

# Specification

**Part No.: DLC85B**

## DLC85B (.110" x .110")



### ◆ Product Features

High Q, high power, low ESR/ESL, low noise,  
high self-resonant frequency, high reliability.

### ◆ Product Application

Typical functions: frequency tuning, bypass, coupling, responding, DC blocking and impedance matching.

Typical applications: semiconductor RF power, MRI, repeater, high speed railway signal responsor, wireless broadcasting and TV device.

### ◆ DLC85B Capacitance Table

| Cap | Code | Tol.    | Rated WVDC                                  | Cap | Code | Tol.    | Rated WVDC                                  | Cap | Code                                        | Tol.  | Rated WVDC                                  | Cap | Code | Tol.                                       | Rated WVDC                                  |
|-----|------|---------|---------------------------------------------|-----|------|---------|---------------------------------------------|-----|---------------------------------------------|-------|---------------------------------------------|-----|------|--------------------------------------------|---------------------------------------------|
| pF  |      |         |                                             | pF  |      |         |                                             | pF  |                                             |       |                                             | pF  |      |                                            |                                             |
| 0.1 | 0R1  | A,B,C,D | 500V<br>Code 501<br>or<br>1500V<br>Code 152 | 2.4 | 2R4  | A,B,C,D | 500V<br>Code 501<br>or<br>1500V<br>Code 152 | 20  | 200                                         | F,G,J | 500V<br>Code 501<br>or<br>1500V<br>Code 152 | 160 | 161  | F,G,J                                      | 300V<br>Code 301<br>or<br>1000V<br>Code 102 |
| 0.2 | 0R2  |         |                                             | 2.7 | 2R7  |         |                                             | 22  | 220                                         |       |                                             | 180 | 181  |                                            |                                             |
| 0.3 | 0R3  |         |                                             | 3.0 | 3R0  |         |                                             | 24  | 240                                         |       |                                             | 200 | 201  |                                            |                                             |
| 0.4 | 0R4  |         |                                             | 3.3 | 3R3  |         |                                             | 27  | 270                                         |       |                                             | 220 | 221  |                                            |                                             |
| 0.5 | 0R5  |         |                                             | 3.6 | 3R6  |         |                                             | 30  | 300                                         |       |                                             | 240 | 241  |                                            |                                             |
| 0.6 | 0R6  |         |                                             | 3.9 | 3R9  |         |                                             | 33  | 330                                         |       |                                             | 270 | 271  |                                            |                                             |
| 0.7 | 0R7  |         |                                             | 4.3 | 4R3  |         |                                             | 36  | 360                                         |       |                                             | 300 | 301  | 200V<br>Code 201<br>or<br>600V<br>Code 601 |                                             |
| 0.8 | 0R8  |         |                                             | 4.7 | 4R7  |         |                                             | 39  | 390                                         |       |                                             | 330 | 331  |                                            |                                             |
| 0.9 | 0R9  |         |                                             | 5.1 | 5R1  |         |                                             | 43  | 430                                         |       |                                             | 360 | 361  |                                            |                                             |
| 1.0 | 1R0  |         |                                             | 5.6 | 5R6  |         |                                             | 47  | 470                                         |       |                                             | 390 | 391  |                                            |                                             |
| 1.1 | 1R1  |         |                                             | 6.2 | 6R2  |         |                                             | 51  | 510                                         |       |                                             | 430 | 431  |                                            |                                             |
| 1.2 | 1R2  |         |                                             | 6.8 | 6R8  |         |                                             | 56  | 560                                         |       |                                             | 470 | 471  |                                            |                                             |
| 1.3 | 1R3  |         |                                             | 7.5 | 7R5  |         |                                             | 62  | 620                                         |       |                                             | 510 | 511  | 100V<br>Code 101<br>or<br>300V<br>Code 301 |                                             |
| 1.4 | 1R4  |         |                                             | 8.2 | 8R2  |         |                                             | 68  | 680                                         |       |                                             | 560 | 561  |                                            |                                             |
| 1.5 | 1R5  |         |                                             | 9.1 | 9R1  |         |                                             | 75  | 750                                         |       |                                             | 620 | 621  |                                            |                                             |
| 1.6 | 1R6  |         |                                             | 10  | 100  | 82      |                                             | 820 | 680                                         |       |                                             | 681 |      |                                            |                                             |
| 1.7 | 1R7  |         |                                             | 11  | 110  | 91      |                                             | 910 | 750                                         |       |                                             | 751 |      |                                            |                                             |
| 1.8 | 1R8  |         |                                             | 12  | 120  | 100     |                                             | 101 | 820                                         |       |                                             | 821 |      |                                            |                                             |
| 1.9 | 1R9  |         |                                             | 13  | 130  | 110     |                                             | 111 | 910                                         |       |                                             | 911 |      |                                            |                                             |
| 2.0 | 2R0  |         |                                             | 15  | 150  | 120     |                                             | 121 | 300V<br>Code 301<br>or<br>1000V<br>Code 102 |       | 1000                                        | 102 |      |                                            |                                             |
| 2.1 | 2R1  |         |                                             | 16  | 160  | 130     |                                             | 131 |                                             |       |                                             |     |      |                                            |                                             |
| 2.2 | 2R2  |         |                                             | 18  | 180  | 150     |                                             | 151 |                                             |       |                                             |     |      |                                            |                                             |

