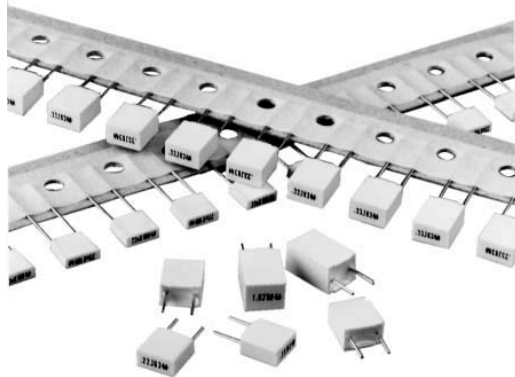


# Type 167/184 Metallized Polyester Radial Lead Capacitors

## Radial Box Metallized Polyester Capacitors for Automatic Insertion



The Type 167/184 series radial lead metallized polyester box capacitors are available in bulk (Type 167) or on ammo pack or radial tape and reel (Type 184). These capacitors are constructed in rugged rectangular plastic cases and all come with 7.5 mm (0.3") lead spacing. They are good for general purpose applications such as bypass, decoupling, energy storage/discharge and arc suppression.

### Highlights

- Rugged plastic case
- Case and epoxy fill meets UL94V0
- 7.5 mm (0.3") lead spacing
- Bulk, tape and reel or ammo pack
- Non-inductively wound
- Non-polar

### Specifications

**RoHS Compliant**

- Capacitance Range:** 0.001  $\mu$ F to 1.0  $\mu$ F  
**Voltage Range:** 63 Vdc to 630 Vdc (40 Vac to 250 Vac, 60 Hz)  
**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 | $\tan\delta \times 10^{-4}$ |
|-----|-----------------------------|
| 1   | $\leq$ 100                  |
| 10  | $\leq$ 150                  |

**Total Self Inductance (L):** Approximately 8 nH

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

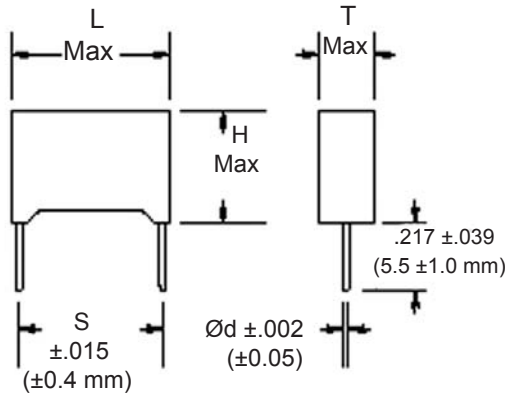
| Vn  | V/ $\mu$ s |
|-----|------------|
| 63  | 12         |
| 100 | 20         |
| 250 | 32         |
| 400 | 41         |
| 630 | 70         |

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.

| <b>Long Term Stability (after two years)</b> |  |
|--|--|
| <b>Storage</b>                               | Standard Environmental Conditions            |
| <b>Performance</b>                           | Capacitance Change $\Delta C/C \leq \pm 3\%$ |

