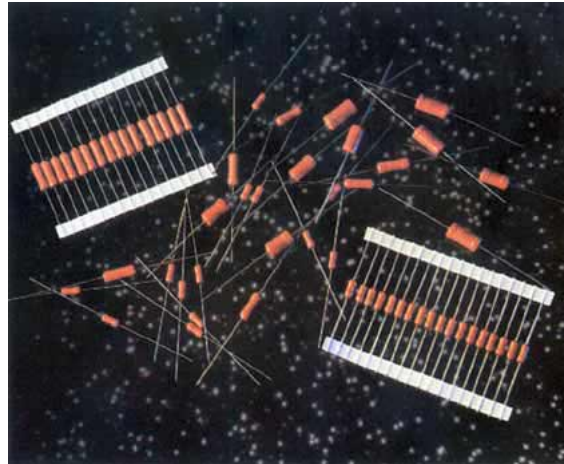


**Type 192P Pacer®**  
**Miniature, Sleeved**  
**Polyester Film/Foil Capacitors**

**Features**

- Axial-lead, designed for automatic insertion.
- Non-inductively wound, extended foil construction.
- Lead wire has metal end cap for solid, highly reliable connection to extended foil.
- Moisture resistant. Encased in orange, polyolefin sleeve.



**Specifications**

**Capacitance Range:**

100 pF to .39  $\mu$ F

**Capacitance Tolerance:**

$\pm$ 5%,  $\pm$ 10%,  $\pm$ 20%

**Voltage Ratings:**

80 to 600 Volts D-C

55 to 200 Volts A-C

**Operating Temperature Range:**

-55°C to +85°C (at full voltage)

up to +125°C with derating

**Voltage Derating:**

At +105°C, 70% of +85°C rating.

At +125°C, 50% of +85°C rating.

**Lead Wire:**

Tinned copper-clad steel,

See standard sizes/ratings table for size.

**Insulation Resistance:**

100,000 M $\Omega$  minimum at +25°C

15,000 M $\Omega$  minimum at +85°C

2,000 M $\Omega$  minimum at +105°C

200 M $\Omega$  minimum at +125°C

**Pulse Rise Time, dV/dt:**

See tabulated data.

**Dissipation Factor:**

1.0% Maximum

**Encasement:**

Capacitor is protected by an orange, heat-shrunk, polyolefin sleeve with an epoxy end pour.

**Dielectric:**

Polyester film.

**Construction:**

Non-inductively wound with extended aluminumfoil.

**Applications:**

Power supplies, instrumentation, communication equipment and many general purpose applications.

Dimensions in inches, metric (mm) in parenthesis.

## General Specifications

The Type 192P Pacer® is manufactured with Polyester film and extended foil. The 192P's unique construction regarding the metal end cap and lead wire assembly offers a rugged connection of the terminal wire to the extended foil. This connection allows for a unit with minimal inductance.

The metal end cap assembly and its highly reliable, welded connection to the extended foil give the 192P a distinct advantage over a metallized polyester film capacitor for pulse applications.

Other specifications are listed below and on the following pages.

### Operating Temperature Range:

The standard operating temperature range for polyester film is -55°C to +85°C. The 192P may be operated at full voltage within this temperature range.

The 192P may be operated up to +105°C provided the DC working voltage is reduced to 70% of the +85°C rating (full rating), and up to +125°C with a 50% reduction from the +85°C rating (full rating).

For more specific details regarding operation above +85°C please contact our design engineering department.

The maximum operating temperature for the 192P polyester film capacitors is +125°C.

### Dielectric Withstanding Voltage:

Units shall withstand a DC potential of 200% of rated voltage applied between terminals for one (1) minute.

### AC Voltage Applications:

The A-C component of the 192P's voltage rating has been specified to assure that corona will not be encountered when the capacitor is operated within the noted specifications. We encourage you to contact us if you have any concerns about operating voltage, temperature limits, etc.

### Lead Pull Test:

5 lbs. (2.3 Kg) for 1 minute. No damage.

### Lead Bend Test:

After 3 consecutive 180° bends. No damage.