Remark: special capacitance, tolerance and WVDC are available, consult with DALICAP.

## ◆ Part Numbering

DLC85:series  
B:1111

### Capacitor Code:

Cap < 10pF, e.g.:1R0=1.0pF, R denotes decimal point.;  
Cap ≥ 10pF, e.g.:101=100pF, the third number  
is the power of 10.

Capacitance Tolerance: See below list

| Capacitance Tolerance |         |        |         |        |     |     |     |      |
|-----------------------|---------|--------|---------|--------|-----|-----|-----|------|
| Code                  | A       | B      | C       | D      | F   | G   | J   | K    |
| Tol.                  | ±0.05pF | ±0.1pF | ±0.25pF | ±0.5pF | ±1% | ±2% | ±5% | ±10% |

DLC85B 101 J W 501 X T

Packaging Type

T: Horizontal Orientation Tape & Reel ,  
2000 pcs/reel

TV: Vertical Orientation Tape & Reel,  
1500pcs/Reel

Laser Marking:

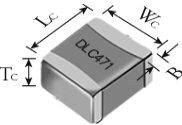
X, Laser Marking; N, No Marking

Rated Voltage  
e.g:501=500V

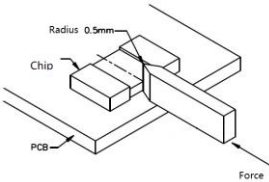
Termination Type

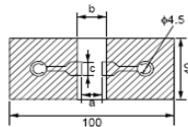
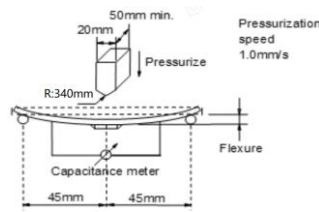
## ◆ DLC85B Termination Type and Dimensions

unit: inch (millimeter)

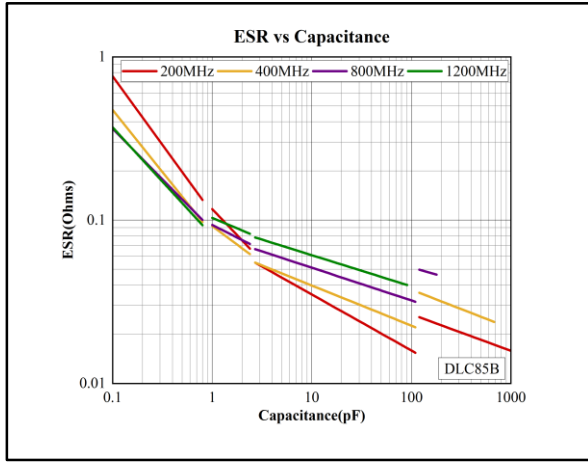
| Series | Term.<br>Code  | Type/<br>Outlines                                                                   | Capacitor Dimensions                          |                          |                   |                          | Termi<br>Material                                 |
|--------|----------------|-------------------------------------------------------------------------------------|-----------------------------------------------|--------------------------|-------------------|--------------------------|---------------------------------------------------|
|        |                |                                                                                     | Length<br>Lc                                  | Width<br>Wc              | Thickness<br>Tc   | Overlap<br>B             |                                                   |
| 85B    | W              |  | .110<br>-.010~+.025<br>(2.79<br>-.025 ~ 0.63) | .110±.015<br>(2.79±0.38) | .102<br>(2.60)max | .024~.039<br>(0.60~1.00) | 100%Sn over Nickel<br>Plating ,<br>RoHS Compliant |
|        | L              |                                                                                     |                                               |                          |                   |                          | 10%Pb90%Sn over<br>Nickel Plating ,               |
|        | P<br>(Non-Mag) |                                                                                     |                                               |                          |                   |                          | 100%Sn over Copper<br>Plating ,<br>RoHS Compliant |

