

### ■ Packaging Styles and Standard Packaging Quantities

Quantity : pcs./reel

Packaging Style Code	Packaging Styles	Size Thickness	0402	0603	0805		1206		
			T=0.5	T=0.8	T=0.85	T=1.25	T=0.85	T=1.15	T=1.6
E	φ180 reel	Paper taping (Pitch : 2 mm)	10,000	—	—	—	—	—	—
V		Paper taping (Pitch : 4 mm)	—	4,000	4,000	—	4,000	—	—
F		Embossed taping (Pitch : 4 mm)	—	—	—	3,000	—	3,000	—
Y			—	—	—	—	—	—	2,000

φ330 reel and Bulk case Type : Please contact us.

### ■ Temperature Characteristics

#### ● Class 2

Temperature Characteristic Code	Temperature Characteristics	Capacitance Change	Measurement Temperature Range	Reference Temperature
B, X	B	±10 %	-25 to 85 °C	20 °C
	X7R	±15 %	-55 to 125 °C	25 °C
	X5R	±15 %	-55 to 85 °C	25 °C
F	F	+30, -80 %	-25 to 85 °C	20 °C
	Y5V	+22, -82 %	-30 to 85 °C	25 °C

For applicable "Temperature Characteristics", see the lists of standard products on page 6 to 7.

### ■ Rated Voltage

Code	1H	1E	1C	1A	0J
Rated Voltage	DC 50 V	DC 25 V	DC 16 V	DC 10 V	DC 6.3 V

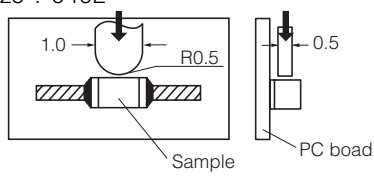
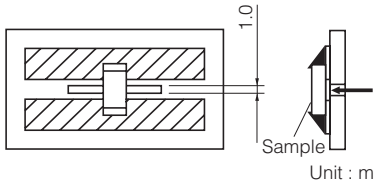
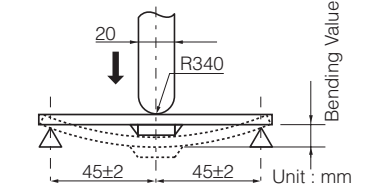
### ■ Nominal Capacitance

Ex.	105	225	106	226
Nominal Capacitance	1,000,000 pF (1 μF)	2,200,000 pF (2.2 μF)	10,000,000 pF (10 μF)	22,000,000 pF (22 μF)

### ■ Capacitance Tolerance

Class	Temperature Characteristics	Capacitance Tolerance Code	Capacitance Tolerance
2	B, X7R, X5R	K	±10 %
		M	±20 %
	F, Y5V	Z	+80, -20 %