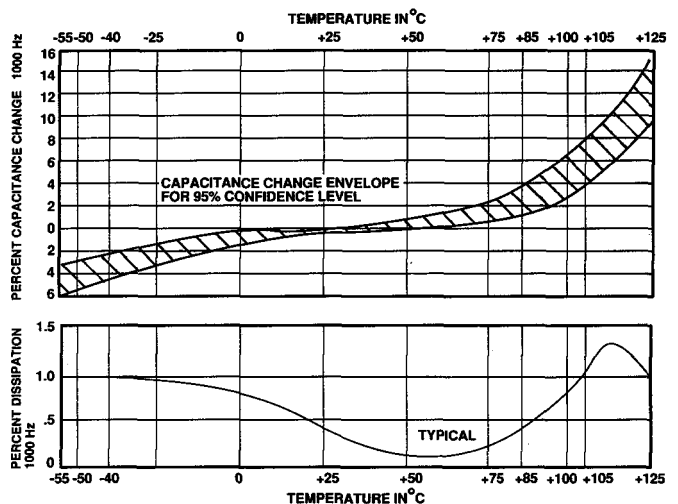
### Humidity Testing:

Units subjected to 95% relative humidity for 500 hours with no voltage applied at +40°C. After 4 hours of drying, insulation resistance shall be no less than 50% of initial limit, and units shall have no visible damage.

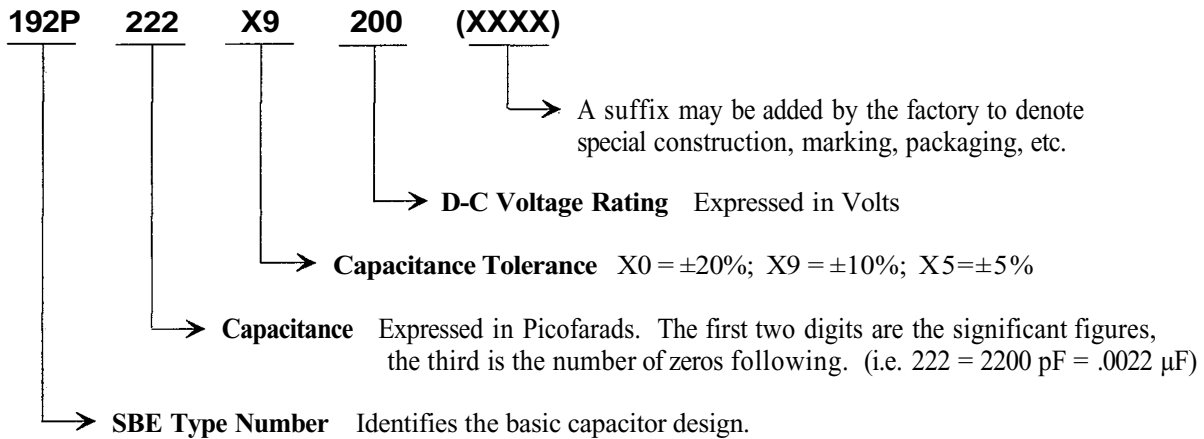
### DC Voltage Life Test:

250 hours at +85°C at 150% of rated voltage. After test; capacitance shall not have changed by more than ±10% of initial value, insulation resistance shall not have decreased by more than 50% of initial value and dissipation factor shall not have increased to more than 1.0%. In addition, there should be no open or short circuits, and no sign of visible damage.

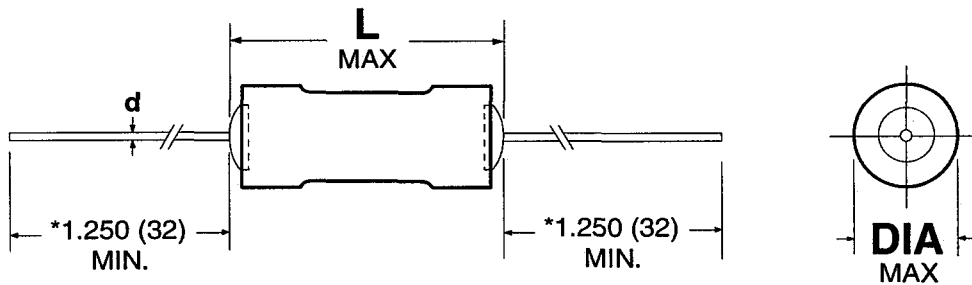
### Typical Temperature Characteristics:



## Ordering/Part Number Information



## Dimensions



\* The minimum lead length of 1.250 (32) applies to units supplied in Bulk package.

