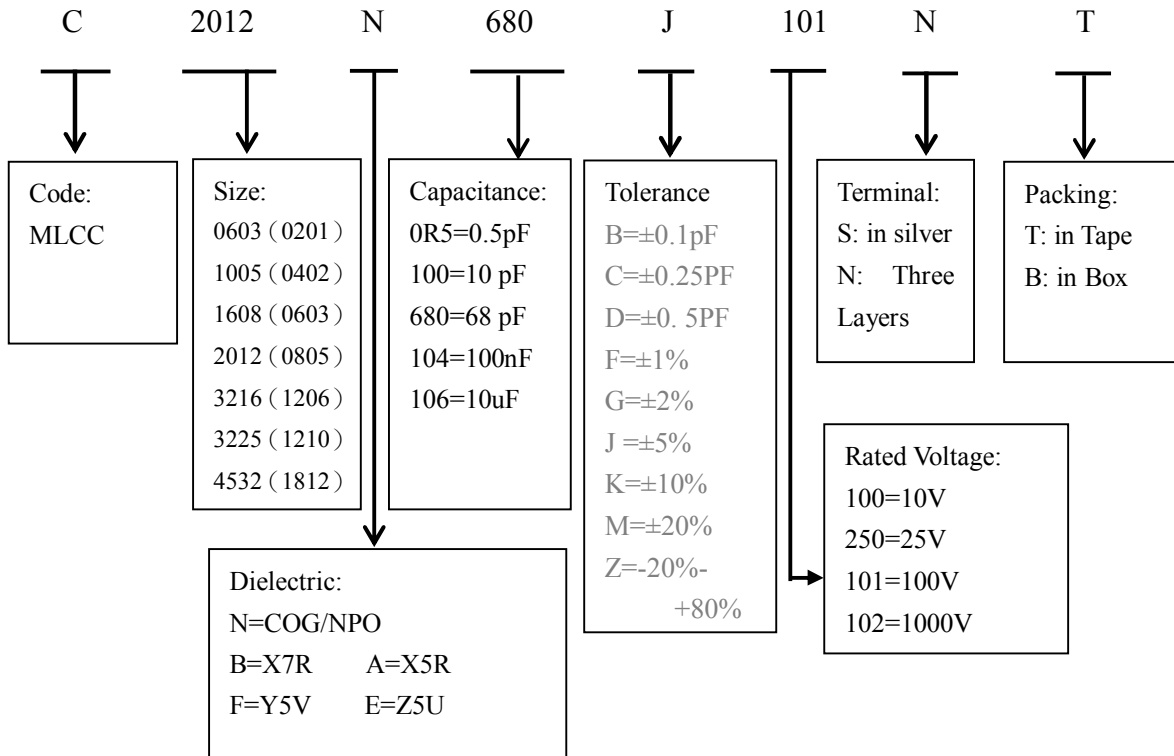


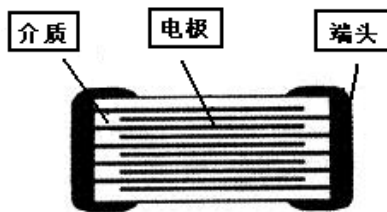
### 1. PART NUMBER

e.g.: C2012N680J101NT

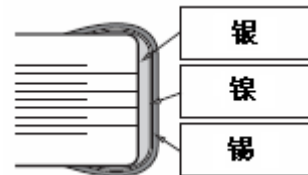


### 2. STRUCTURE

介质: Dielectric 电极: Electrode 端头: Terminal 银: Silver 镍: Nickel 锡: Tin

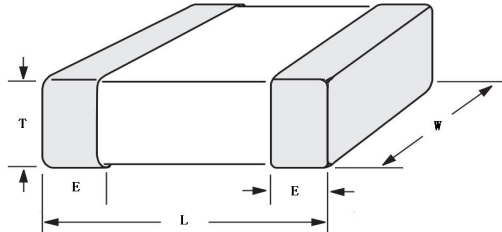


Inner Structure



Three Electrode layers

**3. SIZE AND ELECTRICAL PARAMETERS**



| SIZE (mm) |        | DIMENSION (mm)  |                 |   |                 |
|-----------|--------|-----------------|-----------------|---|-----------------|
| INCH      | METRIC | L               | W               | T   | E               |
| 0201      | 0603   | $0.6 \pm 0.03$  | $0.3 \pm 0.03$  | $0.3 \pm 0.03$  | $0.15 \pm 0.05$ |
| 0402      | 1005   | $1.00 \pm 0.05$ | $0.50 \pm 0.05$ | $0.50 \pm 0.05$                                       | $0.25 \pm 0.10$ |
| 0603      | 1608   | $1.60 \pm 0.10$ | $0.80 \pm 0.10$ | $0.80 \pm 0.10$                                       | $0.30 \pm 0.10$ |
| 0805      | 2012   | $2.00 \pm 0.20$ | $1.25 \pm 0.20$ | $0.70 \pm 0.20$<br>$1.00 \pm 0.20$<br>$1.25 \pm 0.20$ | $0.50 \pm 0.20$ |
| 1206      | 3216   | $3.20 \pm 0.30$ | $1.60 \pm 0.2$  | $0.70 \pm 0.20$<br>$1.00 \pm 0.20$<br>$1.25 \pm 0.20$ | $0.50 \pm 0.25$ |
| 1210      | 3225   | $3.20 \pm 0.30$ | $2.50 \pm 0.30$ | $1.25 \pm 0.30$<br>$1.50 \pm 0.30$                    | $0.75 \pm 0.25$ |
| 1812      | 4532   | $4.50 \pm 0.40$ | $3.20 \pm 0.30$ | $\leq 2.5$  | $0.75 \pm 0.20$ |

## 4. DIELECTRIC CHARACTERISTIC INTRODUCTION AND TEST METHOD

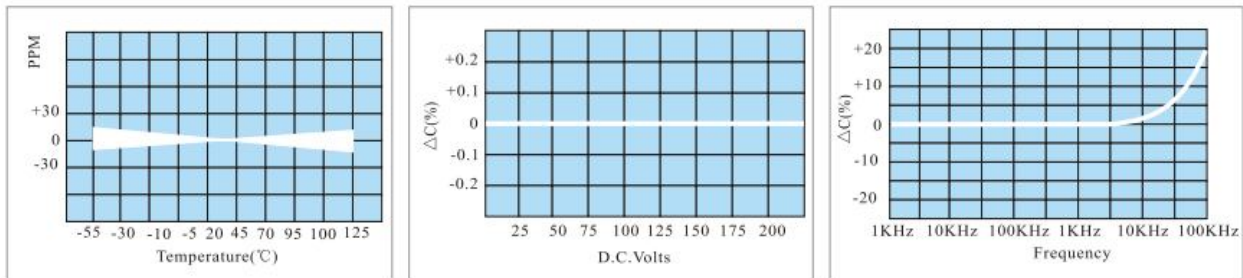
| ITEM                            | STANDARD  |  |           |         | TEST METHOD  |
|---------------------------------|---|--|-----------|---------|--|
| Capacitance                     | 0.5PF-47uF  |  |           |         | <b>COG:</b><br>C≤1000PF : 1MHz±10%<br>1.0±0.2Vrms<br>C>1000PF: 1KHz±10%<br>1.0±0.2Vrms<br><b>X7R/X5R:</b><br>1KHz±10% 1.0±0.2Vrms<br><b>Y5V/Z5U:</b><br>1KHz±10% 1.0±0.2Vrms ≤10uF<br>120Hz 0.5±0.2Vrms >10uF                                  |
| Tolerance                       | B=±0.1PF  | C=±0.25PF                                    | D=±0.5.PF |         |  |
|                                 | F=±1%   | G=±2%  | J=±5%     |         |  |
| Rated Voltage                   | 16、25、50、100、200、500、1000、2000 V(DC)                                      |  |           |         |  |
| Dissipation Factor              | COG/NPO   | DF≤0.15%                                     |           |         |  |