◆ **Reliability Test Conditions.**

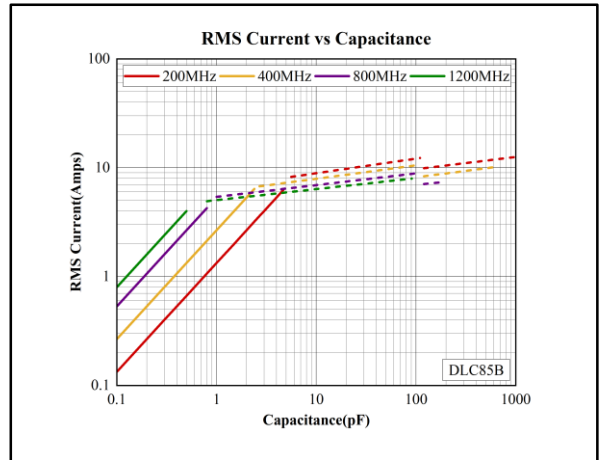
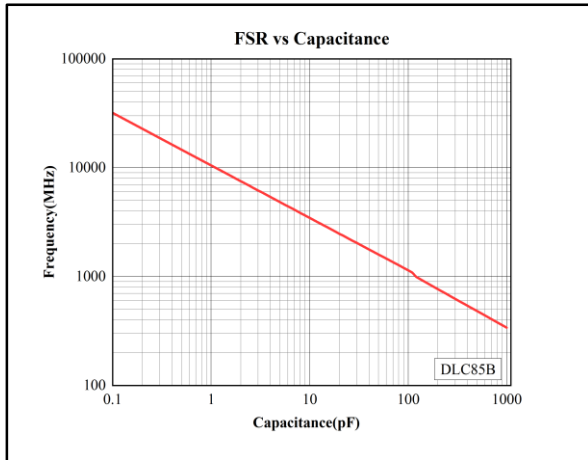
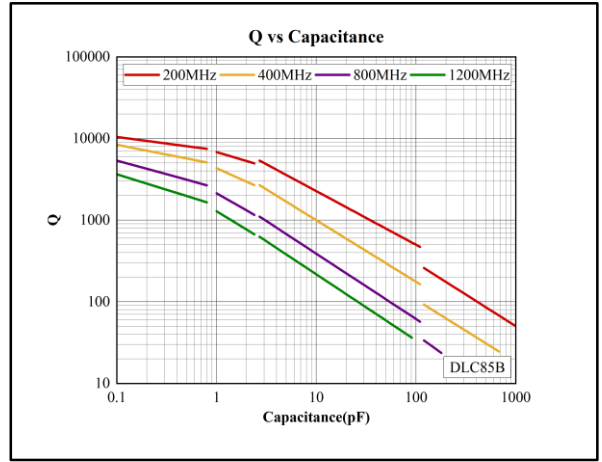
| No.  | Item                                  | Specification                                                                   | Test method                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                 |   |      |   |       |   |      |   |       |   |      |
|------|---------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------|---|------|---|-------|---|------|---|-------|---|------|
| 1    | Operating temperature                 | -55℃～150℃                                                                       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                 |   |      |   |       |   |      |   |       |   |      |
| 2    | Appearance                            | No defects or abnormality                                                       | Visual inspection: ×10 microscope.                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                 |   |      |   |       |   |      |   |       |   |      |
| 3    | Dimensions                            | See the previous page                                                           | Caliper inspection                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                 |   |      |   |       |   |      |   |       |   |      |
| 4    | Capacitance                           | Shall be within the applicable tolerance specified.                             | Test frequency:<br>C≤1000pF: 1MHz±10%<br>C>1000pF: 1KHz±10%<br>Test voltage: 1.0±0.2Vrms                                                                                                                                                                                                                                                                                                                                                                           |      |                 |   |      |   |       |   |      |   |       |   |      |
| 5    | D.F                                   | D.F≤0.05%                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |   |      |   |       |   |      |   |       |   |      |
| 6    | Insulation resistance                 | 10 <sup>5</sup> Megohms min. @ +25 °C<br>10 <sup>4</sup> Megohms min. @ +125 °C | Voltage: DC Rated Voltage (500V max)                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                 |   |      |   |       |   |      |   |       |   |      |