### ■ Specifications and Testing Methods

Item	Specification	Test Method																														
Operating Temperature Range	Temp. Char. B, X7R : -55 to 125 °C Temp. Char. B, X5R : -55 to 85 °C Temp. Char. F, Y5V : -30 to 85 °C	—————																														
Dielectric Withstanding Voltage	No dielectric breakdown and/or damage	Test voltage : Rated voltage x250 % Duration:1 to 5 s. Charge / Discharge current: 50 mA max.																														
Insulation Resistance (I.R.)	500/C (MΩ) min. Note : 100/C(MΩ)min. for DC 10 V max. C : Nominal Cap. in μF	Measuring voltage : Rated voltage Duration : 60±5 s Charge / Discharge current: 50 mA max.																														
Capacitance	Within the specified tolerance	Measuring temperature: 20±2 °C Preconditioning: The capacitors shall be kept in temperature of 150 +0/-10 °C for 1 hour and subject to standard condition* 48±4 hours before initial measurement.																														
Dissipation Factor (tan δ)	0.2 max. Please see the technical specifications for details.																															
<table border="1"> <thead> <tr> <th>Nominal capacitance</th> <th>C≤10 μF</th> <th>C&gt;10 μF</th> </tr> </thead> <tbody> <tr> <td>Measuring frequency</td> <td>1 kHz±10 %</td> <td>120 Hz±20 %</td> </tr> <tr> <td>Measuring voltage</td> <td>1.0±0.2 Vrms</td> <td>0.5±0.2 Vrms</td> </tr> </tbody> </table>			Nominal capacitance	C≤10 μF	C>10 μF	Measuring frequency	1 kHz±10 %	120 Hz±20 %	Measuring voltage	1.0±0.2 Vrms	0.5±0.2 Vrms																					
Nominal capacitance	C≤10 μF	C>10 μF																														
Measuring frequency	1 kHz±10 %	120 Hz±20 %																														
Measuring voltage	1.0±0.2 Vrms	0.5±0.2 Vrms																														
Temperature Characteristics	Temperature Characteristics B : ±10 % X7R : ±15 % X5R : ±15 % F : +30, -80 % Y5V : +22, -82 %	Maximum capacitance change at stages 1 to 5 <table border="1"> <thead> <tr> <th>Temp. Char.</th> <th>B, F</th> <th>X7R</th> <th>X5R</th> <th>Y5V</th> </tr> </thead> <tbody> <tr> <td>Stage 1</td> <td>20 °C</td> <td>25 °C</td> <td>25 °C</td> <td>25 °C</td> </tr> <tr> <td>Stage 2</td> <td>-25 °C</td> <td>-55 °C</td> <td>-55 °C</td> <td>-30 °C</td> </tr> <tr> <td>Stage 3 (Ref. Temp.)</td> <td>20 °C</td> <td>25 °C</td> <td>25 °C</td> <td>25 °C</td> </tr> <tr> <td>Stage 4</td> <td>85 °C</td> <td>125 °C</td> <td>85 °C</td> <td>85 °C</td> </tr> <tr> <td>Stage 5</td> <td>20 °C</td> <td>25 °C</td> <td>25 °C</td> <td>25 °C</td> </tr> </tbody> </table> See the technical specifications for details such as measuring voltage.	Temp. Char.	B, F	X7R	X5R	Y5V	Stage 1	20 °C	25 °C	25 °C	25 °C	Stage 2	-25 °C	-55 °C	-55 °C	-30 °C	Stage 3 (Ref. Temp.)	20 °C	25 °C	25 °C	25 °C	Stage 4	85 °C	125 °C	85 °C	85 °C	Stage 5	20 °C	25 °C	25 °C	25 °C
Temp. Char.	B, F	X7R	X5R	Y5V																												
Stage 1	20 °C	25 °C	25 °C	25 °C																												
Stage 2	-25 °C	-55 °C	-55 °C	-30 °C																												
Stage 3 (Ref. Temp.)	20 °C	25 °C	25 °C	25 °C																												
Stage 4	85 °C	125 °C	85 °C	85 °C																												
Stage 5	20 °C	25 °C	25 °C	25 °C																												
Adhesion	Terminal electrodes shall be free from peeling or signs of peeling.	Applied force : 5 N Duration : 10 s Size : 0402  Size : 0603 to 1206  Unit : mm																														
Bending Strength	Appearance: No mechanical damage Capacitance change: Temp. Char. B, X7R, X5R: within ±12.5 % F, Y5V: within ±30 %	Bending value :1 mm Bending speed : 1 mm/s  Unit : mm																														
Vibration Proof	Appearance : No mechanical damage. Capacitance : Within the specified tolerance tanδ : Initial standard value	Total amplitude : 1.5 mm Vibration frequency : 10 to 55 to 10 Hz for 1 min 3 perpendicular directions for 2 hours each, a total of 6 hours																														

\*Standard condition : Temperature 15 to 35 °C, Relative humidity 45 to 75 %

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.  
Should a safety concern arise regarding this product, please be sure to contact us immediately.