## Standard Marking Format

Marking	Description	Tolerance codes per EIA standards	
SBE	SB Electronics identification		
192P	Type number		
200V	D-C Voltage rating, Volts	J	±5%
222K	Capacitance and tolerance code	K	±10%
9810	Weekly date code (i.e. 10th week of 1998)	M	±20%



## Type 192 P Standard Sizes/Ratings<sup>3</sup>

Value, $\mu$ F	Part Number <sup>1</sup>	LMAX	DIA MAX	d (wire)	Value, $\mu$ F	Part Number <sup>1</sup>	LMAX	DIA MAX	d (wire)
<b>80 VDC / 55 VAC<sup>2</sup></b>					<b>200 VDC / 140 VAC<sup>2</sup></b>				
.0022	192P222X9080 *	.437(11.1)	.153(3.9)	.025(0.6)	.00047	192P471X9200	.437(11.1)	.153(3.9)	.025 (0.6)
.0027	192P272X9080	.437(11.1)	.153(3.9)	.025(0.6)	.00056	192P561X9200	.437(11.1)	.153(3.9)	.025 (0.6)
.0033	192P332X9080	.437(11.1)	.153(3.9)	.025(0.6)	.00068	192P681X9200	.437(11.1)	.153(3.9)	.025 (0.6)
.0039	192P392X9080	.437(11.1)	.153(3.9)	.025(0.6)	.00082	192P821X9200	.437(11.1)	.153(3.9)	.025 (0.6)
.0047	192P472X9080 *	.437(11.1)	.153(3.9)	.025(0.6)	.001	192P102X9200*	.437(11.1)	.153(3.9)	.025 (0.6)
.0056	192P562X9080	.500(12.7)	.185(4.7)	.025(0.6)	.0012	192P122X9200	.437(11.1)	.153(3.9)	.025 (0.6)
.0068	192P682X9080	.500(12.7)	.185(4.7)	.025(0.6)	.0015	192P152X9200	.437(11.1)	.153(3.9)	.025 (0.6)
.0082	192P822X9080	.500(12.7)	.185(4.7)	.025(0.6)	.0018	192P182X9200	.437(11.1)	.185(4.7)	.025 (0.6)
.01	192P103X9080 *	.500(12.7)	.185(4.7)	.025(0.6)	.0022	192P222X9200 *	.437(11.1)	.185(4.7)	.025 (0.6)
.012	192P123X9080	.562(14.3)	.185(4.7)	.025(0.6)	.0027	192P272X9200	.437(11.1)	.185(4.7)	.025 (0.6)
.015	192P153X9080 *	.562(14.3)	.185(4.7)	.025(0.6)	.0033	192P332X9200	.437(11.1)	.185(4.7)	.025 (0.6)
.018	192P183X9080	.625(15.9)	.185(4.7)	.025(0.6)	.0039	192P392X9200	.562 (14.3)	.185(4.7)	.025 (0.6)
.022	192P223X9080	.625(15.9)	.185(4.7)	.025(0.6)	.0047	192P472X9200 *	.562 (14.3)	.185(4.7)	.025 (0.6)
.027	192P273X9080	.562(14.3)	.229(5.8)	.032(0.8)	.0056	192P562X9200	.562 (14.3)	.185(4.7)	.025 (0.6)
.033	192P333X9080	.562(14.3)	.229(5.8)	.032(0.8)	.0068	192P682X9200	.562 (14.3)	.185(4.7)	.025 (0.6)
.039	192P393X9080	.687(17.5)	.229(5.8)	.032(0.8)	.0082	192P822X9200	.625(15.9)	.185(4.7)	.025 (0.6)
