^{±0.12} |

| 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 Code | H Dimensions | |
|--------------|-----------------------|------------------------|
| | Millimeters | Inches |
| A | 16.5 ^{±0.75} | .679 ^{±0.030} |
| B | 18.5 ^{±0.75} | .728 ^{±0.030} |

Part Numbering System for Auto Insertion

| 168/185 | 104 | K | 100 | R | H | B | -F |
|---------|---------------|-----------|---------------|--------------------|---------------|-------------------|----------------------------|
| Series | Capacitance | Tolerance | Voltage | Packaging Type (#) | Internal Code | *Tooling Code (>) | RoHS Compliant Designation |
| 185 | 102 = .001 μF | J = ±5% | 50 = 50 Vdc | A = Ammo | Letter | 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.