02 Dec. 2008

Item	Specification	Test Method												
Resistance to Soldering Heat	Appearance : No mechanical damage Capacitance change : Temp. Char. B, X7R, X5R : within $\pm 7.5$ % F, Y5V : within $\pm 20$ % $\tan\delta$ : Initial standard value IR : Initial standard value Withstand voltage : No dielectric breakdown or damage	Soldering bath method Preconditioning : Heat treatment <sup>(*1)</sup> Solder temperature : $270\pm 5$ °C Dipping period : $3.0\pm 0.5$ s Preheat condition : <table border="1"> <thead> <tr> <th>Order</th> <th>Temp. (°C)</th> <th>Size 0805 max.</th> <th>Size 1206</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>80 to 100</td> <td>120 to 180s</td> <td>300 to 360s</td> </tr> <tr> <td>2</td> <td>150 to 200</td> <td>120 to 180s</td> <td>300 to 360s</td> </tr> </tbody> </table> Recovery (Standard condition) : $48\pm 4$ h	Order	Temp. (°C)	Size 0805 max.	Size 1206	1	80 to 100	120 to 180s	300 to 360s	2	150 to 200	120 to 180s	300 to 360s
Order	Temp. (°C)	Size 0805 max.	Size 1206											
1	80 to 100	120 to 180s	300 to 360s											
2	150 to 200	120 to 180s	300 to 360s											
Solderability	More than 95 % of the soldered area of both terminal electrodes shall be covered with fresh solder.	Soldering bath method Solder temperature : $230\pm 5$ °C Dipping period : $4\pm 1$ s Solder : H63A (JIS-Z-3282)												
Temperature Cycle	Appearance : No mechanical damage Capacitance change : Temp. Char. B, X7R, X5R : within $\pm 7.5$ % F, Y5V : within $\pm 20$ % $\tan\delta$ : Initial standard value IR : Initial standard value Withstand voltage : No dielectric breakdown and/or damage	Preconditioning : Heat treatment <sup>(*1)</sup> Step 1: Minimum operating temp. $30\pm 3$ min Step 2: Room temp. 3 min max. Step 3: Maximum operating temp. $30\pm 3$ min Step 4: Room temp. 3 min max. Number of cycles : 5 cycles Recovery(Standard condition) : $48\pm 4$ h												
Damp Heat (steady state)	Appearance : No mechanical damage Capacitance change : Temp. Char. B, X7R, X5R : within $\pm 20$ % F, Y5V : within $\pm 30$ % $\tan\delta$ : Temp. Char. B, X7R, X5R : 0.25 max. F, Y5V : 0.3 max. IR : 50/C (M $\Omega$ ) min. Note : 10/C (M $\Omega$ ) min. for rated vol. DC 10 V max. C:Nominal cap. in $\mu$ F Please see the technical specifications for details.	Preconditioning : Heat treatment <sup>(*1)</sup> Temperature : $40\pm 2$ °C Relative humidity : 90 to 95 % Test period : 500+24/0 h Recovery(Standard condition) : $48\pm 4$ h												
Damp Heat Load	Appearance : No mechanical damage Capacitance change : Temp. Char. B, X7R, X5R : within $\pm 20$ % F, Y5V : within $\pm 30$ % $\tan\delta$ : Temp. Char. B, X7R, X5R : 0.25 max. F, Y5V : 0.3 max. IR : 25/C (M $\Omega$ ) min. Note : 5/C (M $\Omega$ ) min. for rated vol. DC 10 V max. C:Nominal cap. in $\mu$ F Please see the technical specifications for details.	Preconditioning : Voltage treatment <sup>(*2)</sup> Temperature : $40\pm 2$ °C Relative humidity : 90 to 95 % Applied voltage : Rated voltage Charge/discharge current : 50 mA max. Test period : 500+24/0 h Recovery(Standard condition) : $48\pm 4$ h												
High Temperature Load	Appearance : no mechanical damage Capacitance change : Temp. Char. B, X7R, X5R : within $\pm 20$ % F, Y5V : within $\pm 30$ % $\tan\delta$ : Temp. Char. B, X7R, X5R : 0.25 max. F, Y5V : 0.3 max. IR : 50/C (M $\Omega$ ) min. Note : 10/C (M $\Omega$ ) min. for rated vol. DC 10 V max. C:Nominal cap. in $\mu$ F Please see the technical specifications for details.	Preconditioning : Voltage treatment <sup>(*2)</sup> Temperature : Maximum operation temp. $\pm 3$ °C Applied voltage : (1)Rated voltage $\times 200$ % (2)Rated voltage $\times 150$ % (3)Rated voltage $\times 100$ % Please see the technical specifications for details. Charge/discharge current : 50 mA max. Test period : 1000+48/0 h Recovery (Standard condition) : $48\pm 4$ h												