# Type 167/184 Metallized Polyester Radial Lead Capacitors

## Capacitor Outline Drawing



Lead length shown is as supplied on 167 Series

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

## Test Method and Performance

| Insulation Resistance               |   |
|-------------------------------------|---|
| <b>Test Conditions</b>              |   |
| Temperature                         | 25 °C $\pm 5$ °C  |
| Voltage Charge Time                 | 1 minute  |
| Voltage Charge                      | 50 Vdc for $V_n < 100$ Vdc<br>100 Vdc for $V_n \geq 100$ Vdc  |
| <b>Performance</b>                  |   |
| For $V_n > 100$ Vdc                 | $\geq 30,000$ M $\Omega$ (50,000 M $\Omega$ typical)  |
| For $V_n \leq 100$ Vdc              | $\geq 10,000$ M $\Omega$ for $C \leq 0.1 \mu\text{F}$<br>$\geq 1,000$ M $\Omega \times \mu\text{F}$ for $> 0.1 \mu\text{F}$ |
| Damp Heat Test                      |   |
| <b>Test Conditions</b>              |   |
| Temperature                         | +40 °C  |
| Relative Humidity                   | 95%   |
| Test Duration                       | 21 days   |
| <b>Performance</b>                  |   |
| Capacitance Change $\Delta C/C$     | $\leq \pm 5\%$  |
| DF Change $\Delta \text{tg} \delta$ | $\leq 50 \times 10^{-4}$ at 1 kHz   |
| Insulation Resistance               | $\geq 50\%$ of limit value  |
| Life Test                           |   |
| <b>Test Conditions</b>              |   |
| Temperature                         | +85 °C  |
| Test Duration                       | 1000 hrs  |
| Voltage Applied                     | 1.25 x $V_n$  |
| <b>Performance</b>                  |   |
| Capacitance Change $\Delta C/C$     | $\leq \pm 5\%$  |
| DF Change $\Delta \text{tg} \delta$ | $\leq 30 \times 10^{-4}$ at 10 kHz  |
| Insulation Resistance               | $\geq 50\%$ of limit value  |

## Ratings

RoHS Compliant

| Cap ( $\mu\text{F}$ )   | Catalog Part Number | Tape & Reel Ammo Pack | Inches |       |       |       |             | Millimeters |     |      |     |             |
|-------------------------|---------------------|-----------------------|--------|-------|-------|-------|-------------|-------------|-----|------|-----|-------------|
|                         |                     |                       | L      | T     | H     | S     | $\text{Ød}$ | L           | T   | H    | S   | $\text{Ød}$ |
| <b>63 Vdc / 40 Vac</b>  |                     |                       |        |       |       |       |             |             |     |      |     |             |
| .068                    | 167683*63A-F        | 184683*63#A>-F        | 0.413  | 0.138 | 0.276 | 0.295 | 0.024       | 10.5        | 3.5 | 7.0  | 7.5 | 0.6         |
| .10                     | 167104*63A-F        | 184104*63#A>-F        | 0.413  | 0.138 | 0.276 | 0.295 | 0.024       | 10.5        | 3.5 | 7.0  | 7.5 | 0.6         |
| .15                     | 167154*63A-F        | 184154*63#A>-F        | 0.413  | 0.138 | 0.276 | 0.295 | 0.024       | 10.5        | 3.5 | 7.0  | 7.5 | 0.6         |
| .22                     | 167224*63A-F        | 184224*63#A>-F        | 0.413  | 0.138 | 0.276 | 0.295 | 0.024       | 10.5        | 3.5 | 7.0  | 7.5 | 0.6         |
| .27                     | 167274*63A-F        | 184274*63#A>-F        | 0.413  | 0.138 | 0.276 | 0.295 | 0.024       | 10.5        | 3.5 | 7.0  | 7.5 | 0.6         |
| .33                     | 167334*63A-F        | 184334*63#A>-F        | 0.413  | 0.138 | 0.276 | 0.295 | 0.024       | 10.5        | 3.5 | 7.0  | 7.5 | 0.6         |
| .47                     | 167474*63B-F        | 184474*63#B>-F        | 0.413  | 0.157 | 0.354 | 0.295 | 0.024       | 10.5        | 4.0 | 9.0  | 7.5 | 0.6         |
| .68                     | 167684*63C-F        | 184684*63#C>-F        | 0.413  | 0.197 | 0.433 | 0.295 | 0.024       | 10.5        | 5.0 | 11.0 | 7.5 | 0.6         |
| 1.00                    | 167105*63C-F        | 184105*63#C>-F        | 0.413  | 0.197 | 0.433 | 0.295 | 0.024       | 10.5        | 5.0 | 11.0 | 7.5 | 0.6         |
| <b>100 Vdc / 63 Vac</b> |                     |                       |        |       |       |       |             |             |     |      |     |             |
| .033                    | 167333*100A-F       | 184333*100#A>-F       | 0.413  | 0.138 | 0.276 | 0.295 | 0.024       | 10.5        | 3.5 | 7.0  | 7.5 | 0.6         |
| .047                    | 167473*100A-F       | 184473*100#A>-F       | 0.413  | 0.138 | 0.276 | 0.295 | 0.024       | 10.5        | 3.5 | 7.0  | 7.5 | 0.6         |
| .068                    | 167683*100A-F       | 184683*100#A>-F       | 0.413  | 0.138 | 0.276 | 0.295 | 0.024       | 10.5        | 3.5 | 7.0  | 7.5 | 0.6         |
| .10                     | 167104*100A-F       | 184104*100#A>-F       | 0.413  | 0.138 | 0.276 | 0.295 | 0.024       | 10.5        | 3.5 | 7.0  | 7.5 | 0.6         |
| .12                     | 167124*100B-F       | 184124*100#B>-F       | 0.413  | 0.157 | 0.354 | 0.295 | 0.024       | 10.5        | 4.0 | 9.0  | 7.5 | 0.6         |
| .15                     | 167154*100B-F       | 184154*100#B>-F       | 0.413  | 0.157 | 0.354 | 0.295 | 0.024       | 10.5        | 4.0 | 9.0  | 7.5 | 0.6         |
| .22                     | 167224*100C-F       | 184224*100#C>-F       | 0.413  | 0.197 | 0.433 | 0.295 | 0.024       | 10.5        | 5.0 | 11.0 | 7.5 | 0.6         |
| .33                     | 167334*100C-F       | 184334*100#C>-F       | 0.413  | 0.197 | 0.433 | 0.295 | 0.024       | 10.5        | 5.0 | 11.0 | 7.5 | 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, C = 16.0 mm (See H dimension in taping specifications)