|                                 | X7R/X5R   | DF ≤ 2.5%(≥ 50V) , ≤ 3.0%(25V) , ≤ 3.5%(16V) |           |         |  |
|                                 | Y5V/Z5U   | DF ≤ 7%(C ≥ 100nF) . ≤ 3.5%(C<100nF)         |           |         |  |
| Insulation Resistance(IR)       | COG/NPO   | C≤10NF IR>50000MΩ ;<br>C>10NF IR>5000Ω F     |           |         | Test voltage: rated<br>Time: 1 minute<br>Temperature: 18-25℃<br>Humidity: <80%   |
|                                 | X7R/X5R   | C≤25NF IR>10000MΩ ;<br>C>25NF RXC>100Ω F     |           |         |  |
|                                 | Y5V/Z5U   | C≤25NF IR>4000MΩ ;<br>C>25NF RXC>100Ω F      |           |         |  |
| Dielectric withstanding voltage | No damage after test  |  |           |         | Apply 2.5x rated voltage to both terminations for 5 seconds, charge and discharge current are less than 50mA. (This test doesn't apply to high-voltage MLCC)   |
| Termination Adhesion            | No damage after test  |  |           |         | Test Condition: 5N 10±1S   |
| Bending Strength                | No damage after test and capacitance tolerance shall not be more than 10% |  |           |         | After soldering capacitor on the PCB, 1mm per 1 second of bending for this PCB shall be applied.   |
| Solderability                   | Temperature   | 235±5℃                                       |           |         | Completely immerse the capacitor in the molthen rosin for 2s and then put it in the 10mm molthen solder with a temperature of 235±5℃ (265±5℃) for 2(5)s. after that pick it up, clean the solvent and inspect it under 10x or more microscope. |
|                                 | Time  | 1±1S   |           |         |  |
|                                 | Cover   | ≥95  |           |         |  |
| Resistance to soldering Heat    | Tempertaure   | 265±5℃                                       |           |         |  |
|                                 | Time  | 1±1S   |           |         |  |
|                                 | Cover   | ≥95  |           |         |  |
|                                 | ΔC/C  | ≤0.5% or 0.5PF                               |           |         |  |
| Temperature Cycling             | Dielectric  | COG/NPO                                      | X7R/X5R   | Y5V/Z5U | Temperature: -55 ± 3℃ ~125 ± 3℃<br>COG/X7R<br>-25±3℃~85±3℃ Y5V<br>-10±3℃~85±3℃ Z5U<br>Cycle times: 5 times per 30s<br>Resume time: 24h   |
|                                 | ΔC/C  | ≤1%  | ≤±10%     | ≤±30%   |  |
|                                 | No damage after test  |  |           |         |  |