| 7    | Dielectric withstanding voltage (DWV) | Shall be no evidence of breakdown or visible evidence of arcing or damage.      | Test Voltage:<br>Rated voltage≤500V: 250% of the rated voltage<br>500V<Rated voltage≤1250V: 150% of the rated voltage<br>Rated voltage> 1250V: 120% of the rated voltage<br>Applied Time: 5 s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                               |      |                 |   |      |   |       |   |      |   |       |   |      |
| 8    | Temperature coefficient               | 0±30ppm/℃                                                                       | The capacitance change should be measured after 5 min. at each specified temp. stage. Capacitance value as a reference is the value in step 3.<br><table><tr><td>step</td><td>temperature (℃)</td></tr><tr><td>1</td><td>25±2</td></tr><tr><td>2</td><td>-55±3</td></tr><tr><td>3</td><td>25±2</td></tr><tr><td>4</td><td>150±3</td></tr><tr><td>5</td><td>25±2</td></tr></table> <div>TC=<math>\frac{C_5-C_3}{C_3 \times \Delta T} \times 10^6</math> ppm/℃</div> | step | temperature (℃) | 1 | 25±2 | 2 | -55±3 | 3 | 25±2 | 4 | 150±3 | 5 | 25±2 |
| step | temperature (℃)                       |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |   |      |   |       |   |      |   |       |   |      |
| 1    | 25±2                                  |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |   |      |   |       |   |      |   |       |   |      |
| 2    | -55±3                                 |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |   |      |   |       |   |      |   |       |   |      |
| 3    | 25±2                                  |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |   |      |   |       |   |      |   |       |   |      |
| 4    | 150±3                                 |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |   |      |   |       |   |      |   |       |   |      |
| 5    | 25±2                                  |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |   |      |   |       |   |      |   |       |   |      |
| 9    | Capacitance Drift                     | ±0.2% or ±0.05pF, whichever is larger.                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |   |      |   |       |   |      |   |       |   |      |
| 10   | Adhesive Strength of Termination      | No removal of the terminations or other defect should occur.                    | Pressurizing force: 22.0 <sup>+1.0</sup> <sub>0</sub> N<br>Test time: 10±1 sec.<br>                                                                                                                                                                                                                                                                                           |      |                 |   |      |   |       |   |      |   |       |   |      |