# Type 167/184 Metallized Polyester Radial Lead Capacitors

| Cap<br>( $\mu$ F)        | Catalog<br>Part Number | Tape & Reel<br>Ammo Pack | Inches |       |       |       |               | Millimeters |     |      |     |               |
|--------------------------|------------------------|--------------------------|--------|-------|-------|-------|---------------|-------------|-----|------|-----|---------------|
|                          |                        |                          | L      | T     | H     | S     | $\emptyset$ d | L           | T   | H    | S   | $\emptyset$ d |
| <b>250 Vdc / 160 Vac</b> |                        |                          |        |       |       |       |               |             |     |      |     |               |
| .010                     | 167103*250A-F          | 184103*250#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .015                     | 167153*250A-F          | 184153*250#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .018                     | 167183*250A-F          | 184183*250#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .022                     | 167223*250A-F          | 184223*250#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .027                     | 167273*250B-F          | 184273*250#B>-F          | 0.413  | 0.157 | 0.354 | 0.295 | 0.024         | 10.5        | 4.0 | 9.0  | 7.5 | 0.6           |
| .033                     | 167333*250B-F          | 184333*250#B>-F          | 0.413  | 0.157 | 0.354 | 0.295 | 0.024         | 10.5        | 4.0 | 9.0  | 7.5 | 0.6           |
| .039                     | 167393*250B-F          | 184393*250#B>-F          | 0.413  | 0.157 | 0.354 | 0.295 | 0.024         | 10.5        | 4.0 | 9.0  | 7.5 | 0.6           |
| .047                     | 167473*250B-F          | 184473*250#B>-F          | 0.413  | 0.157 | 0.354 | 0.295 | 0.024         | 10.5        | 4.0 | 9.0  | 7.5 | 0.6           |
| .068                     | 167683*250C-F          | 184683*250#C>-F          | 0.413  | 0.197 | 0.433 | 0.295 | 0.024         | 10.5        | 5.0 | 11.0 | 7.5 | 0.6           |
| .100                     | 167104*250C-F          | 184104*250#C>-F          | 0.413  | 0.197 | 0.433 | 0.295 | 0.024         | 10.5        | 5.0 | 11.0 | 7.5 | 0.6           |
| <b>400 Vdc / 200 Vac</b> |                        |                          |        |       |       |       |               |             |     |      |     |               |
| .0047                    | 167472*400A-F          | 184472*400#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .0056                    | 167562*400A-F          | 184562*400#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .0068                    | 167682*400A-F          | 184682*400#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .010                     | 167103*400A-F          | 184103*400#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .015                     | 167153*400B-F          | 184153*400#B>-F          | 0.413  | 0.157 | 0.354 | 0.295 | 0.024         | 10.5        | 4.0 | 9.0  | 7.5 | 0.6           |
| .022                     | 167223*400C-F          | 184223*400#C>-F          | 0.413  | 0.197 | 0.433 | 0.295 | 0.024         | 10.5        | 5.0 | 11.0 | 7.5 | 0.6           |
| .033                     | 167333*400C-F          | 184333*400#C>-F          | 0.413  | 0.197 | 0.433 | 0.295 | 0.024         | 10.5        | 5.0 | 11.0 | 7.5 | 0.6           |
| <b>630 Vdc / 220 Vac</b> |                        |                          |        |       |       |       |               |             |     |      |     |               |
| .0010                    | 167102*630A-F          | 184102*630#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .0015                    | 167152*630A-F          | 184152*630#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .0022                    | 167222*630A-F          | 184222*630#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .0033                    | 167332*630A-F          | 184332*630#A>-F          | 0.413  | 0.138 | 0.276 | 0.295 | 0.024         | 10.5        | 3.5 | 7.0  | 7.5 | 0.6           |
| .0047                    | 167472*630B-F          | 184472*630#B>-F          | 0.413  | 0.157 | 0.354 | 0.295 | 0.024         | 10.5        | 4.0 | 9.0  | 7.5 | 0.6           |
| .0068                    | 167682*630B-F          | 184682*630#B>-F          | 0.413  | 0.157 | 0.354 | 0.295 | 0.024         | 10.5        | 4.0 | 9.0  | 7.5 | 0.6           |
| .010                     | 167103*630C-F          | 184103*630#C>-F          | 0.413  | 0.197 | 0.433 | 0.295 | 0.024         | 10.5        | 5.0 | 11.0 | 7.5 | 0.6           |
| .015                     | 167153*630D-F          | 184153*630#D>-F          | 0.413  | 0.236 | 0.472 | 0.295 | 0.024         | 10.5        | 6.0 | 12.0 | 7.5 | 0.6           |