.047	192P473X9080 *	.687(17.5)	.229(5.8)	.032(0.8)	.01	192P103X9200*	.625(15.9)	.185(4.7)	.025 (0.6)
.056	192P563X9080	.687(17.5)	.250(6.4)	.032(0.8)	.012	192P123X9200	.562(14.3)	.229 (5.8)	.032 (0.8)
.068	192P683X9080	.687(17.5)	.250(6.4)	.032(0.8)	.015	192P153X9200	.562(14.3)	.229 (5.8)	.032 (0.8)
.082	192P823X9080	.645(16.4)	.315(8.0)	.032(0.8)	.018	192P183X9200	.687(17.5)	.229 (5.8)	.032 (0.8)
.1	192P104X9080 *	.645(16.4)	.315(8.0)	.032(0.8)	.022	192P223X9200	.687(17.5)	.229 (5.8)	.032 (0.8)
.12	192P124X9080	.770(19.6)	.315(8.0)	.032(0.8)	.027	192P273X9200	.687 (17.5)	.250 (6.4)	.032 (0.8)
.15	192P154X9080	.770(19.6)	.315(8.0)	.032(0.8)	.033	192P333X9200	.687 (17.5)	.250 (6.4)	.032 (0.8)
.18	192P184X9080	.770(19.6)	.343(8.7)	.032(0.8)	.039	192P393X9200	.645(16.4)	.315(8.0)	.032 (0.8)
.22	192P224X9080	.770(19.6)	.343(8.7)	.032(0.8)	.047	192P473X9200	.645(16.4)	.315(8.0)	.032 (0.8)
.27	192P274X9080	1.020(25.9)	.343(8.7)	.032(0.8)	.056	192P563X9200	.770(19.6)	.315(8.0)	.032 (0.8)
.33	192P334X9080	1.332(33.8)	.343(8.7)	.032(0.8)	.068	192P683X9200	.770(19.6)	.315(8.0)	.032 (0.8)
.39	192P394X9080	1.332(33.8)	.343(8.7)	.032(0.8)	.082	192P823X9200	.770(19.6)	.343 (8.7)	.032 (0.8)
<b>200 VDC / 140 VAC<sup>2</sup></b>					.1	192P104X9200*	.770(19.6)	.343 (8.7)	.032 (0.8)
.0001	192P101X9200	.437(11.1)	.153(3.9)	.025 (0.6)	.12	192P124X9200	1.020(25.9)	.343 (8.7)	.032 (0.8)
.00012	192P121X9200	.437(11.1)	.153(3.9)	.025 (0.6)	.15	192P154X9200	1.020(25.9)	.343 (8.7)	.032 (0.8)
.00015	192P151X9200	.437(11.1)	.153(3.9)	.025 (0.6)	.18	192P184X9200	1.332(33.8)	.343 (8.7)	.032 (0.8)
.00018	192P181X9200	.437(11.1)	.153(3.9)	.025 (0.6)	.22	192P224X9200	1.332(33.8)	.343 (8.7)	.032 (0.8)
.00022	192P221X9200	.437(11.1)	.153(3.9)	.025 (0.6)	.00027	192P271X9200	.437(11.1)	.153(3.9)	.025 (0.6)
.00027	192P271X9200	.437(11.1)	.153(3.9)	.025 (0.6)	.00033	192P331X9200	.437(11.1)	.153(3.9)	.025 (0.6)
.00033	192P331X9200	.437(11.1)	.153(3.9)	.025 (0.6)	.00039	192P391X9200	.437(11.1)	.153(3.9)	.025 (0.6)
.00039	192P391X9200	.437(11.1)	.153(3.9)	.025 (0.6)					

<sup>1</sup> To complete part number for specific tolerance, packaging, etc. please refer to Ordering/Part Number Information page.