|                                  |                      |          |         |                                |  |
|----------------------------------|----------------------|----------|---------|--------------------------------|--|
| Humidity and Moisture Resistance | Dielectric           | COG/NPO  | X7R/X5R | Y5V/Z5U                        | Permanent Moisture<br>T=40±2°C<br>T=21D<br>Relative Humidity: 93+2~3%<br>Resume Time: 1-2h |
|                                  | ΔC/C                 | ≤2%      | ≤10%    | ≤20%                           |  |
|                                  | DF                   | 0.03     | 0.05    | 0.07                           |  |
|                                  | IR                   | RXC>25S  | RXC>25S | RXC>25S                        |  |
| No damage after test             |                      |          |         |                                |  |
| T.C. characteristics             | dielectric           | ΔC/C     |         | T.C.                           |  |
|                                  | COG/NPO              | ±30PPM   |         | +20°C → -55°C → +20°C → +125°C |  |
|                                  | X7R/X5R              | ±15°C    |         | +20°C → -55°C → +20°C → +125°C |  |
|                                  | Z5U                  | ±22%~56% |         | +20°C → +10°C → +20°C → +85°C  |  |
|                                  | Y5V                  | ±22%~82% |         | +20°C → -25°C → +20°C → +85°C  |  |
| Vibration                        | No damage after test |          |         | f=10-500Hz<br>0.75MM/2S        |  |
| Bump                             | No damage after test |          |         | 4000 times                     |  |
| Life test                        | dielectric           | COG/NPO  | X7R/X5R | Y5V/Z5U                        | Temperature: +125°C NPO/X7R<br>+85°C Y5V/Z5U<br>T=100 h<br>Resume time: 24h                |
|                                  | ΔC/C                 | ≤2%      | ≤±12.5% | ≤±30%                          |  |
|                                  | DF                   | 0.003    | 0.003   | 0.05                           |  |
|                                  | IR                   | RXC>25S  | RXC>25S | RXC>25S                        |  |

