

# 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

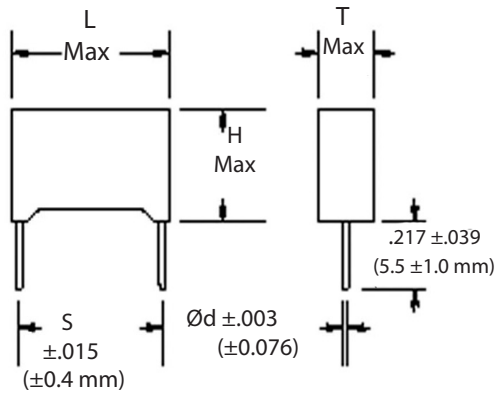
- Rugged plastic case
- Case and epoxy fill meets UL94V0
- 7.5 mm (0.3") lead spacing
- Bulk, tape and reel or ammo pack
- Non-inductively wound
- Non-polar

### Specifications

Capacitance Range	0.001 $\mu$ F to 10.0 $\mu$ F													
Capacitance Tolerance	$\pm$ 5%, $\pm$ 10%, $\pm$ 20%													
Rated Voltage	63 to 630 Vdc													
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 s @ +25 $^{\circ}$ C $\pm$ 5 $^{\circ}$ C													
Dissipation Factor @ 120 Hz, +25 $^{\circ}$ C	$\text{tg}\delta \times 10^{-4}$ at +25 $^{\circ}$ C $\pm$ 5 $^{\circ}$ C <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="color: red;">kHz</th> <th style="color: red;"><math>\text{tan}\delta \times 10^{-4}</math></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;"><math>\leq</math>100</td> </tr> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;"><math>\leq</math>150</td> </tr> </tbody> </table>		kHz	$\text{tan}\delta \times 10^{-4}$	1	$\leq$ 100	10	$\leq$ 150						
kHz	$\text{tan}\delta \times 10^{-4}$													
1	$\leq$ 100													
10	$\leq$ 150													
Total Self Inductance (L)	Approximately 8 nH													
Maximum Pulse Rise Time (dv/dt)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="color: red;">Vn</th> <th style="color: red;">V/<math>\mu</math>s</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">63</td> <td style="text-align: center;">12</td> </tr> <tr> <td style="text-align: center;">100</td> <td style="text-align: center;">20</td> </tr> <tr> <td style="text-align: center;">250</td> <td style="text-align: center;">32</td> </tr> <tr> <td style="text-align: center;">400</td> <td style="text-align: center;">41</td> </tr> <tr> <td style="text-align: center;">630</td> <td style="text-align: center;">70</td> </tr> </tbody> </table> <p>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.</p>		Vn	V/ $\mu$ s	63	12	100	20	250	32	400	41	630	70
Vn	V/ $\mu$ s													
63	12													
100	20													
250	32													
400	41													
630	70													
Long Term Stability (after two years)	Storage Performance Capacitance Change $\Delta C/C \leq \pm 3\%$	Standard Environmental Conditions												
<a href="#">RoHS Compliant</a>														

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## Capacitor Outline Drawing



Soldering	
<b>Test Conditions</b>	
Soldering Temperature	260 °C ±5 °C
Soldering Duration	10 sec ±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 ±5 °C
Voltage Charge Time	1 minute
Voltage Charge	50 Vdc for $V_n < 100$ Vdc 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 $C \leq 0.1 \mu\text{F}$ $\geq 1,000$ 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

Cap ( $\mu\text{F}$ )	Catalog Part Number	Tape & Reel Ammo Pack	Inches					Millimeters				
			L	T	H	S	$\text{\O}d$	L	T	H	S	$\text{\O}d$
<b>63 Vdc</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</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 ( $\mu$ F)	Catalog Part Number	Tape & Reel Ammo Pack	Inches					Millimeters				
			L	T	H	S	$\emptyset$ d	L	T	H	S	$\emptyset$ d
<b>250 Vdc</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</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</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

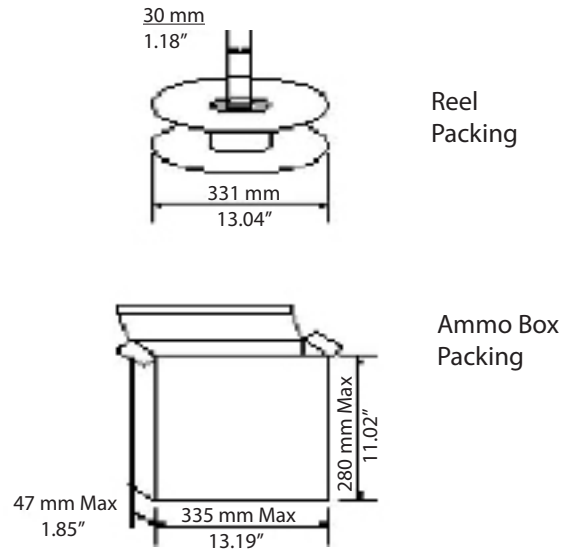
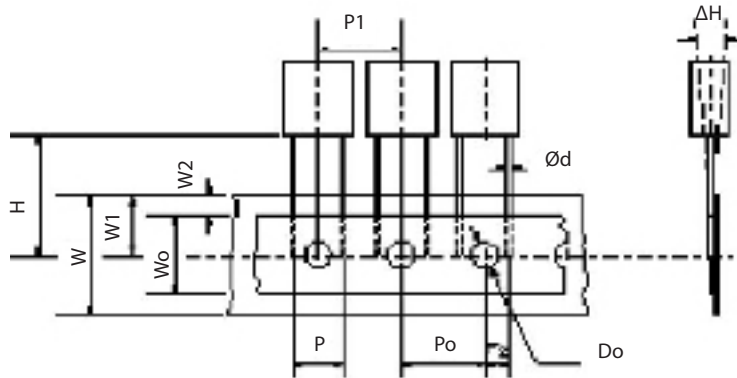
> Indicates tooling code: A = 16.5 mm, B = 18.5 mm, C = 16.0 mm (See H dimension in taping specification)

## 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



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 -.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>	3.75 <sup>±0.7</sup>	.148 <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 -.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 -.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>±0.030</sup>
B	18.5 <sup>±0.75</sup>	.728 <sup>±0.030</sup>
C	16.0 <sup>±0.75</sup>	.630 <sup>±0.030</sup>

## Part Numbering System for Auto Insertion

184	104	K	100	(#)	A	(>)	-F
<b>Series</b>	<b>Capacitance</b>	<b>Tolerance</b>	<b>Voltage</b>	<b>Packaging Type</b>	<b>Internal Code</b>	<b>*Tooling Code</b>	<b>RoHS Compliant Designator</b>
184	392 = .0039 µF	J = ±5%	63 = 63 Vdc	A = Ammo	A	A	
	103 = .01 µF	K = ±10%	100 = 100 Vdc	R = Tape & Reel	B	B	
	104 = .1 µF	M = ±20%	250 = 250 Vdc	Blank = Bulk	C	C	
	105 = 1.0 µF		630 = 630 Vdc		D	Blank = Bulk	

\* 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.

## **Type 167/184 Metallized Polyester Radial Lead Capacitors**

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