<sup>2</sup> 60 Hz., RMS

<sup>3</sup> Shaded part numbers are Standard Stock items available through the Sprague/Vishay Distribution Network. Packaging for these items is Bulk. However, part numbers indicated by an asterisk (\*) are also available in Tape & Reel packaging as Standard Stock items (see Ordering and Packaging information for complete part number, i.e. 192P222X9080P303). Standard capacitance tolerance is  $\pm 10\%$  for these Stock items. In addition there are four part numbers available as Stock items with  $\pm 5\%$  tolerance; they are 192P103X5080, 192P223X5080, 192P473X5080 and 192P104X5080. Any other part number, capacitance value, tolerance or packaging option is also available through the Sprague/Vishay Distribution Network on special order.

Dimensions in inches, metric (mm) in parenthesis.



## Type 192P Standard Sizes/Ratings<sup>3</sup>

Value, $\mu$ F	Part Number	L MAX	DIA MAX	d (wire)	Value, $\mu$ F	Part Number <sup>1</sup>	L MAX	DIA MAX	d (wire)
<b>400 VDC / 200 VAC<sup>2</sup></b>					<b>600 VDC / 200 VAC<sup>2</sup></b>				
.00047	192P471X9400	.500 (12.7)	.185(4.7)	.025 (0.6)	.00047	192P471X9600	.562(14.3)	.185(4.7)	.025 (0.6)
.00056	192P561X9400	.500 (12.7)	.185(4.7)	.025 (0.6)	.00056	192P561X9600	.562(14.3)	.185(4.7)	.025 (0.6)
.00068	192P681X9400	.500 (12.7)	.185(4.7)	.025 (0.6)	.00068	192P681X9600	.562(14.3)	.185(4.7)	.025 (0.6)
.00082	192P821X9400	.500 (12.7)	.185(4.7)	.025 (0.6)	.00082	192P821X9600	.645(16.4)	.185(4.7)	.025 (0.6)
.001	192P102X9400	.500(12.7)	.185(4.7)	.025 (0.6)	.001	192P102X9600	.645(16.4)	.185(4.7)	.025 (0.6)
.0012	192P122X9400	.500 (12.7)	.185(4.7)	.025 (0.6)	.0012	192P122X9600	.562(14.3)	.229 (5.8)	.032 (0.8)
.0015	192P152X9400	.500 (12.7)	.185(4.7)	.025 (0.6)	.0015	192P152X9600	.562(14.3)	.229 (5.8)	.032 (0.8)
.0018	192P182X9400	.562(14.3)	.185(4.7)	.025 (0.6)	.0018	192P182X9600	.687(17.5)	.229 (5.8)	.032 (0.8)
.0022	192P222X9400	.562(14.3)	.185(4.7)	.025 (0.6)	.0022	192P222X9600	.687(17.5)	.229 (5.8)	.032 (0.8)
.0027	192P272X9400	.562(14.3)	.229 (5.8)	.032 (0.8)	.0027	192P272X9600	.687(17.5)	.250 (6.4)	.032 (0.8)
.0033	192P332X9400	.562(14.3)	.229 (5.8)	.032 (0.8)	.0033	192P332X9600	.687(17.5)	.250 (6.4)	.032 (0.8)
.0039	192P392X9400	.562(14.3)	.229 (5.8)	.032 (0.8)	.0039	192P392X9600	.770(19.6)	.315(8.0)	.032 (0.8)
.0047	192P472X9400	.562(14.3)	.229 (5.8)	.032 (0.8)	.0047	192P472X9600	.770(19.6)	.315(8.0)	.032 (0.8)
.0056	192P562X9400	.687(17.5)	.250 (6.4)	.032 (0.8)	.0056	192P562X9600	.770(19.6)	.315(8.0)	.032 (0.8)
.0068	192P682X9400	.687(17.5)	.250 (6.4)	.032 (0.8)	.0068	192P682X9600	.770(19.6)	.315(8.0)	.032 (0.8)
.0082	192P822X9400	.687(17.5)	.250 (6.4)	.032 (0.8)	.0082	192P822X9600	.770(19.6)	.343 (8.7)	.032 (0.8)
.01	192P103X9400	.687(17.5)	.250 (6.4)	.032 (0.8)	.01	192P103X9600	.770(19.6)	.343 (8.7)	.032 (0.8)
.012	192P123X9400	.645(16.4)	.315(8.0)	.032 (0.8)	.012	192P123X9600	1.020(25.9)	.343 (8.7)	.032 (0.8)
.015	192P153X9400	.645(16.4)	.315(8.0)	.032 (0.8)	.015	192P153X9600	1.020(25.9)	.343 (8.7)	.032 (0.8)
.018	192P183X9400	.770(19.6)	.315(8.0)	.032 (0.8)	.018	192P183X9600	1.020(25.9)	.343 (8.7)	.032 (0.8)
.022	192P223X9400	.770(19.6)	.315(8.0)	.032 (0.8)	.022	192P223X9600	1.020(25.9)	.343 (8.7)	.032 (0.8)
.027	192P273X9400	.770(19.6)	.343 (8.7)	.032 (0.8)	.027	192P273X9600	1.332(33.8)	.343 (8.7)	.032 (0.8)
.033	192P333X9400	.770(19.6)	.343 (8.7)	.032 (0.8)	.033	192P333X9600	1.332(33.8)	.343 (8.7)	.032 (0.8)
.039	192P393X9400	1.020(25.9)	.343 (8.7)	.032 (0.8)					
.047	192P473X9400	1.020(25.9)	.343 (8.7)	.032 (0.8)					
.056	192P563X9400	1.332(33.8)	.343 (8.7)	.032 (0.8)					
.068	192P683X9400	1.332(33.8)	.343 (8.7)	.032 (0.8)					