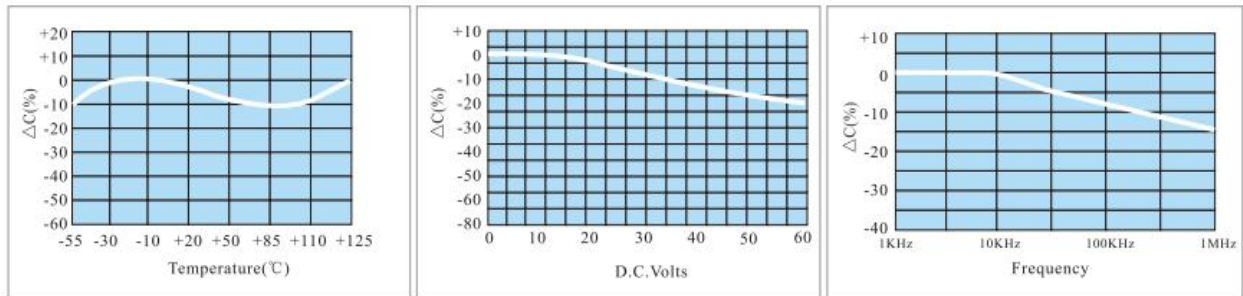
**5. T.C.CHARACTERISTICS**

| Dielectric            | NPO(COG)  | X7R(X5R)      | Y5V      |
|-----------------------|-----------|---------------|----------|
| Operating Temperature | -55~125°C | -55~125(85)°C | -30~85°C |
| T.C.Characteristics   | ±30PPM/°C | ±15%          | -20~+80% |

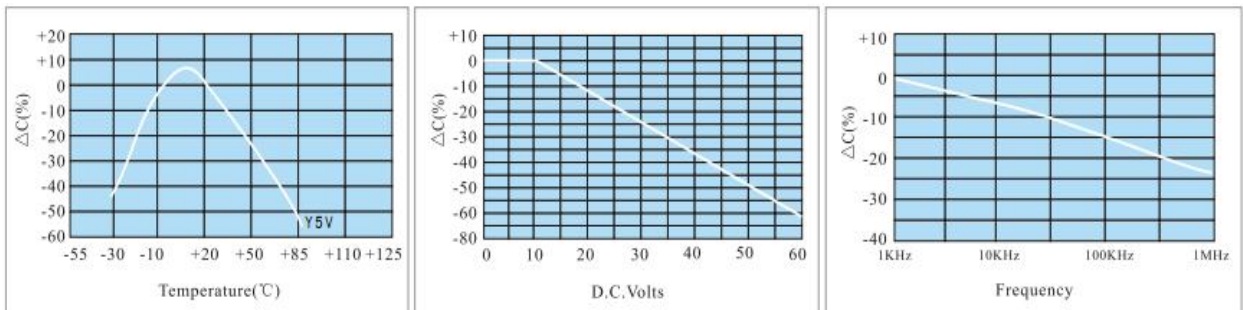
COG8/NPO Typical Characteristics



X7R/X5R Typical Characteristics



Y5V Typical Characteristics



## 6. VOLTAGE AND CAPACITANCE ( COG/NPO)

| Size | Voltage | Capacitance       |
|------|---------|-------------------|
| 0201 | 25V     | 0.5 PF -1000PF    |
|      | 50V     | 0.5 PF -680PF     |
| 0402 | 25V     | 0.5 PF -2200PF    |
|      | 50V     | 0.5 PF -2200PF    |
| 0603 | 25V     | 0.5 PF -10000PF   |
|      | 50V     | 0.5 PF -10000PF   |
| 0805 | 25V     | 0.5 PF -68000PF   |
|      | 50V     | 0.5 PF -47000PF   |
| 1206 | 16V     | 0.5 PF -100000PF  |
|      | 25V     | 0.5 PF -100000PF  |
|      | 50V     | 0.5 PF -68000PF   |
| 1210 | 25V     | 470 PF -47000PF   |
|      | 50V     | 560 PF -56000PF   |
| 1812 | 25V     | 1000 PF -100000PF |
|      | 50V     | 1000 PF -47000PF  |

