

# Specification

**Part No.: DLC70D**

## DLC70D (.080" x .050")

### ◆ Product Features

High Q, High Power, Low ESR/ESL, Low Noise,  
High Self-Resonance,Ultra- Stable Performance.

### ◆ Product Application

Typical Functional : Tuning, Bypassing, Coupling, Feedback, Impedance Matching and D.C. Blocking.

Typical Applications: Civil Satellite Communications, Mobile Communication Base Stations,RF Repaters,Trunked Communications.

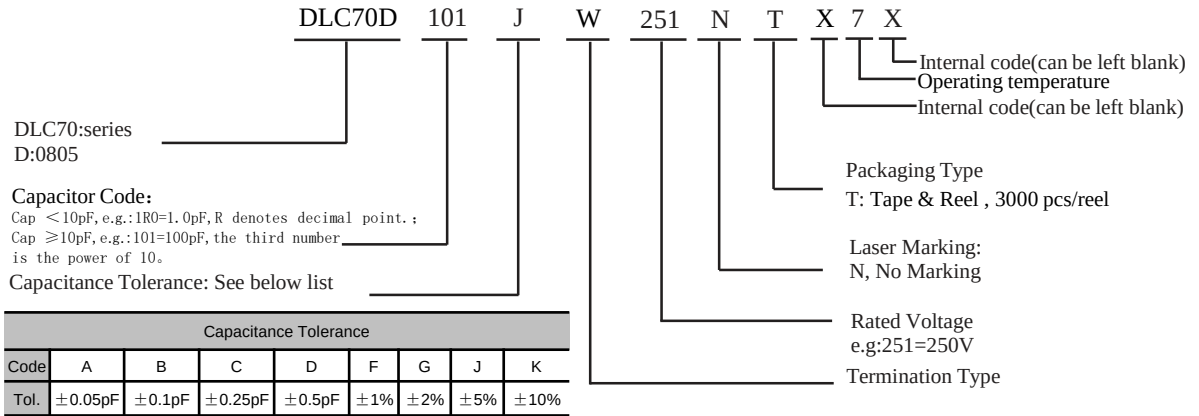


### ◆ DLC70D Capacitance Table

| Cap. | Code | Tol.        | Rated                                            | Cap. | Code | Tol.        | Rated                                            | Cap.                | Code | Tol.  | Rated                                            | Cap. | Code | Tol.  | Rated                                            |
|------|------|-------------|--------------------------------------------------|------|------|-------------|--------------------------------------------------|---------------------|------|-------|--------------------------------------------------|------|------|-------|--------------------------------------------------|
| pF   |      |             | WVDC                                             | pF   |      |             | WVDC                                             | pF                  |      |       | WVDC                                             | pF   |      |       | WVDC                                             |
| 0.1  | 0R1  | A,B,<br>C,D | 250V<br>Code<br>251<br>or<br>500V<br>Code<br>501 | 2.4  | 2R4  | A,B,<br>C,D | 250V<br>Code<br>251<br>or<br>500V<br>Code<br>501 | 20                  | 200  | F,G,J | 250V<br>Code<br>251<br>or<br>500V<br>Code<br>501 | 160  | 161  | F,G,J | 250V<br>Code<br>251<br>or<br>300V<br>Code<br>301 |
| 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  |       |                                                  |
| 0.8  | 0R8  |             |                                                  | 4.7  | 4R7  |             |                                                  | 39                  | 390  |       |                                                  | 330  | 331  |       |                                                  |
| 0.9  | 0R9  |             |                                                  | 5.1  | 5R1  |             |                                                  | 43                  | 430  |       |                                                  | 360  | 361  |       |                                                  |
| 1    | 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  |       |                                                  |
| 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                                              | 250V<br>Code<br>251 |      |       |                                                  |      |      |       |                                                  |
| 1.8  | 1R8  | 12          | 120                                              | 100  | 101  | 820         | 821                                              |                     |      |       |                                                  |      |      |       |                                                  |
| 1.9  | 1R9  | 13          | 130                                              | 120  | 121  | 910         | 911                                              |                     |      |       |                                                  |      |      |       |                                                  |
| 2    | 2R0  | 15          | 150                                              | 150  | 151  | 1000        | 102                                              |                     |      |       |                                                  |      |      |       |                                                  |
| 2.1  | 2R1  | 16          | 160                                              |      |      |             |                                                  |                     |      |       |                                                  |      |      |       |                                                  |
| 2.2  | 2R2  | 18          | 180                                              |      |      |             |                                                  |                     |      |       |                                                  |      |      |       |                                                  |
|      |      |             |                                                  |      |      | F,G,J       |                                                  |                     |      |       |                                                  |      |      |       | 100V<br>Code<br>101<br>or<br>200V<br>Code<br>201 |