<sup>1</sup> To complete part number for specific tolerance, packaging, etc. please refer to Ordering/Part Number Information page.

<sup>2</sup> 60 Hz., RMS

<sup>3</sup> Shaded part numbers are Standard Stock items available through the Sprague/Vishay Distribution Network. Packaging for these items is Bulk. However, part numbers indicated by an asterisk (\*) are also available in Tape & Reel packaging as Standard Stock items (see Ordering and Packaging information for complete part number, i.e. 192P222X9080P303). Standard capacitance tolerance is  $\pm 10\%$  for these Stock items. In addition there are four part numbers available as Stock items with  $\pm 5\%$  tolerance; they are 192P103X5080, 192P223X5080, 192P473X5080 and 192P104X5080. Any other part number, capacitance value, tolerance or packaging option is also available through the Sprague/Vishay Distribution Network on special order.



## dV/dt Specifications

**Maximum Pulse Rise Time (dV/dt) in Volts/usec**

Cap Value (μF)	80V	200V	400V	600V
.0001	-	27900	-	-
.00012	-	25500	-	-
.00015	-	22800	-	-
.00018	-	20800	-	-
.00022	-	18800	-	-
.00027	-	17000	-	-
.00033	-	15400	-	-
.00039	-	14100	-	-
.00047	-	12900	16100	20300
.00056	-	11800	14800	18600
.00068	-	10700	13400	16900
.00082	-	9800	12200	15100
.001	-	8800	11000	13600
.0012	-	8100	10100	12700
.0015	-	7200	9000	11400
.0018	-	6600	8100	10400
.0022	4500	6000	7300	9400
.0027	4000	5400	6600	8000
.0033	3600	4900	6000	7200
.0039	3400	4400	5500	6700
.0047	3100	4000	5000	6100
.0056	2800	3700	4300	5700
.0068	2500	3300	3900	5200
.0082	2300	3000	3600	4400
.01	2100	2700	3200	4000
.012	1900	2500	3000	3700
.015	1700	2200	2700	3300
.018	1500	1900	2300	2600
.022	1400	1700	2100	2300
.027	1200	1600	1900	2000
.033	1100	1400	1700	1800
.039	1000	1300	1400	-
.047	900	1200	1200	-
.056	800	1100	1100	-
.068	700	1000	1000	-
.082	700	900	-	-
.1	600	800	-	-
.12	500	600	-	-
.15	500	600	-	-
.18	400	500	-	-
.22	400	400	-	-
.27	300	-	-	-
.33	300	-	-	-
.39	200	-	-	-

Note: dV/dt ratings based on measurements made at the junction of the wire leads and capacitor body

## Packaging

### **Bulk Packaging**

Standard package quantity for units ordered in Bulk Pack is 500 pieces per bag. Please contact us if you require any special packaging.