**(X7R/X5R)**

| Size | Voltage | Capacitance     |
|------|---------|-----------------|
| 0402 | 6.3V    | 100 PF -1.0 uF  |
|      | 10V     | 100 PF -680nF   |
|      | 16V     | 100 PF -220nF   |
| 0603 | 6.3V    | 100 PF -4.7 uF  |
|      | 10V     | 100 PF -4.7 uF  |
|      | 16V     | 100 PF -2.2 uF  |
|      | 25V     | 100 PF -2.2 uF  |
|      | 50V     | 100 PF -1.0 uF  |
| 0805 | 6.3V    | 220 PF -10 uF   |
|      | 10V     | 220 PF -10 uF   |
|      | 16V     | 220 PF -10 uF   |
|      | 25V     | 220 PF -4.7 uF  |
|      | 50V     | 220 PF -2.2 uF  |
| 1206 | 6.3V    | 220 PF -10 uF   |
|      | 10V     | 220 PF -10uF    |
|      | 16V     | 220 PF -10 uF   |
|      | 25V     | 220 PF -10 uF   |
|      | 50V     | 220 PF -10 uF   |
| 1210 | 6.3V    | 1000 PF -47 uF  |
|      | 10V     | 1000 PF -22 uF  |
|      | 16V     | 1000 PF -22 uF  |
|      | 25V     | 1000 PF -22 uF  |
|      | 50V     | 1000 PF -10 uF  |
| 1812 | 25V     | 10000 PF -47 uF |
|      | 50V     | 10000 PF -22 uF |

**(Y5V)**

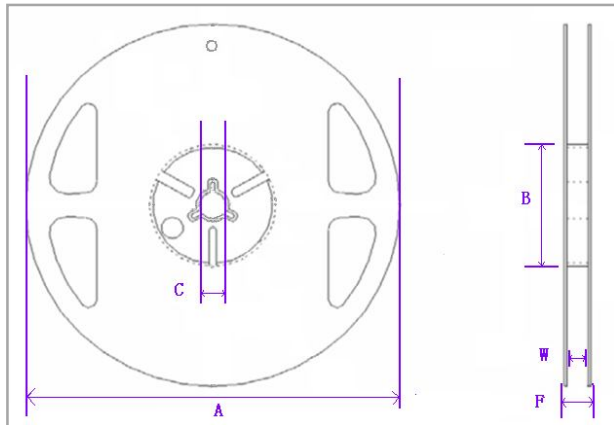
| Size | Voltage | Capacitance   |
|------|---------|---------------|
| 0402 | 6.3V    | 100nF -1 uF   |
|      | 10V     | 100nF -1 uF   |
|      | 16V     | 22nF -680nF   |
|      | 50V     | 22nF -680nF   |
| 0603 | 6.3V    | 680nF-4.7 uF  |
|      | 10V     | 22nF -4.7 uF  |
|      | 16V     | 22nF -4.7 uF  |
|      | 25V     | 22nF -2.2 uF  |
|      | 50V     | 22nF -1 uF    |
| 0805 | 6.3V    | 4.7 uF -10 uF |
|      | 10V     | 2.2 uF -10 uF |
|      | 16V     | 22nF -4.7 uF  |
|      | 25V     | 22nF -2.2 uF  |
|      | 50V     | 22nF -1 uF    |
| 1206 | 6.3V    | /             |
|      | 10V     | 2.2uF -22 uF  |
|      | 16V     | 1uF -10 uF    |
|      | 25V     | 22nF -10 uF   |
|      | 50V     | 22nF -10 uF   |
| 1210 | 6.3V    | 22nF-47 uF    |
|      | 10V     | 10uF-22 uF    |
|      | 16V     | 2.2uF-10 uF   |
|      | 25V     | 220nF-2.2 uF  |
|      | 50V     | 22nF -10 uF   |
| 1812 | 25V     | 10uF-47 uF    |
|      | 50V     | 22nF-22uF     |



**7.Packing Information**

Reel

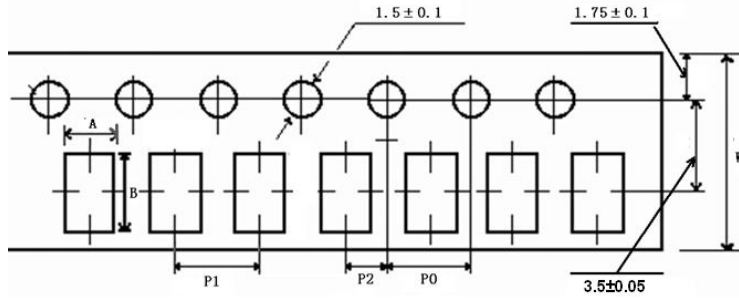
| Dimension                                    |      | A           | B           | C           | F           | W           |
|--|------|-------------|-------------|-------------|-------------|-------------|
| 0201<br>0402<br>0603<br>0805<br>1206<br>1210 | mm   | 178±2.0     | 60.0±1.0    | 13.5±0.5    | 11.4±0.1    | 9.00±0.3    |
|  | Inch | 7.008±0.079 | 2.362±0.039 | 0.531±0.020 | 0.449±0.039 | 0.354±0.012 |
|  | mm   | 178±2.0     | 60.0±1.0    | 13.5±0.5    | 15.4±1.0    | 13.0±0.3    |
|  | Inch | 7.008±0.079 | 2.362±0.039 | 0.531±0.020 | 0.606±0.039 | 0.512±0.012 |