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

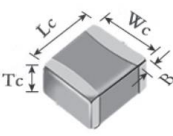
## ◆ Part Numbering



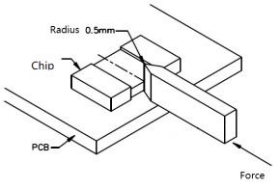
※Operating temperature: left blank : -55°C~125°C; 5: -55°C~150°C; 7: -55°C~175°C.

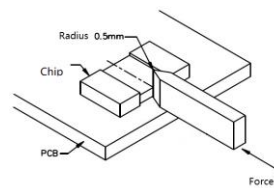
## ◆ DLC70D Termination Type and Dimensions

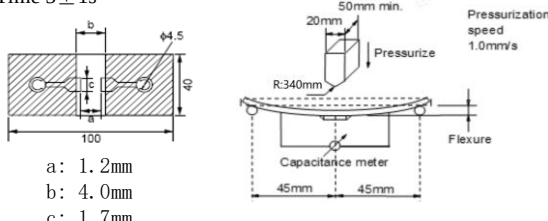
unit: inch ( millimeter )

| Series | Term. Code     | Type/<br>Outlines                                                                   | Capacitor Dimensions      |                           |                       |                          | Termina<br>Material                               |
|--------|----------------|-------------------------------------------------------------------------------------|---------------------------|---------------------------|-----------------------|--------------------------|---------------------------------------------------|
|        |                |                                                                                     | Length<br>Lc              | Width<br>Wc               | Thickness<br>Tc       | Overlap<br>B             |                                                   |
| 70D    | W              |  | .079±0.008<br>(2.00±0.20) | .049±0.008<br>(1.25±0.20) | .057<br>(1.45)<br>Max | .014~.028<br>(0.35~0.70) | 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.**