| No.  | Item                              | Specification                                                                                                                                                                                                                                                                       | Test method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |
|------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------|-----------|---|-----------|-----------|---|-------|----------|---|-----------|-----------|---|-------|----------|
| 11   | Substrate Bending test            | Appearance: No defects or abnormalities.<br>Capacitance Change: With in $\pm 5\%$ or $\pm 0.3\text{pF}$ whichever is larger.                                                                                                                                                        | Mounting method: Reflow solder the capacitor on the test substrate.<br>Pressurization Method: Shown as below. Flexure 1mm. Holding Time $5 \pm 1\text{s}$<br><br>a: 2.2mm<br>b: 5.0mm<br>c: 3.2mm<br>                                                                                                                                            |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |
| 12   | Solderability of termination      | Shall be at least 95 percent covered with a smooth solder coating.                                                                                                                                                                                                                  | Immerse the capacitor in a eutectic solution requirement temperature $245 \pm 2\text{ }^{\circ}\text{C}$ for $2 \pm 0.5$ seconds. Capacitor shall be immersed to a depth of 10mm.                                                                                                                                                                                                                                                                                                                                   |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |
| 13   | Resistance to soldering Heat      | Appearance:<br>No evidence of mechanical damage or delamination or exposed.<br>Cap change:<br>within $-1.0\% \sim +2.0\%$ or $\pm 0.5\text{pF}$ whichever is larger.<br>Q: No less than initial requirement.<br>IR(25 $^{\circ}\text{C}$ ): No less than initial requirement.       | Preheat for 1 minute at 150 $^{\circ}\text{C}$ to 180 $^{\circ}\text{C}$ before immerse the capacitor in a eutectic solution at $260 \pm 5^{\circ}\text{C}$ for $10 \pm 1$ seconds. Capacitor shall be immersed to a depth of 10mm.<br>And following a $24 \pm 2$ hours cooling period.                                                                                                                                                                                                                             |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |
| 14   | Temperature Cycle                 | Appearance:<br>No evidence of mechanical damage .<br>Cap change:<br>within $\pm 0.5\%$ or $\pm 0.5\text{pF}$ whichever is larger.<br>Q: No less than initial requirement.<br>IR(25 $^{\circ}\text{C}$ ): No less than 30% initial requirement.<br>DWV: To meet initial requirement. | Perform the 5 cycles according to the four heat treatments listed in the following table. Set it for $24 \pm 2$ hours at room temperature. <table><tr><th>step</th><th>Temperature(<math>^{\circ}\text{C}</math>)</th><th>Time(min)</th></tr><tr><td>1</td><td>-55(-3~0)</td><td><math>\geq 30</math></td></tr><tr><td>2</td><td>25+10</td><td><math>\leq 5</math></td></tr><tr><td>3</td><td>125(0~+3)</td><td><math>\geq 30</math></td></tr><tr><td>4</td><td>25+10</td><td><math>\leq 5</math></td></tr></table> | step | Temperature( $^{\circ}\text{C}$ ) | Time(min) | 1 | -55(-3~0) | $\geq 30$ | 2 | 25+10 | $\leq 5$ | 3 | 125(0~+3) | $\geq 30$ | 4 | 25+10 | $\leq 5$ |
| step | Temperature( $^{\circ}\text{C}$ ) | Time(min)                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |
| 1    | -55(-3~0)                         | $\geq 30$                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |
| 2    | 25+10                             | $\leq 5$                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |
| 3    | 125(0~+3)                         | $\geq 30$                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |
| 4    | 25+10                             | $\leq 5$                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |
| 15   | Humidity, steady state            | Appearance:<br>No evidence of mechanical damage .<br>Cap change:<br>within $\pm 0.3\%$ or $\pm 0.3\text{pF}$ whichever is larger.<br>IR(25 $^{\circ}\text{C}$ ): No less than initial requirement.                                                                                  | With 1.5 Volts D.C. applied while subjected to an environment of 85 $^{\circ}\text{C}$ with 85% relative humidity for 240 hours minimum.<br>Removed and sit $3.5 \pm 0.5$ hours at room temperature.                                                                                                                                                                                                                                                                                                                |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |
| 16   | High Temperature Load (Life)      | Appearance:<br>No evidence of mechanical damage .<br>Cap change:<br>within $\pm 2\%$ or $\pm 0.5\text{pF}$ whichever is larger.<br>Q: No less than 50% initial requirement.<br>IR(25 $^{\circ}\text{C}$ ): No less than 30% initial requirement.                                    | Test Voltage:<br>Rated voltage $\leq 500\text{V}$ : 200% of the rated voltage<br>500V<Rated voltage $\leq 1250\text{V}$ : 120% of the rated voltage<br>Rated voltage> 1250V: 100% of the rated voltage。<br>The charge/discharge current is less than 50mA.<br>Temperature: 150 $^{\circ}\text{C}$ ;<br>Time: 2000h.<br>Measurement:<br>Set it for 48 hours at room temperature, then measure.                                                                                                                       |      |                                   |           |   |           |           |   |       |          |   |           |           |   |       |          |

## ◆ DLC85B Performance Curve



ESR Measurement: Coaxial Resonant Cavity Method.