Packing Quantity

|              | 0201    | 0402 | 0603 | 0805 | 1206 | 1210  | 1812   |
|--------------|---------|------|------|------|------|-------|--------|
| Paper Tape   | 10K/15K | 10K  | 4K   | 4K   | 4K   |       |        |
| Plastic Tape |         |      |      | 2K   | 2K   | 1K/2K | 500PCS |

Tape

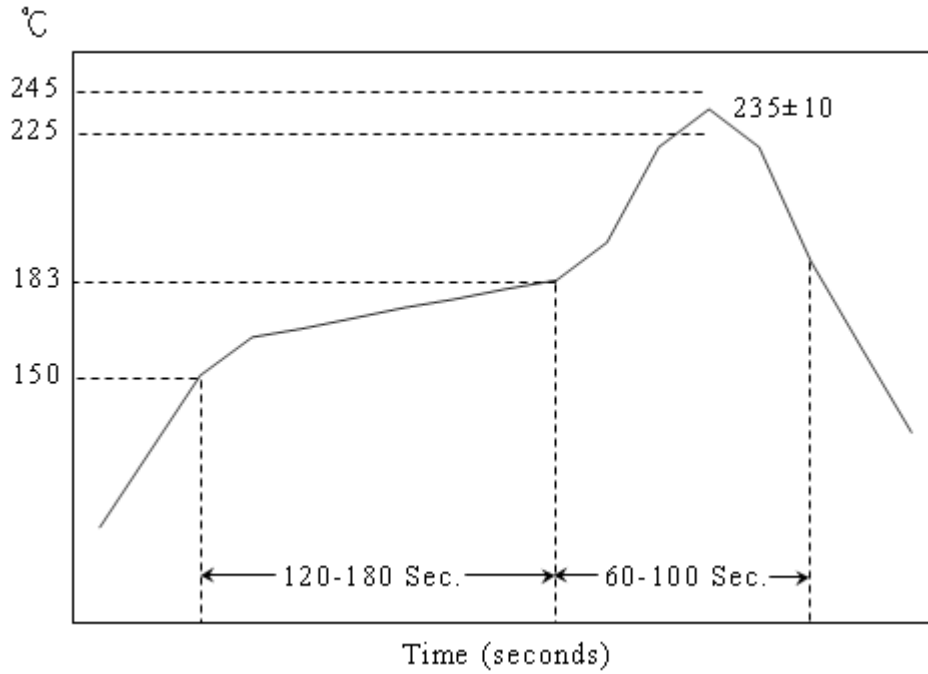


Unit: mm

| TYPE | A         | B         | W          | P0        | P1        | P2        |
|------|-----------|-----------|------------|-----------|-----------|-----------|
| 0201 | 0.38±0.05 | 0.68±0.05 | 8.00±0.20  | 4.00±0.10 | 2.00±0.10 | 2.00±0.05 |
| 0402 | 0.65±0.10 | 1.15±0.10 | 8.00±0.20  | 4.00±0.10 | 2.00±0.10 | 2.00±0.05 |
| 0603 | 1.10±0.10 | 1.90±0.10 | 8.00±0.20  | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 |
| 0805 | 1.65±0.20 | 2.40±0.20 | 8.00±0.20  | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 |
| 1206 | 2.00±0.20 | 3.60±0.20 | 8.00±0.20  | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 |
| 1210 | 2.80±0.10 | 3.50±0.10 | 8.00±0.20  | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 |
| 1812 | 3.60±0.20 | 4.90±0.20 | 12.00±0.10 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 |

**8.WELDING TEMPERATURE**

Suitable reflow temperature



1-2°C/Sec ramp

Preheat 150-183°C : 2-3 minutes

Time above 183°C : 60-100 seconds

Peak Temperature: 230±10°C

Module should only be in oven for 5.5-6 minute