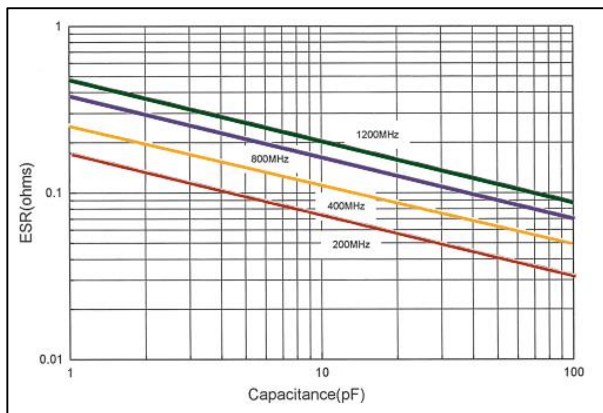
| No.  | Item                                  | Specification                                                                   | Test method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                  |   |      |   |       |   |      |   |         |   |      |
|------|---------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|------|---|-------|---|------|---|---------|---|------|
| 1    | Operating temperature                 | -55℃~125℃<br>-55℃~175℃                                                          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                  |   |      |   |       |   |      |   |         |   |      |
| 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%                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                  |   |      |   |       |   |      |   |         |   |      |
| 5    | D.F                                   | D.F≤0.05%                                                                       | Test voltage: 1.0±0.2Vrms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                  |   |      |   |       |   |      |   |         |   |      |
| 6    | Insulation resistance                 | 10 <sup>5</sup> Megohms min. @ +25 °C<br>10 <sup>4</sup> Megohms min. @ +125 °C | Voltage: DC Rated Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                  |   |      |   |       |   |      |   |         |   |      |
| 7    | Dielectric withstanding voltage (DWV) | Shall be no evidence of breakdown or visible evidence of arcing or damage.      | Test Voltage: 250% of the rated voltage<br>Applied Time: 5 s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |   |      |   |       |   |      |   |         |   |      |
| 8    | Temperature coefficient               | (0±30)ppm/°C(-55℃~125℃)<br>(0±60)ppm/°C(+125℃~175℃)                             | <div>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.</div> <table><tr><td>step</td><td>temperature (°C)</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>Tmax ±3</td></tr><tr><td>5</td><td>25±2</td></tr></table> <div><math display="block">TC = \frac{C_2 - C_3}{C_3 \times \Delta T} \times 10^6 \text{ ppm/}^\circ\text{C}</math></div> | step | temperature (°C) | 1 | 25±2 | 2 | -55±3 | 3 | 25±2 | 4 | Tmax ±3 | 5 | 25±2 |
| step | temperature (°C)                      |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |      |   |       |   |      |   |         |   |      |
| 1    | 25±2                                  |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |      |   |       |   |      |   |         |   |      |
| 2    | -55±3                                 |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |      |   |       |   |      |   |         |   |      |
| 3    | 25±2                                  |                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |      |   |       |   |      |   |         |   |      |
| 4    | Tmax ±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.                    | <div>Pressurizing force: 10.0<sup>+1.0</sup><sub>0</sub>N<br/>Test time: 10±1 sec.</div>                                                                                                                                                                                                                                                                                                                                          |      |                  |   |      |   |       |   |      |   |         |   |      |



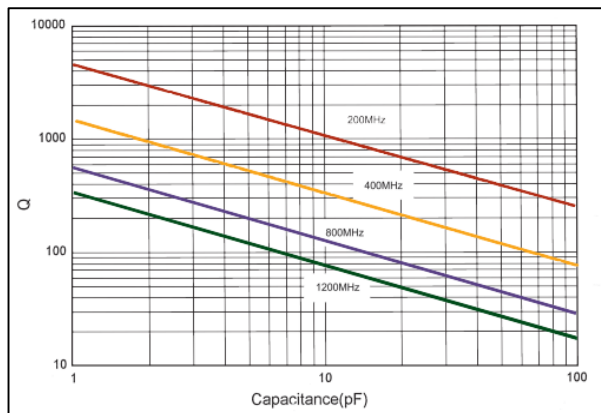
| No.  | Item                            | Specification                                                                                                                                                                                                                                                                     | 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> <p>a: 1.2mm<br/>b: 4.0mm<br/>c: 1.7mm</p>                                                                                                                                                                                                                         |      |                                 |           |   |           |           |   |       |          |   |           |           |   |       |          |
| 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 $245 \pm 2^\circ\text{C}$ 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: 200% of the rated voltage.<br>The charge/discharge current is less than 50mA.<br>Temperature: $T_{\text{max}}^\circ\text{C}$ .<br>Time: 2000h.<br>Measurement:<br>Set it for 48 hours at room temperature, then measure.                                                                                                                                                                                                                                                                            |      |                                 |           |   |           |           |   |       |          |   |           |           |   |       |          |