(\*1) Heat treatment : 1 h of heat treatment at  $150+0/-10$  °C followed by  $48\pm 4$  h recovery under standard conditions.

(\*2) Voltage treatment : 1 h of voltage treatment under the specified temperature and voltage for testing followed by  $48\pm 4$  h of recovery under standard conditions.

### ■ Standard Products for EIA Size "0402", Taped Version

#### ● Class 2

##### ◆ Temperature Characteristic Code : B (Temperature Characteristics : X5R)

Rated Voltage		DC 16 V			DC 10 V			DC 6.3 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R
1	±10 %(K) or ±20 %(M)	ECJ0EB1C105M	0.5*	○	ECJ0EB1A105□	0.5	○	ECJ0EB0J105□	0.5	○
2.2								ECJ0EB0J225M	0.5	○
4.7								ECJ0EB0J475M	0.5*	○

□ : Capacitance tolerance code : "□" for "K" or "M"

Dimensional tolerance of L, W, T : ±0.05 mm for no mark,  $\pm 0.15$  mm for "\*" mark.

Standard packaging quantity of Packaging Style Code "E" (T = 0.5 mm) : 10,000 pcs./reel.

Avoid flow soldering.

##### ◆ Temperature Characteristic Code : F (Temperature Characteristics : F, Y5V)

Rated Voltage		DC 6.3 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. F Y5V
1	+80, -20 % (Z)	ECJ0EF0J105Z	0.5	○ ○

Standard packaging quantity of Packaging Style Code "E" (T = 0.5 mm) : 10,000 pcs./reel.

Recommend soldering method : Reflow soldering.

### ■ Standard Products for EIA Size "0603", Taped Version

#### ● Class 2

##### ◆ Temperature Characteristic Code : B (Temperature Characteristics : X5R)

Rated Voltage		DC 25 V			DC 16 V			DC 10 V			DC 6.3 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R
1	±10 %(K) or ±20 %(M)	ECJ1VB1E105□	0.8	○	ECJ1VB1C105□	0.8	○	ECJ1VB1A105□	0.8	○	ECJ1VB0J105□	0.8	○
2.2					ECJ1VB1C225□*	0.8	○	ECJ1VB1A225□*	0.8	○	ECJ1VB0J225□	0.8	○
4.7					ECJ1VB1C475□*	0.8**	○	ECJ1VB1A475□*	0.8	○	ECJ1VB0J475□*	0.8	○
10								ECJ1VB1A106M*	0.8**	○	ECJ1VB0J106M*	0.8**	○

□ : Capacitance tolerance code : "□" for "K" or "M"

Standard packaging quantity of Packaging Style Code "V" (T = 0.8 mm) : 4,000 pcs./reel.

"\*" : Avoid flow soldering.