### Definition and Measurement Conditions.

Definition: The capacitor is connected in series to the microstrip line, bridging the two ends of 50-ohm microstrip line with a gap.

Measurement Conditions:

Substrate: Rogers RT/duroid® 5880

Substrate dielectric constant: 2.20

Characteristic impedance: 50 ohms

The current determined by rated voltage (max voltage products).  
(Solid line)

$$I_{RMS} = \frac{\sqrt{2}}{2} I_{peak} = \frac{\sqrt{2}}{2} \times \frac{V_{rated}}{X_C} = \sqrt{2\pi F C V_{rated}}$$

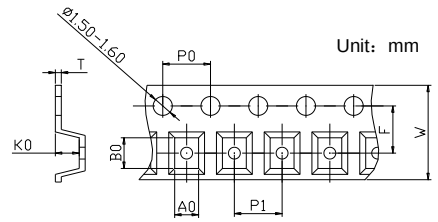
The current determined by dissipated power. (Dashed line)

$$I_{RMS} = \sqrt{\frac{Pd_{max}}{ESR}}$$

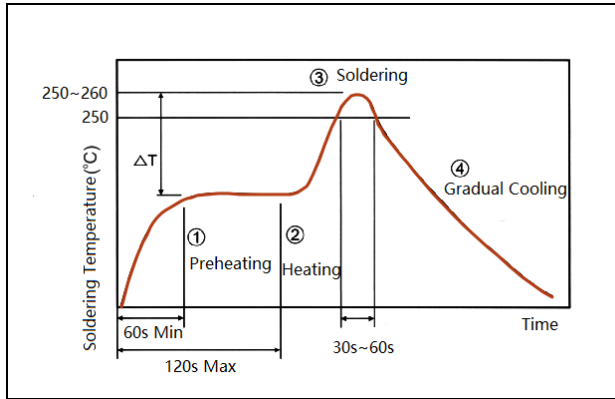
If the rated current is based on a temperature rise( $\Delta T$ ) of 60°C (Ambient Temperature at 65°C), with a thermal resistance( $\theta$ ) of 24.0°C/W, the maximum power dissipation of the capacitor is 2.5W.

### ◆ Tape & Reel Specifications

| Orientation | EIA  | A0   | B0   | K0   | W     | P0   | P1   | T    | F    | Qty/reel | Tape Material |
|-------------|------|------|------|------|-------|------|------|------|------|----------|---------------|
| Horizontal  | 1111 | 2.85 | 3.60 | 2.40 | 8.00  | 4.00 | 4.00 | 0.25 | 3.50 | 2000     | Plastic       |
| Vertical    | 1111 | 2.30 | 3.55 | 2.70 | 12.00 | 4.00 | 4.00 | 0.40 | 5.50 | 1500     | Plastic       |



### ◆ Recommended soldering conditions



$\Delta T \leq 190^{\circ}\text{C}$  ;

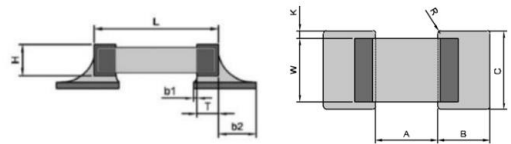
Maximum temperature:  $255^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ;

Heating rate:  $\leq 4^{\circ}\text{C/s}$ .

### ◆ Recommended Land Dimensions

#### Horizontal Mounting

| Orientation | EIA  | A(mm) | B(mm) | C(mm) |
|-------------|------|-------|-------|-------|
| Horizontal  | 1111 | 2.00  | 1.50  | 2.80  |



#### Vertical Mounting

| Orientation | EIA  | A(mm) | B(mm) | C(mm) |
|-------------|------|-------|-------|-------|
| Vertical    | 1111 | 1.90  | 1.70  | 2.50  |