\* Indicates capacitance tolerance: J =  $\pm$ 5%, K =  $\pm$ 10%, M =  $\pm$ 20%

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

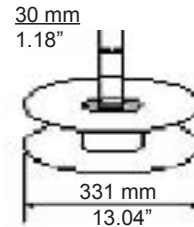
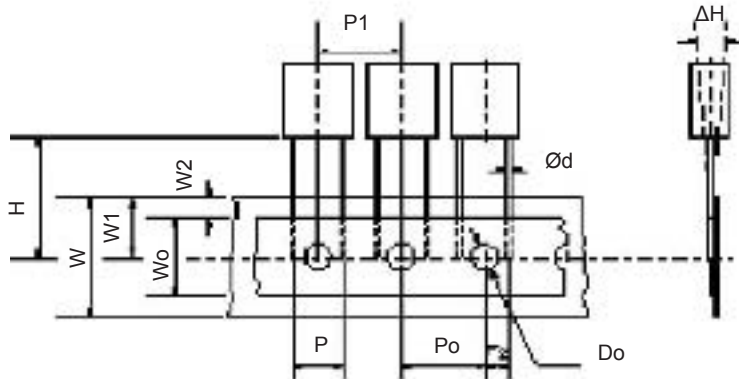
> Indicates tooling code: A = 16.5 mm, B = 18.5 mm, C = 16.0 mm (See H dimension in taping specification)

## Part Numbering System for Bulk Items

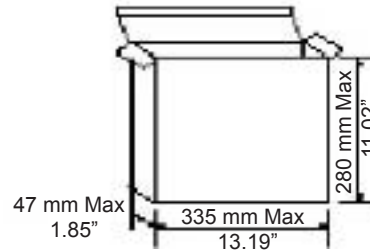
|               |                     |                  |                |                  |                                  |
|---------------|---------------------|------------------|----------------|------------------|----------------------------------|
| <b>167</b>    | <b>104</b>          | <b>K</b>         | <b>100</b>     | <b>A</b>         | <b>-F</b>                        |
|               |                     |                  |                |                  |                                  |
| <b>Series</b> | <b>Capacitance</b>  | <b>Tolerance</b> | <b>Voltage</b> | <b>Case Code</b> | <b>RoHS Compliant Designator</b> |
| 167           | 392 = .0039 $\mu$ F | J = $\pm$ 5%     | 63 = 63 Vdc    | A                |                                  |
|               | 103 = .01 $\mu$ F   | K = $\pm$ 10%    | 100 = 100 Vdc  | B                |                                  |
|               | 104 = .1 $\mu$ F    | M = $\pm$ 20%    | 250 = 250 Vdc  | C                |                                  |
|               | 105 = 1.0 $\mu$ F   |                  | 630 = 630 Vdc  | D                |                                  |