"\*\*" : "L", "W", "T" Dimension Tolerance ±0.15 mm

##### ◆ Temperature Characteristic Code : F (Temperature Characteristics : F, Y5V)

Rated Voltage		DC 25 V			DC 16 V			DC 10 V			DC 6.3 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. F	Part No.	Dim. T (mm)	Temp. Char. F	Part No.	Dim. T (mm)	Temp. Char. F Y5V	Part No.	Dim. T (mm)	Temp. Char. F Y5V
1	+80,	ECJ1VF1E105Z	0.8	○	ECJ1VF1C105Z	0.8	○	ECJ1VF1A105Z	0.8	○ ○			
2.2	-20 % (Z)							ECJ1VF1A225Z	0.8	○ ○	ECJ1VF0J225Z	0.8	○ ○

Standard packaging quantity of Packaging Style Code "V" (T = 0.8 mm) : 4,000 pcs./reel.

### ■ Standard Products for EIA Size "0805", Taped Version

#### ● Class 2

##### ◆ Temperature Characteristic Code : B (Temperature Characteristics : B, X5R)

Rated Voltage		DC 25 V			DC 16 V			DC 10 V			DC 6.3 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. X5R	Part No.	Dim. T (mm)	Temp. Char. B X5R	Part No.	Dim. T (mm)	Temp. Char. X5R
1	±10 %(K) or ±20 %(M)	ECJ2FB1E105□	1.25*	○	ECJ2FB1C105□	1.25*	○	ECJ2FB1A105□	1.25	○ ○			
2.2					ECJ2FB1C225□	1.25*	○	ECJ2FB1A225□	1.25*	— ○	ECJ2FB0J225□	1.25	○
4.7			ECJ2FB1E475□	1.25*	○	ECJ2FB1C475□	1.25*	○	ECJ2FB1A475□	1.25*	— ○	ECJ2FB0J475□	1.25*
10					ECJ2FB1C106□	1.25**	○	ECJ2FB1A106□	1.25**	— ○	ECJ2FB0J106□	1.25**	○
22								ECJ2FB1A226M	1.25**	— ○	ECJ2FB0J226M	1.25**	○

□ : Capacitance tolerance code : "□" for "K" or "M"

Dimensional tolerance of L, W, T : L, W : ±0.1 mm for no mark, ±0.15 mm for "\*" mark, ±0.2 mm for "\*\*" mark.

Standard packaging quantity of Packaging Style Code "F" (T = 1.25 mm) : 3,000 pcs./reel.

Avoid flow soldering.

##### ◆ Temperature Characteristic Code : F (Temperature Characteristics : F, Y5V)

Rated Voltage		DC 50 V			DC 25 V			DC 16 V			DC 10 V		
Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char. F	Part No.	Dim. T (mm)	Temp. Char. F	Part No.	Dim. T (mm)	Temp. Char. F Y5V	Part No.	Dim. T (mm)	Temp. Char. F Y5V
1	+80, -20 % (Z)	ECJ2FF1H105Z	1.25*	○	ECJ2FF1E105Z	1.25*	○	ECJ2VF1C105Z	0.85	○ ○			
2.2					ECJ2FF1E225Z	1.25*	○	ECJGVF1C225Z	0.85	○ ○			
4.7								ECJGVF1C475Z	0.85	○ ○	ECJGVF1A475Z	0.85	○ ○
10											ECJ2FF1A106Z	1.25*	○ ○

Dimensional tolerance of L, W, T : L, W : ±0.15 mm / T : ±0.1 mm for no mark, ±0.15 mm for "\*" mark.

Standard packaging quantity of Packaging Style Code "V" (T = 0.85 mm) : 4,000 pcs./reel, "F" (T = 1.25 mm) : 3,000 pcs./reel.

Soldering method of dimension T > 1 mm: Avoid flow soldering.

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Should a safety concern arise regarding this product, please be sure to contact us immediately.