### **Tape and Reel Packaging**

The 192P is also available on Tape & Reel, packaged in accordance with EIA specification EIA-296-E. Listed below, and on the following page, are standard Tape & Reel specifications. If you require a specific tape spacing, pitch, reel quantity, or any other specific parameter please contact us. We will be happy to provide you with additional information to meet your specific requirements.

## General Tape & Reel Specifications

### **Tape Leader**

Minimum of 12.0" (300) provided at both ends of the reel.

### **Splicing**

Spliced areas will be of equal strength to original tape and splicing tape will overlap a minimum of 2.0" (51) in each direction. Misalignment of tape splice shall be no greater than 0.031" (0.8). Staples shall not be used for splicing.

### **Component Taping**

Taping material used shall not cause any deterioration to lead solderability. Taping material shall also hold the units firmly as to prevent any movement during normal handling.

### **Missing Units**

The number of missing capacitors, empty spaces, shall not exceed 0.1 % of the total number of units on the reel. No consecutive missing units are allowed.

### **Protection of reeled units**

A strip of kraft paper is utilized to protect the units from damage as they are reeled. The kraft paper separates the layers of units on each reel. A final strip of corrugated cardboard is then wrapped around the outside of the reel to provide additional protection during shipping.

### **Container Packaging**

Reels shall be packaged in a cardboard box protected with Anti-Static bubble packing.

## Ordering/Part Number Information

To specify the standard Tape & Reel packaging as noted herein, in accordance with EIA-296-E, please refer to the table below (Please note: A suffix is not required when ordering Bulk Packaging)

### **<sup>1</sup>0.197" (5.0) Pitch/2.063" (52.4) Tape Spacing (formerly Class I)**

If unit "DIA" is	Add suffix to part #	Standard reel qty <sup>2</sup>
153" (3.9)	P303	3000
185" (4.7)	P304	3000

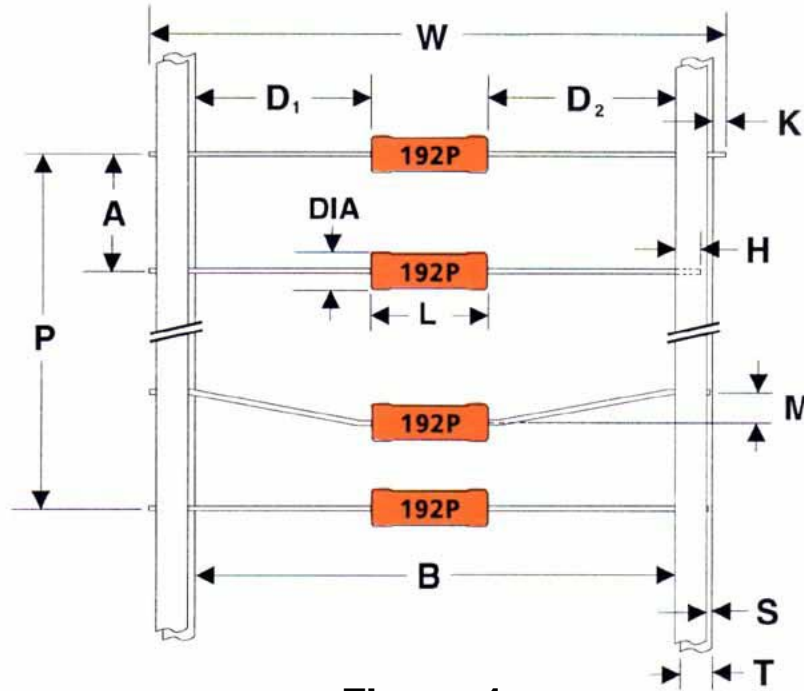
### **<sup>1</sup>0.394" (10.0) Pitch/2.50" (63.5) Tape Spacing (formerly Class II)**

If unit "DIA" is	Add suffix to part #	Standard reel qty <sup>2</sup>
.229" (5.8)	P305	1250
.250" (6.4)	P384	1000
.315" (8.0)	P347	1000
.343" (8.7)	P347	750

<sup>1</sup> Maximum unit diameter, DIA, must be less than nominal pitch.