## ◆ DLC70D Performance Curve

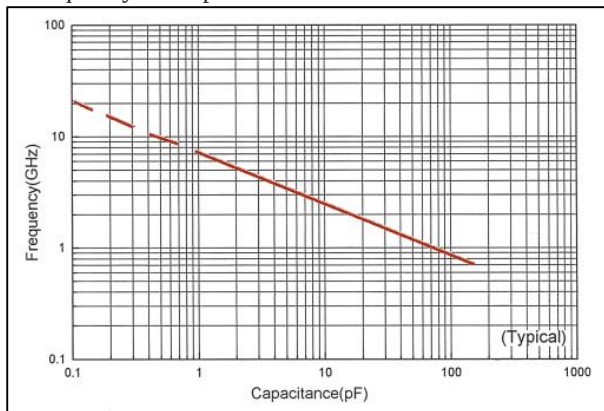
ESR vs Capacitance



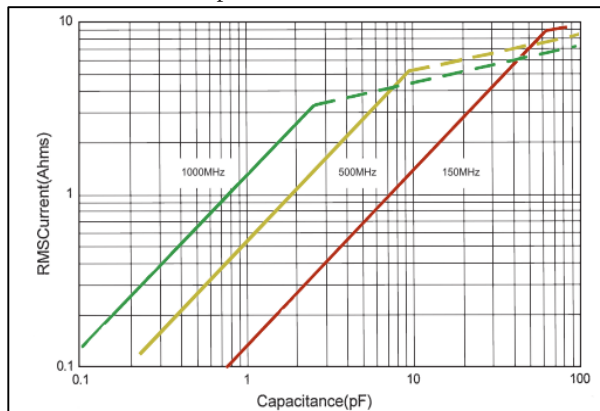
Q vs Capacitance



Frequency vs Capacitance

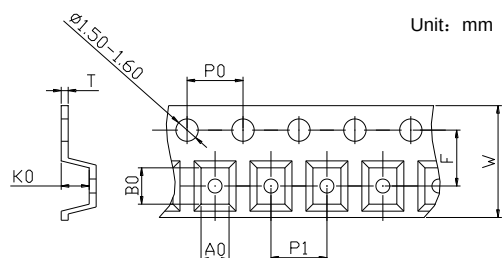


RMSCurrent vs Capacitance

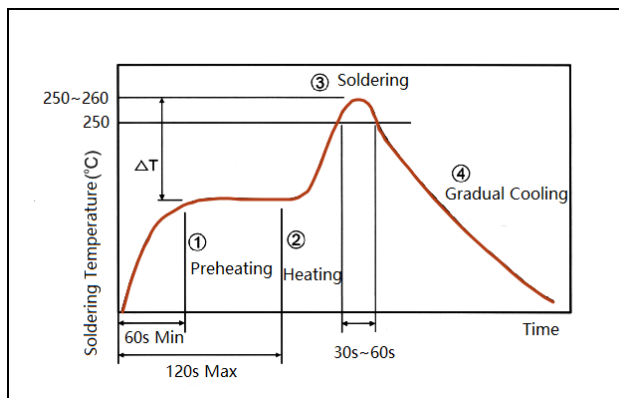


## ◆ Tape & Reel Specifications

| EIA  | A0   | B0   | K0   | W    | P0   | P1   | T    | F    | Qty/reel | Tape Material |
|------|------|------|------|------|------|------|------|------|----------|---------------|
| 0805 | 1.40 | 2.20 | 1.20 | 8.00 | 4.00 | 4.00 | 0.22 | 3.50 | 3000     | Plastic       |



## ◆ Recommended soldering conditions



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

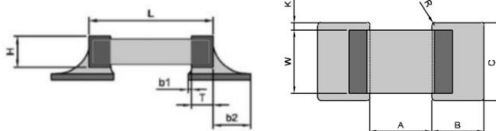
Maximum temperature:  $255^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ;

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

## ◆ Recommended Land Dimensions

### Horizontal Mounting

| Orientation | EIA  | A(mm) | B(mm) | C(mm) |
|-------------|------|-------|-------|-------|
| Horizontal  | 0805 | 1.0   | 0.8   | 1.3   |



### Vertical Mounting

| Orientation | EIA  | A(mm) | B(mm) | C(mm) |
|-------------|------|-------|-------|-------|
| Vertical    | 0805 | 1.1   | 1.1   | 1.4   |