### ■ Standard Products for EIA Size "1206", Taped Version

#### ● Class 2

◆ Temperature Characteristic Code : B (Temperature Characteristics : B, X7R, X5R)

Rated Voltage	DC 25 V				DC 16 V				DC 10 V				DC 6.3 V				
	Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.
1			ECJ3YB1E105□	1.6	○ ○	ECJ3FB1C105□	1.15*	○ ○									
2.2	±10 % (K)		ECJ3YB1E225□	1.6	— —	ECJ3YB1C225□	1.6	○ ○	ECJ3YB1A225□	1.6	○ ○						
4.7			ECJ3YB1E475□	1.6	— —	ECJ3YB1C475□	1.6	— —	ECJ3YB1A475□	1.6	— —	ECJ3YB0J475□	1.6	○			
10	±20 % (M)		ECJ3YB1E106□	1.6	— —	ECJ3YB1C106□	1.6	— —	ECJ3YB1A106□	1.6	— —	ECJDV50J106M	0.85**	○			
22						ECJ3YB1C226M	1.6	— —	ECJ3YB1A226M	1.6	— —	ECJDV50J226M	0.85**	○			

□ : Capacitance tolerance code : "□" for "K" or "M"

Dimensional tolerance of L, W, T: ±0.2 mm for no mark, L, W: ±0.15 mm / T: ±0.1 mm for "\*" mark, L, W: ±0.2 mm / T: ±0.1 mm for "\*\*" mark.

Standard packaging quantity of Packaging Style Code "V" (T = 0.85 mm) : 4,000 pcs./reel, "F" (T = 1.15 mm) : 3,000 pcs./reel, "Y" (T = 1.6 mm) : 2,000 pcs./reel

Avoid flow soldering.

◆ High Temperature Series : Temperature Characteristic Code : B, X (Temperature Characteristics : B, Y7R)

Rated Voltage	DC 50 V				DC 25 V				DC 16 V				DC 10 V				
	Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.
1	±10 % (K)		ECJ3YX1H105□	1.6	○ ○	ECJ3YB1E105□	1.6	○ ○	ECJ3FB1C105□	1.15*	○ ○						
2.2									ECJ3YB1C225□	1.6	○ ○	ECJ3YB1A225□	1.6	○ ○			
4.7	±20 % (M)							ECJ3YX1C475□	1.6	○ ○							
10								ECJ3YX1C106□	1.6	○ ○							

□ : Capacitance tolerance code : "□" for "K" or "M"

Dimensional tolerance of L, W, T: ±0.2 mm for no mark, L, W: ±0.15 mm / T: ±0.1 mm for "\*" mark.

Standard packaging quantity of Packaging Style Code "F" (T = 1.15 mm) : 3,000 pcs./reel, "Y" (T = 1.6 mm) : 2,000 pcs./reel

Avoid flow soldering.

◆ Temperature Characteristic Code : F (Temperature Characteristics : F, Y5V)

Rated Voltage	DC 50 V				DC 25 V				DC 16 V				DC 10 V				
	Capacitance (μF)	Capacitance Tolerance	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.	Part No.	Dim. T (mm)	Temp. Char.
1	+80, -20 % (Z)		ECJ3FF1H105Z	1.15*	○	ECJ3FF1E105Z	1.15*	○ ○	ECJ3VF1C105Z	0.85*	○ ○						
2.2						ECJ3FF1E225Z	1.15*	○ ○	ECJ3VF1C225Z	0.85*	○ ○						
4.7						ECJ3FF1E475Z	1.15*	○ —	ECJ3FF1C475Z	1.15*	○ ○						
10						ECJ3YF1E106Z	1.6	○ —	ECJMFF1C106Z	1.15**	○ ○	ECJMFF1A106Z	1.15**	○ ○			
22												ECJMFF1A226Z	1.15**	○ ○			

Dimensional tolerance of L, W, T: ±0.2 mm for no mark, L, W: ±0.15 mm / T: ±0.1 mm for "\*" mark, L, W: ±0.2 mm / T: ±0.1 mm for "\*\*" mark.

Standard packaging quantity of Packaging Style Code "V" (T = 0.85 mm) : 4,000 pcs./reel, "F" (T = 1.15 mm) : 3,000 pcs./reel, "Y" (T = 1.6 mm) : 2,000 pcs./reel

Avoid flow soldering.