<sup>2</sup> Typical quantity. Specific quantities can be reeled to meet your exact needs.

**Taping Specifications/Dimensions**  
(reference EIA-296-E)



**Figure 1**

Description/Notation	Dimensions/Tolerances	
Capacitor body diameter (DIA)	.153 (3.9) and .185(4.7)	.229(5.8) to .343 (8.7)
Inside tape spacing (B)	2.063 (52.4) ±0.059 (1.5)*	2.50 (63.5) ±0.059 (1.5)*
Pitch (A)	197 (5.0) ±0.020 (0.5)	.394 (10.0) ±0.020 (0.5)
Cumulative pitch, 6 consecutive units (P)	6 times "A" dimension ±0.059 (1.5)	
Eccentricity, centering tolerance (D <sub>1</sub> - D <sub>2</sub> )	.055 (1.4) Max.	
Lead extension (K)	.031 (0.8) Max.	
Lead into tape, sandwich (H)	½T Min.	
Tape width (T)	.250(6.4) ±0.015(0.4)	
Exposed adhesive (S)	.031 (0.8) Max.	
Lead bending, alignment (M)	.047 (1.2) Max.	
Overall width (W)	4.862 (123.5) Max.	
Capacitor body length (L)	Refer to standard sizes/ratings tables	

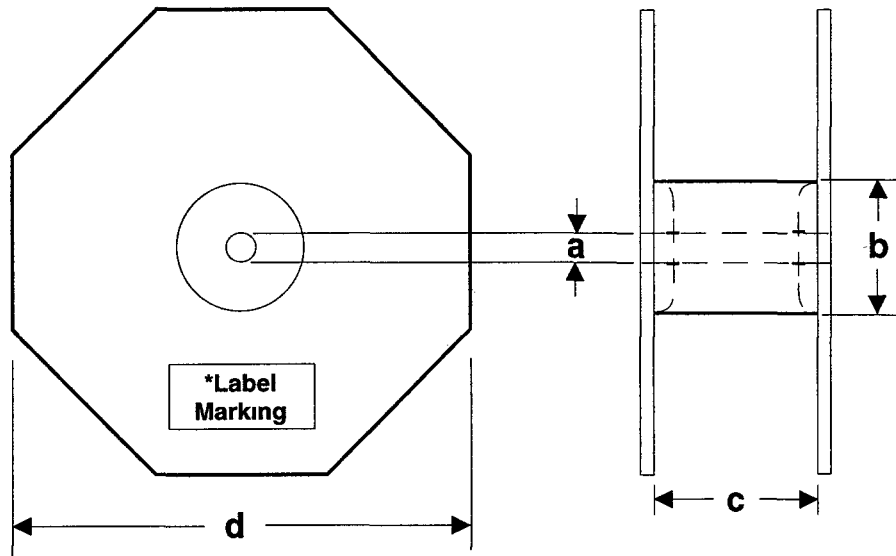
\* Previously recognized as Class I and Class II respectively. Class III tape spacing of 2.874 (73.0) is available upon request.

Note: Dimensions associated with lead wire originate from centerline of wire.

Dimensions in inches, metric (mm) in parenthesis.



**Reeling Specifications/Dimensions**  
(reference EIA-296-E)



**Figure 2**

Description/Notation	Dimensions
Arbor hole diameter (a)	.625(15.9)
Core outside diameter (b)	1.374 (34.9) to 3.626 (92.1)
Flange width (d)	10.5(266.7)
Inside flange spacing (c)	Governed by overall width of taped components (ref. "W" in Figure 1). Dimension shall be 0.059 (1.5) to 0.315 (8.0) greater than "W"

\*Label Marking shall include the following:

Customer part number	Product date code
SBE part number	Capacitance value
Manufacturer's name, SBE	Tolerance
Quantity	Voltage
Taping date	

Final note: In accordance with EIA-296-E metric dimensions shall govern.

Dimensions in inches, metric (mm) in parenthesis.