# Type 167/184 Metallized Polyester Radial Lead Capacitors

## Tape Specification - 7.5 mm Lead Spacing



Reel  
Packing



Ammo Box  
Packing

| Item                                 | Code           | Millimeters                | Inches                        |
|--------------------------------------|----------------|----------------------------|-------------------------------|
| Lead-Wire Diameter                   | Ød             | 0.6 <sup>+0.04 -0.01</sup> | .024 <sup>±.001</sup>         |
| Lead-to-Lead Distance                | P              | 7.5 <sup>+0.6 -0.2</sup>   | .295 <sup>+0.024 -0.040</sup> |
| Feed Hole Pitch                      | P <sub>0</sub> | 2.7 <sup>±0.3</sup>        | .5 <sup>±.012</sup>           |
| Pitch of Component                   | P <sub>1</sub> | 12.7 <sup>±1.0</sup>       | .5 <sup>±.039</sup>           |
| Hole Center to Lead                  | P <sub>2</sub> | 8.95 <sup>±0.7</sup>       | .352 <sup>±.028</sup>         |
| Component Alignment, F-R             | Δh             | 0 <sup>±2.0</sup>          | 0 <sup>±.079</sup>            |
| Tape Width                           | W              | 18 <sup>+1.0 -0.1</sup>    | .709 <sup>+0.039 -0.004</sup> |
| Hold-down Tape Width                 | W <sub>0</sub> | 6.0 min                    | .236 min                      |
| Hole Position                        | W <sub>1</sub> | 9.0 <sup>+0.75 -0.05</sup> | .355 <sup>+0.030 -0.001</sup> |
| Hold-down Tape Position              | W <sub>2</sub> | 3.0 Max                    | .118 Max                      |
| Height of Component from Tape Center | H              | >                          | >                             |
| Feed Hole Diameter                   | D <sub>0</sub> | 4.0 <sup>±0.3</sup>        | .157 <sup>±.012</sup>         |

| Case Code | Quantity Reeled | Quantity Ammo Pack |
|-----------|-----------------|--------------------|
| A         | 1800            | 1500               |
| B         | 1500            | 1500               |
| C         | 1200            | 1000               |
| D         | 1000            | 1000               |

> 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 <sup>±0.75</sup> | .679 <sup>±.030</sup> |
| B            | 18.5 <sup>±0.75</sup> | .728 <sup>±.030</sup> |
| C            | 16.0 <sup>±0.75</sup> | .630 <sup>±.030</sup> |

## Part Numbering System for Auto Insertion

|        |                |           |               |
|--------|----------------|-----------|---------------|
| 184    | 104            | K         | 100           |
| Series | Capacitance    | Tolerance | Voltage       |
| 184    | 392 = .0039 µF | J = ±5%   | 63 = 63 Vdc   |
|        | 103 = .01 µF   | K = ±10%  | 100 = 100 Vdc |
|        | 104 = .1 µF    | M = ±20%  | 250 = 250 Vdc |
|        | 105 = 1.0 µF   |           | 630 = 630 Vdc |

|                    |           |                   |                           |
|--------------------|-----------|-------------------|---------------------------|
| R                  | A         | B                 | -F                        |
| Packaging Type (#) | Case Code | *Tooling Code (>) | RoHS Compliant Designator |
| A = Ammo           | A         | A                 |                           |
| R = Tape & Reel    | B         | B                 |                           |
|                    | C         | C                 |                           |
|                    | D         |                   |                           |

\* Tooling code is at the discretion of the user depending on the insertion equipment being used.

See table for specific "H" dimensions

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